

**INTERNATIONAL ECOLOGICAL
CLASSIFICATION STANDARD:
TERRESTRIAL ECOLOGICAL CLASSIFICATIONS**

Kisatchie National Forest Final Report

April 30, 2004

by

NatureServe

1101 Wilson Blvd., 15th floor
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This subset of the International Ecological Classification Standard covers vegetation associations and alliances attributed to the Kisatchie National Forest (Louisiana). This classification has been developed in consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications. Comments and suggestions regarding the contents of this subset should be directed to Milo Pyne milo_pyne@natureserve.org.



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Canada

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Latin American and Caribbean

Centro de Datos para la Conservacion de Bolivia, La Paz, Bolivia; Centro de Datos para la Conservacion de Colombia, Cali, Valle, Columbia; Centro de Datos para la Conservacion de Ecuador, Quito, Ecuador; Centro de Datos para la Conservacion de Guatemala, Ciudad de Guatemala, Guatemala; Centro de Datos para la Conservacion de Panama, Query Heights, Panama; Centro de Datos para la Conservacion de Paraguay, San Lorenzo, Paraguay; Centro de Datos para la Conservacion de Peru, Lima, Peru; Centro de Datos para la Conservacion de Sonora, Hermosillo, Sonora, Mexico; Netherlands Antilles Natural Heritage Program, Curacao, Netherlands Antilles; Puerto Rico-Departamento De Recursos Naturales Y Ambientales, Puerto Rico; Virgin Islands Conservation Data Center, St. Thomas, Virgin Islands.

NatureServe also has partnered with many International and United States Federal and State organizations, which have also contributed significantly to the development of the International Classification. Partners include the following The Nature Conservancy; Provincial Forest Ecosystem Classification Groups in Canada; Canadian Forest Service; Parks Canada; United States Forest Service; National GAP Analysis Program; United States National Park Service; United States Fish and Wildlife Service; United States Geological Survey; United States Department of Defense; Ecological Society of America; Environmental Protection Agency; Natural Resource Conservation Services; United States Department of Energy; and the Tennessee Valley Authority. Many individual state organizations and people from academic institutions have also contributed to the development of this classification.

PREFACE

This report is a final product resulting from a continuing agreement between NatureServe, The Nature Conservancy (TNC) and USDA Forest Service Region 8. This agreement provides for the application of the United States National Vegetation Classification (USNVC) standard to all Region 8 National Forests, resulting in a basic list of vegetation units (alliances and community associations) presented on a Forest by Forest basis. The USNVC provides a framework for vegetation classification and is intended to serve as a tool for conservation planning and biodiversity protection, as well as resource planning, management, and vegetation mapping. In the southeastern United States, the USNVC is being developed in cooperation with the state Natural Heritage Programs, the USDA Forest Service, and other state and Federal partners. Its development has involved consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications.

This classification subset includes all alliances and community associations attributed to the Kisatchie National Forest (Louisiana), as well as some that are thought to occur there but for which more data are needed to confirm their occurrence. This report is intended for review and use by Forest Service personnel and other ecologists working in this geographic area. The fieldwork supporting development of this subset took place primarily in 1994-1995, during the early life of this project. This field reconnaissance was conducted in coordination with U.S. Forest Service personnel with the objective of visiting representative examples of all the major vegetation types, rare or unusual communities, and vegetation resulting from common forest management regimes. Due to this field work having been conducted so early in the life of the project, the classification could undoubtedly benefit from additional activity in this unit, both in regard to additional data collection, but also acquisition and analysis of existing data which has been collected since this earlier date.

We hope that the issuance of this admittedly insufficient report will stimulate the need for additional vegetation survey work on this National Forest, whose conservation is critical for maintaining the biodiversity of Louisiana.

The vegetation classification produced through this agreement will form the foundation for continuing use of the USNVC on U.S. Forest Service lands in Region 8 for natural resource planning and management. The classification continues to rely on feedback and additional fieldwork to improve its coverage of the individual Forest unit. Future refinements, revisions, and additions will be made to this classification based on review by Forest Service personnel, review of other vegetation studies, and analysis of data collected during field reconnaissance. In the meanwhile, the entire National Vegetation Classification is available on-line in a fully searchable database that is updated on a quarterly basis (www.NatureServe.org).

Comments and suggestions for additions or revisions are welcome and encouraged. Please submit comments to the authors at the following address: NatureServe; Southern U. S. Office, 6114 Fayetteville Road, Suite 109, Durham, NC 27713-6284 or by phone or electronic mail: Milo Pyne: 919-484-7857 x 136 (milo_pyne@natureserve.org).

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TABLE OF CONTENTS

PREFACE..... i

ACKNOWLEDGMENTS i

INTRODUCTION..... vi

Background vi

Purpose and Scope of the USNVC..... vi

A Combined Physiognomic/Floristic System..... vii

Terrestrial Vegetation; “Natural” and “Semi-natural” Types..... viii

Physiognomic Levels: Description And Definitions ix

Floristic Levels: Description And Definitions ix

The Alliance Concept ix

The Association Concept..... x

The Purpose of Naming..... xi

Applications of the Classification System xi

Conservation Ranking and its Use in Planning..... xi

Applications of the USNVC by U.S.D.A. Forest Service and other Federal Agencies of the United States xiv

Structure and Format of this Report xiv

Format of Alliance Descriptions..... xv

Format of Association Descriptions..... xvi

REFERENCES CITED xvii

ALLIANCES BY US NATIONAL VEGETATION CLASSIFICATION HIERARCHY..... 1

I. Forest..... 1

I.A.8.C.x. *Pinus taeda* Planted Forest Alliance (A.99)..... 1

I.A.8.C.x. *Pinus palustris* Planted Forest Alliance (A.96) 1

I.A.8.C.x. *Pinus echinata* Planted Forest Alliance (A.94)..... 2

I.A.8.C.x. *Pinus elliottii* Planted Forest Alliance (A.95)..... 2

I.A.8.N.b. *Pinus taeda* - *Pinus echinata* Forest Alliance (A.129) 3

I.A.8.N.b. *Pinus taeda* Forest Alliance (A.130) 4

I.A.8.N.b. *Pinus palustris* - (*Pinus elliottii*) Forest Alliance (A.123)..... 5

I.B.2.N.a. *Fagus grandifolia* - *Quercus alba* Forest Alliance (A.228)..... 5

I.B.2.N.a. *Quercus shumardii* - *Quercus pagoda* Forest Alliance (A.252) 6

I.B.2.N.a. *Quercus falcata* Forest Alliance (A.243) 7

I.B.2.N.d. *Quercus (michauxii, pagoda, shumardii)* - *Liquidambar styraciflua* Temporarily Flooded Forest Alliance (A.291) 8

I.B.2.N.d. *Quercus (phellos, nigra, laurifolia)* Temporarily Flooded Forest Alliance (A.292) 10

I.B.2.N.d. *Salix nigra* Temporarily Flooded Forest Alliance (A.297)..... 11

I.B.2.N.d. *Populus deltoides* Temporarily Flooded Forest Alliance (A.290) 12

I.B.2.N.d. *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis (occidentalis, laevigata)* Temporarily Flooded Forest Alliance (A.286)13

I.B.2.N.d. *Betula nigra* - (*Platanus occidentalis*) Temporarily Flooded Forest Alliance (A.280) 15

I.B.2.N.d. *Platanus occidentalis* - (*Fraxinus pennsylvanica, Celtis laevigata, Acer saccharinum*) Temporarily Flooded Forest Alliance (A.288)..... 16

I.B.2.N.e. *Quercus (laurifolia, phellos)* Seasonally Flooded Forest Alliance (A.327)..... 17

I.B.2.N.e. *Nyssa (aquatica, biflora, ogeche)* Floodplain Seasonally Flooded Forest Alliance (A.323) 17

I.B.2.N.e. *Nyssa (aquatica, biflora, ogeche)* Pond Seasonally Flooded Forest Alliance (A.324)..... 18

I.B.2.N.e. *Taxodium distichum* - *Nyssa (aquatica, biflora, ogeche)* Seasonally Flooded Forest Alliance (A.337) 19

I.B.2.N.e. *Salix nigra* Seasonally Flooded Forest Alliance (A.334)..... 20

I.B.2.N.e. *Quercus texana* - (*Quercus lyrata*) Seasonally Flooded Forest Alliance (A.331) 21

I.B.2.N.e. *Quercus lyrata* - (*Carya aquatica*) Seasonally Flooded Forest Alliance (A.328)..... 21

I.B.2.N.e. *Quercus phellos* Seasonally Flooded Forest Alliance (A.330) 22

I.B.2.N.f. *Taxodium distichum* Semipermanently Flooded Forest Alliance (A.346)..... 23

I.B.2.N.f. *Nyssa aquatica* - (*Taxodium distichum*) Semipermanently Flooded Forest Alliance (A.345) 25

I.C.2.N.a. *Fagus grandifolia* - *Magnolia grandiflora* Forest Alliance (A.369)..... 25

I.C.2.N.b. <i>Fagus grandifolia</i> - <i>Liquidambar styraciflua</i> - <i>Pinus taeda</i> - (<i>Magnolia grandiflora</i>) Temporarily Flooded Forest Alliance (A.1989).....	27
I.C.2.N.d. <i>Magnolia virginiana</i> - <i>Nyssa biflora</i> - (<i>Quercus laurifolia</i>) Saturated Forest Alliance (A.378).....	27
I.C.3.N.a. <i>Pinus (echinata, taeda)</i> - <i>Quercus (incana, margarettiae, arkansana)</i> Forest Alliance (A.386).....	28
I.C.3.N.a. <i>Pinus taeda</i> - <i>Quercus (alba, falcata, stellata)</i> Forest Alliance (A.404).....	29
I.C.3.N.a. <i>Pinus echinata</i> - <i>Quercus (alba, falcata, stellata, velutina)</i> Forest Alliance (A.394).....	30
I.C.3.N.b. <i>Pinus taeda</i> - <i>Quercus (phellos, nigra, laurifolia)</i> Temporarily Flooded Forest Alliance (A.437).....	31
II. Woodland.....	32
II.A.4.N.a. <i>Pinus palustris</i> / <i>Quercus</i> spp. Woodland Alliance (A.499).....	32
II.A.4.N.a. <i>Pinus palustris</i> Woodland Alliance (A.520).....	33
II.A.4.N.f. <i>Pinus palustris</i> - <i>Pinus (elliottii, serotina)</i> Saturated Woodland Alliance (A.578).....	35
II.B.2.N.a. <i>Quercus stellata</i> - <i>Quercus marilandica</i> Woodland Alliance (A.625).....	36
II.C.3.N.a. <i>Pinus (echinata, taeda)</i> - <i>Quercus (stellata, marilandica, falcata)</i> Woodland Alliance (A.2011).....	38
III. Shrubland.....	38
III.A.2.N.i. <i>Cyrilla racemiflora</i> - <i>Ilex coriacea</i> - (<i>Cliftonia monophylla</i>) Saturated Shrubland Alliance (A.802).....	38
III.B.2.N.a. <i>Crataegus spathulata</i> Shrubland Alliance (A.900).....	39
V. Herbaceous Vegetation.....	39
V.A.5.N.a. <i>Schizachyrium scoparium</i> - <i>Sorghastrum nutans</i> Herbaceous Alliance (A.1198).....	40
V.A.5.N.l. <i>Typha (angustifolia, latifolia)</i> - (<i>Schoenoplectus</i> spp.) Semipermanently Flooded Herbaceous Alliance (A.1436).....	41
V.A.5.N.m. <i>Rhynchospora oligantha</i> - <i>Sarracenia</i> spp. - (<i>Aristida beyrichiana, Ctenium aromaticum</i>) - <i>Osmunda cinnamomea</i> / <i>Sphagnum</i> spp. Saturated Herbaceous Alliance (A.1463).....	43
V.B.2.N.b. <i>Bigelovia nuttallii</i> Herbaceous Alliance (A.1617).....	44
V.C.2.N.a. <i>Nelumbo lutea</i> Permanently Flooded Temperate Herbaceous Alliance (A.1671).....	45
V.C.2.N.a. <i>Nymphaea odorata</i> - <i>Nuphar</i> spp. Permanently Flooded Temperate Herbaceous Alliance (A.1984).....	45
VII. Sparse Vegetation.....	46
VII.C.2.N.c. <i>Eleocharis</i> spp. - <i>Schoenoplectus</i> spp. - <i>Fimbristylis</i> spp. - <i>Juncus</i> spp. Temporarily Flooded Sparsely Vegetated Alliance (A.1924).....	46
ASSOCIATIONS GROUPED BY ECOLOGICAL SYSTEM.....	47
UPLANDS, VEGETATED.....	47
Cultivated Forest.....	47
Loblolly Pine Planted Forest.....	47
Longleaf Pine Planted Forest.....	48
Shortleaf Pine Planted Forest.....	49
Slash Pine - (Longleaf Pine) Managed Forest.....	49
Slash Pine Planted Forest.....	50
Semi-natural Forest.....	51
Loblolly Pine - Shortleaf Pine - (Eastern Red-cedar) / Mixed Herbs Forest.....	51
Loblolly Pine - Sweetgum Semi-natural Forest.....	52
Loblolly Pine / Winged Sumac Managed Forest.....	53
Slash Pine - (Longleaf Pine) Managed Forest.....	54
West Gulf Coastal Plain Catahoula Barrens.....	55
(Longleaf Pine) / Little Bluestem - Nuttall's Rayless-goldenrod / Reindeer Lichen species Herbaceous Vegetation.....	55
Longleaf Pine / Blackjack Oak / Slender Bluestem - Savanna Hairgrass - Nuttall's Rayless-goldenrod - Roundleaf Groundsel Woodland.....	57
West Gulf Coastal Plain Mesic Hardwood Forest.....	58
American Beech - Southern Magnolia - White Oak / Ironwood / Eastern Hop-hornbeam - American Holly Forest.....	58
American Beech - White Oak / (Southern Sugar Maple, Chalk Maple) / Eared Goldenrod Forest.....	59
American Beech - White Oak / American Holly / Southern Lady Fern Forest.....	61
Southern Red Oak - Post Oak - (Loblolly Pine) West Gulf Coastal Plain Forest.....	62
White Ash - Sugarberry - Blackgum - Shumard Oak - American Elm Forest.....	63
West Gulf Coastal Plain Pine-Hardwood Forest.....	64
(Shortleaf Pine, Loblolly Pine) / Horsesugar - Wax-myrtle - Mayberry Forest.....	64
Loblolly Pine - (Shortleaf Pine) - Southern Red Oak - Black Hickory / Farkleberry Forest.....	66

Loblolly Pine - (Shortleaf Pine) - White Oak - Mockernut Hickory / Southern Sugar Maple - (Chalk Maple) Forest.....	67
Loblolly Pine - Shortleaf Pine / Longleaf Spikegrass Forest.....	69
Loblolly Pine - White Oak - American Beech / American Holly / Sarsaparilla-vine - Partridgeberry Forest.....	70
Shortleaf Pine - Loblolly Pine - (White Oak, Southern Red Oak, Post Oak) Forest.....	71
Shortleaf Pine - Loblolly Pine - Post Oak - Black Hickory / Farkleberry Woodland.....	72
Shortleaf Pine - Post Oak - Southern Red Oak - Black Hickory Woodland.....	74
West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland.....	75
(Longleaf Pine) - Post Oak - Bluejack Oak / Louisiana Squarehead Woodland.....	75
Longleaf Pine - (Shortleaf Pine, Loblolly Pine) - Southern Red Oak - Black Hickory Woodland.....	76
Shortleaf Pine - (Loblolly Pine) - (Sand Post Oak, Post Oak, Southern Red Oak) - Black Hickory Forest.....	77
Shortleaf Pine - Loblolly Pine - Post Oak / Eastern Red-cedar / Roughleaf Dogwood Woodland.....	79
Shortleaf Pine / Bluejack Oak / Riddell's Spike-moss Forest.....	80
West Gulf Coastal Plain Upland Longleaf Pine.....	81
(Longleaf Pine) - Post Oak - Blackjack Oak - Black Hickory / Wavyleaf Noseburn Woodland.....	81
Longleaf Pine - (Shortleaf Pine, Loblolly Pine) - (Bluejack Oak, Sand Post Oak) / Little Bluestem Woodland.....	82
Longleaf Pine - (Shortleaf Pine, Loblolly Pine) / (Sweetgum) / Little Bluestem Woodland.....	84
Longleaf Pine - Blackjack Oak West Gulf Woodland.....	85
Longleaf Pine / (Southern Red Oak, Post Oak) - Sweetgum - Black Hickory / Little Bluestem Woodland.....	85
Longleaf Pine / Blackjack Oak / Little Bluestem - Compass Plant - Low Wild Petunia Woodland.....	86
Longleaf Pine / Blackjack Oak / Switchgrass Woodland.....	87
Longleaf Pine / Blackjack Oak / Yaupon / Little Bluestem Woodland.....	88
Longleaf Pine / Bluejack Oak - Sand Post Oak / Farkleberry / Texas Tread-softly - Western Dawnflower Woodland.....	90
Longleaf Pine / Bluejack Oak / Little Bluestem - Sandhill Croton Woodland.....	91
Longleaf Pine / Little Bluestem - Cattail Gayfeather Woodland.....	92
Longleaf Pine / Little Bluestem - Gulf Coast Brown-eyed-Susan Woodland.....	94
WETLANDS, VEGETATED.....	95
West Gulf Coastal Plain Herbaceous Seepage Bog.....	95
Trumpet Pitcherplant - Slender Beaksedge - Bog Coneflower - Yellow Sunnysbell Herbaceous Vegetation.....	95
West Gulf Coastal Plain Large River Floodplain Forest.....	97
American Lotus Herbaceous Vegetation.....	97
Bald-cypress - Water Tupelo - Red Maple / Virginia-willow Forest.....	98
Bald-cypress / Lesser Duckweed Forest.....	100
Black Willow / Coastal Sweet-pepperbush / Water Tupelo Successional Forest.....	102
Black Willow Large River Floodplain Forest.....	103
Broadleaf Cattail Southern Herbaceous Vegetation.....	103
Broadleaf Pond-lily - White Water-lily Herbaceous Vegetation.....	104
Diamondleaf Oak - (Overcup Oak, Willow Oak) - Swamp Blackgum West Gulf Floodplain Forest.....	105
Eastern Cottonwood - Black Willow / Climbing Hempvine Forest.....	106
Green Ash - American Elm - Sugarberry / Possum-haw Forest.....	107
River Birch - Sycamore / Smooth Alder / False Nettle Forest.....	109
Swamp Chestnut Oak - Sweetgum - Nuttall Oak - Overcup Oak Forest.....	110
Sycamore - Sweetgum - (American Elm) / (Green Hawthorn) Forest.....	111
Water Oak - Sweetgum - (Loblolly Pine) / American Holly - Black Highbush Blueberry / White-edge Sedge Temporarily Flooded Forest.....	112
Water Tupelo - Swamp Blackgum Forest.....	114
Water Tupelo Forest.....	115
Water-locust - Water Hickory Forest.....	116
Willow Oak - Sweetgum / Possum-haw - Ironwood / Trailing Loosestrife Forest.....	117
West Gulf Coastal Plain Pine-Hardwood Flatwoods.....	118
Loblolly Pine - White Oak - American Beech / American Holly / Sarsaparilla-vine - Partridgeberry Forest.....	118
West Gulf Coastal Plain Saline Glade.....	120
Spikerush species - Clubrush species - Fimbry species - Rush species Southeastern Coastal Plain Inland Salt Flat Sparse Vegetation.....	120
West Gulf Coastal Plain Seepage Swamp and Baygall.....	120
(Swamp Blackgum, Blackgum) - Sweetbay - Diamondleaf Oak / Titi - Big Gallberry - Texas Azalea Forest.....	120
(Sweetbay) / Big Gallberry - Evergreen Bayberry Shrubland.....	122
Sweetbay - (Swamp Blackgum, Blackgum) - Red Maple / Evergreen Bayberry / Netted Chainfern Forest.....	123

West Gulf Coastal Plain Small Stream and River Forest	125
American Beech - Loblolly Pine - (Sweetgum, Southern Magnolia, White Oak) Small Stream Forest	125
American Beech - Sweetbay - (Longleaf Pine) / Longleaf Spikegrass Sandhill Streamhead Forest.....	126
Cherrybark Oak - Sweetgum - Loblolly Pine Forest	128
Loblolly Pine - Sweetgum - (Water Oak, Willow Oak) / Ironwood - Parsleyleaf Haw Stream Bottom Forest	129
Nuttall Oak - Overcup Oak Forest.....	130
Southern Magnolia - American Beech - White Oak - Loblolly Pine Forest.....	131
Swamp Chestnut Oak - Water Oak - Loblolly Pine / Ironwood Forest	132
Water Oak - Sweetgum - (Loblolly Pine) / American Holly - Black Highbush Blueberry / White-edge Sedge Temporarily Flooded Forest	133
West Gulf Coastal Plain Southern Calcareous Prairie.....	135
Little Bluestem - Missouri Coneflower - Narrowleaf Gumweed - (Cusp Gayfeather) Herbaceous Vegetation	135
Little Bluestem - Puffballs - Celestial-lily Herbaceous Vegetation	137
Little Bluestem - Wiry Panicgrass - Little-tooth Sedge Herbaceous Vegetation.....	138
Little Bluestem - Yellow Indiangrass Jackson Prairie Herbaceous Vegetation.....	139
Littlehip Haw - Roughleaf Dogwood - Supplejack Shrubland.....	140
Shumard Oak - White Ash - Nutmeg Hickory / Southern Arrow-wood / Cherokee Sedge Forest	141
West Gulf Coastal Plain Wet Hardwood Flatwoods	142
Swamp Blackgum - Diamondleaf Oak / Peatmoss species Depression Forest.....	142
Willow Oak - Delta Post Oak / Parsleyleaf Haw - Littlehip Haw / Slender Spikegrass Forest.....	144
West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods	145
Longleaf Pine - (Shortleaf Pine, Loblolly Pine) / (Sweetgum) / Little Bluestem Woodland.....	145
Longleaf Pine / Savanna Eryngo - Beaksedge species - (Toothache Grass) Woodland.....	146
Longleaf Pine / Wax-myrtle - Evergreen Bayberry - Big Gallberry Woodland.....	147
Slash Pine - (Longleaf Pine) / Wax-myrtle - Big Gallberry Woodland.....	149
BIBLIOGRAPHY.....	151

INTRODUCTION

Background

NatureServe (formerly the Association for Biodiversity Information [ABI]) is a not-for-profit organization dedicated to developing and providing knowledge about the world's natural diversity. Working in partnership with 75 independent Natural Heritage programs and conservation data centers that gather scientific information on rare plants and animals and ecosystems in the U.S., Latin America, and Canada, NatureServe is a leading source for the biodiversity information that is essential for effective conservation action.

NatureServe was formed in July 1999 when The Nature Conservancy and the Natural Heritage Network jointly established an independent organization to achieve their mutual goal of advancing the application of biodiversity information to conservation. Although NatureServe is a new organization, its databases, staff expertise, and methods reflect more than 25 years of experience, research, and development. NatureServe addresses biodiversity information needs at the regional, national, and international levels, complementing the availability of detailed state or province-level information from individual Natural Heritage programs.

NatureServe is continuing to implement and advance approaches to the conservation of biological diversity that have been employed since 1975 by The Nature Conservancy (TNC) and the Network of Natural Heritage Programs. One component of this methodology is referred to as a "coarse filter/fine filter" approach to biological diversity conservation (Jenkins 1976, Hunter 1991). This methodology involves the identification and protection of ecological communities (coarse filter) as well as rare species (fine filter). Identifying and protecting representative examples of all ecological communities assures the conservation and maintenance of biotic interactions and ecological processes, in addition to conservation of most species. Those species whose conservation is not adequately assured through the conservation of communities -- those that fall through the coarse community filter -- are generally the rarest species. These species often have specialized life histories, or are simply so rare and restricted that their conservation requires explicit planning based on species-specific information. Using a combination of communities and species as conservation targets ensures protection of a more complete spectrum of biological diversity.

A major obstacle to using ecological communities as conservation units for national, regional, and global projects was the lack of a consistent classification system, developed through analysis of community data from a range-wide perspective. NatureServe and TNC, in conjunction with the network of Natural Heritage Programs and Conservation Data Centers, began developing a standardized, hierarchical vegetation classification system. This system, known as the International Ecological Classification Standard (IECS) (formerly called the International Classification of Ecological Communities [ICEC]), has now been used to classify and describe terrestrial communities across the United States and other parts of the world (Grossman *et al.* 1994, Grossman *et al.* 1998).

For the past decade, TNC, NatureServe and the international network of Natural Heritage Programs and Conservation Data Centers (CDC) have been developing the IECS. Within the United States, the domestic component of the international effort, the United States National Vegetation Classification (USNVC), has received widespread support from state, federal, academic, and international partners (Jennings 1993, Greenall 1996, Loucks 1996, FGDC 1997). For the first time, vegetation of all types, whether mountain bogs, shortleaf pine woodlands, or limestone glades can be treated together in one system. This classification serves many natural resource management purposes including conservation planning, biodiversity protection, scientific research, inventory, and mapping.

Many details of the classification are presented in a series of documents by NatureServe's Community Ecology Group (formerly TNC) (Grossman *et al.* 1998, Anderson *et al.* 1998, Maybury 1999). These documents include detailed background on the structure and development of the classification and are available on NatureServe's public web site (www.natureserve.org) under the Biodiversity Information/Ecological Communities link.

Purpose and Scope of the USNVC

The purpose of the USNVC classification system is to provide a complete, standardized listing and description of all vegetation types that represent the variation in biological diversity at the community level, and to identify those communities that require protection (Grossman *et al.* 1994). The shared mission of NatureServe and The Nature Conservancy is the protection of biodiversity; this, along with conservation planning, is also the principal objective for the development of the classification. The classification will be consistent throughout the United States and elsewhere at appropriate scales for conservation planning, and management, and long-term monitoring of ecological communities and ecosystems. It will also have applications as a vegetation data layer in landscape and ecosystem characterization and mapping.

Classifications of ecological systems can be based on a variety of biotic and abiotic factors including hydrology, soils, landform, and vegetation that may be used in combination or individually. The ICEC classification approach presented here is based on vegetation because it is a biotic factor and hence a measurement of biodiversity, which NatureServe and TNC are directed to protect. Moreover, it integrates environmental conditions, ecological processes, and biogeographical dynamics at a site more measurably than any other

factor or suite of factors (Mueller-Dombois and Ellenberg 1974, Kimmins 1997); it is often used to infer soil and climate patterns; and it can be easily measured.

The USNVC has been developed for terrestrial vegetation, that is, all upland terrestrial vegetation and all wetland vegetation with rooted vascular plants. In relation to Cowardin et al. (1979), terrestrial includes those portions of the palustrine, lacustrine, riverine, estuarine, and marine systems that have rooted vegetation. Classification of this vegetation (the Terrestrial System) is distinct from that of unvegetated deep-water habitats (Freshwater and Marine Systems) and unvegetated subterranean habitats (Subterranean System), all of which will have their own classification systems (e.g. Lammert et al. 1997).

The classification system focuses on existing vegetation rather than potential natural vegetation, “climax vegetation”, or physical habitats. The vegetation types described in the classification range from the ephemeral to the stable and persistent. Recognizing and accommodating this variation is fundamental to protecting biodiversity. The manner in which a community occurs is, in part, an intrinsic property of the vegetation itself. A classification that is not restricted to static vegetation types ensures that the units are useful both for inventory/site description, and as the basis for building dynamic ecological models.

The USNVC includes vegetation occurring anywhere along the continuum of "natural" to “invasive” to “cultural”, but it emphasizes vegetation types that are "natural" since these communities are the focus of biodiversity protection. Broadly speaking, natural types include a range of naturalness, namely, "natural" (narrowly defined), "semi-natural" and "modified" vegetation, which together reflect differences in anthropogenic disturbance regimes. However, all natural types occur spontaneously without regular human management, maintenance, or planting, and generally have a strong component of native species (see below). Natural vegetation, narrowly defined, includes plant communities that appear not to have been modified by human activities or only those human activities that mimic natural processes (e.g. prescribed burning). The term semi-natural can include “plant communities where the structure of vegetation has been changed through human activities, but where the species composition is natural” (van der Maarel and Klötzli 1996). In contrast to natural vegetation, then, "cultural" vegetation can be recognized as that which includes planted/cultivated vegetation types. Cultural, modified and exotic vegetation is classified in the USNVC at a much coarser scale than natural and semi-natural vegetation, but other organizations and agencies may refine these coarse units further. To date, most units described with the finest levels in the classification system (association) have been natural and semi-natural types. However, when necessary, modified, cultural and exotic types have been identified in the classification system, especially for the purpose of vegetation mapping. Exotic vegetation is differentiated at association level.

The USNVC has a hierarchical taxonomic structure that is a combination of physiognomic and floristic systems. The rationale for coupling physiognomic and floristic systems has developed over many years (e.g., Rübél 1930, Whittaker 1962, Ellenberg 1963, Webb et al. 1970, Westhoff 1967, Beard 1973, Werger and Spangers 1982, Borhidi 1991). These studies have found a good correlation between floristic and physiognomic classifications of the same vegetation. In the United States, Driscoll et al. (1984) recommended the development of a joint system using the physiognomic units of UNESCO (1973) and the floristic units of habitat types, of which an example has been provided by Dick-Peddie (1993) for New Mexico. The USNVC uses a similar methodology. Vankat (1990) developed a physiognomic-dominance type classification for forest types in North America. Strong et al. (1990) in Canada also proposed a combined physiognomic-floristic approach.

A Combined Physiognomic/Floristic System

The hierarchy of the classification system employs physiognomic criteria at the highest levels and floristic criteria at the lower levels. The formation concept, with units modified from UNESCO (1973), guides the definition of the physiognomic units, and the association and alliance concepts define the floristic units (see Figure 1 and Table 1). This system allows the broad-scale geographic application of physiognomic characteristics to be tied to local, site-specific, floristically-defined units. In combination, these hierarchical levels can satisfy a broad range of objectives for use in a single classification system.

FIGURE 1. VEGETATION CLASSIFICATION SYSTEM.

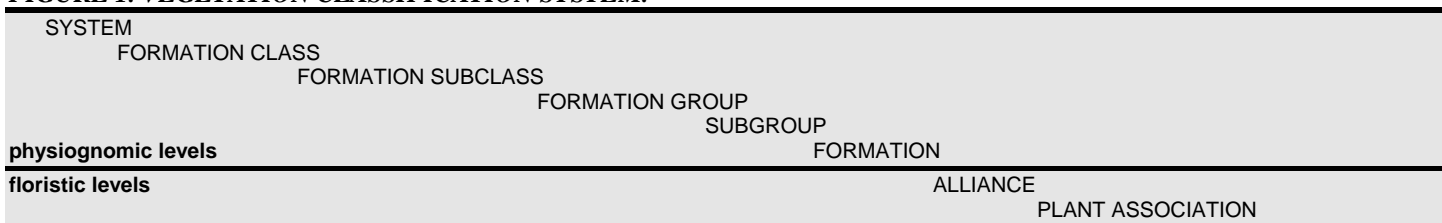


TABLE 1. HIERARCHICAL VEGETATION CLASSIFICATION SYSTEM FOR TERRESTRIAL ECOLOGICAL COMMUNITIES. (Examples)

CLASS	FOREST	WOODLAND	SHRUBLAND
SUBCLASS	Deciduous Forest	Evergreen Woodland	Deciduous Shrubland
GROUP	Cold-deciduous Forest	Temperate or Subpolar Needle-leaved Evergreen Woodland	Temperate Broad-leaved Evergreen Shrubland
SUBGROUP	Natural/Semi-natural	Natural/Semi-natural	Natural/Semi-natural
FORMATION	Lowland or Submontane Cold-deciduous Forest	Saturated Temperate or Subpolar Needle-leaved Evergreen Woodland	Sclerophyllous Temperate Broad-leaved Evergreen Shrubland
ALLIANCE	<i>Quercus stellata</i> - <i>Quercus marilandica</i> Forest Alliance	<i>Pinus palustris</i> Saturated Woodland Alliance	<i>Quercus havardii</i> Shrubland Alliance
ASSOCIATION	<i>Quercus stellata</i> - <i>Quercus marilandica</i> - <i>Carya (glabra, texana)</i> / <i>Vaccinium arboreum</i> Forest	<i>Pinus palustris</i> / <i>Leiophyllum buxifolium</i> / <i>Aristida stricta</i> Woodland	<i>Quercus havardii</i> - (<i>Penstemon ambiguus</i> , <i>Croton dioicus</i>) / <i>Sporobolus giganteus</i> Shrubland

The combined physiognomic/floristic system developed by TNC/NatureServe allows identification of units from both a "top-down" (divisive) and "bottom-up" (agglomerative) approach. The top-down approach allows the use of physiognomic distinctions to help map vegetation, to stratify sampling, and to delimit vegetation units where floristic information is lacking. A bottom-up approach employs plot sampling and floristic analysis as the primary means for defining associations. Where physiognomy is variable, the bottom-up approach can also be used to help determine the important physiognomic distinctions. The relationships between physiognomy and floristics are not always simple; when they do not correspond, precedent may be given to the floristic relationships over the physiognomic structure.

The basic unit of inventory, the plant association or community element, is more or less uniform in structure, composition, and habitat. The uniformity of the plant community makes the comparison and identification of protection priorities more objective than would be possible at more heterogeneous scales. The plant association is a suitable unit for conservation planning because it encompasses all the layers of vegetation in a stand, reflects ecological and human-caused processes including management activities, and is a repeating unit in different landscapes. From a site-based perspective, there may be many different community types at a given location. In fact, it is relatively rare that a site contains only a single community type. However, community elements tend to combine in predictable ways to create repeatable landscape mosaics. Thus the particular mosaic of community elements present at a site and their distribution across the landscape provide information that is fundamental to any type of ecological land management.

The rationale for coupling physiognomic and floristic systems has been developed over the years (e.g., Rubel 1930, Whittaker 1962, Ellenberg 1963, Webb *et al.* 1970, Westhoff 1967, Beard 1973, Werger and Spangers 1982). These studies have found a good fit between floristic and physiognomic classifications of the same vegetation. In the United States, Driscoll *et al.* (1984) recommended the development of a joint system using the physiognomic units of UNESCO (1973) and the floristic units of habitat types, of which an example has recently been provided by Dick-Peddie (1993) in New Mexico. Vankat (1990) developed a physiognomic-dominance type classification for forest types in North America. Strong *et al.* (1990) in Canada also proposed a combined physiognomic-floristic approach. In addition, Specht *et al.* (1974) used the joint approach to develop a conservation evaluation for Australian plant communities.

Terrestrial Vegetation; "Natural" and "Semi-natural" Types

The TNC physiognomic-floristic classification has been developed for terrestrial vegetation, that is, all upland terrestrial vegetation and all wetland vegetation with rooted vascular plants. In relation to Cowardin *et al.* (1979), terrestrial includes those portions of the palustrine, lacustrine, riverine, estuarine, and marine systems that have rooted vegetation. Classification of this vegetation (the Terrestrial System) is distinct from that of unvegetated deep-water habitats (Freshwater and Marine Systems) and unvegetated subterranean habitats (Subterranean System), all of which will have their own classification systems (e.g. Lammert *et al.* 1997).

The USNVC includes all existing vegetation, occurring anywhere along the continuum of "natural" to "cultural", but TNC has emphasized vegetation types that are "natural" since these communities are the focus of biodiversity protection. The classification system separates natural/semi-natural types from cultural types at a certain level in the hierarchy (the formation subgroup, see table 1). Broadly speaking, natural types include a range of naturalness, namely, "natural" (narrowly defined), "semi-natural" and "modified" vegetation, which together reflect differences in anthropogenic disturbance regimes. All natural types occur spontaneously without regular human management, maintenance, or planting, and generally have a strong component of native species. More specifically, "natural" vegetation includes plant communities that appear not to have been significantly modified by human activities, and "semi-natural" vegetation includes plant communities where the structure of vegetation has been noticeably changed through human activities, but where the species composition is unchanged (van der Maarel and Klotzli 1996). In contrast to natural vegetation, then, "cultural" vegetation can be recognized as that which includes planted/cultivated vegetation types. For cultural and modified vegetation,

TNC classifies at a much coarser scale than for natural and semi-natural vegetation, but other organizations and agencies may refine these coarse units further. To date, most units described with the finest levels in the classification system have been natural and semi-natural types. However, when necessary, modified and cultural types have been identified in the classification system, especially for the purpose of vegetation mapping.

Physiognomic Levels: Description And Definitions

The hierarchy for the Terrestrial System has seven levels, with five physiognomic levels (formation class, formation subclass, formation group, formation subgroup and formation) and two floristic levels (alliance and association), see Figure 1. The basic unit of the physiognomic portion of the classification is the "formation", a "community type defined by dominance of a given growth form in the uppermost stratum (or the uppermost closed stratum) of the vegetation, or by a combination of dominant growth forms" (Whittaker 1962, see also Schrader-Frechette and McCoy 1993). In practice, formations are defined by varied, conventionally-accepted combinations of growth-form dominance and characteristics of the environment (e.g., cold-deciduous alluvial forests, rounded-crowned temperate needle-leaved evergreen forest, seasonally flooded perennial forb vegetation).

The physiognomic portion of the classification is based upon the UNESCO (1973) world physiognomic classification of vegetation, which was modified and refined to provide greater consistency at all hierarchical levels and to include additional physiognomic types. Some of the revisions made by Driscoll *et al.* (1984) for the United States were incorporated, and the international scope was expanded.

Compatibility with other systems was also a consideration in the development of the physiognomic levels. The subclass level of UNESCO was modified and a new Formation Subgroup that separates natural vegetation from cultural vegetation was added to better conform to the Federal Geographic Data Committee's (FGDC) standards for vegetation classification (FGDC 1997). Hydrological modifiers based on Cowardin *et al.* (1979) also were added at the formation level since they have been used extensively to map wetlands across the United States. Each of the physiognomic levels is described in more detail by Grossman *et al.* (1998).

Floristic Levels: Description And Definitions

Since this report focuses on the floristic levels of the USNVC, the alliance and the association, the following sections provide more detail about these classification units.

THE ALLIANCE CONCEPT

The alliance is a physiognomically uniform group of plant associations (see Association definition below) sharing one or more diagnostic species (dominant, differential, indicator or character), which, as a rule, are found in the dominant and/or uppermost strata of the vegetation (Mueller-Dombois and Ellenberg 1974). Dominant species are often emphasized in the absence of detailed floristic information (such as quantitative plot data), whereas diagnostic species (including characteristic species, dominant differential, and other species groupings based on constancy) are used where detailed floristic data are available (Moravec 1993). The alliance level includes existing (not just "climax" or potential) vegetation types.

For forested communities, the alliance is similar to the "cover type" of the Society of American Foresters (Eyre 1980), developed to describe the forest types of North America. An alliance is equivalent to a cover type when the dominant species also have diagnostic value. The alliance may be finer than a cover type when the dominant species extend over large geographic areas and varied environmental conditions especially when a diagnostic species occurs in different climate zones or in both upland and wetland situation. The concept for the alliance is also similar to the concept of the "series", a concept developed by the Habitat Type System to group habitat types that share the same dominant species under climax conditions (Daubenmire 1952, Pfister and Arno 1980). Alliances, however, are described by the diagnostic species for all existing vegetation types, whereas series are restricted to climax types and are described by the primary dominant species (see Pfister and Arno 1980).

Examples include:

- *Fagus grandifolia* - *Quercus alba* Forest Alliance;
- *Quercus alba* – (*Quercus rubra*, *Carya* spp.) Forest alliance
- *Nyssa (aquatica, biflora, ogeche)* Pond Seasonally Flooded Forest Alliance
- *Fagus grandifolia* - *Magnolia grandiflora* Forest Alliance
- *Pinus pungens* - (*Pinus rigida*) Woodland Alliance
- *Quercus stellata* – *Quercus marilandica* Woodland Alliance
- *Cephalanthus occidentalis* Semipermanently Flooded Shrubland Alliance
- *Alnus serrulata* Saturated Shrubland Alliance
- *Andropogon virginicus* Herbaceous Alliance

The use of a joint physiognomic-floristic classification influences the alliance concept developed in the national classification. The alliance is constrained both by the floristic patterns of the associations it contains and by the physiognomic-ecologic patterns of the formation that it represents. From a top-down perspective, this facilitates identification of alliances. Information from a wide variety of sources that describes the dominant species of different formations (e.g., wet meadows, saturated peatlands, or temperate broad-leaved evergreen forests) can be used to develop some initial floristic groupings. From a bottom-up perspective, however, this may lead to alliances that differ physiognomically, but otherwise share many species in common. Associations that share a number of dominant or diagnostic species may be placed under different alliances that are in separate formations.

Guidelines for alliance nomenclature are as follows. Dominant and diagnostic species are identified from the dominant and/or top strata of the vegetation. Species placed in parentheses are less consistently found in all associations of the alliance, and the names within parentheses generally are listed alphabetically. Vascular plant species nomenclature follows the nationally standardized list, Kartesz (1999), with very few exceptions. Nomenclature for nonvascular plants follows Anderson (1990), Anderson *et al.* (1990), Egan (1987, 1989, 1990), Esslinger and Egan (1995), and Stotler and Crandall-Stotler (1977). Alliance names include the formation class in which they are listed, e.g., *Pinus ponderosa* Forest Alliance. For wetland alliances, the hydrologic regime that the alliance is found in is always provided for clarity, e.g., *Acer saccharinum* Temporarily Flooded Forest Alliance. Therefore, all alliances that have no hydrological modifier are upland alliances. Environmental or geographic descriptors are used sparingly, to more clearly separate alliances with the same nominal species or to provide clarity when differential species are not yet known (e.g., *Quercus stellata* Flatwoods Forest Alliance; *Acer grandidentatum* Montane Forest Alliance; *Taxodium ascendens* Tropical Woodland Alliance).

THE ASSOCIATION CONCEPT

The association (or plant association) is the finest level of the classification system. For the terrestrial system, plant association is defined as “a plant community of definite floristic composition, presenting a uniform physiognomy, and growing in uniform habitat conditions” (Flahault and Schroter 1910). This basic concept has been used by most schools of vegetation classification (Whittaker 1962, Braun-Blanquet 1965, Westhoff and van der Maarel 1978). In this traditional sense, the plant association concept applies to existing vegetation regardless of successional status. The terms “association”, “plant association”, “community”, and “community association” are used interchangeably.

The plant association is differentiated from the alliance level by additional plant species, found in any stratum, which indicate finer scale environmental patterns and disturbance regimes. This level is derived from analyzing complete floristic composition of the vegetation unit when plot data are available. In the absence of a complete data set, approximation of this level is reached by using available information on the dominant species or environmental modifiers, and their hypothesized indicator species. NatureServe will primarily use the plant association as the level at which community inventory and conservation action are aimed.

While this definition of a plant association is still generally accepted as an international standard, a few clarifications of the use of the definition for the USNVC may be helpful:

- “Habitat” refers to the combination of environmental conditions and ecological processes influencing the community.
- Uniformity of physiognomy and habitat conditions may include patterned heterogeneity (e.g., hummock/hollow).
- As a rule, community elements occur repeatedly over the natural landscape.
- The scale of the community element varies. Among other factors, the variation is determined by the size and apparent homogeneity of the occurrences across the landscape, the amount of data that has been collected and the interpretation of these data by the field experts.
- The community element may be composed of a complex of plant associations that constitutes a functioning ecological unit if the plant associations always occur together (e.g., prairie mound and intermound, wooded ridge and swale complex).

Associations are named with one or more species from the alliance name, and have additional species that represent dominants or indicators from any layer of the vegetation. Associations are named with one or more component plant species, separated by punctuation to indicate strata, followed by a descriptor of the physiognomic class. Strata are separated by the 'forward slash' /, while species within strata are separated by hyphens. Nominal species which are substantially inconstant, that is, often absent in a given occurrence (stand) of the type, are placed in parentheses. Within a stratum, parenthetical species are always placed following nonparenthetical (more constant) species. If more than one species in a stratum is parenthetical, the species are separated by commas and alphabetized. For instance, the *Pinus palustris* - *Pinus (echinata, taeda)* Woodland can include stands dominated by a mixture of *Pinus palustris* and either or both *Pinus echinata* and *Pinus taeda*. An environmental or geographic descriptor such as wetland, mesic, serpentine, etc., are used sparingly, when species composition for a type is not known well enough to provide full representation using only species in a name. When an environmental/geographic descriptor is used, it is inserted between the floristic nominals and the class descriptor.

EXAMPLES: *Quercus palustris* - *Quercus bicolor* - *Quercus macrocarpa* - *Acer rubrum* Sand Flatwoods Forest
Quercus falcata - *Quercus alba* - *Carya* spp. Interior Plateau Forest

[Association name = floristic nominals in stratal order + [optional environmental/geographic descriptor] + class descriptor]

In theory, additional data will allow a modification to the name (for instance, addition of another nominal) to clearly separate this association from similar associations, and then the environmental/geographic descriptor will be unnecessary.

When an association has several layers, an attempt is made to include species that are dominants or indicators from at least the two most dominant layers. Indicator species are those species, other than dominants, which have been chosen to distinguish an association or alliance from others like it, or to indicate specific environmental conditions that have a controlling influence on vegetation in the community. However, the indicator species are seldom limited to the association. For instance, *Sideroxylon lanuginosum* is added to the name of the Gulf coast shell midden woodland to distinguish this type from its close relative, the Atlantic coast shell midden woodland, since its range does not extend onto the Atlantic Coast. At the same time, this *Sideroxylon* species is present in other communities along the Gulf Coast and in the lower Midwest.

The Purpose of Naming

The purpose of naming is, in a sense, obvious, but bears restating. The primary purpose of naming the units in a classification is to create a label for the units, to facilitate unambiguous communication. A secondary goal is to create a name which is meaningful and easy to remember and use (mnemonic). These purposes are somewhat in conflict. The primary purpose of an unambiguous label is met by 'Community association 2546', but such a label is not meaningful or easy to remember. A long descriptive name is meaningful, but difficult to remember and use. To meet these varying requirements, we try to create a name that is a good compromise between these needs. We also use codes and common names to achieve these sometimes conflicting needs.

While it is tempting to interpret the floristic name of an association as a shorthand description of the community, it is important to remember that the name is not a description. The name does not describe an association any more than the name of a species describes it. An association is defined by more than the nominal species used in its names -- it is defined as well based on relative similarity of overall floristic composition, vegetation structure, and environment. One does not expect to be able to recognize *Quercus alba* because it is an oak and white, or *Quercus virginiana* because it is an oak and "from Virginia". Each association in the classification has (or will have) a detailed description of the floristic composition, physiognomic structure, environment (soils, geology, hydrology, climate, etc.), dynamics (fire, flooding, succession, etc.), geographic distribution, and taxonomic distinction from similar associations.

Ideally, the name of an association should provide, to a person relatively knowledgeable about the vegetation of an area and familiar with the taxonomic and nomenclatural principles of the classification, a clear indication of the type. Thus, community names are more meaningful or descriptive than the names of species, but do not purport to provide a full diagnosis or description of the type.

In this report, at least three identifiers are provided for each association. The **NVCS association name** (or Global Name) is the scientific name of the association and uses Latin names of component species (as described above). The **Database Code** (or Element Code) is a unique, 10 character code assigned to each association in the USNVC. However, in this report the **Common Name**, which is an informal, descriptive name, is the identifier used at the beginning of each association description. Where Common Names have not been developed, a **Translated Name** (using common names instead of scientific names for nominal species) is provided. Since Common Names have not been standardized, the Element Code or Global Name should be used when querying any USNVC database or when providing input about the USNVC.

Applications of the Classification System

CONSERVATION RANKING AND ITS USE IN PLANNING

The ability to apply conservation ranks to vegetation units is integral to the success of the classification system as a tool in biodiversity conservation. Associations are ranked by their relative endangerment to determine their relative conservation priority. These ranks are based on factors such as present geographic extent, threats, number of distinct occurrences, degree of decline from historic extent, and degree of alteration of natural processes affecting the dynamics, composition, or function of the type. Ranks are customarily assigned by the various members of the Natural Heritage Programs and of the national, regional, and state offices of NatureServe. For a given community type, ranks are assigned at three declining hierarchical levels of geography, from global or rangewide (the Global Rank or GRANK), through national or country (the National Rank or NRANK), to state, province, or other subnational unit (the State Rank or SRANK). A numeric scalar of 1 to 5 is added, with 1 indicating critical imperilment due to rarity, endemism, and/or threats, and 5 indicating little or no risk of extirpation or elimination. For example, a rank of G1 indicates critical imperilment on a rangewide basis, i.e. a great risk of "extinction" of the type worldwide; S1 indicates critical imperilment within a specific state, province, or other subnational jurisdiction, i.e. a great risk of extirpation of the type from the subnation.

When detailed information is available, two primary ranking factors are used in assessing the appropriate conservation status rank for a community element: (1) the total number of occurrences and (2) the total area (acreage) of the element. Secondary ranking factors such as the geographic range over which the element occurs, the threats to the occurrences, and the viability of the extant occurrences also affect the rank.

Although community ranking is best done when information on all the factors listed above is available, it is often necessary to establish preliminary ranks when this information is lacking or incomplete. This is particularly true for communities that have not been well described. In practice, four main factors have been useful in arriving at a preliminary assessment of a community's rangewide (global) rank:

1. The geographic range over which the type occurs.
2. The long term decline of the type across this range.
3. The degree of site specificity exhibited by the type.
4. The rarity across the range based on state ranks assigned by state Natural Heritage Programs.

Most of the ranks currently applied to USNVC types are based on such preliminary assessments of rarity.

Imperiled community types (and species), those ranked G1 through G3, are often regarded as the principal targets for conservation action, although NatureServe is dedicated to the conservation of all native community types. Special attention is generally given to taxa of high endangerment, as opportunities for their conservation may be limited in space and time. However, some highly ranked community types may be essentially secure because of their occurrence in areas that are remote from human alteration, that already have high degrees of protection, or that are unsuitable as human habitat. Others are essentially secure because of their intrinsic resistance to alteration or degradation. The conservation status of highly ranked communities should be assessed and steps should be taken to ensure their adequate protection.

More common and less imperiled community types, those ranked G4 and G5, are also conservation priorities. In most parts of the world, these more common community types have generally been highly altered and degraded by human action, and have often also been fragmented and their functioning impaired. For the conservation of many rare and common species, these relatively secure communities are of critical importance. In North America, a large tract of a common vegetation type in pristine condition that occurs in an essentially intact landscape with relatively intact ecological processes is of high priority for conservation. Though the type itself is common, large, high quality examples are rare and the opportunity to conserve such an example may be very limited. Generally, the conservation of lower ranked community types should be focused on examples in especially good condition, of large extent, with high landscape integrity/connectivity, and with ancillary conservation benefits. Because a primary purpose of the USNVC is to help set conservation priorities for natural community types, the recognition and naming of units reflects their relative naturalness. There generally exists a strong correlation between naturalness and conservation priority.

The dynamic nature of vegetation presents some additional complications in the evaluation of the naturalness and conservation priority of community units. Early- and mid-seral vegetation may be readily classifiable as distinct in composition and physiognomy from later seral vegetation, but may be transient on the landscape. Transience makes this vegetation difficult to "track" or monitor over time and the conservation of seral sequences will generally be dependent on the conservation of large landscapes that contain a mosaic of seral stages.

Also, disturbances cannot be clearly and cleanly classified as "natural" or "anthropogenic". Some anthropogenic disturbances are similar enough to natural disturbances that the resulting successional communities cannot be clearly distinguished, while others may create unique and unprecedented communities that do not occur in the natural landscape.

We therefore have developed categories and a resulting ranking system for communities that go beyond those used for species conservation. The various ranks used for communities presented in this document are listed and briefly described in Table 2. For further information on ranking see Master (1991).

TABLE 2: Global Rank Definitions

GX	ELIMINATED throughout its range, with no restoration potential due to extinction of dominant or characteristic species.
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., <i>Castanea dentata</i> 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.
- GC PLANTED/CULTIVATED
Vegetation which has been planted in its current location by humans and/or is treated with annual tillage, a modified conservation tillage, or other intensive management or manipulation.
- GW INVASIVE EXOTIC
Vegetation dominated by invasive alien species.
- GD RUDERAL
Vegetation resulting from succession following anthropogenic disturbance of an area.
- GM MODIFIED
Vegetation resulting from the management or modification of natural vegetation, it is readily restorable by management or time, and/or the restoration of ecological processes.

Modifiers and Rank Ranges

- ? 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.

APPLICATIONS OF THE USNVC BY U.S.D.A. FOREST SERVICE AND OTHER FEDERAL AGENCIES OF THE UNITED STATES

The USNVC is increasingly used by the federal agencies (including Forest Service, Fish and Wildlife Service, Dept. of Defense, National Park Service, Bureau of Land Management, USGS Biological Resources Division, Environmental Protection Agency, and others), and The Nature Conservancy as a fundamental basis for ecosystem management, natural resource planning, and land management. The various lower hierarchical levels of the USNVC, particularly the alliance and the association, have particularly appropriate uses.

The **U.S. Forest Service**, a long-time user and supporter of this classification effort, is using the alliance level to describe the existing and potential vegetation for the ecoregional provinces, sections, and subsections in the Eastern and Southern Regions (Keys *et al.* 1995). This information is used for determining management and conservation goals. Other potential uses include using the alliance to characterize stand types in forest inventory or to characterize the habitats of wildlife species, including neotropical migrant birds, other birds, and other vertebrate animals. Alliances could easily be aggregated into the USFS “old growth types” or used to map dominant vegetation cover.

The association level is being used to by the Forest Service to describe and classify existing and potential natural vegetation. Individual National Forests throughout the country are using the community associations in the USNVC to conduct inventories of natural plant communities. The conservation status information contained within the USNVC can be used to rank the imperilment status of ecosystems and communities and to assess the conservation needs for both rare and representative community types on National Forest lands. Since rare species are linked to associations in the USNVC, associations can easily be used to help characterize the habitats and habitat needs of Proposed, Endangered, Threatened, and Sensitive (PETS) species. As part of the Forest planning process, the associations can be used to set priorities for representation in Research Natural Areas (RNA) and Special Interest Areas (SIA). Associations can also be used to develop management prescriptions, for prescribed fire, thinning, and other land management and restoration activities.

The **USGS BRD Gap Analysis Program** uses the alliance level of the USNVC to map vegetation using TM satellite imagery on a state level. As a requirement of this program the imagery must be classified at the alliance level, and those states that have not mapped to the alliance level must describe the relationship between their classification units and the alliance units.

The **U.S. Fish and Wildlife Service** is interested in applying the same classification and mapping standards as the NBS/NPS Vegetation Mapping Program for the wildlife refuge system. The Service believes that identifying vegetation communities throughout the National Wildlife Refuge System will improve the management of the System’s fish and wildlife resources. Natural community inventories using the USNVC are currently underway on many refuges.

As part of the National Park Service Inventory and Monitoring Program, the **USGS BRD/NPS Vegetation Mapping Program** is currently involved in a long-term project to map the vegetation of all National Park units using the standard classification. This program requires the mapping of vegetation according to the classification, using a minimum mapping unit of 0.5 hectare (about 1 acre) mapped to a standard 1:24,000 scale USGS topographic quadrangle. Alliances or plant associations must be assigned to each vegetation polygon delineated. All vegetation maps, associated vegetation plot data, and accuracy assessment points are geographically referenced and made available in digital form that is GIS compatible.

As part of an assessment of the status of biodiversity, the **Environmental Protection Agency** has sponsored reviews of natural communities in both the Great Lakes region (TNC, Great Lakes Program 1994) and Great Plains (Ostlie *et al.* 1996). The Great Plains review contributed to a thorough review of the identification and status of all natural communities throughout the Great Plains. Follow-up surveys in specific landscapes are being planned. In addition, the agency has sponsored the Midwest Oak Ecosystems Recovery Plan (Leach and Ross 1995), which uses the structure of this classification to define the Midwest oak savanna and woodland types.

Structure and Format of this Report

The descriptions in this report may vary widely in length and level of detail. Some vegetation types are well studied, and well documented; while others are poorly known with little or no published material available. Ecological dynamics, disturbance regimes and successional processes of some vegetation types have also been studied and documented, but for others this sort of information is scanty. The user will find some descriptions to be fairly comprehensive and complete, and others to be missing pieces of information. As part of the USNVC, these descriptions are dynamic and are continuously changing and improving as more information becomes available. In its current form, we consider the classification complete and accurate enough to be usable for the full variety of possible potential applications, and that use will inevitably result in revisions, modifications, and enhancements.

All scientific names for vascular species in the report follow that of Kartesz (1999). Nomenclature for nonvascular plants follows Anderson (1990), Anderson *et al.* (1990), Egan (1987, 1989, 1990), Esslinger and Egan (1995), and Stotler and Crandall-Stotler (1977).

The main body of this report is presented in two sections, both containing vegetation descriptions for the area of interest. The first contains information on associations and the second includes information on alliances.

FORMAT OF ALLIANCE DESCRIPTIONS

The Table of Contents includes an index to alliance descriptions found in this report. The first level of this index is the Class, while the second and third level show the Formation and Alliance. The Formation Code (e.g. I.A. 8.N.b.) shows the position of the alliance within the physiognomic portion of the national classification hierarchy. The Alliance Code (e.g. I.A.8.N.b.14) includes the Formation Code plus a one to three digit counter that is assigned by the national classification database. Additionally listed is an Alliance Key (e.g. A.127), which is a unique identifier assigned to each alliance in the national classification.

Alliance descriptions are arranged in the hierarchical order of the national classification, with alliances in the same formation listed in order of their alliance codes.

Each alliance description is divided into sections and fields of information reported from the national classification database. Figure 3 presents the format of an alliance description with a description of the information contained in each field or section, including caveats about the data in that field or section.

FIGURE 3: Alliance Description Content

Formation

Alliance Code - Scientific Name of the Alliance (Nomenclature follows Kartesz 1999) – (**Alliance Key**)

Translated Name (Common) of the Alliance -

ALLIANCE CONCEPT

Summary: Description of the conceptual borders of the alliance in terms of vegetation composition and structure, expected geographic distribution, and expected environmental factors such as characteristic landscape position, rock type, soil texture, hydrology, etc..

Related Concepts: A list of common synonyms for the alliance from other vegetation or natural community classifications. An exhaustive survey for all possible other names for individual alliances has not been completed. Synonymy is usually provided to the Society of American Foresters (SAF) classification of forest cover types (Eyre 1980), as well as to the first TNC Southeast Regional Ecological Community Classification (Allard 1990). Synonymy to state Heritage Program classifications is also sometimes given, but this synonymy is not fully populated. The synonym is followed by the short citation for the author of the synonym. There often follows a comment on the relationship of the alliance to its synonym (“In part” is the most common comment). “In part” is used to describe a relationship in which the alliance and its synonym overlap to some degree but are not equivalent. Full citations are provided in the Bibliography at the end of this report.

Classification Comments: Text description of any classification questions for the alliance that may not have been addressed in other fields. This includes comments on relationships between similar alliances, comments on the level of documentation for the alliance, discussion of classification problems of individual associations, and reporting of physiognomic variability of the alliance that may affect its placement in the hierarchy.

ALLIANCE DISTRIBUTION

Range: Text description of the alliance's known or suspected range of distribution. This may be reported by broad geographic regions or a list of states and provinces. A state, province, or country shown without a “?” indicates that the alliance is documented to occur there, or is very likely to occur there. A “?” indicates that the distribution is uncertain or speculative -- the uncertainty often relates to taxonomic questions about the circumscription of the alliance, but sometimes is simply the result of lack of information. For most alliances, this listing is intended to be (and should be) comprehensive. For some alliances, particularly those that are peripheral to our region from north, west, or south (tropical), the listing may only represent partial information, generally biased towards political units or ecoregions in close proximity to our area of concern. Note that a state, may be mentioned in the alliance distribution, but not for any of its associations (see below); this generally indicates that other associations remain to be described in the alliance.

Subnations: A listing of states or provinces where associations in this alliance have been defined. A state, province, or country shown without a “?” indicates that the alliance is documented to occur there, or is very likely to occur there. A “?” indicates that the distribution is uncertain or speculative.

TNC Ecoregions: The distribution of the alliance in ecoregions defined by TNC, with a level of confidence for the alliance's status in that ecoregion. Ecoregion codes from TNC are followed by a colon and letters that indicate confidence in the occurrence of an alliance in each ecoregion. Confidence levels are defined as follows: C = alliance occurrence is certain, P = alliance occurrence is probable, ? = alliance occurrence is possible. Ecoregions that are not listed for an alliance should not necessarily be taken to mean that the alliance absolutely does not occur there. Inventory efforts for many taxonomic groups of vegetation types, and in some geographic areas, are incomplete.

USFS Ecoregions: The distribution of the alliance at the ecoregion section level, with a level of confidence for the alliance's status in that ecoregion section. Ecoregion codes are from Keys et al. 1995. Ecological Units of the Eastern United States -- First approximation (map). A list of ecoregion codes and names is included in an appendix at the end of this report. Each code is followed by a colon and letters that indicate confidence in the occurrence of an alliance in each section. Confidence levels are defined as follows: C = alliance occurrence is certain, P = alliance occurrence is probable, ? = alliance occurrence is possible. Sections that are not listed for an alliance should not necessarily be taken to mean that the alliance absolutely does not occur there. Inventory efforts for many taxonomic groups of vegetation types, and in some geographic areas, are incomplete.

Federal Lands: This field lists federal land units (such as National Park Service units, individual National Forests, etc.) within which the alliance occurs. This field is incompletely populated. The intent is to develop a comprehensive listing of the occurrence of vegetation types on the lands of important federal land-managing agencies, especially (in the Southeast) the U.S. Forest Service, Department of Defense, National Park Service, U.S. Fish and Wildlife Service, and Corps of Engineers. Because the field is in the process of being populated, the absence of a federal land management unit should not be considered to indicate that the type is absent on that unit, but the listing of a federal land management unit is generally a reliable indication of the type's likely occurrence there. The information is currently most complete for U.S. Forest Service units, and for selected other units on which effort has been concentrated.

ALLIANCE SOURCES

References: References listed are those that have contributed directly to the concept of the alliance. It is by no means an exhaustive list of literature which deals with the alliance. The list of references is in a short citation format and the reader should consult the Bibliography at the back of the report for a full citation.

FORMAT OF ASSOCIATION DESCRIPTIONS

The hierarchical nature of the USNVC generally places structurally and compositionally related vegetation types (alliances and associations) near one another. Thus, the Forest Class (vegetation dominated by closed canopies of trees) is followed by the Woodland Class (vegetation dominated by open canopies of trees). All temperate pine forests will be found together in I.A. (Evergreen Forest subclass). Of course, such a linear ordering of types does not and cannot capture all relationships, and sometimes communities that are closely related ecologically are separated widely in the physiognomic hierarchy. For example, temperate live oak Woodlands are grouped together in II.C, separately from the temperate live oak Forests (I.C.). Similarly, related wetland communities, such as tidal flat communities may be found classed all across the hierarchy as Shrublands (III), Dwarf Shrublands (IV) or Herbaceous Vegetation (V).

For this reason, the association descriptions in this report have been organized into ecological groupings rather than following the hierarchical ordering of the upper levels of the USNVC. These groupings are not intended for use as a standard classification level, but are just a way of organizing the report. This ordering is intended to facilitate the use of this document by those unfamiliar with the USNVC hierarchy, by grouping ecologically related associations under a single heading. Additionally, ecological groups may provide another method for aggregating associations into higher level units for mapping or other management purposes.

The Table of Contents includes an index to association descriptions organized by Ecological Groups. The associations are then listed within each group. Within the main body of this report, the ecological group is printed at the beginning of each association.

Each association description is divided into sections and fields of information reported from the national classification database. Figure 2 presents the format of an association description with a description of the information contained in each field or section, including caveats about the data in that field or section.

FIGURE 2: Association Description Content

COMMON NAME OF ASSOCIATION

ELEMENT IDENTIFIERS

NVC association: The scientific name (Global name) of the association based on Latin names of dominant or characteristic plant species. The standard name used in the USNVC. (nomenclature follows Kartesz 1999).

Database Code: Element Code (ELCODE). The database code used to identify the association in the national community database (BCD).

Formation: The lowest physiognomic level of the national classification hierarchy. The formation represents a grouping of community types that share a definite physiognomy or structure and broadly defined environmental factors, such as elevation and hydrologic regime.

Alliance: Alliance scientific name based on the Latin names of the dominant or characteristic plant species, followed by the alliance code from the national community database (BCD).

ELEMENT CONCEPT

Summary: A short description of the association including information on physiognomy, landscape setting, dominant species, range, primary environmental characteristics, and any other unique or noteworthy characteristics.

Environment: A description of the most important environmental determinants of the biological composition or structure of this association and/or its subtypes.

Vegetation: Vegetation attributes of the association including species richness, diversity, physiognomic structure, spatial distribution of vegetation, strata height, dominant life-forms, coverage of unvegetated substrate, and additional compositional comments.

Dynamics: Important natural disturbance regimes, successional status, and temporal dynamics for the association.

Similar Associations: Closely related or similar communities which make classification difficult, with comments on how they differ.

Related Concepts: A list of common synonyms for the association from other vegetation or natural community classifications and the scientific literature. An exhaustive survey for all possible other names for individual associations has not been completed. Synonymy is usually provided to the Society of American Foresters (SAF) classification of forest cover types (Eyre 1980), as well as to the first TNC Southeast Regional Ecological Community Classification (Allard 1990). Synonymy is also given to names used in the scientific literature, especially when that literature has been used as a primary source for development of the taxonomic unit and its description. Synonymy to state Heritage Program classifications is given in the element distribution section (below). The synonym is followed by the short citation for the author of the synonym. Full citations are provided in the Bibliography at the end of this report.

Classification Comments: Additional comments about the association, including comments about classification criteria used to define the association, outstanding classification issues, comments on relationships between similar associations, comments on the level of documentation for the association, comments about the variability among occurrences of the association.

CONSERVATION RANKING & RARE SPECIES

GRank: The Global Element Rank which characterizes the relative rarity or endangerment of the association world-wide and the reason for assigning the Global Element Rank, such as number of occurrences, number of hectares, total area reduction from original, threats, degradation, etc.

High-ranked species: Latin names of high-ranking (G3 or higher) plant species expected to be found within occurrences of this association.

ELEMENT DISTRIBUTION

Range: Description of the association's present range.

Subnations: A listing of states or provinces where the associations are thought to occur. A state, province, or country shown without a "?" indicates that the association is documented to occur there, or is very likely to occur there. A "?" indicates that the distribution is uncertain or speculative.

USFS Ecoregions: The distribution of the association by USFS Ecoregions. Ecoregion codes are from Keys et al. 1995. Ecological Units of the Eastern United States -- First approximation (map) and are listed to as fine a level as possible (Province, Section, Subsection). A list of ecoregion codes and names is included in an appendix at the end of this report. Each code is followed by a colon and letters that indicate confidence in the occurrence of an association at each mapping level. Confidence levels are defined as follows: C = association occurrence is certain, P = association occurrence is probable, ? = association is possible. Ecoregions that are not listed for an association should not necessarily be taken to mean that the association absolutely does not occur there. Inventory efforts for many taxonomic groups of vegetation types, and in some geographic areas, are incomplete.

Federal Lands: This field lists federal land units (such as National Park Service units, individual National Forests, etc.) within which the association occurs. Federal units where an association is predicted to occur, but on which it has not been documented, are marked with a question mark (?). This field is incompletely populated. The intent is to develop a comprehensive listing of the occurrence of vegetation types on the lands of important federal land-managing agencies, especially (in the Southeast) the U.S. Forest Service, Department of Defense, National Park Service, U.S. Fish and Wildlife Service, and Corps of Engineers. Because the field is in the process of being populated, the absence of a federal land management unit should not be considered to indicate that the type is absent on that unit, but the listing of a federal land management unit is generally a reliable indication of the type's likely occurrence there. The information is currently most complete for U.S. Forest Service units, and for selected other units on which effort has been concentrated.

ELEMENT SOURCES

References: This is a listing (by no means complete at this time) of literature which deals with the association. References listed are those that have contributed directly to its development. The list of references is in a short citation format and the reader should consult the Bibliography at the back of this report for a full citation.

The final section of this report includes a bibliography of references relevant to the alliances and associations included herein.

Comments regarding the content of the classification are welcomed and encouraged. Please submit comments and suggestions to the authors at the following address: NatureServe, Southern U.S. Office; 6114 Fayetteville Road Suite 109, Durham, NC 27713; or by electronic mail to: Milo Pyne: milo_pyne@natureserve.org.

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ALLIANCES BY US NATIONAL VEGETATION CLASSIFICATION HIERARCHY

I. Forest

I.A.8.C.x. Planted/cultivated temperate or subpolar needle-leaved evergreen forest

I.A.8.C.X. *PINUS TAEDA* PLANTED FOREST ALLIANCE (A.99) LOBLOLLY PINE PLANTED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance represents young, monospecific plantation stands of *Pinus taeda*. These are cultivated forests and are not considered natural or near-natural vegetation. They are plantations in the strictest sense, typically managed under a regime in which most of the characteristics and attributes of a natural forest are absent. The core concept of these stands are those which support dense, often perfect rows of planted *Pinus taeda* or otherwise dense, young, stands which are managed and maintained for the extraction of forest products, especially pulpwood. In most cases these stands support almost no other tree species in the overstory, and typically very little understory. This association rarely exceeds 20-40 years of age and, with more intensive management, these rotation may be shortened even further. Stands are typically established with artificial regeneration, often using genetically improved tree stock. Excluded from this alliance are former plantation stands which have "broken up" with age or management to approximate a more natural structure and composition. Dense planting in rows, if successful, tends to result in nearly complete canopy closure which persists until the stand has either been regenerated or transitions into a different association. Herbaceous ground cover of any kind tends to be sparse due to reduction during site preparation, the typically dense canopy cover, and to the fact that many young plantations are infrequently burned at best.

Related Concepts:

- *Pinus taeda* / *Rhus copallina* planted forest alliance (Hoagland 1998a) ?
- Loblolly Pine: 81 (Eyre 1980) I

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and possibly Virginia.

Subnations: AL, AR, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA?

TNC Ecoregions: 38:C, 39:C, 40:C, 41:C, 42:P, 43:C, 44:C, 50:C, 51:C, 52:C, 53:C, 56:P, 57:C, 58:P

USFS Ecoregions: 221Jb:CCC, 222C:CC, 222E:CC, 231Aa:CCC, 231B:CC, 231Ca:CPP, 231Cd:CPP, 231E:CC, 232Bm:CCC, 232Br:CCC, 232Ca:CCC, 232Cb:CCC, 232Ce:CCC, 234A:CC, M221D:CC, M222A:CC, M231A:CC

Federal Lands: DOD (Arnold, Fort Benning, Fort Bragg, Fort Gordon, Fort Stewart); DOE (Savannah River Site); USFS (Angelina, Bankhead?, Bienville, Cherokee, Conecuh, Croatan, Davy Crockett, De Soto, Delta, Francis Marion, Holly Springs, Kisatchie, Land Between the Lakes, Oconee, Ouachita, Ozark, Sabine NF, Sam Houston, St. Francis?, Sumter, Talladega, Tombigbee, Tuskegee); USFWS (Eufaula)

ALLIANCE SOURCES

References: Eyre 1980, Farnum et al. 1983, Hoagland 1998a, Hunter 1990, Moorhead et al. 1998, Ursic 1963

I.A.8.C.X. *PINUS PALUSTRIS* PLANTED FOREST ALLIANCE (A.96) LONGLEAF PINE PLANTED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes young, monospecific plantation stands of *Pinus palustris*. These are cultivated forests which do not represent or approximate natural or near-natural vegetation structure. They are maintained as plantations for the harvest of forest products (usually poletimber). The core concept of these stands are those which are mechanically planted to dense, often perfect rows of planted *Pinus palustris* or otherwise dense, young stands which are managed and maintained for the extraction of forest products. Stands are typically established with mechanical planting, but may also be established through other means. In most cases these stands support almost no other tree species in the overstory, and typically very little understory. This alliance rarely exceeds 20-40 years of age on most timberlands. Excluded from this alliance are areas where longleaf pine has been planted in ways that maintain natural ground layer components (such as hand planting with no mechanical site preparation), as well as areas which originated as mechanically planted, dense stands but which have been thinned and burned or have "broken up" with age allowing for restoration of some natural ground cover components and a canopy structure approximating that of natural longleaf pine communities. Most stands in this alliance are created after clear-cutting of natural stands and mechanical site preparation to reduce or eliminate competition for planted pine seedlings. Dense planting in rows, if successful, tends to result in nearly complete canopy closure which persists until the stand has been "thinned" twice, at which time some openings in the canopy are created which may allow some sunlight to the ground

layer. Herbaceous ground cover of any kind tends to be sparse due to reduction during site preparation, the typically dense canopy cover, and to the fact that many young plantations are infrequently burned at best. Moreover, 'natural' ground layer vegetation is especially lacking. In North and South Carolina, pinestraw is commonly harvested from these forests, often further damaging the ground cover.

Related Concepts:

- Longleaf Pine: 70 (Eyre 1980) I

Classification Comments: The core concept of these stands are those which are mechanically planted to dense, often perfect rows of planted *Pinus palustris* or otherwise dense, young stands which are managed and maintained for the extraction of forest products. Stands are typically established with mechanical planting, but may also be established through other means. Excluded from this alliance are areas where longleaf pine has been planted in ways that maintain natural ground layer components (such as hand planting with no mechanical site preparation), as well as areas which originated as mechanically planted, dense stands but which have been thinned and burned or have "broken up" with age allowing for restoration of some natural ground cover components and a canopy structure approximating that of natural longleaf pine communities.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 40:C, 41:C, 43:P, 50:P, 53:C, 55:P, 56:P, 57:P

USFS Ecoregions: 231Ca:PPP, 231Cd:PPP, 232Bq:CCC, 232Br:CCC, 232Ca:CCC, 232Cb:CCC, 232F:CC

Federal Lands: DOD (Fort Benning, Fort Bragg, Fort Gordon, Fort Stewart); DOE (Savannah River Site); USFS (Angelina, Apalachicola, Bankhead?, Croatan?, Francis Marion, Kisatchie, Ocala?, Osceola, Sabine NF, Sumter?, Talladega?, Tuskegee?)

ALLIANCE SOURCES

References: Eyre 1980

**I.A.8.C.X. PINUS ECHINATA PLANTED FOREST ALLIANCE (A.94)
SHORTLEAF PINE PLANTED FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: This alliance includes young, monospecific plantation stands of *Pinus echinata*. These are cultivated forests which do not represent or approximate natural or near-natural vegetation structure. They are typically maintained as plantations for the harvest of forest products. The core concept of stands in this alliance are those which are artificially regenerated to dense stands which are managed and maintained for the extraction of forest products. Stands may be established with mechanical planting, but may also be established through other means. In most cases these stands support almost no other tree species in the overstory, and typically very little understory. This alliance rarely exceeds 20-40 years of age on most timberlands.

Related Concepts:

- Shortleaf Pine: 75 (Eyre 1980) I

Classification Comments: *Pinus echinata* is one of the most important commercial conifers in the southeastern United States. During the year 2000, a vast majority of stands in the Daniel Boone National Forest (Kentucky) suffered from damage by the Southern Pine Beetle (*Dendroctonus frontalis*). They will apparently be replanted.

ALLIANCE DISTRIBUTION

Range: This alliance is found throughout the southeastern United States. It is known from Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, and Texas.

Subnations: AL, AR, GA, KY, LA, MS, NC, OK, SC, TX

TNC Ecoregions: 38:C, 39:C, 40:C, 41:P, 43:P, 44:P, 50:C, 51:C, 52:P, 53:C

USFS Ecoregions: 221Ha:CC?, 221Hc:CCC, 221He:CCC, 222Eb:CCC, 222En:CCC, 222Eo:CCC, 231Dc:CCC, 231E:CC, 232Bm:CCC, M221D:CC, M222A:CC, M231A:CC

Federal Lands: USFS (Chattahoochee, Cherokee?, Daniel Boone, Davy Crockett, Kisatchie, Ouachita, Ozark, Sabine NF, Sam Houston, Talladega?, Tuskegee?)

ALLIANCE SOURCES

References: Burns and Honkala 1990a, Eyre 1980

**I.A.8.C.X. PINUS ELLIOTTII PLANTED FOREST ALLIANCE (A.95)
SLASH PINE PLANTED FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: This alliance includes planted stands (plantations) of *Pinus elliottii* var. *elliottii* (typically monospecific), within and outside of its natural range. These are cultivated forests and are not considered natural or semi-natural vegetation. They are maintained as plantations for the harvest of forest products (lumber, pulpwood). Stands of this alliance are primarily in uplands, but

occasional stands in wetland environments are included here as well. This alliance is also supposed to include the rare case of "exotic" stands resulting from natural regeneration outside of the natural range of *Pinus elliottii* var. *elliottii*, although these are probably better accommodated as examples of *Pinus elliottii* var. *elliottii* - (*Pinus palustris*) Managed Forest (CEGL007171), a member of the *Pinus palustris* - (*Pinus elliottii*) Forest Alliance (A.123).

Related Concepts:

- Slash Pine: 84 (Eyre 1980) I

Classification Comments: Slash pine has been introduced into Kentucky, Virginia and eastern Texas, and now reproduces naturally in these locations.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Florida, Georgia, Kentucky(?), Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia(?). In Arkansas the species is found on industrial timber land. It is reportedly introduced into Kentucky.

Subnations: AL, AR, FL, GA, KY?, LA, MS, NC, SC, TX, VA?

TNC Ecoregions: 40:C, 41:C, 43:C, 52:P, 53:C, 55:C, 56:P, 57:P, 58:P

USFS Ecoregions: 231:C, 232Br:CCC, 232Ca:CCC, 232Cb:CCC

Federal Lands: DOD (Fort Benning, Fort Bragg, Fort Gordon, Fort Stewart); NPS (Fort Pulaski); USFS (Angelina, Apalachicola, Conecuh, Kisatchie, Ocala, Osceola, Sabine NF)

ALLIANCE SOURCES

References: Eyre 1980

I.A.8.N.b. Rounded-crowned temperate or subpolar needle-leaved evergreen forest

I.A.8.N.B. PINUS TAEDA - PINUS ECHINATA FOREST ALLIANCE (A.129)

LOBLOLLY PINE - SHORTLEAF PINE FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes natural forests occurring in the Coastal Plain west of the Mississippi River, managed forests in the East and West Gulf coastal plains, and successional stands in Piedmont North Carolina, South Carolina (?), and Georgia. Forests in this alliance dominate the landscape in the region between longleaf pine belt and Ouachitas, and west of longleaf pine range in Texas. This vegetation also occurs in the Red Hills of the Florida Panhandle, and other areas in the East Gulf Coastal Plain as well. These are successional stands both within and to the north of the range of longleaf pine. Within the range of longleaf pine, this vegetation may occur on "peninsulas" in the Fragipan Loam Hills Subsection of Louisiana, and on hills in the western part of this subsection. Semi-natural or successional stands may be included here which are dominated by this combination of pines. These are found on sites which would have been naturally dominated by *Pinus palustris*. Some clarification of the relative "naturalness" of this combination of pines on various sites and regions needs to be attempted.

Related Concepts:

- Loblolly Pine - Shortleaf Pine: 80 (Eyre 1980) I
- Lowland Pine - Oak Forest (Foti 1994b) I
- T1A9bIII3a. *Pinus echinata* - *Pinus taeda* - *Carya* spp. (Foti et al. 1994) ?
- Upland Pine Forest (FNAI 1992a) I

Classification Comments: The summary and range descriptions of this alliance have been taken verbatim from that of the former *Pinus taeda* - *Pinus echinata* - (*Juniperus virginiana*) Forest Alliance (Weakley et al. 1998, September edition).

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, and Texas. This alliance includes natural forests occurring in the coastal plain west of the Mississippi River, managed forests in the East and West Gulf Coastal Plains, and successional stands in Piedmont North Carolina, South Carolina (?), and Georgia. Forests in this alliance dominate the landscape in the region between the longleaf pine belt and Ouachitas, and west of the longleaf pine range in Texas. Similar vegetation is common as managed forests or abandoned plantations (I.A.8.C.) in the Ouachita Mountains, but this alliance does not occur naturally in the highland areas of the Ouachita Mountains. This vegetation also occurs in the Red Hills of the Florida Panhandle, and other areas in the East Gulf Coastal Plain as well. These are successional stands both within and to the north of the range of longleaf pine. Within the range of longleaf pine, this vegetation may occur on "peninsulas" in the Fragipan Loam Hills Subsection of Louisiana and on hills in the western part of this subsection.

Subnations: AL?, AR, FL?, GA, KY?, LA, MS?, NC, OK, SC, TN?, TX, VA?

TNC Ecoregions: 40:C, 41:C, 43:P, 44:P, 50:C, 52:P, 53:P, 56:P, 57:P

USFS Ecoregions: 221:?, 222:?, 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Ah:CCP, 231Ai:CCP, 231Aj:CCC, 231Ak:CCP, 231Am:CCP, 231An:CCC, 231Ao:CCC, 231Ba:CC?, 231Bb:CC?, 231Bc:CC?, 231Bd:CC?, 231Be:CC?, 231Bg:CC?, 231Bh:CC?, 231Bi:CC?, 231Bj:CCC, 231Bk:CC?, 231Ca:C??, 231Cb:C??, 231Cc:C??, 231Cd:C??, 231Ce:C??, 231Cf:C??, 231Cg:C??, 231Da:C??, 231Db:C??, 231Dc:C??, 231Dd:C??, 231De:C??, 231Ea:CCC, 231Eb:CCC, 231Ef:CCC, 231Eg:CCC, 231Eh:CCC, 231Ei:CCC, 231Ej:CC?, 231Ek:CC?, 231Em:CCC, 231En:CCC, 232Ba:CCP,

232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Bg:CCP, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CC?, 232Bq:CC?, 232Br:CCP, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC

Federal Lands: DOD (Fort Benning?); NPS (Kennesaw Mountain); USFS (Angelina, Bienville, Davy Crockett, De Soto, Holly Springs, Homochitto, Kisatchie, Oconee, Sabine NF, Sam Houston, St. Francis, Sumter, Talladega, Tombigbee, Tuskegee, Uwharrie)

ALLIANCE SOURCES

References: Eyre 1980, FNAI 1992a, FNAI 1992b, Foti 1994b, Foti et al. 1994, Weakley et al. 1998

I.A.8.N.B. *PINUS TAEDA* FOREST ALLIANCE (A.130) LOBLOLLY PINE FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes both successional forests, following cropping or site conversion, and natural forests in the Piedmont, Cumberland and Ridge and Valley, and Coastal Plain of the southeastern United States. Other canopy and subcanopy species that may be present in successional stands are *Liriodendron tulipifera*, *Acer rubrum*, *Liquidambar styraciflua*, *Pinus virginiana*, *Juniperus virginiana* var. *virginiana*, *Quercus stellata*, *Quercus velutina*, *Ulmus rubra*, *Quercus alba*, *Nyssa sylvatica*, *Ulmus alata*, *Cornus florida*, *Prunus serotina* var. *serotina*, and *Carya* spp. *Vaccinium* spp., especially *Vaccinium stamineum*, are common in these forests. One association in this alliance occurs on barrier islands in the Mid-Atlantic Coastal Plain. Along with the dominant *Pinus taeda*, canopy associates often include *Quercus falcata*, *Acer rubrum*, *Prunus serotina* var. *serotina*, and *Sassafras albidum*. The tall-shrub layer is comprised of *Morella cerifera* (= *Myrica cerifera*) and *Vaccinium formosum*. Vines and lianas are always present in abundance; *Vitis rotundifolia* is most commonly present, but *Toxicodendron radicans*, *Smilax rotundifolia*, *Smilax glauca*, and *Parthenocissus quinquefolia* are usually present in abundance as well. The herbaceous layer may be sparse, particularly if shrubs and vines are dense, but *Chasmanthium laxum* may be fairly abundant in this community. Other herbs include *Panicum amarum* var. *amarulum*, *Eupatorium hyssopifolium*, and *Elephantopus nudatus*. In southern Virginia and North Carolina, *Quercus virginiana* and *Gelsemium sempervirens* may also be present, but *Quercus virginiana* is never abundant and when present is usually restricted to the understory. *Pinus taeda* may occur rarely in the Ouachita Mountains and Ozarks of Arkansas where the species is becoming naturalized, expanding from its native range in the Coastal Plain, where it naturally occurs in low, moist areas (e.g., deep, well-drained soils of floodplains). However, a natural *Pinus taeda* forest association is not recognized for the Ozark or Ouachita region.

Related Concepts:

- Loblolly Pine: 81 (Eyre 1980) I
- Lowland Pine - Oak Forest (Foti 1994b) ?
- T1A9bII2a. *Pinus taeda* (Foti et al. 1994) ?
- Upland Mixed Forest (FNAI 1992a) ?
- Upland Mixed Forest, Gumbo Loblolly Forest subtype (FNAI 1992b) ?

Classification Comments: On the Bankhead National Forest in the Cumberland Plateau of northern Alabama, this alliance includes streamside terraces that are presumed to have been previously farmed. Associations occurring as plantations are classed in *Pinus taeda* Planted Forest Alliance (A.99).

ALLIANCE DISTRIBUTION

Range: This alliance is found in the Cumberland Plateau, Piedmont and Coastal Plains of the southeastern United States, from Delaware and Maryland south and west to Texas, and in the interior to Tennessee and possibly West Virginia.

Subnations: AL, AR, DE, FL, GA, LA, MD, MS, NC, NJ, OK, SC, TN, TX, VA

TNC Ecoregions: 31:P, 39:C, 40:C, 41:C, 42:P, 43:C, 44:C, 50:C, 52:C, 53:C, 55:?, 56:C, 57:C, 58:C, 59:C, 62:C

USFS Ecoregions: 221D:CC, 221Jb:CCC, 222Cb:CCC, 222Dc:CCC, 222Dd:CCC, 222Eb:CCC, 222Ec:CCC, 222Eg:CCC, 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Ah:CCC, 231Ai:CCC, 231Aj:CCC, 231Ak:CCC, 231Al:CCC, 231Am:CCC, 231An:CCC, 231Ao:CCP, 231Ba:CCC, 231Bb:CCP, 231Bc:CCP, 231Bd:CCC, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCP, 231Bk:CCP, 231Bl:CC?, 231Ca:CCP, 231Cb:CCP, 231Cc:CCP, 231Cd:CCC, 231Ce:CCC, 231Cf:CCC, 231Cg:CCP, 231Da:CCP, 231Dc:CCC, 231De:CC?, 231Ea:CCC, 231Eb:CC?, 231Ec:CC?, 231Ed:CC?, 231Ef:CC?, 231Eg:CCP, 231Eh:CCC, 231Ei:CC?, 231Ej:CC?, 231Ek:CCP, 231En:CC?, 231Fa:CCP, 231Fb:CP?, 232Ac:CCC, 232Ba:CCC, 232Bb:CC?, 232Bc:CC?, 232Bd:CC?, 232Be:CC?, 232Bg:CCC, 232Bh:CC?, 232Bi:CC?, 232Bj:CCC, 232Bk:CC?, 232Bl:CC?, 232Bm:CCC, 232Bn:CC?, 232Bo:CC?, 232Bp:CC?, 232Bq:CCC, 232Br:CCC, 232Bt:CC?, 232Bu:CC?, 232Bv:CC?, 232Bx:CC?, 232Bz:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CC?, 232Ce:CCC, 232Cf:CC?, 232Cg:CC?, 232Ci:CC?, 232Da:CC?, 232Dc:CCC, 232Fa:CC?, 232Fb:CC?, 232Fe:CCC, 255Da:PPP, M221D:??

Federal Lands: DOD (Arnold, Fort Benning, Fort Gordon); NPS (Assateague Island, Cape Hatteras, Chickamauga-Chattanooga, Cowpens, Fort Donelson, Guilford Courthouse, Kennesaw Mountain, Kings Mountain, Little River Canyon?, Ninety Six, Shiloh?); TVA (Tellico); USFS (Angelina, Apalachicola, Bankhead, Bienville, Chattahoochee, Conecuh, Croatan, Davy Crockett, Kisatchie, Land Between the Lakes?, Oconee, Sabine NF, Sam Houston, Sumter, Talladega, Tuskegee, Uwharrie); USFWS (Chincoteague)

ALLIANCE SOURCES

References: Cain and Shelton 1994, Eyre 1980, FNAI 1992a, FNAI 1992b, Felix et al. 1983, Foti 1994b, Foti et al. 1994, Martin and Smith 1991, Martin and Smith 1993

I.A.8.N.B. *PINUS PALUSTRIS* - (*PINUS ELLIOTTII*) FOREST ALLIANCE (A.123) LONGLEAF PINE - (SLASH PINE) FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance accommodates flatwoods and other mesic Coastal Plain environments dominated by mixtures of *Pinus palustris* and *Pinus elliottii* var. *elliottii*. This includes a variety of situations, for example dense, fire-suppressed *Pinus elliottii* var. *elliottii* plantations and old-field stands, on former *Pinus palustris* sites, with a remnant semi-natural ground layer; in addition to other silviculturally manipulated stands, such as forests resulting from planting or regeneration of *Pinus elliottii* var. *elliottii* from seed trees. Examples of this alliance are generally silviculturally managed, so some examples at particular times may exhibit canopy coverage below the 60% cover limit for a forest, but all examples are conceptually included here. Burning frequencies for management purposes are generally increased in older stands (greater than 15 years of age).

Examples of this alliance in the West Gulf Coastal Plain include stands which are old plantations planted outside the natural range of *Pinus elliottii* var. *elliottii*, sometimes on former *Pinus palustris* sites. In this region, the local expression of this alliance depends on soil conditions. In mesic to dry-mesic uplands, the canopy may range from nearly pure *Pinus elliottii* (possibly with some *Pinus taeda* ingrowth) to a mixed canopy containing *Pinus elliottii* var. *elliottii* and *Pinus palustris* in combination. In the former case, soils are generally acidic silt loams and sandy loams; in the latter case they tend to be well-drained to moderately well-drained fine sandy loams and sands underlain by clay. The understory and herbaceous strata vary depending on management, site conditions, and canopy coverage; the tall-shrub stratum ranges from fairly dense to sparse, and may be patchy. In the Inner Coastal Plain of South Carolina (Savannah River Site), mature upland plantations in this alliance tend to develop an understory including *Nyssa sylvatica* and an herbaceous stratum dominated by *Rubus argutus*. In contrast, burned examples tend to have *Prunus serotina* var. *serotina* in the understory and *Andropogon virginicus* in the herbaceous layer.

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) I
- Loamy Hills Longleaf - Slash Pine Forest (Wieland 1994b) I
- Longleaf - Slash Pine Forest (Wieland 1994b) I
- Longleaf Pine - Slash Pine: 83 (Eyre 1980) I

Classification Comments: Associations on the Kisatchie, Angelina, and Sabine national forests are former plantations that are out of the natural range of *Pinus elliottii* var. *elliottii*. This alliance contains managed forests which are manipulated through silvicultural techniques such as burning and thinning. Initially planted as a seedling/sapling phase, they progress relatively quickly (9-12 years) to a forest physiognomy. See also the *Pinus elliottii* Planted Forest Alliance (A.95), for these younger stands are likely to be cut before succeeding to other vegetation types.

ALLIANCE DISTRIBUTION

Range: This alliance is found in the Coastal Plain of the United States in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 41:C, 53:C, 55:C, 56:C, 57:C

USFS Ecoregions: 232Ba:CCC, 232Be:CCC, 232Bf:CCC, 232Bg:CCC, 232Bh:CCC, 232Bi:CCC, 232Bj:CCC, 232Bk:CCC, 232Bn:CC?, 232Bo:CCP, 232Bp:CCP, 232Bq:CCP, 232Br:CCC, 232Bu:CC?, 232Bv:CC?, 232Ca:CCP, 232Cb:CCP, 232Cc:CCP, 232Cd:CCP, 232Ce:CCC, 232Cf:CCP, 232Db:CCC, 232Dc:CCC, 232Dd:CCP, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC, 232Ga:C??

Federal Lands: DOD (Eglin, Fort Bragg); DOE (Savannah River Site); NPS (Big Thicket); USFS (Angelina, Apalachicola, Conecuh, Croatan, Davy Crockett, De Soto, Francis Marion, Kisatchie, Sabine NF, Sam Houston?, Tuskegee?); USFWS (St. Marks)

ALLIANCE SOURCES

References: Allard 1990, Clewell 1981, Eyre 1980, Jones et al. 1981b, Pearson et al. 1987, Quarterman and Keever 1962, Smith pers. comm., Wieland 1994b

I.B.2.N.a. Lowland or submontane cold-deciduous forest

I.B.2.N.A. *FAGUS GRANDIFOLIA* - *QUERCUS ALBA* FOREST ALLIANCE (A.228) AMERICAN BEECH - WHITE OAK FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes southern mixed hardwood forests with admixtures of *Quercus alba* and *Fagus grandifolia*. Associations in this alliance include dry-mesic to mesic forests that typically occur on slopes and small stream bottoms in the Coastal Plain, and also in other adjacent physiographic provinces, including the southern part of Crowley's Ridge, Arkansas, and the

Piedmont. This alliance is distributed primarily north of the distribution of *Magnolia grandiflora*, but may also include stands within this range which lack a *Magnolia grandiflora* component. A diverse, often dense canopy is usually present, which may include *Liriodendron tulipifera*, *Liquidambar styraciflua*, *Quercus michauxii*, *Quercus pagoda*, *Carya cordiformis*, *Fraxinus americana*, and *Ulmus* spp. In the southern part of the range, examples of this alliance may have *Acer barbatum* and *Acer leucoderme* in the subcanopy. A widely variable understory and shrub layer is usually present. Although the herbaceous layer is typically sparse, it may contain a number of species restricted, or nearly so, to rich mesic habitats.

Related Concepts:

- *Fagus grandifolia* forest alliance (Hoagland 1998a) ?
- American Beech - White Oak / *Mitchella* Loamy Moist-Mesic Steep Slopes and Ravines (Turner et al. 1999) I
- American Beech-Southern Magnolia Series (Diamond 1993) I
- American Beech-White Oak Series (Diamond 1993) ?
- Basic Mesic Forest, Coastal Plain Subtype (Schafale and Weakley 1990) ?
- Basic Mesic Forest, Piedmont Subtype (Schafale and Weakley 1990) ?
- Beech-Sweet Gum-Tulip Poplar MAP (Pyne 1994) ?
- Calcareous Forest (Smith 1996a) I
- Calcareous mesophytic forest (Evans 1991) I
- Coastal Plain Beech Forest (Foti 1994b) ?
- Coastal Plain mesophytic cane forest (Evans 1991) I
- Deep soil mesophytic forest (Evans 1991) I
- Hardwood Slope Forest (Smith 1996a) I
- IA8b. Coastal Plain Calcareous Forest (Allard 1990) I
- IA8d. Southern Mixed Hardwood Forest (Allard 1990) I
- Mixed Mesophytic Forest (Foti 1994b) I
- Piedmont Mesic Broad-leaved Deciduous Forest (Ambrose 1990a) ?
- Piedmont/Coastal Plain Heath Bluff (Schafale and Weakley 1990) I
- T1B2a11a. *Fagus grandifolia* - *Ilex opaca* (Foti et al. 1994) ?

Classification Comments: This alliance presumably forms the core of the "Southern Mixed Hardwoods" of Monk et al. (1989). Although they recognized two subgroups within this type, these appear to be broader concepts than most associations as currently defined.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

Subnations: AL, AR, FL, GA, KY, LA, MS, NC, NJ, OK, SC, TN, TX, VA

TNC Ecoregions: 40:C, 41:C, 42:C, 43:C, 52:C, 53:C, 56:?, 57:C, 58:C

USFS Ecoregions: 222Ao:C??, 222Cb:CCP, 222Cc:CCC, 222D:C?, 231Aa:CCC, 231Ae:CCP, 231Af:CCC, 231Ba:CCP, 231Bc:CCC, 231Bd:CCC, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCC, 231Bi:CCP, 231Bj:CCP, 231Cd:CCP, 231Ea:CCC, 231Eb:CCP, 231Ed:CCC, 231Ej:CCP, 231Ek:CCP, 232A:CC, 232Ba:CCP, 232Bb:CCC, 232Bc:CCP, 232Bd:CCC, 232Be:CCP, 232Bf:CCP, 232Bg:CCC, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCC, 232Bm:CCP, 232Bn:CCC, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bu:CCP, 232Bv:CCP, 232Ca:CCC, 232Cb:CCC, 232Cf:CCC, 232Ch:CC?, 232Ea:CCC, 232Fa:CCC, 232Fb:CCP, 232Fe:CCC, 234Aa:CCC, 234Ab:CCC, 234Ad:CCP, 234An:CC?

Federal Lands: COE (Claiborne Lake); DOD (Fort Benning, Fort Stewart); NPS (Colonial, Congaree Swamp, Kings Mountain); USFS (Angelina, Apalachicola, Bienville, Conecuh, Croatan, De Soto, Francis Marion, Homochitto, Kisatchie, Ouachita?, Sabine NF, Sam Houston?, St. Francis, Talladega, Tombigbee, Tuskegee); USFWS (Lake Isom)

ALLIANCE SOURCES

References: Allard 1990, Ambrose 1990a, Clark 1974, Clark 1977c, Diamond 1993, Evans 1991, Foti 1994b, Foti et al. 1994, Frost et al. 1990, Hill 1992, Hoagland 1998a, Martin and Smith 1991, Monk 1965, Monk et al. 1989, Pyne 1994, Quarterman and Keever 1962, Rice and Peet 1997, Schafale and Weakley 1990, Smith 1996a, Soblo 1989, Turner et al. 1999, Ware 1970, Ware 1988, Ware and Ware 1992

**I.B.2.N.A. QUERCUS SHUMARDII - QUERCUS PAGODA FOREST ALLIANCE (A.252)
SHUMARD OAK - CHERRYBARK OAK FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: This alliance includes mesic upland forests of the Coastal Plain, which occur over calcareous substrates as well as over loess deposits. The canopies of stands are typically dominated by some combination of *Quercus shumardii*, *Quercus pagoda*, *Quercus muehlenbergii*, *Quercus michauxii*, *Fraxinus americana*, *Acer barbatum*, *Liquidambar styraciflua*, *Ulmus* spp., and *Carya* spp. Stands may also contain *Magnolia acuminata*, *Magnolia grandiflora*, *Liriodendron tulipifera*, *Quercus falcata*, *Fagus grandifolia*, *Gleditsia triacanthos*, *Diospyros virginiana*, *Tilia americana*, *Morus rubra*, *Juniperus virginiana* var. *virginiana*, and *Pinus taeda*.

The somewhat rare *Carya myristiciformis* may be present within its range. As presently circumscribed, this alliance includes rich forests of lower slopes above cypress or bottomland hardwood forests, as well as oak or oak-hardwood forests adjacent to Keiffer Prairies or Jackson Prairies of Louisiana, as well as other poorly-known and unusual forests over limestones or other basic to circumneutral strata in the East Gulf Coastal Plain and Upper East Gulf Coastal Plain.

The mesic calcareous forests associated with Jackson Prairies in Louisiana contain a dense canopy dominated by *Quercus shumardii*, *Quercus pagoda*, and *Fraxinus americana*, with *Liquidambar styraciflua*, *Magnolia acuminata*, *Liriodendron tulipifera*, *Quercus phellos*, *Quercus michauxii*, *Acer barbatum*, *Quercus muehlenbergii*, *Platanus occidentalis*, and *Pinus taeda*. The open to fairly dense subcanopy contains *Ostrya virginiana*, *Cornus florida*, *Acer barbatum*, *Asimina triloba*, *Ulmus alata*, *Frangula caroliniana*, *Zanthoxylum clava-herculis*, *Cercis canadensis*, *Hamamelis virginiana*, and *Sideroxylon lanuginosum*. The sparse shrub and woody vine layer includes *Bignonia capreolata*, *Aesculus pavia* var. *pavia*, *Rhus aromatica*, *Cocculus carolinus*, *Berchemia scandens*, and *Arundinaria gigantea* ssp. *gigantea*. The sparse herb layer includes *Carex cherokeensis*, *Lithospermum tuberosum*, *Botrychium virginianum*, *Aristolochia serpentaria*, *Delphinium carolinianum*, *Dioscorea quaternata*, *Trillium ludovicianum*, *Podophyllum peltatum*, *Polygonatum biflorum*, *Passiflora lutea*, *Phryma leptostachya*, *Spigelia marilandica*, *Taenidia integerrima*, *Phlox divaricata*, and *Smilax herbacea*. More information is needed on the composition and dynamics of this alliance outside of Louisiana.

In Kentucky, vegetation of this alliance occurs in the Upper East Gulf Coastal Plain on lower toe slopes above cypress or bottomland hardwood forests. Typical canopy trees include *Quercus phellos*, *Quercus michauxii*, *Quercus pagoda*, *Quercus falcata*, and *Quercus stellata*. These are often mixed with swamp species like *Quercus palustris* and upland forest species like *Quercus alba*. At these Kentucky sites, flooding occurs in winter, and groundwater probably remains high through most years, but upper soil horizons may become relatively dry in the summer.

Related Concepts: No information

Classification Comments: MP 2001-04-11: Stands are reported by Tom Govus from Broken Arrow Creek (Russell County, Alabama, directly across the Chattahoochee River from Georgia) which possibly should be placed here. Data from TG: "The stand is dominated by *Quercus muehlenbergii* and *Quercus shumardii*. The canopy also contains *Quercus pagoda*, *Fagus grandifolia*, *Quercus rubra*, *Carya alba* and *Fraxinus americana*. The subcanopy contains *Halesia tetraptera*, *Ulmus alata*, *Acer leucoderme*, *Cercis canadensis*, *Cornus florida*, and *Ostrya virginiana*. Shrubs include *Staphylea trifolia*, *Acer leucoderme*, *Hydrangea quercifolia*, *Ulmus alata*, and *Aesculus pavia*. Herbs include *Polystichum acrostichoides*, *Chasmanthium laxum* (dominant?), and *Solidago auriculata*. These are very short bluffs adjacent to the river and extending up Broken Arrow Creek (along the north aspect portions). Chris Oberholster has recently informed me that the substrate is the Blufftown Formation which includes a calcareous sand (?!!!). There is quite a bit of clay mining for bricks to the north and it may be that this forest is on calcareous clay." Additional info from TG 2001-04-12: "According to Chris Oberholster, the substrate is the Blufftown Formation which includes calcareous clays and sands. It is definitely a sticky, heavy clay which I assume was deposited by the Chattahoochee and perhaps cut into by Broken Arrow Creek to create this 1 mile +, linear, steep short bluff. The community composition described by the *Quercus shumardii* - *Quercus pagoda* Forest Alliance indeed hits the nail on the head. I now have an idea about the herbaceous layer which includes: *Phlox divaricata*, *Amsonia tabernaemontana*, *Trillium decipiens*! (perhaps an ecological equivalent to *Trillium ludovicianum*?), *Cynoglossum virginianum*, *Zephyranthes atamasca*, *Solidago auriculata*, *Lithospermum tuberosum*, *Nothoscordum bivalve*, *Geranium maculatum*, *Hepatica nobilis* var. *obtusata*, and many others - quite diverse. It seems like an unusual enough community to be worth the effort. If you ever can ever decide on an Association that you like for it please let me know. I would assume it to have a high Grank." *Juniperus virginiana* - *Fraxinus americana* - *Quercus shumardii* Forest Alliance (A.381) was in effect a mixed variant of A.252 (with *Juniperus*); it has now been merged (MP 2001-04).

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas (?), Georgia, Kentucky, Mississippi, Louisiana, South Carolina, and Tennessee. One association also presumably ranges into eastern Texas.

Subnations: AL, AR, GA?, KY, LA, MS, OK?, SC, TN, TX?

TNC Ecoregions: 40:C, 41:C, 43:C, 44:C, 53:C, 56:P, 57:C

USFS Ecoregions: 222Cb:CCC, 222Cc:CCP, 222Ce:CCP, 222Cg:CCC, 231Bd:CCC, 231Be:CC?, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Ea:CCP, 231Eb:CCC, 231Ej:CCC, 232Ba:CCP, 232Bb:CCP, 232Bd:CCP, 232Bj:CCP, 232Bl:CCC, 232Cb:CCC, 232Dc:C??, 232Fa:CCC, 234Ah:???, 234Ak:???, 234Al:???, 234An:???

Federal Lands: COE (Bayou Bodcau); DOD (Barksdale, Fort Benning, Fort Polk); NPS (Fort Donelson, Shiloh); USFS (Angelina, Davy Crockett, Francis Marion, Holly Springs?, Kisatchie, Sabine NF, Sam Houston)

ALLIANCE SOURCES

References: Allen 1993a, Martin and Smith 1991, Patterson et al. 1994, Smith et al. 1989, Wieland 2000a

I.B.2.N.A. *QUERCUS FALCATA* FOREST ALLIANCE (A.243) SOUTHERN RED OAK FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Dry oak forests with canopies characteristically dominated by *Quercus falcata*, typically with some combination of *Quercus stellata*, *Quercus velutina*, and *Quercus coccinea*. The relative dominance of these four species is variable between associations across the range of this alliance. *Quercus alba* may be present (although more likely in the understory than in the canopy), but it will rarely contribute to the dominance. Within its range, some examples have strong dominance by *Quercus coccinea*. In the Atlantic Coastal Plain, *Quercus nigra* may be the other oak sharing dominance with *Quercus falcata*. *Vaccinium* spp. are common in the understory of some stands (including successional ones on subxeric, intermediate sites). Some typical occurrences are found on well-drained sandy loam or clay loam soils that are often, although not always, shallow. Some other examples are found on sites with unusual soil conditions, such as hardpans with retarded drainage. These typically occur in upland flats and have been called xerohydric because they occasionally will have standing water in the winter due to a perched water table, but are droughty by the end of the growing season. The range of forests of this alliance is throughout the East Gulf Coastal Plain, West Gulf Coastal Plain, Upper West Gulf Coastal Plain, Piedmont, Carolina Sandhills, low mountains, and Cumberland and Interior Low plateaus. The overall distribution in the Atlantic Coastal Plain and Ouachita Mountains needs assessment.

Related Concepts:

- *Quercus falcata* forest alliance (Hoagland 1998a) ?
- Acidic xeric forest (Evans 1991) I
- Dry Oak--Hickory Forest, Coastal Plain Sand Variant (Schafale and Weakley 1990) ?
- Post Oak-Black Hickory Series (Diamond 1993) ?
- Southern Red Oak RV (Pyne 1994) ?
- Xerohydric flatwoods (Evans 1991) I

Classification Comments: This alliance is found in central and western Tennessee and Kentucky, rather than the montane portions of these states. There is a *Quercus coccinea*-dominated association in Tennessee (S. Major pers. comm.). Former *Quercus falcata* - *Fagus grandifolia* - *Pinus taeda* Forest Alliance (A.409) merged in here, its only association (CEGL007540) also moved here.

ALLIANCE DISTRIBUTION

Range: This alliance is found from Oklahoma, Kentucky, and North Carolina, south to Louisiana, Mississippi, and South Carolina, in the East Gulf Coastal Plain, Upper West Gulf Coastal Plain, Piedmont, Cumberland Plateau, Carolina Sandhills, low mountains, Interior Low Plateau, Ozarks, and Ouachitas. Its distribution and extent in the Atlantic Coastal Plain needs assessment. It is also reported from the Chesapeake Bay Region and the Northern Piedmont.

Subnations: AL, AR, DE, GA, IN?, KY, LA, MD, MO?, MS, NC, NJ, OK, SC, TN, TX

TNC Ecoregions: 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 52:P, 53:C, 56:C, 57:C, 58:C, 62:C

USFS Ecoregions: 221Hc:CPP, 221Ja:CCP, 221Jb:CCC, 222Cb:CCC, 222Cc:CCP, 222Ce:CCP, 222Da:CCC, 222Dc:CC?, 222Dg:CCC, 222Eb:CCC, 222Ej:CCC, 222El:CCC, 231Aa:CCC, 231Ae:CC?, 231Cd:CCC, 231Ea:CCC, 232Ab:CCC, 232Ac:CCP, 232Ba:CCP, 232Bb:CCP, 232Bh:CCP, 232Bi:CC?, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCP, 232Bt:CCC, 232Bu:CCP, 232Bv:CC?, 232Bx:CCC, 232Bz:CCP, 232Ca:CC?, 232Ce:CC?, 232Ci:CCC, 232Fa:CCP, 232Fb:CCP, 232Fe:CCC, 234Aa:CCP, 234Ab:CCC, 234Ac:CCC, 234Ae:CCC, 234Ag:CCP, 234Ah:CC?, 234Am:CC?, 234An:CCP, M222Ab:CCC, M231Aa:CCP, M231Ab:CCP, M231Ac:CCP, M231Ad:CCP

Federal Lands: DOD (Arnold, Fort Benning); NPS (Mammoth Cave, Shiloh); TVA (Tellico); USFS (Angelina, Bankhead, Bienville, Cherokee?, Conecuh, Davy Crockett, De Soto, Holly Springs, Homochitto, Kisatchie?, Ouachita, Sabine NF, Sam Houston, St. Francis, Talladega, Tombigbee, Tuskegee)

ALLIANCE SOURCES

References: Andreu and Tukman 1995, Diamond 1993, Evans 1991, Hoagland 1998a, Major pers. comm., Pyne 1994, Schafale and Weakley 1990, Wharton 1945

I.B.2.N.d. Temporarily flooded cold-deciduous forest

I.B.2.N.D. QUERCUS (MICHAUXII, PAGODA, SHUMARDII) - LIQUIDAMBAR STYRACIFLUA TEMPORARILY FLOODED FOREST ALLIANCE (A.291) (SWAMP CHESTNUT OAK, CHERRYBARK OAK, SHUMARD OAK) - SWEETGUM TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Stands of this alliance are typically dominated by some combination of *Quercus michauxii*, *Quercus pagoda*, and *Quercus shumardii*, with *Liquidambar styraciflua* typically as a significant component. All three of these primary oaks are possible in combination in the coastal plains, *Quercus pagoda* being the most restricted in range. *Quercus michauxii* will be absent from much of the Ozarks, Ouachitas, and Interior Low Plateau (except along the larger unimpounded rivers). *Quercus shumardii* is apparently absent from much of the Mississippi River Alluvial Plain. In addition, *Quercus phellos*, *Quercus laurifolia*, *Quercus similis*, *Quercus oglethorpensis*, *Quercus sinuata* var. *sinuata*, and/or *Quercus nigra* may also be present, but in combination with the other primary oaks. Other associated species include *Carya glabra*, *Carya ovata*, *Fraxinus americana*, *Fraxinus pennsylvanica*, *Carya alba*, *Carya*

cordiformis, *Carya myristiciformis*, *Nyssa biflora*, *Liriodendron tulipifera*, *Pinus taeda*, *Pinus glabra*, with *Carya laciniosa* in the northern part of the range of the alliance. Associated subcanopy and shrub species include *Asimina triloba*, *Ilex opaca* var. *opaca*, *Aesculus sylvatica*, *Carpinus caroliniana*, *Ilex decidua*, *Cornus foemina*, *Cornus florida*, *Halesia diptera*, and *Styrax americanus*. *Arundinaria gigantea* is common in forests in this alliance. Other herbaceous and vine species that may be present include *Phlox carolina*, *Chasmanthium laxum*, *Chasmanthium sessiliflorum*, *Tillandsia usneoides*, *Campsis radicans*, *Toxicodendron radicans*, and *Parthenocissus quinquefolia*. Within the Mississippi River Alluvial Plain, high presence of *Liquidambar* and *Quercus nigra* indicate past farming at least on the associated upland. This alliance occurs primarily in brownwater situations, and often occurs on terraces in second bottoms. This alliance is distributed throughout the Atlantic and Gulf coastal plains, the Piedmont, the Cumberland Plateau, the Interior Low Plateau, and in the Mississippi River Alluvial Plain northwards to southern Illinois.

Related Concepts:

- *Liquidambar styraciflua* - *Liriodendron tulipifera* (Jackson 1979) ?
- *Quercus* - *Carya/Hymenocallis* community (Voigt and Mohlenbrock 1964) ?
- *Quercus shumardii* - *Carya laciniosa* forests (Jackson 1979) ?
- Bottomland hardwood forest (Evans 1991) I
- Coastal Plain Bottomland Hardwoods, Brownwater Subtype (Schafale and Weakley 1990) ?
- IIA6b. Sweetgum - Mixed Bottomland Oak Forest (Allard 1990) I
- IIA8a. Forested Canebrake (Allard 1990) I
- IIA8b. Swamp Chestnut Oak - Cherrybark Oak Bottomland Forest (Allard 1990) ?
- Lowland Oak - Sweetgum Forest (Foti 1994b) ?
- P1B3cIII6a. *Quercus falcata* var. *pagodifolia* - *Quercus phellos* - *Liquidambar styraciflua* (Foti et al. 1994) ?
- P1B3cIII6c. *Quercus falcata* var. *pagodifolia* - *Quercus michauxii* - *Quercus phellos* (Foti et al. 1994) ?
- Swamp Chestnut Oak - Cherrybark Oak: 91 (Eyre 1980) I
- Swamp Chestnut Oak-Willow Oak Series (Diamond 1993) ?

Classification Comments: Status of this alliance in the Cumberlands need further assessment. Is a new association distinct from CEGLO02099 required? This forest type is widespread in the Coastal Plain of Arkansas and existed historically in the Arkansas Valley and becomes more limited in the Ouachita Mountains (J. Campbell pers. comm., D. Zollner pers. comm.). Arkansas types have *Arundinaria gigantea* in the understory.

Ridges along brownwater in the Altamaha River Bioserve are dominated by *Quercus michauxii* and *Quercus laurifolia* with a little *Quercus pagoda* (K. Tassin pers. comm.), and this occurs on blackwater in the Outer Coastal Plain of South Carolina (C. Aulbach-Smith pers. comm.).

One rare association in Louisiana that occurs on calcareous soils has a mixed canopy of *Quercus oglethorpensis*, *Quercus similis*, *Quercus sinuata* var. *sinuata*, *Quercus phellos*, *Quercus pagoda*, *Quercus shumardii*, *Quercus alba*, *Pinus taeda*, *Carya ovata*, *Acer barbatum*, *Liquidambar styraciflua*, *Fraxinus americana*, and *Ulmus alata*. Sparse subcanopy of canopy species. Sparse shrub layer of *Crataegus marshallii*, *Crataegus flava*, *Crataegus triflora*, *Aesculus pavia* var. *pavia*, *Bignonia capreolata*, and *Parthenocissus quinquefolia*. Herb layer sparse to moderately dense with *Trillium ludovicianum*, *Oxalis rubra*, *Carex cherokeensis*, *Sisyrinchium* sp., *Tillandsia usneoides*, *Pleopeltis polypodioides* ssp. *michauxiana*, *Chasmanthium sessiliflorum*, *Danthonia spicata*, *Lithospermum tuberosum*, *Allium canadense* var. *canadense*, and *Cardamine bulbosa*. Hydrologic placement of this association needs verification. In Mississippi, forests of this alliance are reported to occur "on heavy clays along small creeks that do not flood but get very wet" (R. Wieland pers. comm.). The former *Quercus pagoda* - *Quercus similis* Temporarily Flooded Forest Alliance (I.B.2.N.d) was joined with this alliance and the associations formerly in that alliance moved here.

ALLIANCE DISTRIBUTION

Range: This alliance occurs primarily in brownwater situations, and often occurs on terraces in second bottoms. This alliance is distributed throughout the Atlantic and Gulf coastal plains, the Piedmont, the southern Ridge and Valley, the Cumberland Plateau, the Interior Low Plateau, and in the Mississippi River Alluvial Plain northwards to southern Illinois. This alliance is found in southern Illinois, southern Indiana, southeastern Missouri, Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia, and possibly Florida (?), and Oklahoma (?).

Subnations: AL, AR, FL?, GA, IL, IN, KY, LA, MD, MO, MS, NC, OK?, SC, TN, TX, VA

TNC Ecoregions: 38:C, 39:?, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 52:C, 53:C, 56:C, 57:C, 58:C

USFS Ecoregions: 221He:CCC, 222A1:CCC, 222A0:CCP, 222Ca:CCC, 222Cb:CCC, 222Cc:CCC, 222Ce:CCP, 222Cf:CCP, 222Cg:CCC, 222Ch:CCC, 222Db:CCC, 222Dc:CCC, 222Di:CCC, 222Eb:CCC, 222Ee:CCP, 222Ef:CCP, 222Eg:CCP, 222Ff:CCC, 222Gc:CCC, 231Aa:CCC, 231Ac:CCC, 231Ae:CCC, 231Af:CCC, 231Ai:CCP, 231Aj:CCC, 231Ao:CCC, 231Ba:CCP, 231Bb:CCP, 231Bc:CCC, 231Bd:CCC, 231Be:CCP, 231Bg:CCP, 231Bh:CCC, 231Bj:CCC, 231Bk:CCP, 231Cd:CCC, 231Db:CCC, 231Dd:CCP, 231Ea:CCC, 231Eb:CCC, 231Ec:CC?, 231Ed:CC?, 231Ee:CC?, 231Ef:CC?, 231Eg:CC?, 231Eh:CCC, 231Ei:CC?, 231Ej:CCC, 231Ek:CC?, 231El:CCC, 231Em:CC?, 231En:CC?, 232Ad:CCC, 232Ba:CCP, 232Bb:CCC, 232Bc:CCP, 232Bd:CCP, 232Bi:CCP, 232Bj:CCC, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCC, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bv:CCC, 232Ca:CCC, 232Cb:CCC, 232Cg:CCC, 232Ch:CCP, 232Fa:CCC, 232Fb:CCP, 232Fc:CCC, 232Fd:CCC, 234Aa:CCP,

234Ab:CCP, 234Ac:CCC, 234Ae:CCC, 234Ag:CCP, 234Ah:CCP, 234Ak:CC?, 234Al:CC?, 234Am:CCP, 234An:CCC, M221Cd:CCC

Federal Lands: COE (Claiborne Lake, Jordan Lake); DOD (Arnold, Fort Benning, Pine Bluff Arsenal); DOE (Savannah River Site); NPS (Chickasaw NRA, Congaree Swamp, Ninety Six, Shiloh); USFS (Angelina, Apalachicola?, Bankhead, Bienville, Conecuh, Croatan?, Daniel Boone, Davy Crockett, De Soto, Delta, Francis Marion, Holly Springs?, Homochitto, Kisatchie, Oconee, Ouachita, Sabine NF, Sam Houston, St. Francis, Talladega, Tombigbee, Tuskegee); USFWS (Chickasaw NWR?, Eufaula, Felsenthal?, Hatchie, Overflow, Pond Creek, Reelfoot)

ALLIANCE SOURCES

References: Allard 1990, Aulbach-Smith pers. comm., Burns and Honkala 1990b, Campbell pers. comm., Diamond 1993, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Foti pers. comm., Jackson 1979, Klimas 1988b, Pell and Rettig 1983, Schafale and Weakley 1990, Tassin pers. comm., Voigt and Mohlenbrock 1964, Wharton et al. 1982, Wieland pers. comm., Zollner pers. comm.

LB.2.N.D. QUERCUS (PHELLOS, NIGRA, LAURIFOLIA) TEMPORARILY FLOODED FOREST ALLIANCE (A.292) (WILLOW OAK, WATER OAK, DIAMONDLEAF OAK) TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Forests in this alliance are typically dominated by some combination of *Quercus phellos*, *Quercus nigra*, and/or *Quercus laurifolia*. They may be found throughout the Coastal Plain and adjacent areas of the lower Piedmont, Arkansas Valley, Interior Low Plateau, and the Ouachita Mountains in temporarily flooded environments. These forests may occur in large, relatively high-gradient floodplains (in which they tend to occur on topographically higher portions of the floodplain, such as ridges or terraces), or in small, relatively low-gradient floodplains (in which the landforms are too small and/or too poorly developed to create much consistent, local topographic relief). In the Atlantic and East Gulf Coastal Plains, these forests may occur more often in association with blackwater/low-sediment/low-nutrient rivers and streams than brownwater ones. Dominant and associated species vary with geographic location and landscape setting. Associated canopy species include *Quercus texana*, *Fraxinus pennsylvanica*, *Pinus taeda*, *Quercus similis*, *Quercus michauxii*, *Magnolia virginiana*, *Pinus glabra*, *Liquidambar styraciflua*, *Acer rubrum*, *Nyssa biflora*, *Ulmus alata*, *Carya aquatica*, *Carya alba*, *Carya glabra*, *Quercus pagoda*, *Taxodium distichum*, and *Celtis laevigata*. Subcanopy and shrub species include *Halesia diptera*, *Carpinus caroliniana*, *Ilex decidua*, *Sebastiania fruticosa*, *Ostrya virginiana*, *Viburnum rufidulum*, *Diospyros virginiana*, *Itea virginica*, *Symplocos tinctoria*, *Rhododendron canescens*, *Illicium floridanum*, *Cyrilla racemiflora*, *Ilex verticillata*, *Crataegus viridis*, *Vaccinium elliotii*, and *Ilex opaca* among others. Woody vines are an important component of these forests, and species include *Toxicodendron radicans*, *Bignonia capreolata*, *Smilax rotundifolia*, *Vitis rotundifolia*, *Parthenocissus quinquefolia*, *Trachelospermum difforme*, *Berchemia scandens*, *Smilax glauca*, *Campsis radicans*, *Cocculus carolinus*, *Ampelopsis arborea*, and others. This alliance also includes forests of large bottomlands dominated by *Quercus phellos* and *Ulmus crassifolia* that occur on flat ridges and grade up from forests dominated by *Quercus lyrata* and *Carya aquatica*. Characteristic canopy species include *Pinus taeda*, *Quercus similis*, *Liquidambar styraciflua*, *Gleditsia triacanthos*, and *Carya aquatica*, but the wettest sites likely will have only *Quercus phellos* and *Ulmus crassifolia*. Understory species include *Ilex decidua*, *Viburnum dentatum*, and *Crataegus* spp., with *Sabal minor* in drier sites. These forests occur on very acid to mildly alkaline soils, commonly on Portland, Tensas, and Hebert silt loams.

Related Concepts:

- *Quercus nigra* forest alliance (Hoagland 1998a) ?
- Cedar Elm - Hackberry / *Justicia* Wet-Mesic Stream Bottoms (Turner et al. 1999) I
- Coastal Plain Bottomland Hardwoods, Blackwater Subtype (Schafale and Weakley 1990) ?
- P1B3cVIII14c. *Quercus phellos* - *Quercus laurifolia* (Foti et al. 1994) ?
- P1B3cVIII14d. *Quercus phellos* - *Quercus nigra* (Foti et al. 1994) ?
- Sweetgum - Willow Oak: 92 (Eyre 1980) I
- Water Oak-Willow Oak Series (Diamond 1993) ?
- Willow Oak - Laurel Oak / *Bignonia* Loamy Wet-Mesic Stream Bottoms (Turner et al. 1999) ?
- Willow Oak - Water Oak - Diamondleaf (Laurel) Oak: 88 (Eyre 1980) I
- Willow Oak Forest (Foti 1994b) ?

Classification Comments: From Eyre (1980). Water oak - willow oak communities occur in northeastern Texas (Eidson pers. comm.). Some vegetation of the Interior Low Plateau of southern middle Tennessee is tentatively placed here.

ALLIANCE DISTRIBUTION

Range: Forests in this alliance occur in the Atlantic Coastal Plain, lower Piedmont, Arkansas Valley, East Gulf Coastal Plain, West Gulf Coastal Plain, and the Ouachita Mountains. This alliance is found in Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and possibly Alabama (?) and Virginia (?).

Subnations: AL, AR, FL, GA, LA, MS, NC, OK, SC, TN, TX, VA?

TNC Ecoregions: 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:?, 52:C, 53:C, 55:P, 56:C, 57:C, 58:?

USFS Ecoregions: 222Eb:CCC, 222Ec:CC?, 222Eg:CC?, 231Aa:CCP, 231Ba:CCP, 231Bb:CCP, 231Bc:CCC, 231Bd:CCC, 231Be:CC?, 231Bf:CCP, 231Bi:CCP, 231Bj:CCP, 231Bl:CCP, 231Cc:C??, 231Cd:C??, 231Da:CC?, 231Db:CC?, 231Dc:CC?, 231Dd:CC?, 231De:CC?, 231Ea:CCP, 231Eb:CCP, 231Ec:CCP, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCC, 231Eh:CCC, 231Ei:CCC, 231Ej:CCP, 231Ek:CCP, 231El:CCC, 231Em:CCP, 231En:CCP, 231Ga:CCC, 231Gb:CCC, 232Ba:CCC, 232Bb:CCC, 232Bc:CCC, 232Bd:CCC, 232Be:CCC, 232Bf:CCC, 232Bg:CCC, 232Bh:CCC, 232Bi:CCC, 232Bj:CCC, 232Bk:CCC, 232Bl:CCC, 232Bm:CCC, 232Bn:CCC, 232Bo:CCC, 232Bp:CCC, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bt:CCC, 232Bu:CCC, 232Bv:CCC, 232Bx:CCC, 232Bz:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCC, 232Cd:CCC, 232Ce:CCC, 232Cf:CCC, 232Cg:CCC, 232Ch:CCC, 232Ci:CCC, 232Cj:CCC, 232Ea:CCC, 232Fa:CCC, 232Fb:CCC, 232Fc:CCC, 232Fd:CCP, 232Fe:CCC, 234Aa:CCC, 234Ab:CCC, 234Ac:CCC, 234Ae:CCP, 234Ag:CCP, 234Ah:CC?, 234Ai:CCC, 234Ak:CC?, 234Al:CC?, 234Am:CCP, 234An:CCP, 255:?, M231Ac:CCC, M231Ad:CCC

Federal Lands: COE (Arkansas River); DOD (Arnold, Fort Benning, Pine Bluff Arsenal); DOE (Savannah River Site); NPS (Big Thicket?, Congaree Swamp, Gulf Islands); USFS (Angelina, Apalachicola, Bienville, Conecuh, Croatan?, Davy Crockett, De Soto, Delta, Francis Marion, Holly Springs, Homochitto, Kisatchie, Oconee?, Ouachita, Sabine NF, Sam Houston, St. Francis, Talladega, Tombigbee, Tuskegee); USFWS (Big Lake?, Eufaula, Hatchie, Lower Hatchie?, Pond Creek)

ALLIANCE SOURCES

References: Allen 1993a, Diamond 1993, Eidson pers. comm., Eyre 1980, Foti 1994b, Foti et al. 1994, Gemborys and Hodgkins 1971, Glascock and Ware 1979, Golden 1979, Hoagland 1998a, Martin and Smith 1991, Nixon and Raines 1976, Schafale and Weakley 1990, Smith 1994c, Turner et al. 1999

I.B.2.N.D. *SALIX NIGRA* TEMPORARILY FLOODED FOREST ALLIANCE (A.297) BLACK WILLOW TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance contains vegetation that is dominated by *Salix nigra* and that occurs in temporarily flooded sites, i.e., surface water is present for brief periods during the growing season, but the water table usually lies well below soil surface. Other canopy species that may be present include *Populus deltoides*, *Planera aquatica*, *Betula nigra*, *Platanus occidentalis*, *Celtis laevigata*, *Fraxinus pennsylvanica*, *Carya illinoensis*, *Diospyros virginiana*, *Quercus nigra*, *Cornus drummondii*, *Ulmus americana*, *Acer rubrum*, *Acer negundo*, *Acer saccharinum* (in the Mississippi River Alluvial Plain north of Memphis, Tennessee), *Catalpa bignonioides* (in range), and *Morus rubra*. The herbaceous and shrub strata may be absent to fairly dense, and species that may be present include *Ampelopsis arborea*, *Mikania scandens*, *Toxicodendron radicans*, *Polygonum* spp., *Erechtites hieracifolia*, *Boehmeria cylindrica*, *Commelina virginica*, *Eupatorium serotinum*, *Phytolacca americana*, *Asplenium platyneuron*, and others. This alliance is common on the fronts of both small rivers and streams and larger rivers where it is a component of point bar succession. This alliance is common throughout the southeastern and southern midwestern United States.

Related Concepts:

- Alluvial forest (Evans 1991) I
- Black Willow: 95 (Eyre 1980) I
- IIA7a. Black Willow Riverfront Forest (Allard 1990) I
- Montane Alluvial Forest (Schafale and Weakley 1990) ?
- R1B3c13a. *Salix nigra* (Foti et al. 1994) ?
- Riparian forest (Evans 1991) I Riverfront Forest (Foti 1994b) I
- Rocky Bar and Shore (Schafale and Weakley 1990) ?
- Sand and Mud Bar (Schafale and Weakley 1990) ?

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in Iowa, Missouri, Virginia, West Virginia, Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas, and in Ontario, Canada. In addition, it is possibly found in Illinois (?), Indiana (?), Ohio (?), and Oklahoma (?).

Subnations: AL, AR, FL, GA, IA, IL?, IN?, KY, LA, MO?, MS, NC, OH?, OK?, ON, SC, TN, TX, VA, WV

TNC Ecoregions: 30:C, 31:C, 32:C, 33:C, 37:C, 38:P, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 50:C, 51:P, 52:P, 53:C, 55:P, 56:P, 57:C, 58:P, 59:P

USFS Ecoregions: 221Db:CCP, 221Eb:CCP, 221Ec:CCP, 221Ed:CC?, 221Ef:CC?, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221Hd:CCP, 221He:CCC, 221Ja:CCP, 221Jb:CCC, 221Jc:CCP, 222Ab:CCP, 222Ag:CCP, 222Ah:CCP, 222Al:CCP, 222Am:CCP, 222An:CCP, 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:CCP, 222Eb:CCC, 222Ec:CCP, 222Ed:CCP, 222Ee:CCP, 222Ef:CCP, 222Eg:CCP, 222Eh:CCP, 222Ei:CCP, 222Ej:CCP, 222Ek:CCP, 222En:CCC, 222Eo:CCC, 222Fa:CCP, 222Fb:CCP, 222Fc:CCP, 222Fd:CCP, 222Ff:CCP, 231Aa:CCP, 231Ab:CCP, 231Ac:CCP, 231Ad:CCP, 231Ae:CCP, 231Af:CCP, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCP,

231Ap:CCP, 231Ba:CCP, 231Bb:CCP, 231Bc:CCC, 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:CCP, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ei:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:CCP, 231Fb:CCP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCP, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Bg:CCP, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCC, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCP, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCP, 232Cb:CCP, 232Cc:CCP, 232Cd:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCP, 232Cj:CCP, 232Dc:CCP, 232Ee:CCP, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 232Fe:CCP, 234Aa:CC?, 234Ac:CCC, 234Ad:CCP, 234Af:CC?, 234Ag:CCC, 234Ah:CC?, 234Ai:CC?, 234Aj:CCP, 234Ak:CC?, 234Al:CC?, 234Am:CCC, 234An:CCC, 251Ea:CCP, 251Ec:CCP, 251Ed:CCP, 251Fb:CCP, 251Fc:CCP, 255Aa:CCP, 255Ab:CCP, 255Ac:CCP, 255Ad:CCP, 255Ae:CCP, 255Af:CCP, 255Ag:CCP, 255Ah:CCP, 255Ai:CCP, 255Aj:CCP, 255Ak:CCP, 255Ba:CCP, 255Ca:CCP, 255Cb:CCP, 255Cc:CCP, 255Cd:CCP, 255Ce:CCP, 255D:CC, 311A:CC, 315E:CC, 332E:CC, M221Aa:CCP, M221Ab:CCP, M221Ba:CCP, M221Bd:CCP, M221Be:CCP, M221Ca:CCP, M221Cb:CCP, M221Cc:CCP, M221Cd:CCC, M221Ce:CCP, M221Da:CCP, M221Db:CCP, M221Dc:CCP, M221Dd:CCP, M222Aa:CCP, M222Ab:CCP, M231Aa:CCP, M231Ab:CCP, M231Ac:CCP, M231Ad:CCP

Federal Lands: COE (Arkansas River); DOD (Arnold, Fort Benning); DOE (Savannah River Site); NPS (Congaree Swamp, Ninety Six, Stones River); TVA (Tellico); USFS (Angelina, Apalachicola, Bienville, Cherokee?, Conecuh, Daniel Boone, Davy Crockett, De Soto, Delta, Francis Marion, Holly Springs, Kisatchie, Nantahala, Ocala?, Pisgah, Sabine NF, Sam Houston, St. Francis, Sumter?, Talladega, Tombigbee, Tuskegee); USFWS (Chickasaw NWR, Lower Rio Grande Valley, Reelfoot?, Santa Ana)

ALLIANCE SOURCES

References: Allard 1990, Burns and Honkala 1990b, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Klimas 1988b, Schafale and Weakley 1990, Van Auken and Bush 1988, Wharton et al. 1982

I.B.2.N.D. *POPULUS DELTOIDES* TEMPORARILY FLOODED FOREST ALLIANCE (A.290) EASTERN COTTONWOOD TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance, found throughout the central midwestern and southeastern United States, contains riverfront floodplain forests. The tree canopy is tall (to 30 m) and dominated by *Populus deltoides* and *Salix nigra*, although *Fraxinus pennsylvanica*, *Acer negundo*, *Acer rubrum*, *Acer saccharinum*, *Platanus occidentalis*, and *Ulmus americana* are also commonly encountered in various parts of this alliance's range. Tree diversity is limited due to the dynamics of flooding and deposition/scouring of sediments. The shrub layer is often sparse, but species such as *Salix exigua*, *Carpinus caroliniana*, *Lindera benzoin*, *Cornus drummondii* and, in the Southeast, *Ilex vomitoria*, *Ilex opaca* var. *opaca*, and *Forestiera acuminata* can be found. Herbaceous growth can be thick and lush but is often patchy and sparse due to frequent inundation. Herbaceous species found throughout the range of this alliance are not well known, but in parts of the range, species can include *Carex* spp., *Leersia oryzoides*, *Bidens* spp., Asteraceae spp., *Eragrostis hypnoides*, *Lipocarpa micrantha*, *Rumex maritimus*, *Potentilla paradoxa*, and, more commonly in the Southeast, *Leptochloa panicea* ssp. *mucronata* (= *Leptochloa mucronata*) and *Mikania scandens*.

Stands are found primarily along riverfronts, where they develop on bare, moist soil on newly made sand bars, front-land ridges, and well-drained flats. Soils are formed in alluvium, are deep, medium-textured, and with adequate or excessive moisture available for vegetation during the growing season. This alliance can also be found on abandoned fields and well-drained ridges in the first bottoms.

Related Concepts:

- *Populus deltoides* Dominance Type (Hansen et al. 1988b) I
- *Populus deltoides* forest alliance (Hoagland 1998a) ? *Populus-Salix* wetland forest (No. 24) (Vankat 1990) I
- Cottonwood: 63 (Eyre 1980) I
- II A7c. Eastern Cottonwood - Willow Riverfront Forest (Allard 1990) I
- R1B3cI2a. *Populus deltoides* (Foti et al. 1994) ?
- R1B3cI2c. *Populus deltoides* - *Salix nigra* - *Celtis laevigata* (Foti et al. 1994) ?
- Riparian forest (Evans 1991) I
- Riverfront Forest (Foti 1994b) I

Classification Comments: In the Midwest, this alliance can overlap floristically with the I.B.2.N.d *Acer saccharinum* Temporarily Flooded Forest Alliance (A.279), particularly where historic flooding regimes have been altered, leading to stabilized substrates and suitable conditions for *Acer saccharinum* and other species less tolerant of floods. Where *Acer saccharinum* is either codominant with *Populus deltoides* or has become the dominant subcanopy species and understory composition reflects the new hydrologic regime, the stand should be placed in that alliance. This alliance is known from Kentucky's Mississippi River Alluvial Plain, where it provides nesting habitat for the Mississippi Kite.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina (?), Oklahoma, South Carolina, Tennessee, Texas, Virginia, Indiana (?), Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota (?), South Dakota, Wisconsin, Montana, and in Canada, in Saskatchewan. It is likely to occur elsewhere.

Subnations: AB, AL, AR, FL, GA, IA, IL, IN, KS, KY, LA, MN, MO, MS, MT, NC, ND, NE, OH, OK, SC, SD, SK, TN, TX, VA?, WI

TNC Ecoregions: 10:C, 25:C, 26:C, 31:C, 32:C, 33:C, 35:C, 36:C, 37:C, 38:C, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 46:C, 53:C, 56:C, 57:C, 58:?

USFS Ecoregions: 212Aa:P??, 212Ab:P??, 212Ba:PPP, 212Bb:PPP, 212Ca:PPP, 212Cb:PPP, 212Da:PPP, 212Dc:PPP, 212Ea:PPP, 212Eb:PPP, 212Ec:PPP, 212Ed:PP?, 212Fa:PPP, 212Fb:PPP, 212Fc:PPP, 212Ga:PPP, 212Gb:PPP, 221Aa:PP?, 221Ad:PPP, 221Ae:PPP, 221Af:PPP, 221Ag:PPP, 221Ah:PP?, 221Ai:PPP, 221Aj:PP?, 221Ak:PPP, 221Al:PPP, 221Ba:PPP, 221Bb:PPP, 221Bc:PPP, 221Bd:PPP, 221Db:PPP, 221Ea:PPP, 221Eb:PPP, 221F:PP, 222Ab:CCC, 222Ad:CC?, 222Ae:CC?, 222C:CP, 222D:CP, 222E:CP?, 222Ef:CP?, 222Eg:CP?, 222F:CP, 222G:CP, 222H:CP, 222Ia:CPP, 222Ib:CPP, 222Ic:CPP, 222Id:CPP, 222Ie:CPP, 222If:CPP, 222J:CP, 222K:CP, 222L:CCC, 222M:CCC, 222Me:CCC, 231Aa:CCP, 231Ae:CCP, 231Af:CCP, 231Ak:CCP, 231Al:CCP, 231An:CCP, 231Ap:CCP, 231Ba:CC?, 231Bb:CC?, 231Bc:CC?, 231Bd:CC?, 231Be:CC?, 231Bf:CCC, 231Bg:CC?, 231Bh:CC?, 231Bi:CC?, 231Bj:CC?, 231Bk:CC?, 231Bl:CC?, 231Ca:CP?, 231Cb:CP?, 231Cc:CP?, 231Cd:CP?, 231Ce:CP?, 231Cf:CP?, 231Cg:CP?, 231Ec:CCP, 231Ed:CCP, 231El:CCP, 231Em:CCP, 231F:CP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ad:CPP, 232Bj:CCC, 232Br:CCP, 232Bs:CCC, 232C:CP, 232Fc:CCP, 232Fd:CCP, 234Aa:CCC, 234Ac:CCC, 234Ad:CCC, 234Ae:CC?, 234Af:CC?, 234Ag:CCC, 234Ah:CCP, 234Ai:CCP, 234Ak:CC?, 234Al:CCP, 234Am:CCC, 234An:CCC, 251Aa:CCC, 251Ba:CCC, 251Bb:CCC, 251Cd:CC?, 251Cg:CCC, 251Cq:CCC, 251D:CP, 251Ea:CCC, 251Fa:CCC, 255Aa:CC?, 255Ab:CC?, 255Ac:CC?, 255Ad:CC?, 255Ae:CC?, 255Af:CC?, 255Ag:CCC, 255Ah:CCC, 255Ai:CC?, 255Aj:CCC, 255Ak:CC?, 255Db:CCC, 311A:CC, 331D:CC, 331E:CC, 331F:CC, 331G:CC, 332A:CC, 332B:CP, 332C:CC, 332D:CC, 332E:CC, 342A:??, M212Ac:PPP, M212Ad:PPP, M212Ba:PPP, M212Bb:PPP, M212Ca:PPP, M212Cc:PPP, M212Cd:PPP, M212Da:PPP, M212Db:PPP, M212Dc:PPP, M212Ea:PP?, M212Eb:PPP, M212Fa:PP?, M212Fb:PPP, M221Aa:?PP, M221Ab:?PP, M221Bb:?PP, M221Bd:?PP, M221Be:?PP, M221Bf:?PP, M221Ca:?PP, M221Cb:?PP, M221Cd:?PP, M221Da:???, M331A:CC, M331B:C?, M332D:CC

Federal Lands: COE (Claiborne Lake); NPS (Badlands, Congaree Swamp); USFS (Angelina, Apalachicola, Conecuh, Davy Crockett, De Soto, Delta, Francis Marion?, Holly Springs?, Homochitto?, Kisatchie, Sabine NF, Sam Houston, St. Francis?, Sumter, Tombigbee?); USFWS (Chickasaw NWR, Hatchie, Holla Bend, Lower Hatchie?, Reelfoot?)

ALLIANCE SOURCES

References: Allard 1990, Ambrose 1990a, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Hansen et al. 1988b, Hansen et al. 1991, Hansen et al. 1995, Hoagland 1998a, Klimas 1988b, MTNHP unpubl. data, Oberholster 1993, Smith 1996a, TNC 1996b, Van Auken and Bush 1988, Vankat 1990, Voigt and Mohlenbrock 1964, Wieland 1994b

I.B.2.N.D. *FRAXINUS PENNSYLVANICA* - *ULMUS AMERICANA* - *CELTIS (OCCIDENTALIS, LAEVIGATA)* TEMPORARILY FLOODED FOREST ALLIANCE (A.286)

GREEN ASH - AMERICAN ELM - (NORTHERN HACKBERRY, SUGARBERRY) TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Forests of this alliance occur on base-rich alluvial sites in floodplains of large and small, generally alluvial or brownwater rivers, on low ridges, flats, and sloughs of first bottoms; and terrace flats and sloughs. Species composition differs somewhat with geography and topographic position. Dominant species in these forests are some combination of *Celtis laevigata*, *Celtis occidentalis*, *Fraxinus pennsylvanica*, and *Ulmus americana*. Characteristic canopy and subcanopy species include *Carya aquatica*, *Quercus texana*, *Quercus phellos*, *Quercus nigra*, *Quercus lyrata*, *Quercus laurifolia*, *Quercus muehlenbergii*, *Taxodium distichum*, *Sideroxylon lanuginosum*, *Liquidambar styraciflua*, *Ulmus alata*, *Ulmus crassifolia*, *Ulmus rubra*, *Nyssa biflora*, *Diospyros virginiana*, *Gleditsia aquatica*, *Gleditsia triacanthos*, *Acer rubrum*, *Acer negundo*, *Acer saccharinum*, *Platanus occidentalis*, *Populus deltoides*, *Salix nigra*, *Carya illinoensis*, *Morus rubra*, *Carpinus caroliniana*, *Asimina triloba*, *Planera aquatica*, *Cornus foemina*, and *Crataegus viridis*. Common shrubs include *Cornus drummondii* and *Ilex decidua*. Vines are especially common in these forests, and species that may be present include *Berchemia scandens*, *Campsis radicans*, *Smilax bona-nox*, *Bignonia capreolata*, *Vitis rotundifolia*, *Brunnichia ovata*, *Cocculus carolinus*, and *Toxicodendron radicans*. Common herbaceous species include *Carex grayi*, *Carex lupulina*, *Carex retroflexa*, *Carex intumescens*, *Pilea pumila*, *Viola affinis*, *Galium tinctorium*, *Carex bromoides*, *Elymus virginicus*, *Packera glabella* (= *Senecio glabellus*), *Hydrocotyle verticillata*, and *Stellaria prostrata*. Occasionally, small occurrences of this community may be composed of almost pure *Fraxinus pennsylvanica* particularly on moist flats or in shallow sloughs; likewise occurrences on fronts are more likely to be dominated by *Celtis* spp. *Celtis laevigata* is common in the southern portion of the alliance's range, while *Celtis occidentalis* is more common in the north. This is a very widely distributed alliance that occurs in suitable habitat from the Prairie Parkland of North Dakota, Saskatchewan, and Manitoba to the Coastal Plain of Florida. It occurs on the Atlantic Coastal Plain and Piedmont as far north as Virginia, and is common as well in the Interior Low Plateau. It is attributed to the Cumberland/Southern Ridge and Valley, but without complete information. In the leveed Mississippi River Alluvial Plain, this

alliance was found to succeed from Black Willow Riverfront Forest away from the levee, from Sycamore - Sweetgum - American Elm Bottomland Forest following repeated disturbance, and from Sweetgum - Mixed Bottomland Oak Forest following repeated selective harvests.

Related Concepts:

- *Fraxinus pennsylvanica* forest alliance (Hoagland 1998a) ?
- *Ulmus - Fraxinus* wetland forest (No. 25) (Vankat 1990) ?
- *Ulmus americana/rubra* forest alliance (Hoagland 1998a) ?
- Bottomland Hardwood Forest (Smith 1996a) I
- Bottomland hardwood forest (Evans 1991) I
- Coastal Plain Levee Forest, Brownwater Subtype (Schafale and Weakley 1990) ?
- IIA6d. Sugarberry - American Elm - Green Ash Bottomland Forest (Allard 1990) ?
- P1B3cIV9a. *Celtis laevigata - Fraxinus pennsylvanica - Ulmus americana* (Foti et al. 1994) ?
- Silver Maple - American Elm: 62 (Eyre 1980) I
- Sugarberry - American Elm - Green Ash: 93 (Eyre 1980) I
- Sugarberry - Elm - Ash (Foti 1994b) ?
- Sugarberry-Elm Series (Diamond 1993) I

Classification Comments: In the Midwest, this alliance is typically found between a wetter or earlier successional forest on the river side and upland forest or prairie communities on the landward side (Weaver 1960). An Arkansas type is described as occurring in 'poorly drained bottomlands' (Foti et al. 1994). This alliance may exist as seasonally flooded vegetation in the Arkansas River Valley. There is a gravel streambank association in the Uwharrie National Forest, North Carolina, with *Alnus serrulata* and *Plantago cordata* dominated by *Fraxinus pennsylvanica*. Sugarberry - American Elm - Green Ash Bottomland Forest was found to be the second most common bottomland type in the Gulf Coastal Plain; Klimas (1988a) found this type to be the most common in the leveed Mississippi River Alluvial Plain, comprising 23.1% of the area.

ALLIANCE DISTRIBUTION

Range: This alliance is found from the southeastern and south-central United States to the northern Great Plains and southern Great Lakes region. Its distribution includes North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Alabama, Arkansas, Florida (?), Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia; and in Canada in Saskatchewan, Manitoba, and Ontario.

Subnations: AL, AR, DE, FL?, GA, IA, IL, IN, KS, KY, LA, MB, MD?, MI, MN, MO, MS, NC, ND, NE, NJ, OH, OK, ON, PA, SC, SD, TN, TX, VA?, WI

TNC Ecoregions: 32:C, 33:C, 34:C, 35:C, 36:C, 37:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:P, 44:C, 45:C, 46:C, 47:C, 48:C, 49:C, 50:C, 52:C, 53:C, 56:P, 57:C, 58:P, 61:C

USFS Ecoregions: 212Hb:CC?, 212He:CCP, 212Hm:CCP, 212Hq:CCC, 212Hr:CCP, 212Hs:CCP, 212Ht:CCP, 212Hu:CCP, 212Hx:CCP, 212Hy:CCP, 212Ja:CPP, 212Jb:CPP, 212Jc:CPP, 212Jl:CPP, 212Jm:CPP, 212Jn:CPP, 212Jo:CPP, 212Kb:CCC, 212Mb:CCC, 212Na:CCC, 212Nb:CCP, 212Nc:CCC, 212Nd:CCC, 212D:CC, 212Ec:CCP, 212Ed:CCP, 212Ef:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Aj:CCC, 222Ak:CCC, 222Am:CCC, 222Ao:CCP, 222Ca:CCP, 222Cb:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CC?, 222Cg:CC?, 222Ch:CCP, 222Da:CC?, 222Dc:CCC, 222Dd:CC?, 222Dg:CC?, 222Di:CCP, 222Ee:CC?, 222Ef:CC?, 222Eg:CC?, 222Eh:CC?, 222Ek:CCC, 222Em:CCP, 222Fd:CCC, 222Fe:CCC, 222Ha:CCC, 222Hb:CCC, 222Hf:CCC, 222If:CCC, 222Jb:CCC, 222Jc:CCC, 222Jg:CCC, 222Jh:CCC, 222Ji:CCC, 222Lc:CCC, 222Lf:CCC, 222Ma:CCC, 222Mb:CCC, 222Mc:CCC, 222Md:CCC, 222Me:CCC, 222Na:CCC, 231Aa:CCC, 231Ab:CC?, 231Ac:CC?, 231Ad:CC?, 231Ae:CCC, 231Af:CCC, 231Ag:CC?, 231Ah:CC?, 231Ai:CC?, 231Aj:CC?, 231Am:CC?, 231An:CC?, 231Ao:CC?, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCP, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCC, 231Bk:CCP, 231Bl:CCC, 231Ca:CP?, 231Cb:CP?, 231Cc:CP?, 231Cd:CP?, 231Ce:CP?, 231Cf:CP?, 231Cg:CP?, 231Da:CP?, 231Db:CP?, 231Dc:CP?, 231Dd:CP?, 231De:CP?, 231Ea:CCC, 231Eb:CCP, 231Ec:CCC, 231Ed:CCC, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCC, 231Em:CCC, 231Fa:C??, 231Fb:C??, 231Ga:CCC, 231Gc:CC?, 232Ba:CCP, 232Bb:CCC, 232Bc:CCP, 232Bd:CCP, 232Bg:CC?, 232Bh:CCP, 232Bi:CCP, 232Bj:CCC, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCP, 232Br:CCP, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCC, 232Cb:CCC, 232Cc:CCP, 232Cd:CCP, 232Ce:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCP, 232Ci:CCP, 232Cj:CCP, 232D:CP, 232Ea:CP?, 232Eb:CP?, 232Fa:CCP, 232Fb:CCP, 232Fc:CCC, 232Fd:CCP, 232Fe:CCP, 234Aa:CCC, 234Ac:CCC, 234Ad:CCC, 234Ae:CCP, 234Af:CCC, 234Ag:CCC, 234Ah:CCC, 234Ai:CCC, 234Aj:CCC, 234Ak:CCC, 234Al:CCC, 234Am:CCC, 234An:CCC, 251Aa:CCC, 251Ab:CCC, 251Ba:CCC, 251Bb:CCC, 251Be:CCC, 251Cd:CCP, 251Cp:CCC, 251Cq:CCC, 251Eb:CCC, 251Fd:CCC, 251G:CC, 255Aa:CC?, 255Ab:CC?, 255Ac:CC?, 255Ad:CC?, 255Ae:CC?, 255Af:CC?, 255Ag:CCP, 255Ah:CC?, 255Ai:CC?, 255Aj:CC?, 255Ak:CC?, 255Ba:CCC, 255Ce:CCC, 332:P, M231A:CC

Federal Lands: DOD (Fort Benning, Pine Bluff Arsenal); DOE (Oak Ridge); NPS (Chickasaw NRA, Congaree Swamp, Shiloh, Stones River, Theodore Roosevelt); USFS (Angelina, Apalachicola?, Bienville, Davy Crockett, Delta, Kisatchie, Oconee, Sabine NF, Sam Houston, St. Francis, Tombigbee?, Tuskegee, Uwharrie); USFWS (Eufaula, Hatchie, Lower Hatchie?, Reelfoot?)

ALLIANCE SOURCES

References: Allard 1990, Burgess et al. 1973, Bush and Van Auken 1983, Diamond 1993, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Hoagland 1998a, Jackson and Thomas 1983, Klimas 1988a, McWilliams and Rosson 1990, Rice and Peet 1997, Schafale and Weakley 1990, Smith 1996a, Smith and Craig 1990, Thieret 1971, Vankat 1990, Weaver 1960, Wharton et al. 1982, Whipple et al. 1981

I.B.2.N.D. *BETULA NIGRA* - (*PLATANUS OCCIDENTALIS*) TEMPORARILY FLOODED FOREST ALLIANCE (A.280)

RIVER BIRCH - (SYCAMORE) TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Forests in this alliance occur on riverfronts in areas with repeated, frequent, natural disturbance in the form of flooding. In addition to the codominants *Betula nigra* and *Platanus occidentalis*, a variety of canopy species occur in these forests, including *Acer negundo*, *Populus deltoides*, *Acer saccharinum*, *Salix nigra*, *Celtis laevigata*, *Quercus laurifolia*, *Liriodendron tulipifera*, and *Liquidambar styraciflua*. The subcanopy or tall-shrub strata may include *Cornus florida* and *Carpinus caroliniana*, along with *Acer rubrum*, *Ilex opaca*, *Ulmus alata*, *Prunus serotina*, and *Carya* spp. The shrub layer is often sparse with such species as *Asimina triloba*, *Lindera benzoin*, *Crataegus marshallii*, and *Crataegus viridis* present. The herbaceous and vine components may be lush and diverse, and species of these strata include *Boehmeria cylindrica*, *Campsis radicans*, *Elymus hystrix*, *Stellaria pubera*, *Impatiens capensis*, *Pilea pumila*, *Bignonia capreolata*, *Toxicodendron radicans*, *Berchemia scandens*, *Campsis radicans*, *Parthenocissus quinquefolia*, *Vitis rotundifolia*, *Chasmanthium latifolium* (= *Uniola latifolia*), *Arundinaria gigantea*, and *Podophyllum peltatum*. These forests occur more frequently on sandy soils than on heavier soils and their most characteristic location is on levees. The soils are deep and well-drained with low organic matter content and are most commonly of the Orders Inceptisol and Entisol. This is a wide ranging alliance that occurs throughout most of the southeastern and midwestern United States.

Related Concepts:

- *Betula nigra* forest alliance (Hoagland 1998a) ?
- Floodplain Forest (Smith 1991) ?
- IIA7b. River Birch - Sycamore Riverfront Forest (Allard 1990) ?
- R1B3cII4a. *Betula nigra* - *Platanus occidentalis* (Foti et al. 1994) ?
- Riparian forest (Evans 1991) I
- River Birch - Sycamore: 61 (Eyre 1980) I
- Riverfront Forest (Foti 1994b) I
- Sycamore - (river birch) - box-elder floodplain forest (Fike 1999) ?

Classification Comments: In the Ouachita Mountains of Arkansas and Oklahoma, these forests occur along larger streams and rivers, especially those with a sandy substrate.

ALLIANCE DISTRIBUTION

Range: This is a wide-ranging alliance that occurs throughout most of the southeastern and midwestern United States. This alliance is found in eastern Iowa, Missouri, Illinois, Indiana, Ohio, Virginia, West Virginia, Florida, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas. It may be found in Canada in southern Ontario (?).

Subnations: AL, AR, DE, FL, GA, IA, IL, IN, KY, LA, MD, MO, MS, NC, NJ, NY, OH, OK, ON?, PA, SC, TN, TX, VA, WV

TNC Ecoregions: 32:P, 36:C, 37:P, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 45:C, 48:C, 49:C, 50:C, 51:C, 52:C, 53:C, 55:C, 56:C, 57:C, 58:P, 59:C, 60:C, 61:C

USFS Ecoregions: 212Fa:CCC, 212Fb:CCP, 212Fc:CCC, 212Fd:CCC, 212Ga:CCP, 212Gb:CCP, 221Bd:CCC, 221Db:CCP, 221Ea:CCC, 221Eb:CCP, 221Ec:CCC, 221Ed:CCP, 221Ef:CCC, 221Eg:CCC, 221Fa:CCC, 221Fc:CCC, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 221Ja:CCP, 221Jb:CCP, 222Ab:CCC, 222Ad:CCP, 222Ae:CCP, 222Af:CCC, 222Ca:CCP, 222Cb:CCP, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CCC, 222Cg:CCC, 222Ch:CCP, 222En:CCC, 222Eo:CCC, 222Ga:CCC, 222Ha:CCC, 222If:CCC, 231Aa:CCP, 231Ab:CCP, 231Ac:CCP, 231Ad:CCP, 231Ae:CCP, 231Af:CCP, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap: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:CCC, 231Eb:CCP, 231Ec:CCP, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCC, 231Eh:CCP, 231Ei:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:CCP, 231Fb:CCP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ba:CCC, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Be:CCP, 232Bf:CCC, 232Bg:CCP, 232Bh:CC?, 232Bi:CCC, 232Bj:CCC, 232Bk:CCP, 232Bl:CCC, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCP, 232Br:CCP, 232Bs:CCP, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCP, 232Cb:CCP, 232Cc:CCP, 232Cd:CCP, 232Ce:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCP, 232Ci:CCP, 232Cj:CCP, 232Dc:CCC, 232Fa:CCC, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 232Fe:CCC, 234A:PC, 251Ea:CCP, 251Ec:CCP, 251Ed:CCP, 251Fb:CCP, 251Fc:CCP, 255:C, M212Eb:CCC, M221Aa:CCC, M221Ac:CCC,

M221Ad:CCC, M221Be:CCC, M221Bf:CCC, M221Cd:CCC, M221Da:CCC, M221Dc:CCC, M222Aa:CCP, M222Ab:CCP, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Fort Benning); NPS (Mammoth Cave, Shiloh); USFS (Angelina, Apalachicola, Bankhead?, Bienville, Chattahoochee, Conecuh, Croatan?, Daniel Boone, Davy Crockett, De Soto, Delta, Francis Marion?, Holly Springs, Kisatchie, Oconee, Osceola?, Ouachita, Ozark, Sabine NF, Sam Houston, St. Francis, Sumter, Talladega, Tombigbee, Tuskegee); USFWS (Felsenthal?, Hatchie?, Little River, Overflow?, Pond Creek)

ALLIANCE SOURCES

References: Allard 1990, Burns and Honkala 1990a, Campbell 1988, Campbell 1989b, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Fike 1999, Foti 1994b, Foti et al. 1994, Fowells 1965, Gettman 1974, Hoagland 1998a, Klimas et al. 1981, Smith 1991, Wharton 1978, Wharton et al. 1982

I.B.2.N.D. PLATANUS OCCIDENTALIS - (FRAXINUS PENNSYLVANICA, CELTIS LAEVIGATA, ACER SACCHARINUM) TEMPORARILY FLOODED FOREST ALLIANCE (A.288) SYCAMORE - (GREEN ASH, SUGARBERRY, SILVER MAPLE) TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Forests in this alliance occur on the fronts, terraces, and levees of small, medium and large rivers of the Atlantic Coastal Plain, Southern Ridge and Valley, Interior Low Plateau, Ozark Highlands, Ouachita Mountains, Arkansas Valley, East and West Gulf coastal plains, Mississippi River Alluvial Plain, Cumberland Plateau, Southern Blue Ridge, and lower Piedmont. These forests are dominated by *Platanus occidentalis* or a mixture of it with *Fraxinus pennsylvanica*, *Celtis laevigata*, and *Acer saccharinum*, as well as *Acer negundo*, *Ulmus americana*, *Liquidambar styraciflua*, *Ulmus alata*, *Planera aquatica*, *Juglans nigra*, *Celtis occidentalis*, *Carya illinoensis*, *Quercus nigra*, *Salix nigra*, *Carya cordiformis*, *Quercus pagoda*, and *Carya aquatica*. The understory may be dense and typically contains *Asimina triloba*, *Crataegus viridis*, *Crataegus spathulata*, and *Lindera benzoin*. Herbaceous species that may be present include *Elymus virginicus*, *Carex grayi*, *Carex lupulina*, *Carex abscondita*, *Chasmanthium latifolium*, *Boehmeria cylindrica*, *Polygonum virginianum*, *Elymus virginicus*, *Pilea pumila*, *Leersia lenticularis*, and others. Vines may be abundant and species include *Bignonia capreolata*, *Toxicodendron radicans*, and *Smilax tamnoides* (= *Smilax hispida*). This alliance does not include typical alluvial forests of the upper Piedmont and Blue Ridge, but forests in this alliance may occur in these areas in restricted calcareous situations. In Arkansas, these forests occur during point bar succession as intermediates between forests dominated by *Salix* and *Populus*, and those dominated by *Carya illinoensis*. In Kentucky and Arkansas, *Fraxinus americana*, *Fraxinus pennsylvanica*, *Ulmus rubra*, and *Ulmus americana* are common in these forests. According to K. Ribbeck (pers. comm.) 'Sycamore - River Birch - Silver Maple' forests of the Pearl River in Louisiana are included here.

Related Concepts:

- Alluvial forest (Evans 1991) I
- IIA7g. Sycamore - Sweetgum - American Elm Riverfront Forest (Allard 1990) I
- Riparian forest (Evans 1991) I
- Sycamore - Sweetgum - American Elm: 94 (Eyre 1980) I
- Sycamore-Willow Series (Diamond 1993) I

Classification Comments: The relationship between this alliance and the *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis occidentalis*, *laevigata* Temporarily Flooded Forest Alliance (A.286) needs to be defined more clearly. It appears that this alliance (A.288) may be more northern in distribution and more often located closer to the river and in areas of more active deposition, but further research is needed. In Texas, where *Acer saccharinum* is absent, these forests occur on the Sabine and Neches rivers. In Arkansas, forests in this alliance that are dominated by *Celtis laevigata*, *Platanus occidentalis*, and *Carya illinoensis* occur in areas with flowing water, active deposition, and lots of meandering; still water and lesser deposition are needed for succession to oaks (T. Foti pers. comm.).

ALLIANCE DISTRIBUTION

Range: Forests in this alliance occur on the fronts, terraces, and levees of small, medium and large rivers of the Atlantic Coastal Plain, Southern Ridge and Valley, Cumberland Plateau, Interior Low Plateau, Ozark Highlands, Ouachita Mountains, Arkansas Valley, East and West Gulf coastal plains, Mississippi River Alluvial Plain, and lower Piedmont. It also ranges into the southern midwestern United States. This alliance does not include typical alluvial forests of the upper Piedmont and Blue Ridge, but forests in this alliance may occur in these areas in restricted calcareous situations.

Subnations: AL, AR, CT, DE, GA, IN, KY, LA, MA, MO, MS, NC, NH, NY, OH, RI, SC, TN, TX, VA?, VT

TNC Ecoregions: 24:C, 29:C, 31:C, 32:?, 37:C, 38:C, 39:P, 40:C, 41:C, 42:C, 43:C, 44:C, 45:C, 49:C, 50:C, 51:C, 52:C, 53:P, 56:P, 57:C, 58:P, 59:C, 60:C, 61:C, 63:C

USFS Ecoregions: 212E:C?, 212Fb:CCP, 212Fc:CCC, 221Af:CCC, 221Bd:CCC, 221D:CC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCP, 221Eg:CCC, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 222Ab:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCC, 222Aj:CCC, 222Ak:CCC, 222Am:CCC, 222An:CCC, 222Cb:CCP, 222Cd:CCP, 222Ce:CCP, 222Cg:CCC, 222De:CCP, 222Eb:CCC, 222Ec:CCC, 222Ed:CCP, 222Eh:CCP, 222Em:CCP, 222En:CCC, 222Eo:CCC,

222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Hb:CCC, 222Hf:CCC, 222I:C?, 222O:C?, 231Aa:CCC, 231Ae:CCC, 231Af:CCC, 231Ak:CCP, 231Al:CCC, 231Ap:CCC, 231Ba:CCP, 231Bc:CCP, 231Bd:CCP, 231Be:CCC, 231Bg:CCP, 231Bj:CCP, 231Bk:CCP, 231Bl:CCP, 231Cd:CCC, 231Da:CCP, 231Dc:CCC, 231Ef:CCC, 231Eg:CCP, 231Eh:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ad:CCC, 232Bj:CCC, 232Bk:CCP, 232Bl:CCP, 232Bq:CCP, 232Br:CCP, 232Bs:CCC, 232Bu:CCP, 232Bv:CCP, 232Ca:CCP, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 234Aa:CCP, 234Ab:CC?, 234Ac:CCC, 234Ae:CCP, 234Ag:CCC, 234Ah:CC?, 234Am:CCC, 234An:CCC, 251Cd:CCP, 251Eb:CCC, 255Da:CCP, 255Db:CCC, 315:C, M212Bd:CCC, M221Aa:CCC, M221Ab:CCC, M221Cd:CCC, M221Da:CCC, M221Db:CCP, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231:P

Federal Lands: DOD (Arnold, Fort Benning); NPS (Blue Ridge Parkway?, Congaree Swamp, Great Smoky Mountains, Harpers Ferry, Kennesaw Mountain, Ninety Six, Rock Creek, Shiloh); USFS (Angelina, Bankhead, Bienville, Chattahoochee, Daniel Boone, Davy Crockett, De Soto, Delta?, Holly Springs?, Homochitto, Jefferson, Kisatchie, Oconee, Ozark, Pisgah?, Sabine NF, Sam Houston, St. Francis?, Tombigbee?, Tuskegee); USFWS (San Bernard?)

ALLIANCE SOURCES

References: Allard 1990, Diamond 1993, Evans 1991, Eyre 1980, Foti pers. comm., Ribbeck pers. comm.

I.B.2.N.e. Seasonally flooded cold-deciduous forest

I.B.2.N.E. *QUERCUS (LAURIFOLIA, PHELLOS) SEASONALLY FLOODED FOREST ALLIANCE (A.327)*

(DIAMONDLEAF OAK, WILLOW OAK) SEASONALLY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance occurs in seasonally flooded portions of active floodplains that periodically receive overbank flooding and hold water into the growing season. The canopy usually contains *Quercus laurifolia* or *Quercus phellos*. Other species characteristic of forests in this alliance include *Taxodium distichum*, *Nyssa biflora*, *Quercus nigra*, *Fraxinus caroliniana*, *Itea virginica*, *Sabal minor*, *Justicia ovata*, *Proserpinaca pectinata*, and *Saururus cernuus*. The subcanopy layer is often well-developed and *Carpinus caroliniana* is common, but the shrub and herbaceous layers usually are sparse. These forests often grade into *Taxodium - Nyssa* swamps. They are distributed in the Atlantic Coastal Plain from North Carolina and possibly Virginia to Georgia, and in the Gulf Coast to Louisiana and possibly Texas. An association described from Ft. Benning and the Oconee National Forest is dominated by *Quercus phellos* and *Liquidambar styraciflua*.

Related Concepts: No information

Classification Comments: This alliance is known from TNC's Altamaha River Bioreserve. Some associations in A.292 with *Quercus laurifolia* dominance appear to deserve relocation to this alliance (A.327). These include longer-hydroperiod, seasonally flooded floodplains and seasonally flooded upland depressions and flatwoods. If this occurs, it will necessitate revising the alliance description and distribution for A.327.

ALLIANCE DISTRIBUTION

Range: Forests in this alliance are distributed in the Atlantic Coastal Plain from North Carolina and possibly Virginia to Georgia and Florida, and in the Gulf Coast to Louisiana and Texas.

Subnations: AL, FL, GA, LA?, MS?, NC, SC, TX, VA?

TNC Ecoregions: 40:P, 41:C, 43:C, 52:C, 53:C, 55:C, 56:C, 57:C, 58:P

USFS Ecoregions: 231Ah:CC?, 231Ai:CC?, 231Ba:CC?, 231Bc:CC?, 231Bd:CCC, 231Bf:CC?, 231E:CP, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Be:CCP, 232Bf:CCC, 232Bg:CCP, 232Bh:CCC, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCC, 232Cb:CCC, 232Cg:CCC, 232Dc:CCC, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCC

Federal Lands: DOD (Fort Benning, Fort Gordon?); DOE (Savannah River Site); NPS (Congaree Swamp); USFS (Angelina, Croatan, Davy Crockett?, Francis Marion, Kisatchie?, Ocala, Oconee, Sabine NF?)

ALLIANCE SOURCES

References: Jones et al. 1981b, Schafale and Weakley 1990, Wharton et al. 1982, Whisenant 1981

I.B.2.N.E. *NYSSA (AQUATICA, BIFLORA, OGECHE) FLOODPLAIN SEASONALLY FLOODED FOREST ALLIANCE (A.323)*

(WATER TUPELO, SWAMP BLACKGUM, OGEECHEE TUPELO) FLOODPLAIN SEASONALLY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes forests dominated by some combination of *Nyssa aquatica*, *Nyssa biflora*, or *Nyssa ogeche* without substantial *Taxodium distichum*, that occur in seasonally flooded floodplains, sloughs, and backswamps. *Acer rubrum var. rubrum*, *Quercus laurifolia*, *Quercus lyrata*, *Ulmus americana*, and *Liquidambar styraciflua* are characteristic canopy species. The canopy

layer in these forests often is dense, but strata below are sparse to very sparse. *Fraxinus caroliniana*, *Itea virginica*, and *Sebastiania fruticosa* are common understory species. Common herbaceous species of forests in this alliance include *Carex gigantea*, *Phanopyrum gymnocarpon* (= *Panicum gymnocarpon*), *Pluchea* sp., *Carex bromoides*, *Rhynchospora corniculata*, *Leersia lenticularis*, *Proserpinaca pectinata*, and *Pleopeltis polypodioides*.

Related Concepts:

- Basin Swamp (FNAI 1992a) I
- Basin Swamp, Blackgum Swamp subtype (FNAI 1992b) ?
- Coastal Plain Bottomland Hardwoods, Blackwater Subtype (Schafale and Weakley 1990) I
- IIA4d. Tupelo Swamp (Allard 1990) I
- Water Tupelo - Swamp Tupelo: 103 (Eyre 1980) I

Classification Comments: This alliance includes both blackwater and brownwater small stream swamp forests dominated by *Nyssa ogeche* within its range of the Coastal Plain of Georgia, northern Florida, and southeastern South Carolina. This alliance is attributed to Congaree Swamp (NPS), but not to any association; alliance was not noted in TNC 1998b.

ALLIANCE DISTRIBUTION

Range: Distribution of this alliance is the Atlantic Coastal Plain from southern Virginia to Florida, and the Gulf Coastal Plain to eastern Texas. This alliance is found in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia, and possibly Texas (?).

Subnations: AL, AR, FL, GA, LA, MD, MS, NC, SC, TX, VA

TNC Ecoregions: 31:C, 38:P, 40:P, 41:C, 42:C, 43:P, 44:P, 52:P, 53:C, 55:P, 56:C, 57:C, 58:P

USFS Ecoregions: 222Cb:CCP, 222Cc:CCP, 222Ce:CCP, 222Cf:CCP, 222Cg:CCP, 222Ch:CCP, 222Eb:CCC, 222Ef:CC?, 231Aa:CC?, 231Ae:CC?, 231Af:CCC, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCP, 231Bf:CC?, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCP, 231Bl:CCP, 231Fa:CCC, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Be:CCP, 232Bf:CCP, 232Bg:CCC, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCC, 232Bx:CCP, 232Bz:CCP, 232Ca:CCC, 232Cb:CCC, 232Cc:CCP, 232Cd:CCP, 232Ce:CCC, 232Cf:CCC, 232Cg:CCP, 232Ch:CCC, 232Ci:CCC, 232Cj:CCP, 232Dc:CCC, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 232Fe:CCP, 234Aa:CCP, 234Ac:CCC, 234Ad:CCC, 234Ae:CCC, 234Af:CCP, 234Ag:CCP, 234Ah:CCC, 234Ai:CCC, 234Aj:CCC, 234Ak:CCC, 234Al:CC?, 234Am:CCC, 234An:CCC

Federal Lands: DOD (Fort Benning, Fort Gordon, Fort Stewart); DOE (Savannah River Site); NPS (Congaree Swamp); USFS (Apalachicola, Francis Marion, Kisatchie, Uwharrie)

ALLIANCE SOURCES

References: Allard 1990, Eyre 1980, FNAI 1992a, FNAI 1992b, Schafale and Weakley 1990, Wharton 1978, Whipple et al. 1981

**I.B.2.N.E. NYSSA (AQUATICA, BIFLORA, OGECHÉ) POND SEASONALLY FLOODED FOREST ALLIANCE (A.324)
(WATER TUPELO, SWAMP BLACKGUM, OGEECHÉ TUPELO) POND SEASONALLY FLOODED FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: Forests, dominated by one or more of *Nyssa aquatica*, *Nyssa biflora*, or *Nyssa ogeche*, that occur in isolated wetlands within an upland matrix. Other woody species that may be present include *Taxodium ascendens*, *Cephalanthus occidentalis*, *Liquidambar styraciflua*, *Itea virginica*, *Acer rubrum* var. *rubrum*, *Quercus nigra*, *Leucothoe racemosa*, *Viburnum nudum* var. *nudum*, *Alnus serrulata*, *Ilex verticillata*, *Clethra alnifolia*, *Lyonia lucida*, and *Cliftonia monophylla* (within its range). The shrub and herb layers may be sparse to relatively lush and characteristic herbaceous species include *Carex jorii*, *Saccharum baldwinii*, *Smilax laurifolia*, *Juncus repens*, *Carex crinita*, *Panicum virgatum* var. *virgatum*, *Woodwardia virginica*, *Carex turgescens*, *Carex striata*, *Carex glaucescens*, *Carex verrucosa*, *Woodwardia areolata*, *Osmunda cinnamomea*, and *Rhynchospora* spp. Vegetation of peaty or mucky, acidic, wet depressions in the Atlantic and East Gulf coastal plains, as well as of isolated ponds in the Interior Low Plateau is included in this alliance. There is a rare community in this alliance dominated by *Nyssa ogeche* that occurs in sinkhole depressions in Georgia and Florida.

Related Concepts:

- Basin Swamp (FNAI 1992a) I
- Bottomland Forest (FNAI 1992a) I
- IIA10b. Swamp Tupelo Pond Forest (Allard 1990) I
- Upland Pool (Schafale and Weakley 1990) I
- Water Tupelo - Swamp Tupelo: 103 (Eyre 1980) I

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: Forests in this alliance are found in the Atlantic and East Gulf coastal plains, as well as in the Interior Low Plateau. There is a rare community in this alliance dominated by *Nyssa ogeche* that occurs in sinkhole depressions in Georgia and Florida. This alliance is found in Alabama, Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Virginia, and possibly Arkansas (?).

Subnations: AL, AR?, FL, GA, LA, MO, MS, NC, SC, TN, VA?

TNC Ecoregions: 38:P, 43:P, 44:C, 50:C, 52:C, 53:C, 55:C, 56:C, 57:C, 58:P

USFS Ecoregions: 222A:CC, 222Cb:CCP, 222Cc:CCP, 222Ce:CCP, 222Cf:CCP, 222Cg:CCP, 222Ch:CCP, 222Eb:CCC, 222Ef:CC?, 231Aa:CC?, 231Ae:CC?, 231Af:CCC, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCP, 231Bf:CC?, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCP, 231Bl:CCP, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Be:CCP, 232Bf:CCP, 232Bg:CCC, 232Bh:CCC, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCP, 232Br:CCC, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCC, 232Bx:CCP, 232Bz:CCP, 232Ca:CCC, 232Cb:CCC, 232Cc:CCP, 232Cd:CCP, 232Ce:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCC, 232Ci:CCC, 232Cj:CCP, 232Dc:CCC, 232Fc:CCP, 232Fd:CCP, 234Aa:CC?, 234Ad:CC?, 234Af:CC?, 234Ah:CC?, 234Ai:CC?, 234Aj:CC?, 234Ak:CC?, 234Al:CC?, 234An:CCC

Federal Lands: DOD (Arnold, Eglin, Fort Benning, Fort Stewart); USFS (Apalachicola, Conecuh, Croatan, De Soto, Francis Marion, Holly Springs?, Kisatchie?, Oconee?, Osceola, St. Francis, Tombigbee?, Tuskegee, Uwharrie); USFWS (Eufaula)

ALLIANCE SOURCES

References: Allard 1990, Clewell 1971, Clewell 1981, Eyre 1980, FNAI 1992a, Schafale and Weakley 1990, Smith pers. comm.

I.B.2.N.E. TAXODIUM DISTICHUM - NYSSA (AQUATICA, BIFLORA, OGECHIE) SEASONALLY FLOODED FOREST ALLIANCE (A.337)

BALD-CYPRESS - (WATER TUPELO, SWAMP BLACKGUM, OGEECHIE TUPELO) SEASONALLY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Floodplain forests, with seasonally flooded hydrology, dominated by *Taxodium distichum* and usually one or more of the following: *Nyssa aquatica*, *Nyssa biflora*, and/or *Nyssa ogeche*. Characteristic woody species include *Quercus lyrata*, *Carya aquatica*, *Acer rubrum*, *Planera aquatica*, *Fraxinus caroliniana*, *Liquidambar styraciflua*, *Quercus laurifolia*, *Populus heterophylla*, *Ilex decidua*, and others. The subcanopy, shrub and herbaceous layers of these communities range from sparse to moderate. Herbaceous and vine species that may be present include *Leersia lenticularis*, *Justicia ovata*, *Carex intumescens*, *Boehmeria cylindrica*, *Onoclea sensibilis*, *Commelina communis*, *Hydrocotyle verticillata*, *Ludwigia palustris*, *Carex bromoides*, *Saururus cernuus*, *Pilea pumila*, *Phanopyrum gymnocarpon* (= *Panicum gymnocarpon*), *Campsis radicans*, *Smilax tamnoides* (= *Smilax hispida*), *Ampelopsis arborea*, *Mikania scandens*, and others. Forests in this alliance occur in the Coastal Plain from Virginia south to Florida, west to eastern Texas, and in the Mississippi River alluvial basin north to southern Illinois.

Related Concepts:

- Bald Cypress - Water Tupelo Swamp (Wieland 1994b) ?
- Baldcypress - Tupelo: 102 (Eyre 1980) I
- Baldcypress / *Ceratophyllum* Semi-Permanently Flooded Swamps (Turner et al. 1999) I
- Baldcypress-Water Tupelo Series (Diamond 1993) I Cypress - Tupelo Swamp (Foti 1994b) ?
- Cypress swamp (Evans 1991) I
- Cypress/Cypress-Tupelo Swamp (Smith 1996a) I
- Floodplain swamp (FNAI 1992a) I
- IIA4b. Bald Cypress - Water Tupelo Swamp (Allard 1990) I
- P1B3d11b. *Taxodium distichum* - *Nyssa aquatica* (Foti et al. 1994) ?
- Palustrine *Taxodium distichum*-*Nyssa* spp. Series (Pyne 1994) I

Classification Comments: Compare to alliances in I.B.2.N.f with semipermanently flooded hydrology where surface water persists through the growing season in most years. This alliance with seasonal flooding has flooding of long duration, but the water level is below the surface by the end of the growing season. Several communities in Louisiana contain *Taxodium distichum* with various hardwoods (*Quercus nigra* and *Magnolia virginiana*; *Celtis laevigata* and *Acer rubrum* or *Acer negundo*). Assessment is needed regarding their alliance placement.

ALLIANCE DISTRIBUTION

Range: Forests in this alliance occur in the Coastal Plain from Delaware south to Florida and west to eastern Texas and in the Mississippi River alluvial basin north to Kentucky.

Subnations: AL, AR, DE, FL, GA, KY, LA, MD, MS, NC, SC, TN, TX, VA

TNC Ecoregions: 40:P, 41:C, 42:C, 43:C, 53:C, 55:C, 56:C, 57:C, 58:C

USFS Ecoregions: 231B:C?, 231E:CP, 231Gc:CCC, 232Ac:CCC, 232Ad:CCC, 232Ba:CCC, 232Bb:CCC, 232Bc:CCC, 232Bd:CCC, 232Be:CCC, 232Bf:CCC, 232Bg:CCC, 232Bh:CCC, 232Bi:CCC, 232Bj:CCC, 232Bk:CCC, 232Bl:CCC, 232Bm:CCC,

232Bn:CCC, 232Bo:CCC, 232Bp:CCC, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bt:CCC, 232Bu:CCC, 232Bv:CCC, 232Bx:CCC, 232Bz:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCC, 232Cd:CCC, 232Cf:CCC, 232Cg:CCC, 232Ch:CCC, 232Ci:CCC, 232Cj:CCC, 232Dc:CCC, 232Fa:CCC, 232Fb:CCC, 232Fc:CCC, 232Fd:CCC, 232Fe:CCC, 234Aa: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: DOD (Camp Lejeune, Camp MacKall); DOE (Savannah River Site); NPS (Congaree Swamp); USFS (Angelina, Apalachicola, Croatan, Davy Crockett, De Soto, Delta, Francis Marion, Holly Springs, Kisatchie, Ocala, Osceola, Sabine NF, Sam Houston, Tuskegee); USFWS (Okefenokee?)

ALLIANCE SOURCES

References: Allard 1990, Conner and Day 1976, Conner et al. 1981, Diamond 1993, Evans 1991, Eyre 1980, FNAI 1992a, Foti 1994b, Foti et al. 1994, Jones et al. 1981b, Martin and Smith 1991, Pyne 1994, Schafale and Weakley 1990, Schneider et al. 1989, Smith 1996a, Turner et al. 1999, Wharton 1978, Wharton et al. 1982, Whipple et al. 1981, Wieland 1994b

I.B.2.N.E. SALIX NIGRA SEASONALLY FLOODED FOREST ALLIANCE (A.334) BLACK WILLOW SEASONALLY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance contains *Salix nigra* communities with seasonally flooded hydrology, i.e., the water table is below the soil surface by the end of the growing season in most years. They can occur in the swamps away from the river, behind the levees in the Mississippi River floodplain with *Carya aquatica* (K. Ribbeck pers. comm.), as well as on newly accreted areas on large river floodplains and along lakeshores, irrigation reservoirs, and borrow areas. These forests also may develop following clearcut logging in swamp forests. Species composition varies with geography and topographic setting. Other species that may be present include *Quercus lyrata*, *Taxodium distichum*, *Nyssa aquatica*, *Nyssa biflora*, *Morella cerifera* (= *Myrica cerifera*), *Gleditsia triacanthos*, *Fraxinus pennsylvanica*, *Acer rubrum*, and *Celtis laevigata*. *Cephalanthus occidentalis* is a common shrub in these forests. The vine component often is well-developed. These communities are often short-lived and succeed to bottomland hardwood forests. However, reportedly in Mississippi, long-persisting forests of this type have huge trees on loamy soils of low terraces with little understory (R. Wieland pers. comm.). In the Columbia Bottomlands area of coastal Texas, vegetation classified in this alliance occupies large shallow ponds in ancient river floodplains. The successional status of this vegetation is undetermined, but it is apparently long persisting.

Related Concepts:

- Black Willow: 95 (Eyre 1980) I
- IIA7a. Black Willow Riverfront Forest (Allard 1990) I
- Riparian forest (Evans 1991) ?

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

Subnations: AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, TX, VA

TNC Ecoregions: 31:C, 32:P, 33:C, 37:P, 38:C, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 50:C, 52:C, 53:C, 56:C, 57:C, 58:P

USFS Ecoregions: 221Db:CCP, 221Eb:CCP, 221Ha:CCP, 221Hb:CCP, 221Hc:CCP, 221Hd:CCP, 221He:CCP, 221Ja:CCP, 221Jb:CCC, 221Jc:CCP, 222Ab:CCP, 222Ag:CCP, 222Ah:CCP, 222Al:CCP, 222Am:CCP, 222An:CCP, 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:CCP, 222Eb:CCC, 222Ec:CCP, 222Ed:CCP, 222Ee:CCP, 222Ef:CCP, 222Eg:CCP, 222Eh:CCP, 222Ei:CCP, 222Ej:CCP, 222Ek:CCP, 222En:CCC, 222Eo:CCC, 222Fa:CCP, 222Fb:CCP, 222Fc:CCP, 222Fd:CCP, 222Ff:CCP, 231Aa:CCP, 231Ab:CCP, 231Ac:CCP, 231Ad:CCP, 231Ae:CCP, 231Af:CCP, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap: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:CCP, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ei:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:CCP, 231Fb:CCP, 231Ga:CCP, 231Gb:CCP, 231Gc:CCP, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCC, 232Bg:CCP, 232Bh:CCP, 232Bi:CCP, 232Bj:CCC, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCP, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCP, 232Cb:CCP, 232Cc:CCP, 232Cd:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCP, 232Cj:CCP, 232Dc:CCP, 232Eb:CCC, 232Ee:CCP, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 232Fe:CCP, 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, 251Ea:CCP, 251Ec:CCP, 251Ed:CCP, 251Fb:CCP, 251Fc:CCP, 255Aa:CCP, 255Ab:CCP, 255Ac:CCP, 255Ad:CCP, 255Ae:CCP, 255Af:CCP, 255Ag:CCP, 255Ah:CCP, 255Ai:CCP, 255Aj:CCP, 255Ak:CCP, 255Ba:CCP, 255Ca:CCP, 255Cb:CCP, 255Cc:CCP, 255Cd:CCP, 255Ce:CCP, 255Db:CCC, 311A:CC, 332E:CC, M221Aa:CCP, M221Ab:CCP, M221Ba:CCP, M221Bd:CCP, M221Be:CCP, M221Ca:CCP, M221Cb:CCP, M221Cc:CCP, M221Cd:CCP,

M221Ce:CCP, M221Da:CCP, M221Db:CCP, M221Dc:CCP, M221Dd:CCP, M222Aa:CCP, M222Ab:CCP, M231Aa:CCP, M231Ab:CCP, M231Ac:CCP, M231Ad:CCP

Federal Lands: DOD (Arnold); USFS (Angelina, Apalachicola, Bienville, Conecuh, Daniel Boone, Davy Crockett, De Soto, Delta, Francis Marion, Holly Springs, Kisatchie, Ocala, Sabine NF, Sam Houston, St. Francis, Tombigbee?, Tuskegee); USFWS (Aransas, San Bernard)

ALLIANCE SOURCES

References: Allard 1990, Allen 1958, Evans 1991, Eyre 1980, Klimas 1988b, Ribbeck pers. comm., TNC 1998a, Wieland pers. comm.

I.B.2.N.E. *QUERCUS TEXANA* - (*QUERCUS LYRATA*) SEASONALLY FLOODED FOREST ALLIANCE (A.331) NUTTALL OAK - (OVERCUP OAK) SEASONALLY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: These bottomland forests of the Mississippi River Alluvial Plain, West Gulf Coastal Plain, and Mobile-Tensaw Delta are dominated by *Quercus texana* and, often, *Quercus lyrata*. Associated woody species include *Sassafras albidum*, *Taxodium distichum*, *Liquidambar styraciflua*, *Fraxinus profunda*, *Fraxinus pennsylvanica*, *Celtis laevigata*, *Forestiera acuminata*, *Carya aquatica*, and *Gleditsia aquatica*. Vines are common in these forests and species include *Campsis radicans*, *Toxicodendron radicans*, *Ampelopsis arborea*, *Ampelopsis cordata*, *Berchemia scandens*, and others. Among the herbaceous species that may be present are *Symphytotrichum lateriflorum* (= *Aster lateriflorus*), *Justicia ovata*, *Laportea canadensis*, and *Leersia virginica*.

Related Concepts:

- Bottomland Hardwood Forest, Overcup Oak - Water Oak variant (Smith 1996a) ?
- Clay - Clay Loam Flat Hardwood Bottom Forest (Wieland 1994b) ?
- IIA5a. Overcup Oak - Water Hickory Bottomland Forest (Allard 1990) I
- Overcup Oak - Water Hickory Bottomland Forest (Oberholster 1993) I
- Overcup Oak - Water Hickory: 96 (Eyre 1980) I
- P1B3cV. *Quercus nuttallii* (Foti et al. 1994) ?

Classification Comments: *Quercus texana* is the biggest component in the transitional zone between *Quercus lyrata* - *Carya aquatica* forests and *Quercus phellos* - *Ulmus crassifolia* forests (T. Foti pers. comm.). J. Campbell (pers. comm.) and D. Zollner (pers. comm.) describe *Quercus texana* forests in southwestern Arkansas (Pond Creek Bottoms) associated with relatively nutrient-rich, fine-textured slackwater alluvium and occurring in a transitional position between *Fraxinus* - *Ulmus* - *Celtis* or *Quercus* - *Liquidambar* forests and the wetter *Quercus lyrata* - *Carya aquatica* sloughs.

ALLIANCE DISTRIBUTION

Range: This alliance is found in the Mississippi River Alluvial Plain and West Gulf Coastal Plain of Arkansas and Louisiana, in the East Gulf Coastal Plain (Mobile-Tensaw Delta), and possibly in Mississippi (?) and Texas (?).

Subnations: AL, AR, LA, MS, OK?, TX?

TNC Ecoregions: 40:C, 41:C, 42:C, 53:C

USFS Ecoregions: 232Bs:CCC, 232Fa:CCC, 232Fc:CC?, 234Aa:CCC, 234Ab:CC?, 234Ac:CCC, 234Ae:CCP, 234Af:CCC, 234Ag:CCC, 234Ah:CCP, 234Ai:CCC, 234Am:CCC, 234An:CCC

Federal Lands: DOD (Pine Bluff Arsenal); USFS (Delta, Kisatchie); USFWS (Felsenthal?, Pond Creek)

ALLIANCE SOURCES

References: Allard 1990, Campbell pers. comm., Eyre 1980, Foti et al. 1994, Foti pers. comm., Klimas 1988b, Martin and Smith 1991, Oberholster 1993, Smith 1996a, Wieland 1994b, Zollner pers. comm.

I.B.2.N.E. *QUERCUS LYRATA* - (*CARYA AQUATICA*) SEASONALLY FLOODED FOREST ALLIANCE (A.328) OVERCUP OAK - (WATER HICKORY) SEASONALLY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: *Quercus lyrata* is dominant or codominant in stands of this alliance. There is often substantial *Carya aquatica*, especially in the wetter sites where no other canopy species occur. Less wet occurrences of this alliance will have substantial *Liquidambar styraciflua*, as well as *Quercus texana* within its range. Species composition varies with geography, but characteristic species include *Quercus laurifolia*, *Fraxinus pennsylvanica*, *Carpinus caroliniana*, *Fraxinus profunda*, *Taxodium distichum*, *Planera aquatica*, *Populus heterophylla*, *Celtis laevigata*, *Diospyros virginiana*, *Acer rubrum*, *Quercus phellos* (sometimes codominant to dominant), and occasionally *Ulmus americana*, *Nyssa sylvatica*, *Quercus michauxii*, and *Quercus palustris*. Common understory and shrub associates include *Ilex decidua*, *Crataegus viridis*, *Cornus foemina* (= *Cornus stricta*), *Forestiera acuminata*, *Carpinus caroliniana*, and *Cephalanthus occidentalis*. Species composition and density of the herbaceous stratum vary with geography and frequency of

flooding. Common species in this layer include *Justicia ovata*, *Saururus cernuus*, *Leersia lenticularis*, *Mikania scandens*, *Lobelia cardinalis*, *Ludwigia palustris*, *Diodia virginiana*, *Gratiola virginiana*, *Carex jorii*, *Carex intumescens*, *Symphyotrichum lateriflorum* (= *Aster lateriflorus*), *Boehmeria cylindrica*, and *Pilea pumila*. The exotic *Ludwigia grandiflora* (= *Ludwigia uruguayensis*) may be common in examples of this alliance. Some occurrences in Arkansas have *Gleditsia aquatica*, *Liquidambar styraciflua*, *Acer rubrum*, *Acer saccharinum*, and *Diospyros virginiana*. Shrubs include *Planera aquatica*, *Styrax americanus*, *Cornus foemina*, and *Cephalanthus occidentalis*. Vines are common and species include *Lonicera japonica* (exotic), *Vitis palmata*, and *Cardiospermum halicacabum*. Forests of this alliance occur on heavy clay soils of the Orders Ultisol and Vertisol on low, wet, seasonally flooded floodplains, shallow sloughs with relatively little water flow, and in depressions.

Related Concepts:

- Bottomland hardwood swamp (Evans 1991) I
- Depression swamp (Evans 1991) I
- Floodplain Forest (FNAI 1992a) ?
- Floodplain Forest, Overcup Oak/Water Hickory Flat subtype (FNAI 1992b) ?
- IIA5a. Overcup Oak - Water Hickory Bottomland Forest (Allard 1990) ? Overcup Oak - Water Hickory: 96 (Eyre 1980) I
- Overcup Oak / *Justicia* Clayey/Loamy Seasonally Flooded Low River Floodplains (Turner et al. 1999) ?
- Overcup Oak Forest (Foti 1994b) ?
- Overcup Oak Series (Diamond 1993) I
- P1B3cI. *Quercus lyrata* (Foti et al. 1994) I
- P1B3cI4a. *Quercus lyrata* - *Quercus nuttallii* (= *Q. texana*) - *Liquidambar styraciflua* (Foti et al. 1994) ?
- P1B3cVII14b. *Quercus phellos* - *Quercus palustris* - *Quercus lyrata* (Foti et al. 1994) ?

Classification Comments: *Carya aquatica* was put back in the name for places in Arkansas and Louisiana with little or no *Quercus lyrata*. This alliance may need to be split; there are four associations which represent ponds (e.g., *Quercus lyrata* - *Quercus (palustris, phellos)* - *Liquidambar styraciflua* - (*Populus heterophylla*) Forest (CEGL004421) [KY, TN], *Quercus lyrata* - *Quercus palustris* / *Acer rubrum* var. *drummondii* / *Itea virginica* - *Cornus foemina* - (*Lindera melissifolia*) Forest (CEGL004778) [AR, MO], *Quercus lyrata* / *Betula nigra* / *Pleopeltis polypodioides* ssp. *michauxiana* Forest (CEGL004975) [TN], and *Quercus lyrata* Pond Forest (CEGL004642) [AR, MO]).

ALLIANCE DISTRIBUTION

Range: This alliance occurs throughout the Atlantic Coastal Plain from Virginia to Florida, and in the Gulf Coastal Plain to Texas. It also is found in the Mississippi River Alluvial Plain northward to Illinois. It is found in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, western Tennessee, eastern Texas, Virginia, southeastern Missouri, southern Illinois, and southwestern Indiana.

Subnations: AL, AR, FL, GA, IL, IN, KY, LA, MO, MS, NC, OK, SC, TN, TX

TNC Ecoregions: 38:C, 40:C, 41:C, 42:C, 43:C, 44:C, 52:C, 53:C, 56:C, 57:C, 58:P

USFS Ecoregions: 222Cc:CC?, 222Cd:CC?, 222Ce:CC?, 222Cf:CC?, 222Cg:CCC, 222D:C?, 222Eb:CCC, 222Ef:CCC, 222Eg:CCP, 222Eh:CCC, 231Aa:CCP, 231Ae:CCC, 231Af:CCP, 231Ai:CCP, 231Aj:CCP, 231Ao:CCP, 231Ba:CP?, 231Bb:CP?, 231Bc:CP?, 231Bd:CP?, 231Be:CP?, 231Bf:CCP, 231Bg:CP?, 231Bh:CCP, 231Bi:CP?, 231Bj:CP?, 231Bk:CP?, 231Bl:CP?, 231C:CP, 231Da:CC?, 231Dc:CCC, 231Ea:CCC, 231Ec:CCC, 231Ed:CCC, 231Ef:CCC, 231Eg:CCP, 231Eh:CCP, 231Ej:CCC, 231Em:CCP, 232Ba:CCC, 232Bb:CCC, 232Bc:CCP, 232Bd:CCC, 232Be:CCP, 232Bg:CCP, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCP, 232Br:CCP, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCC, 232Cb:CCC, 232Cc:CCP, 232Cd:CCP, 232Cf:CCP, 232Cg:CCC, 232Ch:CCP, 232Dc:CCC, 232Fa:CCC, 232Fe:CCC, 234Aa: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, 255Da:???, 255Db:???, M222Aa:CCC

Federal Lands: DOD (Arnold); NPS (Congaree Swamp, Shiloh); USFS (Angelina, Apalachicola, Bienville, Croatan, Davy Crockett, De Soto, Delta, Francis Marion, Holly Springs?, Homochitto, Kisatchie, Oconee, Ouachita, Ozark, Sabine NF, Sam Houston, St. Francis, Tombigbee?); USFWS (Reelfoot)

ALLIANCE SOURCES

References: Allard 1990, Campbell and Grubbs 1992, Campbell pers. comm., Diamond 1993, Evans 1991, Eyre 1980, FNAI 1992a, FNAI 1992b, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Johnson and Bell 1976, Klimas 1988b, Robertson et al. 1984, Schafale pers. comm., Turner et al. 1999, Wharton et al. 1982, Zollner pers. comm.

**I.B.2.N.E. QUERCUS PHELLOS SEASONALLY FLOODED FOREST ALLIANCE (A.330)
WILLOW OAK SEASONALLY FLOODED FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: Forests in this alliance have seasonally flooded hydrology and are typically dominated or codominated by *Quercus phellos*. Other canopy species that frequently occur in these forests are *Quercus lyrata*, *Quercus nigra*, *Quercus laurifolia* (within its range), *Quercus similis* (within its range), *Quercus texana* (within its range), *Quercus bicolor* (within its range), *Nyssa biflora*, *Liquidambar styraciflua*, *Ulmus americana*, and in the northern extension of its range, *Celtis laevigata* var. *laevigata* and *Fraxinus*

pennsylvanica. The subcanopy and shrub layers are poorly developed. Common species of these strata are *Acer rubrum*, *Ilex decidua*, *Fraxinus caroliniana*, *Salix nigra*, and *Viburnum nudum* var. *nudum*. Some other characteristic herbs of these forests include *Boehmeria cylindrica*, *Saururus cernuus*, *Onoclea sensibilis*, *Carex jorii*, *Carex striata*, *Carex intumescens*, *Saccharum baldwinii*, *Juncus coriaceous*, *Trachelospermum difforme*, *Cinna arundinacea*, *Chasmanthium sessiliflorum*, *Rhynchospora glomerata*, and *Osmunda cinnamomea*. *Sphagnum* spp. may be common, especially *Sphagnum lescurii*. This alliance occurs in upland depressions and swales in flatwoods that do not receive overbank flooding. In addition, some associations in this alliance are described from depressions in floodplains, but these may more appropriately be placed in the related alliance, *Quercus (laurifolia, phellos)* Seasonally Flooded Forest Alliance (A.327). The flooding is seasonal in all these environments, but the hydroperiod may be longer or shorter depending on the situation. Some examples typically have longer hydroperiods than *Quercus phellos*-dominated communities in floodplain terraces. This alliance is found in the central and southeastern United States. Its component associations are distributed from the West Gulf Coastal Plain of Arkansas and Texas through the Gulf Coastal Plain, and north in the Atlantic Coastal Plain and Piedmont to Virginia. They also occur in the Interior Low Plateau of Tennessee and Kentucky, the Cumberland Plateau of northern Alabama, and the Mississippi River Alluvial Plain north to southern Illinois.

Related Concepts:

- Depression swamp (Evans 1991) ?
- Flatwood Depression Forest (Smith 1996b) ?
- IIA10d. Upland Depression Swamp (Allard 1990) I
- Nonriverine Willow Oak Flatwoods (Smith 1996a) ?
- P1B3cVII. *Quercus phellos* (Foti et al. 1994) ?
- Sagpond Forest (Ambrose 1990a) ?
- Sweetgum - Willow Oak: 92 (Eyre 1980) ?
- Upland Depression Swamp Forest (Schafale and Weakley 1990) ?
- Willow Oak - Laurel Oak / *Bignonia* Loamy/Clayey Seasonally Flooded River Floodplains (Turner et al. 1999) I
- Willow Oak - Water Oak - Diamondleaf (Laurel) Oak: 88 (Eyre 1980) I
- Willow Oak Forest (Foti 1994b) ?
- Xerohydric flatwoods (Evans 1991) I

Classification Comments: This alliance (A.330) and its partner A.327 were re-evaluated by J. Teague and M. Pyne, hopefully responding to the comments of T. Foti: Consider splitting this alliance (T. Foti pers. comm.). There are types associated with a variety of environments. Some associations in this alliance are described from depressions in floodplains, but these may more appropriately be placed in the related alliance A.327.

ALLIANCE DISTRIBUTION

Range: This alliance is found in southern Illinois, southeastern Missouri, Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Delaware, Maryland, and Virginia.

Subnations: AL, AR, DE, GA, IL, KY, LA, MD, MO?, MS?, NC, OK?, SC, TN, TX, VA

TNC Ecoregions: 38:C, 39:P, 40:C, 41:C, 42:C, 43:?, 44:C, 50:C, 52:C, 53:C, 56:P, 57:C, 58:C, 62:P

USFS Ecoregions: 221Hc:CCC, 221He:CCC, 222Af:CCC, 222Cb:CCC, 222Da:CCC, 222Eb:CCC, 222Eh:CCC, 231Aa:CCC, 231Ae:CCC, 231Ah:CC?, 231Ai:CC?, 231Aj:CC?, 231Ak:CC?, 231Ao:CCC, 231Ap:CCC, 231Ba:CC?, 231Bc:CC?, 231Bd:CC?, 231Bj:CCC, 231Bl:CC?, 231Cd:CCC, 231Cf:CCC, 231Da:CCC, 231Dc:CCC, 231De:CCC, 231Ea:CCC, 231Eb:CC?, 231Ec:CC?, 231Ed:CC?, 231Ee:CC?, 231Ef:CCC, 231Eg:CC?, 231Eh:CCC, 231Ei:CCC, 231Ej:CCC, 231Ek:CC?, 231El:CC?, 231Em:CC?, 231En:CC?, 231Ga:CCC, 231Gb:CC?, 231Gc:CCC, 232A:CP, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Bh:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCP, 232Br:CCP, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCC, 232Ca:CCP, 232Cb:CCP, 232Cc:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCP, 232Cj:CCP, 232Fa:CC?, 232Fb:CC?, 232Fc:CC?, 232Fd:CCC, 232Fe:CCC, 234Aa:CCC, 234Ab:CCP, 234Ac:CCC, 234Ad:CCC, 234Ae:CCP, 234Af:CCP, 234Ag:CCC, 234Ah:CCC, 234Ai:CCP, 234Aj:CCP, 234Ak:CCP, 234Al:CCP, 234Am:CCC, 234An:CCP, 255:C, M221Cd:CCC, M231Aa:CCC, M231Ac:CCC

Federal Lands: COE (Bayou Bodcau); DOD (Arnold, Barksdale, Louisiana Army Ammunition Plant); NPS (Chickamauga-Chattanooga, Congaree Swamp); USFS (Angelina, Bankhead, Bienville?, Chattahoochee, Daniel Boone, Davy Crockett, De Soto?, Delta?, Holly Springs?, Homochitto?, Kisatchie, Oconee, Ouachita, Ozark, Sabine NF, Sam Houston, St. Francis?, Tombigbee?, Tuskegee?, Uwharrie); USFWS (Big Lake?, Cossatot River?, Eufaula, Felsenthal?, Holla Bend?, Little River, Overflow?, Pond Creek?, Upper Ouachita?, White River NWR?)

ALLIANCE SOURCES

References: Allard 1990, Ambrose 1990a, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Foti pers. comm., Klimas 1988b, Nelson 1985, Schafale and Weakley 1990, Smith 1996a, Smith 1996b, Turner et al. 1999, Voigt and Mohlenbrock 1964, Wharton et al. 1982, White and Madany 1978

I.B.2.N.f. Semipermanently flooded cold-deciduous forest

I.B.2.N.F. TAXODIUM DISTICHUM SEMIPERMANENTLY FLOODED FOREST ALLIANCE (A.346) BALD-CYPRESS SEMIPERMANENTLY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: Swamp forests dominated by *Taxodium distichum* often with a monospecific canopy. Dominance by *Taxodium* should be greater than 75%, but hardwoods may be present. Other canopy species that may be present include *Fraxinus profunda* (= *Fraxinus tomentosa*), *Populus heterophylla*, *Nyssa aquatica*, and possibly others. The subcanopy is usually sparse and may contain *Planera aquatica*, *Fraxinus caroliniana* (in its range), and occasionally *Acer rubrum*. The shrub and herbaceous layers are very sparse and frequently limited to tree bases and downed logs. Species present include *Cephalanthus occidentalis*, *Forestiera acuminata*, *Bidens discoidea*, *Carex lupulina*, *Proserpinaca palustris*, *Lemna minor*, *Azolla caroliniana*, and *Saururus cernuus*. Occurrence of the alliance is possible in suitable habitat anywhere within the range of *Taxodium distichum*, i.e., the lower Atlantic Coastal Plain from southern Delaware to southern Florida, the lower Gulf Coastal Plain to southeastern Texas, and the Mississippi River Alluvial Plain to southern Illinois. However, it is more commonly recognized outside of, or near the edge of, the range of *Nyssa aquatica* which otherwise is frequently codominant with *Taxodium distichum*. Such areas include: southwestern Arkansas and northwestern Louisiana, southeastern Oklahoma, eastern Mississippi and adjacent Alabama, southern Indiana, peninsular Florida, northeastern Virginia, eastern Maryland and Delaware.

Related Concepts:

- *Taxodium distichum* forest alliance (Hoagland 1998a) ?
- Bald Cypress - Tupelo Gum Swamp (Nelson 1986) I
- Bald Cypress Swamp (Wieland 1994b) I
- Bald Cypress Swamp (Oberholster 1993) I
- Baldcypress / *Ceratophyllum* Semi-Permanently Flooded Swamps (Turner et al. 1999) I
- Baldcypress: 101 (Eyre 1980) I
- Blackwater Stream Floodplain Forest (Ambrose 1990a) I
- Brownwater Stream Floodplain Forest (Ambrose 1990a) I
- Cypress Swamp (Foti 1994b) ?
- Cypress swamp (Evans 1991) I
- Cypress--Gum Swamp, Blackwater Subtype (Schafale and Weakley 1990) I
- Cypress--Gum Swamp, Brownwater Subtype (Schafale and Weakley 1990) I
- Cypress/Cypress-Tupelo Swamp (Smith 1996a) I
- Floodplain Swamp (FNAI 1992a) I
- IIA4a. Bald Cypress Swamp (Allard 1990) I
- Mesotrophic Semipermanently Flooded Forest (Rawinski 1992) ?
- P1B3d11a. *Taxodium distichum* (Foti et al. 1994) ?

Classification Comments: The vegetation of this alliance is relatively uncommon in the Midwest. Some confusion may be found with stands in the *Nyssa aquatica* - (*Taxodium distichum*) Semipermanently Flooded Forest Alliance (A.345), especially where logging in *Taxodium distichum* semipermanently flooded forest stands may have reduced the dominance by *Taxodium distichum*. Examples in Arkansas include Pond Creek Bottoms (Sevier and Little River counties). This alliance is attributed to Congaree Swamp (NPS), but not to any association; alliance was not noted in TNC 1998b.

ALLIANCE DISTRIBUTION

Range: This alliance is found in southeastern Missouri, southern Illinois, southern Indiana, Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Delaware, Maryland, and Virginia.

Subnations: AL, AR, DE, FL, GA, IL, IN, KY, LA, MO, MS, NC, OK, SC, TN, TX, VA?

TNC Ecoregions: 31:C, 38:C, 39:P, 40:C, 41:C, 42:C, 43:C, 44:C, 52:P, 53:C, 54:P, 55:C, 56:C, 57:C, 58:C

USFS Ecoregions: 222A:CC, 222Cc:CCC, 222Cd:CCP, 222Ce:CCC, 222Ch:CCC, 222Da:CCC, 222Db:CCC, 222Gc:CCP, 231Ba:CC?, 231Bb:CC?, 231Bc:CC?, 231Bd:CC?, 231Bf:CC?, 231Bg:CC?, 231Bh:CC?, 231Bi:CC?, 231Bj:CC?, 231Bk:CC?, 231Bl:CC?, 231Ea:CCP, 231Eb:CCP, 231Ec:CCP, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ei:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:CCC, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Be:CCP, 232Bf:CCP, 232Bg:CCP, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCP, 232Cb:CCP, 232Cg:CCP, 232Ch:CCP, 232Da:CCP, 232Db:CCP, 232Dc:CCP, 232Dd:CCP, 232De:CCP, 232Ea:CCP, 232Eb:CCP, 232Ec:CCP, 232Ed:CCP, 232Ee:CCP, 232Fa:CCC, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 232Fe:CCP, 234Aa: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: DOE (Savannah River Site); NPS (Chickasaw NRA, Congaree Swamp, Shiloh?); USFS (Angelina, Apalachicola, Conecuh, Davy Crockett, De Soto, Delta?, Holly Springs?, Homochitto?, Kisatchie, Ocala, Osceola, Sabine NF, Sam Houston, St. Francis?, Tombigbee?, Tuskegee); USFWS (Chickasaw NWR, Little River, Reelfoot)

ALLIANCE SOURCES

References: Allard 1990, Ambrose 1990a, Conner and Day 1989, Devall 1991, Evans 1991, Eyre 1980, FNAI 1992a, FNAI 1992b, Faber-Langendoen et al. 1996, Faircloth 1971, Foti 1994b, Foti et al. 1994, Hoagland 1998a, Nelson 1985, Nelson 1986, Oberholster 1993, Rawinski 1992, Schafale and Weakley 1990, Smith 1996a, Turner et al. 1999, Wharton et al. 1982, Wieland 1994b

**I.B.2.N.F. NYSSA AQUATICA - (TAXODIUM DISTICHUM) SEMIPERMANENTLY FLOODED FOREST ALLIANCE (A.345)
WATER TUPELO - (BALD-CYPRESS) SEMIPERMANENTLY FLOODED FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: This alliance encompasses semipermanently flooded forested riverine swamps dominated by *Nyssa aquatica*, with or without *Taxodium distichum* as a codominant. Stands of this alliance may vary in composition from ones largely dominated by *Nyssa* to ones dominated by a mix of *Taxodium*, *Nyssa*, and other hardwood species. Dominance of *Nyssa* may vary conceptually from 100-25%. Dominance of *Taxodium* may vary from less than 75% to absent. Other canopy and subcanopy species may include *Nyssa biflora*, *Quercus lyrata*, *Carya aquatica*, *Fraxinus profunda*, *Fraxinus caroliniana*, *Planera aquatica*, and *Populus heterophylla*. Shrubs and herbs are typically limited to tree bases, fallen logs, and other elevated places in the stand. *Itea virginica* is often the only shrub present. Herbaceous species may be absent and often are sparse. Species present can include *Phanopyrum gymnocarpon* (= *Panicum gymnocarpon*), *Pluchea camphorata*, *Boehmeria cylindrica*, *Rudbeckia laciniata*, *Sagittaria latifolia*, *Onoclea sensibilis*, *Triadenum walteri*, *Carex jorii*, *Carex glaucescens*, *Proserpinaca pectinata*, *Asclepias perennis*, *Saururus cernuus*, *Justicia ovata*, *Leersia lenticularis*, and others. Associations in this alliance occur in backwater sloughs, low wet flats, swales and backswamps, and along blackwater streams and other alluvial settings. Related vegetation associated with artificial lakes and millponds are accommodated in another alliance, *Taxodium distichum* - (*Taxodium ascendens*) Seasonally Flooded Lakeshore Woodland Alliance (A.652). Surface water is present throughout the growing season in most years. Forests in this alliance occur virtually throughout the Atlantic and Gulf coastal plains and the Mississippi River Alluvial Plain within the range of *Nyssa aquatica*, and in the Arkansas River Valley; also reported from the Mobile and Tensaw rivers in Alabama.

Related Concepts:

- Baldcypress - Tupelo: 102 (Eyre 1980) I
- Baldcypress / *Ceratophyllum* Semi-Permanently Flooded Swamps (Turner et al. 1999) I
- Baldcypress-Water Tupelo Series (Diamond 1993) I
- Cypress - Tupelo Swamp (Foti 1994b) ?
- IIA4b. Bald Cypress - Water Tupelo Swamp (Allard 1990) I
- IIA4c. Bald Cypress - Swamp Black Gum Swamp (Allard 1990) I
- IIA4d. Tupelo Swamp (Allard 1990) I P1B3dI1a. *Taxodium distichum* (Foti et al. 1994) ?
- P1B3dI1b. *Taxodium distichum* - *Nyssa aquatica* (Foti et al. 1994) ? P1B3dIII3a. *Nyssa aquatica* (Foti et al. 1994) ?
- Tupelo Blackgum Swamp (Foti 1994b) ?
- Water Tupelo - Swamp Tupelo: 103 (Eyre 1980) I

Classification Comments: Compare with seasonally flooded alliances (I.B.2.N.e) which have no surface water present by the end of the growing season in most years. There is an association that occurs in semipermanently flooded sloughs that is dominated by *Nyssa ogeche* under scattered *Nyssa aquatica*; its alliance placement needs assessment.

ALLIANCE DISTRIBUTION

Range: Forests in this alliance occur virtually throughout the Atlantic and Gulf coastal plains and the Mississippi River Alluvial Plain within the range of *Nyssa aquatica*, and in the Arkansas River Valley; also reported from the Mobile and Tensaw rivers in Alabama. This alliance is found in Illinois, Indiana, Missouri, Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and possibly Ohio (?).

Subnations: AL, AR, FL, GA, IL, IN?, KY, LA, MO, MS, NC, SC, TN, TX, VA

TNC Ecoregions: 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 53:C, 56:C, 57:C, 58:C

USFS Ecoregions: 222A:CC, 222Cb:CC?, 222Cc:CC?, 222Cd:CC?, 222Ce:CC?, 222D:CC, 231Bc:CCC, 231E:C?, 231Ga:CCC, 231Gb:CCC, 232Bn:CCC, 232Br:CCC, 232Bs:CCC, 232Bv:CCC, 232Cb:CCC, 232Ce:CCC, 232Cf:CCC, 232Cg:CCC, 232Ch:CCC, 232Cj:CCC, 232Dc:CCC, 232Fa:CCC, 232Fb:CCC, 232Fc:CCC, 232Fd:CCC, 232Fe:CCC, 234Aa: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: DOD (Fort Benning, Pine Bluff Arsenal); DOE (Savannah River Site); NPS (Congaree Swamp, Shiloh); USFS (Angelina?, Apalachicola, Conecuh?, Croatan, Davy Crockett, De Soto, Delta, Francis Marion, Kisatchie, Ocala, Ozark, Sabine NF?, Sam Houston, St. Francis, Talladega, Tuskegee); USFWS (Hatchie, Lower Hatchie?)

ALLIANCE SOURCES

References: Allard 1990, Conner and Day 1976, Devall 1991, Diamond 1993, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994a, Foti 1994b, Foti et al. 1994, Fowells 1965, Hardin 1990, Klawitter 1962, Leitman et al. 1983, Miller and Neiswender 1989, Monk 1968, Schneider et al. 1989, Turner et al. 1999, Wharton et al. 1982, Whipple et al. 1981

I.C.2.N.a. Mixed broad-leaved evergreen - cold-deciduous forest

**I.C.2.N.A. FAGUS GRANDIFOLIA - MAGNOLIA GRANDIFLORA FOREST ALLIANCE (A.369)
AMERICAN BEECH - SOUTHERN MAGNOLIA FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: This alliance includes a variety of mesic to dry-mesic, mixed broad-leaved evergreen-deciduous hardwood forests, occurring in fire-sheltered situations, on sandy, clayey, or calcareous substrates in the southeastern Coastal Plain. *Magnolia grandiflora* and *Fagus grandifolia* are characteristic species, and may be codominant in less species-rich associations. In more species-rich associations, canopy composition is very diverse and mixed, with no species dominating. Typical canopy species in this alliance include *Magnolia grandiflora*, *Fagus grandifolia*, *Acer barbatum*, *Carya alba*, *Carya glabra*, *Carya pallida*, *Celtis laevigata*, *Fraxinus americana*, *Ilex opaca*, *Juglans nigra*, *Liquidambar styraciflua*, *Magnolia macrophylla*, *Oxydendrum arboreum*, *Persea borbonia*, *Pinus glabra*, *Pinus taeda*, *Quercus alba*, *Quercus hemisphaerica*, *Quercus michauxii*, *Quercus pagoda*, *Quercus shumardii*, *Quercus virginiana*, *Sabal palmetto*, *Sapindus saponaria* (= *Sapindus marginatus*), *Tilia americana* var. *caroliniana*, *Ulmus alata*, and *Ulmus americana*. Typical subcanopy species may include *Carpinus caroliniana* ssp. *caroliniana*, *Cercis canadensis* var. *canadensis*, *Cornus florida*, *Halesia carolina*, *Halesia diptera* (= var. *diptera* and = var. *magniflora*), *Magnolia acuminata*, *Magnolia ashei*, *Magnolia macrophylla*, *Magnolia pyramidata*, *Ostrya virginiana*, *Acer rubrum* var. *rubrum*, *Quercus hemisphaerica*, *Nyssa sylvatica*, *Ilex opaca* var. *opaca*, *Oxydendrum arboreum*, *Persea borbonia*, *Prunus caroliniana*, *Taxus floridana* (rare and restricted), and *Torreya taxifolia* (rare and restricted). Typical shrubs and woody vines include *Chionanthus virginicus*, *Hamamelis virginiana*, *Ilex vomitoria*, *Illicium floridanum* (East Gulf Coastal Plain only), *Hydrangea quercifolia*, *Kalmia latifolia*, *Sebastiania fruticosa*, *Stewartia malacodendron*, *Styrax grandifolius*, *Symplocos tinctoria*, *Rhododendron austrinum*, *Halesia diptera*, *Clethra alnifolia*, *Vaccinium elliotii*, *Asimina parviflora*, and *Toxicodendron radicans*. Typical herbaceous stratum species may include *Sanicula canadensis* var. *canadensis* (= *Sanicula canadensis* var. *floridana*), *Mitchella repens*, *Elephantopus carolinianus*, *Hexastylis arifolia*, *Polystichum acrostichoides*, *Aristolochia serpentaria*, *Asplenium platyneuron*, *Polystichum acrostichoides*, *Oplismenus hirtellus* ssp. *setarius* (= *Oplismenus setarius*), *Smilax pumila*, *Chasmanthium sessiliflorum*, *Chasmanthium laxum*, and *Pteridium aquilinum* var. *pseudocaudatum*. *Tillandsia usneoides* and *Pleopeltis polypodioides* ssp. *michauxiana* are frequent and typical epiphytes. Species composition is variable and dependent on geography, topographic position, and soil chemistry. Vegetation which represents the drier phase of this alliance may contain more *Pinus glabra*, *Quercus alba*, *Quercus falcata*, and possibly also *Pinus taeda* than more mesic examples. This vegetation may grade into that of the I.B.2.N.a *Quercus alba* - (*Quercus nigra*) Forest Alliance (A.238) or the I.C.3.N.a *Pinus taeda* - *Quercus* (*alba*, *falcata*, *stellata*) Forest Alliance (A.404).

Related Concepts:

- *Nyssa sylvatica* - *Persea borbonia* Community (Whipple et al. 1981) ?
- American Beech - White Oak / *Mitchella* Loamy Moist-Mesic Steep Slopes and Ravines (Turner et al. 1999) I
- American Beech-Southern Magnolia Series (Diamond 1993) ?
- Beech - Magnolia Hammock (Nelson 1986) ?
- Calcareous Coastal Fringe Forest (Schafale 1994) ?
- IA8e. Beech - Magnolia Forest (Allard 1990) ?
- Slope Forest (FNAI 1992a) ?
- Slope Forest, Beech/Magnolia subtype (FNAI 1992b) ?
- Southern Mesophytic Forest (Smith 1996a) ?
- Southern Mixed Hardwood Forest (Quarterman and Keever 1962) ?
- Upland Hardwood Forest (FNAI 1992a) ?
- Upland Hardwood Forest, Beech/Magnolia Forest subtype (FNAI 1992b) ?

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas.

Subnations: AL, AR, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 40:C, 41:C, 42:P, 43:C, 52:P, 53:C, 55:P, 56:C, 57:C, 58:P

USFS Ecoregions: 231Bc:CCP, 231Bd:CCC, 231Bj:CCC, 231Bl:CCP, 231Ea:CCC, 231Ef:CC?, 231Eh:CCC, 231Fa:CCC, 232Ba:CCC, 232Bb:CCC, 232Bc:CCP, 232Bd:CCC, 232Bg:CCC, 232Bh:CCC, 232Bi:CCC, 232Bj:CCC, 232Bk:CCC, 232Bl:CCC, 232Bm:CCC, 232Bn:CCC, 232Bo:CCC, 232Bp:CCC, 232Br:CCC, 232Bs:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCC, 232Dc:CCC, 232Ea:CCP, 232Ee:CCP, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC, 234Ad:CCP, 234Ak:CCP

Federal Lands: COE (Claiborne Lake); DOD (Camp Beauregard, Eglin); DOE (Savannah River Site); NPS (Big Thicket); USFS (Angelina, Apalachicola, Conecuh?, De Soto, Homochitto, Kisatchie, Sabine NF, Sam Houston, Tuskegee); USFWS (St. Marks)

ALLIANCE SOURCES

References: Allard 1990, Batson et al. 1957, Blaisdell et al. 1974, Daubenmire 1990, Delcourt and Delcourt 1974, Delcourt and Delcourt 1977, Diamond 1993, FNAI 1992a, FNAI 1992b, Glitzenstein et al. 1986, Harcombe and Marks 1977, Nelson 1986, Nixon et al. 1980a, Platt and Schwartz 1990, Quarterman and Keever 1962, Schafale 1994, Smith 1996a, Turner et al. 1999, Wharton 1978, Whipple et al. 1981

I.C.2.N.b. Temporarily flooded mixed evergreen - cold-deciduous forest

**I.C.2.N.B. FAGUS GRANDIFOLIA - LIQUIDAMBAR STYRACIFLUA - PINUS TAEDA - (MAGNOLIA GRANDIFLORA) TEMPORARILY FLOODED FOREST ALLIANCE (A.1989)
AMERICAN BEECH - SWEETGUM - LOBLOLLY PINE - (SOUTHERN MAGNOLIA)
TEMPORARILY FLOODED FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: Stands of this temporarily flooded alliance are found within the average annual floodplain of small streams in central and western Louisiana and eastern Texas, generally on acidic sandy loams and silt loams on both Pleistocene and Tertiary formations. Hydrologically, it is characterized by short-duration flood events, on the order of 1-3 days per event, occurring a few times in an average year. It occurs in the West (and possibly the East) Gulf Coastal Plain, along small streams within the range of *Magnolia grandiflora*. The canopies of stands of this alliance are typically dominated by a combination of *Magnolia grandiflora*, *Fagus grandifolia*, *Pinus taeda*, *Quercus alba*, *Liquidambar styraciflua*, *Nyssa sylvatica*, and *Quercus nigra*. Some examples lack strong dominance by *Magnolia grandiflora*, but these are included here. Other canopy species often present include *Quercus laurifolia*, *Quercus michauxii*, *Quercus pagoda*, *Nyssa biflora*, *Magnolia virginiana*, *Liriodendron tulipifera*, *Ulmus alata*, *Acer rubrum*, *Prunus serotina*, *Carya alba*, *Carya glabra*, and *Quercus falcata*. Common midstory and understory species include *Carpinus caroliniana*, *Ilex opaca*, *Viburnum dentatum*, *Halesia diptera*, *Hamamelis virginiana*, *Cornus florida*, *Rhododendron canescens*, *Symplocos tinctoria*, *Vaccinium elliotii*, *Sambucus nigra ssp. canadensis* (= *Sambucus canadensis*), *Itea virginica*, and others. *Arundinaria gigantea* is typically very common in patches. Vines are usually conspicuous and may include *Vitis rotundifolia*, *Smilax* spp., *Berchemia scandens*, *Campsis radicans*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Bignonia capreolata*. Herbaceous species often include *Athyrium filix-femina*, *Polystichum acrostichoides*, *Chasmanthium latifolium*, *Chasmanthium sessiliflorum*, *Arisaema triphyllum*, *Lobelia cardinalis*, *Polygonum* spp., and others.

Related Concepts: No information

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in Louisiana, Texas, and possibly other states (i.e., in the East Gulf Coastal Plain).

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fa:CCC, 232Fe:CCC

Federal Lands: DOD (Fort Polk); USFS (Angelina, Kisatchie, Sabine NF, Sam Houston)

ALLIANCE SOURCES

References: No information

I.C.2.N.d. Saturated mixed broad-leaved evergreen - cold-deciduous forest

**I.C.2.N.D. MAGNOLIA VIRGINIANA - NYSSA BIFLORA - (QUERCUS LAURIFOLIA) SATURATED FOREST ALLIANCE (A.378)
SWEETBAY - SWAMP BLACKGUM - (DIAMONDLEAF OAK) SATURATED FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: Forests of floodplain flats and small blackwater stream headwaters. Canopies are diverse, but various combinations of *Magnolia virginiana*, *Nyssa biflora*, and *Quercus laurifolia* often strongly dominate the canopy stratum. In the East Gulf Coastal Plain of Louisiana and Mississippi, this alliance includes *Quercus laurifolia* bayheads, over sticky clay soils, which are less acid and shrubby than most other bayhead types; as well as small ravine-bottom bayheads with seepage. In the former, the canopy is dominated by *Quercus laurifolia*, *Nyssa biflora*, *Magnolia virginiana*, and *Acer rubrum* var. *rubrum*. In addition, the subcanopy contains *Fraxinus caroliniana*. The open shrub stratum may contain *Cyrilla racemiflora*, *Vaccinium elliotii*, *Leucothoe racemosa*, *Rhododendron viscosum*, *Viburnum nudum* var. *nudum*, *Toxicodendron radicans*, *Chionanthus virginicus*, and *Lyonia lucida*. In the latter case, the canopy is dominated by *Magnolia virginiana*, *Nyssa biflora*, *Magnolia grandiflora*, and *Liriodendron tulipifera*. The shrub layer is dominated by *Ilex coriacea* and *Viburnum nudum* var. *nudum*; also *Illicium floridanum*, *Morella cerifera* (= *Myrica cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Leucothoe racemosa*, and *Lyonia lucida*. In the West Gulf Coastal Plain of Louisiana and Texas (and possibly Arkansas and Oklahoma), this alliance is expressed in at least two broad types which vary geographically along a north-south gradient. These broad-leaved mixed evergreen-deciduous forests are dominated by *Magnolia virginiana* and *Nyssa biflora*, with *Liquidambar styraciflua* codominant in some occurrences. Associated canopy species may include *Quercus laurifolia*, *Magnolia grandiflora*, *Quercus alba*, *Quercus nigra*, *Fagus grandifolia*, *Taxodium distichum*, *Pinus palustris*, and *Pinus taeda*. The subcanopy may include *Persea palustris*, *Acer rubrum*, *Ilex opaca* var. *opaca*, and occasionally *Chionanthus virginicus* and *Fraxinus pennsylvanica*. Tall shrubs include *Viburnum nudum* var. *nudum*, *Morella caroliniensis*, *Rhododendron canescens*, *Persea palustris*, *Morella cerifera*, *Ilex coriacea*, *Alnus serrulata*, *Photinia pyrifolia* (= *Aronia arbutifolia*), *Styrax americanus*, and *Rhododendron oblongifolium*. The short-shrub stratum includes seedlings of overstory and tall-shrub species, plus *Itea virginica*, *Berchemia scandens*, *Rubus* spp., and *Hypericum* spp. *Smilax laurifolia* and *Decumaria barbara* are conspicuous

vines. Herb species may include *Woodwardia areolata*, *Osmunda regalis*, *Osmunda cinnamomea*, *Athyrium filix-femina* ssp. *asplenoides*, *Chasmanthium latifolium*, *Chasmanthium laxum*, *Carex leptalea*, *Carex atlantica*, *Carex lonchocarpa* (= *Carex folliculata* var. *australis*), *Eleocharis tortilis*, and *Saururus cernuus*, as well as *Onoclea sensibilis*, *Elephantopus carolinianus*, *Boehmeria cylindrica*, *Juncus* spp., and *Fimbristylis* spp. This manifestation of the alliance occurs on deep, very acidic silt loams, fine sandy loam, and loamy fine sand soils with high organic content, primarily on floodplain flats and along small blackwater streams of low velocity.

Related Concepts:

- Bayhead Swamp (Smith 1996a) I
- IIA2a. Bay Forest (Allard 1990) I
- Mill Creek Bayhead (Martin and Smith 1991) ? Semi-Evergreen Broad-leaved Acid Seep Forest (Bridges and Orzell 1989a) ?
- Sweetbay - Swamp Tupelo - Redbay: 104 (Eyre 1980) I Sweetbay - Swamp Tupelo / *Osmunda* Loamy Wet Forested Seeps (Turner et al. 1999) ?
- Sweetbay Magnolia Series (Diamond 1993) I
- Upper Prairie Creek/Upper Wet Community (Nixon et al. 1983a) ?

Classification Comments: Compare to "Swamp Tupelo-Sweetbay Type" of Beckett and Golden (1982) of the Reed Brake RNA, Talladega National Forest, Alabama.

ALLIANCE DISTRIBUTION

Range: This alliance is found in the southeastern United States, primarily in the coastal plains, in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, and Texas.

Subnations: AL, AR, FL, GA, LA, MS, TX

TNC Ecoregions: 40:C, 41:C, 43:C, 50:P, 52:P, 53:C, 55:P, 56:C, 57:P, 58:P

USFS Ecoregions: 231Bc:CCC, 231Bd:CCC, 231Dd:CPP, 231Ed:CCC, 231Ef:CC?, 231Eh:CCC, 232Ba:CCC, 232Bb:CCC, 232Bc:CCC, 232Bd:CCC, 232Be:CCC, 232Bf:CCC, 232Bh:CCC, 232Bi:CC?, 232Bj:CCC, 232Bk:CCC, 232Bm:CCC, 232Bn:CCC, 232Bp:CCC, 232Bq:CCC, 232Br:CCC, 232Bs:CC?, 232Cd:CCC, 232Dc:CCC, 232Dd:CCP, 232Ea:CCC, 232Eb:CCC, 232Fa:CCC, 232Fb:CCP, 232Fe:CCC

Federal Lands: DOD (Fort Benning?, Fort Gordon); USFS (Angelina, Apalachicola, Conecuh, Kisatchie, Osceola, Sabine NF, Sam Houston, Talladega, Tuskegee); USFWS (Bon Secour?)

ALLIANCE SOURCES

References: Allard 1990, Beckett and Golden 1982, Bridges and Orzell 1989a, Clewell 1985, Diamond 1993, Eyre 1980, Gresham and Lipscomb 1981, Martin and Smith 1991, McDonald pers. comm., Monk 1968, Nixon et al. 1983a, Smith 1994a, Smith 1996a, Turner et al. 1999, Wharton 1978

I.C.3.N.a. Mixed needle-leaved evergreen - cold-deciduous forest

**I.C.3.N.A. PINUS (ECHINATA, TAEDA) - QUERCUS (INCANA, MARGARETTIAE, ARKANSANA) FOREST ALLIANCE (A.386)
(SHORTLEAF PINE, LOBLOLLY PINE) - (BLUEJACK OAK, SAND POST OAK, ARKANSAS OAK) FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: This alliance includes communities dominated by the nominal species, on xeric, sandy sites in the Coastal Plain west of the Mississippi River. The canopy coverage may be variable, reflecting the range of situations involved, ranging from open canopied woodlands on very well-drained Pleistocene terraces and low, broad ridges on deep, acidic sandy soils to slightly more or less dense examples on similarly droughty sites. In addition to the nominal canopy species, *Carya texana* may be present. Among the subcanopy, *Quercus incana* is arguably the most constant species. In most cases a patchy shrub stratum (varying from approximately 30-60% in total cover) consisting of stunted, scrubby *Quercus* spp. and tall shrubs ranging from 2.5-5 m in height is present. *Quercus arkansana*, a rare Coastal Plain endemic species, may occur in some examples. Due to xeric conditions, graminoids and forbs are very sparse in this community, and patches of exposed sand are common. Lichens (*Cladonia* spp.) and spike-moss (*Selaginella arenicola* ssp. *riddellii*) form large patches. Typical shrubs include *Sassafras albidum*, *Vaccinium arboreum*, *Ilex vomitoria*, *Sideroxylon lanuginosum* ssp. *lanuginosum*, *Asimina parviflora*, *Chionanthus virginicus*, *Stillingia sylvatica*, and *Frangula caroliniana*, and seedlings of canopy species. Depending, in part, upon management history, the herbaceous layer density may vary widely and is sometimes quite sparse. However, in nearly all cases it will contain a suite of habitat fidels, several of which are either endemic or nearly so to the West Gulf Coastal Plain. Herbaceous species may include *Aristida desmantha*, *Schizachyrium scoparium*, *Opuntia humifusa*, *Cnidocolus texanus*, *Eriogonum longifolium*, *Eriogonum multiflorum*, *Penstemon murrayanus*, *Polanisia erosa*, *Polygonella americana*, *Polygonella polygama*, and *Zornia bracteata*. More open examples that approach woodland structure may contain scattered patches of fruticose lichens (*Cladonia* spp.) and possibly spike-moss (*Selaginella arenicola* ssp. *riddellii*). The historical fire frequency of these vegetation types is unknown but is widely believed to have been less than that of *Pinus palustris*-dominated woodlands (which sometimes occur adjacent to this type). Too frequent fires would not allow for the persistence of *Pinus echinata* and hardwood species, although young *Pinus echinata* has the ability to resprout when top-killed by fire. In some areas of

eastern Texas these xeric sandhills occupy very limited portions of the landscape possibly suggesting that natural fire frequencies may not have been as constant or as frequent as would be necessary to maintain herbaceous-dominated woodlands. In addition, the extremely droughty soils contribute to only sparse fine fuel build-up making frequent, natural fires difficult to either ignite or spread. In the continued absence of fire, these mixed forests may become increasingly invaded by *Pinus taeda*. This alliance occurs on ridgetops and flat xeric uplands on very well-drained, acidic sandy soils in the West Gulf Coastal Plain and Upper West Gulf Coastal Plain of Arkansas, Louisiana, Oklahoma, and Texas. Its status in the western part of the East Gulf Coastal Plain is unclear.

Related Concepts:

- Bluejack Oak-Pine Series (Diamond 1993) I
- IA7a. Xeric Shortleaf Pine - Oak Forest (Allard 1990) I
- Loblolly Pine - Hardwood: 82 (Eyre 1980) I
- Shortleaf Pine - Bluejack Oak / *Tragia* Grossarenic Dry Uplands (Turner et al. 1999) I
- Shortleaf Pine - Oak: 76 (Eyre 1980) I
- Shortleaf Pine-Oak Series (Diamond 1993) I
- Shortleaf Pine/Oak-Hickory Forest (Smith 1996a) I
- Western Xeric Sandhill Woodland (Smith 1996a) I

Classification Comments: The former *Pinus (echinata, taeda) - Quercus (arkansana, incana, margarettiae)* Woodland Alliance (A.696), which occurred on closely related sites, has been merged into this alliance. This former alliance was created at the West Gulf Coastal Plain Crosswalk session (11-96) to accommodate an association which was formerly placed in the II.A.4.N.a *Pinus echinata* Woodland Alliance (A.515) but which was mixed according to Tom Foti.

ALLIANCE DISTRIBUTION

Range: This alliance occurs in the West Gulf Coastal Plain and Upper West Gulf Coastal Plain of Arkansas, Louisiana, Oklahoma, and Texas. Its status in the western part of the East Gulf Coastal Plain is unclear. This alliance is found in Louisiana, Oklahoma, Texas, and possibly Arkansas (?) and others.

Subnations: AR?, LA, OK, TX

TNC Ecoregions: 40:C, 41:C, 53:P

USFS Ecoregions: 231Ea:CCC, 231Eb:CCP, 231Ed:CCC, 231Ee:CC?, 231Ef:CCC, 231Eg:CCC, 231Eh:CCC, 231Ei:CCC, 231Ej:CCP, 231Ek:CCP, 231Em:CC?, 231En:CCP, 232Ba:C??, 232Bb:C??, 232Bc:C??, 232Bd:C??, 232Bj:C??, 232Bk:C??, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ALLIANCE SOURCES

References: Allard 1990, Allred and Mitchell 1955, Diamond 1993, Eyre 1980, Foti pers. comm., Hoagland pers. comm., Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Smith 1996a, Turner et al. 1999

**I.C.3.N.A. PINUS TAEDA - QUERCUS (ALBA, FALCATA, STELLATA) FOREST ALLIANCE (A.404)
LOBLOLLY PINE - (WHITE OAK, SOUTHERN RED OAK, POST OAK) FOREST ALLIANCE**

ALLIANCE CONCEPT

Summary: This alliance encompasses loblolly pine - oak forests of the Coastal Plain and some adjacent provinces of the eastern United States. The canopy is dominated by *Pinus taeda* with some combination of the nominal oaks. More mesic examples tend to be codominated by *Quercus alba*, while dry to dry-mesic examples are usually codominated by *Quercus falcata*. Associated species vary by geography, substrate, and exposure. Described members of this alliance are found sporadically, ranging from the North Atlantic Coast of Delaware, through the Chesapeake Lowlands of Maryland and Virginia to the West Gulf and Upper West Gulf coastal plains of eastern Texas and Arkansas where they are most common. These forests are apparently absent from the Mid-Atlantic Coastal Plain of North and South Carolina, but are documented in the South Atlantic Coastal Plain of Georgia. Successional and/or semi-natural examples are known from the East Gulf and Upper East Gulf coastal plains. Within the longleaf pine belt, these forests can occur naturally on fire-protected areas such as topographically isolated hilltops, mid to lower slopes, protected ravines, broad flats and second bottoms. In some cases, they are successional forests on broad uplands following clearing or alteration of natural forests, especially those historically dominated by *Pinus palustris*. A broad range of associated species may be present in this type, including *Carya alba*, *Carya texana*, *Nyssa sylvatica*, *Liquidambar styraciflua*, *Carya cordiformis*, *Magnolia grandiflora*, *Fagus grandifolia*, *Quercus velutina*, *Quercus michauxii*, *Quercus pagoda*, and *Acer rubrum*. The subcanopy can include canopy species, as well as *Ilex opaca* var. *opaca*, *Ostrya virginiana*, *Carpinus caroliniana*, *Cornus florida*, and others. *Callicarpa americana*, *Symplocos tinctoria*, *Morella cerifera* (= *Myrica cerifera*), *Vaccinium elliotii*, *Viburnum dentatum*, and *Viburnum acerifolium* are common shrub species. Herbaceous species that may be present include *Polystichum acrostichoides*, *Athyrium filix-femina* ssp. *asplenioides*, *Phegopteris hexagonoptera*, *Prenanthes altissima*, *Spigelia marilandica*, *Mitchella repens*, *Podophyllum peltatum*, *Phlox divaricata*, *Tipularia discolor*, *Arisaema triphyllum*, *Erigeron pulchellus*, *Lilium michauxii*, *Chasmanthium laxum*, *Chasmanthium sessiliflorum*, and *Melica mutica*.

Related Concepts:

- Calcareous Forest (Smith 1996a) I

- Dry-Mesic Mixed Oak - Pine Forest (Wieland 1994b) ?
- IA6e. Loblolly Pine - Shortleaf Pine - Oak Forest (Allard 1990) I
- Loblolly Pine - Hardwood: 82 (Eyre 1980) ?
- Loblolly Pine-Oak Series (Diamond 1993) ?
- Lowland Pine - Oak Forest (Foti 1994b) ?
- Mixed Hardwood-Loblolly Pine Forest (Smith 1996a) I
- T1B3aII4a. *Pinus echinata* - *Pinus taeda* - *Quercus* spp. (*stellata*, *alba*, *falcata*) (Foti et al. 1994) ?
- White Oak - Loblolly Pine/*Callicarpa* Loamy Mesic Lower Slopes and Terraces (Turner et al. 1999) I

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance encompasses pine-oak forests of the Coastal Plain and some adjacent provinces from Virginia to Texas. This includes the mesic to dry-mesic loblolly pine-oak-hickory forests of Arkansas, Louisiana, and Texas; dry forests on flats in the Piedmont of, at least, North Carolina and South Carolina that are dominated by *Pinus taeda* with a combination of the nominal oaks; and related vegetation in the East Gulf and Atlantic coastal plains.

Subnations: AL, AR, DE, FL?, GA, LA, MD, MS, NC?, OK, SC, TN?, TX, VA

TNC Ecoregions: 31:C, 40:C, 41:C, 43:P, 44:P, 50:?, 52:P, 53:C, 56:C, 57:C, 58:C, 62:C

USFS Ecoregions: 231Aa:CCC, 231Ac:CCC, 231Ae:CCC, 231Af:CCC, 231Ah:CCP, 231Ba:CCP, 231Bc:CCP, 231Bd:CCC, 231Be:CCC, 231Bg:CCP, 231Bh:CCP, 231Bi:CCC, 231C:CC, 231Ea:CCC, 231Ee:CCC, 231Ef:CCC, 231Eg:CCC, 231Eh:CCC, 231Ei:CCC, 231Ej:CCC, 231En:CCC, 231Fa:CCC, 232Ac:CCC, 232Ad:CCC, 232Ba:CCC, 232Bb:CCC, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCC, 232Bm:CCP, 232Bn:CCC, 232Bo:CCP, 232Bq:CCC, 232Br:CCC, 232Bt:CCC, 232Bu:CCC, 232Bv:CCC, 232Bx:CCC, 232Bz:CCC, 232Ca:CCC, 232Cb:CCC, 232Ce:CCC, 232E:C?, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC, 234Ab:PP?, 234Ac:PPP, 234Ah:PPP, 255:?

Federal Lands: DOD (Fort Benning); NPS (Chickamauga-Chattanooga, Kennesaw Mountain, Rock Creek); USFS (Angelina, Apalachicola?, Bienville, Conecuh, Croatan?, Davy Crockett, De Soto, Francis Marion, Holly Springs, Homochitto, Kisatchie, Oconee, Sabine NF, Sam Houston, St. Francis, Sumter?, Talladega, Tombigbee, Tuskegee, Uwharrie?); USFWS (Eufaula, Noxubee?)

ALLIANCE SOURCES

References: Allard 1990, Baker and Langdon 1990, Clarke et al. 2000, Diamond 1993, Eyre 1980, Foti 1994b, Foti et al. 1994, Golden 1979, Martin and Smith 1991, Martin and Smith 1993, Smith 1996a, Smith pers. comm., Turner et al. 1999, Wieland 1994b

I.C.3.N.A. *PINUS ECHINATA* - *QUERCUS* (*ALBA*, *FALCATA*, *STELLATA*, *VELUTINA*) FOREST ALLIANCE (A.394)

SHORTLEAF PINE - (WHITE OAK, SOUTHERN RED OAK, POST OAK, BLACK OAK) FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance occurs in the southeastern United States from the Inner Coastal Plain and Piedmont, ranging north and west through the Cumberland Plateau, Ridge and Valley, and low Blue Ridge, and from eastern Texas and Louisiana, through the Ouachita Mountains and Ozarks. It includes mesic to dry-mesic forests with mixed evergreen and deciduous canopies where *Pinus echinata* and one or more of the nominal *Quercus* spp. occur in varying ratios. In some associations *Pinus taeda* may be a dominant evergreen canopy component. *Quercus rubra* codominates in associations in the Ozarks and Ouachita Mountains. Other common species vary greatly with geography, but can include *Carya alba*, *Carya texana*, *Sassafras albidum*, *Oxydendrum arboreum*, *Acer rubrum*, *Nyssa sylvatica*, *Cornus florida*, *Vaccinium arboreum*, *Vaccinium pallidum*, *Vaccinium stamineum*, *Chimaphila maculata*, *Tephrosia virginiana*, *Coreopsis major*, and others. Forests in this alliance occur on dry hilltops, upper slopes, and ridges on acidic soils. The alliance also includes associations from some more non-acidic substrates, including hilltops and upper slopes in Louisiana associated with the Cook Mountain Formation and with calcareous prairies on the Fleming Formation in eastern Texas.

Related Concepts:

- *Pinus echinata* forest alliance (Hoagland 1998a) I
- Dry Oak--Hickory Forest (Schafale and Weakley 1990) I
- Dry Shortleaf Pine - Oak Forest (Foti 1994b) ?
- IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) I
- Mixed Oaks-Shortleaf Pine HR (Pyne 1994) ?
- Shortleaf Pine - Oak: 76 (Eyre 1980) I
- Shortleaf Pine-Oak Series (Diamond 1993) I
- Shortleaf Pine-White Oak CUPL (Pyne 1994) ? T1B3aII3b. *Quercus alba* - *Pinus echinata* - *Quercus (velutina, falcata)* (Foti et al. 1994) ?

Classification Comments: This alliance has an overall more mesophytic species composition than shortleaf pine - oak forests found in *Pinus echinata* - *Quercus (coccinea, prinus)* Forest Alliance (A.395). This alliance (A.394) is recognized as distinct in both Arkansas and the Midwest. It contains oaks such as *Quercus alba*, *Quercus falcata*, *Quercus stellata*, *Quercus velutina*, *Quercus*

rubra, plus *Carya texana* and *Carya alba*. In Arkansas, there are many forests dominated by *Pinus echinata* and *Quercus rubra*, as described in *Pinus echinata - Quercus (alba, rubra) / Vaccinium (arboreum, pallidum) / Schizachyrium scoparium - Chasmanthium sessiliflorum - Solidago ulmifolia* Forest (CEGL007489). Even though *Quercus rubra* is not an alliance nominal, these forests fit within the alliance concept and are placed in this alliance. This alliance was not observed on the Bankhead National Forest. However dry-mesic shortleaf pine vegetation is potentially on the Bankhead and, if found, should be classed in this alliance. The foregoing statements imply that the primary intended distinction between A.394 and A.395 is one of moisture regime rather than biogeography; however, the nominal oaks of A.395 also give it an "Appalachian" (in the broad sense) distribution as opposed to an Ozarkian one (as *Quercus prinus* does not go west of the Mississippi River nor into much of the coastal plains, and *Quercus coccinea* is absent from the Ozarks and Ouachitas of Arkansas, but present in Missouri).

ALLIANCE DISTRIBUTION

Range: This alliance occurs in the southeastern United States from the inner Coastal Plain and Piedmont, ranging north and west through the Cumberland Plateau, Ridge and Valley, and low-elevation Blue Ridge, and from eastern Texas and Louisiana through the Ouachita Mountains and Ozarks. Associations have been defined in Alabama, Arkansas, Georgia, Kentucky, Illinois, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Oklahoma, Tennessee, Texas, and Virginia (?).

Subnations: AL, AR, FL?, GA, IL, KY, LA, MO, MS, NC, OH?, OK, SC, TN, TX, VA?, WV?

TNC Ecoregions: 32:C, 38:C, 39:C, 40:C, 41:C, 43:C, 44:C, 49:P, 50:C, 51:C, 52:C, 53:C, 56:C, 57:P

USFS Ecoregions: 221Ea:PP?, 221Eb:PP?, 221Ec:PPP, 221H:PP, 221I:PP, 221J:PP, 222Aa:CCC, 222Ab:CCC, 222Ad:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCC, 222Aj:CCC, 222Ak:CCC, 222Al:CCC, 222An:CCC, 222Aq:CCC, 222D:CP, 222Eg:CCC, 222F:C?, 231Aa:CCP, 231Ab:CCC, 231Ac:CCC, 231Ad:CCP, 231Ae:CCC, 231Af:CCC, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap:CCP, 231Ba:CCP, 231Bb:CCP, 231Bc:CCC, 231Bd:CCC, 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:CCC, 231Dc:CCC, 231Dd:CCC, 231De:CCP, 231Ea:CCC, 231Eb:CC?, 231Ee:CC?, 231Ef:CCC, 231Eg:CC?, 231Eh:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ba:CCC, 232Bj:CCP, 232Fa:CCC, 232Fb:CCC, 232Fc:CCC, 232Fd:CCC, 232Fe:CCC, 234Ab:PPP, M221C:CP, M221Dc:CCC, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Fort Benning); NPS (Carl Sandburg Home, Hot Springs, Kennesaw Mountain, Kings Mountain, Little River Canyon?); USFS (Angelina, Chattahoochee, Cherokee, Daniel Boone, Davy Crockett, Holly Springs, Kisatchie, Land Between the Lakes, Oconee, Ouachita, Ozark, Sabine NF, Sam Houston, Shawnee, St. Francis, Sumter, Talladega, Tombigbee, Tuskegee?, Uwharrie); USFWS (Noxubee)

ALLIANCE SOURCES

References: Allard 1990, Cain and Shelton 1994, Campbell et al. 1996, Diamond 1993, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti and Guldin 1994, Foti et al. 1994, Fountain and Sweeney 1985, Fountain and Sweeney 1987, Halls and Homesley 1966, Hoagland 1998a, Johnson 1986a, Kennedy 1973, Martin and Smith 1991, Martin and Smith 1993, Pyne 1994, Rice and Penfound 1959, Schafale and Weakley 1990, USFS 1990

I.C.3.N.b. Temporarily flooded mixed needle-leaved evergreen - cold-deciduous forest

I.C.3.N.B. *PINUS TAEDA - QUERCUS (PHELLOS, NIGRA, LAURIFOLIA) TEMPORARILY FLOODED FOREST ALLIANCE (A.437)*

LOBLOLLY PINE - (WILLOW OAK, WATER OAK, DIAMONDLEAF OAK) TEMPORARILY FLOODED FOREST ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance covers mixed loblolly-hardwood forests of primarily blackwater rivers of the eastern Coastal Plain and related small stream floodplains west of the Mississippi River. Stands are dominated by *Pinus taeda* with any combination of the nominal *Quercus* species (e.g., *Quercus laurifolia*, *Quercus nigra*, *Quercus phellos*). Some stands could originate as *Pinus taeda* plantations, with subsequent ingrowth of the hardwoods. These situations confound the status of this alliance as distinct from its deciduous equivalent (A.292). See the description for the I.B.2.N.d *Quercus (phellos, nigra, laurifolia)* Temporarily Flooded Forest Alliance (A.292) which is very similar, but lacks a significant component of *Pinus taeda*. This alliance perhaps uncomfortably combines natural, ecologically restricted situations (e.g., CEGL007548 of "sandy blackwater streams and on low, sandy terraces and levees in the Atlantic Coastal Plain") as well as more semi-natural or successional situations under less restricted or clearly defined conditions.

Related Concepts:

- Coastal Plain Bottomland Hardwoods, Blackwater Subtype (Schafale and Weakley 1990) ?
- IIA8c. Lowland Pine - Oak Forest (Allard 1990) I
- Loblolly Pine - Hardwood: 82 (Eyre 1980) I
- Loblolly Pine-Lowland Hardwoods Type (?) (Beckett and Golden 1982) ?
- Loblolly Pine: 81 (Eyre 1980) I

- Lowland Pine - Oak Forest (Foti 1994b) I
- T1B3aIII5b. *Pinus taeda* - *Quercus phellos* - *Quercus stellata* (Foti et al. 1994) ?
- White Oak - Loblolly Pine / *Callicarpa* Loamy Infrequently Flooded Levees and Bottomland Ridges (Turner et al. 1999) I

Classification Comments: This vegetation may occur along small streams and rivers at the northern periphery of the Gulf Coast Prairies and Marshes Ecoregion in eastern Texas in the vicinity of Beaumont.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, Texas, South Carolina, Delaware, Maryland, and Virginia, and probably Arkansas (?).

Subnations: AL, AR, DE, FL, GA, LA, MD, MS, NC, OK, SC, TX, VA?

TNC Ecoregions: 31:C, 40:C, 41:C, 42:C, 43:P, 50:P, 52:P, 53:C, 55:P, 56:C, 57:C, 58:C, 62:C

USFS Ecoregions: 231Aa:CCC, 231Ab:CC?, 231Ac:CC?, 231Ad:CC?, 231Ae:CCP, 231Af:CCC, 231Ag:CCC, 231Ah:CC?, 231Ai:CC?, 231Aj:CC?, 231Am:CC?, 231Ao:CCC, 231Ba:CCP, 231Bb:CCP, 231Bc:CCC, 231Bd:CCP, 231Be:CC?, 231Bf:CCP, 231Bg:CC?, 231Bi:CCP, 231Bj:CCP, 231Bl:CCP, 231Da:CC?, 231Db:CC?, 231Dc:CC?, 231Dd:CC?, 231De:CC?, 231Ea:CCP, 231Eb:CCP, 231Ec:CCP, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCC, 231Ei:CCP, 231Ej:CCC, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:CCP, 232A:CP, 232Ba:CCC, 232Bb:CCC, 232Bc:CCC, 232Bd:CCC, 232Be:CCC, 232Bf:CCC, 232Bg:CCC, 232Bh:CCC, 232Bi:CCC, 232Bj:CCC, 232Bk:CCC, 232Bl:CCC, 232Bm:CCC, 232Bn:CCC, 232Bo:CCC, 232Bp:CCC, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bt:CCC, 232Bu:CCC, 232Bv:CCC, 232Bx:CCC, 232Bz:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCC, 232Cd:CCC, 232Ce:CCC, 232Cf:CCC, 232Cg:CCC, 232Ch:CCC, 232Ci:CCC, 232Cj:CCC, 232Dc:C??, 232Ea:CCC, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 232Fe:CCC, 234Ac:CCP, 234Ah:CC?, 234Ak:CC?

Federal Lands: DOD (Fort Bragg); USFS (Angelina, Apalachicola, Bienville, Conecuh, Croatan?, Davy Crockett, De Soto, Francis Marion?, Holly Springs, Homochitto?, Kisatchie, Osceola, Sabine NF, Sam Houston, St. Francis, Sumter, Talladega?, Tombigbee, Tuskegee)

ALLIANCE SOURCES

References: Allard 1990, Beckett and Golden 1982, Eyre 1980, Foti 1994b, Foti et al. 1994, Schafale and Weakley 1990, Turner et al. 1999

II. Woodland

II.A.4.N.a. Rounded-crowned temperate or subpolar needle-leaved evergreen woodland

II.A.4.N.A. *PINUS PALUSTRIS* / *QUERCUS* SPP. WOODLAND ALLIANCE (A.499) LONGLEAF PINE / OAK SPECIES WOODLAND ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes all *Pinus palustris*-dominated vegetation on dry to xeric sites in the southeastern United States. These types include 'longleaf pine sandhills' of the Atlantic and Gulf coastal plains; other dry to xeric substrates of the East Gulf and West Gulf coastal plains; as well as 'montane longleaf' on rocky substrates of the Piedmont, Cumberland Plateau, and Ridge and Valley. Longleaf pine sandhills include a variety of xeric to dry-mesic *Pinus palustris* communities, characterized by the presence of one or more scrub oaks, most characteristically including *Quercus incana*, *Quercus laevis*, *Quercus margarettiae*, *Quercus myrtifolia*, *Quercus geminata*, *Quercus minima*, *Quercus arkansana*, *Quercus chapmanii*, *Quercus stellata*, and *Quercus marilandica*, sometimes in combination with the more mesic oaks *Quercus virginiana*, *Quercus falcata*, *Quercus pumila*, and *Quercus nigra*. The more montane examples may contain *Quercus prinus*, *Quercus coccinea*, *Quercus falcata*, *Pinus echinata*, and *Pinus virginiana*. The structure of examples of these communities is highly variable, depending on fire frequency. Generally, appropriately fire-managed examples of these communities have an open canopy of *Pinus palustris*, with scattered tree-sized individuals of the *Quercus* spp.; the oaks are otherwise reduced to sprouts. Under lower fire frequency, these communities often develop a dense subcanopy, shrub layer, or even canopy of scrub oaks. In addition, fire suppression may promote ingrowth of other pines, particularly *Pinus clausa*, *Pinus echinata*, and/or *Pinus taeda*. Where a well-developed shrub stratum is present, common shrubs include *Vaccinium stamineum*, *Vaccinium arboreum*, *Vaccinium virgatum*, *Vaccinium tenellum*, *Gaylussacia dumosa* (= var. *dumosa*), *Gaylussacia frondosa* (= var. *frondosa*), *Gaylussacia nana* (= *Gaylussacia frondosa* var. *nana*), *Gaylussacia tomentosa* (= *Gaylussacia frondosa* var. *tomentosa*), *Ilex vomitoria*, *Rhus copallinum*, *Asimina parviflora*, and *Morella cerifera* (= *Myrica cerifera*). *Aristida stricta* or *Aristida beyrichiana* are also dominant or at least present within their ranges in the herbaceous layer of many associations. Other characteristic grasses include *Sporobolus junceus*, *Aristida purpurascens*, *Schizachyrium scoparium*, *Andropogon gyrans*, and *Andropogon ternarius*. Soils of this alliance include sandy Entisols, plinthic and aquic Ultisols, Alfisols and occasionally Spodosols. Soils vary in texture from deep sands to well-drained loams with a strong clay component. Montane examples occur on rocky ridges comprised of various rock types including sandstone, quartzite, phyllite, mica schists, and gneiss.

Related Concepts:

- Bluejack Oak-Pine Series (Diamond 1993) I
- Coastal Fringe Sandhill (Schafale and Weakley 1990) ?

- IB6a. Western Xeric Sandhill (Allard 1990) ?
- IB6b. Southeastern Coastal Plain Xeric Sandhill (Allard 1990) ?
- IB6c. Southeastern Coastal Plain Subxeric Pine - Oak Sandhill (Allard 1990) I
- IB6d. Southeastern Coastal Plain Subxeric Longleaf Pine - Saw Palmetto Woodland (Allard 1990) ?
- Longleaf Pine - Bluejack Oak / *Tragia* Grossarenic Dry Uplands (Turner et al. 1999) I
- Longleaf Pine: 70 (Eyre 1980) I
- Mesic Pine Flatwoods (Schafale and Weakley 1990) ?
- Pine/Scrub Oak Sandhill, Mesic Transition Variant (Schafale 1994) ?
- Pine/Scrub Oak Sandhill, Mixed Oak Variant (Schafale 1994) ?
- Pine/Scrub Oak Sandhill, Northern Variant (Schafale 1994) ?
- Sandhill (FNAI 1992a) I
- Western Wet/Mesic Longleaf Pine Savannah/Flatwoods (Smith 1996a) I
- Xeric Sandhill Scrub, Coastal Fringe Variant (Schafale 1994) ?
- Xeric Sandhill Scrub, Coastal Plain Variant (Schafale 1994) ?
- Xeric Sandhill Scrub, Sand Barren Variant (Schafale 1994) ?

Classification Comments: This alliance includes vegetation referred to as 'longleaf pine sandhills' of the Atlantic and Gulf coastal plains; other dry to xeric substrates of the East Gulf and West Gulf coastal plains; as well as 'montane longleaf' on rocky substrates of the Piedmont, Cumberland Plateau, and Ridge and Valley. Some of these associations, because of their inland geography and/or a history of disturbance and/or fire suppression, contain other pine species (*Pinus echinata* and/or *Pinus taeda*) or oaks in their canopies. Depending on fire interval, the canopy closure may temporarily exceed 60%. Despite this, all are now placed here. Some examples of this condition include fire-suppressed or otherwise ecologically disturbed longleaf pine woodlands from the coastal plains with tall and dense scrub oaks that enter the canopy, or mixed pine woodlands within the natural range of *Pinus palustris* and at least partially dominated by it. The pine canopy component is typically a mixture of pine species; this usually arises from ingrowth of the less fire-tolerant pines (*Pinus echinata*, *Pinus taeda*) into natural, planted, or managed stands of *Pinus palustris*. In addition, included here are naturally mixed pine - oak stands which have a canopy containing *Pinus palustris* with a mixture of other pines and oaks, in the Piedmont and Ridge and Valley of Georgia, in the Ridge and Valley of Alabama, and possibly other areas outside of the Coastal Plain. In some of these associations, the original composition and canopy closure are speculative; a higher canopy closure (greater than 60%) may be the result of fire suppression in woodlands more typically dominated by *Pinus palustris*. Oaks present may include *Quercus stellata*, *Quercus marilandica*, *Quercus prinus*, *Quercus margarettiae*, *Quercus incana*, and *Quercus falcata*, which will frequently be present in the understory or also scattered in the overstory, depending on the moisture regime. *Quercus coccinea* and *Quercus georgiana* are more rarely found. The woodland structure may be wholly 'natural,' or it may have been created and maintained by silvicultural techniques designed to replicate this natural condition. At many sites, both forest and woodland communities may be present, grading into one another depending on aspect, surface geology, or fire history.

ALLIANCE DISTRIBUTION

Range: This alliance is found in the Coastal Plain province from Virginia south to south-central Florida, and west to eastern Texas. It also extends inland to "hard rock" provinces (Piedmont, Cumberland Plateau, Ridge and Valley) of Alabama, Georgia, and North Carolina. Overall, this alliance is found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX, VA

TNC Ecoregions: 31:C, 40:C, 41:C, 43:C, 50:C, 52:C, 53:C, 55:C, 56:C, 57:C

USFS Ecoregions: 231Aa:CCC, 231Ab:CC?, 231Ac:CCC, 231Af:CCC, 231Ai:CCP, 231Aj:CCC, 231Ao:CC?, 231Bc:CCC, 231Bd:CCC, 231Bj:CCP, 231Ca:CCC, 231Da:CC?, 231Db:CCC, 231Dc:CCC, 231Dd:CCC, 231De:CC?, 231Ea:CCC, 231Eg:CCP, 231Fa:CCC, 232Ba:CCC, 232Bb:CCC, 232Bc:CCP, 232Be:CCP, 232Bf:CCC, 232Bg:CCC, 232Bh:CCC, 232Bj:CCC, 232Bk:CCC, 232Bl:CCC, 232Bm:CCP, 232Bn:CCC, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bu:CCP, 232Bv:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCP, 232Ce:CCC, 232Cf:CCP, 232Ch:CCC, 232Da:CCP, 232Db:CCC, 232Dc:CCC, 232Ea:CCC, 232Eb:CCP, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC, 232Ga:CP?, 232Gb:CPP, 232Gc:CPP, 411Ac:CCP, 411Af:CCC

Federal Lands: DOD (Camp Lejeune, Camp Shelby, Eglin, Fort Benning, Fort Bragg, Fort Gordon, Fort Jackson, Fort McClellan, Fort Stewart, Sunny Point); NPS (Big Thicket); USFS (Angelina, Apalachicola, Bankhead, Bienville, Chattahoochee, Conecuh, Croatan, Davy Crockett, De Soto, Francis Marion, Homochitto?, Kisatchie, Ocala, Osceola, Sabine NF, Sam Houston, Talladega, Tuskegee, Uwharrie); USFWS (Eufaula)

ALLIANCE SOURCES

References: Allard 1990, Allen 1956, Bridges and Orzell 1989a, Diamond 1993, Eyre 1980, FNAI 1992a, FNAI 1992b, MacRoberts and MacRoberts 1992, Martin and Smith 1991, Martin and Smith 1993, Myers 1990, Myers and Ewel 1990, Peet and Allard 1993, Pessin 1933, Schafale 1994, Schafale and Weakley 1990, Smith 1996a, Soil Conservation Service 1990, Turner et al. 1999, Wentworth et al. 1993

II.A.4.N.A. *PINUS PALUSTRIS* WOODLAND ALLIANCE (A.520)

LONGLEAF PINE WOODLAND ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes mesic to dry-mesic upland *Pinus palustris* woodlands and savannas, on rolling hills or on flats, with an open to sparse canopy of *Pinus palustris*, and lacking scrub oaks and the extreme xeric conditions that typically support these species. If oaks are present, they are generally of more mesic species, such as *Quercus falcata*, *Quercus nigra*, *Quercus virginiana*, or *Quercus pumila*; examples may contain more xeric species such as *Quercus marilandica* or *Quercus stellata*, in combination with the more mesic oaks. Other pines, particularly *Pinus echinata*, *Pinus elliottii* var. *elliottii*, and *Pinus taeda*, may be present. While not dominant, they may form part of the canopy, increasing with fire suppression. When fire-suppressed, *Quercus falcata*, *Liquidambar styraciflua*, *Acer rubrum*, *Quercus nigra*, *Nyssa sylvatica*, *Cornus florida*, *Callicarpa americana*, and/or *Rhus copallinum* may invade or increase. Overall floristic composition is primarily composed of upland species typical of mesic to dry-mesic conditions, but may include an admixture of species characteristic of wetland sites and those characteristic of xeric sites as well. Some typical mesic to dry-mesic herbaceous species include *Andropogon ternarius*, *Andropogon gyrans* var. *gyrans*, *Schizachyrium scoparium*, *Sorghastrum nutans*, and *Panicum virgatum*. *Aristida stricta* or *Aristida beyrichiana* are also dominant or at least present in the herbaceous layer of many associations within their respective ranges. Variation in floristic composition of this wide-ranging alliance is related to site conditions, fire interval, and local or regional floristics. The herbaceous layer typically becomes much less diverse with increased fire interval. This alliance typically occurs on finer-textured soils, such as clays and clay loams.

Related Concepts:

- IB6i. Atlantic Coastal Plain Mesic Longleaf Pine Forest (Allard 1990) ?
- IB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) I
- IB6l. East Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) I
- Loamy Hills Longleaf - Slash Pine Forest (Wieland 1994b) ?
- Longleaf Pine - Mixed Hardwood Woodland (Moore pers. comm.) ?
- Longleaf Pine - Scrub Oak: 71 (Eyre 1980) I
- Longleaf Pine-Little Bluestem Series (Diamond 1993) I
- Longleaf Pine: 70 (Eyre 1980) I
- Mesic Pine Flatwoods (Schafale and Weakley 1990) I
- Mesic Pine Flatwoods, Coastal Plain Variant (Schafale 1994) ?
- Mesic Pine Flatwoods, Little River Variant (Schafale 1994) ?
- Mesic Pine Flatwoods, Sandhills Variant (Schafale 1994) ?
- Southern Mesic Longleaf Pine Woodland (Peet and Allard 1993) ?
- Western Upland Longleaf Pine Forest (Smith 1996a) I

Classification Comments: This alliance includes a variety of associations characterized by the presence of *Pinus palustris* occurring on a variety of mesic to dry-mesic substrates, most commonly on loamy and clayey soils in the Atlantic and Gulf coastal plains. It is differentiated from the *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499) by the dearth of xeric oaks (*Quercus laevis*, *Quercus incana*, *Quercus margarettiae*) and its occurrence in the Coastal Plain in mesic to dry-mesic situations on finer-textured soils. There is some floristic overlap between these two alliances and therefore substrate and physiographic differences help to differentiate them. This alliance includes a variety of associations previously placed in related other alliances which have now been merged with this one. These related alliances include the former I.C.3.N.a *Pinus palustris* - *Pinus* (*echinata*, *taeda*) - *Quercus* (*incana*, *margarettiae*, *falcata*, *laevis*) Forest Alliance (A.397) and former II.A.4.N.a *Pinus palustris* - *Pinus* (*echinata*, *taeda*) Woodland Alliance (A.519). Some of these associations, because of their inland geography and/or a history of disturbance and/or fire suppression, contain other pine species (*Pinus echinata* and/or *Pinus taeda*) or oaks in their canopies. Depending on fire interval, the canopy closure may temporarily exceed 60%. Despite this, all are now placed here. Some examples of this condition include fire-suppressed or otherwise ecologically disturbed longleaf pine woodlands from the coastal plains with tall and dense oaks that enter the canopy, or mixed pine woodlands within the natural range of *Pinus palustris* and at least partially dominated by it. The pine canopy component is sometimes a mixture of pine species; this usually arises from ingrowth of the less fire-tolerant pines (*Pinus echinata*, *Pinus taeda*) into natural, planted, or managed stands of *Pinus palustris*. Oaks present may include *Quercus stellata*, *Quercus falcata*, *Quercus marilandica*, *Quercus alba*, *Quercus nigra*, *Quercus hemisphaerica*, and *Quercus prinus*, which will frequently be present in the understory or also scattered in the overstory, depending on the moisture regime. *Oxydendrum arboreum* is commonly present, and *Liquidambar styraciflua*, *Carya alba*, *Carya pallida*, *Diospyros virginiana*, *Nyssa sylvatica*, and *Cornus florida* could be as well. The woodland structure may be wholly 'natural,' or it may have been created and maintained by silvicultural techniques designed to replicate this natural condition. At many sites, both forest and woodland communities may be present, grading into one another depending on aspect, surface geology, or fire history. This alliance also includes silviculturally managed forests of planted or seed tree/shelterwood-regenerated *Pinus palustris* with *Pinus echinata* and/or *Pinus taeda* invading due to fire suppression.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 31:C, 40:C, 41:C, 43:C, 53:C, 55:C, 56:C, 57:C

USFS Ecoregions: 231Ac:CCC, 231Bd:CCC, 231Bj:CCP, 231Dd:CCC, 231Ea:CCC, 231Ef:CCC, 231Eg:CCP, 231Eh:CCC, 231Fa:CPP, 232Ba:CCC, 232Bb:CCC, 232Bc:CCP, 232Be:CCP, 232Bf:CCC, 232Bg:CCC, 232Bh:CCC, 232Bj:CCC, 232Bk:CCC, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bu:CCP, 232Bv:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCP, 232Ce:CCC, 232Cf:CCC, 232Da:CCP, 232Db:CCC, 232Dc:CCC, 232Ea:CCC, 232Eb:CCP, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC, 232Ga:CPP, 232Gb:CPP, 232Gc:CPP

Federal Lands: DOD (Camp Lejeune, Eglin, Fort Benning, Fort Bragg, Fort Gordon, Fort McClellan, Fort Stewart, Sunny Point); NPS (Congaree Swamp); USFS (Angelina, Apalachicola, Bienville, Conecuh, Croatan, Daniel Boone, Davy Crockett, De Soto, Francis Marion, Homochitto, Kisatchie, Ocala, Osceola, Sabine NF, Sam Houston, Talladega, Tuskegee, Uwharrie); USFWS (Bon Secour, Okefenokee)

ALLIANCE SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Burk 1959, Diamond 1993, Eyre 1980, Frost 1993, Martin and Smith 1991, Moore pers. comm., Myers 1990, Peet and Allard 1993, Pessin 1933, Schafale 1994, Schafale and Weakley 1990, Smith 1996a, Weaver 1969, Wharton 1978, Wieland 1994b

II.A.4.N.f. Saturated temperate or subpolar needle-leaved evergreen woodland

II.A.4.N.F. *PINUS PALUSTRIS* - *PINUS (ELLIOTTII, SEROTINA)* SATURATED WOODLAND

ALLIANCE (A.578)

LONGLEAF PINE - (SLASH PINE, POND PINE) SATURATED WOODLAND ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance consists of wet pinelands (often termed pine flatwoods, wet pine flatwoods, and pine savannas) of the Outer Coastal Plain or "coastal flatlands" typically dominated by *Pinus palustris*, with or without the presence of the other nominals. *Pinus elliottii* var. *elliottii* and *Pinus serotina* are more restricted geographically and edaphically than is *Pinus palustris*. *Pinus serotina* may be present within its natural range (from southeastern Virginia south to panhandle Florida) but tends to be codominant only on the wettest, often organic soils. *Pinus elliottii* var. *elliottii* may be present or codominant within its natural range from South Carolina to eastern Louisiana, as well as in limited areas of the West Gulf Coastal Plain (which are outside the natural range of *Pinus elliottii* var. *elliottii*). Both *Pinus elliottii* and *Pinus serotina* may replace *Pinus palustris* on wetter sites. Both species are less tolerant of frequent fire than is *Pinus palustris*. While *Pinus elliottii* can survive reasonably frequent fire, it has been estimated that natural fire frequencies are less than half that of longleaf pine, while typical regimes for *Pinus serotina* may be less than one-third as frequent. Thus, it is often believed that these species were confined historically to wetter flatwoods sites with lower burn frequencies than those typical of *Pinus palustris*-dominated communities. With fire suppression, alteration of fire regimes, and widespread logging of *Pinus palustris*, *Pinus elliottii* has invaded many flatwoods sites historically dominated almost exclusively by *Pinus palustris*. To a lesser extent this phenomenon may also have occurred with *Pinus serotina*. As presently defined, this alliance includes both naturally mixed *Pinus palustris* - *Pinus elliottii* stands, as well as those originally dominated by *Pinus palustris* into which *Pinus elliottii* has invaded, as well as silviculturally managed stands outside of the natural range of *Pinus elliottii* var. *elliottii* in Louisiana and Texas. Across the range of this alliance, pine densities vary from low with widely spaced trees giving an open savanna-like aspect, to high with dense, nearly closed canopies. Nevertheless, even the densest stands have discontinuous canopies which allow considerable light to penetrate to the forest floor. Probably the most significant factor affecting community composition is fire. In fire-suppressed examples, an understory of *Acer rubrum*, *Liquidambar styraciflua*, and *Morella cerifera* (= *Myrica cerifera*) is likely to develop. Understory composition is variable, and includes both shrub- and shrub/graminoid-dominated systems. Heavily shrubby examples may be indicative of lower fire frequencies than are more herbaceous-dominated examples. Appreciable herb layers typically exist only where the canopy and shrub layers are relatively open, and where there has been relatively frequent fire history. Grasses usually make up the majority of total cover. This alliance also includes silviculturally managed stands from the West Gulf Coastal Plain of Louisiana and Texas.

Related Concepts:

- IIB1b. Wet Longleaf Pine Flatwoods (Allard 1990) ?
- IIB1c. Wet Longleaf Pine - Slash Pine Flatwoods (Allard 1990) ?
- IIB1d. Atlantic Coastal Plain Wet Longleaf Pine Savanna (Allard 1990) ?
- IIB1g. Atlantic Coastal Plain Wet-Mesic Longleaf Pine Savanna (Allard 1990) ?
- IIB1h. East Gulf Coastal Plain Wet Longleaf Pine Savanna (Allard 1990) I
- IIB1i. West Gulf Coastal Plain Wet Longleaf Pine Savanna (Allard 1990) I
- Longleaf Pine - Slash Pine: 83 (Eyre 1980) ?
- Longleaf Pine / *Schizachyrium* - *Drosera* Fine-Sandy Wet Flatwoods (Turner et al. 1999) I
- Longleaf Pine-Beakrush Series (Diamond 1993) I
- Longleaf Pine: 70 (Eyre 1980) I
- Mesic Flatwoods (FNAI 1992a) I
- Piedmont Longleaf Pine Forest, Wet Variant (Schafale 1994) ?
- Pine Savanna (Schafale and Weakley 1990) I

- Pine Savanna, Lumbee Variant (Schafale 1994) ?
- Pine Savanna, Very Wet Clay Variant (Schafale 1994) ?
- Pine Savanna, Wet Spodosol Variant (Schafale 1994) ?
- Pine Savanna, Wet Ultisol Variant (Schafale 1994) ?
- Pond Pine: 98 (Eyre 1980) I
- Western Wet/Mesic Longleaf Pine Savannah/Flatwoods (Smith 1996a) I
- Western Wet/Mesic Longleaf Pine Savannah/Flatwoods, saline variant (Smith 1996a) ?
- Wet Pine Flatwoods (Schafale and Weakley 1990) I
- Wet Pine Flatwoods, Leiophyllum Variant (Schafale 1994) ?
- Wet Pine Flatwoods, Wet Spodosol Variant (Schafale 1994) ?
- Wet Slash Pine Savannah (Wieland 1994b) ?

Classification Comments: More information needs to be integrated on the expression of vegetation of this alliance in Texas (e.g., in the Big Thicket); existing associations as of November 2000 may not be entirely adequate, although one is positively attributed to Texas (MP 2000-12-04). REE 2000-12-01: "the so called wet savannas or flatwoods which may or may not have pitcher plants present are crudely covered by associations. These are the ones which basically come from LA and haven't been worked up enough to specifically incorporate examples in TX. The types from the WGCP were all defined by Latimore Smith from LA examples; their occurrence and distribution are poorly understood west of the Sabine River." There are some stands at Fort Benning, Georgia, which contain *Pinus serotina* with *Pinus palustris* over either *Arundinaria gigantea* or a mix of other evergreen shrubs. This is near the northern limit of the distribution of *Pinus serotina*, and these stands have been placed either as *Arundinaria gigantea* Saturated Shrubland Alliance (A.801) or *Lyonia lucida* - *Ilex glabra* Saturated Wooded Shrubland Alliance (A.805) with scattered, stunted *Pinus serotina*.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX, VA

TNC Ecoregions: 41:C, 43:?, 52:C, 53:C, 55:C, 56:C, 57:C

USFS Ecoregions: 231Ao:CCC, 231Bd:C??, 232Ba:CCC, 232Be:CCC, 232Bf:CCC, 232Bg:CCC, 232Bh:CCC, 232Bi:CCC, 232Bj:CCC, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bv:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCC, 232Cd:CCC, 232Ce:CCC, 232Cf:CCC, 232Ch:CCC, 232Db:CCC, 232Dc:CCC, 232Dd:CCC, 232Ea:CPP, 232Fa:CCC, 232Fb:CCC, 232Fe:CCP, 232Ga:CCC, 232Gc:CCC, 232Gd:CCP

Federal Lands: DOD (Avon Park, Camp Lejeune, Eglin, Fort Benning, Fort Bragg, Fort Jackson, Fort Stewart); NPS (Big Thicket); USFS (Angelina, Apalachicola, Conecuh, Croatan, De Soto, Francis Marion, Kisatchie, Ocala, Osceola, Uwharrie); USFWS (Carolina Sandhills, Grand Bay, Mississippi Sandhill Crane, Pee Dee)

ALLIANCE SOURCES

References: Abrahamson and Hartnett 1990, Allard 1990, Bridges and Orzell 1989a, Christensen 1979, Clewell 1981, Diamond 1993, Eyre 1980, FNAI 1992a, FNAI 1992b, Frost 1993, Frost et al. 1986, Kologiski 1977, Martin and Smith 1991, Martin and Smith 1993, Peet and Allard 1993, Pessin 1933, Schafale 1994, Schafale and Weakley 1990, Smith 1996a, Turner et al. 1999, Walker and Peet 1983, Wharton 1978, Wieland 1994b, Woodwell 1956

II.B.2.N.a. Cold-deciduous woodland

II.B.2.N.A. *QUERCUS STELLATA* - *QUERCUS MARILANDICA* WOODLAND ALLIANCE (A.625) POST OAK - BLACKJACK OAK WOODLAND ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes open-canopy stands, typically dominated by *Quercus stellata* and/or *Quercus marilandica*, found throughout the southeastern and lower midwestern United States. These communities are physiognomically variable, locally varying from deciduous to mixed, these mixed stands often having substantial *Juniperus virginiana* var. *virginiana*, especially as a result of fire suppression. These post oak - blackjack oak barrens are more edaphically extreme or frequently burned than the corresponding I.B.2.N.a *Quercus stellata* - *Quercus marilandica* Forest Alliance (A.253), which is currently more common due to fire suppression. Some examples occur on 2:1 montmorillonitic clays, while others are on limestone-derived soils. Canopy and subcanopy associates, in addition to *Quercus stellata* and *Quercus marilandica*, may include *Juniperus virginiana* var. *virginiana*, *Pinus echinata*, *Pinus virginiana*, *Carya texana*, *Carya glabra*, *Cornus florida*, *Quercus alba*, *Quercus falcata*, *Quercus prinus*, *Quercus velutina*, *Diospyros virginiana*, *Chionanthus virginicus*, and *Vaccinium arboreum*. *Pinus palustris* may be present in this alliance in the West Gulf Coastal Plain of eastern Texas and western Louisiana. In associations on mafic substrates, *Carya caroliniae-septentrionalis*, *Ulmus alata*, *Fraxinus americana*, and *Cercis canadensis* are common. *Acer rubrum* and *Liquidambar styraciflua* increase with disturbance. Shrubs may be sparse to dense, and species present include *Viburnum rafinesquianum*, *Ilex longipes*, *Symphoricarpos orbiculatus*, *Gaylussacia baccata*, *Rhododendron canescens*, *Vaccinium stamineum*, *Vaccinium corymbosum*, and *Viburnum prunifolium*. In the southeastern Coastal Plain, some stands may contain *Quercus margarettiae*. A rare type that occurs in North and

South Carolina has an herbaceous layer containing many prairie species such as *Silphium terebinthinaceum*, *Solidago nemoralis*, *Coreopsis major*, *Liatris aspera*, *Andropogon gerardii*, and *Sorghastrum nutans*. The most common herbaceous species are *Schizachyrium scoparium* and *Danthonia spicata*.

In Tennessee, woodlands in this alliance occur in the Central Basin and adjacent Highland Rim and may contain *Andropogon gerardii*, *Schizachyrium scoparium*, and/or *Sorghastrum nutans*. Pines are absent; instead, *Juniperus virginiana* var. *virginiana* may be present in the more-or-less open subcanopy. Shrubs in the Central Basin examples include *Forestiera ligustrina*, *Hypericum frondosum*, *Rhus aromatica*, and *Viburnum rufidulum*. Fire suppression in these sites may lead to dense undergrowth of *Juniperus*. In Louisiana and Texas (and in the Sandhills of the southeastern Coastal Plain), this alliance results mostly from pine removal and fire suppression, and examples only marginally fit this concept. This alliance occurs on xeric sites in northwestern Arkansas and may include some of Arkansas's glade/outcrop complexes and prairie communities, as well as ridgetop savanna / glade communities. This alliance is widespread throughout the southeastern and lower midwestern United States and occurs in the following regions: Ozarks, Interior Low Plateau, Boston Mountains, Southern Piedmont, Southern Ridge and Valley, Arkansas Valley, Ouachita Mountains, Atlantic Coastal Plain, Upper East Gulf Coastal Plain (Black Belt), Crowley's Ridge, and the Prairie Parkland.

Related Concepts:

- *Quercus marilandica* woodland alliance (Hoagland 1998a) ?
- *Quercus stellata* - *Quercus marilandica* woodland alliance (Hoagland 1998a) ?
- Dry Post Oak-Blackjack Oak Forest (Pyne 1994) I
- Eastern Redcedar: 46 (Eyre 1980) I
- IA6c. Dry Post Oak - Blackjack Oak Forest (Allard 1990) I
- Juniper - Hardwood Woodland (Foti 1994b) ?
- Post Oak - Blackjack Oak: 40 (Eyre 1980) I
- Post Oak-Blackjack Oak Series (Diamond 1993) I
- T2A2bI. *Juniperus virginiana* - *Quercus* spp. (Foti et al. 1994) ?
- T2B4aI1b. *Quercus stellata* - *Quercus marilandica* - *Carya texana* (Foti et al. 1994) ?

Classification Comments: This alliance is attributed to Fort Benning, Georgia, to represent more frequently burned or disturbed areas with dominance by *Quercus marilandica*, *Quercus stellata* over a grassy understory. An association is being described to accommodate this vegetation. The relationship of these stands either to related forests or to *Quercus laevis*-dominated stands is unknown.

ALLIANCE DISTRIBUTION

Range: This alliance is widespread throughout the southeastern and lower midwestern United States and occurs in the following regions: Ozarks, Interior Low Plateau, Boston Mountains, Southern Piedmont, Southern Ridge and Valley, Arkansas Valley, Ouachita Mountains, Atlantic Coastal Plain, Upper East Gulf Coastal Plain (Black Belt), Crowley's Ridge, and the Prairie Parkland. It is found in Illinois, Indiana, Iowa (?), Kansas, Missouri, Virginia, Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. In addition, an inland dune association of New Jersey (?) and New York is placed here.

Subnations: AL, AR, GA, IA?, IL, IN, KS, KY, LA, MO, MS, NC, NJ, NY, OK, SC, TN, TX, VA

TNC Ecoregions: 28:C, 29:C, 32:C, 33:C, 36:C, 37:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 52:C, 53:C, 56:P, 57:P, 62:C

USFS Ecoregions: 221Dc:CCC, 221Ha:CCP, 221Hc:CCC, 221Hd:CCP, 221He:CCP, 221Ja:CCP, 221Jb:CCC, 221Jc:CCP, 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCC, 222Aj:CCC, 222Ak:CCC, 222Am:CCC, 222An:CCC, 222Aq:CCP, 222Ca:CCC, 222Cb:CCP, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CCP, 222Cg:CCP, 222Ch:CCP, 222Da:CCP, 222Db:CCP, 222Dc:CCC, 222Dd:CCP, 222De:CCC, 222Dg:CCP, 222Dh:CCC, 222Di:CCP, 222Dj:CCP, 222Ea:CCP, 222Eb:CCC, 222Ec:CCC, 222Ed:CCC, 222Ee:CCP, 222Ef:CCP, 222Eg:CCC, 222Eh:CCC, 222Ei:CCP, 222Ej:CCP, 222Ek:CCP, 222En:CCP, 222Eo:CCP, 222Fa:CCP, 222Fb:CCP, 222Fc:CCP, 222Fd:CCP, 222Ff:CCP, 222Gb:CCC, 222Gc:CCP, 222Gd:CCP, 231Aa:CCC, 231Ab:CCP, 231Ac:CCP, 231Ad:CCP, 231Ae:CCC, 231Af:CCC, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCC, 231Ap:CCP, 231Ba:CCC, 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:CCC, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCP, 231Db:CCP, 231Dc:CCP, 231Dd:CCP, 231De:CCP, 231Ea:CCC, 231Eb:CCC, 231Eh:CCC, 231Ej:CCC, 231Em:CCC, 231En:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ac:CCC, 232Bj:CC?, 232Bl:CC?, 232Bm:CC?, 232Bn:CC?, 232Bq:CCC, 232Fa:CCP, 232Fb:CCC, 232Fe:CCC, 234Ab:CCC, 234Ac:CCC, 234Ae:CCC, 234Ah:CC?, 251Cc:CCP, 251Cd:CCP, 251Ci:CCC, 251E:CC, 251Fc:CC?, 255Aa:CCC, 255Ab:CCC, 255Ac:CCP, 255Ad:CCC, 255Ae:CCC, 255Af:CCC, 255Ah:CCC, 255Ai:CCC, 255Aj:CCC, 255Ba:CCC, 255Ca:CCC, 255Cc:CCC, 311A:CC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: COE (Falls Lake, J. Percy Priest?, Lake Millwood); DOD (Arnold, Fort Benning, Fort Chaffee, Fort Polk); NPS (Buffalo, Chickasaw NRA, Stones River); USFS (Angelina, Cherokee, Conecuh, Daniel Boone, Davy Crockett?, De Soto, Holly Springs, Kisatchie, Oconee, Ouachita, Ozark, Sabine NF, Sam Houston, Shawnee, Sumter, Talladega?, Tombigbee, Tuskegee, Uwharrie); USFWS (Piedmont)

ALLIANCE SOURCES

References: Allard 1990, Burns and Honkala 1990b, Diamond 1993, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Hoagland 1998a, Nelson 1986, Pyne 1994, Schafale and Weakley 1990

II.C.3.N.a. Mixed needle-leaved evergreen - cold-deciduous woodland

II.C.3.N.A. PINUS (ECHINATA, TAEDA) - QUERCUS (STELLATA, MARILANDICA, FALCATA) WOODLAND ALLIANCE (A.2011) (SHORTLEAF PINE, LOBLOLLY PINE) - (POST OAK, BLACKJACK OAK, SOUTHERN RED OAK) WOODLAND ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes stands of vegetation in the Coastal Plain west of the Mississippi River which are dominated by *Pinus echinata* or *Pinus taeda* either solely or in combination, with a diagnostic component of *Quercus stellata*. Other species which may be locally important in the overstory include *Quercus marilandica*, *Quercus falcata*, *Carya texana*, and *Carya alba*. This vegetation was historically subject to frequent fires which created relatively open, woodland structure and in some case species-rich understories. Most current examples have been fire-suppressed for varying time periods and consequently are more densely wooded and believed to be less species-rich than historically.

Related Concepts: No information

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found west of the Mississippi River within the West Gulf and Upper West Gulf Coastal Plain ecoregions.

Subnations: AR, LA, OK, TX

TNC Ecoregions: 32:?, 40:C, 41:C, 42:C, 53:C

USFS Ecoregions: 231Ea:CCC, 231Ef:CCC, 231Eg:CCC, 231Eh:CCC, 231En:CCP, 232Fa:CCC, 232Fb:CCP, 232Fe:CCC, 234:C, 255Ca:CCC, M231A:CC

Federal Lands: NPS (Big Thicket?); USFS (Angelina, Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ALLIANCE SOURCES

References: No information

III. Shrubland

III.A.2.N.i. Saturated temperate broad-leaved evergreen shrubland

III.A.2.N.I. CYRILLA RACEMIFLORA - ILEX CORIACEA - (CLIFTONIA MONOPHYLLA) SATURATED SHRUBLAND ALLIANCE (A.802) TITI - BIG GALLBERRY - (BLACK TITI) SATURATED SHRUBLAND ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance consists of evergreen shrublands of the southeastern Coastal Plain (Atlantic Coastal Plain, East and West Gulf coastal plains, and occasionally adjacent provinces). *Cyrilla racemiflora*, *Ilex coriacea*, and *Cliftonia monophylla* (within its range) are characteristic. Other characteristic shrubs (although some are absent in portions of the alliance's distribution) include *Ilex glabra*, *Ilex myrtifolia*, *Lindera subcoriacea*, *Lyonia lucida*, *Morella cerifera* (= *Myrica cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Morella inodora* (= *Myrica inodora*), *Persea palustris*, *Smilax laurifolia*, *Alnus serrulata*, *Toxicodendron vernix*, and *Vaccinium formosum*. In some situations, stunted *Magnolia virginiana* may be a component; emergent *Pinus elliotii* var. *elliottii* and/or *Taxodium ascendens* may be present. Communities in this alliance occur in poorly drained flats in the Outer Coastal Plain, along lake- or pondshores, where the water table is maintained in at least a seasonally saturated condition by the water body, and in seepages in rolling hill landscapes of the Coastal Plain (often associated with and adjacent to herbaceous seepage bogs). Some types occur over peats or other sapric soil types. Occurrences expand or contract in size under different fire regimes.

Related Concepts:

- Bog (FNAI 1992a) I
- Carolina bay/Okefenokee swamp shrub/scrub vegetation (Ambrose 1990a) ?
- High Pocosin (Wieland 1994b) ?
- Low Pocosin (Wieland 1994b) ?
- Natural Lake Shoreline (Schafale and Weakley 1990) I
- Scrub/Shrub Swamp (Smith 1996a) I Seepage Slope (FNAI 1992a) I
- Seepage Slope Shrub Thicket (Smith 1996a) I
- Seepage Slope, *Pinckneya* Bog subtype (FNAI 1992b) ?
- Shrub Bog (Wharton 1978) I

- Sweetbay - Swamp Tupelo / *Osmunda* Loamy Wet Forested Seeps (Turner et al. 1999) I

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance consists of evergreen shrublands of the southeastern coastal plain (Atlantic Coastal Plain, East and West Gulf coastal plains, and occasionally adjacent provinces). It is found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 40:C, 41:C, 53:C, 55:P, 56:C, 57:C

USFS Ecoregions: 231Ea:CCC, 231Ef:CC?, 231Eg:CCC, 231Eh:CCC, 231Ei:CC?, 232Ba:CCC, 232Be:CCP, 232Bg:CCC, 232Bh:CCP, 232Bi:CCP, 232Bj:CCC, 232Bk:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bu:CCP, 232Bv:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CCC, 232Cd:CCC, 232Ce:CCC, 232Cf:CCP, 232Ch:CCC, 232Dc:CCC, 232Ea:CP?, 232Eb:CP?, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC

Federal Lands: DOD (Eglin, Fort Benning, Fort Gordon, Fort Stewart); USFS (Angelina, Apalachicola, Conecuh, Croatan, De Soto, Francis Marion, Kisatchie, Sabine NF, Sam Houston?); USFWS (Okefenokee)

ALLIANCE SOURCES

References: Ambrose 1990a, FNAI 1992a, FNAI 1992b, Schafale and Weakley 1990, Smith 1996a, Turner et al. 1999, Wharton 1978, Wieland 1994b

III.B.2.N.a. Temperate cold-deciduous shrubland

III.B.2.N.A. *CRATAEGUS SPATHULATA* SHRUBLAND ALLIANCE (A.900) LITTLEHIP HAW SHRUBLAND ALLIANCE

ALLIANCE CONCEPT

Summary: The shrubland vegetation of the Cook Mountain Calcareous Prairies consists of clumps or thickets of shrubs, most notably *Crataegus* spp. (*Crataegus spathulata*, *Crataegus crus-galli*, *Crataegus berberifolia*). Other dominant vines and shrubs include *Berchemia scandens*, *Cornus drummondii*, *Diospyros virginiana*, *Juniperus virginiana* var. *virginiana*, *Ilex decidua*, *Sideroxylon lanuginosum* ssp. *lanuginosum*, *Prunus mexicana*, *Frangula caroliniana*, and *Rubus* spp. The tall-shrub stratum (2-5 m high) ranges from 25-60% cover. Open examples include a sparse to patchy ground cover. Grasses include *Schizachyrium scoparium*, *Andropogon glomeratus*, *Andropogon gerardii*, *Sporobolus* spp., *Setaria parviflora*, *Panicum flexile*, *Aristida* spp., *Paspalum floridanum*, and *Sorghastrum nutans*. This successional shrubland community develops on soils derived from marly clays and chalk of marine origin. These soils are typically silty clay loams, clays, and silt loams that are well-drained, slowly permeable, and alkaline (pH 7.5-8.0). Subsurface clay layers have calcareous concretions, weathered limestone aggregations, and shrink-swell properties. This community typically occupies 1-8 hectares within calcareous forests dominated by *Pinus taeda* or *Quercus* spp. This community occurs in a nearly level to gently rolling landscape, on ridgetops and on gentle slopes that often border small streams. Moisture regimes are typically dry to dry-mesic.

Related Concepts:

- Cook Mountain Calcareous Prairie (Smith 1996a) I
- ID4e. Cook Mountain Calcareous Prairie (Allard 1990) I

Classification Comments: Vegetation in this alliance currently contains only fire-suppressed examples of the rare calcareous Cook Mountain Prairie in Louisiana and the concept may need to be broadened to include other associations. Similar vegetation on the Sam Houston National Forest occurring on calcareous soils derived from the Fleming Formation is classed here.

ALLIANCE DISTRIBUTION

Range: Vegetation in this alliance currently contains only fire-suppressed examples of the rare calcareous Cook Mountain Prairie in Louisiana.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fa:CCC, 232Fb:CC?, 232Fe:CC?

Federal Lands: DOD (Fort Benning); USFS (Kisatchie, Sam Houston)

ALLIANCE SOURCES

References: Allard 1990, Allen 1993c, Martin and Smith 1991, Smith 1996a, Smith et al. 1989

V. Herbaceous Vegetation

V.A.5.N.a. Tall sod temperate grassland

V.A.5.N.A. SCHIZACHYRIUM SCOPARIUM - SORGHASTRUM NUTANS HERBACEOUS ALLIANCE (A.1198)
LITTLE BLUESTEM - YELLOW INDIANGRASS HERBACEOUS ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance, comprising dry-mesic tallgrass vegetation and blackland prairies, is found in the central United States and southern Canada. The vegetation of stands of this alliance is characterized by moderate to dense cover of medium and tall grasses and a diverse mixture of forbs. Woody species are absent to rare but can be uncommon in some communities. The most abundant species across the range of this alliance are *Bouteloua curtipendula*, *Schizachyrium scoparium*, and *Sorghastrum nutans*. Other graminoids species common in parts of this alliance are *Andropogon gerardii*, *Bouteloua hirsuta*, *Carex* spp., *Danthonia spicata*, *Hesperostipa spartea* (= *Stipa spartea*), and *Sporobolus heterolepis*. In the far southern part of the alliance's range, associations can contain *Andropogon glomeratus*, *Panicum virgatum*, and *Sporobolus clandestinus*. Some of the many forbs which can be found in this alliance include *Symphytotrichum ericoides* (= *Aster ericoides*), *Echinacea pallida*, *Helianthus* spp., *Hedyotis nigricans* var. *nigricans* (in Illinois and Missouri), *Lespedeza capitata* (especially on sand), *Lithospermum canescens*, *Clinopodium arkansanum* (= *Calamintha arkansana*) (in Illinois), and *Solidago nemoralis*. In the Southeast, *Ratibida pinnata* or *Baptisia australis* var. *minor* may be found, as well as a variety of forbs with Coastal Plain affinities. Woody species that are found in stands of this alliance are those that can adapt to the dry to dry-mesic conditions, such as *Acer rubrum* and *Juniperus virginiana*.

In the Southeast, this alliance includes a variety of relatively restricted communities which are rare and/or have been greatly reduced through land-use change. Many of these occur on distinctive soils or geologic formations, such as calcareous clays. This includes the Jackson Formation of Mississippi and Louisiana; the Cook Mountain Formation, Fleming Formation, and Morse Clays of Louisiana; the Demopolis and related formations of the Alabama Black Belt; as well as blackland prairies on Alfisols, Mollisols, and Vertisols in Texas, and isolated occurrences on the Catahoula Formation in eastern Texas. This alliance also occurs in the Coosa River valley of northwestern Georgia and northeastern Alabama and the Arbuckle Mountains of Oklahoma. This alliance includes remnant prairie-like vegetation occupying small areas (<1 acre) of mafic substrates in the Southern Blue Ridge plateau underlain by magnesium-rich bedrock; this vegetation is disjunct from the principal distribution of this alliance. Fire presumably played an important ecological role in maintaining natural stands of this vegetation in the presettlement landscape. Threats to these communities include fire suppression, livestock grazing, and damage by feral hogs and by vehicles.

Most stands of this alliance are found on gentle to moderately steep slopes, although stands on flat plains can occur (Curtis 1959, Nelson 1985). The most prevalent slope aspects are south or west. Soils range from shallow to deep and are well-drained to excessively well-drained (White and Madany 1978, Chapman 1984). Most are loams or sands, but some can be gravel or clay. These soils are formed from eolian or alluvial sand, limestone, dolomite, sandstone, glacial till, glacial outwash, chert, loess, or shale.

Related Concepts:

- *Dalea* Clayey Dry Blackland Prairies (Turner et al. 1999) ?
- *Schizachyrium* - *Sorghastrum* - *Andropogon* community type (Diamond and Smeins 1984) I
- *Schizachyrium* - *Sorghastrum* - *Andropogon* community type (Diamond and Smeins 1988) I
- *Schizachyrium scoparium*-*Helenium autumnale* calcareous clay prairie or barren (Wieland 1995) ?
- Bluestem Tallgrass Prairie (Pyne 1994) I
- Cook Mountain Calcareous Prairie (Smith 1996a) ?
- Hempstead Plains Grassland (Reschke 1990) ?
- ID4a. Bluestem Tallgrass Prairie (Allard 1990) I
- ID4b. Morse Clay Calcareous Prairie (Allard 1990) ?
- ID4c. Fleming Calcareous Prairie (Allard 1990) ? ID4c. Jackson Prairie (Allard 1990) ?
- ID4e. Cook Mountain Calcareous Prairie (Allard 1990) ?
- Jackson Calcareous Prairie (Smith 1996a) ?
- Keiffer Calcareous Prairie (Smith et al. 1989) ?
- Limestone prairie (Evans 1991) I
- Little Bluestem - Big Bluestem - Indiangrass Association (Diamond and Smeins 1990) ?
- Little Bluestem-Indiangrass Series (Diamond 1993) I
- Morse Clay Calcareous Prairie (Smith 1996a) ?
- Red Clay Prairie (Foti 1994b) ?
- Sandplain Grassland (Swain and Kearsley 2001) ?
- Sandstone prairie (Evans 1991) I T5A1aI1c. *Andropogon gerardii* - *Sorghastrum avenaceum* (Foti et al. 1994) ?

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in Minnesota, Iowa, Missouri, Kansas, Illinois, Wisconsin, Indiana, Michigan, Ohio, Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas, New York, and Virginia, and in Canada in southern Ontario.

Subnations: AL, AR, CT, GA, IA, IL, IN, KS, KY, LA, MA, MI, MN, MO, MS, NY, OH, OK, ON, TN, TX, VA, WI, WV

TNC Ecoregions: 32:C, 35:C, 36:C, 37:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 45:C, 46:C, 47:C, 48:C, 49:C, 50:C, 51:C, 52:C, 53:?, 56:P, 59:C, 61:C, 62:C

USFS Ecoregions: 212Hu:CCC, 212Hy:CCP, 212Jd:CCC, 212Jg:CCC, 212Kb:CCC, 212Mb:C??, 212Nc:CCC, 221Ea:CCC, 221Ed:CCP, 221Eg:CCC, 221Fa:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 221Ja:CCC, 222Ab:CCC, 222Ac:CCC, 222Ae:CC?, 222Ag:CCC, 222Ai:CCC, 222Ak:CC?, 222Am:CCC, 222Ao:CCC, 222Aq:CCC, 222Ca:CC?, 222Cb:CCC, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CCP, 222Cg:CCP, 222Da:CP?, 222Dc:CP?, 222Dd:CP?, 222Dg:CP?, 222Dh:CCP, 222Dj:CP?, 222Ea:CC?, 222Eb:CCC, 222Ec:CCP, 222Ed:CCP, 222Ee:CC?, 222Ef:CCP, 222Eg:CCC, 222Eh:CCC, 222Ei:CC?, 222Ej:CCC, 222Ek:CCC, 222En:CCC, 222Eo:CCC, 222Fa:C??, 222Fb:C??, 222Fc:C??, 222Fd:C??, 222Ga:CCC, 222Gb:CCC, 222Ge:CCC, 222Ha:CCC, 222Hb:CCC, 222Hc:CCC, 222Hf:CCC, 222Ib:CCP, 222If:CCC, 222Ja:CCP, 222Jh:CCC, 222Ji:CCC, 222Jj:CCC, 222Ka:CCC, 222Ke:CCC, 222Kf:CCC, 222Kg:CCC, 222Kh:CCC, 222Ki:CCC, 222Kj:CCC, 222La:CCC, 222Lb:CCC, 222Lc:CCC, 222Le:CCC, 222Lf:CCC, 222Ma:CCC, 222Mb:CCC, 222Mc:CCC, 222Md:CCC, 222Me:CCC, 231Ba:CCC, 231Bg:CC?, 231Bh:CC?, 231Bj:CCC, 231Bk:CCP, 231Cd:CP?, 231Ce:CCP, 231Da:CC?, 231Dc:CCC, 231De:CCC, 231Ea:CCC, 231Eb:CCC, 231Eh:CCC, 231Ej:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Aa:CCC, 232B:C?, 232Fa:CCC, 232Fb:CC?, 232Fe:CCC, 234Ac:CCC, 234Ae:CCC, 234Aj:CC?, 251Aa:CCC, 251Ba:CCC, 251Bb:CCC, 251Bd:CCC, 251Be:CCC, 251Ca:CCC, 251Cc:CCC, 251Cd:CC?, 251Cf:CCC, 251Ch:CCC, 251Ci:CCC, 251Cj:CCC, 251Ck:CCC, 251Da:CCC, 251Db:CCC, 251Dc:CCC, 251Dd:CCC, 251De:CCC, 251Df:CCC, 251Dg:CCC, 251Dh:CCC, 251Ea:CCC, 251Eb:CCC, 251Fb:C??, 251Fc:C??, 255Ai:CCC, 255Aj:CCC, 255Ba:CCC, 255Cd:CCP, 255Cf:CCP, 255D:CC, 263A:CC, M221Db:CCC, M231Aa:???, M231Ab:???, M231Ac:???, M231Ad:???, M242A:CC, M261A:CC

Federal Lands: COE (Lake Millwood); DOD (Arnold, Fort Campbell, Fort Chaffee, Fort Hood, Warner Robins); DOE (Oak Ridge); NPS (Blue Ridge Parkway?, Mammoth Cave, Stones River); TVA (Land Between the Lakes); USFS (Bienville, Caddo/LBJ, Daniel Boone, Kisatchie, Sam Houston, Tombigbee)

ALLIANCE SOURCES

References: Allard 1990, Chapman 1984, Curtis 1959, DeSelm 1990, Diamond 1993, Diamond and Smeins 1984, Diamond and Smeins 1985, Diamond and Smeins 1988, Diamond and Smeins 1990, Evans 1991, Evers 1955, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Hart and Lester 1993, Heikens et al. 1994, Homoya 1994, Hutchison 1994, MNNHP 1993, Martin and Smith 1991, Nelson 1985, Pyne 1994, Reschke 1990, Rostlund 1957, Smith 1996a, Smith et al. 1989, Swain and Kearsley 2001, Turner et al. 1999, Voigt and Mohlenbrock 1964, White and Madany 1978, Wieland 1995

V.A.5.N.I. Semipermanently flooded temperate or subpolar grassland

V.A.5.N.L. *TYPHA* (*ANGUSTIFOLIA*, *LATIFOLIA*) - (*SCHOENOPLECTUS* SPP.) SEMIPERMANENTLY FLOODED HERBACEOUS ALLIANCE (A.1436) (NARROWLEAF CATTAIL, BROADLEAF CATTAIL) - (CLUBRUSH SPECIES) SEMIPERMANENTLY FLOODED HERBACEOUS ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance, found in virtually every state in the United States and probably most Canadian provinces, contains stands dominated by *Typha angustifolia* and/or *Typha latifolia*, either alone or in combination with other tall emergent marsh species. Associated species vary widely; in the Midwest they include many sedges such as *Carex aquatilis*, *Carex rostrata*, *Carex pellita* (= *Carex lanuginosa*), bulrushes such as *Schoenoplectus americanus* (= *Scirpus americanus*), *Schoenoplectus acutus* (= *Scirpus acutus*), and *Schoenoplectus heterochaetus* (= *Scirpus heterochaetus*), and broad-leaved herbs such as *Thelypteris palustris*, *Asclepias incarnata*, *Impatiens capensis*, *Sagittaria latifolia*, *Scutellaria lateriflora*, *Sparganium eurycarpum*, *Hibiscus moscheutos*, and *Verbena hastata*. Floating aquatics such as *Lemna minor* may predominate in deeper zones.

This alliance is found most commonly along lake margins and in shallow basins, and occasionally in river backwaters. Lacustrine cattail marshes typically have a muck-bottom zone bordering the shoreline, where cattails are rooted in the bottom substrate, and a floating mat zone, where the roots grow suspended in a buoyant peaty mat. *Typha angustifolia* can grow in deeper water compared to *Typha latifolia*, although both species reach maximum growth at a water depth of 50 cm. *Typha* often occurs in pure stands, and can colonize areas recently exposed by either natural or human causes. *Lythrum salicaria*, an exotic species from Europe, has become a common associate of many eastern *Typha* marshes. In the Southeast, this alliance is widespread and currently representative of a wide variety of mixed marshes with no clear dominants. Vegetation in this alliance may be natural or semi-natural and includes mixed stands of the nominal species, as well as essentially monospecific stands of *Typha latifolia*. These monospecific stands occur especially in artificial wetlands, such as borrow pits or ponds. This alliance occurs on hydric soils in wetlands, ditches, ponds, lakes, and rivers, as well as on shorelines and streambanks. Inundation is commonly 3-6 dm (1-2 feet) in depth. These marshes have hydric

soils and are flooded with water levels ranging from several centimeters to more than 1 m for a significant part of the growing season. Occurrences may display areas of open water, but emergent vegetation dominates (80% cover). Seasonal flooding during winter and spring or flooding during heavy rains help maintain these marshes by causing water exchange which replenishes freshwater and circulates nutrients and organic debris. Soils which support this community can be mineral or organic but are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. Vegetative diversity and density is highly variable in response to water depth, water chemistry, and natural forces.

Related Concepts:

- *Typha (angustifolia, latifolia)* herbaceous alliance (Hoagland 1998a) ?
- *Typha latifolia* Habitat Type (Hansen et al. 1995) ?
- *Typha latifolia* herbaceous alliance (Hoagland 2000) ?
- Cat-tail marsh (Fike 1999) ?
- Cattail Marsh (Foti 1994b) I Cattail Series (Sawyer and Keeler-Wolf 1995) I
- L5D2aI2a. *Typha latifolia* (Foti et al. 1994) ?
- P5A4bII2a. *Typha latifolia* (Foti et al. 1994) ?
- Robust Emergent Marsh (Smith 1991) I

Classification Comments: It has been suggested that mixed emergent marshes tend to occur on harder pond, lake, or river bottoms and are less likely to contain a peaty mat with its diverse mixture of forbs (MNNHP 1993). Alliances that describe marshes dominated by mixed emergents other than cattails and the associates listed above include the V.A.5.N.I *Phragmites australis* Semipermanently Flooded Herbaceous Alliance (A.1431), the V.A.5.N.I *Schoenoplectus acutus* - (*Schoenoplectus tabernaemontani*) Semipermanently Flooded Herbaceous Alliance (A.1443), the V.A.5.N.I *Schoenoplectus americanus* Semipermanently Flooded Herbaceous Alliance (A.1432), and the V.A.5.N.I *Zizania (aquatica, palustris)* Semipermanently Flooded Herbaceous Alliance (A.1441). In shallow flooded conditions this alliance grades into the V.A.5.N.k *Typha spp.* - (*Schoenoplectus spp.*, *Juncus spp.*) Seasonally Flooded Herbaceous Alliance (A.1394), as well as V.A.5.N.k *Schoenoplectus fluviatilis* Seasonally Flooded Herbaceous Alliance (A.1387). *Typha latifolia* can hybridize with *Typha angustifolia*, and the hybrid, *Typha X glauca*, may be more invasive of disturbed areas than the parent species. In the West, some studies have classified marshes dominated by *Typha domingensis* as phases of *Typha latifolia* marshes. This alliance now includes wetland communities dominated by *Typha latifolia*, often in disturbed or sedimented situations. The concept and distribution of this alliance in the Southeast needs reassessment. Many of the presettlement occurrences of this alliance have been drained and converted to cropland or destroyed by siltation, which greatly accelerates the natural successional process from shallow inundation to moist soil. *Lythrum salicaria* is an aggressive exotic species that threatens this vegetation type in Canada, the Northeast, and more recently in the Midwest.

ALLIANCE DISTRIBUTION

Range: This alliance is found in virtually every state in the United States and is likely to be found in most Canadian provinces. In the southeastern United States, it is found in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

Subnations: AB, AL, AR, AZ, BC, CA, CO, CT, DE, FL?, GA, IA, ID, IL, IN, KS, KY, LA, MA, MB, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, ON, OR, PA, QC, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY

TNC Ecoregions: 2:C, 4:P, 5:P, 6:C, 7:C, 8:P, 10:C, 11:C, 12:C, 13:C, 14:C, 17:C, 18:P, 19:C, 20:C, 21:P, 22:P, 25:C, 26:C, 27:C, 31:C, 32:C, 33:C, 34:C, 35:C, 36:C, 37:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 45:C, 46:C, 47:C, 48:C, 49:C, 50:P, 51:P, 52:C, 53:C, 56:C, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C, 64:C, 68:P

USFS Ecoregions: 212Aa:C??, 212Ab:C??, 212Ba:C??, 212Bb:C??, 212Ca:CC?, 212Cb:CCC, 212Da:CCC, 212Db:CCC, 212Dc:CC?, 212Ea:CCC, 212Ec:CCP, 212Ed:CCP, 212Ee:CCP, 212Fa:CCC, 212Fb:CCC, 212Fc:CCC, 212Fd:CCC, 212Ga:CCC, 212Gb:CCC, 212Ha:CCP, 212Hb:CCP, 212He:CCC, 212Hh:CCP, 212Hi:CCP, 212Hj:CCC, 212Hk:CCC, 212Hl:CCC, 212Hm:CCP, 212Hn:CCP, 212Ho:CCC, 212Hp:CCP, 212Hq:CCP, 212Hr:CCP, 212Hs:CCP, 212Ht:CCC, 212Hu:CCC, 212Hv:CCC, 212Hw:CCC, 212Hx:CCC, 212Hy:CCP, 212Ia:CCC, 212Ib:CCP, 212Ja:CCC, 212Jb:CCP, 212Jc:CCP, 212Jf:CCP, 212Jj:CCP, 212Jk:CCP, 212Jl:CCP, 212Jm:CCP, 212Jn:CCC, 212Jo:CCP, 212Jr:CCC, 212Ka:CCP, 212Kb:CCC, 212La:CCP, 212Lb:CCP, 212Lc:CCP, 212Ld:CCP, 212Ma:CCP, 212Mb:CCP, 212Na:CCP, 212Nb:CCP, 212Nc:CCC, 212Nd:CCP, 212Oa:CCC, 212Ob:CCC, 212Pa:CCC, 212Pb:CCC, 221Aa:CC?, 221Ab:CCC, 221Ac:CC?, 221Ad:CC?, 221Ae:CCP, 221Af:CC?, 221Ag:CC?, 221Ah:CC?, 221Ai:CC?, 221Aj:CC?, 221Ak:CC?, 221Al:CCC, 221Am:CC?, 221Ba:CCP, 221Bb:CCC, 221Bc:CCP, 221Bd:CCC, 221Da:C??, 221Db:C??, 221Dc:C??, 221Ea:CC?, 221Eb:CC?, 221Ec:CCC, 221Eg:CCC, 221Fa:C??, 221Fb:C??, 221H:CC, 221Ja:CC?, 221Jc:CC?, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222Am:CCC, 222An:CCC, 222Cf:CCP, 222Cg:CCP, 222D:CC, 222Eb:CCC, 222Eg:CCP, 222Eh:CCP, 222F:CC, 222Ge:CCC, 222Ha:CCC, 222Hb:CCC, 222Ia:CCC, 222Ib:CCP, 222Ic:CC?, 222Id:CC?, 222Ie:CCP, 222If:CCC, 222Ja:CCC, 222Jc:CCC, 222Je:CCC, 222Jg:CCC, 222Jh:CCC, 222Ji:CCC, 222Jj:CCC, 222Kd:CCC, 222Ke:CCC, 222Kf:CCC, 222Kg:CCC, 222Kj:CCC, 222Lc:CCC, 222Mb:CCC, 222Mc:CCC, 222Md:CCC, 222Me:CCC, 222Na:CCC, 222Q:CC, 231Aa:C??, 231Ae:C??, 231Af:C??, 231Ak:C??, 231Al:C??, 231Am:C??, 231An:C??, 231Ao:C??, 231Ap:C??, 231C:CC, 231E:CC, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Aa:C??, 232Ac:C??, 232Ad:C??, 232Bc:C??, 232Bd:C??, 232Br:C??, 232Ce:CCC, 232Ch:CC?, 232Cj:CC?, 234Aa:CCC, 234Ac:CC?, 242A:CC, 251Aa:CCC, 251Ab:CCC, 251Ba:CCC, 251Bb:CCC, 251Bd:CCC, 251Be:CCC, 251Cb:CCC, 251Cc:CCC, 251Cd:CC?, 251Cf:CCC, 251Cg:CCC, 251Ch:CCC, 251Cm:CCC, 251Cp:CCC, 251Dc:CCC, 251Dg:CCC, 251Ea:CCC, 251Eb:CCC, 251Ed:CCC, 251F:CC, 255Aa:CCC,

255C:CC, 255Da:CCC, 255Dc:CCC, 261A:CC, 262A:CC, 263A:CC, 311A:CC, 331C:CC, 331F:CP, 331H:CC, 331I:CC, 332A:CP, 332B:C?, 332C:CC, 332D:CP, 332E:CC, 341C:CC, 342:C, M212Aa:CP?, M212Ab:CP?, M212Ac:CP?, M212Ad:CP?, M212Ba:CP?, M212Bb:CP?, M212Ca:CP?, M212Cb:CPP, M212Cc:CP?, M212Cd:CP?, M212Da:CC?, M212Db:CC?, M212Dc:CC?, M212Ea:CCC, M212Eb:CCC, M212Fa:C??, M212Fb:C??, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Ba:CCC, M221Bb:CCC, M221Bc:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCC, M221Ca:C??, M221Cb:C??, M221Cc:C??, M221Cd:C??, M221Da:CCC, M221Db:CCP, M221Dc:CCP, M221Dd:CCP, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC, M261E:CC, M331F:CC, M331I:CC, M333C:CC, M334A:CC

Federal Lands: DOD (Arnold, Fort Benning); NPS (Acadia, Agate Fossil Beds, Badlands, Cape Cod, Fort Laramie, Isle Royale, Ninety Six, Scotts Bluff, Theodore Roosevelt, Voyageurs, Wind Cave, Yosemite); PC (Waterton Lakes); USFS (Black Hills, Daniel Boone, Kisatchie, Oconee?, Ouachita, Ozark, Pisgah, Talladega?, Tuskegee?); USFWS (Anahuac, Brazoria, Lacreek, Little River, Ouray, Reelfoot, San Bernard)

ALLIANCE SOURCES

References: Anderson 1982, Apfelbaum 1985, Bundy et al. 1996, Bunin 1985, Christy 1973, Eggers and Reed 1987, Faber-Langendoen et al. 1996, Fike 1999, Foti 1994b, Foti et al. 1994, Grace and Wetzel 1981, Great Plains Flora Association 1986, Hansen et al. 1991, Hansen et al. 1995, Hoagland 1998a, Hoagland 2000, Jones and Walford 1995, Kittel et al. 1996, Kittel et al. 1999a, Komarkova 1976, Komarkova 1986, Kovalchik 1993, Lindauer 1978, Lindauer and Christy 1972, MNNHP 1993, Masek 1979, McEachern 1979, Mitsch and Gosselink 1993, Mohlenbrock 1959, Muldavin et al. 1993b, Muldavin et al. 2000a, Padgett et al. 1989, Sawyer and Keeler-Wolf 1995, Segadas-Vianna 1951, Simkins 1931, Smith 1991, TNC 1995b, Tolstead 1942, Wharton 1978, Youngblood et al. 1985a

V.A.5.N.m. Saturated temperate or subpolar grassland

V.A.5.N.M. *RHYNCHOSPORA OLIGANTHA* - *SARRACENIA* SPP. - (*ARISTIDA BEYRICHIANA*, *CTENIUM AROMATICUM*) - *OSMUNDA CINNAMOMEA* / *SPHAGNUM* SPP. SATURATED HERBACEOUS ALLIANCE (A.1463)

FEATHER-BRISTLE BEAKSEDGE - PITCHERPLANT SPECIES - (SOUTHERN WIREGRASS, TOOTHACHE GRASS) - CINNAMON FERN / PEATMOSS SPECIES SATURATED HERBACEOUS ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes herbaceous bogs and wetland savannas of the southeastern Coastal Plain ranging from Texas and Oklahoma eastward to North Carolina. Such communities have been variously called hillside seepage bogs, wet prairies, muck bogs, poor fens, sandhill seeps, and other names. Examples are influenced by groundwater seepage and/or seasonally high water tables. Given the large geographic range and extensive species turnover within the Coastal Plain, associations found in this alliance are quite floristically variable. Most types are heavily dominated by wetland herbaceous species. Woody species may occur in scattered clumps and patches in most examples, with density dependent largely on fire frequency and seasonality. In some parts of the distribution of this alliance, especially the Atlantic Coastal Plain, shrubs can be very prominent, even when fire is relatively frequent. *Rhynchospora* spp. are especially prominent and diverse in most examples; many associations may have as many as ten *Rhynchospora* spp. present. Carnivorous taxa are also usually present and diagnostic, especially *Sarracenia* spp. *Sarracenia* spp. range from dominant or codominant to sparse but diagnostic, and from a single species to several present. The range of species include *Sarracenia alata*, *Sarracenia leucophylla*, *Sarracenia psittacina*, *Sarracenia flava*, *Sarracenia purpurea* (= *Sarracenia purpurea* var. *burkii*), and *Sarracenia rubra*. Woody species are *Magnolia virginiana*, *Smilax laurifolia*, *Morella cerifera* (= *Myrica cerifera* var. *cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Morella inodora* (= *Myrica inodora*), *Cliftonia monophylla*, *Cyrtia racemiflora*, *Clethra alnifolia*, *Arundinaria gigantea* ssp. *tractata*, and *Toxicodendron vernix*.

Related Concepts:

- *Drosera* Sandy/Loamy Wet Herbaceous Seeps (Turner et al. 1999) I
- Eastern Hillside Seepage Bog (Smith 1996a) ?
- Hillside Herb Bog (Nelson 1986) I
- Quaking Bog (Wieland 1994b) ?
- Sandhill Seep (Schafale and Weakley 1990) I
- Seepage Slope (FNAI 1992a) I
- Sphagnum-Beakrush Series (Diamond 1993) I
- Western Hillside Seepage Bog (Smith 1996a) ?
- Wet Prairie (FNAI 1992a) I
- Wet Prairie, Pitcher Plant Prairie subtype (FNAI 1992b) I
- Wet Prairie, Wiregrass Prairie subtype (FNAI 1992b) ?

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Florida, Louisiana, Mississippi, North Carolina, South Carolina, and Texas, and possibly Georgia (?).

Subnations: AL, FL, LA, MS, NC, SC, TX

TNC Ecoregions: 32:C, 40:C, 41:C, 43:C, 53:C, 55:P, 56:P, 57:C

USFS Ecoregions: 231Bc:CCC, 231Ea:CCC, 231Ef:CC?, 231Eh:CC?, 231Ei:CC?, 231Fa:C??, 231Fb:C??, 232Ba:CCC, 232Be:CCP, 232Bg:CCC, 232Bh:CCC, 232Bi:CCP, 232Bj:CCC, 232Bk:CCP, 232Bl:CC?, 232Bm:CC?, 232Bn:CC?, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Cc:CP?, 232Cf:CP?, 232Dc:CCC, 232Ea:C??, 232Eb:C??, 232Fa:CCC, 232Fb:CCC, 232Fe:CCP, 234Ad:???, 255Ca:CCC

Federal Lands: DOD (Eglin, Fort Bragg); USFS (Angelina, Apalachicola, Conecuh, De Soto, Homochitto?, Kisatchie, Sabine NF, Talladega); USFWS (Grand Bay, Mississippi Sandhill Crane)

ALLIANCE SOURCES

References: Bridges and Orzell 1989a, Clewell 1971, Diamond 1993, FNAI 1992a, FNAI 1992b, Folkerts 1982, Hermann 1991, LANHP 1992, MacRoberts and MacRoberts 1988, MacRoberts and MacRoberts 1991, Martin and Smith 1991, Martin and Smith 1993, Nelson 1986, Schafale and Weakley 1990, Smith 1996a, Turner et al. 1999, Wieland 1994b

V.B.2.N.b. Low temperate or subpolar perennial forb vegetation

V.B.2.N.B. *BIGELOWIA NUTTALLII* HERBACEOUS ALLIANCE (A.1617) NUTTALL'S RAYLESS-GOLDENROD HERBACEOUS ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance consists of Coastal Plain saline prairies and sandstone glades of central and northern Louisiana, eastern Texas, central Georgia, the Cumberland Plateau of Alabama, and Panhandle Florida, dominated by *Bigelowia nuttallii*, and a mixture of forbs and grasses, including many diminutive annuals. The community types in this alliance are generally distinguished by their herbaceous cover being associated with exposed sandstone boulders, flats, and ledges, intermixed with dense, herbaceous patches, scattered, stunted trees and shrubs, and fruticose lichens. Most examples occur within a matrix of open *Pinus palustris* woodlands (except for Cumberland Plateau Alabama examples). Much of the soil and rock is unvegetated. The alliance is dominated by prairie-like vegetation with *Bigelowia nuttallii*, *Schizachyrium scoparium*, *Aristida longispica*, *Croton michauxii* (= *Crotonopsis linearis*), and (in western examples) *Sporobolus silveanus* as primary components. The herbaceous flora is rich in endemic and disjunct species. In western types, other typical herbaceous species include *Minuartia drummondii*, *Chaetopappa asteroides*, *Astragalus nuttallianus*, *Diodia teres*, *Fimbristylis puberula*, *Houstonia pusilla*, *Hypericum drummondii*, *Krigia occidentalis*, *Lechea san-sabeana*, *Linum medium*, *Marshallia caespitosa*, *Nothoscordum bivalve*, *Phacelia glabra*, *Polygala mariana*, *Rhynchospora globularis*, *Saxifraga texana*, *Isolepis carinata* (= *Scirpus koilolepis*), and *Stylosanthes biflora*. Typical woody species that may be scattered in these communities include *Quercus marilandica*, *Quercus stellata*, *Pinus palustris*, *Pinus echinata*, *Pinus taeda*, *Ilex vomitoria*, and *Morella cerifera* (= *Myrica cerifera*). The herbaceous flora is diverse and varies considerably seasonally. Occurrences may appear almost devoid of vegetation during the dry summers, while the spring and autumn are periods of peak flowering. Soils are strongly acid, sandy loams and silty clay loams, with high aluminum content. These soils can be saturated during the cooler, wetter months, but are extremely dry and hard during summer droughts.

Related Concepts:

- *Schizachyrium - Bigelowia* Clayey Dry-Mesic Catahoula Barrens (Turner et al. 1999) ?
- IE7f. Catahoula Barren (Allard 1990) I
- Little Bluestem-Nuttall's Rayless Goldenrod Series (Diamond 1993) ?

Classification Comments: None

ALLIANCE DISTRIBUTION

Range: This alliance is found in central and northern Louisiana, eastern Texas, central Georgia, the Cumberland Plateau of Alabama, and Panhandle Florida.

Subnations: AL, AR, FL, GA, LA, TX

TNC Ecoregions: 32:P, 40:C, 41:C, 50:C, 53:C, 56:C

USFS Ecoregions: 231Cc:CCC, 231Eh:CCC, 232Bg:CCP, 232Bh:CCC, 232Br:CCC, 232Fa:CCC, 232Fe:CCC

Federal Lands: NPS (Little River Canyon); USFS (Angelina, Kisatchie, Sabine NF)

ALLIANCE SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Diamond 1993, MacRoberts et al. 1994, Marietta 1979, Marietta and Nixon 1984, Martin and Smith 1991, Perkins 1981, Turner et al. 1999

V.C.2.N.a. Permanently flooded temperate or subpolar hydromorphic-rooted vegetation

V.C.2.N.A. NELUMBO LUTEA PERMANENTLY FLOODED TEMPERATE HERBACEOUS ALLIANCE (A.1671)
AMERICAN LOTUS PERMANENTLY FLOODED TEMPERATE HERBACEOUS ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance includes essentially monospecific *Nelumbo lutea* communities, in either natural wetlands or in artificial impoundments, sometimes with scattered *Cephalanthus occidentalis*. Other floating-leaved aquatic plant species that may be present include *Nuphar lutea* ssp. *advena* and *Nymphaea odorata*. In shallow depressional wetlands in the Coastal Plain of Florida, *Nelumbo lutea* occurs in an admixture with *Schoenoplectus tabernaemontani* (= *Scirpus tabernaemontani*), *Pontederia cordata*, *Juncus effusus*, *Typha latifolia*, *Eichhornia crassipes* (alien), *Hydrocotyle* spp., and seasonally with floating aquatics, such as *Salvinia minima*, *Spirodela* spp., *Lemna* spp., and *Azolla caroliniana*.

Related Concepts:

- *Nelumbo lutea* herbaceous alliance (Hoagland 1998a) ?

Classification Comments: The hydrology of examples of this alliance is highly variable; the hydrologic placement is debatable. This alliance was moved from V.C.2.N.a to V.B.2.N.e and back again (when in non-hydromorphic, it was regarded as emergent and only semipermanently flooded). Now placed here with other temperate floating/emergent 'pad-leaved' vegetation (*Nuphar*, *Nymphaea*, *Brasenia*, etc.) rather than in semipermanently flooded perennial forb vegetation (e.g., *Polygonum*, *Peltandra*, *Potamogeton*, etc.) at V.B.2.N.e.

ALLIANCE DISTRIBUTION

Range: This alliance is common in the southeastern United States and portions of the central midwestern U.S. and Ontario, Canada.

Subnations: AL, AR, FL, GA, IA, IL?, IN, KY, LA, MI, MO?, MS, NC, OK, ON, SC, TN, TX, VA

TNC Ecoregions: 31:C, 32:P, 36:C, 37:C, 38:C, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 46:C, 48:C, 51:?, 52:P, 53:C, 55:C, 56:P, 57:P, 58:C, 59:C

USFS Ecoregions: 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Ch:CCC, 222Db:CCC, 222Ka:CCC, 222Kb:CCC, 222Ke:CCC, 222Kf:CCC, 222Kh:CCC, 222Lb:CCC, 222Lc:CCC, 222Ld:CCC, 222Le:CCC, 231A:CP, 231B:CP, 231E:CP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CC, 232C:CP, 232D:CC, 232F:CC, 234An:CCC, 251Df:CCC, 255Dc:CCC, M221Ad:CCC, M221D:C?, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Fort Benning); NPS (Effigy Mounds); USFS (Kisatchie, Ouachita, Ozark); USFWS (Aransas?, Big Lake, Brazoria, Eufaula, McFaddin, Reelfoot)

ALLIANCE SOURCES

References: Faber-Langendoen et al. 1996, Guthrie 1989, Heineke 1987, Hoagland 1998a, McAlister and McAlister 1995

V.C.2.N.A. NYMPHAEA ODORATA - NUPHAR SPP. PERMANENTLY FLOODED TEMPERATE HERBACEOUS ALLIANCE (A.1984)
WHITE WATER-LILY - YELLOW POND-LILY SPECIES PERMANENTLY FLOODED TEMPERATE HERBACEOUS ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance, common throughout most of the eastern and central United States and adjacent Canadian provinces, contains vegetation which may occur in a variety of slow-moving water bodies, including rivers, millponds, blackwater rivers, streams, shallow ponds or lakes, or on shores of deeper water bodies including freshwater tidal areas. The water depth is generally greater than 0.5 m and up to 2 m. Stands are dominated by hydromorphic rooted aquatic plants, typically *Nuphar lutea* (any of its various subspecies), with or without *Nymphaea odorata*. Emergent vegetation is less than 25%, and typically plant species diversity is low. Other species present may include *Utricularia* spp., *Potamogeton* spp., and others. In the north, *Brasenia schreberi* may be locally dominant. Other characteristic northern species include *Nymphaea tetragona* and *Potamogeton amplifolius*. Associates found in the Midwest include *Polygonum amphibium*. In the Southeast, examples may include the floating or emergent 'pad-leaved' species *Nelumbo lutea* or *Nymphoides aquatica*. Submerged aquatic species which may be present include *Cabomba caroliniana*, *Ceratophyllum demersum*, and *Heteranthera dubia*. Stands of this alliance are permanently to semipermanently flooded.

Related Concepts:

- *Nuphar lutea* herbaceous alliance (Hoagland 1998a) I
- *Nymphaea odorata* herbaceous alliance (Hoagland 1998a) ? Artificial Pond (Smith 1991) I
- L5D2a11a. *Nuphar lutea* (Foti et al. 1994) ?
- Natural Pond (Smith 1991) I
- Open water/aquatic bed veg., natural impoundment pond (Ambrose 1990a) ?
- Small Depression Pond (Schafale and Weakley 1990) I
- Spatterdock - water lily wetland (Fike 1999) ?
- Spring-run Stream (FNAI 1990) I

- Stable Natural Pool (Smith 1991) I

Classification Comments: Field guidelines for separating floating-leaved aquatic alliances from submerged aquatic alliances are also needed.

ALLIANCE DISTRIBUTION

Range: This alliance is common throughout most of the eastern and central United States and adjacent Canadian provinces. It is also found in Oregon, Washington, California, Idaho, Colorado, and Wyoming.

Subnations: AL, AR, BC, CA, CO, CT, DE, FL, GA, IA, ID, IL, IN, KY, LA, MA, MB, MD, ME, MI, MN, MO, MS, NC, NH, NJ, NY, OH, OK, ON, OR, PA, RI, SC, TN, TX, VA, VT, WA, WI, WV

TNC Ecoregions: 2:C, 6:C, 7:C, 10:C, 20:C, 31:C, 32:P, 36:C, 37:C, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 45:C, 46:C, 47:C, 48:C, 49:C, 50:C, 51:C, 52:C, 53:C, 55:C, 56:C, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C

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, 212Ha:CCP, 212Hb:CCP, 212He:CCP, 212Hh:CCP, 212Hi:CCP, 212Hj:CCP, 212Hk:CCP, 212Hl:CCP, 212Hm:CCP, 212Hn:CCP, 212Ho:CCP, 212Hp:CCP, 212Hq:CCP, 212Hr:CCP, 212Hs:CCP, 212Ht:CCP, 212Hu:CCP, 212Hv:CCP, 212Hw:CCP, 212Hx:CCP, 212Hy:CCP, 212Ib:CCP, 212Ja:CCP, 212Jb:CCP, 212Jc:CCP, 212Je:CCP, 212Jf:CCP, 212Jj:CCP, 212Jk:CCP, 212Jl:CCP, 212Jm:CCC, 212Jn:CCP, 212Jo:CCP, 212Jr:CCP, 212Ka:CCP, 212La:CCP, 212Lb:CCC, 212Lc:CCP, 212Ld:CCC, 212Ma:CCP, 212Mb:CCP, 212Na:CCP, 212Nb:CCP, 212Nc:CCP, 221Ah:CCC, 221Ai:CCC, 221Al:CCC, 221Am:CCC, 221Bd:CCP, 221Da:CCC, 221Db:CCC, 221Ea:CCC, 221Ed:CC?, 221Ef:CCC, 221He:CCC, 222Ch:CCC, 222Db:CCC, 222Gc:C??, 222Ha:CCC, 222Ja:CCC, 222Jb:CCC, 222Je:CCC, 222Ji:CCC, 222Jj:CCC, 222Kf:CCC, 222Kg:CCC, 222Kh:CCC, 222Kj:CCC, 222L:CC, 231Bc:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ac:CCC, 232Bf:CCC, 232Bg:CCC, 232Bj:CC?, 232Ca:CCC, 232Cb:CCC, 232Cc:CC?, 232Cd:CCC, 232Ch:CCC, 232Dc:CCC, 234Ac:CC?, 234An:CCC, 242A:CC, 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, M221Dd:CCC, M331A:CC, M331D:CC, M331H:CC, M332C:CC, M332E:CC, M333A:CC, M333B:CC, M333D:CC

Federal Lands: DOD (Eglin, Fort Benning); NPS (Acadia, Carl Sandburg Home, Effigy Mounds, Glacier, Isle Royale, Voyageurs); USFS (Angelina, Conecuh, Davy Crockett, Kisatchie, Ocala, Ozark, Sabine NF, Sam Houston?, Talladega); USFWS (Okefenokee, Reelfoot)

ALLIANCE SOURCES

References: Ambrose 1990a, FNAI 1990, Faber-Langendoen et al. 1996, Fike 1999, Foti et al. 1994, Harris et al. 1996, Heineke 1987, Hoagland 1998a, Kovalchik 1993, Marr et al. 1980, Penfound 1952, Ramaley 1909, Sawyer and Keeler-Wolf 1995, Schafale and Weakley 1990, Smith 1991, Wharton 1978, Wolfe 1990

VII. Sparse Vegetation

VII.C.2.N.c. Temporarily flooded sand flats

VII.C.2.N.C. *ELEOCHARIS* SPP. - *SCHOENOPLECTUS* SPP. - *FIMBRISTYLIS* SPP. - *JUNCUS* SPP. TEMPORARILY FLOODED SPARSELY VEGETATED ALLIANCE (A.1924) SPIKERUSH SPECIES - CLUBRUSH SPECIES - FIMBRY SPECIES - RUSH SPECIES TEMPORARILY FLOODED SPARSELY VEGETATED ALLIANCE

ALLIANCE CONCEPT

Summary: This alliance consists of sparsely vegetated saline flats in interior situations of the southeastern coastal plain.

Related Concepts: No information

Classification Comments: This alliance needs additional consideration; it may be possible to lump it with an herbaceous alliance.

ALLIANCE DISTRIBUTION

Range: This alliance is found in Louisiana.

Subnations: LA

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie)

ALLIANCE SOURCES

References: No information

LOBLOLLY PINE PLANTED FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* Planted Forest

Database Code: CEGLO07179

Formation: Planted/cultivated temperate or subpolar needle-leaved evergreen forest (I.A.8.C.x)

Alliance: *Pinus taeda* Planted Forest Alliance (A.99)

ELEMENT CONCEPT

Summary: This association represents young, monospecific planted stands of *Pinus taeda*. Due to the commercial value of this species, this type is widely distributed across much of the southeastern United States from the Interior Highlands to the Coastal Plain, including areas outside the natural range of the species. The core concept of stands attributable to this type are those which support dense, often perfect rows of planted *Pinus taeda* or otherwise dense, young stands which are established, managed, and/or maintained for the extraction of forest products (usually pulpwood). In most cases these stands support almost no other tree species in the overstory. Understory composition and density can vary widely depending upon location, management history, and stand age. Stands are typically established with mechanical planting, but may also be established through other means. This association rarely exceeds 20-40 years of age on most timberlands. Excluded from this association are plantation stands which have "broken up" with age or thinning to approximate a more natural structure. Dense planting in rows, if successful, tends to result in nearly complete canopy closure which persists until the stand has either been regenerated or transitions into a different association. Herbaceous ground cover of any kind tends to be sparse due to reduction during site preparation, the typically dense canopy cover, and to the fact that many young plantations are infrequently burned at best.

Environment: No information

Vegetation: In the Ouachita Mountains planted loblolly is found with a variable amount of *Quercus alba*, *Quercus falcata*, *Quercus marilandica*, *Quercus stellata*, and *Quercus velutina*; on drier sites *Pinus echinata*, *Carya alba*, and *Carya texana*; and *Acer rubrum*, *Liquidambar styraciflua*, and *Quercus nigra* on wetter sites. The understory can be thick especially after thinning and/or burning. Common understory species are *Vaccinium pallidum*, *Vaccinium arboreum*, *Vaccinium stamineum*, *Cornus florida*, *Ulmus alata*, and others. Vines are an important component, including *Berchemia scandens*, *Vitis* spp., *Smilax* spp., and *Toxicodendron radicans*. In dense stands the herbaceous layer is suppressed by dense needle litter. In thinned and burned stands the plantations are often grazed. Herbaceous species can include *Solidago ulmifolia*, *Chasmanthium sessiliflorum*, *Schizachyrium scoparium*, *Danthonia spicata*, *Tephrosia virginiana*, *Lespedeza* spp., *Symphotrichum patens* (= *Aster patens*), *Eupatorium* spp., and others. In Oklahoma, associates include *Rhus copallinum*, *Hypericum densiflorum*, *Liquidambar styraciflua* and *Toxicodendron radicans* (Hoagland 2000). Additional data on several stands on the Croatan National Forest can be found in Doyle and Allard (1990).

Dynamics: No information

Similar Associations:

- *Pinus taeda* / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011) -- develops when stands develop typical two-layered structure with well-developed subcanopy.
- *Pinus taeda* / *Rhus copallinum* Managed Forest (CEGL007108) -- may replace this association as stands mature.
- *Pinus taeda* / *Saccharum alopecuroidum* - (*Andropogon* spp.) Forest (CEGL007109)

Related Concepts:

- Loblolly Pine: 81 (Eyre 1980) B

Classification Comments: At Arnold Air Force Base, Coffee and Franklin counties, Tennessee, *Pinus taeda* is near the edge of its putative natural range, and was apparently absent prior to being planted there between 1945 and 1950 on abandoned agricultural land and along roadsides. Older plantings have not been intensively managed, and many have become 'modified' vegetation (e.g., CEGLO07109), and are no longer regarded as plantations. More recently (1998-2001) some of these older pine stands have been harvested and replaced with true *Pinus taeda* plantations. *Pinus taeda* also invades seasonally wet hardwood depressions, but these stands remain recognizable as to their natural identity (e.g., CEGLO07364).

Associations occur as plantations and on old fields on Kisatchie and Sumter national forests and after blowdowns on the Kisatchie. South Carolina information after Jones et al. (1981).

In the Coastal Plain of South Carolina, there are mature loblolly plantations, often with *Prunus serotina* in the understory, that have been prescribed burned (based on seven plots at Savannah River Site) - such stands are presumably better covered under *Pinus taeda* Forest Alliance (A.130).

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (cultural) (2000-8-8): This community represents vegetation which has been planted in its current location by humans and/or is treated with annual tillage, a modified conservation tillage, or other intensive management or manipulation. It is not a conservation priority and does not receive a conservation rank.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is found throughout the southeastern United States.

Subnations: AL, AR, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA?

TNC Ecoregions: 38:C, 39:C, 40:C, 41:C, 42:P, 43:C, 44:C, 50:C, 51:C, 52:C, 53:C, 56:P, 57:C, 58:P

USFS Ecoregions: 221Jb:CCC, 222C:CC, 222E:CC, 231Aa:CCC, 231B:CC, 231Ca:CPP, 231Cd:CPP, 231E:CC, 232Bm:CCC, 232Br:CCC, 232Ca:CCC, 232Cb:CCC, 232Ce:CCC, 234A:CC, M221D:CC, M222A:CC, M231A:CC

Federal Lands: DOD (Arnold, Fort Benning, Fort Bragg, Fort Gordon, Fort Stewart); DOE (Savannah River Site); USFS (Angelina, Bankhead?, Bienville, Cherokee, Conecuh, Croatan, Davy Crockett, De Soto, Delta, Francis Marion, Kisatchie, Land Between the Lakes, Oconee, Ouachita, Ozark, Sabine NF, Sam Houston, St. Francis?, Sumter, Talladega, Tuskegee); USFWS (Eufaula)

ELEMENT SOURCES

References: ALNHP 2002, Doyle and Allard 1990, Eyre 1980, Hoagland 1998a, Hoagland 2000, Jones et al. 1981b, Southeastern Ecology Working Group n.d., TNC 1998a

LONGLEAF PINE PLANTED FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* Planted Forest

Database Code: CEGLO07176

Formation: Planted/cultivated temperate or subpolar needle-leaved evergreen forest (I.A.8.C.x)

Alliance: *Pinus palustris* Planted Forest Alliance (A.96)

ELEMENT CONCEPT

Summary: This association includes young, monospecific plantation stands of *Pinus palustris* that are maintained for the extraction of forest products. The core concept of these stands are those which are mechanically planted to dense, often perfect rows of planted *Pinus palustris* or otherwise dense, young stands which are managed and maintained for the extraction of forest products. Stands are typically established with mechanical planting, but may also be established through other means. In most cases these stands support almost no other tree species in the overstory, and typically very little understory. This association rarely exceeds 20-40 years of age on most timberlands. In North and South Carolina, pine straw is commonly harvested from these forests. This association does not include natural or near-natural *Pinus palustris* forests that retain some natural ground layer components and that will be managed for restoration of a natural longleaf pine community even though the *Pinus palustris* may have been planted.

Environment: No information

Vegetation: This alliance includes young, monospecific plantation stands of *Pinus palustris*. In most cases these stands support almost no other tree species in the overstory, and typically very little understory.

Dynamics: Most stands in this alliance are created after clear-cutting of natural stands and mechanical site preparation to reduce or eliminate competition for planted pine seedlings. Dense planting in rows, if successful, tends to result in nearly complete canopy closure which persists until the stand has been "thinned" twice, at which time some openings in the canopy are created which may allow some sunlight to the ground layer. Herbaceous ground cover of any kind tends to be sparse due to reduction during site preparation, the typically dense canopy cover, and to the fact that many young plantations are infrequently burned at best.

Similar Associations:

Related Concepts: No information

Classification Comments:

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (cultural) (2000-8-8): This community represents vegetation which has been planted in its current location by humans and/or is treated with annual tillage, a modified conservation tillage, or other intensive management or manipulation. It is not a conservation priority and does not receive a conservation rank.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 40:C, 41:C, 43:P, 50:P, 53:C, 55:P, 56:P, 57:P

USFS Ecoregions: 231Ca:PPP, 231Cd:PPP, 232Bq:CCC, 232Br:CCC, 232Ca:CCC, 232Cb:CCC, 232F:CC

Federal Lands: DOD (Fort Benning, Fort Bragg, Fort Gordon, Fort Stewart); DOE (Savannah River Site); USFS (Angelina, Apalachicola, Bankhead?, Croatan?, Francis Marion, Kisatchie, Ocala?, Osceola, Sabine NF, Sumter?, Talladega?, Tuskegee?)

ELEMENT SOURCES

References: Southeastern Ecology Working Group n.d.

SHORTLEAF PINE PLANTED FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus echinata* Planted Forest

Database Code: CEGLO07169

Formation: Planted/cultivated temperate or subpolar needle-leaved evergreen forest (I.A.8.C.x)

Alliance: *Pinus echinata* Planted Forest Alliance (A.94)

ELEMENT CONCEPT

Summary: This association includes young, monospecific, dense stands of *Pinus echinata* across a variety of managed site conditions. The majority of stands accommodated in this association were artificially established through mechanical planting, although they may be established through other means such as seed-tree cuts. In most cases these stands support almost no other tree species, and typically very little understory. These are cultivated forests and are not considered natural or near-natural vegetation. If these areas exist on private lands, they are often maintained for the harvest of forest products and rarely exceeds 20-40 years of age.

Environment: No information

Vegetation: Stands of this alliance are young, monospecific plantations dominated by *Pinus echinata*.

Dynamics: No information

Similar Associations:

Related Concepts:

- Shortleaf Pine: 75 (Eyre 1980) B

Classification Comments: During the year 2000, a vast majority of stands in the Daniel Boone National Forest (Kentucky) suffered from damage by the Southern Pine Beetle (*Dendroctonus frontalis*). They will apparently be replanted.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (cultural) (2000-8-8): This community represents vegetation which has been planted in its current location by humans and/or is treated with annual tillage, a modified conservation tillage, or other intensive management or manipulation. It is not a conservation priority and does not receive a conservation rank.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This alliance is found throughout the southeastern United States.

Subnations: AL, AR, GA, KY, LA, MS, NC, OK, SC, TX

TNC Ecoregions: 38:C, 39:C, 40:C, 41:P, 43:P, 44:P, 50:C, 51:C, 52:P, 53:C

USFS Ecoregions: 221Ha:CC?, 221Hc:CCC, 221He:CCC, 222Eb:CCC, 222En:CCC, 222Eo:CCC, 231Dc:CCC, 231E:CC, 232Bm:CCC, M221D:CC, M222A:CC, M231A:CC

Federal Lands: USFS (Chattahoochee, Cherokee?, Daniel Boone, Davy Crockett, Kisatchie, Ouachita, Ozark, Sabine NF, Sam Houston, Talladega?, Tuskegee?)

ELEMENT SOURCES

References: Eyre 1980, Southeastern Ecology Working Group n.d.

SLASH PINE - (LONGLeAF PINE) MANAGED FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus elliottii* var. *elliottii* - (*Pinus palustris*) Managed Forest

Database Code: CEGLO07171

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b)

Alliance: *Pinus palustris* - (*Pinus elliottii*) Forest Alliance (A.123)

ELEMENT CONCEPT

Summary: This association describes *Pinus elliottii* var. *elliottii* stands which were either planted or naturally regenerated on old-field, former *Pinus palustris* sites. Ground layer composition is highly variable and may range from substantially natural to highly altered, or very sparse, depending on management, canopy closure, and other factors. Sites representing this association can also be considered as altered versions of more natural associations; these are placed in needle-leaved evergreen woodland (II.A).

Environment: West Gulf Coastal Plain stands which are placed here are old plantations planted outside the natural range of *Pinus elliottii* var. *elliottii*, sometimes on former *Pinus palustris* sites. In this region, the local expression of this association depends on soil conditions. In mesic to dry-mesic uplands, the canopy may range from nearly pure *Pinus elliottii* (possibly with some *Pinus taeda* ingrowth) to a mixed canopy containing *Pinus elliottii* var. *elliottii* and *Pinus palustris* in combination. In the former case, soils are generally acidic silt loams and sandy loams; in the latter case they tend to be well-drained to moderately well-drained, fine sandy loams and sands underlain by clay. On dry to xeric former *Pinus palustris* sites, on silt loams, fine sandy loams, or silty clay loams underlain by clay of the Kisatchie Series, the soil is moderately deep with siltstone or sandstone occurring at 36-60 inches. This well-drained, very slowly permeable soil ranges from strongly to extremely acidic.

Vegetation: This broadly conceived association accommodates flatwoods and a variety of other mesic Coastal Plain environments which are dominated by mixtures of *Pinus palustris* and *Pinus elliottii* var. *elliottii*. This includes a variety of situations. In the West Gulf Coastal Plain, which is outside of the natural range of *Pinus elliottii*, the understory and herbaceous strata vary depending on management, site conditions, and canopy coverage; the tall-shrub stratum ranges from fairly dense to sparse, and may be patchy. The herbaceous layer also varies; in younger stands, the canopy may often be too dense for the herbaceous layer to become well-developed. However, *Schizachyrium scoparium*-dominated ground cover may be extensive in older stands (60 years or greater in age) that have been burned and thinned. On some dry to xeric former *Pinus palustris* sites, this vegetation is expressed as a fairly open forest dominated by *Pinus elliottii* ranging from 60-80% cover. Ingrowths of *Pinus echinata*, *Pinus taeda*, and *Pinus palustris* may occur here, and there is a patchy subcanopy of scrubby *Quercus incana* and/or *Quercus margarettiae*; the shrub and herbaceous strata are sparse. In the Inner Coastal Plain of South Carolina (Savannah River Site), mature upland plantations placed here tend to develop an understory including *Nyssa sylvatica* and an herbaceous stratum dominated by *Rubus argutus*. In contrast, burned examples tend to have *Prunus serotina* var. *serotina* in the understory and *Andropogon virginicus* in the herbaceous layer.

Dynamics: This forest is primarily disturbed through silvicultural management techniques such as burning and thinning. This forest is initially planted as a seedling/sapling phase and progresses relatively quickly (9 to 12 years) to a forest physiognomy. This forest is likely cut before it succeeds to another community.

Similar Associations:

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Longleaf Pine (21) (USFS 1988) B
- Longleaf Pine - Slash Pine: 83 (Eyre 1980) ?
- Slash Pine (22) (USFS 1988) B

Classification Comments: In particular, this broadly conceived association includes various pine stands in the West Gulf Coastal Plain, which contain *Pinus elliottii*. This region is outside of the natural range of this species.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2002-5-15): These are managed or manipulated stands, whose composition has been altered by management or affected by the site history. Despite this, they may either have some conservation value (as habitat for longleaf pine-related animals, or because they have a more-or-less intact ground layer), or which may be restorable to higher-quality *Pinus palustris*-dominated stands.

High-ranked species: *Picoides borealis* (G3)

ELEMENT DISTRIBUTION

Range: This association is found in the Coastal Plain of the United States.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 41:C, 53:C, 55:C, 56:C, 57:C

USFS Ecoregions: 232Ba:CCC, 232Dc:CCC, 232F:CC

Federal Lands: DOD (Eglin, Fort Bragg); DOE (Savannah River Site); NPS (Big Thicket); USFS (Angelina, Apalachicola, Conecuh, Croatan, Davy Crockett, De Soto, Francis Marion, Kisatchie, Sabine NF, Tuskegee?); USFWS (St. Marks)

ELEMENT SOURCES

References: Allard 1990, Burns and Honkala 1990a, Eyre 1980, Hatchell 1964, Jones et al. 1981a, Smith pers. comm., Southeastern Ecology Working Group n.d., USFS 1988, Wieland 1994b, Wieland 2000b

SLASH PINE PLANTED FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus elliottii* var. *elliottii* Planted Forest

Database Code: CEGLO07170

Formation: Planted/cultivated temperate or subpolar needle-leaved evergreen forest (I.A.8.C.x)

Alliance: *Pinus elliottii* Planted Forest Alliance (A.95)

ELEMENT CONCEPT

Summary: This association includes planted stands (plantations) of *Pinus elliottii* var. *elliottii* (typically monospecific), within and outside of its natural range. These are cultivated forests and are not considered natural or semi-natural vegetation. They are maintained as plantations for the harvest of forest products (lumber, pulpwood). Stands are primarily in uplands, but occasional stands in wetland environments are included here as well. This concept is also supposed to include the rare case of "exotic" stands resulting from natural regeneration out of the natural range of *Pinus elliottii* var. *elliottii*, although these are probably better accommodated as examples of *Pinus elliottii* var. *elliottii* - (*Pinus palustris*) Managed Forest (CEGL007171), a member of the *Pinus palustris* - (*Pinus elliottii*) Forest Alliance (A.123).

Environment: Stands are primarily in uplands, but occasional stands in wetland environments are included here as well.

Vegetation: These are planted stands dominated by *Pinus elliottii* var. *elliottii* (typically monospecific), within and outside of its natural range.

Dynamics: No information

Similar Associations:

Related Concepts: No information

Classification Comments: These are cultivated forests and are not considered natural or semi-natural vegetation. They are maintained as plantations for the harvest of forest products (lumber, pulpwood). Slash pine has been introduced into Kentucky, Virginia and eastern Texas, and now reproduces naturally in these locations.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (cultural) (2000-8-8): This community represents vegetation which has been planted in its current location by humans and/or is treated with annual tillage, a modified conservation tillage, or other intensive management or manipulation. It is not a conservation priority and does not receive a conservation rank.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This planted vegetation may be found throughout the lower south, from North Carolina to Texas, in the Coastal Plain and some adjacent ecoregions.

Subnations: AL, AR, FL, GA, KY?, LA, MS, NC, SC, TX, VA?

TNC Ecoregions: 40:C, 41:C, 43:P, 52:P, 53:C, 55:P, 56:P, 57:P, 58:P

USFS Ecoregions: 231:C, 232Br:CCC, 232Ca:CCC, 232Cb:CCC

Federal Lands: DOD (Fort Benning, Fort Bragg, Fort Gordon, Fort Stewart); NPS (Fort Pulaski); USFS (Angelina, Apalachicola, Conecuh, Kisatchie, Ocala, Osceola, Sabine NF)

ELEMENT SOURCES

References: Southeastern Ecology Working Group n.d.

SEMI-NATURAL FOREST

LOBLOLLY PINE - SHORTLEAF PINE - (EASTERN RED-CEDAR) / MIXED HERBS FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - *Pinus echinata* - (*Juniperus virginiana* var. *virginiana*) / Mixed Herbs Forest

Database Code: CEGL007114

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b)

Alliance: *Pinus taeda* - *Pinus echinata* Forest Alliance (A.129)

ELEMENT CONCEPT

Summary: This association includes various successional forests dominated by *Pinus taeda* and *Pinus echinata* in the eastern and more inland parts of the southeastern United States. In areas outside the Coastal Plain, this alliance includes situations where *Pinus echinata* has been planted and *Pinus taeda* has become naturalized, expanding its range from the Coastal Plain. *Juniperus virginiana* var. *virginiana* may be a component of the understory.

Environment: No information

Vegetation: Stands of this successional forest association are dominated by *Pinus taeda* and *Pinus echinata*.

Dynamics: In areas outside the Coastal Plain, this alliance includes situations where *Pinus echinata* has been planted and *Pinus taeda* has become naturalized, expanding its range from the Coastal Plain.

Similar Associations:

- *Pinus taeda* - *Pinus echinata* Forest [Placeholder] (CEGL008403)

Related Concepts: No information

Classification Comments: It is unclear what the core concept or distribution of this association is supposed to be. Does this cover the "residual" parts of "managed forests in the East and West Gulf coastal plains, and successional stands in Piedmont North Carolina,

South Carolina (?), and Georgia" [from the alliance description]? Need to clarify the putative range. Re-reading between the lines in Weakley et al. (1998, March edition), one would be led to believe that this association should be, in effect, the "alliance placeholder" for the "eastern and more inland parts of the region," i.e., not ECO39, ECO40, or ECO41 - so these ecoregions would not be needed on this type.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (ruderal) (2001-1-10): This forest, dominated by native species, represents early successional vegetation and is thus not of conservation concern.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range:

Subnations: AL?, FL?, GA, KY?, LA, MS?, NC, OK, SC, TN?, VA?

TNC Ecoregions: 43:?, 52:?, 53:?

USFS Ecoregions: 231E:CC, 232F:CC

Federal Lands: USFS (Kisatchie?)

ELEMENT SOURCES

References: Southeastern Ecology Working Group n.d.

LOBLOLLY PINE - SWEETGUM SEMI-NATURAL FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - *Liquidambar styraciflua* Semi-natural Forest

Database Code: CEGLO08462

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b)

Alliance: *Pinus taeda* Forest Alliance (A.130)

ELEMENT CONCEPT

Summary: This community type is broadly defined to accommodate mid- to late-successional upland forests strongly codominated by *Pinus taeda* and *Liquidambar styraciflua*, resulting from past disturbance (such as agricultural or other land clearing). Understory composition differs based on edaphic site and on age and history. This broadly defined type occupies a variety of edaphic sites, ranging from mesic through dry-mesic sites on a wide variety of (generally acidic) soils. If left unmanaged or undisturbed, this can be a short-lived forest type, which is likely to succeed with greater age into various oak- and oak-pine-dominated forests.

Environment: Stands of this community type are strongly codominated by *Pinus taeda* and *Liquidambar styraciflua*, resulting from past disturbance followed by forest succession. This community type is more influenced by past land-use history than by specific soil differences. However, this community type tends to occur on poorly drained and low-nutrient soils, especially in areas that were farmed heavily in the past.

Vegetation: Stands of this community type are strongly codominated by *Pinus taeda* and *Liquidambar styraciflua*. Some other species which may be present in stands of this association include *Quercus phellos*, *Quercus nigra*, *Ulmus alata*, and *Prunus serotina*, along with *Vitis rotundifolia*, *Toxicodendron radicans*, *Rubus argutus*, *Eupatorium capillifolium*, *Eupatorium hyssopifolium*, *Erigeron strigosus*, *Solidago gigantea*, *Ambrosia artemisiifolia*, and the exotics *Lespedeza cuneata* and *Ligustrum sinense*. Examples of this association in low-lying areas may also have a dense herbaceous layer of *Microstegium vimineum*.

Dynamics: This is a short-lived forest type, successional following cropping or other land clearing. It generally succeeds with greater age into various oak- and oak-pine-dominated forests.

Similar Associations:

- *Liriodendron tulipifera* - *Pinus taeda* Forest (CEGL007521) -- with greater dominance by *Liriodendron*.
- *Pinus taeda* / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011) -- is very similar and may need to be merged with this concept someday. For now, the main difference is that this community does not have *Liquidambar styraciflua* present in the canopy, but instead in the subcanopy/tall-shrub layer.
- *Pinus taeda* / *Saccharum alopecuroidum* - (*Andropogon* spp.) Forest (CEGL007109) -- a related *Pinus taeda*-dominated type placed in evergreen.

Related Concepts:

- IF3a. Recently Harvested Timber Land (Allard 1990) B
- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Loblolly Pine - Hardwood (13) (USFS 1988) ?
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- T1B3aIII6a. *Pinus taeda* - *Liquidambar styraciflua* (Foti et al. 1994) ?

Classification Comments: This community likely occurs along the northern periphery of the Gulf Coast Prairies and Marshes Ecoregion of eastern Texas.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2000-10-20): This forest represents early successional or silviculturally managed vegetation and is thus not of conservation concern and does not receive a conservation status rank.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This altered forest type is widespread in the lowland portions of the southeastern United States, particularly on the Coastal Plain, but also on adjacent inland provinces.

Subnations: AL, AR, GA, LA, MS, NC, OK, SC, TX, VA

TNC Ecoregions: 31:P, 39:C, 40:C, 41:C, 43:C, 52:C, 53:C, 56:C, 57:C

USFS Ecoregions: 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Fa:CPP, 232Bm:CCC, 232F:CC, 255Da:PPP

Federal Lands: DOD (Fort Benning?); NPS (Guilford Courthouse, Kings Mountain, Little River Canyon?, Ninety Six); USFS (Angelina, Davy Crockett, Kisatchie, Oconee, Ouachita, Sabine NF, Sam Houston, Talladega?, Tuskegee?, Uwharrie)

ELEMENT SOURCES

References: Allard 1990, Eyre 1980, Foti 1994b, Foti et al. 1994, Harcombe and Neaville 1977, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Southeastern Ecology Working Group n.d., USFS 1988, Zannoni et al. 1979

LOBLOLLY PINE / WINGED SUMAC MANAGED FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* / *Rhus copallinum* Managed Forest

Database Code: CEGLO07108

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b)

Alliance: *Pinus taeda* Forest Alliance (A.130)

ELEMENT CONCEPT

Summary: This mature or late successional *Pinus taeda* forest occurs west of the Mississippi River in the West Gulf and Upper West Gulf coastal plains. It was initially described from *Pinus taeda* seed tree/shelterwood regeneration areas, but may also result from a number of other forestry management practices and/or historical land uses. Many existing examples on the national forests in Texas are derived, in part, from Red-cockaded Woodpecker management programs. These are mature stands with large diameter (usually "sawtimber" sized) pine stems which have been heavily thinned, removing all other overstory trees and leaving a *Pinus taeda* canopy of variable density, but which appears to have a quite open canopy. Early successional, younger, and denser managed *Pinus taeda* stands are covered by other associations. In most of the region in which this type occurs, natural upland *Pinus taeda* stands are quite rare, and most examples of this type are believed to occur on sites formerly occupied by either *Pinus echinata*, *Pinus palustris*, or mixed pine-oak stands. In any given stand, the canopy closure varies temporally as different management techniques are applied, especially thinning, seed tree cuts, and seed tree removals. The understory composition of these stands is especially variable, depending largely upon stand level management objectives. For example, seed tree stands which were cut specifically to regenerate *Pinus taeda* are managed very infrequently with prescribed fire thus allowing the development of dense shrub thicket understories. Certain other stands, such as within *Picoides borealis* habitat management areas, are more actively burned to control understory vegetation. Given the relative intolerance of young and regenerating *Pinus taeda* to fire, pine regeneration may be either plentiful or absent in these stands, just as shrubs are scattered to dense, with composition and density dependent on management (as well as moisture conditions). Herbs are few to absent, in part due to lack of prescribed fire, but also due to a tendency for heavy canopy closure preceding harvesting operations, and occasionally due to previous site preparation practices.

Environment: This forest is a West Gulf Coastal Plain *Pinus taeda* plantation or a seed tree/shelterwood-regenerated site, typically on mesic to dry upland sites. This is a variable community which is silviculturally managed and site prepped, occurring on a wide range of upland habitats and soils. This type is not restricted to any particular soil type, and may occur across nearly any upland soil with the possible exception of calcareous clays. Previously observed on Betis, Briley, Ruston and Smithdale soil series.

Vegetation: The canopy cover ranges from 60-100 % and is typically very dense, especially in younger stands (approximately 15 years or less) which are burned less frequently. Shrubs (2-5 m) are scattered to dense, with composition and density dependent on management and moisture conditions; this stratum is typically more abundant in moister stands on flats than on drier ridgetops and slopes. Species include *Rhus copallinum*, *Cornus florida*, *Callicarpa americana*, *Vaccinium elliotii*, *Morella cerifera* (= *Myrica cerifera*), *Vaccinium arboreum*, and *Ilex vomitoria*. Herbs are few to absent in less frequently burned stands but fairly well-developed in stands that are more frequently burned. Patches of weedy ground cover may be present in the most open examples of this association, including *Croton capitatus*, *Ambrosia psilostachya*, *Dichantheium* spp., and *Paspalum urvillei* (exotic). *Chasmanthium sessiliflorum* is a shade-tolerant grass that occurs at least sparsely even in dense examples; *Schizachyrium scoparium* may be common in the patchy to fairly dense ground cover under more open canopies.

Dynamics: This is a silviculturally disturbed community. Forest management practices directly determine the successional trajectory of these stands. Given frequent fire management, this type may develop an herbaceous-dominated understory. If burned or thinned more frequently, this forest may revert to a woodland physiognomy. This community will likely be cut before any other successional phases occur.

Similar Associations:

- *Pinus taeda* / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011) -- of the Piedmont and related areas.
- *Pinus taeda* / *Saccharum alopecuroidum* - (*Andropogon* spp.) Forest (CEGL007109) -- a more grassy type found east of the Mississippi River.
- *Pinus taeda* Plantation Forest (CEGL007179) -- applies to young, dense, monospecific, stands with plantation structure.

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Loblolly Pine: 81 (Eyre 1980) B
- T1A9bII2a. *Pinus taeda* (Foti et al. 1994) ?

Classification Comments: This association should be expanded to cover other geographic areas where ruderal *Pinus taeda* forests occur.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2001-10-4): No information

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This modified or managed association is found in eastern Texas, western Louisiana, southern Arkansas, and southeastern Oklahoma.

Subnations: AR, LA, OK, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 231Eh:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie, Ouachita, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Eyre 1980, Foti et al. 1994, Hatchell 1964, Hoagland 2000, Martin et al. 1993, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

SLASH PINE - (LONGLeAF PINE) MANAGED FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus elliottii* var. *elliottii* - (*Pinus palustris*) Managed Forest

Database Code: CEGL007171

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b)

Alliance: *Pinus palustris* - (*Pinus elliottii*) Forest Alliance (A.123)

ELEMENT CONCEPT

Summary: This association describes *Pinus elliottii* var. *elliottii* stands which were either planted or naturally regenerated on old-field, former *Pinus palustris* sites. Ground layer composition is highly variable and may range from substantially natural to highly altered, or very sparse, depending on management, canopy closure, and other factors. Sites representing this association can also be considered as altered versions of more natural associations; these are placed in needle-leaved evergreen woodland (II.A).

Environment: West Gulf Coastal Plain stands which are placed here are old plantations planted outside the natural range of *Pinus elliottii* var. *elliottii*, sometimes on former *Pinus palustris* sites. In this region, the local expression of this association depends on soil conditions. In mesic to dry-mesic uplands, the canopy may range from nearly pure *Pinus elliottii* (possibly with some *Pinus taeda* ingrowth) to a mixed canopy containing *Pinus elliottii* var. *elliottii* and *Pinus palustris* in combination. In the former case, soils are generally acidic silt loams and sandy loams; in the latter case they tend to be well-drained to moderately well-drained, fine sandy loams and sands underlain by clay. On dry to xeric former *Pinus palustris* sites, on silt loams, fine sandy loams, or silty clay loams underlain by clay of the Kisatchie Series, the soil is moderately deep with siltstone or sandstone occurring at 36-60 inches. This well-drained, very slowly permeable soil ranges from strongly to extremely acidic.

Vegetation: This broadly conceived association accommodates flatwoods and a variety of other mesic Coastal Plain environments which are dominated by mixtures of *Pinus palustris* and *Pinus elliottii* var. *elliottii*. This includes a variety of situations. In the West Gulf Coastal Plain, which is outside of the natural range of *Pinus elliottii*, the understory and herbaceous strata vary depending on management, site conditions, and canopy coverage; the tall-shrub stratum ranges from fairly dense to sparse, and may be patchy. The herbaceous layer also varies; in younger stands, the canopy may often be too dense for the herbaceous layer to become well-developed. However, *Schizachyrium scoparium*-dominated ground cover may be extensive in older stands (60 years or greater in age) that have been burned and thinned. On some dry to xeric former *Pinus palustris* sites, this vegetation is expressed as a fairly open

forest dominated by *Pinus elliottii* ranging from 60-80% cover. Ingrowths of *Pinus echinata*, *Pinus taeda*, and *Pinus palustris* may occur here, and there is a patchy subcanopy of scrubby *Quercus incana* and/or *Quercus margarettiae*; the shrub and herbaceous strata are sparse. In the Inner Coastal Plain of South Carolina (Savannah River Site), mature upland plantations placed here tend to develop an understory including *Nyssa sylvatica* and an herbaceous stratum dominated by *Rubus argutus*. In contrast, burned examples tend to have *Prunus serotina* var. *serotina* in the understory and *Andropogon virginicus* in the herbaceous layer.

Dynamics: This forest is primarily disturbed through silvicultural management techniques such as burning and thinning. This forest is initially planted as a seedling/sapling phase and progresses relatively quickly (9 to 12 years) to a forest physiognomy. This forest is likely cut before it succeeds to another community.

Similar Associations:

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Longleaf Pine (21) (USFS 1988) B
- Longleaf Pine - Slash Pine: 83 (Eyre 1980) ?
- Slash Pine (22) (USFS 1988) B

Classification Comments: In particular, this broadly conceived association includes various pine stands in the West Gulf Coastal Plain, which contain *Pinus elliottii*. This region is outside of the natural range of this species.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2002-5-15): These are managed or manipulated stands, whose composition has been altered by management or affected by the site history. Despite this, they may either have some conservation value (as habitat for longleaf pine-related animals, or because they have a more-or-less intact ground layer), or which may be restorable to higher-quality *Pinus palustris*-dominated stands.

High-ranked species: *Picoides borealis* (G3)

ELEMENT DISTRIBUTION

Range: This association is found in the Coastal Plain of the United States.

Subnations: AL, FL, GA, LA, MS, NC, SC, TX

TNC Ecoregions: 41:C, 53:C, 55:C, 56:C, 57:C

USFS Ecoregions: 232Ba:CCC, 232Dc:CCC, 232F:CC

Federal Lands: DOD (Eglin, Fort Bragg); DOE (Savannah River Site); NPS (Big Thicket); USFS (Angelina, Apalachicola, Conecuh, Croatan, Davy Crockett, De Soto, Francis Marion, Kisatchie, Sabine NF, Tuskegee?); USFWS (St. Marks)

ELEMENT SOURCES

References: Allard 1990, Burns and Honkala 1990a, Eyre 1980, Hatchell 1964, Jones et al. 1981a, Smith pers. comm., Southeastern Ecology Working Group n.d., USFS 1988, Wieland 1994b, Wieland 2000b

WEST GULF COASTAL PLAIN CATAHOULA BARRENS

(LONGLEAF PINE) / LITTLE BLUESTEM - NUTTALL'S RAYLESS-GOLDENROD / REINDEER LICHEN SPECIES

HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: (*Pinus palustris*) / *Schizachyrium scoparium* - *Bigelowia nuttallii* / *Cladonia* spp. Herbaceous Vegetation

Database Code: CEGLO03600

Formation: Low temperate or subpolar perennial forb vegetation (V.B.2.N.b)

Alliance: *Bigelowia nuttallii* Herbaceous Alliance (A.1617)

ELEMENT CONCEPT

Summary: This association represents Catahoula sandstone glades of western Louisiana that also rarely occur in adjacent Texas. Scattered mature *Pinus palustris* may be present, but the community is fundamentally dominated by herbs and nonvascular plants. The herbaceous cover is depauperate and sparse; with many patches of exposed rock, mineral soils, and *Cladonia* lichens. This community does not possess a strong *Quercus* component, although it may have scattered individuals.

Environment: The dark to light gray silty loam Kisatchie Series soil (fine montmorillonitic, thermic Typic Hapludalf) is strongly acidic and infertile. This soil exhibits shrink-swell properties, being saturated and sticky during the winter and spring, and hard, dry and cracked in the summer and fall. Soils surface temperatures in July and August are high. This rare community is typically less than 2 hectares in size and occurs in sandstone glades of the Catahoula Formation on mesalike, tiered hilltops in Louisiana. Tree seedling desiccation and high mortality rates is apparently one of the main reasons for the very open canopy of this community. Mature trees have an increased susceptibility to windthrow due to the shallow impermeable sandstone layer and rooting depth. Part of this community may be extremely eroded through natural causes, exhibiting exposed subsoils and gully-formation (Martin et al. 1990, Martin and Smith 1991, MacRoberts and MacRoberts 1992).

Vegetation: The canopy of mature, frequently flat-topped *Pinus palustris* is widely scattered, with cover ranging from 10-25%. The *Pinus palustris* canopy is typically stunted, ranging from less than 12 m to approximately 15 m in height. *Pinus taeda* and *Pinus echinata* may occur, being much more abundant in disturbed examples of this community. Although scattered *Quercus* individuals may be present, their cover is much less than 10%; especially in more xeric sites, the scattered *Quercus marilandica*, *Quercus stellata*, and *Quercus falcata* are stunted and gnarled, barely rising above the shrub layer. Shrubs are not significant members of this community, ranging from absent to widely scattered *Ilex vomitoria* and *Vaccinium arboreum*, *Vaccinium corymbosum*, *Vaccinium elliotii*, and *Vaccinium stamineum*. The low-diversity herbaceous layer comprised largely of *Schizachyrium scoparium* and *Bigelovia nuttallii* is often intermingled with patches of exposed sandstone rock, mineral soils, and *Cladonia* spp. The families Poaceae and Asteraceae account for over one-third of the herbaceous taxa in one glade (MacRoberts and MacRoberts 1992). Species that are not dominant but that may be scattered in examples of this community include *Andropogon gyrans* var. *gyrans*, *Andropogon ternarius*, *Anthaenantia villosa*, *Aristida purpurascens* var. *virgata*, *Dichantherium aciculare*, *Dichantherium sphaerocarpon*, *Schizachyrium tenerum*, *Sporobolus junceus*, *Symphytotrichum dumosum* (= *Aster dumosus*), *Ionactis linariifolius*, *Eupatorium leucolepis*, *Helianthus angustifolius*, *Eurybia hemispherica* (= *Aster paludosus* ssp. *hemisphericus*), *Pityopsis graminifolia* var. *graminifolia*, *Liatris pycnostachya*, *Liatris squarrosa*, *Packera tomentosa* (= *Senecio tomentosus*), *Oligoneuron nitidum* (= *Solidago nitida*), *Vernonia texana*, *Juncus marginatus*, *Rhynchospora globularis*, *Rhynchospora plumosa*, *Scleria ciliata*, *Spiranthes tuberosa*, *Spiranthes vernalis*, *Polygala mariana*, *Polygala nana*, *Diodia teres*, and *Viola pedata* (MacRoberts and MacRoberts 1992). Although the species composition overlaps with other Western Gulf Coastal Plain dry to xeric *Pinus palustris* uplands and with xeric *Pinus taeda* - *Pinus echinata*-dominated sandy woodlands, approximately 10% of the species in the glade community sampled by MacRoberts and MacRoberts (1992) are characteristic of wet *Pinus palustris* bogs, including *Aletris aurea*, *Aletris farinosa*, *Drosera brevifolia*, *Pinguicula pumila*, *Platanthera* spp., *Sabatia gentianoides*, and *Asclepias* spp. These species utilize the seasonally saturated soils and the open, high-light conditions.

Dynamics: All examples in the West Gulf Coastal Plain are embedded in a matrix of longleaf pine. This surrounding matrix vegetation likely burned approximately every 2 to 5 years (Martin and Smith), and fires may have maintained open ecotones with this outcrop community. Successional trajectories are unknown, but this is a fire-dependent ancient community.

Similar Associations:

- *Pinus palustris* / *Quercus marilandica* / *Schizachyrium scoparium* - *Silphium laciniatum* - *Ruellia humilis* Woodland (CEGL003596) -- alkaline or high-nutrient glade of the same region.
- *Pinus palustris* / *Quercus marilandica* / *Schizachyrium tenerum* - *Muhlenbergia expansa* - *Bigelovia nuttallii* - *Packera obovata* Woodland (CEGL003597) -- may also have less harsh edaphic conditions and contains a much richer herbaceous layer; many prairie forbs occur, including calciphiles, and bog-type vegetation likely accounts for more than 10% of the herbaceous taxa.

Related Concepts:

- Flat Glade (MacRoberts and MacRoberts 1992) =
- Flat Glade (Martin and Smith 1991) =
- IA7f. Catahoula Barrens (Allard 1990) ?
- IB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) B
- Longleaf Pine (21) (USFS 1988) ? Longleaf Pine: 70 (Eyre 1980) B
- Sandstone Glade (MacRoberts et al. 1994) ?

Classification Comments: This is a very localized community type. Examples occur at Flat Glade (Natchitoches Parish, Kisatchie District, Kisatchie National Forest, Louisiana), and is a small-scale feature at Rocky Branch Barrens in eastern Texas on the Angelina National Forest (R. Evans pers. obs.) and Russel's Prairie in San Jacinto County, Texas (NatureServe Ecology unpubl. data 2001). Russel's Prairie Catahoula Barren has no clear dominant in the sparse herbaceous layer that was characterized in the fall of 2001 by *Paronychia virginica*, *Aristida oligantha*, *Talinum parviflorum*, *Hypericum drummondii*, *Agalinis heterophylla*, *Evolvulus sericeus*, *Palafoxia reverchonii*, *Croton monanthogynus*, *Portulaca pilosa*, and *Dalea* sp.

CONSERVATION RANKING & RARE SPECIES

GRank: G1G2 (2002-10-22): This Catahoula glade is an extremely localized community type with a restricted distribution, being known only from Louisiana and less commonly in eastern Texas. It is confined to exposed outcrops of the Catahoula Formation (Oligocene) on mesa-like, tiered hilltops. Occurrences are typically less than 2 hectares in size. Most high-quality remaining examples are found on the Kisatchie National Forest, and one may occur on the Angelina National Forest in eastern Texas. All examples may be easily degraded by vehicle traffic. Most occurrences not on public land are highly threatened by development, conversion, and alteration of fire regimes. Those occurrences which have not been either protected or already destroyed are severely degraded.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is known only from Louisiana and a single site in eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fa:CCC

Federal Lands: USFS (Angelina, Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Eyre 1980, Groat 1990, MacRoberts and MacRoberts 1992, MacRoberts et al. 1994, Martin and Smith 1991, Martin and Smith 1993, NatureServe Ecology - Southeastern U.S. unpubl. data, Smith 1996a, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., USFS 1988

LONGLEAF PINE / BLACKJACK OAK / SLENDER BLUESTEM - SAVANNA HAIRGRASS - NUTTALL'S RAYLESS-GOLDENROD - ROUNDLEAF GROUNDSEL WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Quercus marilandica* / *Schizachyrium tenerum* - *Muhlenbergia expansa* - *Bigelowia nuttallii* - *Packera obovata* Woodland

Database Code: CEGLO03597

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This sparse woodland is dominated by a scattered, somewhat stunted *Pinus palustris* canopy; *Quercus marilandica* forms a patchy stunted subcanopy. *Pinus taeda* may be abundant in fire-suppressed examples. *Schizachyrium tenerum* and *Schizachyrium scoparium* are dominants in the usually dense herbaceous layer. Herbs typical of both upland *Pinus palustris* woodlands and wetter *Pinus palustris* flatwoods occur, along with more calciphilic species (e.g., *Neptunia lutea*, *Delphinium carolinianum*, *Silphium laciniatum*, *Packera obovata* (= *Senecio obovatus*)). This community contains a highly unusual combination of species, primarily due to the close interdigitation of distinct soil and hydrologic conditions, that in turn reflect the mixed geological character of the environment. This woodland is known from the Dough Hills Member of the Fleming Formation, and is thought to occur primarily on Anacoco and Kisatchie-Anacoco soils which are inclusions in areas mapped as Vaiden-Watsonia. The Kisatchie and Anacoco soils are very strongly acidic silt loams over clay; Anacoco soils are underlain by siltstone. This community ranges from dry with a patchy herbaceous layer and foliose lichens, to more commonly mesic or wet-mesic with *Muhlenbergia expansa* and *Rhynchospora* spp. as codominants. The historical fire frequency is estimated to be 3-4 years and, along with edaphic conditions including rock layers near but not at the soil surface, fire is believed to play a role in maintaining the open physiognomy.

Environment: This sparse woodland is known from the Dough Hills member of the Fleming Formation and is thought to arise primarily on Anacoco (Vertic Albaqualf) and Kisatchie (Typic Hapludalf) soils which are inclusional and mapped as Vaiden-Watsonia on soil maps. The Kisatchie and Anacoco soils are very strongly acidic silt loams over clay. Anacoco soils are gray loams over silty loams, and are underlain by siltstone at 244+ cm. Kisatchie soils are grayish brown silty clays and have siltstone within 102 cm. The small calcareous admixtures in this community are likely a result of the calcareous Vaiden and Watsonia soils occurring in patches. The hydrology of this community ranges from occasionally dry-xeric to more commonly mesic or wet-mesic.

Vegetation: This sparse woodland is dominated by a scattered, somewhat stunted *Pinus palustris* canopy typically 8-15 m tall and approximately 10-25% cover; *Pinus taeda* and/or *Pinus echinata* may also occur in fire-suppressed examples. *Quercus marilandica*, sometimes co-occurring with *Quercus stellata* or *Nyssa sylvatica*, forms a patchy stunted subcanopy approximately 5 m tall and generally of 10-20% cover. Scattered shrubs, typically less than 10% cover, include *Ilex vomitoria* and *Chionanthus virginicus*. *Schizachyrium tenerum* and *Schizachyrium scoparium* are dominant graminoids in this usually dense to continuous stratum. Herbaceous acidophiles typical of both upland *Pinus palustris* woodlands and wetter *Pinus palustris* flatwoods occur, along with inclusional calciphiles due to the small scale interdigitation of soils in this community. On dry-xeric patches the herbaceous layer is patchy, and fruticose lichens (*Cladonia* spp.) occur; on mesic and wet-mesic areas *Muhlenbergia expansa* and *Rhynchospora* spp. are codominants along with the other graminoid species. On the predominantly acidic to very acidic silty clays *Bigelowia nuttallii*, *Liatris acidota*, *Ionactis linariifolius*, *Euphorbia corollata*, *Hedyotis nigricans* var. *nigricans*, *Spiranthes magnicamporum*, and other acidophiles are found. On calcareous clay inclusions scattered calciphilic species such as *Neptunia lutea* and *Delphinium carolinianum* may occur. Other vegetative species that may occur in this community and are rare in the state of Louisiana include *Sporobolus vaginiflorus* var. *ozarkanus* (= *Sporobolus ozarkanus*), *Amsonia ludoviciana*, *Pteroglossaspis ecristata*, *Platanthera integra*, and *Selaginella arenicola* ssp. *riddellii*.

Dynamics: No information

Similar Associations:

Related Concepts:

- IB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) B
- Longleaf Pine - Scrub Oak: 71 (Eyre 1980) B
- Longleaf Pine: 70 (Eyre 1980) B

Classification Comments:

CONSERVATION RANKING & RARE SPECIES

GRank: G1 (1997-12-31): This longleaf pine woodland is an extremely rare community with a restricted distribution, being known only from northern Rapides Parish of the West Gulf Coastal Plain of Louisiana. The historic fire frequency is estimated to be three to four years, and along with edaphic conditions including rock layers near but not at the soil surface, fire is believed to play a role in

maintaining the open physiognomy. It is part of the endangered Longleaf Pine Ecosystem, which once dominated the Coastal Plain landscape of the southeastern United States, and depends on frequent, low-intensity, growing-season fires to control understory vegetation and for the reproduction of *Pinus palustris*. *Pinus palustris*-dominated woodlands are susceptible to the effects of fire suppression, over-grazing, or conversion to commercial forest plantations or agriculture. Remaining examples are highly threatened by development, conversion, and alteration of fire regimes. Most of those occurrences which have not been destroyed are severely degraded.

High-ranked species: *Amsonia ludoviciana* (G3)

ELEMENT DISTRIBUTION

Range: Endemic to a small portion of the West Gulf Coastal Plain, currently known only from one parish in Louisiana.

Subnations: LA, TX?

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Burns and Honkala 1990b, Eyre 1980, Kerr et al. 1980, Martin and Smith 1993, Smith 1996a, Smith pers. comm., Southeastern Ecology Working Group n.d.

WEST GULF COASTAL PLAIN MESIC HARDWOOD FOREST

AMERICAN BEECH - SOUTHERN MAGNOLIA - WHITE OAK / IRONWOOD / EASTERN HOP-HORNBEAM - AMERICAN HOLLY FOREST

ELEMENT IDENTIFIERS

NVC association: *Fagus grandifolia* - *Magnolia grandiflora* - *Quercus alba* / *Carpinus caroliniana* - *Ostrya virginiana* - *Ilex opaca* var. *opaca* Forest

Database Code: CEGL007872

Formation: Mixed broad-leaved evergreen - cold-deciduous forest (I.C.2.N.a)

Alliance: *Fagus grandifolia* - *Magnolia grandiflora* Forest Alliance (A.369)

ELEMENT CONCEPT

Summary: This West Gulf Coastal Plain beech-magnolia forest displays a well-developed three-layered structure; a closed upper canopy of *Fagus grandifolia* with occasional representatives of *Magnolia grandiflora*, *Liquidambar styraciflua*, *Quercus nigra*, and *Quercus alba*. Midstory trees are prevalent, with *Carpinus caroliniana* ssp. *caroliniana* and *Ostrya virginiana* being most important, although *Ilex opaca* var. *opaca*, *Cornus florida*, and *Nyssa sylvatica* are also common components. The relatively sparse shrub stratum is dominated by *Ilex vomitoria*, *Callicarpa americana*, *Hamamelis virginiana*, *Frangula caroliniana*, *Styrax americanus*, and *Vaccinium elliotii*. The woody vine *Vitis rotundifolia* can be abundant. An herbaceous stratum of species typical of mesic, acid, hardwood forests of the region is sparsely present amid dense hardwood leaf litter.

Environment: This community occurs on the Wilcox and Beaumont formations in eastern Texas on moist slopes and non-flooding flats. The classic example of this association, documented by Nixon et al. (1980a), occurred on loam to sandy loam soils that averaged about 54% sand, 32% silt, and 14% clay, with pH ranging from 4.4-4.6, and very low nutrient levels.

Vegetation: The closed upper canopy consists of *Fagus grandifolia* with occasional representatives of *Magnolia grandiflora*, *Liquidambar styraciflua*, *Quercus nigra*, and *Quercus alba*. *Pinus taeda* is usually present to some degree. Other woody species may include *Acer rubrum*, *Aesculus pavia*, *Amelanchier arborea*, *Aralia spinosa*, *Arundinaria gigantea*, *Berchemia scandens*, *Bignonia capreolata*, *Carya glabra*, *Crataegus marshallii*, *Fraxinus americana*, *Gelsemium sempervirens*, *Halesia diptera*, *Magnolia virginiana*, *Morus rubra*, *Parthenocissus quinquefolia*, *Prunus caroliniana*, *Quercus falcata*, *Quercus laurifolia*, *Quercus michauxii*, *Quercus pagoda*, *Quercus phellos*, *Smilax laurifolia*, *Styrax grandifolius*, *Ulmus alata*, *Sideroxylon lanuginosum*, *Symplocos tinctoria*, *Vaccinium arboreum*, *Viburnum dentatum*, *Ilex ambigua*, and *Sassafras albidum*. In more easterly examples, *Magnolia macrophylla* and *Hydrangea quercifolia* can be present and common. Midstory trees are prevalent, with *Carpinus caroliniana* ssp. *caroliniana* and *Ostrya virginiana* being most important, although *Ilex opaca* var. *opaca*, *Cornus florida*, and *Nyssa sylvatica* are also common. A sparse herbaceous stratum typical of mesic, acid, hardwood forests of the region may include *Arisaema triphyllum*, *Aristolochia serpentaria*, *Athyrium filix-femina* ssp. *asplenoides*, *Botrychium virginianum*, *Carex* spp., *Chasmanthium sessiliflorum*, *Desmodium nudiflorum*, *Elephantopus carolinianus*, *Epifagus virginiana*, *Galium circaezans*, *Mitchella repens*, *Oxalis* sp., *Phegopteris hexagonoptera*, *Podophyllum peltatum*, *Polystichum acrostichoides*, *Trillium ludovicianum*, and *Viola* sp.

Dynamics: *Magnolia grandiflora* may not be regenerating successfully in the best known example of this type in eastern Texas (Nixon et al. 1980). A large number of natural canopy gaps are present at this site. Due to the status of this site as a Research Natural Area, permanent vegetation plots were established, and additional data on successional trends may be available.

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208) -- lacks a substantial component of *Magnolia grandiflora*.

Related Concepts:

- American Beech - White Oak / *Mitchella* Loamy Moist-Mesic Steep Slopes and Ravines (Turner et al. 1999) B
- American Beech-Southern Magnolia Series (Diamond 1993) B
- IA8e. Beech - Magnolia Forest (Allard 1990) B
- Lower Slope Hardwood Pine Forest (Marks and Harcombe 1981) B

Classification Comments: The narrative for this type is based largely on Nixon et al (1980), in which *Pinus taeda* was of minor importance, while the data included in Marks and Harcombe (1983) show *Pinus taeda* as the single most important woody species. Examples are known from Magnolia Ridge (Evangeline District, Kisatchie National Forest), Mill Creek Cove Research Natural Area (Sabine National Forest, TX), and Camp Beauregard.

CONSERVATION RANKING & RARE SPECIES

GRank: G2 (2001-1-2): Naturally geographically restricted to the West Gulf Coastal Plain and naturally uncommon, this type was historically found in only small patches in the landscape and was even more rare than the locally related Beech-White Oak Forest, *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208). During the early part of the 20th century, much of the landscape within its range was heavily logged and/or converted to agricultural cropland. Like other hardwood slopes of the region, many of these highly productive sites have been converted to commercial pine plantations, eliminating the original hardwood-dominated community altogether. Most remaining examples of this association are now limited to steep slopes and ravines which are difficult to enter with logging or farm machinery. Once the overstory is removed or damaged, this community is not readily restored. The nominals have difficulty regenerating themselves possibly due to inconsistent cooling temperatures needed for seed stratification (Nixon et al. 1980).

High-ranked species: *Trillium ludovicianum* (G3)

ELEMENT DISTRIBUTION

Range: This association occurs west of the Mississippi River where it has been documented in the West Gulf Coastal Plain of western Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:?, 41:C

USFS Ecoregions: 231Fa:CCC, 232Fe:CCC

Federal Lands: DOD (Camp Beauregard); NPS (Big Thicket); USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Marks and Harcombe 1981, Martin and Smith 1993, McLeod 1975, Nixon et al. 1980a, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Watson 1979

AMERICAN BEECH - WHITE OAK / (SOUTHERN SUGAR MAPLE, CHALK MAPLE) / EARED GOLDENROD FOREST

ELEMENT IDENTIFIERS

NVC association: *Fagus grandifolia* - *Quercus alba* / *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest

Database Code: CEGL007207

Formation: Lowland or submontane cold-deciduous forest (I.B.2.N.a)

Alliance: *Fagus grandifolia* - *Quercus alba* Forest Alliance (A.228)

ELEMENT CONCEPT

Summary: This mesic, subcalcareous forest of the West Gulf Coastal Plain of eastern Texas and western Louisiana is typically dominated by an uneven-aged canopy of *Fagus grandifolia* and *Quercus alba*. It is further characterized by a rich, vernal understory flora and the presence of a number of species which indicate both mesic and calciphilic habitats in the West Gulf Coastal Plain, such as *Acer leucoderme*, *Acer barbatum*, *Cercis canadensis* var. *canadensis*, *Hamamelis virginiana*, *Solidago auriculata*, *Lithospermum tuberosum*, *Cynoglossum virginianum*, *Uvularia perfoliata*, *Dioscorea villosa*, and *Smilax pumila*. This type remains incompletely documented and understood due to relatively recent recognition of the existence of *Acer leucoderme* in eastern Texas. *Viburnum dentatum*, *Viburnum acerifolium*, *Aesculus pavia* var. *pavia*, *Ilex opaca* var. *opaca*, *Asimina triloba*, *Ostrya virginiana*, *Carpinus caroliniana* ssp. *caroliniana*, *Cornus florida*, and *Styrax grandifolius* are also indicative of this type.

Environment: This forest occurs on sandy loams and clays, typically with stratified acidic clays over calcareous parent material. Although the surface layers are often circumneutral, the subsoil is moderately alkaline (pH >7.0). Typical soil series are Hollywood and Vaiden silty clay and Cuthbert and Hornbeck clay. Associated geology includes the Fleming Formation in Louisiana and Weches, Reklaw, Wilcox, Cook Mountain, and Yegua formations in eastern Texas where the forest occurs almost exclusively on steep slopes and protected ravines.

Vegetation: This forest is dominated by a canopy of *Fagus grandifolia* and *Quercus alba*. *Acer barbatum* and/or *Acer leucoderme* are usually present in the subcanopy. Associated species may also include *Fraxinus americana*, *Carya myristiciformis*, *Ulmus americana*, *Ulmus alata*, *Quercus falcata*, *Quercus shumardii*, *Tilia americana* var. *caroliniana*, *Acer rubrum*, *Carya texana*,

Diospyros virginiana, *Quercus michauxii*, *Celtis laevigata*, *Ulmus rubra*, *Carya ovata*, *Gleditsia triacanthos*, *Liquidambar styraciflua*, *Nyssa sylvatica*, *Prunus serotina*, *Morus rubra*, and *Quercus stellata*. The canopy is generally closed and heavily deciduous-dominated. *Phoradendron* spp., *Tillandsia usneoides*, and *Pleopeltis polypodioides* ssp. *polypodioides* may be present on the canopy species. The scattered to patchy shrub stratum includes regenerating canopy species and other species such as *Crataegus marshallii*, *Crataegus spathulata*, *Aesculus pavia*, *Asimina triloba*, *Ostrya virginiana*, *Carpinus caroliniana*, *Cornus florida*, *Cercis canadensis*, *Viburnum dentatum*, *Viburnum acerifolium*, and *Styrax grandifolius*. The sparse herbaceous layer may include species such as *Polystichum acrostichoides*, *Scleria oligantha*, *Solidago auriculata*, *Symphotrichum drummondii* (= *Aster drummondii*), *Helianthus hirsutus*, *Galium circaezans*, *Vicia minutiflora*, *Lithospermum tuberosum*, *Uvularia perfoliata*, *Cynoglossum virginianum*, *Arisaema triphyllum*, *Mitchella repens*, *Pedicularis canadensis*, *Spigelia marilandica*, *Podophyllum peltatum*, *Tragia cordata*, and *Smilax herbacea* (Martin and Smith 1991). The most frequent canopy associates at the *Acer leucoderme* sites described by Bridges and Orzell (1989a) include these additional species: *Carya cordiformis*, *Carya ovata*, and *Carya alba* (= *Carya tomentosa*). They also add understory species such as *Carex amphibola*, *Carex oxylepis*, *Carex retroflexa*, *Carex willdenowii*, *Sanguinaria canadensis*, *Phegopteris hexagonoptera* (= *Thelypteris hexagonoptera*), and *Luzula echinata* to the potential list of associates. A single plot ascribed to this type on the Sabine National Forest completely lacked *Fagus grandifolia* in the overstory and was heavily dominated by *Quercus alba* (NatureServe Ecology unpubl. data).

Dynamics: This association occurs on portions of the landscape where periodic fires were presumably not common, especially mesic steep slopes, and mid to lower slopes along rivers and small streams throughout portions of the West Gulf Coastal Plain which are influenced by high pH substrate. Uncommon to rare windstorms, diseases and insects are the major disturbances in this uneven-aged forest. Regeneration occurs primarily in canopy gaps (Martin and Smith 1991).

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208) -- is the West Gulf Coastal Plain acidic mesic forest equivalent; the two types may occur in close proximity and occasionally may be difficult to distinguish.
- *Pinus taeda* - (*Pinus echinata*) - *Quercus alba* - *Carya alba* / *Acer barbatum* - (*Acer leucoderme*) Forest (CEGL007524) -- may grade into this type upslope; it is often drier and has over 25% of its canopy cover constituted by *Pinus taeda*.
- *Quercus shumardii* - *Fraxinus americana* - *Carya myristiciformis* / *Viburnum dentatum* / *Carex cherokeensis* Forest (CEGL007194) -- is a calcareous forest not dominated by *Fagus grandifolia*; it has a more restricted distribution and is a component of the Keiffer Prairie-forest complex occurring on outcrops of the Cook Mountain geologic formation in Louisiana.

Related Concepts:

- American Beech - White Oak / *Mitchella* Loamy Moist-Mesic Steep Slopes and Ravines (Turner et al. 1999) B
- American Beech-White Oak Series (Diamond 1993) B
- Beech - Magnolia (69) (USFS 1988) ?
- IA8b. Coastal Plain Calcareous Mesic Forest (Allard 1990) B
- IA8e. Beech - Magnolia Forest (Allard 1990) B

Classification Comments: The geographic range of *Acer leucoderme* is much more restricted than that of *Acer barbatum* (Little 1979) and is especially limited in eastern Texas where the species is has been reported from only 5 counties (Bridges and Orzell 1989a). Bridges and Orzell (1989a) first documented the occurrence of *Acer leucoderme* in eastern Texas; omission of this important indicator tree from taxonomic treatments for the region (Correll and Johnston 1970, Nixon 1985) continues to hinder understanding of this community type. Restricting the concept of this type to presence of *Acer leucoderme* would thus create a much rarer type. Excellent characteristic examples can be found at central and northern Sabine National Forest, rarely on the northern Angelina National Forest, and Brushy Heads (western Vernon Parish, Louisiana).

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2001-1-12): This association occurs in a small geographic area and is further limited by the paucity of calcareous / subcalcareous substrate. It has been subjected to many of the same anthropogenic disturbances typically associated with other mesic forests of the West Gulf Coastal Plain. Intact occurrences of this association have now become relatively rare. During the early part of the 20th century, much of the landscape within its range was logged or converted to agricultural cropland. In addition, many of these highly productive sites have been converted to commercial pine plantations, eliminating the original hardwood-dominated community altogether. Once it is removed, this community is not readily restored. Although most remaining examples of this association are difficult to enter with logging or farm machinery (due to occurrence on steep slopes and ravines), threats include increased erosion, windthrow, and microclimate modification caused by intensive silvicultural practices on adjacent uplands, herbicide use, and vegetation damage by feral hogs. A possible long-term threat is that of global climate change. Many species in this association occur at the southwestern limit of their range (McLeod 1975) and require periods of cold-stratification for their seeds to germinate (Nixon et al. 1980). Increased average temperatures may affect the ability of some of these species to germinate and survive (Kutner and Morse 1996).

High-ranked species: *Cypripedium kentuckiense* (G3)

ELEMENT DISTRIBUTION

Range: This association is known from the West Gulf Coastal Plain of Louisiana and Texas, and ranges into the Upper West Gulf Coastal Plain of Texas and possibly Arkansas and Louisiana.

Subnations: AR?, LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 231Eb:CCP, 231Ek:CCP, 232Fa:CCC, 232Fb:CCP, 232Fe:CCC, 234Aa:CCC

Federal Lands: USFS (Angelina, Kisatchie?, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Correll and Johnston 1970, Diamond 1993, Kutner and Morse 1996, Little 1979, Martin and Smith 1991, McLeod 1975, NatureServe Ecology - Southeastern U.S. unpubl. data, Nixon 1985, Nixon et al. 1980a, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988

AMERICAN BEECH - WHITE OAK / AMERICAN HOLLY / SOUTHERN LADY FERN FOREST

ELEMENT IDENTIFIERS

NVC association: *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest

Database Code: CEGLO07208

Formation: Lowland or submontane cold-deciduous forest (I.B.2.N.a)

Alliance: *Fagus grandifolia* - *Quercus alba* Forest Alliance (A.228)

ELEMENT CONCEPT

Summary: This mesic acid forest of the West Gulf Coastal Plain is dominated by *Fagus grandifolia* and *Quercus alba*. It is further typified by the presence of a fairly diverse number of species which indicate high-quality mesic, acidic habitats in the region. The scattered to patchy tall-shrub stratum includes *Ilex opaca* var. *opaca*, *Carpinus caroliniana*, *Ostrya virginiana*, *Cornus florida*, *Styrax grandifolius*, and *Crataegus marshallii*. The sparse herbaceous layer includes *Polystichum acrostichoides*, *Trillium gracile*, *Prenanthes altissima* (uncommon), *Spigelia marilandica* (uncommon), *Galium circaezans*, *Desmodium nudiflorum*, *Uvularia perfoliata*, *Polygonatum biflorum*, *Arisaema triphyllum*, *Viola walteri*, *Mitchella repens*, *Tipularia discolor*, *Lilium michauxii*, *Smilax herbacea* (uncommon-rare), and *Podophyllum peltatum*.

Environment: This forest occurs on acidic soils, typically loamy sands or silt loams including Susquehanna silt loam and Betis and Briley loamy fine sands. Associated geology includes the Sparta, Cockfield, Jackson, Vicksburg, Catahoula, and Fleming formations and Pleistocene High Terraces. Hydrology ranges from dry-mesic to mesic; this community is not subject to flooding. This broad-leaved forest is associated with hilly terrain. The slopes from which this community is known are generally steep, and grade down to riparian forests along streams. It is most common on middle and lower slopes (Martin and Smith 1991).

Vegetation: Stands are dominated by a combination of *Fagus grandifolia* and *Quercus alba* (NatureServe Ecology unpubl. data, Turner et al. unpubl. data). Some stands may have slightly more *Quercus alba* than *Fagus grandifolia* and vice versa (R. Evans pers. obs.). *Pinus taeda* may occur in the canopy but not as a dominant. Although *Fagus grandifolia* and *Quercus alba* may be the only canopy species in some occurrences, canopy species in other occurrences may include *Quercus michauxii*, *Quercus pagoda*, *Quercus velutina*, *Quercus nigra*, *Quercus stellata*, *Carya alba*, *Nyssa sylvatica*, *Liquidambar styraciflua*, and *Acer rubrum*. *Liriodendron tulipifera* may be present in Arkansas and Louisiana examples, but is not a natural component of this type in Texas or Oklahoma. *Magnolia grandiflora* may also be present in examples of this type in Louisiana and Texas, but is absent in Arkansas and Oklahoma. *Phoradendron leucarpum*, *Tillandsia usneoides*, and *Pleopeltis polypodioides* (= *Polypodium polypodioides*) are common epiphytes on the canopy trees. The scattered to patchy tall-shrub stratum includes regenerating canopy species and *Ilex opaca* var. *opaca*, *Carpinus caroliniana*, *Ostrya virginiana*, *Cornus florida*, *Styrax grandifolius*, and *Crataegus marshallii*. The patchy short-shrub stratum includes *Vaccinium virgatum* (= *Vaccinium amoenum*), *Vaccinium arboreum*, *Vaccinium elliottii*, *Ilex opaca* var. *opaca*, *Chionanthus virginicus*, *Crataegus marshallii*, *Frangula caroliniana* (= *Rhamnus caroliniana*), *Amelanchier arborea*, *Callicarpa americana*, *Ilex ambigua*, *Viburnum acerifolium*, *Viburnum dentatum*, and *Viburnum rufidulum*. The sparse herbaceous layer includes *Polystichum acrostichoides*, *Trillium* spp., *Prenanthes altissima*, *Spigelia marilandica*, *Galium circaezans*, *Desmodium nudiflorum*, *Uvularia perfoliata*, *Polygonatum biflorum*, *Arisaema triphyllum*, *Viola walteri*, *Mitchella repens*, *Tipularia discolor*, *Lilium michauxii*, *Smilax herbacea*, and *Podophyllum peltatum*. *Magnolia acuminata* may be present in a few examples of this type, along the eastern and northern periphery of the region associated with especially moist lower slopes.

Dynamics: This association occurs on portions of the landscape where periodic fires were rare to non-existent, especially mesic steep slopes, and mid to lower slopes along rivers and small streams throughout much of the West Gulf Coastal Plain.

The main disturbance vectors in this broad-leaved deciduous forest are windthrow and the active erosion that occurs on the steep slopes. As downstream channelization and gully formation cause streams to erode headward, banks are undercut and erosion is catalyzed on the slopes. This active erosion may contribute to the sparse herbaceous layer. Windstorms, diseases and insects are other disturbances in this uneven-aged forest. Regeneration occurs primarily in canopy gaps (Martin and Smith 1991).

This forest is not a pyrogenic community and experiences very infrequent fires due to its position on generally steep slopes and the lack of available fuel generated by the relatively inflammable deciduous leaf litter. Mesic examples on lower slopes probably burn even less frequently than dry/mesic sites on mid to upper slopes.

Similar Associations:

- *Fagus grandifolia* - *Magnolia grandiflora* - *Quercus alba* / *Carpinus caroliniana* - *Ostrya virginiana* - *Ilex opaca* var. *opaca* Forest (CEGL007872) -- is another acidic, mesic type from the same geographic area.
- *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Small Stream Forest (CEGL007320) -- closely related acid, species composition on small sandy streams of the same region, may spatially co-occur.
- *Fagus grandifolia* - *Quercus alba* / *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest (CEGL007207) -- is the rich mesic forest of the region on more calciphilic substrates. The two types may occur in close proximity and occasionally may be difficult to distinguish.

Related Concepts:

- American Beech - White Oak / *Mitchella* Loamy Moist-Mesic Steep Slopes and Ravines (Turner et al. 1999) B
- American Beech-White Oak Series (Diamond 1993) B
- Beech - Magnolia (69) (USFS 1988) ?
- IA8d. Southern Mixed Hardwood Forest (Allard 1990) B
- IA8e. Beech - Magnolia Forest (Allard 1990) B
- Lower Slope Hardwood Pine Forest (Marks and Harcombe 1981) B
- T1B2a11a. *Fagus grandifolia* - *Ilex opaca* (Foti et al. 1994) ?

Classification Comments: This type may include a number of understory species which become quite rare in the western part of the region, e.g., *Sanguinaria canadensis* and *Uvularia perfoliata* [see Kral 1966, Orzell 1990]. The inclusion of *Magnolia acuminata* in this type is quite interesting given the narrow range of this species in the region. It is apparently rare in the Arkansas portion of the region (Smith 1988) and is not found at all in Texas (Hatch et al. 1990). This type is present at the Beech Creek site in southern Arkansas (T. Foti pers. comm. 2001)

CONSERVATION RANKING & RARE SPECIES

GRank: G3 (1998-12-11): Undisturbed, high-quality occurrences of this association are relatively rare. During the early part of the 20th century, much of the landscape within its range was logged or converted to agricultural cropland. In addition, many of these highly productive sites have been converted to commercial pine plantations, eliminating the original hardwood-dominated community altogether. Once it is removed, this community is not readily restored. Most remaining examples of this association are now limited to steep slopes and ravines which are difficult to enter with logging or farm machinery. Current threats include increased erosion, windthrow, and microclimate modification caused by intensive silvicultural practices on adjacent uplands, herbicide use, and vegetation damage by feral hogs. A possible long-term threat is that of global climate change. Many species in this association occur at the southwestern limit of their range (McLeod 1975) and require periods of cold-stratification for their seeds to germinate (Nixon et al. 1980). Increased average temperatures may affect the ability of some of these species to germinate and survive (Kutner and Morse 1996).

High-ranked species: *Cypripedium kentuckiense* (G3), *Prenanthes barbata* (G3), *Triphora trianthophora* (G3G4)

ELEMENT DISTRIBUTION

Range: This community is known from eastern Texas, western Louisiana, southern Arkansas, and southeastern Oklahoma.

Subnations: AR, LA, OK, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 231Ed:CCC, 231Ej:CCP, 232Fa:CCC, 232Fb:CCP, 232Fe:CCC

Federal Lands: USFS (Angelina, Kisatchie, Ouachita?, Sabine NF, Sam Houston?)

ELEMENT SOURCES

References: Allard 1990, Conant and Collins 1991, Diamond 1993, Evans pers. comm., Foti 1994b, Foti et al. 1994, Foti pers. comm., Hatch et al. 1990, Hoagland 1997, Hoagland 2000, Kral 1966, Kutner and Morse 1996, Marks and Harcombe 1981, Martin and Smith 1991, McLeod 1975, NatureServe Ecology - Southeastern U.S. unpubl. data, Nixon et al. 1980a, Orzell 1990, Smith 1988a, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, USFS 1988, Zanoni et al. 1979

SOUTHERN RED OAK - POST OAK - (LOBLOLLY PINE) WEST GULF COASTAL PLAIN FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus falcata* - *Quercus stellata* - (*Pinus taeda*) West Gulf Coastal Plain Forest

Database Code: CEGL008415

Formation: Lowland or submontane cold-deciduous forest (I.B.2.N.a)

Alliance: *Quercus falcata* Forest Alliance (A.243)

ELEMENT CONCEPT

Summary: This association includes predominately hardwood-dominated, dry to dry-mesic forests of the West Gulf Coastal Plain and Upper West Gulf Coastal Plain. Stands documented in eastern Texas range from strongly dominated by *Quercus falcata* in higher landscape positions to nearly equal ratios of *Quercus falcata* and other hardwood trees, and *Pinus taeda* in lower slope positions. These forests are relatively low in species diversity and have no other particularly diagnostic species. However, sites dominated by *Quercus falcata* in combination with other hardwoods are very rare in the region. As currently defined, this type accommodates a slight range of moisture conditions, and the vegetation is necessarily variable; however, all stands are characterized by *Quercus falcata* as the single most important species.

Environment: This type occurs on the Yegua Formation in eastern Texas on mid to lower slopes and high Pleistocene terraces which do not receive overbank flooding under normal conditions. Soils at documented plot locations were mapped as 84, 88m (Moswell Series?), 85e (Eastwood?), and 52. They tested fairly low in surface pH (5.0-5.9) with sandy loam to loamy surface textures (Turner et al unpubl. data).

Vegetation: All stands are characterized by *Quercus falcata* as the single most important species. Other woody species documented in drier vegetation plots in eastern Texas include *Acer rubrum*, *Pinus echinata*, *Ilex vomitoria*, *Callicarpa americana*, *Viburnum rufidulum*, *Chionanthus virginicus*, *Liquidambar styraciflua*, *Forestiera ligustrina*, *Vaccinium arboreum*, *Carya cordiformis*, *Quercus velutina*, *Cornus florida*, and *Quercus alba*. The understory, as is typical of densely shaded dry to dry-mesic forests of the region, is relatively low in species diversity and dominated by *Chasmanthium sessiliflorum*, *Parthenocissus quinquefolia*, and *Gelsemium sempervirens*. Slightly more mesic plots also have *Ilex opaca*, *Carpinus caroliniana*, *Ostrya virginiana*, *Quercus nigra*, *Quercus phellos*, *Quercus laurifolia*, and *Ulmus* spp.

Dynamics: The landscape in which these sites are found are predominately riparian, suggesting that natural fire frequency may have been quite low.

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest (CEGL007207) -- is subcalcareous and mesic.
- *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208) -- is mesic and acidic.
- *Quercus falcata* - *Quercus stellata* - *Carya alba* / *Vaccinium* spp. Coastal Plain Forest (CEGL007246) -- occurs east of the Mississippi River.

Related Concepts: No information

Classification Comments: This association needs further clarification in other parts of the region, especially Arkansas and Louisiana.

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (2002-9-3): More information is needed to determine the potential occurrence of this forest in Arkansas and Louisiana.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is found west of the Mississippi River in the West Gulf Coastal Plain of Texas, the Upper West Gulf Coastal Plain of Arkansas, and possibly in Louisiana.

Subnations: AR, LA?, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie?, Sabine NF, Sam Houston?)

ELEMENT SOURCES

References: Southeastern Ecology Working Group n.d., Turner et al. unpubl. data

WHITE ASH - SUGARBERRY - BLACKGUM - SHUMARD OAK - AMERICAN ELM FOREST

ELEMENT IDENTIFIERS

NVC association: *Fraxinus americana* - *Celtis laevigata* - *Nyssa sylvatica* - *Quercus shumardii* - *Ulmus americana* Forest

Database Code: CEGL007897

Formation: Lowland or submontane cold-deciduous forest (I.B.2.N.a)

Alliance: *Quercus shumardii* - *Quercus pagoda* Forest Alliance (A.252)

ELEMENT CONCEPT

Summary: This is a generally calcareous forest composed of a variety of mostly calciphilic hardwoods and very limited amounts of *Pinus taeda*. It is found on calcareous clays of various Tertiary formations (e.g., Fleming, Catahoula?, Vicksburg?, Jackson, Cane River, Wilcox) in the uplands of central and northern Louisiana and presumably eastern Texas. Dominant and characteristic canopy species include *Fraxinus americana*, *Celtis laevigata*, *Nyssa sylvatica*, *Liquidambar styraciflua*, *Quercus shumardii*, *Quercus nigra*, *Quercus alba*, *Quercus falcata*, *Quercus stellata*, *Quercus pagoda*, *Ulmus americana*, *Ulmus alata*, *Gleditsia triacanthos*, *Diospyros*

virginiana, *Tilia americana*, *Carya alba*, *Carya glabra*, *Quercus muehlenbergii* (occasional), and *Carya myristiciformis* (rare to occasional). Some dominant and characteristic midstory and understory species include *Ostrya virginiana*, *Carpinus caroliniana*, *Cornus florida*, *Cercis canadensis*, *Cornus drummondii*, *Frangula caroliniana*, *Chionanthus virginicus*, *Viburnum rufidulum*, *Viburnum acerifolium*, *Acer leucoderme*, *Acer barbatum*, *Crataegus* spp. (e.g., *Crataegus spathulata*, *Crataegus crus-galli*), *Ilex decidua*, *Aesculus pavia*, *Asimina triloba*, *Zanthoxylum clava-herculis*, and *Sabal minor*. Prominent vines include *Berchemia scandens*, *Toxicodendron radicans*, *Bignonia capreolata*, *Vitis rotundifolia*, and *Smilax* spp. The herb layer is relatively sparse in most examples but typically includes *Carex cherokeensis*, *Carex* spp., *Chasmanthium laxum*, *Chasmanthium sessiliflorum*, *Viola* spp., *Trillium* spp., *Sanicula canadensis*, and numerous other species. Many species of this community are more typical of the West Gulf Coastal Plain. A similar community with *Cornus drummondii*, *Sideroxylon lanuginosum*, *Diospyros virginiana*, *Fraxinus americana*, and *Quercus muehlenbergii* has been observed on and around Weches glades in eastern Texas. However, *Rhus aromatica*, *Phlox pilosa*, and *Echinacea purpurea* are not present.

Environment: No information

Vegetation: Dominant and characteristic canopy species in stands of this association include *Fraxinus americana*, *Celtis laevigata*, *Nyssa sylvatica*, *Liquidambar styraciflua*, *Quercus shumardii*, *Quercus nigra*, *Quercus alba*, *Quercus falcata*, *Quercus stellata*, *Quercus pagoda*, *Ulmus americana*, *Ulmus alata*, *Gleditsia triacanthos*, *Diospyros virginiana*, *Tilia americana*, *Carya alba*, *Carya glabra*, *Quercus muehlenbergii* (occasional), and *Carya myristiciformis* (rare to occasional). Some dominant and characteristic midstory and understory species include *Ostrya virginiana*, *Carpinus caroliniana*, *Cornus florida*, *Cercis canadensis*, *Cornus drummondii*, *Frangula caroliniana*, *Chionanthus virginicus*, *Viburnum rufidulum*, *Viburnum acerifolium*, *Acer leucoderme*, *Acer barbatum*, *Crataegus* spp. (e.g., *Crataegus spathulata*, *Crataegus crus-galli*), *Ilex decidua*, *Aesculus pavia*, *Asimina triloba*, *Zanthoxylum clava-herculis*, and *Sabal minor*. Prominent vines include *Berchemia scandens*, *Toxicodendron radicans*, *Bignonia capreolata*, *Vitis rotundifolia*, and *Smilax* spp. The herb layer is relatively sparse in most examples but typically includes *Carex cherokeensis*, *Carex* spp., *Chasmanthium laxum*, *Chasmanthium sessiliflorum*, *Viola* spp., *Trillium* spp., *Sanicula canadensis*, and numerous other species. Many species of this community are more typical of the West Gulf Coastal Plain.

Dynamics: No information

Similar Associations:

Related Concepts: No information

Classification Comments: The type is related to those in the Keiffer and Copenhagen areas but is typically not characterized by the diversity of calciphiles present in those areas. An example of this type is "Bear Creek Calcareous Forest," described in Martin and Smith (1991). A similar community with *Cornus drummondii*, *Sideroxylon lanuginosum*, *Diospyros virginiana*, *Fraxinus americana*, and *Quercus muehlenbergii* has been observed on and around Weches glades in eastern Texas. However, *Rhus aromatica*, *Phlox pilosa*, and *Echinacea purpurea* are not present.

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (1999-12-13): This association is only found on mesic calcareous clays that have a restricted distribution in western Louisiana possibly extending into adjacent areas of eastern Texas. It is threatened by logging and conversion to agroforestry uses, and drift and runoff from adjacent agrochemical use. Further inventory is needed to clarify the degree of uncertainty in the rank.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is known from western Louisiana and may occur in eastern Texas.

Subnations: LA, TX?

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231:C, 232:C

Federal Lands: DOD (Barksdale, Bayou Bodcau, Fort Polk); USFS (Kisatchie, Sam Houston?)

ELEMENT SOURCES

References: Martin and Smith 1991, Smith 1996a, Southeastern Ecology Working Group n.d.

WEST GULF COASTAL PLAIN PINE-HARDWOOD FOREST

(SHORTLEAF PINE, LOBLOLLY PINE) / HORSESUGAR - WAX-MYRTLE - MAYBERRY FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus (echinata, taeda) / Symplocos tinctoria - Morella cerifera - Vaccinium elliotii* Forest

Database Code: CEG008410

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b)

Alliance: *Pinus taeda - Pinus echinata* Forest Alliance (A.129)

ELEMENT CONCEPT

Summary: Natural forests occurring in the Coastal Plain west of the Mississippi River dominated by *Pinus echinata* and/or *Pinus taeda*. This forest is known from the West Gulf Coastal Plain of Arkansas, Louisiana, eastern Texas, and southeastern Oklahoma. This type is highly variable in terms of species composition and density due, in part, to occurrence across a wide range of site conditions ranging from dry-mesic to mesic. The canopy cover in stands can range from nearly pure pine of either *Pinus echinata* or *Pinus taeda* singly or in combination to approximately 25% hardwood species. Species composition tends to vary according to soil moisture with *Pinus echinata* attaining greater importance on drier sites, along with *Quercus stellata*, *Quercus falcata*. *Pinus taeda* and hardwoods such as *Nyssa sylvatica*, *Quercus alba*, *Liquidambar styraciflua*, and *Symplocos tinctoria* may be more important on mesic sites. The short-shrub stratum is sparse to patchy and includes canopy seedlings and *Symplocos tinctoria*, *Morella cerifera* (= *Myrica cerifera*), *Vaccinium elliotii*, *Viburnum dentatum*, *Cornus florida*, and *Callicarpa americana*. Vines may be sparse to moderately dense and include *Vitis rotundifolia*, *Gelsemium sempervirens*, *Toxicodendron radicans*, *Parthenocissus quinquefolia*, *Smilax pumila*, and *Smilax rotundifolia*. The herbaceous layer is sparse to moderately dense and includes *Chasmanthium sessiliflorum*, *Carex* spp., *Mitchella repens*, *Eupatorium perfoliatum*, and *Polystichum acrostichoides*. This forest typically occurs on Pleistocene terraces above the current floodplain but not on rugged topography. This community is commonly found on middle and lower slopes between uplands and streambottoms, but also on ridges and upper slopes. Soils are acidic and include silt loams, sandy loams underlain by clay, silty clays and clays. Caddo silt loam is a typical soil series.

Environment: Hydrology ranges from dry-mesic to mesic. This forest typically occurs on Pleistocene terraces above the current floodplain but not on rugged topography. This community is commonly found on middle and lower slopes between uplands and stream bottoms, but also on ridges and upper slopes in areas topographically isolated from fire-prone uplands. Soils are acidic and include silt loams, sandy loams underlain by clay, silty clays and clays. Caddo silt loam is a typical soil series.

Vegetation: The canopy cover in stands can range from nearly pure pine of either *Pinus echinata* or *Pinus taeda* singly or in combination to approximately 25% hardwood species. Species composition tends to vary according to soil moisture with *Pinus echinata* attaining greater importance on drier sites, along with *Quercus stellata*, *Quercus falcata*. *Pinus taeda* and hardwoods such as *Nyssa sylvatica*, *Quercus alba*, *Liquidambar styraciflua*, and *Symplocos tinctoria* may be more important on mesic sites. The short-shrub stratum is sparse to patchy and includes canopy seedlings and *Symplocos tinctoria*, *Morella cerifera* (= *Myrica cerifera*), *Vaccinium elliotii*, *Viburnum dentatum*, *Cornus florida*, and *Callicarpa americana*. Vines may be sparse to moderately dense and include *Vitis rotundifolia*, *Gelsemium sempervirens*, *Toxicodendron radicans*, *Parthenocissus quinquefolia*, *Smilax pumila*, and *Smilax rotundifolia*. The herbaceous layer is sparse to moderately dense and includes *Chasmanthium sessiliflorum*, *Carex* spp., *Mitchella repens*, *Eupatorium perfoliatum*, and *Polystichum acrostichoides*. Other species include *Athyrium filix-femina*, *Phegopteris hexagonoptera*, *Botrychium* spp., *Prenanthes altissima*, *Spigelia marilandica*, *Solidago* spp., *Erigeron pulchellus*, *Epifagus virginiana*, *Viola* spp., *Desmodium nudiflorum*, *Uvularia perfoliata*, *Galium circaezans*, *Polygonatum biflorum*, *Cynoglossum virginianum*, *Sanicula* spp., *Arisaema triphyllum*, *Trillium* spp., *Tipularia discolor*, and *Melica mutica* (Martin and Smith 1993).

Dynamics: One factor influencing the variability in this community is the time since the last natural disturbance. *Pinus taeda* comes in immediately after a natural disturbance event and dominates solely for a period afterwards. Hardwood species are able to colonize with canopy closure, and can quickly capture space and resources with the opening of the *Pinus* canopy due to natural mortality. *Pinus taeda* is seemingly able to re-establish itself in canopy gaps and remain in the community, although its overall cover decreases with time (Martin and Smith 1993, Foti 1995). This community results from natural disturbance, such as wind and ice storms. Some examples of this community, especially drier sites on terraces, may experience periodic, low-intensity ground fires. These sites often contain considerable *Quercus stellata* and *Quercus falcata*, and lack fire-intolerant species like *Fagus grandifolia*, *Ilex opaca*, and *Liquidambar styraciflua*. Insect and pathogen outbreaks are other disturbance events affecting this community (Martin and Smith 1993). This information is from a CCA file (01A09B26.03F).

Similar Associations:

- *Pinus taeda* / *Rhus copallinum* Managed Forest (CEGL007108) -- is a mesic to dry plantation of seedtree/shelterwood-regenerated *Pinus taeda* forest; it is silviculturally managed and site prepped, and generally occurs in larger sized acreages. The ground cover in the plantation forest may differ from that of the natural *Pinus taeda* forest due to the soil disturbance during site preparation.

Related Concepts:

- IA6e. Loblolly Pine - Shortleaf Pine - Oak Forest (Allard 1990) B
- Loblolly Pine (31) (USFS 1988) B
- Loblolly Pine-Oak Series (Diamond 1993) B
- Loblolly Pine: 81 (Eyre 1980) B
- T1A9bII2a. *Pinus taeda* (Foti et al. 1994) ?
- White Oak - Loblolly Pine - *Callicarpa* Mesic Lower Slopes and Terraces (Turner et al. 1999) B

Classification Comments: This type represents the merger of 3 formerly distinct types, former *Pinus echinata* / *Myrica cerifera* - *Symplocos tinctoria* Forest (CEGL007077), former *Pinus taeda* / *Symplocos tinctoria* - *Myrica cerifera* - *Vaccinium elliotii* Forest (CEGL007111), and former *Pinus taeda* - (*Pinus echinata*) / *Chasmanthium sessiliflorum* Natural Successional Forest (CEGL007113), which were found in different alliances. CEGL007077 was in the *Pinus echinata* Forest Alliance (A.119), CEGL007111 was in the *Pinus taeda* Forest Alliance (A.130), and CEGL007113 was in the former *Pinus taeda* - *Pinus echinata* - (*Juniperus virginiana*) Forest Alliance (Weakley et al. 1998, September edition). Shrub nominals of the former CEGL007111 were restored to this type. CEGL007077 was in the *Pinus echinata* Forest Alliance (A.119), CEGL007111 was in the *Pinus taeda* Forest

Alliance (A.130), and CEG007113 was in the former *Pinus taeda* - *Pinus echinata* - (*Juniperus virginiana*) Forest Alliance (Weakley et al. 1998, September edition). Shrub nominals of the former CEG007111 were restored to this type.

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (2000-12-18): This natural forest (or occasionally woodland) occurs on the Upper West Gulf Coastal Plain and was recorded historically from the region. It is believed this broadly variable type develops after disturbances such as blowdowns, ice storms, insect or disease infestations. Such occurrences are generally small (up to a few hectares) and patchy, but it may occur over larger areas. Anthropogenic examples may also develop as a result of abandonment of agricultural land or industrial forest activities. These anthropogenic examples may be difficult to distinguish from more natural ones.

High-ranked species: *Cypripedium kentuckiense* (G3), *Prenanthes barbata* (G3)

ELEMENT DISTRIBUTION

Range: This forest is known from the West Gulf Coastal Plain of Arkansas, Louisiana, eastern Texas, and southeastern Oklahoma (Martin and Smith 1993).

Subnations: AR, LA, OK, TX

TNC Ecoregions: 40:C, 41:P

USFS Ecoregions: 231E:CC

Federal Lands: USFS (Angelina?, Davy Crockett?, Kisatchie, Sabine NF?, Sam Houston?)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Eyre 1980, Foti 1994b, Foti et al. 1994, Foti pers. comm., Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988

LOBLOLLY PINE - (SHORTLEAF PINE) - SOUTHERN RED OAK - BLACK HICKORY / FARKLEBERRY FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - (*Pinus echinata*) - *Quercus falcata* - *Carya texana* / *Vaccinium arboreum* Forest

Database Code: CEG007528

Formation: Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a)

Alliance: *Pinus taeda* - *Quercus* (*alba*, *falcata*, *stellata*) Forest Alliance (A.404)

ELEMENT CONCEPT

Summary: This dry-mesic to dry mixed *Pinus taeda*-hardwood forest is found in the West Gulf Coastal Plain and Upper West Gulf Coastal Plain. The overstory is collectively dominated by hardwoods, although *Pinus taeda* may be the single most important and largest diameter species in most examples. The canopy tends to be closed with individual pine stems somewhat emergent over existing hardwoods. The single most important and diagnostic hardwood is *Quercus falcata*, although other species may also be important. Species associated with mesic conditions in the region are typically lacking or present in very low levels of abundance only, as are species typical of much drier environments of the region.

Environment: Plot locations ascribed to this type in eastern Texas are found on the Yegua and Willis geological formations, mapped as Huntsburg and Gunter soils. These locations have predominately sandy surface textures with surface pH ranges from 5.4-5.9 (Turner et al. unpubl. data). This forest is known from the West Gulf Coastal Plain of Louisiana and Texas, and likely ranges into the Coastal Plain of Arkansas.

Hydrology ranges from dry-mesic to dry. Soils are acidic and include silt loams, sandy loams, and silty clays. This forest occurs on upper slopes and ridges, particularly on low Pleistocene terraces, often on Cadeville very fine sandy loam and Glenmora silt loam. Cadeville soils are moderately well-drained, very slowly permeable fine, mixed thermic Albaquic Hapludalfs occurring on side slopes and ridgetops in terrace uplands; slopes range from 2-12%. Glenmora soils are moderately well-drained, slowly permeable fine-silty, siliceous, thermic Glossaquic Paleudalf with slopes ranging from 1-3%, occurring on broad ridgetops and gentle side slopes in terrace uplands. Cadeville and Glenmora soils are typically found near each other (Kilpatrick et al. 1986, Martin and Smith 1991, 1993).

Vegetation: The overstory of stands of this type may contain *Pinus echinata*. *Liquidambar styraciflua* and *Quercus falcata* are constant components. Other associated hardwoods include *Quercus stellata*, *Quercus nigra*, *Quercus marilandica*, *Carya alba*, and *Carya texana*. *Quercus alba* and *Quercus velutina* are uncommon in Texas examples. The subcanopy is sometimes dominated by *Cornus florida*, although regenerating *Pinus taeda* may be locally dominant as well. The patchy short-shrub stratum includes canopy and subcanopy species, plus *Vaccinium arboreum*, *Chionanthus virginicus*, *Sassafras albidum*, *Callicarpa americana*, *Vaccinium stamineum*, and *Rhus aromatica*. The herbaceous layer is typically sparse. Species include *Chasmanthium sessiliflorum*, *Scleria triglomerata*, *Melica mutica*, and *Scutellaria elliptica*. *Quercus alba* is rare. The midstory includes *Callicarpa americana*, *Ulmus alata*, *Ilex vomitoria*, *Forestiera ligustrina*, *Chionanthus virginicus*, *Cornus florida*, *Sassafras albidum*, and *Nyssa sylvatica*. The most frequent understory may include *Parthenocissus quinquefolia*, *Smilax glauca*, *Dichantheium commutatum*, *Chasmanthium sessiliflorum*, *Toxicodendron radicans*, *Smilax tamnoides* (= *Smilax hispida*), *Galium uniflorum*, *Viburnum dentatum*, *Elephantopus*

tomentosus, *Phryma leptostachya*, *Vitis rotundifolia*, *Sanicula canadensis*, *Morus rubra*, *Vitis aestivalis*, *Dichantherium laxiflorum*, *Carex albicans* var. *australis* (= *Carex physorhyncha*), *Gelsemium sempervirens*, and *Smilax rotundifolia*.

Dynamics: This community is protected from the frequent fires of the typically adjacent *Pinus palustris* communities, but does experience enough smoldering ground fires in drought years to exclude fire-sensitive species like *Fagus grandifolia*, *Magnolia grandiflora*, and *Ilex opaca*. Insect and pathogen outbreaks are other disturbance vectors in this community (Martin and Smith 1991, 1993).

This community is a natural unmanaged type or follows seedtree or shelterwood regeneration. *Pinus taeda* is a rather short-lived species (80-130 years), so in the absence of disturbance this community may be seral to a *Quercus*-dominated forest. However, the actual length of this disturbance-free period may be unrealistically long, as *Pinus taeda* is a fast colonizer and natural mortality in the canopy may be frequent enough to allow this species to persist via regeneration in canopy gaps.

Similar Associations:

- *Pinus taeda* - *Liquidambar styraciflua* Semi-natural Forest (CEGL008462) -- is an early successional, mesic to dry mixed forest; it type is usually silviculturally managed and site prepped, and contains less diverse herbaceous and canopy strata due to the soil disturbance during site preparation and the ongoing silvicultural disturbance.
- *Pinus taeda* - *Quercus alba* - (*Fagus grandifolia*) / *Ilex opaca* / *Smilax pumila* - *Mitchella repens* Forest (CEGL007525) -- is more mesic, occurring on mid to lower slopes and is more topographically isolated from fire; it burns less frequently, thus having much more *Fagus grandifolia* and *Ilex opaca*, and less *Quercus falcata* and *Quercus stellata*.

Related Concepts:

- IA6e. Loblolly Pine - Shortleaf Pine - Oak Forest (Allard 1990) B
- Loblolly Pine - Hardwood (13) (USFS 1988) ?
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Loblolly Pine-Oak Series (Diamond 1993) B
- T1B3aIII5b. *Pinus taeda*-*Quercus* (*phellos*, *nigra*, *stellata*) (Foti et al. 1994) B

Classification Comments: This community is a natural unmanaged type; it commonly occurs downslope of upland *Pinus palustris*-dominated woodlands, and mixed *Pinus echinata* - *Quercus* forests. It often grades down to *Pinus taeda* - *Quercus alba* - (*Fagus grandifolia*) / *Ilex opaca* / *Smilax pumila* - *Mitchella repens* Forest (CEGL007525), which is more mesic, occurring on mid to lower slopes and is more topographically isolated from fire. This latter type burns less frequently, thus having much more *Fagus grandifolia* and *Ilex opaca*, and less *Quercus falcata* and *Quercus stellata*.

CONSERVATION RANKING & RARE SPECIES

GRank: G4 (1999-2-2): No information

High-ranked species: *Cypripedium kentuckiense* (G3), *Prenanthes barbata* (G3)

ELEMENT DISTRIBUTION

Range: This type is known from west of the Mississippi River of eastern Texas and western Louisiana, and may be present in Arkansas and southeastern Oklahoma.

Subnations: AR?, LA, OK?, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Dickson et al. 1993, Eyre 1980, Foti 1994b, Foti et al. 1994, Hatchell 1964, Kilpatrick et al. 1986, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Smith 1995b, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, USFS 1988

LOBLOLLY PINE - (SHORTLEAF PINE) - WHITE OAK - MOCKERNUT HICKORY / SOUTHERN SUGAR MAPLE - (CHALK MAPLE) FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - (*Pinus echinata*) - *Quercus alba* - *Carya alba* / *Acer barbatum* - (*Acer leucoderme*) Forest

Database Code: CEGL007524

Formation: Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a)

Alliance: *Pinus taeda* - *Quercus* (*alba*, *falcata*, *stellata*) Forest Alliance (A.404)

ELEMENT CONCEPT

Summary: This mixed forest of the West Gulf Coastal Plain occurs in a fairly narrow geographic zone on both sides of the Sabine River where it is confined to rich, mesic, calcareous slopes and stream bottoms. The canopy of this forest is dominated by both *Pinus taeda* and mixed hardwoods; these include *Quercus alba*, *Fraxinus americana*, *Carya alba*, *Quercus shumardii*, *Carya texana*, and sometimes some *Fagus grandifolia*. The tall-shrub stratum is patchy and includes canopy saplings and *Ilex opaca*, *Ilex longipes*, *Ilex*

vomitorea, *Acer leucoderme*, *Acer barbatum*, *Crataegus marshallii*, *Crataegus spathulata*, *Ostrya virginiana*, *Carpinus caroliniana*, and *Styrax grandifolius*. The patchy short-shrub stratum includes seedlings of canopy and tall-shrub species, plus *Viburnum dentatum* and *Viburnum acerifolium*. The herbaceous stratum is typically sparse but includes spring ephemerals and species dependent on mesic conditions. This type may have been most common in a vegetation matrix dominated by shortleaf pine, although examples also occur within longleaf pine-dominated landscapes.

Environment: This is a mixed forest of the West Gulf Coastal Plain which occurs in a fairly narrow geographic area on both sides of the Sabine River. It is confined to rich, mesic, calcareous mid to lower slopes, frequently grading down to deciduous slope and riparian forests where it grades into *Fagus grandifolia* - *Quercus alba* / *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest (CEGL007207). It is known from the extreme eastern portion of Texas along the West Gulf / Upper West Gulf Coastal Plain transition.

Hydrology ranges from mesic-wet to dry-mesic. Soils are calcareous and include silt loams, silty clay loams, and silty clay loams that range from calcareous to circumneutral at the surface (pH >7) and are moderately alkaline at the subsurface. Typical soils include Hollywood and Vaiden, although soils series are often mapped as Susquehanna silt loam (a predominantly clayey soil), Anacoco very fine sandy loam, and Ruston fine sandy loam. This calcareous community occurs on the Jackson and Cook Mountain geologic formations. This forest is known particularly from mid to lower mesic slopes, frequently grading down to deciduous slope and riparian forests (Martin et al. 1990, Martin and Smith 1991, 1993).

Vegetation: The canopy of this forest is dominated by both *Pinus taeda* and mixed hardwoods; these include *Quercus alba*, *Fraxinus americana*, *Carya alba*, *Quercus shumardii*, *Carya texana*, and sometimes some *Fagus grandifolia*. The tall-shrub stratum is patchy and includes canopy saplings and *Ilex opaca*, *Ilex longipes*, *Ilex vomitoria*, *Acer leucoderme*, *Acer barbatum*, *Crataegus marshallii*, *Crataegus spathulata*, *Ostrya virginiana*, *Carpinus caroliniana*, and *Styrax grandifolius*. The patchy short-shrub stratum includes seedlings of canopy and tall-shrub species, plus *Viburnum dentatum* and *Viburnum acerifolium*, and one example in eastern Texas is dominated by *Asimina triloba* (Turner et al. unpubl. data). The herbaceous stratum is typically sparse but includes spring ephemerals and species dependent on mesic conditions; these include *Polystichum acrostichoides*, *Mitchella repens*, *Solidago auriculata*, *Arisaema triphyllum*, *Helianthus hirsutus*, *Sanicula canadensis* var. *canadensis* (= *Sanicula canadensis* var. *floridana*), *Symphotrichum drummondii* (= *Aster drummondii*), *Tipularia discolor*, *Spigelia marilandica*, *Scleria oligantha*, and *Dichantherium boscii*. The presence of *Acer leucoderme* greatly narrows the potential range of this type, especially into Texas.

Dynamics: This is a topographically isolated community that rarely burns. It typically contains a few to an abundant number of fire-sensitive species such as *Fagus grandifolia* and *Ilex opaca*. However, historical fire regimes coincident with intact upland pine systems, and more extreme drought conditions, were likely to have subjected these areas to more fire influence than seen on the modern landscape. Insect and pathogen outbreaks are likely more important disturbance vectors in this community, and are clearly so today. In the absence of fire, this type would have certainly been replaced by *Fagus grandifolia* - *Quercus alba* - *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest (CEGL007207). This successional replacement could also have been fostered by outbreaks of southern pine beetle or other disturbances which select pine over hardwoods (such as intense windstorms prior to hardwood leaf out). Once CEGL007207 becomes established on a site, it would take a series of fairly extreme disturbances to move the type back toward pine, but small patches of mineral soil may be sufficient to perpetuate the pine component. It is unclear whether or not both types still occupy the approximate relative historical extent on the landscape. However, given the infrequency of fire on the landscape today and the poor condition of most pine-dominated uplands, it is possible that the hardwood type (CEGL007207) has actually moved upslope eventually replacing the pine habitat of this type (CEGL007524). Since this type is topographically isolated and rarely burns under current forest management prescriptions, it is difficult to envision the process by which pines are perpetuated in the canopy of this community. However, historical fire regimes coincident with intact upland pine systems, and more extreme drought conditions, were likely to have subjected these areas to more fire influence than seen on the modern landscape. Most existing examples seem to lack consistent pine regeneration, which may suggest that periodic, infrequent pulses of seedling recruitment occur (linked to rare and localized conditions which create patches of mineral soil). Given the relatively long lifespan of the pine species, such conditions need only arise on the order of once per century.

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest (CEGL007207) -- is a lower slope, more mesic type, often spatially co-occurring.
- *Pinus taeda* - *Quercus alba* - (*Fagus grandifolia*) / *Ilex opaca* / *Smilax pumila* - *Mitchella repens* Forest (CEGL007525) -- occurs in similar mesic topographic settings, but on more acidic soils without the calciphilic species (*Fraxinus americana*, *Cercis canadensis*, *Acer leucoderme*, and *Crataegus* spp.).

Related Concepts:

- IA6e. Loblolly Pine - Shortleaf Pine - Oak Forest (Allard 1990) B
- Loblolly Pine - Hardwood (13) (USFS 1988) B
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Loblolly Pine-Oak Series (Diamond 1993) B
- White Oak - Loblolly Pine/*Callicarpa* Loamy Mesic Lower Slopes and Terraces (Turner et al. 1999) B

Classification Comments: This community is very uncommon due to the shortage of suitable calcareous substrate in its range (West Gulf Coastal Plain). It has been suggested that this may be an old-field phase of succession on former beech-oak-dominated mesic sites; *Fagus* does not readily reestablish once it is removed (R. Turner pers. comm.).

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2000-7-14): This type has a very narrow geographic range, and is further limited both topographically and edaphically. This type as described should be at least equally ranked with *Fagus grandifolia* - *Quercus alba* / *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest (CEGL007207) (G3). Arguably this type should be ranked even higher since the pine-dominated forests are under more management pressure. Further, this type receives much less conservation attention than the beech-dominated type. Clearly there are places on the landscape in which successional pine has replaced CEGL007207, but the existence of such a semi-natural type should not be confused with this rare, natural transitional habitat. Given the regionwide decline in upland pine (both shortleaf and longleaf) systems, the overall reduction in fire frequency, and the fairly routine disturbance to pine-dominated slopes, this type is under great threat.

High-ranked species: *Cypripedium kentuckiense* (G3)

ELEMENT DISTRIBUTION

Range: This is a mixed forest of the West Gulf Coastal Plain in Louisiana and Texas, possibly ranging north into Arkansas and Oklahoma. It is known from the extreme eastern portion of Texas along the West Gulf / Upper West Gulf Coastal Plain transition.

Subnations: AR?, LA, OK, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 232Fa:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Dickson et al. 1993, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Smith 1988a, Smith 1996a, Smith et al. 1989, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, USFS 1988

LOBLOLLY PINE - SHORTLEAF PINE / LONGLEAF SPIKEGRASS FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - *Pinus echinata* / *Chasmanthium sessiliflorum* Forest

Database Code: CEGL007115

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b)

Alliance: *Pinus taeda* - *Pinus echinata* Forest Alliance (A.129)

ELEMENT CONCEPT

Summary: This mixed pine forest found in the upper Coastal Plain west of the Mississippi River is codominated by *Pinus echinata* and *Pinus taeda*. These forested communities naturally occur in limited areas of the region, typically on dry uplands but occasionally on more mesic sites. Hardwoods rarely enter the canopy of stands although occasional individuals may be present. Shrub composition and density are variable depending upon management regimes and moisture conditions. Stands with dense shrub layers tend to have sparse or patchy herbaceous layers, but some highly managed older stands (which have been thinned and frequently burned) can have a fairly abundant ground cover. *Chasmanthium sessiliflorum* is a typical ground layer dominant or codominant. This community occurs on a range of soil types, including clay loams, sandy loams underlain by clay, and even some deeper sands.

Environment: This community is typically dry to xeric, but occasionally may occur on more mesic sites. This community occurs on a range of soil types, including clay loams, sandy loams underlain by clay, and deeper sands. Soil series include Betis, Briley, Ruston and Smithdale. Under natural conditions these sites would likely support mixed *Pinus echinata* / *Pinus taeda* - *Quercus* spp. woodlands or *Pinus palustris* woodlands, depending on the site conditions. This community is most common on the outer to middle West Gulf Coastal Plain.

Vegetation: This community is a typically dry to xeric, but occasionally mesic mature *Pinus taeda* plantation or seed tree/shelterwood-regenerated type of the West Gulf Coastal Plain with ingrowing *Pinus echinata*. Canopy cover ranges from 60-100%. Shrubs (2-5 m tall) vary in composition and density with management regimes and moisture conditions, but are typically patchy to dense. Dominant shrub species include *Vaccinium arboreum*, *Ilex vomitoria*, *Chionanthus virginicus*, *Cornus florida*, *Vaccinium stamineum*, *Rhus copallinum*, and *Morella cerifera* (= *Myrica cerifera*). In denser stands (including unburned/unthinned younger stands) the canopy cover may be too great for a well-developed herbaceous layer dominated by graminoids, but older plantations (over 40 years) are often thinned more frequently and can have a fairly abundant ground cover. *Chasmanthium sessiliflorum* is a typical ground layer dominant or codominant. Other species encountered in an open, herbaceous-dominated plot in eastern Texas included *Croton capitatus*, *Galactia regularis*, *Dichondra carolinensis*, *Dichantheium* sp., *Rhynchosia latifolia*, *Liatris elegans*, and a fairly large list of other taxa (NatureServe Ecology unpubl. data).

Dynamics: The origin of mixed *Pinus taeda* and *Pinus echinata* vegetation is not known. This association was originally conceived as a semi-natural type, created through management. In most of the region, *Pinus taeda* was not historically present on uplands

(Martin and Smith 1993, Evans 1997), suggesting that such a type may represent an anthropogenic artifact. However, mature examples of this vegetation are extant and can be reliably shown to have not been planted. There is also some evidence documenting such stands on the historical landscape in limited areas (Evans unpubl. data). It is possible that early land clearing removed original forest cover, allowing *Pinus taeda* to become important. In this scenario, these sites would likely have supported mixed *Pinus echinata* / *Quercus* spp. woodlands. Within the range of *Pinus palustris* this type is not known to have occurred naturally. Layer may be abundant and somewhat diverse, and on-site *Pinus echinata* is codominant with off-site *Pinus taeda*. Shrubs may vary in composition and density with management regimes and moisture conditions. In denser stands (including unburned/unthinned younger stands) the herbaceous layer is sparse, but older plantations (greater than 40 years) are often thinned more frequently and can have a fairly abundant ground cover. Under natural conditions these sites would likely support mixed *Pinus echinata* / *Pinus taeda* - *Quercus* spp. woodlands or *Pinus palustris* woodlands, depending on the site conditions.

Similar Associations:

- *Pinus (echinata, taeda)* / *Symplocos tinctoria* - *Morella cerifera* - *Vaccinium elliotii* Forest (CEGL008410)

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B

Classification Comments: This association needs to be better distinguished from *Pinus (echinata, taeda)* / *Symplocos tinctoria* - *Morella cerifera* - *Vaccinium elliotii* Forest (CEGL008410), or merged.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2002-5-15): This forest, dominated by native species, represents successional or altered vegetation and is thus not of conservation concern. Rank changed from GD (ruderal) to GM (modified).

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This mixed pine forest is found in the upper Coastal Plain west of the Mississippi River.

Subnations: AR, LA, OK, TX

TNC Ecoregions: 40:C

USFS Ecoregions: 231Eb:CC?, 231Ef:CCC, 231Em:CC?

Federal Lands: USFS (Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Blair and Hubbell 1938, Duck and Fletcher 1945, Evans pers. comm., Eyre 1980, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

LOBLOLLY PINE - WHITE OAK - AMERICAN BEECH / AMERICAN HOLLY / SARSAPARILLA-VINE - PARTRIDGEBERRY FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - *Quercus alba* - (*Fagus grandifolia*) / *Ilex opaca* / *Smilax pumila* - *Mitchella repens* Forest

Database Code: CEGL007525

Formation: Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a)

Alliance: *Pinus taeda* - *Quercus (alba, falcata, stellata)* Forest Alliance (A.404)

ELEMENT CONCEPT

Summary: This acidic, mesic mixed forest of the West Gulf Coastal Plain may best be described as hardwood - loblolly forest. Taken together, hardwoods are more abundant and important than are pines, however, *Pinus taeda* may be the single most dominant species in the overstory with individual trees attaining large diameters and height. The core concept of this type are stands with a significant component of mesic site species in all strata, although somewhat slightly drier forms may be included as long as *Quercus alba* is important in the overstory. This type occurs in a variety of ecological settings in the region, including middle and lower slopes between uplands and stream bottoms and at the heads of drainages along small, intermittent streams on acid sandy loams, silt loams and silty clays, and mesic situations in flatwoods environments.

Environment: This type occurs in a variety of ecological settings in the region, including middle and lower slopes between uplands and stream bottoms and at the heads of drainages along small, intermittent streams on acid sandy loams, silt loams and silty clays, and mesic situations in flatwoods environments. Hydrology ranges from mesic-wet to dry-mesic. Soils are acidic and include silt loams, sandy loams, and silty clays. This forest occurs on mesic flats and middle and lower slopes between uplands and stream bottoms, often on Caddo and Glenmora silt loams. It is also known from along small streams on Caddo-Guyton silt loams. Caddo soils are poorly drained, slowly permeable fine-silty, siliceous, thermic Typic Glossaqualfs occurring on broad flats in the terrace uplands, with slopes less than 1%. Glenmora soils are moderately well-drained, slowly permeably fine-silty, siliceous, thermic Glossaquic Paleudalf with slopes ranging from 1-3%, occurring on broad ridgetops and gentle side slopes in terrace uplands. Guyton soils are poorly drained, slowly permeable soils formed in loamy alluvium. They are fine-silty, siliceous, thermic Typic Glossaqualfs with slopes less

than 1% occurring in broad flats and depressions, and along streams. Caddo, Glenmora, and Guyton soils are typically found near each other (Kilpatrick et al. 1986, Martin and Smith 1991, 1993).

Vegetation: This mixed forest is dominated by both *Pinus taeda* and mixed hardwoods. Associated hardwoods may include *Quercus alba*, *Quercus nigra*, *Quercus laurifolia*, *Quercus phellos*, *Nyssa sylvatica*, *Liquidambar styraciflua*, *Fagus grandifolia*, *Magnolia grandiflora* (diminishes greatly north of central Louisiana), *Quercus michauxii*, *Quercus pagoda*, *Acer rubrum*, *Carya alba*, *Carya cordiformis*, and less commonly *Quercus falcata*, *Quercus stellata*, and *Carya texana*. The subcanopy may include canopy species and *Ilex opaca* var. *opaca*, *Ostrya virginiana*, *Carpinus caroliniana*, *Prunus mexicana*, and *Cornus florida*. The short-shrub stratum may include canopy and subcanopy species, plus *Callicarpa americana*, *Symplocos tinctoria*, *Morella cerifera* (= *Myrica cerifera*), *Vaccinium elliotii*, *Viburnum dentatum*, and *Viburnum acerifolium*. Herbaceous species may include *Polystichum acrostichoides*, *Athyrium filix-femina* ssp. *asplenioides*, *Phegopteris hexagonoptera*, *Spigelia marilandica*, *Mitchella repens*, *Podophyllum peltatum*, *Phlox divaricata*, *Tipularia discolor*, *Arisaema triphyllum*, *Chasmanthium laxum*, and *Melica mutica* (NatureServe Ecology unpubl. data, Turner et al. unpubl. data).

Dynamics: The influence and historical importance of fire on this type are unknown. It occurs in areas where fire-return intervals were likely quite low and may have only burned when they occurred in proximity to pyrogenic communities (Martin and Smith 1993). Landers (1989) proposed that *Pinus taeda* habitats did not burn at all. In many areas where this vegetation is found in eastern Texas, there is no adjacent pyrogenic vegetation, suggesting that these area may not have burned regularly, if at all, although attempts are made to use prescribed fire in these areas at least once every 10 years (R. Evans pers. obs.).

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208) -- occurs downslope, on richer hardwood-dominated sites.
- *Pinus palustris* / *Quercus (laevis, myrtifolia)* / *Aristida beyrichiana* - *Chapmannia floridana* Woodland (CEGL008569) -- shortleaf-dominated.
- *Pinus taeda* - (*Pinus echinata*) - *Quercus falcata* - *Carya texana* / *Vaccinium arboreum* Forest (CEGL007528) -- may spatially co-occur; often found upslope or in somewhat drier areas.

Related Concepts:

- IA6e. Loblolly Pine - Shortleaf Pine - Oak Forest (Allard 1990) B
- Loblolly Pine - Hardwood (13) (USFS 1988) B
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Loblolly Pine-Oak Series (Diamond 1993) B
- Lower Slope Hardwood Forest (Marks and Harcombe 1981) B
- T1B3aII5b. *Pinus taeda-Quercus (phellos, nigra, stellata)* (Foti et al. 1994) B
- White Oak - Loblolly Pine / *Callicarpa* Loamy Mesic Lower Slopes and Terraces (Turner et al. 1999) B

Classification Comments: The most floristically rich examples occur up slope of mesic ravines in the region. Flatwoods examples and those in related environments lack many of the vernal species which may occasionally be present in this type. With additional work and data these depauperate, presumably drier examples may merit recognition at a later date (R. Evans pers. obs. 2002). Additionally, there may be a slightly subcalcareous subtype along the southwestern periphery of the Upper West Gulf Coastal Plain (see plots SAMH.4, SAMH.2) (NatureServe unpubl. data).

CONSERVATION RANKING & RARE SPECIES

GRank: G3G4 (2001-5-22): This type is heavily altered throughout its natural range by human land-use practices.

High-ranked species: *Cypripedium kentuckiense* (G3), *Prenanthes barbata* (G3)

ELEMENT DISTRIBUTION

Range: This association is known from Louisiana and Texas and likely ranges into Arkansas and Oklahoma.

Subnations: AR, LA, OK?, TX

TNC Ecoregions: 31:C, 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 231Fa:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Dickson et al. 1993, Evans pers. comm., Eyre 1980, Foti et al. 1994, Harcombe and Neville 1977, Hatchell 1964, Kilpatrick et al. 1986, Landers 1989, Marks and Harcombe 1981, Martin and Smith 1991, Martin and Smith 1993, NatureServe Ecology - Southeastern U.S. unpubl. data, Smith 1995b, Smith 1996a, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, USFS 1988

SHORTLEAF PINE - LOBLOLLY PINE - (WHITE OAK, SOUTHERN RED OAK, POST OAK) FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus echinata* - *Pinus taeda* - *Quercus (alba, falcata, stellata)* Forest

Database Code: CEGL004713

Formation: Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a)

Alliance: *Pinus echinata* - *Quercus* (*alba*, *falcata*, *stellata*, *velutina*) Forest Alliance (A.394)

ELEMENT CONCEPT

Summary: This forest association of the West Gulf and Upper West Gulf ecoregions is codominated by *Pinus echinata* and *Pinus taeda* with some combination of the nominal oaks, *Quercus alba*, *Quercus falcata*, and *Quercus stellata*. Stands assigned to this type should have near-equal proportions of at least two of the nominal oak species; stands which are more obviously dominated by a single species are covered by other associations. These are apparently natural forests that may occur both within and beyond the range of *Pinus palustris*. They tend to occur on slopes and in non-riverine flatwoods environments. They generally occupy sites of intermediate moisture status somewhat drier than typical *Pinus taeda* communities, and somewhat more mesic than typical *Pinus echinata* or *Pinus palustris* communities.

Environment: These forests may occur both within and beyond the range of *Pinus palustris*. They tend to occur on slopes and in non-riverine flatwoods environments. They generally occupy sites of intermediate moisture status somewhat drier than typical *Pinus taeda* communities, and somewhat more mesic than typical *Pinus echinata* or *Pinus palustris* communities.

Vegetation: Stands in eastern Texas are codominated by *Pinus echinata* and *Pinus taeda* with some combination of the nominal oaks, *Quercus alba*, *Quercus falcata*, and *Quercus stellata*. Associated woody species may include *Carya alba*, *Carya texana* (within its range), *Vaccinium* spp., *Viburnum dentatum*, and *Callicarpa americana* (NatureServe Ecology unpubl. data, Turner et al. unpubl. data).

Dynamics: Apparently natural upland mixed stands with this composition did occur in the region where they were historically uncommon (R. Evans pers. comm., T. Foti pers. comm.). The overstory composition of stands attributed to this type suggest a fire-return interval of lower frequency than that associated with either longleaf or shortleaf pine forests. Many of the historical stands of this type have been converted to plantations or have been heavily fire-suppressed, resulting in succession to other types. Published references to loblolly - shortleaf mixed forest of the Coastal Plain of Arkansas (Cain and Shelton 1994) and eastern Texas (Halls and Homesley 1966) are from successional, fire-suppressed stands. In some cases, it may be hard to distinguish semi-natural mixed stands which have resulted from encroachment of loblolly pine into formerly pure shortleaf pine stands from naturally mixed stands.

Similar Associations:

- *Pinus echinata* - *Pinus taeda* - *Quercus* (*alba*, *stellata*) - *Carya alba* / *Oxydendrum arboreum* Forest (CEGL008493) -- of the East Gulf Coastal Plain.

Related Concepts: No information

Classification Comments: As originally described this association included successional forests of the Ouachita Mountains (D. Zollner pers. comm.), as well as stands in the East Gulf Coastal Plain. The Ouachita and EGCP portions of the range are now accommodated by other associations.

REE 2001-01-11: It is not clear whether the intention of this association was to represent semi-natural types or something presumably more natural.

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2002-10-22): This forest remains poorly understood and poorly documented, possibly because it has included a number of different concepts from different geographic areas since its conception. As it is currently understood, this type is believed to represent natural mixed stands which were historically uncommon in the West Gulf regions (R. Evans pers. comm., T. Foti pers. comm.). For unknown reasons the overstory supports mixtures of *Pinus echinata*, *Pinus taeda*, and several oak species; such stands appear to be less common than similar stands dominated by either pine species. It is believed that the range of this type in the East Gulf Coastal Plain will be clarified and eventually accommodated elsewhere. At such a time, the rank may be further revised, likely on the rarer end of the scale.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association occurs west of the Mississippi River in the West Gulf and Upper West Gulf coastal plains.

Subnations: AR, LA, OK?, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 232Fa:CC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Kisatchie?, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Cain and Shelton 1994, Evans pers. comm., Foti pers. comm., Halls and Homesley 1966, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Turner et al. unpubl. data, Zollner pers. comm.

SHORTLEAF PINE - LOBLOLLY PINE - POST OAK - BLACK HICKORY / FARKLEBERRY WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus echinata* - *Pinus taeda* - *Quercus stellata* - *Carya texana* / *Vaccinium arboreum* Woodland

Database Code: C EGL007499

Formation: Mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.N.a)

Alliance: *Pinus (echinata, taeda) - Quercus (stellata, marilandica, falcata)* Woodland Alliance (A.2011)

ELEMENT CONCEPT

Summary: This West Gulf Coastal Plain association is dominated by *Pinus echinata* and *Pinus taeda* and is further characterized by a significant component of *Quercus stellata* in the overstory. It may be found on ridgetops and sideslopes 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 *Vaccinium arboreum*, *Callicarpa americana*, *Sassafras albidum*, *Cornus florida*, *Rhus aromatica*, *Rhus copallinum*, *Malus angustifolia*, *Crataegus marshallii*, *Crataegus spathulata*, *Ilex vomitoria*, *Viburnum rufidulum*, *Sideroxylon lanuginosum ssp. lanuginosum*, *Ilex longipes*, *Prunus mexicana*, *Chionanthus virginicus*, *Morus rubra*, and seedlings of canopy species. 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 [see *Pinus echinata - Quercus stellata - Quercus falcata - Carya texana* Woodland (CEGL007800)], but due to fire suppression, current examples have a forest structure.

Environment: This dry-xeric forest occurs on ridgetops and upper slopes on thin usually acidic sandy, clayey, and sandy clay soils. It also occurs on clay loams which can be circumneutral to slightly basic. This type has been documented from vegetation plots on the Fleming, Manning, Caddell, and Yegua formations in eastern Texas (Turner et al. unpubl. data), and is also known from the Cook Mountain Formation (R. Evans pers. obs.). Mapped soils at these locations include the Moswell and Huntsburg series. Within much of the West Gulf Coastal Plain (within the natural range of *Pinus palustris*), this community occurs on somewhat fire-sheltered sites (creating lower fire frequencies typically associated with *Pinus palustris* communities). These areas include isolated ridgetops and upper slopes of finger rings, as well as uplands with Vertisols and/or Alfisols with vertic (shrink-swell) properties.

Vegetation: The canopy includes mixtures of *Pinus echinata*, and less commonly *Pinus palustris* (within its range), and *Pinus taeda* in fire-suppressed examples. *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 *Vaccinium arboreum*, *Callicarpa americana*, *Sassafras albidum*, *Cornus florida*, *Rhus aromatica*, *Rhus copallinum*, *Malus angustifolia*, *Crataegus marshallii*, *Crataegus spathulata*, *Ilex vomitoria*, *Viburnum rufidulum*, *Sideroxylon lanuginosum ssp. lanuginosum*, *Ilex longipes*, *Prunus mexicana*, *Chionanthus virginicus*, *Morus rubra*, and seedlings of canopy species. The herbaceous understory varies considerably within this association depending upon management history. Some frequently prescribe-burned examples in eastern Texas may support over 100 species amidst a dense ground cover of *Chasmanthium sessiliflorum*, while less frequently burned sites tend toward a less well-developed and more scattered herbaceous layer. Historically, this community may have been a woodland on non-topographically isolated, frequently burned sites [see *Pinus echinata - Quercus stellata - Quercus falcata - Carya texana* Woodland (CEGL007800)], but due to fire suppression, current examples have a forest structure. Examples in the southwestern part of the region seem to lack *Quercus marilandica*, and *Vaccinium arboreum* may be only infrequent. Other species found on these southwestern examples can include *Quercus nigra*, *Quercus margarettiae*, and *Ulmus alata*. *Liquidambar styraciflua* is common also. Understory contains abundant *Dichantheium ravenelii*, *Gelsemium sempervirens*, *Parthenocissus quinquefolia*, *Mitchella repens*, *Carex albicans var. australis* (= *Carex physorhyncha*), *Dichantheium commutatum*, *Chasmanthium sessiliflorum*, *Vitis rotundifolia*, *Elephantopus tomentosus*, *Pteridium aquilinum*, *Dichantheium laxiflorum*, *Galium uniflorum*, *Smilax glauca*, *Berchemia scandens*, *Morella cerifera* (= *Myrica cerifera*), *Rubus arvensis* (= *Rubus saepescandens*), *Smilax tamnoides* (= *Smilax hispida*), *Crataegus marshallii*, and *Viburnum dentatum*.

Dynamics: One estimate of the historical fire frequency for *Pinus echinata*-, *Quercus*-, and *Carya*-dominated communities of the Western Gulf Coastal Plain is 5 to 15 years (Martin and Smith 1991, 1993). The historical fire frequency must have been less than that of adjacent *Pinus palustris*-dominated woodlands, especially on sandy sites, in order for the *Pinus echinata* and hardwoods to persist and out-compete the *Pinus palustris*. Although younger *Pinus echinata* are often top-killed by fire, they frequently resprout. Windthrow, insect infestations, and disease also play a (more limited) role in this community's dynamics; hurricanes and tornadoes are infrequent but important events in part of this community's range.

The herbaceous understory varies considerably within this association depending upon management history. Some frequently prescribe-burned examples in eastern Texas may support over 100 species amidst a dense ground cover of *Chasmanthium sessiliflorum*, while less frequently burned sites tend toward a less well-developed and more scattered herbaceous layer (R. Evans and S. Carr pers. obs.). Historically, this community may have been a woodland on non-topographically isolated, frequently burned sites [see *Pinus echinata - Quercus stellata - Quercus falcata - Carya texana* Woodland (CEGL007800)], but due to fire suppression current examples have a forest structure.

Similar Associations:

- *Pinus echinata - Quercus stellata - Quercus falcata - Carya texana* Woodland (CEGL007800)

Related Concepts:

- IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) B

- Shortleaf Pine - (Longleaf Pine) - Post Oak - *Callicarpa* - *Chasmanthium* Loamy Dry-Mesic Uplands (Turner et al. 1999) B
- Shortleaf Pine - Oak (USFS 1988) ? Shortleaf Pine - Oak: 76 (Eyre 1980) B
- Shortleaf Pine-Oak Series (Diamond 1993) B
- T1B3a11a. *Pinus echinata* - *Quercus stellata* - *Carya texana* (Foti et al. 1994) B
- T1B3a11c. *Quercus stellata* - *Pinus echinata* - *Quercus marilandica* (Foti et al. 1994) ?

Classification Comments: This type is placed in a woodland alliance due to floristic relationships; however, structurally this type is manifested as a relatively closed canopy forest. Due to alliance placement the name includes "woodland." This is the driest mixed *Pinus echinata* forest in Arkansas (T. Foti pers. comm.).

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (2002-1-31): Although its range is extensive throughout the West Gulf Coastal Plain, few high-quality examples remain, mostly due to forest type conversion and fire suppression.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest occurs in the West and Upper West Gulf Coastal Plain ecoregions in Texas, Louisiana, Oklahoma, and Arkansas.

Subnations: AR, LA, OK, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fe:CCC, M231A:CC

Federal Lands: NPS (Big Thicket?); USFS (Angelina, Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Allred and Mitchell 1955, Bruner 1931, Diamond 1993, Duck and Fletcher 1945, Evans pers. comm., Eyre 1980, Foti 1994b, Foti et al. 1994, Foti pers. comm., Hatchell 1964, Hoagland 1997, Hoagland 2000, Kennedy 1973, Little 1938, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Masters et al. 1995, Orzell 1990, Osborn 1941, Rice 1963, Rice and Penfound 1959, Smith 1996a, Southeastern Ecology Working Group n.d., Taylor 1965, Turner 1935a, Turner et al. 1999, Turner et al. unpubl. data, USFS 1988, Zanoni et al. 1979

SHORTLEAF PINE - POST OAK - SOUTHERN RED OAK - BLACK HICKORY WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus echinata* - *Quercus stellata* - *Quercus falcata* - *Carya texana* Woodland

Database Code: CEGL007800

Formation: Mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.N.a)

Alliance: *Pinus (echinata, taeda)* - *Quercus (stellata, marilandica, falcata)* Woodland Alliance (A.2011)

ELEMENT CONCEPT

Summary: This *Pinus echinata* - *Quercus stellata* woodland occurs on dry, acid, loamy to clayey uplands in the West Gulf Coastal Plain of Louisiana and Texas. The canopy is dominated by *Pinus echinata* and *Quercus stellata*. Other important overstory trees include *Quercus falcata*, *Carya texana*, and *Carya alba*. The understory tends to be quite open and herb-dominated, and may be quite species-rich. Most of the former examples of this woodland have been fire-suppressed resulting in more closed forests, in which *Pinus taeda* has become an important overstory tree.

Environment: In eastern Texas, this community type is best documented from a very narrow geographic area on the Cook Mountain and adjacent portions of the Yegua geological formation in San Augustine County, on the Angelina National Forest. In this area, the community occurs most typically on acid, loamy to clayey vertic Alfisols (including the Eastwood and Moswell soil series). These sites tend to have higher than normal levels of calcium and magnesium (Turner et al. unpubl. data). As the type ranges further northward (where it is less well understood), it may occur on sandier loams, especially in Louisiana.

Vegetation: The canopy of this association is dominated by some combination of *Pinus echinata*, *Quercus falcata*, *Quercus stellata*, *Carya texana*, and *Carya alba*.

Dynamics: It is believed that historically frequent fires may have been an important factor maintaining the open, woodland structure of this type. The extent to which the understory would have been graminoid-dominated under such conditions is unknown, but it is believed that most examples would have supported a fairly rich herbaceous layer. Indeed, some frequently prescribe-burned examples in eastern Texas support over 100 species amidst a dense ground cover of *Chasmanthium sessiliflorum* (R. Evans pers. comm.), while less frequently burned sites tend toward a less well-developed and more scattered herbaceous layer. Species-rich examples of this type have also been documented by plot data and analysis work done by Susan Carr (Louisiana State University) in northwestern Louisiana. Examples which occur on more extreme soils (vertic and Vertisols) may persist in open, woodland structure (in the absence of frequent fire) for longer periods than less extreme sites. At least one open-structured example which seems to have persisted in this way is still inhabited by Red-cockaded Woodpeckers (near Huntsville, Texas, Fish Hatchery, R. Evans pers. obs.). This is the now very rare (largely historic) woodland phase related to *Pinus echinata* - *Pinus taeda* - *Quercus stellata* - *Carya texana* / *Vaccinium arboreum* Woodland (CEGL007499).

In some areas in which this association occurs, the ignition source of most natural fires may have been isolated natural prairie pockets which occur at varying distances from this type. Most often, at least conceptually, the prairies are ringed by an oak woodland type [see *Quercus stellata* / *Forestiera ligustrina* - *Symphoricarpos orbiculatus* / *Carex cherokeensis* - *Schizachyrium scoparium* Woodland (CEGL007777)], which then grades into this pine-dominated type. The relative extent of each type (prairie versus oak woodland versus shortleaf woodland) has certainly been altered by fire suppression. For example, this pine woodland has likely encroached onto sites historically dominated by the oak woodlands, and to some extent the prairie. Some evidence (Evans and Nesom pers. comm.) suggests that chance pine establishment on these sites, fostered by reduced fire frequency, may alter surface soil pH. As individual pines alter local surface soil chemistry, other species more typical of acid pine forests establish as well.

Similar Associations:

- *Pinus echinata* - *Pinus taeda* - *Quercus stellata* - *Carya texana* / *Vaccinium arboreum* Woodland (CEGL007499) -- is a closely related forest, believed to represent the fire-suppressed, closed-structure expression of this vegetation, which has become more common on the landscape.
- *Pinus echinata* - *Pinus taeda* - *Quercus stellata* / *Juniperus virginiana* var. *virginiana* / *Cornus drummondii* Woodland (CEGL007798) -- is the calcareous equivalent; the two types may grade into one another in certain areas along the southwestern periphery of the region.
- *Pinus echinata* - *Quercus stellata* - (*Quercus marilandica*) Forest (CEGL004053) -- analogous type from the East Gulf Coastal Plain.
- *Pinus taeda* - *Quercus stellata* / *Crataegus* spp. Woodland (CEGL002112) -- is also closely related, occurring in similar physical and geographical settings, but is dominated by *Pinus taeda*.

Related Concepts:

- Shortleaf Pine - Post Oak / *Chasmanthium* Clayey Dry-Mesic Uplands (Turner et al. 1999) B

Classification Comments: This community is now represented largely in forest condition but could be restored to woodland. This type is based on plot data and analysis work done by Susan Carr (Louisiana State University) on Kisatchie National Forest. This is the now very rare (largely historic) woodland phase related to *Pinus echinata* - *Pinus taeda* - *Quercus stellata* - *Carya texana* / *Vaccinium arboreum* Woodland (CEGL007499). In addition to the apparent replacement of this type by more closed structure, this type is also impacted by midstory reduction and/or removal for Red-Cockaded Woodpecker (*Picoides borealis*). It is unclear whether such removals are restoring historically accurate structure or creating management artifacts. Limited occurrences have been observed in the upper portion of the WGCP on the Angelina National Forest (R. Evans pers. obs.).

CONSERVATION RANKING & RARE SPECIES

GRank: G1 (2002-5-15): There are probably fewer than 20 high-quality occurrences of this community throughout its natural range; it is reported from western Louisiana and eastern Texas. High-quality examples of this community are rare throughout its range. Most occurrences have been chronically fire-suppressed, resulting in greater canopy closure and have apparently been replaced by more closed-structured stands with a greater abundance of *Pinus taeda*. This type is also impacted by midstory reduction and/or removal of hardwoods for management of the Red-cockaded Woodpecker (*Picoides borealis*). It is unclear whether such removals are restoring historically accurate structure and composition or simply creating management artifacts. This community is threatened by fire suppression, forest type conversion, forest management, and residential, agricultural, and commercial development.

High-ranked species: *Picoides borealis* (G3)

ELEMENT DISTRIBUTION

Range: This type is endemic to the West Gulf and Upper West Gulf coastal plains of Texas and Louisiana.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 231Ef:CCC, 231Eh:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett?, Kisatchie, Sabine NF?, Sam Houston)

ELEMENT SOURCES

References: Evans pers. comm., NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data

WEST GULF COASTAL PLAIN SANDHILL OAK AND SHORTLEAF PINE FOREST AND WOODLAND

(LONGLEAF PINE) - POST OAK - BLUEJACK OAK / LOUISIANA SQUAREHEAD WOODLAND

ELEMENT IDENTIFIERS

NVC association: (*Pinus palustris*) - *Quercus stellata* - *Quercus incana* / *Tetragonotheca ludoviciana* Woodland

Database Code: CEGLO08566

Formation: Cold-deciduous woodland (II.B.2.N.a)

Alliance: *Quercus stellata* - *Quercus marilandica* Woodland Alliance (A.625)

ELEMENT CONCEPT

Summary: This woodland occurs on narrow, topographically isolated, convex ridgetops and interstream divides in the West Gulf Coastal Plain within a landscape heavily dominated by *Pinus palustris*. The canopy is strongly dominated by *Quercus stellata* with lesser amounts of *Pinus palustris*, *Quercus incana* and *Quercus marilandica* present. *Pinus palustris* stems although not usually dominant, may be much taller than the hardwoods. The sparse to patchy understory includes some species indicative of xeric moisture status in the region, such as *Stylisma pickeringii*, *Tradescantia reverchonii*, *Tragia urticifolia*, *Croton argyranthemus*, *Froelichia floridana*, and *Cnidoscopus texanus*.

Environment: This type is xeric, occurring on excessively well-drained, deep sands, usually as small inclusions (less than 0.4 hectare) in a longleaf pine-dominated woodland matrix. Examples occur on the Catahoula, Willis, and Yegua formations in Texas and the Blounts Creek member of the Fleming Formation? in Louisiana. Typical soil series include Tehran (Grossarenic Paleudult), Tonkawa (Typic Quartzipsamment), and Darco (Grossarenic Paleudult) soils.

Vegetation: The shrub layer is sparse but may include *Sassafras albidum*, *Vaccinium arboreum*, *Asimina parviflora*, *Yucca louisianensis*, *Callicarpa americana*, and *Viburnum rufidulum*. The herbaceous layer is sparse and is often partially suppressed by hardwood leaf litter. Patches of bare sand or areas dominated by lichens (*Cladonia* spp.) and/or *Selaginella arenicola* ssp. *riddellii* may also occur. Common herbaceous species on more xeric examples include *Tragia urens*, *Tragia smallii*, *Schizachyrium scoparium*, *Opuntia stricta*, *Berlandiera pumila*, *Tradescantia reverchonii*, *Commelina erecta*, *Croton argyranthemus*, *Gymnopogon ambiguus*, *Eriogonum longifolium*, *Cnidoscopus texanus*, *Solidago odora*, *Tetragonotheca ludoviciana*, and *Aristolochia reticulata*. Other herbaceous species typical of adjacent longleaf pine-dominated woodlands which may be present include *Schizachyrium scoparium*, *Dichantherium* spp., *Tephrosia virginiana*, *Desmodium* spp., *Stylosanthes biflora*, *Oligoneuron nitidum* (= *Solidago nitida*), *Pityopsis graminifolia*, and *Vernonia texana*.

Dynamics: These sites tend to burn less frequently than the surrounding slopes and uplands, in part due to the amount of hardwood leaves and bare soil patches present. Extremely droughty conditions combined with low fire frequency favor the growth of xeric hardwood species, which in turn perpetuate a lower fire frequency due to the paucity and low flammability of hardwood litter. The current structure and composition of these woodlands may be due, in part, to preferential historic removal of pines over hardwoods, and alteration of fire frequency, seasonality, and intensity. Leaf-cutter ant (*Atta texana*) activity is a frequent cause of large bare soil patches in this type; they may have major local influence on soil characteristics within active and abandoned mound sites (R. Evans pers. obs.).

Similar Associations:

- *Pinus palustris* / *Quercus incana* - *Quercus margarettiae* / *Vaccinium arboreum* / *Cnidoscopus texanus* - *Stylisma pickeringii* var. *pattersonii* Woodland (CEGL003602) -- is more xeric, less topographically isolated.

Related Concepts:

- Longleaf Pine - Bluejack Oak / *Tragia* Grossarenic Dry Uplands (Turner et al. 1999) B
- Post Oak-Blackjack Oak Series (Diamond 1993) B

Classification Comments: The best examples of this type are known from Angelina National Forest (Longleaf Ridge Special Area), most of which remain unmapped, and Little Rocky Preserve (TNC).

CONSERVATION RANKING & RARE SPECIES

GRank: G2 (2002-1-31): This longleaf pine woodland community is restricted in range and habitat conditions. It only occurs in eastern Texas and western Louisiana on narrow, topographically isolated, convex ridgetops and interstream divides. It exists in a matrix of pyrogenic *Pinus palustris* communities but burns less frequently than these surrounding communities. *Pinus palustris*-dominated woodlands on the West Gulf Coastal Plain are threatened by fire suppression, forestry and agricultural land conversion, and overgrazing. Few high-quality sites remain which have a mature canopy and an intact herbaceous layer. Most of those occurrences which have not been destroyed are severely degraded.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is endemic to western Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231:P, 232Fe:CCC

Federal Lands: DOD (Fort Polk); USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Diamond 1993, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data

LONGLEAF PINE - (SHORTLEAF PINE, LOBLOLLY PINE) - SOUTHERN RED OAK - BLACK HICKORY WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* - *Pinus (echinata, taeda)* - *Quercus falcata* - *Carya texana* Woodland

Database Code: CEGL008571

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This sandy upland *Pinus palustris* woodland of the West Gulf Coastal Plain occurs on topographically isolated ridgetops or other dry sites naturally prone to reduced fire frequencies. Due to infrequency of natural fires and proximity to mesic habitats, the overstory supports a natural mixture of *Pinus palustris*, *Pinus echinata*, and *Pinus taeda*. A well-developed, fairly diverse layer of hardwoods is also present in the subcanopy and midstory. The most typical hardwood species are *Quercus falcata* and *Carya texana*. The short-shrub stratum is patchy to dense and may include a number of species, at least some of which are indicative of sandy, yet not xeric conditions.

Environment: This type occurs on well-drained, acidic, sandy, Arenic soils.

Vegetation: The overstory of this community supports a natural mixture of *Pinus palustris*, *Pinus echinata*, and *Pinus taeda*. A well-developed, fairly diverse layer of hardwoods is also present in the subcanopy and midstory. The most typical hardwood species are *Quercus falcata* and *Carya texana*. The short-shrub stratum is patchy to dense and may include a number of species. Woody species documented in eastern Texas plots assigned to this type include *Cornus florida*, *Quercus stellata*, *Quercus marilandica*, *Prunus mexicana*, *Sassafras albidum*, *Vaccinium arboreum*, *Sideroxylon lanuginosum* ssp. *lanuginosum*, *Aesculus pavia*, *Liquidambar styraciflua*, *Callicarpa americana*, *Ceanothus americanus*, *Viburnum rufidulum*, *Rhus copallinum*, *Stillingia sylvatica*, and *Rubus argutus*. Vining species include *Berchemia scandens*, *Vitis rotundifolia*, *Vitis mustangensis*, *Smilax rotundifolia*, and *Toxicodendron radicans*. The scattered herbaceous layer contains *Schizachyrium scoparium*, *Scleria oligantha*, *Baptisia nuttalliana*, *Solidago odora*, *Galactia volubilis*, *Lespedeza hirta*, *Rhus aromatica*, *Desmodium canescens*, *Aristolochia serpentaria*, *Rhynchosia reniformis*, *Galactia regularis*, *Erythrina herbacea*, *Berlandiera pumila*, *Desmodium paniculatum*, *Gymnopogon ambiguus*, and other species (Turner et al. unpubl. data).

Dynamics: The natural fire regime of this type is lower than that of other *Pinus palustris* communities because of topographic isolation. These sites are sand-capped hills adjoining steep mesic slopes and creek bottoms, areas that are not conducive to the spread of fire, requiring lightning ignitions to take place inside these relatively small patches.

Similar Associations:

- *Pinus palustris* - *Pinus* (*echinata*, *taeda*) - *Quercus* (*incana*, *margarettae*) / *Schizachyrium scoparium* Woodland (CEGL007513) - is a fire-infrequent xeric sandhill of the same region.

Related Concepts:

- Bluejack Oak-Pine Series (Diamond 1993) B

Classification Comments: This is a natural type that occurs on fire-protected or fire-infrequent, sandy uplands in the West Gulf Coastal Plain.

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2002-9-3): As with all other longleaf pine types it is believed the areal extent has diminished since European settlement. It is threatened by alteration of fire regimes and conversion to other pine types. This community is known only from very limited areas of eastern Texas, but potentially occurs in western Louisiana.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This *Pinus palustris* association occurs in the West Gulf Coastal Plain of Texas and Louisiana.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:PPP, 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Angelina?, Kisatchie?, Sabine NF)

ELEMENT SOURCES

References: Diamond 1993, Southeastern Ecology Working Group n.d., Turner et al. unpubl. data

SHORTLEAF PINE - (LOBLOLLY PINE) - (SAND POST OAK, POST OAK, SOUTHERN RED OAK) - BLACK HICKORY FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus echinata* - (*Pinus taeda*) - *Quercus* (*margarettae*, *stellata*, *falcata*) - *Carya texana* Forest

Database Code: CEGL007946

Formation: Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a)

Alliance: *Pinus* (*echinata*, *taeda*) - *Quercus* (*incana*, *margarettae*, *arkansana*) Forest Alliance (A.386)

ELEMENT CONCEPT

Summary: This association represents very dry or "subxeric" forests west of the Mississippi River (Upper West Gulf Coastal Plain and West Gulf Coastal Plain ecoregions) dominated by *Pinus echinata* and a variety of oak species, such as *Quercus margarettiae*, *Quercus stellata*, and *Quercus falcata*. This forest differs from other documented sandhill types of the region by exhibiting very dry but not xeric conditions. The fairly species-rich understory is indicative of this moisture status and includes a number of legume species, such as *Stylosanthes biflora*, *Desmodium canescens*, *Centrosema virginianum*, *Lespedeza hirta*, *Galactia regularis*, *Baptisia nuttalliana*, and members of the Asteraceae family (*Rudbeckia hirta*, *Pityopsis graminifolia*, *Vernonia texana*, *Berlandiera pumila*). *Tragia urticifolia* and *Croton argyranthemus* are also indicative. Herbs of the most extreme xeric sites in the region are typically lacking (*Stylisma pickeringii*, *Eriogonum multiflorum*, *Eriogonum longifolium*) or in very low levels of abundance (*Erythrina herbacea*, *Cnidocolus texanus*).

Environment: This upland community occurs on sandy soils which may be sufficiently deep to be classified as Arenic but not deep enough to be considered Grossarenic; nutrients are low, and surface pH is generally acidic. Examples in eastern Texas have been documented on the Sparta geological formation, outside the natural range of *Pinus palustris*.

Vegetation: *Pinus echinata* is the dominant pine under natural conditions. *Pinus taeda* is also generally present, but its abundance in most stands is believed to indicate lower quality stands, often fire-suppressed. *Pinus palustris* may be important within its natural range, although most known examples of this type occur outside this range. *Quercus margarettiae*, *Quercus stellata*, *Quercus marilandica*, and *Carya texana* were the only other overstory trees recorded in two plots attributed to this association on the Davy Crockett National Forest, but others were somewhat more diverse (Turner et al. unpubl. data). Shrub layer and subcanopy species included *Callicarpa americana*, *Diospyros virginiana*, *Vaccinium arboreum*, *Cornus florida*, *Sassafras albidum*, *Frangula caroliniana*, *Ulmus alata*, and *Liquidambar styraciflua*. Important understory species may be *Chasmanthium sessiliflorum*, *Piptochaetium avenaceum*, *Rhus aromatica*, *Schizachyrium scoparium*, *Vernonia texana*, *Lespedeza hirta*, *Stenanthium gramineum*, and *Liatris acidota*. A partial listing of other species recorded in plots included *Stylosanthes biflora*, *Aristolochia reticulata*, *Rubus argutus*, *Aristida* spp., *Baptisia nuttalliana*, *Hypericum hypericoides*, *Desmodium canescens*, *Centrosema virginianum*, *Lespedeza hirta*, *Galactia regularis*, *Galactia volubilis*, *Matelea gonocarpos*, *Dichantheium laxiflorum*, *Vitis aestivalis*, *Pityopsis graminifolia*, *Andropogon virginicus*, *Tragia urticifolia*, *Rudbeckia hirta*, *Glandularia canadensis*, *Piptochaetium avenaceum*, *Desmodium nuttallii*, *Physalis pubescens*, *Croton argyranthemus*, *Hymenopappus artemisiifolius*, *Tephrosia onobrychoides*, *Pteridium aquilinum*, *Tradescantia hirsutiflora*, and *Berlandiera pumila*.

Dynamics: Fire is believed to have been a critical natural disturbance process which affected the vegetation structure and likely the species composition of *Pinus echinata* communities. There are several indirect pieces of evidence which suggest this: (1) *Pinus echinata* is intolerant of competition, and young stems are generally slower growing and slower to dominate sites than either *Pinus taeda* or many hardwood species (Lawson 1990); (2) *Pinus echinata* regeneration decreases dramatically with time since fire (Ferguson 1958); and (3) *Pinus echinata* has the ability to resprout after being burned. A variety of fire-return intervals have been estimated for *Pinus echinata* vegetation. Garren (1943) proposed an 8- to 10-year return interval, Landers (1989) inferred a regime of 10 per century, and Martin and Smith (1993) estimated a 5- to 15-year interval; however, none of these estimates were specific to *Pinus echinata* on sandhills.

Similar Associations:

- *Pinus echinata* - *Quercus* (*incana*, *stellata*, *margarettiae*) / *Cnidocolus texanus* Forest (CEGL007507) -- more xeric association of the same geographic areas.

Related Concepts: No information

Classification Comments: Examples have been documented on the Angelina, Sam Houston, and Davy Crockett national forests, and likely occurs on the Kisatchie.

CONSERVATION RANKING & RARE SPECIES

GRank: G2 (2002-10-22): This subxeric shortleaf pine forest occurs only west of the Mississippi River, where it is only documented from eastern Texas. More information is needed to determine whether or not it is found elsewhere in the region and how common it may be in these areas. Although some examples are known from the Angelina, Davy Crockett, and Sam Houston national forests, this type is very restricted and rare, limited to xeric and subxeric ridges which were uncommon in much of the area originally, but have been further limited by human activities such as road building. All shortleaf pine types, including this one, have declined in the region yet have received almost no conservation attention.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest occurs in eastern Texas and likely ranges into western Louisiana, southern Arkansas, and possibly southeastern Oklahoma.

Subnations: AR?, LA?, OK?, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ef:CCC, 231Eh:CCC, 231Ei:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie?, Sam Houston)

ELEMENT SOURCES

References: Ferguson 1958, Garren 1943, Landers 1989, Lawson 1990, Martin and Smith 1993, Southeastern Ecology Working Group n.d., Turner et al. unpubl. data

SHORTLEAF PINE - LOBLOLLY PINE - POST OAK / EASTERN RED-CEDAR / ROUGHLEAF DOGWOOD WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus echinata* - *Pinus taeda* - *Quercus stellata* / *Juniperus virginiana* var. *virginiana* / *Cornus drummondii* Woodland

Database Code: CEGLO07798

Formation: Mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.N.a)

Alliance: *Pinus (echinata, taeda)* - *Quercus (stellata, marilandica, falcata)* Woodland Alliance (A.2011)

ELEMENT CONCEPT

Summary: This calcareous woodland of the West Gulf Coastal Plain was first described from hilltops and upper slopes in Louisiana associated with the Cook Mountain Formation, in areas in or near areas mapped as Keiffer Clay. The concept has been expanded slightly to accommodate similar situations, associated with calcareous prairies, on the Fleming Formation in eastern Texas. The canopy is dominated by *Pinus echinata*, *Pinus taeda*, *Quercus stellata*, *Fraxinus americana*, *Carya myristiciformis*, *Ulmus alata*, *Quercus alba*, *Quercus shumardii*, and (because of fire suppression) *Liquidambar styraciflua*. Subcanopy species include *Cornus florida*, *Crataegus marshallii*, *Quercus marilandica*, *Ostrya virginiana*, *Chionanthus virginicus*, *Cercis canadensis* var. *canadensis*, *Viburnum rufidulum*, *Frangula caroliniana*, and *Juniperus virginiana* var. *virginiana*. Shrubs and woody vines include *Cornus drummondii*, *Vaccinium arboreum*, *Viburnum dentatum*, *Aesculus pavia* var. *pavia*, *Sideroxylon lanuginosum*, *Toxicodendron radicans*, *Berchemia scandens*, *Vitis rotundifolia*, *Smilax bona-nox*, *Smilax rotundifolia*, *Trachelospermum difforme*, and *Cocculus carolinus*. Herbs include *Chasmanthium sessiliflorum* (dominant), *Scleria oligantha*, *Oxalis violacea*, *Mitchella repens*, *Euphorbia corollata*, *Aristolochia serpentaria*, *Sanicula canadensis*, *Ruellia humilis*, *Dichantherium commutatum*, *Tragia betonicifolia*, and *Baptisia nuttalliana*. This community is a drier woodland associated with and grading to *Quercus shumardii* - *Fraxinus americana* - *Carya myristiciformis* / *Viburnum dentatum* / *Carex cherokeensis* Forest (CEGL007194).

Environment: This calcareous woodland of the West Gulf Coastal Plain was first described from hilltops and upper slopes in Louisiana associated with the Cook Mountain Formation, in areas in or near areas mapped as Keiffer Clay. The concept has been expanded slightly to accommodate similar situations, associated with calcareous prairies, on the Fleming Formation in eastern Texas. This may also occur on the Weches Formation in eastern Texas (R. Turner pers. comm. 2001). This type occurs around calcareous prairies on the Sam Houston National Forest (such as compartment 60 and 61) as well as isolated localities in Ecoregion 41.

Vegetation: The canopy is dominated by *Pinus echinata*, *Pinus taeda*, *Quercus stellata*, *Fraxinus americana*, *Carya myristiciformis*, *Ulmus alata*, *Quercus alba*, *Quercus shumardii*, and (because of fire suppression) *Liquidambar styraciflua*. Subcanopy species include *Cornus florida*, *Crataegus marshallii*, *Quercus marilandica*, *Ostrya virginiana*, *Chionanthus virginicus*, *Cercis canadensis* var. *canadensis*, *Viburnum rufidulum*, *Frangula caroliniana*, and *Juniperus virginiana* var. *virginiana*. Shrubs and woody vines include *Cornus drummondii*, *Vaccinium arboreum*, *Viburnum dentatum*, *Aesculus pavia* var. *pavia*, *Sideroxylon lanuginosum*, *Toxicodendron radicans*, *Berchemia scandens*, *Vitis rotundifolia*, *Smilax bona-nox*, *Smilax rotundifolia*, *Trachelospermum difforme*, and *Cocculus carolinus*. Herbs include *Chasmanthium sessiliflorum* (dominant), *Scleria oligantha*, *Oxalis violacea*, *Mitchella repens*, *Euphorbia corollata*, *Aristolochia serpentaria*, *Sanicula canadensis*, *Ruellia humilis*, *Dichantherium commutatum*, *Tragia betonicifolia*, and *Baptisia nuttalliana*.

Dynamics: This community is a drier woodland associated with and grading to *Quercus shumardii* - *Fraxinus americana* - *Carya myristiciformis* / *Viburnum dentatum* / *Carex cherokeensis* Forest (CEGL007194).

Similar Associations:

- *Pinus taeda* - (*Quercus* spp.) / *Ostrya virginiana* - *Sabal minor* Forest (CEGL007955) -- lower slope, more mesic type which may co-occur in some parts of the range.
- *Quercus stellata* / *Forestiera ligustrina* - *Symphoricarpos orbiculatus* / *Carex cherokeensis* - *Schizachyrium scoparium* Woodland (CEGL007777) -- dry upland which may co-occur at some sites.

Related Concepts: No information

Classification Comments: Examples are known from Keiffer Prairie Calcareous Woodland Complex (Winn Parish, Louisiana). This type is based on data from Charles Allen, interpreted by Latimore Smith (LANHP). This may also occur on the Weches Formation in eastern Texas (R. Turner pers. comm.). This type occurs around calcareous prairies on the Sam Houston National Forest (such as compartment 60 & 61) as well as isolated localities in Ecoregion 41 (REE 6-00). Nearly all known locations in eastern Texas are fire-suppressed with unknown impacts to historical structure and composition. Most eastern Texas examples have also been degraded to various degrees by odd combinations of historical land-use practices linked to adjacent prairies. In some cases these forests may be found in erosional areas within or adjacent to the prairies.

CONSERVATION RANKING & RARE SPECIES

GRank: G1G2Q (2000-7-14): This association is naturally very restricted in range and environmental setting. It is only known from small areas of calcareous soils overlying the Cook Mountain and Fleming formations on hilltops and upper slopes in north-central

Louisiana and eastern Texas where it is associated with calcareous prairie openings. Very few high-quality examples are known. Remaining unprotected examples are vulnerable to logging and conversion to agroforestry uses, overgrazing, damage from off-road vehicles, and other land-use changes. Nearly all known locations in eastern Texas are fire-suppressed with unknown impacts to historical structure and composition. Most eastern Texas examples have also been degraded to various degrees by odd combinations of historical land-use practices linked to adjacent prairies. The geographic range of this type remains poorly documented, and further study is needed to clarify the degree of uncertainty in the rank. This type was once thought to be restricted to the Cook Mountain Formation in Louisiana but has been recently found on the Fleming Formation in Texas. Extending this type to the Fleming Formation in eastern Texas slightly expands the range of this type, although it is still confined to the West Gulf Coastal Plain biogeographic region. Some examples occur on the Sam Houston National Forest, but no comprehensive assessment of these sites has been undertaken. This type also occurs in Polk and Newton counties and possibly other areas; all known sites are private land. The relationship of this community to similar communities needs clarification.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is known from western Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231E:CC, 232Fa:CCC, 232Fb:CCP

Federal Lands: USFS (Kisatchie, Sabine NF?, Sam Houston)

ELEMENT SOURCES

References: NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Turner pers. comm.

SHORTLEAF PINE / BLUEJACK OAK / RIDDELL'S SPIKE-MOSS FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus echinata* / *Quercus incana* / *Selaginella arenicola* ssp. *riddellii* Forest

Database Code: CEGLO03559

Formation: Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a)

Alliance: *Pinus (echinata, taeda)* - *Quercus (incana, margarettiae, arkansana)* Forest Alliance (A.386)

ELEMENT CONCEPT

Summary: This xeric stream terrace forest of the West Gulf Coastal Plain occurs on very well-drained Pleistocene terraces and low, broad ridges on deep, acidic sandy soils. The open canopy consists of *Pinus echinata* (sometimes with some *Pinus taeda* as well). An open to dense subcanopy consists of *Quercus margarettiae*, *Quercus incana*, and *Quercus hemisphaerica*. The patchy to open shrub stratum may include *Sideroxylon lanuginosum*, *Vaccinium arboreum* (= var. *glaucescens*), *Frangula caroliniana*, *Asimina parviflora*, *Chionanthus virginicus*, *Stillingia sylvatica*, *Vitis aestivalis* var. *lincecumii* (= *Vitis lincecumii*). Due to xeric conditions, graminoids and forbs are very sparse in this community, and patches of exposed sand are common. Typical herbs include *Selaginella arenicola* ssp. *riddellii*, *Opuntia humifusa* var. *humifusa*, *Cnidoscopus texanus*, *Aristida desmantha*, *Tephrosia virginiana*, *Cyperus grayoides*, and *Carex tenax*. Lichens (*Cladonia* spp.) and spike-moss (*Selaginella arenicola* ssp. *riddellii*) form large patches.

Environment: This woodland occurs on low xeric Pleistocene terraces on very well-drained, deep, acidic sands. Soils types include Betis, Briley, and Bienville sands. This woodland is most often found scattered near streams on the Sparta and Catahoula geologic formations.

Vegetation: The open *Pinus* canopy ranges generally from 15-40% cover, with some examples being slightly more or less dense (10-60%); however, all occurrences are included under the Woodland Class. The stunted, scrubby tall-shrub stratum ranges from approximately 2-5 m in height. This stratum is patchy and varies from approximately 30-60% in cover and is dominated by *Quercus incana*, *Quercus margarettiae*, and *Quercus hemisphaerica*. Other associates include *Vaccinium arboreum*, *Ilex vomitoria*, and *Sideroxylon lanuginosum* ssp. *lanuginosum*. Due to the xeric conditions, trees are typically stunted, and graminoids and forbs are not abundant in this community. The very widely scattered herbaceous layer may contain *Aristida desmantha*, *Opuntia humifusa*, *Tephrosia virginiana*, *Cnidoscopus texanus*, and others. Open patches of bare sand intermix with patches of lichens (*Cladonia* spp.) and spike-moss (*Selaginella arenicola* ssp. *riddellii*).

Dynamics: Although specific fire frequencies are not yet known, fire certainly played an important role in this community. Fire-suppressed examples of this type are observed to have an increased canopy cover. Historical fire intervals were probably equal to or greater than those estimated for xeric *Pinus palustris*-dominated sandy woodlands of the Western Gulf Coastal Plain (30-50 years). The adjacent *Pinus palustris* woodland matrix was likely important in the fire ecology of this community.

Fire-suppressed occurrences, especially on the less xeric sites, may experience an increased cover of *Pinus* and *Quercus* and succeed to a *Pinus - Quercus* forest. Windthrow, insect infestations, and disease also play a role in this community's dynamics; hurricanes and tornadoes are infrequent but important events in much of this community's range.

Similar Associations:

- (*Quercus incana*) / *Schizachyrium scoparium* - *Bouteloua hirsuta* - *Dalea villosa* var. *grisea* - *Selaginella arenicola* ssp. *riddellii* Xeric Sand Barrens Woodland (CEGL007973)
- *Pinus palustris* / *Quercus incana* / *Schizachyrium scoparium* - *Liatris elegans* - *Opuntia humifusa* var. *humifusa* Woodland (CEGL003580)
- *Quercus* (*incana*, *margarettae*, *arkansana*) - (*Pinus echinata*) - *Schizachyrium scoparium* Woodland (CEGL007972)
- *Quercus arkansana* - *Quercus incana* / *Selaginella arenicola* ssp. *riddellii* Woodland (CEGL003693)

Related Concepts:

- Bluejack Oak-Pine Series (Diamond 1993) B
- IB6a. Western Xeric Sandhill (Allard 1990) B
- Loblolly Pine - Hardwood (USFS 1988) ?
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Sandy Woodland (Martin and Smith 1991) ?
- Shortleaf Pine - Bluejack Oak / *Tragia* Grossarenic Dry Uplands (Turner et al. 1999) B
- Shortleaf Pine - Oak: 76 (Eyre 1980) B Southern Scrub Oak: 72 (Eyre 1980) B

Classification Comments: The nominal *Selaginella arenicola* ssp. *riddellii* occurs on gravelly or sandy soils in the coastal plain of Louisiana, Texas, Arkansas, and Oklahoma and on granite outcrops in Georgia and Alabama. It is included in the name as a geographic and environmental indicator, indicating a xeric habitat. Examples occur at "Pearfield," Winn District, Kisatchie National Forest, Winn Parish, Louisiana (this is presumably also called "Prickly Pear Flat" [see Martin and Smith 1991, p. 247]). There are lingering doubts about the relationship of this type with floristically overlapping types of the region, but as currently conceptualized, this association differs from most other extremely xeric types of the region due to occurrence on stream terraces. Arguably, the most related association is *Pinus palustris* / *Quercus incana* / *Schizachyrium scoparium* - *Liatris elegans* - *Opuntia humifusa* var. *humifusa* Woodland (CEGL003580).

CONSERVATION RANKING & RARE SPECIES

GRank: G2Q (2002-10-22): As currently conceptualized, this association differs from most other extremely xeric types of the region due to occurrence on stream terraces. Xeric sites of any type naturally dominated by shortleaf pine are quite rare, while stream terrace habitats necessary for this type are even rarer, and apparently confined to western Louisiana. Although at least one example, "Pearfield," occurs on the Winn District of Kisatchie National Forest, the site has been previously disturbed (Martin and Smith 1991). Given the rarity in Louisiana, which represents the global distribution of this type, all occurrences are important and in need of conservation attention.

High-ranked species: *Cyperus grayoides* (G3)

ELEMENT DISTRIBUTION

Range: This is a West Gulf Coastal Plain community occurring in west-central Louisiana and possibly in eastern Texas. It does not occur in Arkansas as presently defined (T. Foti pers. comm.) or southeastern Oklahoma (B. Hoagland pers. comm.).

Subnations: AR?, LA, TX?

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 231Eb:CCP, 231Ee:CC?, 231Eg:CC?, 231Ej:CCP, 231Ek:CCP, 231Em:CC?, 231En:CCP, 232Fa:CCC, 232Fb:CCP, 232Fe:CCC

Federal Lands: USFS (Kisatchie, Sabine NF?)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Egan 1987, Eyre 1980, Foti pers. comm., Hoagland pers. comm., Hoagland pers. comm., Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Orzell 1990, Smith 1995b, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988

WEST GULF COASTAL PLAIN UPLAND LONGLEAF PINE

(LONGLEAF PINE) - POST OAK - BLACKJACK OAK - BLACK HICKORY / WAVYLEAF NOSEBURN WOODLAND

ELEMENT IDENTIFIERS

NVC association: (*Pinus palustris*) - *Quercus stellata* - *Quercus marilandica* - *Carya texana* / *Tragia urens* Woodland

Database Code: CEGL007907

Formation: Cold-deciduous woodland (II.B.2.N.a)

Alliance: *Quercus stellata* - *Quercus marilandica* Woodland Alliance (A.625)

ELEMENT CONCEPT

Summary: This woodland occurs on narrow, topographically isolated, convex ridgetops and interstream divides on the West Gulf Coastal Plain within a landscape heavily dominated by *Pinus palustris*. The canopy is strongly dominated by *Quercus stellata*. Lesser amounts of *Carya texana*, *Pinus palustris*, and *Quercus marilandica* are present in most examples. *Pinus palustris* often occurs in the

canopy and, although not usually dominant, may be much taller than the hardwoods which are present. A fairly well-developed midstory is present, with *Quercus marilandica*, *Pinus taeda*, *Cornus florida*, *Carya texana*, and a variety of shrubs, including *Callicarpa americana*, *Ilex vomitoria*, *Sassafras albidum*, *Viburnum rufidulum*, *Persea borbonia*, and *Magnolia grandiflora*. This community most often occurs as inclusions within a matrix of *Pinus palustris* / *Schizachyrium scoparium* - *Rudbeckia grandiflora* var. *alismifolia* Woodland (CEGL003572).

Environment: Most examples of this type occur on well-drained, sandy soils which have a clay lens present at some depth. This community occurs as small inclusions (less than 0.4 hectare) in a longleaf pine-dominated woodland matrix. Examples occur on the Catahoula, Willis, and Yegua formations in Texas and the Blounts Creek member of the Fleming Formation? in Louisiana.

Vegetation: The midstory may contain *Pinus taeda*, and *Cornus florida* over a shrub layer of *Callicarpa americana*, *Ilex vomitoria*, *Sassafras albidum*, *Viburnum rufidulum*, *Asimina parviflora*, *Persea borbonia*, and *Vitis aestivalis*. On some sites, *Quercus falcata* may be important. Common understory species include *Vitis aestivalis*, *Smilax glauca*, *Schizachyrium scoparium*, *Dichanthelium* spp., *Tephrosia virginiana*, *Desmodium* spp., *Stylosanthes biflora*, *Oligoneuron nitidum* (= *Solidago nitida*), *Pityopsis graminifolia*, and *Vernonia texana*. Xeric forb species are uncommon in this type but may be present in low levels [see (*Pinus palustris*) - *Quercus stellata* - *Quercus incana* / *Tetragonotheca ludoviciana* Woodland (CEGL008566)].

Dynamics: These sites tend to burn less frequently than the surrounding slopes and uplands, in part due to the amount of hardwood leaves and bare soil patches present. The current structure and composition of these woodlands may be due, in part, to preferential historic removal of pines over hardwoods, and alteration of fire frequency, seasonality, and intensity. Leaf-cutter ant (*Atta texana*) activity is a frequent cause of large bare soil patches in this type; they may have major local influence on soil characteristics within active and abandoned mound sites (R. Evans pers. obs.).

Similar Associations:

- *Pinus palustris* / *Quercus (incana, margarettiae)* / *Aristida beyrichiana* - *Asimina angustifolia* Woodland (CEGL008586) -- is more xeric.
- *Pinus palustris* / *Quercus incana* - *Quercus margarettiae* / *Vaccinium arboreum* / *Cnidioscolus texanus* - *Stylisma pickeringii* var. *pattersonii* Woodland (CEGL003602)
- *Pinus palustris* / *Schizachyrium scoparium* - *Rudbeckia grandiflora* var. *alismifolia* Woodland (CEGL003572) -- often the local matrix in which this type is embedded.

Related Concepts:

- Longleaf Pine - Bluejack Oak / *Tragia* Grossarenic Dry Uplands (Turner et al. 1999) B
- Post Oak-Blackjack Oak Series (Diamond 1993) B

Classification Comments: The best examples of this type are known from Angelina National Forest (Longleaf Ridge Special Area), most of which remain unmapped, and Little Rocky Preserve (TNC). This community most often occurs as inclusions within a matrix of *Pinus palustris* / *Schizachyrium scoparium* - *Rudbeckia grandiflora* var. *alismifolia* Woodland (CEGL003572).

CONSERVATION RANKING & RARE SPECIES

GRank: G2 (2000-1-21): This longleaf pine woodland community is restricted in range and habitat conditions. It only occurs in eastern Texas and western Louisiana on narrow, topographically isolated, convex ridgetops and interstream divides. It exists in a matrix of pyrogenic *Pinus palustris* communities but burns less frequently than these surrounding communities. *Pinus palustris*-dominated woodlands on the West Gulf Coastal Plain are threatened by fire suppression, forestry and agricultural land conversion, and overgrazing. Few high-quality sites remain which have a mature canopy and an intact herbaceous layer. Most of those occurrences which have not been destroyed are severely degraded.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is endemic to western Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231:P, 232Fe:CCC

Federal Lands: DOD (Fort Polk); USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Diamond 1993, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data

LONGLEAF PINE - (SHORTLEAF PINE, LOBLOLLY PINE) - (BLUEJACK OAK, SAND POST OAK) / LITTLE BLUESTEM WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* - *Pinus (echinata, taeda)* - *Quercus (incana, margarettiae)* / *Schizachyrium scoparium* Woodland

Database Code: CEGL007513

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This xeric forest develops on fuel-limited, xeric, deep sands within the range of *Pinus palustris* in the West Gulf Coastal Plain of Louisiana and Texas. A midstory of *Quercus incana* or *Quercus margarettiae* is usually present, indicative of the extreme droughtiness of the sites. The short-shrub stratum is patchy to dense and may include *Vaccinium arboreum*, *Ilex vomitoria*, *Sideroxylon lanuginosum ssp. lanuginosum*, *Asimina parviflora*, *Chionanthus virginicus*, *Stillingia sylvatica*, *Frangula caroliniana*, *Hamamelis virginiana*, and seedlings of canopy species. The scattered herbaceous layer contains *Schizachyrium scoparium*, *Aristida desmantha*, and *Cnidocolus texanus*. Scattered fruticose lichens (*Cladonia* spp.) often occur. The ground cover is sparse, due to extreme site conditions. This community generally occurs on uplands surrounded by *Pinus palustris*-dominated woodlands.

Environment: This forest occurs on ridgetops and flat xeric uplands. This type occurs on excessively well-drained, acidic, sandy, often Grossarenic soils on xeric uplands. The extremely permeable soils on which this community is found include Betis, Briley and Boykin loamy sands; it is known particularly from sandy strata in the Sparta, Catahoula, and Fleming geologic formations and the Wilcox geologic group.

Vegetation: The fairly open to closed, mixed *Pinus* - *Quercus* canopy (10-22 m high) ranges from 60-100% cover. Due to its lower stature *Quercus incana* is generally low in the canopy or forms a subcanopy stratum. In addition to the nominal species, *Quercus hemisphaerica* may occur. The short-shrub stratum (0.5-2 m in height) is patchy to dense and includes *Vaccinium arboreum*, *Ilex vomitoria*, *Sideroxylon lanuginosum ssp. lanuginosum*, *Asimina parviflora*, *Chionanthus virginicus*, *Stillingia sylvatica*, *Frangula caroliniana*, *Hamamelis virginiana*, and seedlings of canopy species. The scattered herbaceous layer contains *Schizachyrium scoparium*, *Aristida desmantha*, and *Cnidocolus texanus*. Other herbs that may occur in examples of this community include *Eriogonum longifolium*, *Eriogonum multiflorum*, *Penstemon murrayanus*, *Polanisia erosa*, *Polygonella americana*, *Polygonella polygama*, and *Zornia bracteata*. Scattered fruticose lichens (*Cladonia* spp.) often occur.

Dynamics: The natural fire regime is thought to be lower than that of other *Pinus palustris* communities because of naturally sparse fuel conditions. This community results from forest conversion and/or severe fire suppression of historical xeric *Pinus palustris* woodlands.

Similar Associations:

- *Pinus echinata* - *Quercus (incana, stellata, margarettiae)* / *Cnidocolus texanus* Forest (CEGL007507) -- has a canopy containing less than 25% *Pinus palustris* and often occurs on fire-suppressed, historical *Pinus echinata*, as opposed to historical *Pinus palustris*, upland sites.
- *Pinus palustris* / *Quercus incana* - *Quercus margarettiae* / *Vaccinium arboreum* / *Cnidocolus texanus* - *Stylisma pickeringii* var. *pattersonii* Woodland (CEGL003602) -- is the frequently burned longleaf sandhill of the same region.
- *Pinus palustris* / *Quercus incana* / *Schizachyrium scoparium* - *Liatris elegans* - *Opuntia humifusa* var. *humifusa* Woodland (CEGL003580) -- occurs on related soils in stream terraces.

Related Concepts:

- Bluejack Oak-Pine Series (Diamond 1993) B
- Loblolly Pine - Hardwood (USFS 1988) ?
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Longleaf Pine (21) (USFS 1988) B
- Longleaf Pine - Scrub Oak: 71 (Eyre 1980) B

Classification Comments: This is a natural type that occurs on fire-protected or fire-infrequent, extremely deep xeric sands in the West Gulf Coastal Plain.

CONSERVATION RANKING & RARE SPECIES

GRank: G1G2 (1999-12-4): This association only occurs west of the Mississippi River in west-central Louisiana and possibly eastern Texas. It is naturally restricted to extreme xeric conditions found only on deep sands. This association is a component of the endangered Longleaf Pine Ecosystem of the West Gulf Coastal Plain. It is threatened by fire suppression, forestry and agricultural land conversion, and mechanical disturbance caused by off-road vehicles. Most of those natural occurrences which have not been destroyed are severely degraded. This type remains poorly documented and understood, and further study is needed to clarify the degree of uncertainty in the rank.

High-ranked species: *Cyperus grayoides* (G3)

ELEMENT DISTRIBUTION

Range: This type is known from western Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Angelina?, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allred and Mitchell 1955, Diamond 1993, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Orzell 1990, Reed 1982, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner 1935a, Turner et al. unpubl. data, USFS 1988

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* - *Pinus (echinata, taeda)* / (*Liquidambar styraciflua*) / *Schizachyrium scoparium* Woodland

Database Code: CEGLO03609

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* Woodland Alliance (A.520)

ELEMENT CONCEPT

Summary: This association includes various regenerated, silviculturally altered, and/or naturally fire-suppressed *Pinus palustris* woodlands in Louisiana and Texas, primarily the West Gulf Coastal Plain. It is broadly defined to represent the wide variation which can be present in semi-natural and/or fire-suppressed longleaf pine stands. This type is recognized by the presence of *Pinus echinata* and/or *Pinus taeda* in the overstory (abundant enough to constitute 25-75% of the canopy density) along with *Pinus palustris*. It includes silviculturally managed stands of *Pinus palustris* as well as fire-suppressed or otherwise ecologically disturbed longleaf pine forests with oaks or other hardwoods that may enter the canopy. This association tentatively applies to longleaf stands along the range periphery of the species in Texas, where stands are heavily mixed in the overstory.

Environment: As broadly defined, this type extends across a moisture gradient from mesic flats to xeric ridgetops. Soil textures can be extremely variable from fine-textured silty soils to sandy loam soils overlying clay, and coarse-textured sands. Some specific soil series from examples in Louisiana include Smithdale, Ruston, Betis, and Briley. Some examples may be naturally occurring, unmanaged types still suffering from fire suppression, in which the areas are naturally sheltered from frequent fire.

Vegetation: *Pinus taeda* is generally a codominant on more mesic sites and flats, while *Pinus taeda* and/or *Pinus echinata* may codominate on drier sites. *Pinus echinata* tends to be the only codominant pine on xeric sites. The vegetation tends to have a patchy understory due to fire suppression. Depending on the moisture regime, understory species may include *Liquidambar styraciflua*, *Quercus alba*, *Quercus stellata*, *Quercus falcata*, and *Quercus hemisphaerica*. Part of the canopy (but typically not more than 25%) may be composed of these or other hardwood species. Shrubs that may be present, depending on fire history and moisture, include *Cornus florida*, *Callicarpa americana*, *Ostrya virginiana*, *Ilex vomitoria*, and *Vaccinium arboreum*. Herbaceous cover is sparse to fairly dense, and is typically dominated by *Schizachyrium scoparium*. The ground cover is greatly decreased in stands with a high canopy cover.

Dynamics: This type can result from partial thinning or regeneration cutting of formerly pure longleaf stands and/or from infrequent burning of plantations and naturally regenerated stands.

Similar Associations:

- *Pinus palustris* / *Quercus (falcata, stellata)* - *Liquidambar styraciflua* - *Carya texana* / *Schizachyrium scoparium* Woodland (CEGL003576) -- also ranked GM with conceptual overlap in the West Gulf Coastal Plain.

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Loblolly Pine-Hardwood (13) (USFS 1988) ?
- Longleaf Pine (21) (USFS 1988) ?
- Longleaf Pine - Scrub Oak: 71 (Eyre 1980) B Shortleaf Pine - Oak: 76 (Eyre 1980) B
- Shortleaf Pine-Oak (11) (USFS 1988) ?

Classification Comments: More information is needed on vegetation reported from the East Gulf Coastal Plain of Louisiana (232Ba), which is tentatively included here as well. This type was apparently first described from the Kisatchie Ranger District on dry to dry-mesic acidic sandy loams. Variability is primarily determined by burning and thinning frequencies; more open examples having denser shrub and herbaceous strata. The moisture regime and other site conditions also affect the floristic composition of the vegetation. It is primarily disturbed through silvicultural management techniques such as burning and thinning; prescribed burns generally occur at three-year intervals.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2001-6-25): This association consists of various regenerated, silviculturally altered, and/or naturally fire-suppressed *Pinus palustris* stands in the West Gulf Coastal Plain. It is broadly defined to represent the wide variation which can be present in semi-natural and/or fire-suppressed longleaf pine stands, and is not in and of itself a conservation target, although examples may provide habitat for rare and threatened plant and animal species.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is found in the West Gulf Coastal Plain of the United States.

Subnations: LA, TX

TNC Ecoregions: 40:P, 41:C, 53:C

USFS Ecoregions: 231Ea:CPP, 232Ba:CCC, 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Angelina, Davy Crockett?, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Allred and Mitchell 1955, Burns and Honkala 1990a, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Reed 1982, Smith pers. comm., Southeastern Ecology Working Group n.d., Turner 1935b, USFS 1988

LONGLEAF PINE - BLACKJACK OAK WEST GULF WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* - *Quercus marilandica* West Gulf Woodland

Database Code: CEGLO08579

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This upland *Pinus palustris* woodland of the West Gulf Coastal Plain occurs in limited areas primarily north of the main contiguous belt of pure *Pinus palustris* vegetation. Sites on which this type occurs are believed to have a clay lens in the soil. Most known examples occur in a matrix of loamy *Pinus palustris* uplands. These areas were likely not subject to the most frequent fires typically associated with *Pinus palustris* vegetation. Due to infrequency of natural fires and soil conditions, the overstory may support a natural mixture of *Pinus palustris* and *Pinus echinata* and to a lesser extent, *Pinus taeda*. The presence of *Quercus marilandica* is characteristic of this type. Typically absent are species of xeric and very dry environments of the region.

Environment: In eastern Texas this type occurs primarily on the Manning, Yegua, and Cook Mountain geologic formations. Soils at plot locations (Turner et al. unpubl. data) had silt loam surfaces, pH of 4.8-5.4, and low to moderate levels of all nutrients examined. These areas occur north of the main belt of existing and historical longleaf pine vegetation in the region (Bridges and Orzell 1989a, Evans 1997) where original patch size was much smaller, likely contributing to reduced numbers of lightning fire ignitions and greater fire-return intervals.

Vegetation: Any given stand may be locally variable in terms of component vegetation. For more information on species present in this type see plots ANNF A 6106, ANNF A1407 (Turner et al. unpubl. data).

Dynamics: The natural fire regime is lower than that of other *Pinus palustris* communities.

Similar Associations:

- *Pinus palustris* - *Pinus (echinata, taeda)* Upper West Gulf Coastal Plain Woodland (CEGL008482)
- *Pinus palustris* / *Quercus marilandica* / *Ilex vomitoria* / *Schizachyrium scoparium* Woodland (CEGL003579) -- has a naturally more open woodland condition, that occurs on broad, flat landscapes.

Related Concepts: No information

Classification Comments: This is a natural type that occurs on fire-protected or fire-infrequent, sandy uplands in the West Gulf Coastal Plain.

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2002-9-3): This community is known only from very limited areas of eastern Texas; as with all other longleaf pine types it is believed the areal extent has diminished since European settlement. It is threatened by alteration of fire regimes and conversion to other pine types.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is known from Texas and likely occurs in western Louisiana.

Subnations: LA, TX

TNC Ecoregions: 40:?, 41:C

USFS Ecoregions: 232Fa:CCP, 232Fb:CCP, 232Fe:CCC

Federal Lands: USFS (Angelina, Kisatchie?, Sabine NF)

ELEMENT SOURCES

References: Bridges and Orzell 1989a, Evans 1997, Southeastern Ecology Working Group n.d., Turner et al. unpubl. data

LONGLEAF PINE / (SOUTHERN RED OAK, POST OAK) - SWEETGUM - BLACK HICKORY / LITTLE BLUESTEM WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Quercus (falcata, stellata)* - *Liquidambar styraciflua* - *Carya texana* / *Schizachyrium scoparium* Woodland

Database Code: CEGLO03576

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* Woodland Alliance (A.520)

ELEMENT CONCEPT

Summary: This dry-mesic woodland is dominated by a tall *Pinus palustris* canopy of 25-60% cover, and a hardwood subcanopy (*Liquidambar styraciflua*, *Quercus falcata*, *Quercus stellata*, *Carya alba*). *Pinus echinata* and *Pinus taeda* become more prevalent with increased fire intervals, but still constitute less than 25% of the *Pinus* cover. The frequency of hardwoods in the subcanopy and several of the shrub species (*Cornus florida*, *Callicarpa americana*, *Rhus copallinum*) is increased by fire suppression. The herbaceous layer becomes much less diverse with increased fire interval. This community primarily occurs on upland ridges in highly dissected topography but may also occur on gently rolling topography over well-drained sandy loams. This community occurs west of the Mississippi River in west-central Louisiana and eastern Texas, particularly on the Willis and Catahoula formations. This is a fire-suppressed community that has not burned for at least 10-20 years. The lack of fire tends to decrease the abundance of West Gulf Coastal Plain endemic herbs. Floristically, this community may not be too dissimilar from fire-suppressed dry-mesic *Pinus palustris* communities of other Coastal Plain regions.

Environment: No information

Vegetation: No information

Dynamics: No information

Similar Associations:

- *Pinus palustris* - *Pinus* (*echinata*, *taeda*) / (*Liquidambar styraciflua*) / *Schizachyrium scoparium* Woodland (CEGL003609) -- also ranked GM with conceptual overlap in the West Gulf Coastal Plain.

Related Concepts:

- IB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) B
- Longleaf Pine-Little Bluestem Series (Diamond 1993) B

Classification Comments: *Carya texana* is not dominant in this woodland, but its distribution is primarily west of the Mississippi River and is included in this association name as a geographic indicator.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (1997-8-11): No information

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This community occurs in the West Gulf Coastal Plain of Louisiana and Texas.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 231:C, 232:C

Federal Lands: USFS (Angelina, Davy Crockett?, Kisatchie, Sabine NF, Sam Houston?)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Smith 1996a, Southeastern Ecology Working Group n.d.

LONGLEAF PINE / BLACKJACK OAK / LITTLE BLUESTEM - COMPASS PLANT - LOW WILD PETUNIA WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Quercus marilandica* / *Schizachyrium scoparium* - *Silphium laciniatum* - *Ruellia humilis* Woodland

Database Code: CEGL003596

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This small-patch *Pinus palustris* community is associated with outcroppings of calcareous and/or high calcium clay soils in the inner Coastal Plain on Tertiary terraces of the West Gulf Coastal Plain of Louisiana and Texas. Edaphic limitations produce a widely spaced, even stunted woodland canopy that contrasts strikingly with surrounding open *Pinus palustris* woodlands on deeper soils. A continuous herbaceous cover is present. The most abundant ground flora species in Texas are *Coelorachis rugosa*, *Eryngium yuccifolium*, *Andropogon gyrans*, and *Schizachyrium scoparium*. *Silphium laciniatum* is a good indicator species of this community.

Environment: This association occurs on the Fleming Formation (Castor Creek Member, Dough Hills Member, Lena Member) in Louisiana, the Catahoula Formation (Louisiana and Texas), and potentially also on the Vicksburg Group, Jackson Group, and the Cook Mountain Formation. Soils at the single known site in eastern Texas have a pH of 5.2, with very shallow clayey surface soils above Catahoula mudstone or sandstone (R. Evans pers. obs.). These soils are unusually high in both calcium (1530 ppm) and magnesium (830 ppm) (Turner et al. unpubl. data). Sandstone outcrops studied by Van Kley (1999a) on the Kisatchie National Forest are even higher in calcium and magnesium than the known site in eastern Texas, in fact higher than any other community in his study area.

Vegetation: Locally, there may also be *Pinus echinata* in the canopy. At the Texas site, the only other overstory/midstory trees are *Liquidambar styraciflua* and *Nyssa sylvatica*. *Quercus marilandica* is apparently a component of this community in western

Louisiana. The most abundant ground flora species in Texas are *Coelorachis rugosa*, *Eryngium yuccifolium*, *Andropogon gyrans*, and *Schizachyrium scoparium*. Other species include *Rhynchospora globularis*, *Aristida purpurascens*, *Dichanthelium aciculare*, *Symphotrichum patens* (= *Aster patens*), *Stylosanthes biflora*, *Vernonia texana*, *Symphotrichum ericoides* (= *Aster ericoides*), *Silphium laciniatum*, *Scleria verticillata*, *Mimosa quadrivalvis*, *Tephrosia virginiana*, *Asclepias viridiflora*, *Solidago odora*, *Rhynchospora inexpansa*, *Heterotheca subaxillaris*, *Scleria pauciflora*, and *Oligoneuron nitidum* (= *Solidago nitida*). Other typical species of sites in Louisiana include *Crataegus spathulata*, *Crataegus crus-galli*, *Quercus stellata*, *Berchemia scandens*, *Ilex vomitoria*, *Schizachyrium scoparium*, *Sporobolus junceus*, *Muhlenbergia expansa*, *Ruellia humilis*, *Euphorbia corollata*, *Manfreda virginica*, *Dalea candida*, *Andropogon gerardii*, and *Baptisia bracteata* var. *leucophaea* (= *Baptisia bracteata* var. *glabrescens*).

Dynamics: Unlike most of the better known longleaf pine communities of both the West Gulf Coastal Plain and the southeastern United States, this type is more edaphically extreme and even glade-like. Under the same fire regime of adjacent longleaf woodlands on deeper, sandier soils, this type is an order of magnitude more open. Frequent fires are much less essential to maintaining an open aspect and herbaceous dominance in this type. However, such fires are still important to induce flowering in species such as *Sporobolus junceus* (Weakley and Peterson 1998), and some of the other species present.

Similar Associations:

- (*Pinus palustris*) / *Schizachyrium scoparium* - *Bigelowia nuttallii* / *Cladonia* spp. Herbaceous Vegetation (CEGL003600) -- is an acid glade equivalent.

Related Concepts:

- Sandstone Outcrops (Van Kley 1999a) ?

Classification Comments: At present, the concept of this community includes "Prairie Glade Woodlands" recognized on the southern Kisatchie District, Kisatchie National Forest (Wilson Branch Barrens, Agave Glade). It is also present in a single location in Fox Hunters Hill, Sabine National Forest. Additionally, this community may occur on or near the Catahoula barrens in eastern Texas; several of these species (*Pinus palustris*, *Quercus marilandica*, *Berchemia scandens*, *Crataegus spathulata*, *Crataegus crus-galli*, *Quercus stellata*, *Ilex vomitoria*, *Schizachyrium scoparium*, *Ruellia humilis*, *Euphorbia corollata*, *Silphium laciniatum*).

CONSERVATION RANKING & RARE SPECIES

GRank: G1 (2002-1-31): This peculiar *Pinus palustris* woodland community has a very restricted distribution, known only from a few sites associated with outcroppings of calcareous clays in the West Gulf Coastal Plain of Louisiana and Texas. It occupies very small acreages and was never common. It is part of the endangered Longleaf Pine Ecosystem, which once dominated the Coastal Plain landscape of the southeastern United States, and depends on frequent, low-intensity, growing-season fires to control understory vegetation and for the reproduction of *Pinus palustris*. *Pinus palustris*-dominated woodlands are susceptible to the effects of fire suppression, over-grazing, or conversion to commercial forest plantations or agriculture. Remaining examples are highly threatened by development, conversion, and alteration of fire regimes. Most of those occurrences which have not been destroyed are severely degraded.

High-ranked species: *Liatris tenuis* (G3)

ELEMENT DISTRIBUTION

Range: This community is found in the inner Coastal Plain on Tertiary terraces of the West Gulf Coastal Plain of Louisiana and Texas.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Evans pers. comm., Southeastern Ecology Working Group n.d., Turner et al. unpubl. data, Van Kley 1999a, Weakley and Peterson 1998

LONGLEAF PINE / BLACKJACK OAK / SWITCHGRASS WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Quercus marilandica* / *Panicum virgatum* Woodland

Database Code: CEGL008580

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This West Gulf Coastal Plain association is comprised of an open to very open, typically stunted, *Pinus palustris* canopy above a very open hardwood subcanopy, comprised largely of *Quercus marilandica*. This type tends to have an open, herbaceous-dominated understory in which shrubs occur only sporadically. *Panicum virgatum* is the dominant herbaceous species, which along with other grasses (*Sporobolus* sp., *Dichanthelium* spp.) form a nearly continuous grassy ground cover. A number of other herbaceous species are present which are suggestive of mesic but not particularly dry conditions, especially *Stenanthium gramineum*.

Environment: This association is limited to vertic Hapludalf soils in eastern Texas and may occur in western Louisiana. Shrink-swell properties of the soil likely contribute to the open aspect and stunted tree growth of this type.

Vegetation: The ground cover vegetation of this type includes *Panicum virgatum*, *Panicum anceps* (= var. *rhizomatum*), *Schizachyrium scoparium* var. *divergens*, *Sporobolus junceus*, *Dichantheium dichotomum* var. *ensifolium* (= *Dichantheium ensifolium*), and *Paspalum setaceum*. Shrubs are uncommon, at least in well-burned condition; the most abundant species appears to be *Morella cerifera* (= *Myrica cerifera*). Other herbaceous species present in this type include *Asclepias verticillata*, *Eurybia hemispherica* (= *Aster hemisphericus*), *Chamaecrista fasciculata*, *Eryngium yuccifolium*, *Eupatorium hyssopifolium*, *Eupatorium semiserratum*, *Helianthus angustifolius*, *Tephrosia onobrychoides*, *Stylosanthes biflora*, *Liatris elegans*, *Liatris acidota*, *Liatris pycnostachya*, and *Pycnanthemum albescens*.

Dynamics: The combination of edaphic conditions (shrink-swell soil properties) and frequent fires are the most important factors maintaining the openness, and even stunted aspect to the overstory and woody vegetation in this type. Most known examples of this type in eastern Texas were heavily cut in the early 1900s and were reforested with *Pinus elliotii* (outside its natural range) by the Civilian Conservation Corps, unlike sandier areas of the region upon which they replanted *Pinus palustris* (Evans 1996). Possibly the most notable slash pine plantation created on such a site in eastern Texas is the Moore Plantation, which is now a Wildlife Management Area on the Sabine National Forest.

Similar Associations:

Related Concepts:

- IB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) B
- Longleaf Pine - Scrub Oak: 71 (Eyre 1980) B
- Longleaf Pine: 70 (Eyre 1980) B

Classification Comments: Most historical examples of this type have been converted to *Pinus elliotii* in eastern Texas, and possibly in Louisiana as well.

CONSERVATION RANKING & RARE SPECIES

GRank: G2 (2002-10-23): This longleaf pine community is restricted to the West Gulf Coastal Plain, where it is currently known only from Texas. More information is needed to determine whether or not this type occurs in western Louisiana and if so, how common it is. It is very rare in Texas, only known from the Sabine National Forest on soils with vertic properties which are unusual for longleaf pine. The known examples are being maintained successfully by frequent prescribed fires. However, the sites were heavily logged prior to U.S. Forest Service acquisition in the 1930s, removing nearly all of the existing longleaf pine overstory, while slash pines were replanted and still exist scattered throughout. The understory composition is high quality and seems to be stable under current management.

High-ranked species: *Liatris tenuis* (G3)

ELEMENT DISTRIBUTION

Range: This community occurs in the West Gulf Coastal Plain of eastern Texas is likely to occur in western Louisiana.

Subnations: LA?, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie?, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Evans 1996, Eyre 1980, NatureServe Ecology - Southeastern U.S. unpubl. data, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999

LONGLEAF PINE / BLACKJACK OAK / YAUPON / LITTLE BLUESTEM WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Quercus marilandica* / *Ilex vomitoria* / *Schizachyrium scoparium* Woodland

Database Code: CEGLO03579

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This West Gulf Coastal Plain woodland is comprised of an open to very open, typically somewhat stunted, *Pinus palustris* canopy (averaging 16-20 m in height). The hardwood subcanopy, comprised largely of *Quercus marilandica*, is also open to very open, and often occurs in scattered clumps. This type may be quite shrubby, even under frequent burning. This stratum may be strongly dominated by *Ilex vomitoria* (which is often the only species present in this stratum in Louisiana), along with *Callicarpa americana*, *Rhus copallinum*, *Vaccinium arboreum*, sprouts of *Quercus marilandica*, and sometimes *Quercus stellata*. *Schizachyrium scoparium* is the dominant herbaceous species, but a number of other herbs are present, some of which suggest the dry character of this type (for example, *Pityopsis graminifolia* var. *graminifolia* and *Oligoneuron nitidum* (= *Solidago nitida*)).

Environment: This association is limited to the Kisatchie silt clay (montmorillonitic Hapludalfs) region of central Louisiana (Sabine, Natchitoches, La Salle, and Catahoula parishes). A similar community (placed here for now) occurs on certain members of the Fleming Formation (northern Vernon Parish). It is likely that the severe edaphic conditions are at least partly responsible for the open physiognomy of this community. This dry/xeric woodland with moist inclusional patches occurs on well-drained, very slowly permeable Kisatchie Series soils on terrace uplands with slopes of 1-20%. The mechanisms accounting for the moist inclusional areas are not currently understood. Soils of the Kisatchie series are fine, montmorillonitic, thermic Typic Hapludalfs. A typical pedon has a very strongly acidic to strongly acidic A layer of very fine sandy loam, silt loam or silty clay loam (0-20 cm) and a very strongly acidic B layer (15-91 cm) of silty clay and clay loam overlying weakly cemented sandstone plates. Soils of poorer, eroded sites on which much of this community occurs are without the sandy loam cap and consist primarily of clay loam (Soil Conservation Service 1986b, 1990).

Vegetation: This woodland is comprised of an open to very open, typically somewhat stunted, *Pinus palustris* canopy averaging 16-20 m tall. The canopy cover ranges from 25-60%. The hardwood subcanopy, comprised largely of *Quercus incana* and *Quercus marilandica*, is patchy and ranges in cover from 10-40%. *Liquidambar styraciflua* may occur in this stratum, especially in less xeric examples of this community. The tall-shrub stratum is strongly dominated by *Ilex vomitoria* and ranges from patches of scattered individuals to larger, dense patches (approximately 10-65% cover). *Ilex vomitoria* is the species with the highest cover in some examples of this community. *Vaccinium arboreum*, *Vaccinium elliotii*, *Vaccinium stamineum*, *Vaccinium virgatum* (= *Vaccinium amoenum*), and *Morella cerifera* (= *Myrica cerifera*) may occur in the shrub stratum. Herbs include *Schizachyrium scoparium*, *Bigelovia nuttallii*, *Dichanthelium* spp., *Rhynchospora* spp., *Cladonia dimorphoclada*, *Scleria ciliata*, *Muhlenbergia expansa*, *Symphotrichum dumosum* (= *Aster dumosus*), *Liatris elegans*, *Liatris acidota*, *Liatris pycnostachya*, *Pityopsis graminifolia* var. *graminifolia*, and *Oligoneuron nitidum* (= *Solidago nitida*). *Gelsemium sempervirens* is known from the very sparse vine stratum (less than 10%) (Haywood and Thill 1995, L. Smith pers. comm. 1995).

There is some suggestion that stands of this type in Louisiana include *Quercus incana*; this needs to be confirmed. The ubiquitous *Liquidambar styraciflua* may be present but is thought to have been rare under natural conditions and in high-quality examples. Other shrub species may include *Vaccinium elliotii*, *Vaccinium stamineum*, *Vaccinium virgatum* (= *Vaccinium amoenum*), and *Morella cerifera* (= *Myrica cerifera*). It is unclear how much of the current shrub layer density is due to fire regimes; although frequently burned examples exist in eastern Texas, none have been under growing-season burning regimes. Other herbaceous species present in this type include *Paspalum floridanum*, *Muhlenbergia expansa*, *Bigelovia nuttallii* (rare, Louisiana only), *Dichanthelium aciculare* (= *Dichanthelium angustifolium*), *Dichanthelium ovale* var. *addisonii*, *Tephrosia onobrychoides*, *Strophostyles umbellata*, *Stylosanthes biflora*, *Scleria ciliata*, *Symphotrichum dumosum* (= *Aster dumosus*), *Ionactis linariifolius* (= *Aster linariifolius* var. *linariifolius*), *Symphotrichum patens* (= *Aster patens*), *Eurybia hemispherica* (= *Aster hemisphericus*), *Helianthus angustifolius*, *Liatris elegans*, *Liatris acidota*, *Liatris pycnostachya*, and *Pycnanthemum albescens*.

Dynamics: The combination of edaphic conditions (shrink-swell soil properties) and frequent fires are the most important factors maintaining the openness, and even stunted aspect to the overstory and woody vegetation in this type. Most known examples of this type in eastern Texas were heavily cut in the early 1900s and were reforested with *Pinus elliotii* (outside its natural range) by the Civilian Conservation Corps, unlike sandier areas of the region upon which they replanted *Pinus palustris* (Evans 1996). Possibly the most notable slash pine plantation created on such a site in eastern Texas is the Moore Plantation, which is now a Wildlife Management Area on the Sabine National Forest.

The historical fire frequency is estimated to be approximately 3 years. Although fire suppression will lead to an increased cover of woody species, it is not clear whether this community will succeed to a forest physiognomy given the severe edaphic conditions.

Similar Associations:

- (*Pinus palustris*) / *Schizachyrium scoparium* - *Bigelovia nuttallii* / *Cladonia* spp. Herbaceous Vegetation (CEGL003600) -- is an evergreen woodland on Kisatchie series soils but is without significant *Quercus* cover (i.e., less than 25% cover) and occurs on sandstone glades. Shrubs are generally not significant, and patches of exposed mineral soil, sandstone boulders, and *Cladonia* spp. are common.
- *Pinus palustris* - *Quercus marilandica* West Gulf Woodland (CEGL008579)
- *Pinus palustris* / *Quercus marilandica* / *Panicum virgatum* Woodland (CEGL008580)
- *Pinus palustris* / *Quercus marilandica* / *Schizachyrium tenerum* - *Muhlenbergia expansa* - *Bigelovia nuttallii* - *Packera obovata* Woodland (CEGL003597) -- the "Fleming Glade" also occurs on Kisatchie series soils, but is a glade community generally with a very stunted *Pinus palustris* canopy (typically 8-15 m tall). In addition, the glade woodland contains inclusions of wet seepage areas and does not possess a shrub stratum strongly or exclusively dominated by *Ilex vomitoria*.

Related Concepts:

- IB6a. Western Xeric Sandhill (Allard 1990) B
- IB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) B
- Longleaf Pine (21) (USFS 1988) ?
- Longleaf Pine - Scrub Oak: 71 (Eyre 1980) B
- Longleaf Pine / *Schizachyrium* Clayey Dry-Mesic Uplands (Turner et al. 1999) B
- Longleaf Pine: 70 (Eyre 1980) B

Classification Comments: *Quercus incana* was removed as a possible nominal because it rarely, if ever, occurs on shrink-swell clays (R. Evans pers. obs., A. Weakley pers. comm.). However, it was useful to suggest the dryness of this type (versus new clay soil moist type, CEGL008580). This community is found locally in a very restricted range and is susceptible to forest conversion. Most historical examples of this type have been converted to *Pinus elliotii* in eastern Texas, and possibly in Louisiana as well. When small slope areas of this landscape become severely eroded, distinctive-looking herbaceous zones dominated by *Bigelovia nuttallii* may develop. These were previously classified as a separate community type, former *Bigelovia nuttallii* / *Cladonia* spp. Sparse Vegetation (CEGL004407) in former VII.C.3.N.b *Bigelovia nuttallii* Sparsely Vegetated Alliance (A.1869).

CONSERVATION RANKING & RARE SPECIES

GRank: G2 (1997-12-31): This longleaf pine woodland community is found only in a very localized range and under a specific set of habitat conditions. In addition, it is susceptible to forest conversion. It is part of the endangered Longleaf Pine Ecosystem, which once dominated the Coastal Plain landscape of the southeastern United States, and depends on frequent, low-intensity, growing-season fires to control understory vegetation and for the reproduction of *Pinus palustris*. *Pinus palustris*-dominated woodlands are susceptible to the effects of fire suppression, over-grazing, or conversion to commercial forest plantations or agriculture. Remaining examples are highly threatened by development, conversion, and alteration of fire regimes. Most of those occurrences which have not been destroyed are severely degraded.

High-ranked species: *Liatris tenuis* (G3), *Picoides borealis* (G3)

ELEMENT DISTRIBUTION

Range: This community occurs in the West Gulf Coastal Plain of eastern Texas and western Louisiana.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Evans 1996, Eyre 1980, Hatchell 1964, Haywood and Thill 1995, Kilpatrick et al. 1986, Martin et al. 1993, NatureServe Ecology - Southeastern U.S. unpubl. data, Smith 1996a, Smith pers. comm., Soil Conservation Service 1986b, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988

LONGLEAF PINE / BLUEJACK OAK - SAND POST OAK / FARKLEBERRY / TEXAS TREAD-SOFTLY - WESTERN DAWNFLOWER WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Quercus incana* - *Quercus margarettiae* / *Vaccinium arboreum* / *Cnidioscolus texanus* - *Stylisma pickeringii* var. *pattersonii* Woodland

Database Code: CEGL003602

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This xeric woodland of the West Gulf Coastal Plain is dominated by an open to fairly closed *Pinus palustris* canopy. *Pinus palustris* is usually the only overstory tree present in high-quality, well-burned examples. *Quercus margarettiae* and *Quercus incana* are the next most important woody species, along with *Sassafras albidum*. The presence of *Pinus echinata* and *Pinus taeda* in the canopy indicate lower quality examples. *Quercus margarettiae* and *Quercus incana* are the next most important woody species, along with *Sassafras albidum*. The herbaceous layer may be fairly sparse, yet distinguished by several West Gulf Coastal Plain endemics, and local xeric fidels. Considerable lichen cover (*Cladonia* spp. and *Cladina* spp.) may exist along with patches of exposed sand. This type exists in a matrix of pyrogenic *Pinus palustris* communities and experiences average fire-return intervals of 2-10 years.

Environment: This community occurs on ridgetops and upper slopes in highly dissected to rolling topography over extremely well-drained, deep (Grossarenic) sands. In eastern Texas this community is found primarily on the Carrizo Formation and more rarely on the Wilcox Formation, and possibly on the Catahoula, Manning, and Wellborn formations. In western and central Louisiana this type is presumably more widespread on the Pleistocene High Terraces, certain members of the Fleming Formation, and is particularly well expressed on the Catahoula and Sparta formations. Soil subgroups include Grossarenic Paleudults and Typic Quartzipsamments (Bridges and Orzell 1989a, Martin and Smith 1991).

Vegetation: *Pinus palustris* is usually the only overstory tree present in high-quality, well-burned examples. This woodland is dominated by a tall (20-25 m), open to fairly closed (25-60% cover) *Pinus palustris* canopy. *Pinus echinata* and *Pinus taeda* may occur in the canopy but are not dominant. The subcanopy is dense (40-80% cover) due to the lack of fire. *Quercus margarettiae* and *Quercus incana* are the next most important woody species, along with *Sassafras albidum*. Other woody species include *Quercus marilandica*, *Rhus copallinum*, *Asimina parviflora*, *Diospyros virginiana*, and scattered stems of *Pinus echinata* and *Pinus taeda*. The understory of frequently burned examples is dominated by *Schizachyrium scoparium* and *Stylisma pickeringii*. Typical species include

Opuntia humifusa, *Opuntia stricta*, *Andropogon ternarius*, *Gymnopogon ambiguus*, *Aristida desmantha*, *Tragia urens*, *Polygala polygama*, *Triplasis purpurea*, *Tradescantia reverchonii*, *Stylisma pickeringii* var. *pattersonii*, *Vitis aestivalis* var. *lincecumii* (= *Vitis lincecumii*), *Helianthemum georgianum*, *Lithospermum caroliniense*, *Toxicodendron pubescens*, *Selaginella arenicola* ssp. *riddellii*, *Eriogonum longifolium*, *Eriogonum multiflorum*, *Stillingia sylvatica*, and *Tetragonotheca ludoviciana*. Considerable foliose lichen cover exists along with patches of exposed sand (Correll and Johnston 1970, Bridges and Orzell 1989a, Martin and Smith 1991).

Dynamics: The presence of *Pinus echinata* and/or *Pinus taeda* in the canopy is thought to indicate encroachment during periods of reduced fire frequency. However, it is believed that natural fire regimes in this xeric type were somewhat less frequent than the more mesic, matrix types. As a consequence, shrubs are more common in this type than in more mesic and more frequently burned *Pinus palustris* types.

Similar Associations:

- *Pinus palustris* - *Pinus* (*echinata*, *taeda*) - *Quercus* (*incana*, *margarettae*) / *Schizachyrium scoparium* Woodland (CEGL007513) - represents a naturally less fire frequent sandhill of the same habitat.
- *Pinus palustris* / *Quercus incana* / *Schizachyrium scoparium* - *Liatris elegans* - *Opuntia humifusa* var. *humifusa* Woodland (CEGL003580) -- on xeric soils in the same region, but in stream terraces.

Related Concepts:

- Bluejack Oak-Pine Series (Diamond 1993) B
- IB6a. Western Xeric Sandhill (Allard 1990) B
- Longleaf Pine - Bluejack Oak / *Tragia* Grossarenic Dry Uplands (Turner et al. 1999) B
- Longleaf Pine: 70 (Eyre 1980) B

Classification Comments: *Cnidocolus texanus* is included in the name because it is indicative of a xeric moisture regime and a West Gulf Coastal Plain distribution.

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2002-1-31): This longleaf pine woodland community is found only in a restricted range and under a specific set of habitat conditions. It only occurs west of the Mississippi River in west-central Louisiana and eastern Texas, particularly on the Willis, Catahoula, and Carrizo formations. *Pinus palustris*-dominated woodlands on the West Gulf Coastal Plain are threatened by fire suppression, forestry and agricultural land conversion, and over-grazing. Few high-quality sites remain which have a mature canopy and an intact herbaceous layer. Remaining examples are highly threatened by development, conversion, and alteration of fire regimes.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is restricted to the West Gulf Coastal Plain of eastern Texas and central and western Louisiana.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Correll and Johnston 1970, Diamond 1993, Egan 1987, Eyre 1980, Martin and Smith 1991, Orzell 1990, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data

LONGLEAF PINE / BLUEJACK OAK / LITTLE BLUESTEM - SANDHILL CROTON WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Quercus incana* / *Schizachyrium scoparium* - *Croton argyranthemus* Woodland

Database Code: CEGL008572

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)

ELEMENT CONCEPT

Summary: This subxeric woodland of the West Gulf Coastal Plain is dominated by an open to fairly closed *Pinus palustris* canopy. *Pinus palustris* is usually the only overstory tree present in high-quality, well-burned examples. *Quercus incana* is the other most diagnostic and important woody species. Unlike more xeric sites, the herbaceous layer is fairly continuous and dominated by *Schizachyrium scoparium* with patches of lichen cover (*Cladonia* spp. and *Cladina* spp.) with patches of exposed sand encountered only infrequently. This community is further characterized by the presence of many species typical of very dry/subxeric sites of the region, such as *Croton argyranthemus*, *Tragia urticifolia*, *Tragia smallii*, and *Pityopsis graminifolia*. Indicator species of the most extreme xeric sites in the region (*Stylisma pickeringii*, *Cnidocolus texanus*, *Eriogonum longifolium*, etc.) may be present but in relatively low levels.

Environment: This community occurs on ridgetops and upper slopes in highly dissected to rolling topography over extremely well-drained, deep (Grossarenic) sands. In eastern Texas this community is found primarily on the Carrizo Formation and more rarely on the Wilcox Formation, and possibly on the Catahoula, Manning, and Wellborn formations. In western and central Louisiana this type

is presumably more widespread on the Pleistocene High Terraces, certain members of the Fleming Formation, and is particularly well-expressed on the Catahoula and Sparta formations.

Vegetation: *Pinus palustris* is usually the only overstory tree present in high-quality, well-burned examples. The presence of *Pinus echinata* and *Pinus taeda* in the canopy indicate lower quality, fire-suppressed examples, such as within the Upland Island Wilderness Area of the Angelina National Forest in eastern Texas. In addition to *Quercus incana*, woody species encountered in eastern Texas also include *Sassafras albidum*, *Rhus copallinum*, *Cornus florida*, *Callicarpa americana*, *Ilex vomitoria*, *Liquidambar styraciflua*, and *Pinus taeda*. The latter three species are thought to have become more common in the absence of frequent fire. The understory supports a well-developed herbaceous layer dominated by *Schizachyrium scoparium*, along with *Andropogon gerardii*, *Panicum virgatum*, *Andropogon ternarius*, *Dichantherium aciculare*, *Sporobolus junceus*, and *Coelorachis cylindrica*. Other species include *Scleria oligantha*, *Galactia regularis*, *Aristolochia reticulata*, *Physalis pumila*, *Vernonia texana*, *Solidago odora*, *Euphorbia corollata*, *Stillingia sylvatica*, *Lespedeza hirta*, *Tephrosia virginiana*, *Stylosanthes biflora*, *Vitis aestivalis*, *Berlandiera pumila*, and others.

Dynamics: This type exists in a matrix of pyrogenic *Pinus palustris* communities and is believed to have been subject to historically frequent fires with average return intervals of approximately 2-10 years. This type is known from the Upland Island Wilderness Area (Angelina National Forest) in eastern Texas which has not been burned since the mid 1980s. Among the vegetation differences between these stands and examples known from other parts of the national forests in Texas which are still fire managed are greater shrub and *Pinus taeda* density and lower species richness in the graminoid layer (notably lacking in *Sporobolus junceus*, *Coelorachis* spp., etc).

Similar Associations:

- *Pinus palustris* / *Quercus incana* - *Quercus margarettiae* / *Vaccinium arboreum* / *Cnidioscolus texanus* - *Stylisma pickeringii* var. *pattersonii* Woodland (CEGL003602) -- found on more xeric sites of the region.

Related Concepts:

- Bluejack Oak-Pine Series (Diamond 1993) B
- IB6a. Western Xeric Sandhill (Allard 1990) B
- Longleaf Pine - Bluejack Oak / *Tragia* Grossarenic Dry Uplands (Turner et al. 1999) B

Classification Comments:

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2002-9-3): As with all other longleaf pine types it is believed the areal extent has diminished since European settlement. It is threatened by alteration of fire regimes and conversion to other pine types. This community is known only from very limited areas of eastern Texas, but potentially occurs in western Louisiana.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is restricted to the West Gulf Coastal Plain of eastern Texas and likely occurs in central and western Louisiana as well.

Subnations: LA?, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Angelina, Kisatchie?, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data

LONGLEAF PINE / LITTLE BLUESTEM - CATTAIL GAYFEATHER WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Schizachyrium scoparium* - *Liatris pycnostachya* Woodland

Database Code: CEGL003571

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* Woodland Alliance (A.520)

ELEMENT CONCEPT

Summary: This mesic longleaf pine woodland occurs in the West Gulf Coastal Plain. It is dominated by a generally open canopy of mature, tall *Pinus palustris* (20-25 m in height). The herbaceous layer is extremely diverse and is dominated by graminoids, legumes, and composites. This community occurs on gently rolling topography over moderately well-drained silt loams and fine sandy loams, typically downslope from 'tableland' flatwoods which occur on broad flat ridgetops. This community occurs west of the Mississippi River in west-central Louisiana and eastern Texas, particularly on the Pleistocene Intermediate and High Terraces, and also possibly on the Fleming Formation. This is a pyrogenic community with fire-return intervals of 2-5 years (Bridges and Orzell 1989a, Martin and Smith 1991, 1993).

Environment: This community occurs on gently rolling topography. Soils are well-drained sandy loams or occasionally fine sandy loams, and are more calciferous than soils of East Gulf Coastal Plain *Pinus palustris* woodlands. Soils include the Typic Albaqualfs, Typic Hapludults, and Typic and Vertic Hapludalfs soil subgroups (Bridges and Orzell 1989a, Martin and Smith 1991). Typical soils for this association are Beaugard (silt loam) and Glenmora (silt loam).

Vegetation: This evergreen woodland is dominated by a tall (typically 20-25m) *Pinus palustris* canopy (approximately 30-60% cover). A sparse *Pinus palustris* subcanopy occurs at 7-15m. Widely scattered hardwoods such as *Liquidambar styraciflua* and *Quercus falcata* may occur in the sparse subcanopy. Scattered shrubs (less than 2 m) occur, generally *Vaccinium elliotii*, *Morella cerifera* (= *Myrica cerifera*), *Rhus copallinum*, *Callicarpa americana*, and *Cornus florida*. The herbaceous layer is extremely rich and is dominated primarily by members of the Poaceae, Asteraceae, and Fabaceae, although many other families are also represented.

Dynamics: This is a pyrogenic community with an average fire-return interval of 2-5 years. The historical fire season in this region is from late March to July, peaking in May and June. These frequent fires are low-intensity ground fires, with needles and ground cover detritus being the main sources of fuel. The draping tendency of the long *Pinus palustris* needles over the branches of underlying shrubs increases the flammability of the deciduous plants. Fire often burns into the low-shrub stratum and at least top-kills the shrubs.

If fire suppression occurs for approximately 8-12 years, this community will likely turn into an overgrown woodland. With continued fire suppression, this community will experience increased hardwood invasion and cover and succeed to a mixed *Pinus palustris* forest.

Similar Associations:

- *Pinus palustris* / *Schizachyrium scoparium* - *Rudbeckia grandiflora* var. *alismifolia* Woodland (CEGL003572)

Related Concepts:

- IB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) B
- Longleaf Pine (21) (USFS 1988) ?
- Longleaf Pine / *Schizachyrium* - *Drosera* Loamy Dry-Mesic Uplands (Turner et al. 1999) B
- Longleaf Pine-Little Bluestem Series (Diamond 1993) B
- Longleaf Pine: 70 (Eyre 1980) B

Classification Comments: *Pinus palustris*-dominated woodlands on the West Gulf Coastal Plain are threatened by fire suppression, forestry and agricultural land conversion, and over-grazing. The nominals of this type are too general, and the name may need revision to tie it more specifically. This type is closely related to *Pinus palustris* / *Schizachyrium scoparium* - *Rudbeckia grandiflora* var. *alismifolia* Woodland (CEGL003572).

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (1997-11-23): This mesic longleaf pine woodland community occurs on gently rolling topography over moderately well-drained silt loams and fine sandy loams and is restricted to areas west of the Mississippi River in west-central Louisiana and eastern Texas. This is a pyrogenic community with fire-return intervals of 2 to 5 years. *Pinus palustris*-dominated woodlands on the West Gulf Coastal Plain are threatened by fire suppression, forestry and agricultural land conversion, and over-grazing. This was historically one of the most important upland forest types within its range. Few high-quality sites, with a mature canopy and an intact herbaceous layer, remain. In order to maintain the diverse herb layer, control hardwood invasion, and promote *Pinus palustris* regeneration, growing-season, low-intensity fires should be used approximately every 2 to 5 years to simulate the historic fire regime. If fire suppression occurs for approximately 8 to 12 years, this community will likely become overgrown with *Liquidambar styraciflua* and other hardwoods. With continued fire suppression, this community will experience increased hardwood invasion and cover and succeed to a mixed *Pinus palustris* Forest. Remaining examples are highly threatened by development, conversion, and alteration of fire regimes.

High-ranked species: *Botrychium jenmanii* (G3G4), *Echinacea sanguinea* (G3), *Picoides borealis* (G3), *Schwalbea americana* (G2), *Tridens carolinianus* (G3)

ELEMENT DISTRIBUTION

Range: This community occurs west of the Mississippi River in west-central Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:?, 41:C

USFS Ecoregions: 231E:CC, 232F:CC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Correll and Johnston 1970, Diamond 1993, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Orzell 1990, Patterson et al. 1994, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Schizachyrium scoparium* - *Rudbeckia grandiflora* var. *alismifolia* Woodland

Database Code: CEGLO03572

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* Woodland Alliance (A.520)

ELEMENT CONCEPT

Summary: This dry-mesic longleaf pine woodland of the West Gulf Coastal Plain is dominated by a 20- to 25-m tall *Pinus palustris* canopy with generally open cover. *Pinus echinata* and *Pinus taeda* may occasionally occur in the canopy but are never dominant. The herbaceous layer is abundant and diverse and dominated by graminoids, legumes, and composites. This community primarily occurs on rolling to gently rolling topography over acidic, well-drained sandy loams. This community occurs west of the Mississippi River in west-central Louisiana and eastern Texas, particularly on the Pleistocene High Terraces; where it was historically the primary matrix community. Typical soil types on which this association occurs are Ruston (fine sandy loam) and Smithdale (fine sandy loam). This is a pyrogenic community with fire-return intervals of 2-5 years.

Environment: This community occurs west of the Mississippi River in west-central Louisiana and eastern Texas, particularly on the Pleistocene High Terraces; where it was historically the primary matrix community. Typical soil types on which this association occurs are Ruston (fine sandy loam) and Smithdale (fine sandy loam). This is a pyrogenic community with fire-return intervals of 2-5 years.

Vegetation: This evergreen woodland is dominated by a tall (typically 20-25 m) *Pinus palustris* canopy. *Pinus echinata* and *Pinus taeda* may occasionally occur but are not dominant. A sparse *Pinus palustris* subcanopy occurs at 7-15m. Widely scattered hardwoods such as *Liquidambar styraciflua*, *Quercus falcata*, and *Quercus stellata* may occur in the sparse subcanopy. Scattered shrubs (less than 2 m) occur, generally *Vaccinium stamineum*, *Cornus florida*, *Vaccinium arboreum*, *Callicarpa americana*, and *Rhus copallinum*. The herbaceous layer is rich and is dominated primarily by members of the Poaceae, Asteraceae, and Fabaceae, although many other families are also represented. Additional forb species include *Chrysopsis mariana*, *Elephantopus carolinianus*, and *Pityopsis graminifolia*. *Schizachyrium scoparium* is characteristic of the graminoid layer, and *Rudbeckia grandiflora* var. *alismifolia* is also a typical species in stands of this type.

Dynamics: This is a pyrogenic community with an average fire-return interval of 2-8 years. The historical fire season in this region is from late March to July, peaking in May and June. These frequent fire are low-intensity ground fires, with needles and ground cover detritus being the main sources of fuel. The draping tendency of the long *Pinus palustris* needles over the branches of underlying shrubs increases the flammability of the deciduous plants. Fire often burns into the low-shrub stratum and at least top-kills the shrubs.

If fire suppression occurs for approximately 10-20 years or more, this community will likely turn into an overgrown woodland. With continued fire suppression, this community will experience increased hardwood invasion and cover and succeed to a mixed *Pinus palustris* forest.

Similar Associations:

- *Pinus palustris* / *Schizachyrium scoparium* - *Liatris pycnostachya* Woodland (CEGL003571)

Related Concepts:

- IIB6k. West Gulf Coastal Plain Upland Longleaf Pine Forest (Allard 1990) B
- Longleaf Pine (21) (USFS 1988) ?
- Longleaf Pine / *Schizachyrium* - *Drosera* Loamy Dry-Mesic Uplands (Turner et al. 1999) B
- Longleaf Pine-Little Bluestem Series (Diamond 1993) B
- Longleaf Pine: 70 (Eyre 1980) B

Classification Comments: *Pinus palustris*-dominated woodlands on the West Gulf Coastal Plain are threatened by fire suppression, forestry and agricultural land conversion, and over-grazing. The nominals of this type are too general, and the name may need revision to tie it more specifically. This type is closely related to *Pinus palustris* / *Schizachyrium scoparium* - *Liatris pycnostachya* Woodland (CEGL003571).

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (1997-12-31): This longleaf pine woodland community occurs west of the Mississippi River in west-central Louisiana and eastern Texas, particularly on the Willis and Catahoula formations. It is restricted primarily to upland ridges in highly dissected topography but may also occur on gently rolling topography over acidic, well-drained sandy loams. It is part of the endangered Longleaf Pine Ecosystem, which once dominated the Coastal Plain landscape of the southeastern United States, and depends on frequent, low-intensity, growing-season fires to control understory vegetation and for the reproduction of *Pinus palustris*. *Pinus palustris*-dominated woodlands are susceptible to the effects of fire suppression, over-grazing, or conversion to commercial forest plantations or agriculture. Remaining examples are highly threatened by development, conversion, and alteration of fire regimes. This is a pyrogenic community with fire-return intervals of two to eight years. This was historically one of the most important upland forest types within its range. Few high-quality sites remain which have a mature canopy and an intact herbaceous layer. In order to maintain the diverse herb layer, control hardwood invasion, and promote *Pinus palustris* regeneration, growing-

season, low-intensity fires should be used approximately every 2 to 5 years to simulate the historic fire regime. If fire suppression occurs for approximately 8 to 12 years, this community will likely become overgrown with *Liquidambar styraciflua* and other hardwoods. With continued fire suppression, this community will experience increased hardwood invasion and cover and succeed to a mixed *Pinus palustris* Forest. Most of those occurrences which have not been destroyed are severely degraded.

High-ranked species: *Botrychium jenmanii* (G3G4), *Echinacea sanguinea* (G3), *Picoides borealis* (G3), *Schwalbea americana* (G2), *Tridens carolinianus* (G3)

ELEMENT DISTRIBUTION

Range: This community occurs in the West Gulf Coastal Plain of Texas and Louisiana.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 231E:CC, 232F:CC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Correll and Johnston 1970, Diamond 1993, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Orzell 1990, Patterson et al. 1994, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988

WETLANDS, VEGETATED

WEST GULF COASTAL PLAIN HERBACEOUS SEEPAGE BOG

TRUMPET PITCHERPLANT - SLENDER BEAKSEEDGE - BOG CONEFLOWER - YELLOW SUNNYBELL HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Sarracenia alata* - *Rhynchospora gracilentia* - *Rudbeckia scabrifolia* - *Schoenolirion croceum* Herbaceous Vegetation

Database Code: C EGL004175

Formation: Saturated temperate or subpolar grassland (V.A.5.N.m)

Alliance: *Rhynchospora oligantha* - *Sarracenia* spp. - (*Aristida beyrichiana*, *Ctenium aromaticum*) - *Osmunda cinnamomea* / (*A.1463*) *Sphagnum* spp. Saturated Herbaceous Alliance

ELEMENT CONCEPT

Summary: This wet, fire-maintained, hillside seepage community occurs on seepage slopes in sandy *Pinus palustris* uplands in the West Gulf Coastal Plain of eastern Texas and western Louisiana. This oligotrophic wetland is maintained by seepage at the zone between an overlying, permeable sandy layer and a lower layer of relatively impermeable material such as sandstone or clay. The vegetation of intact examples is dominated by a dense, species-rich, graminoid-forb layer less than 1 m tall with a continuous to nearly continuous cover, typically 80-90%. *Sarracenia alata* is often the aspect dominant of this community. Emergent stems of *Toxicodendron vernix*, *Magnolia virginiana*, *Persea borbonia*, and/or *Pinus palustris* may be present even in well-burned examples. An emergent layer of woody stems, including *Magnolia virginiana*, *Toxicodendron vernix*, and *Pinus palustris* may be present. Woody shrubs have a cover of less than 10% in frequently burned examples but increase greatly with reductions in fire frequency. This type is intended to encompass the range of variation present in West Gulf Coastal Plain seepage bogs, although various authors have recognized a number of different subtypes.

Environment: According to Bridges and Orzell (1989a) these communities are commonly found on short, steep slopes (10-30%), most commonly on south-, southwest-, or west-facing slopes on the Catahoula, Willis, and northern portion of the Bentley geologic formations. Soils of these bogs are usually not mapped as distinct from the surrounding drier, sandy uplands. These habitats are commonly presumed to have low nutrient availability, although this presumption seems to be based largely on the presence of carnivorous plants rather than hard data, since actual samples from the region have not documented such deficits (Nixon and Ward 1986) [see also Van Kley (1999a) for calcium and magnesium data]. They occur on permanently wet, seepage slopes which result from lateral movement of precipitation and groundwater at a contact zone with an impermeable layer. Nixon and Ward (1986) distinguish between basin bogs and slope bogs, while Bridges and Orzell (1989a) describe three different landform types. The rocky hillside subtype of Bridges and Orzell (1989a) was described only from Middle Branch Bog in Louisiana, although an apparently similar site occurs in east Texas (Reid full citation??), and a number of sites have exposures of Catahoula mudstone and/or siltstone. The soil pH range of five bogs studied by Nixon and Ward (1986) ranged from 4.3-4.7, with an additional site at 5.3. Three additional Texas examples ranged from 5.4-5.6 (plot data cited below). The Nixon and Ward (1986) samples ranged from 2.2-5.8% organic material. Two Nixon and Ward (1986) sites were 60% sand in the upper surface, and two additional Texas plots (ANNF 92A, SANF

139-01F) were greater than 80% sand in the upper surface (Turner et al. unpubl. data). Remaining Nixon and Ward (1986) sites ranged from only 20-26% sand (46-64% clay), and one additional Texas plot was 40% sand and 39% clay.

Vegetation: Although the number of plant taxa present in bogs of the region varies considerably depending on size, type, degree of disturbance, 200 or more species may be present in this community with greatest representation by taxa in the Poaceae, Cyperaceae, and Asteraceae families (Nixon and Ward 1986). Many bog taxa are distributed primarily eastward reaching their western limits in this habitat. Several species such as *Ctenium aromaticum* and *Sabatia macrophylla* are found only in western Louisiana examples. Nixon and Ward (1986) listed 48 species that were present in 5 or more bogs. This list, as further modified by Bridges and Orzell (1989a), includes the following taxa with % frequencies greater than 50%: *Xyris ambigua*, *Eriocaulon decangulare*, *Magnolia virginiana*, *Liatris pycnostachya*, *Aletris aurea*, *Morella caroliniensis* (= *Myrica heterophylla*), *Rhynchospora gracilentia*, *Drosera capillaris*, *Sarracenia alata*, *Eryngium integrifolium*, *Eupatorium rotundifolium*, *Ptilimnium costatum*, *Xyris baldwiniana*, *Coreopsis linifolia*, *Fuirena squarrosa*, *Mitreola sessilifolia* (= *Cynoctonum sessilifolium*), *Polygala ramosa*, *Rhynchospora oligantha*, *Lachnocaulon anceps*, *Morella cerifera* (= *Myrica cerifera*), *Toxicodendron vernix* (= *Rhus vernix*), *Scleria reticularis*, *Marshallia graminifolia* var. *cynanthera* (= *Marshallia tenuifolia*), *Lycopodiella appressa* (= *Lycopodium appressum*), *Rhexia petiolata*, *Smilax laurifolia*, *Helianthus angustifolius*, and *Sphagnum* sp. Other species present may include *Muhlenbergia expansa*, *Dichantherium dichotomum* var. *ensifolium*, *Dichantherium scabriusculum*, *Dichantherium* spp., *Aristida palustris*, *Aristida purpurascens* var. *virgata*, *Andropogon gyrans* var. *stenophyllus* (= *Andropogon perangustatus*), *Anthaenantia rufa*, *Panicum virgatum*, *Rhynchospora elliottii*, *Rhynchospora latifolia*, *Rhynchospora macra*, *Rhynchospora plumosa*, *Rhynchospora rariflora*, *Scleria muehlenbergii* (= *Scleria reticularis* var. *pubescens*), *Tridens ambiguus*, *Carex glaucescens*, *Eleocharis tuberculosa*, *Juncus trigonocarpus*, *Agalinis obtusifolia*, *Arnoglossum ovatum*, *Burmanna capitata*, *Calopogon tuberosus*, *Centella erecta*, *Drosera brevifolia*, *Eriocaulon texense*, *Gratiola pilosa*, *Lycopodiella* spp., *Marshallia graminifolia* var. *cynanthera* (= *Marshallia graminifolia* ssp. *tenuifolia*), *Oxypolis filiformis*, *Pinguicula pumila*, *Pogonia ophioglossoides*, *Ptilimnium capillaceum*, *Rhexia mariana*, *Schoenolirion croceum*, and *Utricularia juncea*.

Dynamics: Frequent fires are essential to control invasion by wetland shrubs, although the wettest areas may persist in an herbaceous-dominated condition without fire. However, fire may also be necessary to stimulate growth, flowering and seed production of many herbaceous species found in this community. In the absence of fire, these bogs may become heavily wooded, resulting in the eventual elimination of the bog (Folkerts 1982). Increased development of woody species suppresses herbaceous species and potentially produces some drying effect by pumping larger volumes of water.

Similar Associations:

- *Carex lurida* - *Andropogon glomeratus* - *Sarracenia alata* - *Symphyotrichum puniceum* var. *scabricaule* - *Doellingeria sericocarpoides* Herbaceous Vegetation (CEGL008417) -- is endemic to the Texas Post Oak Savanna region.

Related Concepts:

- *Drosera* Sandy/Loamy Wet Herbaceous Seeps (Turner et al. 1999) B
- Boggy Longleaf pine seeps (Van Kley 1999a) ?
- East Texas pitcher plant bogs (Nixon and Ward 1986) ?
- Hillside Seepage Herb Bog (Bridges and Orzell 1989a) ? IID3b. West Gulf Coastal Plain Herbaceous Seepage Bog (Allard 1990) B
- Rocky High Hillside Seepage Bog (Bridges and Orzell 1989a) ?
- Sphagnum-Beakrush Series (Diamond 1993) B

Classification Comments: Bridges and Orzell (1989a) mention three subtypes of WGCP hillside seepage herb bogs: high (upper slope) type, toeslope (lower) subtype, and rocky high hillside subtype. Ward and Nixon (1986) studied and described "basin bogs" and "slope bogs." This community appears to be most common in Louisiana on the Pleistocene Intermediate and High Terraces on certain members of the Fleming Formation and on the Catahoula Formation (especially in Vernon and Natchitoches parishes), and in Texas on the Catahoula, Willis, and the northern half of the Bentley formations (Bridges and Orzell 1989a, MacRoberts and MacRoberts 1991, Martin and Smith 1993).

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2002-1-31): This community is endemic to the West Gulf Coastal Plain, where it is restricted to isolated small patches associated with permanently wet seepage zones. Historically, most occurrences were found within a matrix of pyrogenic *Pinus palustris* woodlands which were critical for the ignition and spread of fires into these embedded habitats. Although there are over 100 known examples, many of which occur on Kisatchie National Forest in Louisiana (Smith 1996a) and Angelina National Forest, Bridges and Orzell (1989a) estimated that less than 30 are relatively undisturbed. The total extent of this community is probably far less than 800 ha (2000 acres). The fact that these sites are widely scattered and relatively isolated from one another makes them difficult to manage and monitor adequately. When coupled with extreme susceptibility to damage, it is clear that even public land examples are by no means secure. Threats include altered hydrologic flow (which may occur as a result of construction of adjacent roads and/or mechanical firelines as well as purposeful ditching and draining), domestic and feral animal grazing, fire exclusion, and uncontrolled off-road vehicle activity. These activities, along with land-use conversion, have resulted in the deterioration or elimination of many examples both on public and private lands. Few examples on private lands are managed with prescribed fire, and the U.S. Forest Service is having an increasingly difficult time doing so, at least in Texas. Several formerly high-quality examples are found within the Upland Island Wilderness Area which has not received any fire in over 20 years. Prescribed

burns mimicking historic growing-season fire seasonality and periodicity (2 to 3 years) and the maintenance of watershed integrity to ensure seepage conditions are important for managing this community.

High-ranked species: *Aimophila aestivalis* (G3), *Bartonia texana* (G2), *Lachnocaulon digynum* (G3), *Platanthera integra* (G3G4), *Ptilimnium costatum* (G3G4), *Rhynchospora macra* (G3), *Rudbeckia scabrifolia* (G2G3), *Xyris drummondii* (G3), *Xyris scabrifolia* (G3)

ELEMENT DISTRIBUTION

Range: This community is endemic to the portion of the West Gulf Coastal Plain formerly dominated by longleaf pine. According to Bridges and Orzell (1989a) it ranges from Natchitoches Parish, Louisiana, west to Polk County, Texas.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC, 232Fb:CCC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Diamond 1993, Folkerts 1982, Hamel 1992, Hermann 1991, LANHP 1992, MacRoberts and MacRoberts 1988, MacRoberts and MacRoberts 1991, Martin and Smith 1991, Martin and Smith 1993, Nixon and Ward 1986, Orzell 1990, Platt et al. 1990, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, Van Kley 1999a, Wilson 1995

WEST GULF COASTAL PLAIN LARGE RIVER FLOODPLAIN FOREST

AMERICAN LOTUS HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Nelumbo lutea* Herbaceous Vegetation

Database Code: CEGLO04323

Formation: Permanently flooded temperate or subpolar hydromorphic-rooted vegetation (V.C.2.N.a)

Alliance: *Nelumbo lutea* Permanently Flooded Temperate Herbaceous Alliance (A.1671)

ELEMENT CONCEPT

Summary: The American lotus type occurs in natural wetlands or artificial impoundments across the eastern United States and southern Ontario. Stands are essentially monospecific *Nelumbo lutea* communities. This association may be divided as more information becomes available. In Wisconsin, this type is located primarily in the backwaters and impoundments of the Mississippi River and along the deep marshes of the lower Wolf River system. In the Central Appalachians this association includes mixed or monospecific *Nelumbo lutea* communities of natural wetlands or artificial impoundments, sometimes with scattered *Cephalanthus occidentalis*. Other floating-leaved aquatic plant species, such as *Nuphar lutea* and *Nymphaea odorata*, may be present, as may emergent species such as *Schoenoplectus tabernaemontani* (= *Scirpus tabernaemontani*), *Pontederia cordata*, *Juncus effusus*, *Typha latifolia*, *Eichhornia crassipes* (alien), *Hydrocotyle* spp., and floating aquatics, such as *Salvinia minima*, *Spirodela* spp., *Lemna* spp., and *Azolla caroliniana*. The hydrology of this association is highly variable; the hydrologic placement is debatable.

Environment: Stands are found in natural wetlands or artificial impoundments. In Wisconsin, this type is located primarily in the backwaters and impoundments of the Mississippi River and along the deep marshes of the lower Wolf River system (E. Epstein pers. comm. 2003). The hydrology of this association in the Central Appalachian region is highly variable; thus, the hydrologic placement is debatable (Central Appalachian Ecoregional Planning Team pers. comm. 1998).

Vegetation: Stands are essentially monospecific *Nelumbo lutea* communities. This association may be divided as more information becomes available. In the Central Appalachian region, mixed or monospecific *Nelumbo lutea* communities of natural wetlands or artificial impoundments sometimes contain scattered *Cephalanthus occidentalis*. Other floating-leaved aquatic plant species, such as *Nuphar lutea* and *Nymphaea odorata*, may be present, as may emergent species such as *Schoenoplectus tabernaemontani* (= *Scirpus tabernaemontani*), *Pontederia cordata*, *Juncus effusus*, *Typha latifolia*, *Eichhornia crassipes* (alien), *Hydrocotyle* spp., and floating aquatics, such as *Salvinia minima*, *Spirodela* spp., *Lemna* spp., and *Azolla caroliniana* (Central Appalachian Ecoregional Planning Team pers. comm. 1998).

Dynamics: No information

Similar Associations:

Related Concepts:

- IID6a. Natural Impoundment Pond (Allard 1990) B
- Water lily emergent vegetation (CAP pers. comm. 1998) ?

Classification Comments: It is unclear whether natural stands (ponds) can be separated from semi-natural stands (cultural impoundments that are invaded by *Nelumbo lutea*), complicating the classification and the assessment of the rarity of this type. This type is relatively uncommon in Wisconsin, but several of the occurrences are quite large (hundreds of acres) and reasonably well protected (E. Epstein pers. comm. 2003).

CONSERVATION RANKING & RARE SPECIES

GRank: G4? (2002-10-15): Although natural stands may be relatively rare, this type may also occur in cultural impoundments. The dominant species in stands of this vegetation is widespread across the eastern 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.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type is found locally across many parts of the eastern/southeastern United States, from Kentucky and Virginia northeast to Ontario and Wisconsin, south to Texas, and east to Georgia.

Subnations: AL, AR, GA, IA, IL?, IN, KY, LA, MI, MO?, MS, NC, OK, ON, SC, TN, TX, VA

TNC Ecoregions: 31:C, 32:P, 36:C, 37:P, 38:C, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 46:C, 48:C, 51:?, 52:P, 53:C, 56:P, 57:P, 58:?, 59:C

USFS Ecoregions: 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Ch:CCC, 222Db:CCC, 222Ka:CCC, 222Kb:CCC, 222Ke:CCC, 222Kf:CCC, 222Kh:CCC, 222Lb:CCC, 222Lc:CCC, 222Ld:CCC, 222Le:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232:C, 234An:CCC, 251Df:CCC, 255Dc:CCC, M221Ad:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Fort Benning); NPS (Effigy Mounds); USFS (Kisatchie, Ouachita, Ozark); USFWS (Aransas?, Big Lake, Brazoria, Eufaula, McFaddin, Reelfoot)

ELEMENT SOURCES

References: ALNHP 2002, Allard 1990, Blair 1938, Blair and Hubbell 1938, CAP pers. comm. 1998, Epstein pers. comm., Fleming et al. 2001, Hoagland 2000, McAlister and McAlister 1995, Penfound 1953, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d.

BALD-CYPRESS - WATER TUPELO - RED MAPLE / VIRGINIA-WILLOW FOREST

ELEMENT IDENTIFIERS

NVC association: *Taxodium distichum* - *Nyssa aquatica* - *Acer rubrum* / *Itea virginica* Forest

Database Code: CEGLO07422

Formation: Seasonally flooded cold-deciduous forest (I.B.2.N.e)

Alliance: *Taxodium distichum* - *Nyssa (aquatica, biflora, ogeche)* Seasonally Flooded Forest Alliance (A.337)

ELEMENT CONCEPT

Summary: This association includes seasonally flooded swamps dominated by *Taxodium distichum* with *Nyssa aquatica* and other hardwood species, especially *Acer rubrum* and *Ulmus americana*. Shrub species which may be present include *Itea virginica* and *Clethra alnifolia* (within its range). *Saururus cernuus* is prominent in the herbaceous stratum, which may be sparse and may also include *Boehmeria cylindrica*, *Sagittaria latifolia*, and *Smilax* spp. In the Mississippi River Alluvial Plain and Gulf Coastal Plain, this community primarily occurs in sloughs which flood for 3-4 months annually.

Environment: This association includes seasonally flooded swamps. In the Mississippi River Alluvial Plain and Gulf Coastal Plain, this community primarily occurs in sloughs which flood for 3-4 months annually. This community occurs primarily in sloughs which receive annual flooding for approximately 3 or 4 months. The acidic clay soils are very poorly drained and very slowly permeable; the Yorktown series (Typic Fluvaquent) is commonly associated with this community in Louisiana. Slopes are typically less than 1%, and the high water table is within 15 cm of the soils surface throughout the year in most years (Martin et al. 1990, L. Smith pers. comm. 1995). Stands assigned here from the Savannah River Plant (South Carolina) are in "floodplains which are flooded most of the year" (Jones et al. 1981b).

Vegetation: This swamp forest has a canopy dominated by *Taxodium distichum*, *Nyssa aquatica*, and *Acer rubrum* var. *drummondii*. Associated canopy species include *Styrax americanus*, *Fraxinus caroliniana*, *Liquidambar styraciflua*, *Quercus phellos*, *Fraxinus pennsylvanica*, *Ulmus rubra*, *Ulmus alata*, *Nyssa biflora*, and *Quercus laurifolia*. This is typically a closed-canopy community, with cover ranging approximately between 60-100%, but most often 80-90%. The sparse to patchy tall-shrub stratum (2-5 m in height) includes *Itea virginica*, *Cephalanthus occidentalis*, *Diospyros virginiana*, *Forestiera acuminata*, *Ilex decidua*, and *Carpinus caroliniana*. In the Kisatchie National Forest, *Itea virginica* has a frequency of 50% in occurrences. The short-shrub stratum (0.5-2 m in height; mean cover of 13%) is dominated by *Acer rubrum*, *Itea virginica*, *Taxodium distichum*, and *Nyssa aquatica*. Associates include *Styrax americanus*, *Ulmus alata*, *Cephalanthus occidentalis*, *Rubus argutus*, *Fraxinus pennsylvanica*, *Quercus* spp., *Diospyros virginiana*, *Quercus lyrata*, *Ilex decidua*, *Liquidambar styraciflua*, *Forestiera acuminata*, *Celtis laevigata*, *Fraxinus caroliniana*, *Carpinus caroliniana*, *Triadica sebifera* (= *Sapium biferum*), *Rubus trivialis*, *Carya aquatica*, *Nyssa biflora*, *Crataegus viridis*, and *Quercus phellos*. The mixed graminoid-forb herbaceous layer (mean cover 33%) is dominated by *Triadenum tubulosum*, *Triadenum virginicum*, *Carex atlantica*, *Saururus cernuus*, and *Gratiola virginiana*. Associates include *Boehmeria cylindrica*, *Justicia ovata* var. *lanceolata*, *Polygonum punctatum*, *Proserpinaca palustris*, *Carex jorii*, *Peltandra virginica*, *Lycopus rubellus*, *Mikania scandens*, *Leersia virginica*, *Lysimachia radicans*, *Carex intumescens*, *Spiranthes cernua*, *Carex tribuloides*,

Hydrocotyle verticillata, *Viola* spp., *Panicum rigidulum*, *Rhynchospora corniculata*, *Ludwigia glandulosa*, *Osmunda regalis*, *Symphotrichum lateriflorum* (= *Aster lateriflorus*), *Carex flaccosperma*, *Commelina virginica*, *Leersia lenticularis*, *Bidens mitis*, *Carex lupulina*, *Carex louisianica*, *Penthorum sedoides*, *Pluchea camphorata*, and *Cyperus virens*. Minor associates (each with cover less than 1%) include *Acmella oppositifolia* var. *repens*, *Carex lonchocarpa*, *Onoclea sensibilis*, *Acalypha rhomboidea* (= *Acalypha virginica* var. *rhomboidea*), *Pilea pumila*, *Lobelia cardinalis*, *Sagittaria platyphylla*, *Dichanthelium dichotomum* var. *dichotomum*, *Carex bromoides*, *Mimulus alatus*, *Hydrolea uniflora*, *Juncus effusus*, *Micranthemum umbrosum*, *Mitchella repens*, *Elephantopus carolinianus*, *Helenium flexuosum*, *Poa autumnalis*, *Woodwardia areolata*, *Asclepias perennis*, *Juncus diffusissimus*, *Phanopyrum gymnocarpon*, *Cerastium glomeratum*, *Erechtites hieraciifolia*, *Erigeron philadelphicus*, *Ageratina altissima* var. *altissima*, *Hypericum mutilum*, *Dichanthelium commutatum*, *Sphenopholis obtusata*, and *Spirodela polyrrhiza*. *Sphagnum* spp. are not significant in this community. Within their ranges *Tillandsia usneoides* and *Pleopeltis polypodioides* ssp. *polypodioides* are present on canopy trees and woody shrubs (Martin and Smith 1991, Allen 1993c).

Dynamics: Hydrologic fluctuation is the main disturbance in this community and the primary ecological factor affecting the species composition and structure. The water budget of alluvial cypress swamp systems includes surface flow, groundwater inflow, precipitation throughfall, flooding, evapotranspiration, interception loss, and surface and subsurface outflow into the river channel. Hydrologic inflows are predominantly runoff from surrounding uplands and overflow of the flooding river. Flooding generally accounts for less than 50% of the total annual water input. Seasonal pulses of floods bring in water and nutrient-rich sediments (Mitsch and Gosselink 1993).

As this community matures, the relative abundance of *Acer rubrum* var. *drummondii* may decrease, with the canopy becoming increasingly dominated by *Taxodium distichum* and *Nyssa aquatica*.

Similar Associations:

- *Nyssa aquatica* - *Nyssa biflora* Forest (CEGL007429) -- is wetter, being semipermanently flooded, and does not contain significant *Taxodium distichum*.
- *Nyssa aquatica* Forest (CEGL002419) -- is a wetter community, dominated almost exclusively by *Nyssa aquatica* without *Taxodium distichum* as a significant component.
- *Nyssa biflora* - *Quercus laurifolia* / *Sphagnum* spp. Depression Forest (CEGL007390) -- is wetter, being flooded/saturated for 4 to 6 months of the year and does not contain *Taxodium distichum* as a dominant.
- *Taxodium distichum* - (*Nyssa aquatica*) / *Forestiera acuminata* - *Planera aquatica* Forest (CEGL002421) -- also of longer hydroperiod.
- *Taxodium distichum* - *Fraxinus pennsylvanica* - *Quercus laurifolia* / *Acer rubrum* / *Saururus cernuus* Forest (CEGL007719) -- with a partly overlapping distribution, but apparently lacking *Nyssa aquatica*.
- *Taxodium distichum* - *Nyssa aquatica* / *Fraxinus caroliniana* Forest (CEGL007431) -- is semipermanently flooded and does not contain a significant herbaceous layer.
- *Taxodium distichum* / *Lemna minor* Forest (CEGL002420) -- is also associated with streams and rivers, but occurs in wetter semipermanently flooded locations and is without a significant *Nyssa aquatica* component.

Related Concepts:

- Bald cypress-water gum-mixed hardwood community (Jones et al. 1981b) ?
- Baldcypress - Tupelo: 102 (Eyre 1980) B
- Baldcypress - Water Tupelo (67) (USFS 1988) ?
- Baldcypress-Water Tupelo Series (Diamond 1993) B
- IIA4b. Bald Cypress - Water Tupelo Swamp (Allard 1990) B
- Palustrine *Taxodium distichum*-*Nyssa* spp. Series (Pyne 1994) B

Classification Comments: This type includes data from Savannah River Site, inner Coastal Plain of South Carolina (after Jones et al. 1981b; Bald cypress-water gum-mixed hardwood community; 5 stands sampled). There are also data from the Kisatchie National Forest (Allen 1993c). No occurrences are known with dominant *Itea virginica* shrub layer in eastern Texas, but it may be possible (R. Turner pers. comm.). *Taxodium distichum* - *Nyssa aquatica* / *Fraxinus caroliniana* Forest (CEGL007431) is similar, but apparently the conceptual difference is that CEGL007431 is semipermanently flooded while this association (CEGL007422) is seasonally flooded.

CONSERVATION RANKING & RARE SPECIES

GRank: G4? (1997-8-15): No information

High-ranked species: *Triphora trianthophora* (G3G4)

ELEMENT DISTRIBUTION

Range: This association is found in the Atlantic and Gulf coastal plains from South Carolina south to Alabama and west to Louisiana and presumably Texas and in the interior to Kentucky and Arkansas.

Subnations: AL, AR, KY, LA, MS, SC, TN, TX

TNC Ecoregions: 40:?, 41:C, 42:C, 43:?, 53:C, 56:C

USFS Ecoregions: 231B:??, 231E:??, 232Bs:CCC, 232C:CP, 232F:CC, 234A:CC

Federal Lands: DOE (Savannah River Site); USFS (Angelina?, Davy Crockett?, De Soto, Delta, Kisatchie, Sabine NF?, Sam Houston?)

ELEMENT SOURCES

References: Allan and Flecker 1993, Allard 1990, Allen 1993c, Clewell 1971, Diamond 1993, Evans 1991, Eyre 1980, Jones et al. 1981b, Martin and Smith 1991, Mitsch and Gosselink 1993, Pyne 1994, Smith 1996a, Smith pers. comm., Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988, Wieland 1994b, Wieland 2000b

BALD-CYPRESS / LESSER DUCKWEED FOREST

ELEMENT IDENTIFIERS

NVC association: *Taxodium distichum* / *Lemna minor* Forest

Database Code: CEG002420

Formation: Semipermanently flooded cold-deciduous forest (I.B.2.N.f)

Alliance: *Taxodium distichum* Semipermanently Flooded Forest Alliance (A.346)

ELEMENT CONCEPT

Summary: This bald-cypress swamp is found in the Atlantic and Gulf coastal plains of the United States in a variety of ecological settings. Examples may occur in oxbow lakes and ponds, and along the banks of rivers and lakes in saturated or flooded soils. This type is characterized by a monospecific canopy of straight, tall individuals of *Taxodium distichum* above shallow to deep water (depths ranging from soil saturation to approximately 6 m) during all or most of the year. Flooding is seasonal, occurring during winter and spring. Stands have a sparse to moderate subcanopy and depauperate shrub and herb layers. The trunks of the canopy trees typically form swelled buttresses. Canopy cover is variable, from at or near 100% to less than 60% in some examples. More open examples of this type tend to occur in deeper water. In the deepest water situations scattered trees grow over an open water surface covered by floating and submersed aquatic plants. *Taxodium distichum* regeneration is absent in areas of permanent inundation, as seed germination does not occur in standing water. The subcanopy and herbaceous layers are dependent upon timing, duration, and depth of flooding. *Cephalanthus occidentalis* and *Rosa palustris* may be common shrubs in some examples of this community, while *Fraxinus caroliniana* (in its range) and *Acer rubrum* var. *drummondii* are common in the subcanopy. Shallow water emergents, floating-leaved aquatics, such as *Azolla caroliniana*, *Brasenia schreberi*, *Cabomba caroliniana*, *Hydrocotyle ranunculoides*, *Limnium spongia*, *Spirodela punctata*, *Wolffia columbiana*, *Lemna* spp., *Nymphaea* spp., and submerged hydrophytes, such as *Ceratophyllum demersum*, *Egeria densa*, *Myriophyllum aquaticum*, and *Potamogeton nodosus*, are common in permanent water zones throughout the range of *Taxodium distichum* swamps. This community is differentiated from other swamp forests by lacking *Nyssa* spp. as other than occasional individuals. This is the only community type currently defined outside Florida with *Taxodium distichum* as the sole dominant.

Environment: This community occurs on a variety of inundated topographic habitats, including oxbow ponds, natural lakes, drowned floodplains, backwater sloughs, along river edges, and in various isolated depressions within the floodplain. It is more commonly associated with brownwater than blackwater rivers. Soil types on which it is found are very poorly drained. This included impounded water (e.g., abandoned millponds, beaver ponds) and other habitats with relatively stable water levels.

Vegetation: The vegetation is characterized by a monospecific canopy of straight, tall individuals of *Taxodium distichum* with a sparse to moderate subcanopy and depauperate shrub and herb layers. Trees are generally very tall and straight with their trunks forming swelled buttresses. Canopy cover is extremely variable, from densely closed forests to sparse canopies. *Taxodium distichum* regeneration is absent in areas of permanent inundation, as seed germination does not occur in standing water. The subcanopy and herbaceous layers are dependent upon timing, duration, and depth of flooding. *Cephalanthus occidentalis* and *Rosa palustris* are common shrubs in this community, while *Fraxinus caroliniana* (in its range) and *Acer rubrum* var. *drummondii* are common in the subcanopy. A common vine is *Brunnichia ovata*. Shallow water emergents, floating-leaved aquatics, such as *Azolla caroliniana*, *Brasenia schreberi*, *Cabomba caroliniana*, *Limnium spongia*, *Spirodela punctata*, *Wolffia columbiana*, *Lemna minor*, *Nymphaea* spp., and submerged hydrophytes, such as *Ceratophyllum demersum*, are common in permanent water zones throughout the range of this type. In the southern part of the range (e.g., southern Alabama) *Lemna minor* is replaced by *Lemna valdiviana*. Other important aquatic species may include *Ludwigia palustris*, *Ludwigia peploides*, and *Hydrolea uniflora*. The most open-canopied examples, in deeper water, may support dense colonies of *Nuphar lutea*, and often greater cover of *Nelumbo lutea*, *Cabomba caroliniana*, *Ceratophyllum demersum*, *Egeria densa*, and *Wolffia columbiana* (Van Kley and Hine 1998). Interestingly, cover of the epiphyte *Tillandsia usneoides* apparently peaks in more closed-canopied situations. Common herbaceous species from occurrences in southwestern Arkansas include *Bidens discoidea*, *Carex lupulina*, *Carex glaucescens*, *Echinodorus cordifolius*, *Heliotropium indicum*, *Leersia oryzoides*, *Limnium spongia*, *Lycopus rubellus*, *Polygonum hydrophyloides*, *Proserpinaca palustris*, and *Saururus cernuus* (J. Campbell pers. comm. 1999, D. Zollner pers. comm. 1999, TNC 1995a).

Dynamics: Canopy cover is variable, from at or near 100% to less than 60% in some examples. More open examples of this type tend to occur in deeper water. In the deepest water situations scattered trees grow over an open water surface covered by floating and submersed aquatic plants (Van Kley and Hine 1998). *Taxodium distichum* regeneration is absent in areas of permanent inundation, as seed germination does not occur in standing water. The subcanopy and herbaceous layers are dependent upon timing, duration, and depth of flooding. Woody regeneration is completely dependent on periods of drawdown, which may result in dense stands of even-

aged trees. Very old, mature trees are generally scattered throughout bald-cypress swamps among dominant, medium-aged trees. Swamps containing large numbers of mature trees exhibit numerous canopy openings due to senescence and wind throws. Old-growth bald-cypress are usually hollow with many snags and dead limbs. Regeneration in bald-cypress swamps does occur on the periphery where fluctuating water levels often leave moist soil areas ideal for seed germination. Seed dispersal is accomplished by floating on the water surface.

Similar Associations:

- *Nyssa aquatica* Forest (CEGL002419) -- lacks bald-cypress as a significant contributor to canopy dominance.
- *Taxodium distichum* - (*Nyssa aquatica*) / *Forestiera acuminata* - *Planera aquatica* Forest (CEGL002421) -- has similar hydrologic characteristics but differs by exhibiting a canopy codominated by bald-cypress and water tupelo.
- *Taxodium distichum* - *Nyssa aquatica* / *Fraxinus caroliniana* Forest (CEGL007431) -- a brownwater Atlantic Coastal Plain seasonally flooded type of flowing rivers.
- *Taxodium distichum* - *Populus heterophylla* Forest (CEGL005201)

Related Concepts:

- *Taxodium* - *Nyssa aquatica* / *Rosa palustris* community (Voigt and Mohlenbrock 1964) B
- *Taxodium distichum* - *Nyssa aquatica* swamp (Robertson et al. 1984) B
- Bald Cypress Swamp (Oberholster 1993) B
- Baldcypress / *Ceratophyllum* Semi-Permanently Flooded Swamps (Turner et al. 1999) ?
- Baldcypress-Water Tupelo Series (Diamond 1993) B
- Baldcypress: 101 (Eyre 1980) B
- Closed-canopy Cypress Swamps & Open (Deep Water) Cypress Swamps (TNC 1995a) ?
- Eastern Broadleaf and Needleleaf Forests: 113: Southern Floodplain Forest (*Quercus-Nyssa-Taxodium*) (Kuchler 1964) B
- IIA4a. Bald Cypress Swamp (Allard 1990) B
- Mesotrophic Semipermanently Flooded Forest (Rawinski 1992) B
- P1B3dI1a. *Taxodium distichum* (Foti et al. 1994) ?
- Palustrine *Taxodium distichum* Series CP, MAP (Pyne 1994) ?
- Palustrine: Forested Wetland: Riparian (TNC 1985) B
- Palustrine: Palustrine Forested Wetland (Cowardin et al. 1979) B
- UNESCO FORMATION CODE: I.B.3e (UNESCO 1973) B

Classification Comments: This is the only community type currently defined outside Florida with *Taxodium distichum* as the sole dominant. Stands are possible in suitable habitat anywhere within the range of *Taxodium distichum*; however, it is more commonly recognized outside of, or near the edge of, the range of *Nyssa aquatica* which otherwise is frequently codominant with *Taxodium distichum*. Classification can become difficult where excessive logging has removed most of the mature bald-cypress. Logging, and possibly alteration of hydrologic regimes, may create an unnaturally open canopy more typical of woodland communities. Water tupelo regeneration is prevalent at these disturbed sites, often replacing bald-cypress as the dominant plant species. Unless canopy composition is severely altered, this criterion is currently used to establish species dominance. Where logging causes classification difficulties, adjacent undisturbed occurrences may be used to ascertain pre-disturbance dominance.

CONSERVATION RANKING & RARE SPECIES

GRank: G4G5 (2001-9-19): No information

High-ranked species: *Carex decomposita* (G3), *Ischnura gemina* (G2)

ELEMENT DISTRIBUTION

Range: This bald-cypress swamp is found in the Atlantic and Gulf coastal plains of the United States. Stands are possible in suitable habitat anywhere within the range of *Taxodium distichum*, i.e., the lower Atlantic Coastal Plain from Virginia to southern Florida, the lower Gulf Coastal Plain to southeastern Texas, and the Mississippi River Alluvial Plain to southern Illinois. However, it is more commonly recognized outside of, or near the edge of, the range of *Nyssa aquatica* which otherwise is frequently codominant with *Taxodium distichum*. Such areas include southwestern Arkansas and northwestern Louisiana, southeastern Oklahoma, eastern Mississippi and adjacent Alabama, southern Indiana, peninsular Florida, northeastern Virginia, eastern Maryland and Delaware.

Bald-cypress occurs over a wide area and reaches its best development in Florida. Bald-cypress swamps occur from southern Florida, along the Gulf Coast to eastern Texas, north into Arkansas and Tennessee, up the Mississippi Valley into southern Illinois and Indiana, and as far north as Delaware along the East Coast. Historically, bald-cypress swamps reached their northernmost limits at the northern boundary of the Gulf Coastal Plains Division in southern Illinois. Remnant bald-cypress swamps still occur in extreme southern Illinois; the most significant occurrences are found in the Cache River Basin. Hydrologic alteration resulting from ditching, draining, and logging has severely reduced the number and size of bald-cypress swamps within their historic range.

Subnations: AL, AR, FL, GA, IL, IN, KY, LA, MO, MS, NC, OK, SC, TN, TX?, VA?

TNC Ecoregions: 31:C, 38:C, 40:C, 41:C, 42:C, 44:C, 53:C, 55:C, 56:C, 57:C

USFS Ecoregions: 222A:CC, 222C:CC, 222D:CP, 222G:CC, 231B:CC, 231E:CP, 231Fa:CCC, 232B:CC, 232C:CC, 232Fa:CCC, 234An:CCC

Federal Lands: DOE (Savannah River Site); NPS (Chickasaw NRA, Shiloh?); USFS (Angelina, Apalachicola, Conecuh, Davy Crockett, De Soto, Delta, Holly Springs?, Homochitto?, Kisatchie, Ocala, Osceola, Sabine NF, Sam Houston, St. Francis?, Tombigbee?); USFWS (Chickasaw NWR, Reelfoot)

ELEMENT SOURCES

References: Allard 1990, Ambrose 1990a, Applequist 1959, Blair and Hubbell 1938, Bruner 1931, Burdant et al. 1977, Burns and Honkala 1990a, Campbell pers. comm., Christensen 1988, Cowardin et al. 1979, Dennis 1988, Diamond 1993, Duck and Fletcher 1945, Evans 1991, Ewel and Odum 1984b, Eyre 1980, FNAI 1992a, Faircloth 1971, Foti 1994b, Foti et al. 1994, Hoagland 1997, Hoagland 2000, Hoagland et al. 1996, Illinois Nature Preserve Commission 1973, Klawitter 1962, Kuchler 1964, Little 1980, Martin et al. 1993, Mitsch and Gosselink 1986, NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Oberholster 1993, Osborn 1941, Penfound and Hall 1939, Pyne 1994, Radford and Martin 1975, Rawinski 1992, Rice 1963, Robertson et al. 1984, Schafale and Weakley 1990, Smith 1996a, Southeastern Ecology Working Group n.d., TNC 1985, TNC 1995a, Turner et al. 1999, UNESCO 1973, Van Kley and Hine 1998, Voigt and Mohlenbrock 1964, Wharton 1989, Wharton et al. 1982, White and Anderson 1970, White and Madany 1978, Wieland 1994b, Wieland 2000b, Zollner pers. comm.

BLACK WILLOW / COASTAL SWEET-PEPPERBUSH / WATER TUPELO SUCCESSIONAL FOREST

ELEMENT IDENTIFIERS

NVC association: *Salix nigra* / *Clethra alnifolia* / *Nyssa aquatica* Successional Forest

Database Code: CEGLO07411

Formation: Seasonally flooded cold-deciduous forest (I.B.2.N.e)

Alliance: *Salix nigra* Seasonally Flooded Forest Alliance (A.334)

ELEMENT CONCEPT

Summary: This forest, dominated by *Salix nigra*, occurs as a result of clearcut logging of forests dominated by *Taxodium distichum* and/or *Nyssa aquatica*. It occurs in very low areas of river floodplains throughout the lower Atlantic and Gulf coastal plains and in the Mississippi River Alluvial Plain. Succession may lead to re-establishment of dominance by *Taxodium distichum* and *Nyssa aquatica*. Stump sprouts of *Nyssa* spp. may occur as canopy emergents. Tree seedlings of several species (*Taxodium distichum*, *Nyssa aquatica*, *Nyssa biflora*, *Acer rubrum*, and *Fraxinus caroliniana*) may be found growing beneath the shrub layer. Common shrubs are *Clethra alnifolia*, *Lyonia ligustrina* var. *foliosiflora*, *Itea virginica*, and *Morella cerifera* (= *Myrica cerifera*). Occurrences are most common on alluvial soils, usually Inceptisols with a clay component, and most will experience annual flooding.

Environment: This forest occurs as a result of clearcut logging of forests dominated by *Taxodium distichum* and/or *Nyssa aquatica*. It occurs in very low areas of river floodplains throughout the lower Atlantic and Gulf coastal plains and in the Mississippi River Alluvial Plain. Occurrences are most common on alluvial soils, usually Inceptisols with a clay component, and most will experience annual flooding.

Vegetation: Occurrences generally have dense canopy and shrub layers. Stump sprouts of *Nyssa* spp. may occur as canopy emergents. Tree seedlings of several species (*Taxodium distichum*, *Nyssa aquatica*, *Nyssa biflora*, *Acer rubrum*, and *Fraxinus caroliniana*) may be found growing beneath the shrub layer. *Typha latifolia* may occur in dense patches beneath canopy gaps.

Dynamics: Occurrences experience annual flooding. It is possible that this community eventually may become dominated again by *Taxodium distichum* and *Nyssa aquatica*.

Similar Associations:

Related Concepts:

- Black Willow: 95 (Eyre 1980) ?
- IIF3a. Recently Harvested Forested Wetland (Allard 1990) B
- Willow (74) (USFS 1988)

Classification Comments:

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2001-2-14): This is a successional forest, which occurs as a result of clearcut logging of forests dominated by other more valuable timber species. It is not a conservation target.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: Theoretically this forest is possible in suitable habitat where the ranges of *Salix nigra*, *Taxodium distichum*, and *Nyssa aquatica* overlap, i.e., the Atlantic Coastal Plain from southeast Virginia to south Georgia, the Gulf Coastal Plain from about Tallahassee, Florida, west to southeast Texas, and the Mississippi Alluvial Plain to south Arkansas and west Texas. Exact distribution is not known.

Subnations: AL, AR, FL, GA, LA, MS, NC, SC, TN, VA

TNC Ecoregions: 41:?, 42:C, 43:C, 53:C, 56:C, 57:C

USFS Ecoregions: 231B:CC, 232:C, 234A:CC

Federal Lands: USFS (Apalachicola, De Soto, Delta, Francis Marion, Holly Springs?, Kisatchie, Ocala, St. Francis?, Tombigbee?, Tuskegee)

ELEMENT SOURCES

References: Allard 1990, Allen 1958, Eyre 1980, Southeastern Ecology Working Group n.d., USFS 1988

BLACK WILLOW LARGE RIVER FLOODPLAIN FOREST

ELEMENT IDENTIFIERS

NVC association: *Salix nigra* Large River Floodplain Forest

Database Code: CEGL007410

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Salix nigra* Temporarily Flooded Forest Alliance (A.297)

ELEMENT CONCEPT

Summary: This riverine community is dominated or codominated by *Salix nigra*. Often, *Salix nigra* is generally the sole dominant with few other species present. It occurs on recently deposited ground in the Mississippi River Alluvial Plain and other large river floodplains. This association also includes some "sandbar forest" examples with *Platanus occidentalis* and *Populus deltoides* sharing dominance with *Salix nigra*.

Environment: This riverine willow community occurs on recently deposited ground in large river floodplains. This includes "sandbar forests dominated by *Salix nigra*, with *Platanus occidentalis* and *Populus deltoides*" in the Mississippi River Alluvial Plain (formerly included in CEGL007908). Heineke (1987) mentions "riverfront areas and frontlands of islands which are actively accreting" with *Salix nigra* and *Populus deltoides*. Landward stands may be pure *Salix nigra*. In addition, he mentions "older, higher sites with more coarse-grained sediments" which are dominated by the mixture of *Salix nigra* and *Populus deltoides*.

Vegetation: *Salix nigra* may be the sole dominant in stands of this type, with few other species present. This association also includes some examples with *Platanus occidentalis* and *Populus deltoides*. Heineke (1987) mentions "riverfront areas and frontlands of islands which are actively accreting" with *Salix nigra* and *Populus deltoides*. Landward stands may be pure *Salix nigra*. In addition, he mentions "older, higher sites with more coarse-grained sediments" which are dominated by the mixture of *Salix nigra* and *Populus deltoides*.

Dynamics: No information

Similar Associations:

- *Salix nigra* Forest (CEGL002103) -- apparently similar (but smaller rivers), also placed in temporarily flooded.

Related Concepts: No information

Classification Comments: Apparently originally conceived of as a community of riverine point-bar succession, this concept more properly placed in Temporarily Flooded [e.g., A.297, to which CEGL007410 is now moved 2001-06-24]. Heineke (1987) mentions "riverfront areas and frontlands of islands which are actively accreting" with *Salix nigra* and *Populus deltoides*. Landward stands may be pure *Salix nigra*. In addition, he mentions "older, higher sites with more coarse-grained sediments" which are dominated by the mixture of *Salix nigra* and *Populus deltoides*. Is it useful or possible to distinguish the pure *Salix* from the mix? This is often an early-successional community, but its regeneration and survival depends on natural flooding and hydrologic regimes being maintained.

CONSERVATION RANKING & RARE SPECIES

GRank: G3G5 (2001-2-14): This is often an early-successional community, but its regeneration and survival depend on natural flooding and hydrologic regimes being maintained.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This community is known from the Mississippi River and similar large river floodplains of Arkansas, Tennessee, Kentucky, Mississippi, Louisiana and possibly Texas(?).

Subnations: AR, KY, LA, MS, TN, TX?

TNC Ecoregions: 41:?, 42:C, 43:C, 53:P

USFS Ecoregions: 231B:CC, 232:C, 234A:CC

Federal Lands: USFS (Angelina?, Apalachicola?, Davy Crockett?, De Soto, Delta, Francis Marion?, Holly Springs, Kisatchie, Ocala?, Sabine NF?, Sam Houston?, St. Francis, Tombigbee); USFWS (Chickasaw NWR, Reelfoot?)

ELEMENT SOURCES

References: Evans 1991, Heineke 1987, Southeastern Ecology Working Group n.d.

BROADLEAF CATTAIL SOUTHERN HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Typha latifolia* Southern Herbaceous Vegetation

Database Code: CEGLO04150

Formation: Semipermanently flooded temperate or subpolar grassland (V.A.5.N.1)

Alliance: *Typha* (*angustifolia*, *latifolia*) - (*Schoenoplectus* spp.) Semipermanently Flooded Herbaceous Alliance (A.1436)

ELEMENT CONCEPT

Summary: This association is a semi-natural type, consisting of *Typha latifolia* as an essentially monospecific stand, especially in artificial wetlands, such as borrow pits or ponds. The water table is at or above the soil surface for at least part of the growing season. The dominant species, *Typha latifolia*, often forms dense, almost monotypic stands. *Carex* spp. and *Schoenoplectus* spp. (= *Scirpus* spp.) are often found in this community, especially on the margins. Other co-occurring species of this association are not fully understood. It is a widespread type. In the Interior Low Plateau of Tennessee, *Typha latifolia* is commonly found with *Scirpus cyperinus* in roadside ditches and on the margins of ponds and reservoirs.

Environment: This type is found especially in artificial wetlands, such as borrow pits or ponds. The water table is at or above the soil surface for at least part of the growing season.

Vegetation: Stands of this association consist of *Typha latifolia* as an essentially monospecific stand. *Carex* spp. and *Schoenoplectus* spp. (= *Scirpus* spp.) are often found in this community, especially on the margins. Other co-occurring species of this association are not fully understood. In the Interior Low Plateau of Tennessee, *Typha latifolia* is commonly found with *Scirpus cyperinus*. In addition, *Juncus effusus* and an occasional *Alnus serrulata* are also present.

Dynamics: No information

Similar Associations:

Related Concepts:

- IID6a. Natural Impoundment Pond (Allard 1990) B
- L5D2aI2a. *Typha latifolia* (Foti et al. 1994) ?
- P5A4bII2a. *Typha latifolia* (Foti et al. 1994) ?

Classification Comments: This community is a common element found in many Southeastern wetland systems, but little work has been done to determine its diagnostic features and component species. The variability of this association across its range and its relation to adjacent types in this and related alliances are not fully understood. At Arnold Air Force Base, Coffee and Franklin counties, Tennessee, this vegetation is found scattered along the border of Woods Reservoir. It appears to be a component of a mosaic of communities which form bands from the edge of the reservoir to the surrounding forest. The band found at the reservoir's edge is dominated by *Typha latifolia* and *Scirpus cyperinus*. *Juncus* sp., grasses, and an occasional *Alnus serrulata* are also present. The *Typha latifolia* grows patchily, being concentrated in dense clumps throughout the outer band.

CONSERVATION RANKING & RARE SPECIES

GRank: G5 (2001-6-14): This is a wide-ranging type that includes naturally occurring and artificial wetlands.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This vegetation is possible throughout the southeastern United States.

Subnations: AL, AR, FL?, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA, WV

TNC Ecoregions: 31:C, 38:C, 39:C, 41:C, 42:C, 43:C, 44:C, 50:P, 52:?, 53:P, 56:P, 57:P, 59:C

USFS Ecoregions: 221:C, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cf:CCP, 222Cg:CCP, 222Eb:CCC, 222Eg:CCP, 222Eh:CCP, 231A:C?, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232:C, 234Aa:CCC, 251:P, 255Da:CCC, 255Dc:CCC, M221:C, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Arnold, Fort Benning); NPS (Ninety Six); USFS (Kisatchie, Oconee?, Ouachita, Ozark, Talladega?, Tuskegee?); USFWS (Anahuac, Brazoria, Reelfoot, San Bernard)

ELEMENT SOURCES

References: Allard 1990, Blair and Hubbell 1938, Foti 1994b, Foti et al. 1994, Grace and Wetzel 1981, Hoagland 2000, McCoy 1958, Southeastern Ecology Working Group n.d., TNC 1998a

BROADLEAF POND-LILY - WHITE WATER-LILY HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Nuphar lutea* ssp. *advena* - *Nymphaea odorata* Herbaceous Vegetation

Database Code: CEGLO02386

Formation: Permanently flooded temperate or subpolar hydromorphic-rooted vegetation (V.C.2.N.a)

Alliance: *Nymphaea odorata* - *Nuphar* spp. Permanently Flooded Temperate Herbaceous Alliance (A.1984)

ELEMENT CONCEPT

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*.

Environment: This community occupies shallow water depressions, oxbow ponds, and backwater sloughs of river floodplains, ponds, and small lakes.

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*, *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*.

Dynamics: No information

Similar Associations:

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) ?

Classification Comments: Occurs in borrow pits on Kisatchie National Forest. On the Conecuh National Forest (Alabama), vegetation of this alliance occurs in Gum Pond and Open Pond as a mix of *Nymphaea odorata* and *Nuphar lutea* ssp. *advena*.

CONSERVATION RANKING & RARE SPECIES

GRank: G4G5 (2002-10-15): 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.

High-ranked species: No information

ELEMENT DISTRIBUTION

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.

Subnations: AL, AR, CT, DE, GA, IA, IL, IN, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, NH, NJ, NY, OH, OK, ON, PA, RI, SC, TN, TX, VA, VT, WI, WV

TNC Ecoregions: 31:C, 32:P, 36:C, 37:C, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 45:C, 46:C, 47:C, 48:C, 49:C, 50:C, 51:C, 52:C, 53:C, 55:P, 56:C, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C

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, 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, 234Ac:CC?, 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, Carl Sandburg Home, Effigy Mounds); USFS (Angelina, Conecuh, Davy Crockett, Kisatchie, Ocala, Ozark, Sabine NF, Sam Houston?, Talladega); USFWS (Reelfoot)

ELEMENT SOURCES

References: Ambrose 1990a, Anderson 1982, Breden et al. 2001, FNAI 1990, Fike 1999, Fleming et al. 2001, Foti et al. 1994, Gawler 2002, Hoagland 2000, Midwestern Ecology Working Group n.d., NAP pers. comm. 1998, NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Penfound 1953, Rawinski 1984, Schafale and Weakley 1990, Swain and Kearsley 2001, Zanoni et al. 1979

DIAMONDLEAF OAK - (OVERCUP OAK, WILLOW OAK) - SWAMP BLACKGUM WEST GULF FLOODPLAIN FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus laurifolia* - *Quercus (lyrata, phellos)* - *Nyssa biflora* West Gulf Floodplain Forest

Database Code: CEGL003854

Formation: Seasonally flooded cold-deciduous forest (I.B.2.N.e)

Alliance: *Quercus (laurifolia, phellos)* Seasonally Flooded Forest Alliance (A.327)

ELEMENT CONCEPT

Summary: This is a wet bottomland forest of the West Gulf Coastal Plain. The canopy of stands of this type have no clear dominant species and contain *Quercus laurifolia*, *Nyssa biflora*, *Quercus phellos*, and/or *Quercus lyrata*. Other species characteristic of this association include *Quercus nigra*, *Liquidambar styraciflua*, *Ulmus americana*, and *Acer rubrum*. The shrub and herbaceous layers are usually sparse. Some possible components are *Berchemia scandens*, *Sebastiania fruticosa*, *Itea virginica*, *Sabal minor*, *Justicia ovata*, *Proserpinaca pectinata*, *Hymenocallis* sp., and *Saururus cernuus*.

Environment: No information

Vegetation: The canopy of stands of this type contain *Quercus laurifolia*, *Nyssa biflora*, *Quercus phellos*, and/or *Quercus lyrata*. Other species characteristic of this association include *Quercus nigra*, *Liquidambar styraciflua*, *Ulmus americana*, and *Acer rubrum*. Some possible shrub and herbaceous layer components are *Berchemia scandens*, *Sebastiania fruticosa*, *Itea virginica*, *Sabal minor*, *Justicia ovata*, *Proserpinaca pectinata*, *Hymenocallis* sp., and *Saururus cernuus*.

Dynamics: The sparseness of the ground cover vegetation indicates a relatively long hydroperiod in this type.

Similar Associations:

Related Concepts: No information

Classification Comments: Examples are found on the Angelina National Forest in eastern Texas. More information is needed on the variability and detailed floristics of this type.

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (2002-5-20): As defined, this type is endemic to a narrow geographic area of eastern Texas (and possibly adjacent western Louisiana). Some of the best examples of this type are known on U.S. Forest Service lands, although none are known to be specifically protected. Unprotected examples are threatened by removal of commercially valuable tree species, conversion to agroforestry and other land uses, as well as by hydrologic alterations. Further study is needed to clarify the degree of uncertainty in the rank. The relationship of this community to similar communities needs clarification.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest association is known from eastern Texas; it may also occur in adjacent western Louisiana.

Subnations: LA?, TX

TNC Ecoregions: 40:P, 41:C

USFS Ecoregions: 231E:PP, 232Fd:CCC

Federal Lands: USFS (Angelina, Davy Crockett?, Kisatchie?, Sabine NF?)

ELEMENT SOURCES

References: Southeastern Ecology Working Group n.d.

EASTERN COTTONWOOD - BLACK WILLOW / CLIMBING HEMPVINE FOREST

ELEMENT IDENTIFIERS

NVC association: *Populus deltoides* - *Salix nigra* / *Mikania scandens* Forest

Database Code: CEGLO07346

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Populus deltoides* Temporarily Flooded Forest Alliance (A.290)

ELEMENT CONCEPT

Summary: This forest, dominated by *Populus deltoides* and *Salix nigra*, occurs in the southeastern Coastal Plain along the fronts and banks of large rivers and on islands where sediment accretes. In addition to the above-listed species, *Acer rubrum*, *Fraxinus pennsylvanica*, *Salix caroliniana*, *Betula nigra*, *Planera aquatica*, *Ulmus americana*, *Liquidambar styraciflua*, *Morus rubra*, *Juglans nigra*, and *Acer saccharinum* all may be present within their ranges. *Ilex opaca* var. *opaca*, *Carpinus caroliniana*, *Lindera benzoin*, *Cornus drummondii*, and *Forestiera acuminata* may be present in the subcanopy. Depending on the maturity of the occurrence, physiognomy varies. The herb layer is sparse to dense. Distribution is not known. The western limit of distribution also is not known. Work needs to be done to determine more precisely the range of this community and to determine whether it needs to be separated into less widespread types. The ranges of the dominant species in all strata do not preclude its wide distribution.

Environment: This forest occurs in the southeastern Coastal Plain along the fronts and banks of large rivers and on islands where sediment accretes. This community is found on the fronts or banks of major rivers which are better-drained than areas farther from the watercourse. It can also be found on relatively newly accreted soil at the ends of islands and stream bars. Soils are coarser-textured than those of most other bottomland communities because the heavier soil particles drop out of flood waters first; silts and clays stay suspended longer and are deposited farther from the watercourse. This community may establish itself in either Zone III or Zone IV. If it occurs in Zone III, soil accretion will move the community into Zone IV. Zone III communities experience semipermanently inundated or saturated soil from surface or groundwater during >25% of the growing season; flooding is typical during winter and spring with a 51-100% frequency, but the soil is not saturated approximately 60% of the year. Zone IV communities experience

seasonal inundation or groundwater saturation for approximately 12.5-25% of the year, usually during spring and early summer with a frequency of 51-100%.

Vegetation: Stands of this forest are dominated by *Populus deltoides* and *Salix nigra*. These two species combined contribute at least 75% of the canopy cover with each contributing 25-75% of the total and a variety of other bottomland species contributing the rest. In addition to the above-listed species, *Acer rubrum*, *Fraxinus pennsylvanica*, *Salix caroliniana*, *Betula nigra*, *Planera aquatica*, *Ulmus americana*, *Liquidambar styraciflua*, *Morus rubra*, *Juglans nigra*, and *Acer saccharinum* all may be present within their ranges. *Ilex opaca* var. *opaca*, *Carpinus caroliniana*, *Lindera benzoin*, *Cornus drummondii*, and *Forestiera acuminata* may be present in the subcanopy. Depending on the maturity of the occurrence, physiognomy varies. The herb layer is sparse to dense.

Dynamics: This community experiences frequent flooding of short duration. Very heavy siltation can kill enough individuals of *Populus deltoides* to convert the community to one dominated almost exclusively by *Salix nigra*. This forest often succeeds to a forest dominated by some combination of *Celtis laevigata*, *Ulmus americana*, *Platanus occidentalis*, *Fraxinus pennsylvanica*, and *Liquidambar styraciflua*. Regardless, succession in this community occurs relatively swiftly.

Similar Associations:

- *Populus deltoides* - *Salix nigra* Forest (CEGL002018) -- is more northern in distribution.

Related Concepts:

- Black Willow: 95 (Eyre 1980) ?
- Cottonwood: 63 (Eyre 1980) ?
- Eastern Cottonwood - Willow Riverfront Forest (Oberholster 1993) ?
- IA7c. Eastern Cottonwood - Willow Riverfront Forest (Allard 1990) B
- R1B3cI2c. *Populus deltoides* - *Salix nigra* - *Celtis laevigata* (Foti et al. 1994) ?
- R1B3cI3a. *Salix nigra* (Foti et al. 1994) ?

Classification Comments: This community is dominated by *Populus deltoides* and *Salix nigra* in varying proportions but contributing at least 80% of the cover when combined. Other riverfront communities that have one or both of these species present will have less contribution of cover by these two species combined. Compare to its northern equivalent, *Populus deltoides* - *Salix nigra* Forest (CEGL002018). Kentucky examples may exhibit features of either type.

CONSERVATION RANKING & RARE SPECIES

GRank: G4G5 (1999-9-2): No information

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest occurs in the southeastern Coastal Plain of the United States.

Subnations: AL, AR, FL, GA, LA, MS, TN, TX

TNC Ecoregions: 40:P, 41:C, 42:C, 43:C, 53:C

USFS Ecoregions: 231A:CC, 232F:CC, 234A:CC

Federal Lands: USFS (Angelina?, Davy Crockett?, De Soto, Delta, Kisatchie, Sabine NF?, Sam Houston?, Sumter); USFWS (Chickasaw NWR, Hatchie, Lower Hatchie?, Reelfoot?)

ELEMENT SOURCES

References: Allard 1990, Ambrose 1990a, Burns and Honkala 1990b, Clark and Benforado 1981, Dickson and Segelquist 1978, Eyre 1980, Faulkner and Patrick n.d., Foti et al. 1994, Klimas 1988b, Klimas et al. 1981, McWilliams and Rosson 1990, Oberholster 1993, Putnam 1951, Putnam et al. 1960, Smith 1996a, Smith and Linnartz 1980, Southeastern Ecology Working Group n.d., Van Auken and Bush 1988, Wharton 1978, Wharton et al. 1982, Wieland 1994b, Wieland 2000b

GREEN ASH - AMERICAN ELM - SUGARBERRY / POSSUM-HAW FOREST

ELEMENT IDENTIFIERS

NVC association: *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis laevigata* / *Ilex decidua* Forest

Database Code: CEGl002427

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis (occidentalis, laevigata)* Temporarily Flooded Forest Alliance (A.286)

ELEMENT CONCEPT

Summary: This green ash - American elm - sugarberry community is found throughout the central and southern United States. Stands occur in floodplains of major rivers where water is absent for most of the growing season. Soils are moist alluvial clay or silt loams. *Ulmus americana* was once the most prominent member of this forest, but Dutch elm disease (*Ceratostomella ulmi*) and logging have eliminated many of the largest mature *Ulmus* spp. from most of the species natural range. *Fraxinus pennsylvanica* dominates on moist flats and shallow sloughs, while *Celtis laevigata* is most prevalent on new land or front sites. Other species commonly encountered include *Carya aquatica*, *Quercus lyrata*, *Liquidambar styraciflua*, and *Acer negundo*. The subcanopy is often dense and dominated by *Fraxinus pennsylvanica* which sprouts prolifically. Shrubs typical of this forest include *Cornus drummondii*, *Ilex decidua*, and *Crataegus* spp. The herbaceous layer is dense and diverse, dominated by *Galium* spp., *Viola* spp., *Carex* spp.,

Leersia spp., *Boehmeria cylindrica*, *Laportea canadensis*, *Pilea pumila*, *Impatiens capensis* (= *Impatiens biflora*), and *Impatiens pallida*. Vines most often encountered include *Toxicodendron radicans*, *Campsis radicans*, and *Parthenocissus quinquefolia*.

Environment: This community occurs in floodplains of major rivers, generally alluvial or brownwater rivers, on low ridges, flats, and sloughs; terrace flats and sloughs; and occasionally on new lands or fronts. In terms of hydrology, this is a Zone IV community (Wharton et al. 1982). Soils are clay or silt loams that are seasonally inundated or saturated for 1 or 2 months during the growing season, with a 50-100% annual frequency (Eyre 1980, Smith and Craig 1990). Alluvial deposition and nutrient input occurs, but less than in more frequently flooded forest types (Schafale and Weakley 1990).

Vegetation: This community is a broadleaf deciduous floodplain forest which exhibits high canopy diversity and good herbaceous diversity (although lower herbaceous diversity than mesic floodplain forest). *Ulmus americana* was once the most prominent member of this forest, but Dutch elm disease (*Ceratostomella ulmi*) and logging have eliminated many of the largest mature *Ulmus* spp. from most of the species natural range (Collingwood and Brush 1984). *Fraxinus pennsylvanica* dominates on moist flats and shallow sloughs, while *Celtis laevigata* is most prevalent on new land or front sites. Other species commonly encountered include *Carya aquatica*, *Quercus lyrata*, *Liquidambar styraciflua*, and *Acer negundo*. The subcanopy is often dense and dominated by *Fraxinus pennsylvanica* which sprouts prolifically. *Fraxinus pennsylvanica*, however, is considered a pioneer species and does not maintain its canopy position under intense shading found in later successional stages (Voigt and Mohlenbrock 1964). Shrubs typical of this forest include *Cornus drummondii*, *Ilex decidua*, and *Crataegus* spp. The herbaceous layer is dense and diverse, dominated by *Galium* spp., *Viola* spp., *Carex* spp., *Leersia* spp., *Boehmeria cylindrica*, *Laportea canadensis*, *Pilea pumila*, *Impatiens capensis* (= *Impatiens biflora*), and *Impatiens pallida*. Vines most often encountered include *Toxicodendron radicans*, *Campsis radicans*, and *Parthenocissus quinquefolia* (TNC 1995a).

Dynamics: Although this community can be early-successional, occurring on river fronts and other recently disturbed areas, this is a generally long-lived type (Eyre 1980, Diamond 1993). This community is usually located in transitional areas between the *Quercus (michauxii, pagoda, shumardii) - Liquidambar styraciflua* Forest Alliance (A.291) and the *Quercus lyrata - (Carya aquatica)* Seasonally Flooded Forest Alliance (A.328).

Similar Associations:

- *Acer (rubrum, saccharinum) - Fraxinus* spp. - *Ulmus americana* Forest (CEGL005038) -- is often non-floodplain.
- *Acer saccharinum - Celtis laevigata - Carya illinoensis* Forest (CEGL002431)
- *Fraxinus pennsylvanica - Ulmus* spp. - *Celtis occidentalis* Forest (CEGL002014)

Related Concepts:

- Brownwater Levee Forest (Medium Levee Subtype) (Schafale 2000) ?
- Eastern Broadleaf and Needleleaf Forests: 113: Southern Floodplain Forest (*Quercus-Nyssa-Taxodium*) (Kuchler 1964) B
- IIA6d. Sugarberry - American Elm - Green Ash Bottomland Forest (Allard 1990) B
- P1B3cIV9a. *Celtis laevigata - Fraxinus pennsylvanica - Ulmus americana* (Foti et al. 1994) ?
- Palustrine: Palustrine Forested Wetland (Cowardin et al. 1979) F
- Sugarberry - American Elm - Green Ash: 93 (Eyre 1980) B
- Terrestrial: Forest: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: I.B.3d (UNESCO 1973) B

Classification Comments: The Southeast Regional Office is in the process of describing the Mississippi River Alluvial Plain portion of this type, which includes southern Illinois, as a separate type.

CONSERVATION RANKING & RARE SPECIES

GRank: G4G5 (1997-8-15): No information

High-ranked species: *Macrochelys temminckii* (G3G4)

ELEMENT DISTRIBUTION

Range: This green ash - American elm - sugarberry community is found throughout the central and southern United States on floodplains of major rivers from Texas, Oklahoma, Arkansas, north to southern Illinois and adjacent Indiana, east to Tennessee, and south to Louisiana. The range formerly included states of the Atlantic Coastal Plain, but now see *Fraxinus pennsylvanica - Ulmus americana / Carpinus caroliniana / Boehmeria cylindrica* Forest (CEGL007806).

Subnations: AR, IL, IN, KY, LA, MO, MS, OK, TN, TX?

TNC Ecoregions: 39:C, 40:C, 41:C, 42:C, 43:P, 44:C, 50:P, 53:C

USFS Ecoregions: 221D:CC, 222C:CC, 222D:CP, 222E:CP, 231Ba:CPP, 231C:CP, 231D:CP, 231E:CC, 231G:C?, 232D:CP, 232F:CC, 234A:CC, M231A:CP

Federal Lands: DOE (Oak Ridge); NPS (Shiloh, Stones River); USFS (Angelina?, Bienville, Davy Crockett?, Delta, Kisatchie, Sabine NF?, Sam Houston?, St. Francis); USFWS (Hatchie, Lower Hatchie?, Reelfoot?)

ELEMENT SOURCES

References: Allard 1990, Collingwood and Brush 1984, Cowardin et al. 1979, Diamond 1993, Eyre 1980, Foti 1994b, Foti et al. 1994, Hoagland 1997, Hoagland 2000, Kuchler 1964, Nelson 1985, Penfound 1948, Penfound 1953, Rice and Penfound 1956, Rosson 1995, Schafale 2000, Schafale and Weakley 1990, Smith and Craig 1990, Southeastern Ecology Working Group n.d., TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, Wharton et al. 1982, White and Madany 1978

ELEMENT IDENTIFIERS

NVC association: *Betula nigra* - *Platanus occidentalis* / *Alnus serrulata* / *Boehmeria cylindrica* Forest

Database Code: CEGLO07312

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Betula nigra* - (*Platanus occidentalis*) Temporarily Flooded Forest Alliance (A.280)

ELEMENT CONCEPT

Summary: This riverfront forest, dominated by *Betula nigra* and *Platanus occidentalis*, occurs primarily on levees along small rivers and streams. It also is found along flowages of larger rivers ('artificial oxbows'). It ranges from Virginia to southern Georgia in the Piedmont and Coastal Plain (and into the southern and lower-elevation parts of the Southern Blue Ridge, excluding the highest elevations of the Mountains) and west to eastern Texas, and possibly the Cumberland Plateau of northern Alabama. No effort has been made to subdivide this type into northern and southern, or Coastal Plain and Interior variants, although there are undoubtedly some floristic differences between these extremes, at least in the lower strata.

Platanus occidentalis may be codominant, or at least prominent, with large individuals overtopping the *Betula*, which tends to have a greater number of stems, but *Platanus occidentalis* may be more conspicuous because of its larger size. Other canopy associates include *Liriodendron tulipifera*, *Liquidambar styraciflua*, *Acer rubrum*, *Acer negundo*, *Ulmus americana*, *Ulmus rubra*, *Celtis* spp., and *Quercus* spp. The subcanopy or tall-shrub strata may include *Cornus florida* and *Carpinus caroliniana*, along with *Acer rubrum*, *Ilex opaca*, *Ulmus alata*, *Prunus serotina*, and *Carya* spp. Shrubs and woody vines may include *Alnus serrulata*, *Euonymus americana*, *Parthenocissus quinquefolia*, *Smilax rotundifolia*, *Toxicodendron radicans*, and *Vitis rotundifolia*. Herbs may include *Boehmeria cylindrica*, *Polygonum virginianum*, *Rudbeckia laciniata*, *Sanicula* sp., *Symphotrichum lateriflorum* (= *Aster lateriflorus*), *Thalictrum dioicum*, *Viola sororia*, *Polystichum acrostichoides*, *Woodwardia areolata*, *Botrychium dissectum*, *Botrychium virginianum*, and *Impatiens capensis*. The exotics *Ligustrum sinense*, *Lonicera japonica*, *Microstegium vimineum*, and *Rosa multiflora* may spread into disturbed examples of this community.

Environment: *Betula nigra* requires soils near field capacity throughout the year but is relatively intolerant of flooding; *Platanus occidentalis* also is intolerant of flooding during the growing season and will die if the entire tree is inundated for more than two weeks. The absence of this community in the lower Mississippi River Alluvial Plain is attributed this intolerance, as is its most common location on levees of smaller rivers. The community usually is found on the natural levee of the watercourse and, therefore, is slightly elevated from the flats behind the levee. The community is more common along small streams and blackwater streams than along alluvial floodplains, mostly because of the higher sustained flow rates of these larger rivers. It also is found along flowages of larger rivers ("artificial oxbows") in southeast Kentucky. In the Upper East Gulf Coastal Plain (Shiloh National Military Park, Hardin County, Tennessee), this association occurs along small stream floodplains.

Vegetation: *Betula nigra* contributes at least 50%, and often more, of the tree density of stands of this community. *Platanus occidentalis* may be codominant, or at least prominent, with large individuals overtopping the *Betula*, which tends to have a greater number of stems, but *Platanus occidentalis* may be more conspicuous because of its larger size. Other canopy associates include *Liriodendron tulipifera*, *Liquidambar styraciflua*, *Acer rubrum*, *Acer negundo*, *Ulmus americana*, *Ulmus rubra*, *Celtis* spp., and *Quercus* spp. *Pinus echinata*, *Pinus strobus*, or *Pinus virginiana* may be found in some montane or submontane examples. The subcanopy or tall-shrub strata may include *Cornus florida* and *Carpinus caroliniana*, along with *Acer rubrum*, *Ilex opaca*, *Ulmus alata*, *Prunus serotina*, and *Carya* spp. Shrubs and woody vines may include *Alnus serrulata*, *Euonymus americana*, *Parthenocissus quinquefolia*, *Smilax rotundifolia*, *Toxicodendron radicans*, and *Vitis rotundifolia*. Herbs may include *Boehmeria cylindrica*, *Polygonum virginianum*, *Rudbeckia laciniata*, *Sanicula* sp., *Symphotrichum lateriflorum* (= *Aster lateriflorus*), *Thalictrum dioicum*, *Viola sororia*, *Polystichum acrostichoides*, *Woodwardia areolata*, *Botrychium dissectum*, *Botrychium virginianum*, and *Impatiens capensis*. The exotics *Ligustrum sinense*, *Lonicera japonica*, *Microstegium vimineum*, and *Rosa multiflora* may spread into disturbed examples of this community. No effort has been made to subdivide this type into northern and southern, or Coastal Plain and Interior variants, although there are undoubtedly some floristic differences between these extremes, at least in the lower strata.

Dynamics: Forests in this alliance occur on riverfronts in areas with repeated, frequent, natural disturbance in the form of flooding. Occurrences of this type may have a rather high percentage of standing dead trees, including remnant snags from earlier successional communities. A layer of sand is often deposited at the surface of the soil when streams overflow their banks during flash floods. Little or no clay is present in the upper strata of soils which support stands of this alliance. Flooding is seasonal and/or occasional and shallow, but never prolonged. Most of this short-duration flooding takes place in early spring.

This is a Zone IV community. Zone IV communities experience seasonal inundation or groundwater saturation for approximately 12.5-25% of the year, usually during spring and early summer with a frequency of 51-100%.

This community often succeeds riverfront forests dominated by *Salix* spp. and *Populus* spp. It probably succeeds to forests dominated by *Celtis* spp., *Ulmus* spp., *Fraxinus pennsylvanica*, and *Liquidambar styraciflua*.

Similar Associations:

- *Betula nigra* - *Platanus occidentalis* Forest (CEGL002086)

Related Concepts:

- Brownwater Levee Forest (Birch-Sycamore Successional Phase) (Schafale 2000) ?
- Eutrophic Seasonally Flooded Forest (Rawinski 1992) ?
- IIA7b. River Birch - Sycamore Riverfront Forest (Allard 1990) B
- Mountain Stream Floodplain Forest (Ambrose 1990a) ?
- River Birch - Sycamore (72) (USFS 1988) ?
- River Birch - Sycamore Riverfront Forest (Oberholster 1993) B
- River Birch - Sycamore: 61 (Eyre 1980) ?
- River Birch-Sycamore Riverfront Forest (Pyne 1994) ?

Classification Comments: No effort has been made to subdivide this type into northern and southern, or Coastal Plain and Interior variants, although there are undoubtedly some floristic differences between these extremes, at least in the lower strata. This includes the 'Sycamore - River Birch - Silver Maple' forests of the Pearl River in Louisiana mentioned by K. Ribbeck. Additional species from the shrub and herb strata need to be added to make more apparent the differences between this association and *Betula nigra* - *Platanus occidentalis* Forest (CEGL002086), which is a more northern forest. In Kentucky, this association (CEGL007312) would be found on the southern part of the Daniel Boone National Forest, in contrast to CEGL002086, which is more northern.

CONSERVATION RANKING & RARE SPECIES

GRank: G4G5 (2001-9-19): This is a widespread, variable, dynamic association. The principal threats to it come from hydrologic alterations, stands do not typically contain valuable timber species.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This riverfront association ranges from Virginia to southern Georgia in the Piedmont and Coastal Plain (and into the southern and lower-elevation parts of the Southern Blue Ridge, excluding the highest elevations of the mountains) and west to eastern Texas, and possibly the Cumberland Plateau of northern Alabama.

Subnations: AL, GA, KY, LA, MS, NC, SC, TN, TX, VA

TNC Ecoregions: 32:P, 40:P, 41:C, 42:C, 43:C, 44:C, 50:C, 51:C, 52:C, 53:C, 56:C, 57:C, 58:?

USFS Ecoregions: 221Hc:CCC, 222Cf:CCC, 222Cg:CCC, 222E:CC, 231Cd:CPP, 231E:CC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CC, 232C:CC, 232D:CC, 232F:CC, 234A:CC, 255:C, M221Cd:CCC, M221Dc:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Fort Benning); NPS (Shiloh); USFS (Bankhead?, Chattahoochee, Daniel Boone, Kisatchie, Sumter); USFWS (Little River)

ELEMENT SOURCES

References: Allard 1990, Ambrose 1990a, Burns and Honkala 1990b, Campbell 1988, Campbell 1989a, Clark and Benforado 1981, Dickson and Segelquist 1978, Duever and Brinson 1984b, Evans 1991, Eyre 1980, FNAI 1992b, Faulkner and Patrick n.d., Fleming et al. 2001, Flinchum 1977, Gettman 1974, Hoagland 1997, Kartesz 1999, Klimas et al. 1981, McWilliams and Rosson 1990, NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Oberholster 1993, Palmer-Ball et al. 1988, Peet et al. unpubl. data 2002, Putnam 1951, Putnam et al. 1960, Pyne 1994, Rawinski 1992, Schafale 2000, Schafale and Weakley 1990, Smith 1996a, Southeastern Ecology Working Group n.d., USFS 1988, Wharton 1978, Wharton et al. 1982, Wieland 1994b, Wieland 2000b

SWAMP CHESTNUT OAK - SWEETGUM - NUTTALL OAK - OVERCUP OAK FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus michauxii* - *Liquidambar styraciflua* - *Quercus texana* - *Quercus lyrata* Forest

Database Code: CEGL007906

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Quercus (michauxii, pagoda, shumardii)* - *Liquidambar styraciflua* Temporarily Flooded Forest Alliance (A.291)

ELEMENT CONCEPT

Summary: This community occurs along intermediate-sized streams in the West Gulf Coastal Plain. It is intermediate in hydrology, in that it lacks *Pinus taeda*, yet supports other species not typical of very wet bottomland hardwood forests. The overstory is characterized by *Quercus michauxii*, *Liquidambar styraciflua*, *Quercus texana*, *Quercus lyrata*, *Quercus nigra*, *Ulmus americana*, *Carya aquatica*, *Carya glabra*, and (at least at times) *Carya ovata*. The midstory is typically greatly dominated by *Carpinus caroliniana* ssp. *caroliniana*, although some *Ulmus alata*, *Crataegus marshallii*, *Crataegus viridis* may be present. *Cephalanthus occidentalis* is a common shrub. Additionally, *Arundinaria gigantea* is common in patches. Common vines include *Bignonia capreolata*, *Toxicodendron radicans*, *Smilax rotundifolia*, *Ampelopsis arborea*, *Berchemia scandens*, and *Vitis rotundifolia*. Although the ground is well-shaded, there are patches of *Chasmanthium* spp., *Carex* spp., and *Saururus cernuus*. Other herbs may include *Boehmeria cylindrica*, *Polygonum virginianum*, *Elephantopus carolinianus*, and *Mitchella repens*.

Environment: This community occurs along intermediate-sized streams in the West Gulf Coastal Plain. It is intermediate in hydrology, in that it lacks *Pinus taeda*, yet supports other species not typical of very wet bottomland hardwood forests.

Vegetation: The overstory is characterized by *Quercus michauxii*, *Liquidambar styraciflua*, *Quercus texana*, *Quercus lyrata*, *Quercus nigra*, *Ulmus americana*, *Carya aquatica*, *Carya glabra*, and (at least at times) *Carya ovata*. It is noteworthy that *Pinus taeda* is typically lacking. The midstory is typically greatly dominated by *Carpinus caroliniana ssp. caroliniana*, although some *Ulmus alata*, *Crataegus marshallii*, *Crataegus viridis* may be present. *Cephalanthus occidentalis* is a common shrub. Additionally, *Arundinaria gigantea* is common in patches. Common vines include *Bignonia capreolata*, *Toxicodendron radicans*, *Smilax rotundifolia*, *Ampelopsis arborea*, *Berchemia scandens*, and *Vitis rotundifolia*. Although the ground is well-shaded, there are patches of *Chasmanthium* spp., *Carex* spp., and *Saururus cernuus*. Other herbs may include *Boehmeria cylindrica*, *Polygonum virginianum*, *Elephantopus carolinianus*, and *Mitchella repens*.

Dynamics: No information

Similar Associations:

Related Concepts: No information

Classification Comments: Occurrences known from Shagbark Bottom, Kisatchie District, Kisatchie National Forest (Natchitoches Parish, Louisiana).

CONSERVATION RANKING & RARE SPECIES

GRank: GNR (1999-7-22): No information

High-ranked species: No information

ELEMENT DISTRIBUTION

Range:

Subnations: LA, TX?

TNC Ecoregions: 41:C

USFS Ecoregions: 232:C

Federal Lands: USFS (Kisatchie)

ELEMENT SOURCES

References: Smith 1996a, Southeastern Ecology Working Group n.d.

SYCAMORE - SWEETGUM - (AMERICAN ELM) / (GREEN HAWTHORN) FOREST

ELEMENT IDENTIFIERS

NVC association: *Platanus occidentalis* - *Liquidambar styraciflua* - (*Ulmus americana*) / (*Crataegus viridis*) Forest

Database Code: CEGLO07335

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Platanus occidentalis* - (*Fraxinus pennsylvanica*, *Celtis laevigata*, *Acer saccharinum*) Temporarily Flooded Forest Alliance (A.288)

ELEMENT CONCEPT

Summary: This floodplain forest of the Upper East and West Gulf coastal plains has a canopy dominated by *Platanus occidentalis* and *Liquidambar styraciflua*. Examples may be found on stabilized natural levees, point bars and first bottoms of large streams and rivers. Depending upon location and previous disturbance history (including hydrologic regime), a number of other tree species may also be present in lesser amounts. These may include *Ulmus americana*, *Carya illinoensis*, *Nyssa biflora*, *Celtis laevigata*, *Populus deltoides*, *Quercus nigra*, *Salix nigra*, *Fraxinus pennsylvanica*, *Betula nigra*, *Acer negundo*, and *Carya aquatica*. Shrubs are sparse to moderately dense in this community with covers ranging from 10-40%. Species may include *Crataegus viridis*, *Ilex decidua*, *Lindera benzoin*, *Carpinus caroliniana*, and *Aesculus pavia var. pavia*. Characteristic herbs include *Elymus hystrix*, *Boehmeria cylindrica*, *Chasmanthium latifolium*, and *Viola* spp. Patches of *Arundinaria gigantea* can be common in this community.

Environment: This forest occurs on stabilized natural levees, point bars and first bottoms of small- to large-sized alluvial streams and rivers in the Gulf Coastal Plain from Texas as far eastward as Alabama and Georgia. Soils are seasonally/temporarily flooded. In much of its range this community is inundated or saturated typically for 1 or 2 months during the growing season with a frequency ranging from 51 to 100 years out of every 100. The inundation persists almost continuously during the winter and early spring (Wharton et al. 1982, Smith 1988).

Vegetation: The canopy of stands of this association is dominated by *Platanus occidentalis* and *Liquidambar styraciflua*. The canopy cover ranges from 60-100%. Other canopy associates may include *Carya illinoensis*, *Nyssa biflora*, *Celtis laevigata*, *Populus deltoides*, *Quercus nigra*, *Salix nigra*, *Fraxinus pennsylvanica*, *Betula nigra*, *Acer negundo*, and *Carya aquatica*. *Ulmus americana* may also be present in some examples, and may have been an historically common component of this type. However, *Ulmus americana* is currently less abundant due to the vascular fungus (Dutch elm disease) that has severely reduced populations of this species (Harlow et al. 1991). Shrubs are sparse to moderately dense in this community with covers ranging from 10-40%. More floristic data are available (NatureServe Ecology unpubl. data), but more comprehensive data are needed.

Dynamics: The composition and structure of this community is dependent on the hydrologic regime of the river. Levees on the outside of channel bends may be undercut and eroded away, while those on the inside may be gradually abandoned by the river as new point bar deposition occurs. Point bars stabilized by early successional vegetation serve as new sites on which this forest can establish. This forest often succeeds from *Salix nigra* and *Populus deltoides* - *Salix nigra* early successional communities. The state of this community is variable, ranging from mid-seral to mature examples.

Similar Associations:

Related Concepts:

- IIA7g. Sycamore - Sweetgum - American Elm Riverfront Forest (Allard 1990) B
- Sugarberry-Elm Series (Diamond 1993) B
- Sycamore - Pecan - American Elm (25) (USFS 1988) ?
- Sycamore - Sweet Gum - American Elm: 94 (Eyre 1980) ? Sycamore - Sweetgum American Elm Riverfront Forest (Oberholster 1993) ?

Classification Comments: This association was originally defined to cover a very broad geographic range (from western Texas to the Coastal Plain of North Carolina and Virginia) and may need substantial revision. Its range has subsequently become more restricted (currently to the Upper East Gulf Coastal Plain, and the Upper West Gulf Coastal Plain and West Gulf Coastal Plain from Georgia and Alabama west to Texas).

CONSERVATION RANKING & RARE SPECIES

GRank: G3G4 (2004-2-25): There is little data available to support a comprehensive evaluation of this forest association. It has a potentially large range from the West Gulf Coastal Plain across the Mississippi River to the Upper East Gulf Coastal Plain. However, intact flooding regimes of coastal plain rivers are necessary to perpetuate this type, and most such rivers within this type's range have been altered through dam construction and/or channelization. The extent to which this forest will continue to exist under altered flow regimes is unknown. More data are needed to determine the stability of this natural forest, as opposed to non-natural examples with similar species composition. Given these factors a rank of G3G4 has been assigned.

High-ranked species: *Amsonia ludoviciana* (G3)

ELEMENT DISTRIBUTION

Range: This community ranges across the Gulf Coastal Plain from Georgia to Texas, but is apparently absent from the Mississippi River Alluvial Plain. It may occur as far north as western Tennessee.

Subnations: AL, GA, LA, MS, TN?, TX

TNC Ecoregions: 40:C, 41:C, 43:C

USFS Ecoregions: 231B:CC, 231Ef:CCC, 231Eg:CCP, 231Eh:CCC, 232F:CC

Federal Lands: DOD (Fort Benning); USFS (Angelina, Bienville, Davy Crockett, Holly Springs, Kisatchie, Sabine NF, Sam Houston, St. Francis?, Tombigbee?)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Eyre 1980, Harlow et al. 1991, NatureServe Ecology - Southeastern U.S. unpubl. data, Oberholster 1993, Smith 1988c, Smith 1996a, Southeastern Ecology Working Group n.d., USFS 1988, Wharton et al. 1982, Wieland 1994b, Wieland 2000b

WATER OAK - SWEETGUM - (LOBLOLLY PINE) / AMERICAN HOLLY - BLACK Highbush Blueberry / White-Edge SEDGE TEMPORARILY FLOODED FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus nigra* - *Liquidambar styraciflua* - (*Pinus taeda*) / *Ilex opaca* - *Vaccinium fuscatum* / *Carex debilis* Temporarily Flooded Forest

Database Code: CEGLO07984

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Quercus (phellos, nigra, laurifolia)* Temporarily Flooded Forest Alliance (A.292)

ELEMENT CONCEPT

Summary: This floodplain forest community occurs on temporarily flooded terraces along small streams and small rivers in the West Gulf Coastal Plain. The temporarily high water table leads to frequent tree falls and gaps. This plant community floods occasionally, and water stands for relatively short duration. *Quercus nigra* is the dominant tree, with *Liquidambar styraciflua* being a common component. Constant tree-fall disturbance leads to a high component of *Liquidambar styraciflua* in the overstory. Other tree species include *Carya ovata*, *Nyssa sylvatica*, *Pinus taeda* (present only as stumps in some examples), *Quercus shumardii*, *Quercus alba*, and *Ulmus americana*. *Ilex opaca* is the dominant understory tree with *Acer rubrum* var. *rubrum*, *Carpinus caroliniana*, *Crataegus marshallii*, *Diospyros virginiana*, *Ulmus alata*, *Celtis laevigata*, and *Fraxinus pennsylvanica*. In addition, *Juglans nigra* will be present in some stands as a subcanopy or canopy component. The shrub layer is often sparse except in tree-fall gaps and includes *Vaccinium fuscatum*, and *Vaccinium virgatum* and *Sebastiania fruticosa* in more southerly examples. *Sabal minor* may be present within its range. Woody vines are an important component of this community and may be present in high cover values. Vine species

include *Vitis rotundifolia*, *Ampelopsis arborea*, *Amphicarpaea bracteata*, *Berchemia scandens*, *Bignonia capreolata*, *Campsis radicans*, *Cocculus carolinus*, *Parthenocissus quinquefolia*, *Smilax bona-nox*, *Smilax rotundifolia*, *Trachelospermum difforme*, and *Toxicodendron radicans*. The herbaceous layer is moderately dense with *Symphyotrichum lanceolatum* (= *Aster lanceolatus*), *Carex complanata*, *Carex debilis*, *Carex glaucoidea*, *Galium obtusum ssp. obtusum*, *Sanicula canadensis*, *Trachelospermum difforme*, *Tridens strictus*, and occasional stands of *Arundinaria gigantea*. Little leaf litter is present.

Environment: These forests occur on slightly elevated, relatively well-drained, acidic (?), sandy soils in floodplains and terraces. Some stands attributed here contain taxa regarded as not strongly acid-loving components. The inclusion of these plots may have somewhat broadened the overall concept.

Vegetation: *Quercus nigra* is the dominant tree in stands of this type, with *Liquidambar styraciflua* being a common to codominant component. The canopy is moderately tall (80+ feet) and generally closed, although constant tree-fall disturbance leads to a high component of *Liquidambar styraciflua* in the overstory. Other tree species include *Carya alba*, *Carya ovata*, *Nyssa sylvatica*, *Pinus taeda* (present only as stumps in some examples), *Quercus shumardii*, *Quercus alba*, and *Ulmus americana*. *Ilex opaca* is the dominant understory tree with *Acer rubrum var. rubrum*, *Carpinus caroliniana*, *Celtis laevigata*, *Cercis canadensis*, *Cornus florida*, *Crataegus marshallii*, *Diospyros virginiana*, *Fraxinus pennsylvanica*, *Morus rubra*, *Ostrya virginiana*, *Ulmus alata*, and *Ulmus rubra*. In addition, *Juglans nigra* will be present in some stands as a subcanopy or canopy component. The shrub layer is often sparse except in tree-fall gaps and includes *Asimina triloba*, *Callicarpa americana*, *Forestiera ligustrina*, *Frangula caroliniana*, *Vaccinium fuscatum*, and *Vaccinium virgatum* and *Sebastiania fruticosa* in more southerly examples. *Sabal minor* may be present within its range. Woody vines are an important component of this community and may be present in high cover values. Vine species include *Vitis rotundifolia*, *Ampelopsis arborea*, *Amphicarpaea bracteata*, *Berchemia scandens*, *Bignonia capreolata*, *Campsis radicans*, *Cocculus carolinus*, *Parthenocissus quinquefolia*, *Smilax bona-nox*, *Smilax glauca*, *Smilax rotundifolia*, *Trachelospermum difforme*, and *Toxicodendron radicans*. The herbaceous layer is moderately dense with *Symphyotrichum lanceolatum* (= *Aster lanceolatus*), *Carex complanata*, *Carex debilis*, *Carex glaucoidea*, *Chasmanthium sessiliflorum*, *Galium obtusum ssp. obtusum*, *Sanicula canadensis*, *Trachelospermum difforme*, *Tridens strictus*, and occasional stands of *Arundinaria gigantea*. Some additional herbs and herbaceous vines may include *Ageratina altissima*, *Elephantopus carolinianus*, *Melothria pendula*, *Oplismenus hirtellus ssp. setarius* (= *Oplismenus setarius*), *Polygonum virginianum*, and *Verbesina virginica*. Little leaf litter is present.

Dynamics: The high water table leads to frequent tree falls and gaps. This plant community floods occasionally, and water stands for relatively short duration.

Similar Associations:

Related Concepts:

- IIA6b. Sweetgum - Mixed Bottomland Oak Forest (Allard 1990) B
- Sweetgum - Willow Oak: 92 (Eyre 1980) B
- Water Oak-Willow Oak Series (Diamond 1993) B
- Willow Oak - Laurel Oak / *Bignonia* Loamy Wet-Mesic Stream Bottoms (Turner et al. 1999) B

Classification Comments: Approximately 1200 to 1600 hectares of this community (actually the former CEGL007841 now merged here) occur on the Ouachita National Forest - Tiak District (R. Basterache pers. comm.). This type accommodates the former *Quercus nigra* - *Liquidambar styraciflua* / *Sebastiania fruticosa* - *Toxicodendron radicans* Forest (CEGL007369) which is no longer recognized as distinct. The type location is in Dallas County, Arkansas. Examples are known from Big Cypress Unique Area and Pond Creek National Wildlife Refuge.

CONSERVATION RANKING & RARE SPECIES

GRank: G4? (2002-1-30): In Arkansas, this type is apparently reasonably common, although no high-quality examples are known (D. Zollner pers. comm.). Some stands are located on the national forests in Oklahoma and Texas, but these do not necessarily receive any formal protection.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is found in the West Gulf Coastal Plain of southern Arkansas, eastern Texas, western Louisiana, and southeastern Oklahoma.

Subnations: AR, LA, OK, TX

TNC Ecoregions: 39:P, 40:C, 41:C

USFS Ecoregions: 231Eg:CCC, 231Eh:CCC, 232F:CC, M231:C

Federal Lands: DOD (Pine Bluff Arsenal?); USFS (Angelina, Davy Crockett, Kisatchie, Ouachita, Sabine NF, Sam Houston); USFWS (Pond Creek)

ELEMENT SOURCES

References: Allard 1990, Allen 1993b, Basterache pers. comm., Blair and Hubbell 1938, Bruner 1931, Diamond 1993, Eyre 1980, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Nixon and Raines 1976, Osborn 1941, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Zollner pers. comm.

ELEMENT IDENTIFIERS

NVC association: *Nyssa aquatica* - *Nyssa biflora* Forest

Database Code: CEGLO07429

Formation: Semipermanently flooded cold-deciduous forest (I.B.2.N.f)

Alliance: *Nyssa aquatica* - (*Taxodium distichum*) Semipermanently Flooded Forest Alliance (A.345)

ELEMENT CONCEPT

Summary: This forest, dominated by *Nyssa aquatica* and *Nyssa biflora* in varying proportions, is found along shallow borders of alluvial swamps and flats near uplands. It is a Zone II community. The range has not been completely assessed; it is theoretically possible on the Atlantic Coastal Plain from southeastern Virginia to southern Georgia, the Gulf Coastal Plain from about Tallahassee west to southeastern Texas, and the Mississippi Alluvial Plain to southern Arkansas and western Tennessee. *Taxodium distichum* may occur in the canopy of this community, but is not a dominant (usually less than 25% cover). Other tree canopy/subcanopy species are *Fraxinus pennsylvanica*, *Salix nigra*, *Populus heterophylla*, and *Carpinus caroliniana*. Other shrub and herbaceous species are *Leucothoe racemosa*, *Cyrilla racemiflora*, *Planera aquatica*, and *Saururus cernuus*. *Decumaria barbara*, *Toxicodendron radicans*, *Ampelopsis arborea*, and *Bignonia capreolata* are commonly occurring vines, but have less than 10% cover.

Environment: This forest association is found along shallow borders of alluvial swamps and flats near uplands. Hydrologic regime is the most important environmental determinant of the distribution of this community. It occurs in Zone II (Wharton et al. 1982), and therefore probability of annual flooding is 100% and duration of flooding is approximately 100% of the growing season with soils nearly permanently saturated. The community occurs along shallow borders of alluvial swamps and flats near the uplands (Eyre 1980) and probably is found in less wet areas than swamp forests dominated by *Taxodium distichum* and *Nyssa aquatica*.

Vegetation: Stands of this forest are dominated by *Nyssa aquatica* and *Nyssa biflora* in varying proportions. *Taxodium distichum* may occur in the canopy of this community, but is not a dominant (usually less than 25% cover). Other tree canopy/subcanopy species are *Fraxinus pennsylvanica*, *Salix nigra*, *Populus heterophylla*, and *Carpinus caroliniana*. Other shrub and herbaceous species are *Leucothoe racemosa*, *Cyrilla racemiflora*, *Planera aquatica*, and *Saururus cernuus*. *Decumaria barbara*, *Toxicodendron radicans*, *Ampelopsis arborea*, and *Bignonia capreolata* are commonly occurring vines, but have less than 10% cover.

Dynamics: Probability of annual flooding is 100%, and duration of flooding is approximately 100% of the growing season with soils nearly permanently saturated. Seedlings of the dominant tree species are not shade-tolerant and require unflooded soil for germination. Successional relationships of this community to others is not clear, although with organic matter accumulation and soil buildup, this community may succeed to a bottomland hardwood type.

Similar Associations:

- *Taxodium distichum* - (*Nyssa aquatica*) / *Forestiera acuminata* - *Planera aquatica* Forest (CEGL002421) -- has only *Nyssa aquatica* and not *Nyssa biflora* and has *Taxodium distichum* as a dominant.

Related Concepts:

- Baldcypress-Water Tupelo Series (Diamond 1993) B
- IIA4d. Tupelo Swamp (Allard 1990) B
- P1B3dII3b. *Nyssa aquatica* - *Nyssa biflora* - *Taxodium distichum* (Foti et al. 1994) ?
- Tupelo Swamp (Oberholster 1993) B
- Water Tupelo - Swamp Tupelo: 103 (Eyre 1980) B

Classification Comments: Although swamp forests dominated by *Nyssa aquatica* and *Nyssa biflora* and lacking *Taxodium distichum* completely or as a dominant develop following logging, this community is naturally occurring. More work needs to understand the development of this community and to determine the extent of its geographic variation.

CONSERVATION RANKING & RARE SPECIES

GRank: G4G5 (1997-8-15): No information

High-ranked species: *Cardamine longii* (G3), *Carex decomposita* (G3), *Lejeunea bermudiana* (G3G4)

ELEMENT DISTRIBUTION

Range: The range has not been completely assessed; it is theoretically possible on the Atlantic Coastal Plain from southeastern Virginia to southern Georgia, the Gulf Coastal Plain from about Tallahassee west to southeastern Texas, and the Mississippi Alluvial Plain to southern Arkansas and presumably western Tennessee.

Subnations: AL, AR, FL, GA, LA?, MS, NC?, SC, TN?, TX, VA

TNC Ecoregions: 40:C, 41:C, 42:C, 43:C, 53:C, 56:C, 57:C

USFS Ecoregions: 232:C, 234A:CC

Federal Lands: DOD (Fort Benning); DOE (Savannah River Site); USFS (Angelina?, Apalachicola, Francis Marion, Kisatchie, Sabine NF?); USFWS (Hatchie, Lower Hatchie?)

ELEMENT SOURCES

References: Allard 1990, Ambrose 1990a, Diamond 1993, Evans 1991, Eyre 1980, Fleming et al. 2001, Foti et al. 1994, Nelson 1986, Oberholster 1993, Schafale and Weakley 1990, Smith 1996a, Southeastern Ecology Working Group n.d., Wharton et al. 1982, Wieland 1994b, Wieland 2000b

WATER TUPELO FOREST

ELEMENT IDENTIFIERS

NVC association: *Nyssa aquatica* Forest

Database Code: C EGL002419

Formation: Semipermanently flooded cold-deciduous forest (I.B.2.N.f)

Alliance: *Nyssa aquatica* - (*Taxodium distichum*) Semipermanently Flooded Forest Alliance (A.345)

ELEMENT CONCEPT

Summary: This semipermanently flooded water tupelo swamp forest is found in the Coastal Plain from Virginia south to Florida, west to Texas, and north in the Mississippi delta region to Missouri, Illinois, and Kentucky. Stands occur on permanently saturated soils on low, wet flats and sloughs, swales and backswamps, and the association is more common on floodplains of brownwater, rather than blackwater, rivers. Both organic and mineral soils may be present. The vegetation is dominated by dense, and occasionally pure, stands of *Nyssa aquatica* but often in association with *Taxodium distichum* (never very abundant in this type), *Liquidambar styraciflua*, *Planera aquatica*, *Nyssa biflora*, *Gleditsia aquatica*, *Fraxinus profunda*, and *Cephalanthus occidentalis*. The herbaceous layer is conspicuously sparse, and density is wholly dependent upon the extent and duration of flooding. Where water is permanent, herbaceous plants rely on substrates found on rotting logs, stumps, terraces, and buttresses of trees. Subcanopy density and forest tree recruitment are poor due to fluctuating water levels.

Environment: Stands of this association occur on permanently saturated soils on low, wet flats and sloughs, swales and backswamps, and the association is more common on floodplains of brownwater, rather than blackwater, rivers. Both organic and mineral soils may be present.

Vegetation: The vegetation is dominated by dense, and occasionally pure, stands of *Nyssa aquatica* but often in association with *Taxodium distichum* (never very abundant in this type), *Liquidambar styraciflua*, *Planera aquatica*, *Nyssa biflora*, *Gleditsia aquatica*, *Fraxinus profunda*, and *Cephalanthus occidentalis*. The herbaceous layer is conspicuously sparse, and density is wholly dependent upon the extent and duration of flooding. Where water is permanent, herbaceous plants rely on substrates found on rotting logs, stumps, terraces, and buttresses of trees. Some herbs which may be present at low densities on these elevated places include *Phanopyrum gymnocarpon*, *Pluchea camphorata*, *Boehmeria cylindrica*, *Rudbeckia laciniata*, *Sagittaria latifolia*, *Onoclea sensibilis*, *Triadenum walteri*, *Carex jorii*, *Carex glaucescens*, *Asclepias perennis*, *Saururus cernuus*, *Justicia ovata*, *Leersia lenticularis*, and others. Subcanopy density and forest tree recruitment are poor due to fluctuating water levels (TNC 1995a).

Dynamics: This is a climax wetland community. Flooding frequency is approximately 100% of years, and flooding duration is approximately 100% of the growing season. Seasonal flooding and permanent water require special adaptations by vegetation to exist in this extremely dynamic ecosystem. Many plants have highly specialized methods to facilitate acquisition and transport of oxygen during periods of prolonged inundation.

Similar Associations:

- *Taxodium distichum* - (*Nyssa aquatica*) / *Forestiera acuminata* - *Planera aquatica* Forest (CEGL002421) -- may resemble *Nyssa aquatica* Forest in habitats where most bald-cypress have been removed by logging and a few very old trees remain.
- *Taxodium distichum* - *Nyssa biflora* / *Berchemia scandens* - *Toxicodendron radicans* / *Woodwardia areolata* Forest (CEGL004429)

Related Concepts:

- *Nyssa aquatica* - *Taxodium distichum* swamp (Robertson et al. 1984) =
- *Taxodium* - *Nyssa aquatica* / *Rosa palustris* community (Voigt and Mohlenbrock 1964) B
- Baldcypress-Water Tupelo Series (Diamond 1993) B
- Eastern Broadleaf and Needleleaf Forests: 113: Southern Floodplain Forest (*Quercus-Nyssa-Taxodium*) (Kuchler 1964) B
- IIA4d. Tupelo Swamp (Allard 1990) B
- P1B3dII3a. *Nyssa aquatica* (Foti et al. 1994) ?
- Palustrine *Nyssa* sp. Series CP (Pyne 1994) ?
- Palustrine: Forested Wetland: Riparian (TNC 1985) B
- Palustrine: Palustrine Forested Wetland (Cowardin et al. 1979) B
- Tupelo Swamp (Oberholster 1993) B
- UNESCO FORMATION CODE: I.B.3e (UNESCO 1973) B
- Water Tupelo - Swamp Tupelo: 103 (Eyre 1980) B

Classification Comments: More work needs to be done to understand development of this community where the ranges of *Nyssa aquatica* and *Taxodium distichum* overlap, to determine the differences between this and a *Nyssa aquatica*-dominated forest that develops following logging of *Taxodium distichum*, and to determine the extent of geographic variation. Where bald-cypress and

water tupelo ranges overlap, little is known about conditions which select for either or both species. Selective removal of bald-cypress can shift dominance in mixed bald-cypress - water tupelo stands to favor water tupelo. Water tupelo seem to select transitional zones between permanent water and upland habitat and seldom occur as a dominant component of the canopy where inundation is semipermanent or permanent.

CONSERVATION RANKING & RARE SPECIES

GRank: G4G5 (2001-9-19): Depending on how historic distribution and abundance are factored into the rank, the rank could be considerably higher, perhaps a G3G4. Many stands have been extensively cleared.

High-ranked species: *Carex decomposita* (G3)

ELEMENT DISTRIBUTION

Range: This water tupelo swamp forest is found on the lower Atlantic Coastal Plain from southeastern Virginia to southeastern Georgia, the Gulf Coastal Plain from about Tallahassee, Florida, west to southeastern Texas, and the Mississippi River Alluvial Plain to southern Illinois and southeastern Missouri.

The type occurs on permanently saturated soils on low, wet flats and sloughs, swales, and back swamps and is more common on floodplains of brownwater, rather than blackwater, rivers. The range of water tupelo swamps has been greatly reduced within the last 100-150 years by ditching and draining for agriculture and logging. Water tupelo swamps today occur in areas where topographic and hydrologic conditions discouraged these practices. The removal of bald-cypress may actually select for water tupelo in swamps where both species occur. Historically, water tupelo swamps reached their northernmost limits in extreme southern Illinois.

Subnations: AL, AR, FL, GA, IL, KY, LA, MO, MS, NC, SC, TN, TX, VA

TNC Ecoregions: 40:C, 41:C, 42:C, 43:C, 44:C, 53:C, 56:C, 57:C

USFS Ecoregions: 222A:CC, 222C:CP, 222D:CP, 231Bc:CCC, 231E:C?, 232B:CC, 232C:CC, 232F:CC, 234A:CC

Federal Lands: DOD (Fort Benning?); DOE (Savannah River Site); NPS (Shiloh); USFS (Apalachicola?, Conecuh?, De Soto, Delta, Francis Marion, Kisatchie, Talladega)

ELEMENT SOURCES

References: Allard 1990, Ambrose 1990a, Applequist 1959, Burk 1977, Burns and Honkala 1990a, Burns and Honkala 1990b, Christensen 1988, Cowardin et al. 1979, Demaree 1932, Dennis 1988, Diamond 1993, Evans 1991, Ewel and Odum 1984b, Eyre 1980, Fleming et al. 2001, Foti 1994b, Foti et al. 1994, Klawitter 1962, Kuchler 1964, Mitsch and Gosselink 1993, NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Oberholster 1993, Peet et al. unpubl. data 2002, Penfound and Hall 1939, Pyne 1994, Radford and Martin 1975, Robertson et al. 1984, Schafale 2000, Schafale and Weakley 1990, Smith 1996a, Southeastern Ecology Working Group n.d., TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, Wharton 1989, Wharton et al. 1982, White and Anderson 1970, White and Madany 1978, Wieland 1994b, Wieland 2000b

WATER-LOCUST - WATER HICKORY FOREST

ELEMENT IDENTIFIERS

NVC association: *Gleditsia aquatica* - *Carya aquatica* Forest

Database Code: C EGL007426

Formation: Seasonally flooded cold-deciduous forest (I.B.2.N.e)

Alliance: *Quercus lyrata* - (*Carya aquatica*) Seasonally Flooded Forest Alliance (A.328)

ELEMENT CONCEPT

Summary: This bottomland hardwood association, primarily distributed in the Mississippi River Alluvial Plain, is typically dominated by *Gleditsia aquatica* and *Carya aquatica*. Some occurrences may contain no other canopy species. Stands of this type vary from those with 90% or more *Carya aquatica* with a heavy vine component and a subcanopy/shrub layer with *Planera aquatica* and *Forestiera acuminata* (especially at the juncture of the Red and Mississippi rivers) to those with some *Quercus lyrata* and *Celtis laevigata*. This vegetation type occurs in sites just slightly higher and drier than those that are dominated by *Taxodium distichum* and *Nyssa aquatica*, and slightly lower and wetter than those dominated by *Quercus lyrata*.

Environment: This vegetation type occurs in sites just slightly higher and drier than those that are dominated by *Taxodium distichum* and *Nyssa aquatica*, and slightly lower and wetter than those dominated by *Quercus lyrata*.

Vegetation: This bottomland hardwood association is typically dominated by *Gleditsia aquatica* and *Carya aquatica*. Some occurrences may contain no other canopy species. Stands of this type vary from those with 90% or more *Carya aquatica* with a heavy vine component and a subcanopy/shrub layer with *Planera aquatica* and *Forestiera acuminata* (especially at the juncture of the Red and Mississippi rivers) to those with some *Quercus lyrata* and *Celtis laevigata*.

Dynamics: No information

Similar Associations:

Related Concepts: No information

Classification Comments: See Wharton et al. 1982.

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (1997-8-15): No information

High-ranked species: No information

ELEMENT DISTRIBUTION

Range:

Subnations: AR, LA, MS, TX

TNC Ecoregions: 40:?, 41:?, 42:C, 43:?

USFS Ecoregions: 234An:CCC

Federal Lands: USFS (Bienville?, Delta?, Holly Springs?, Kisatchie?)

ELEMENT SOURCES

References: Southeastern Ecology Working Group n.d., Wharton et al. 1982

WILLOW OAK - SWEETGUM / POSSUM-HAW - IRONWOOD / TRAILING LOOSESTRIFE FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus phellos* - *Liquidambar styraciflua* / *Ilex decidua* - *Carpinus caroliniana* / *Lysimachia radicans* Forest

Database Code: CEGLO07370

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Quercus (phellos, nigra, laurifolia)* Temporarily Flooded Forest Alliance (A.292)

ELEMENT CONCEPT

Summary: This oak-sweetgum bottomland forest is found in the West Gulf Coastal Plain of Louisiana and Texas and possibly Arkansas. *Quercus phellos* strongly dominates the overstory, with *Liquidambar styraciflua*. Other canopy and subcanopy trees include *Quercus michauxii*, *Quercus pagoda*, *Quercus nigra*, *Quercus lyrata*, *Ostrya virginiana*, *Ulmus americana*, and *Nyssa sylvatica*. The midstory is dominated by *Carpinus caroliniana*, followed closely by *Fraxinus caroliniana*, *Ilex decidua*, and individuals of species present in the overstory. The understory contains species typical of bottomland habitats in the region including *Sebastiania fruticosa*, *Campsis radicans*, *Justicia ovata*, *Bignonia capreolata*, *Lysimachia lanceolata*, *Carex louisianica*, *Carex tribuloides*, *Ampelopsis arborea*, and *Brunnichia ovata*.

Environment: In Texas, this type has been documented along the Neches River floodplain on soils rich in both calcium and magnesium. In addition to low-lying flats in this large river bottom, this type apparently also occurs in abandoned stream channels, low positions on natural levees, and depressional areas in otherwise flat alluvial plains in Louisiana. Floodplains border clear-flowing streams typically with outcroppings of sandstone and siltstone bedrock such as those of the Catahoula and Fleming formations. Soils are somewhat poorly drained, very slowly permeable clays or silt loams formed in alluvium. This type has been documented from the Moreland Soil Series (Vertic Hapludalf) in Louisiana where the A horizon pH varies from slightly acid to mildly alkaline. The seasonal high water table is within 0.3 m of the soils surface from December through April in most years. Slopes range from 0-3%.

Vegetation: This broad-leaved bottomland forest is dominated by *Liquidambar styraciflua*, *Acer rubrum*, *Ulmus rubra*, *Quercus phellos*, *Quercus laurifolia*, and *Quercus lyrata*. Canopy cover ranges from approximately 60-100%, but is most typically fairly open in the 70-80% range. Canopy associates include *Carya aquatica*, *Nyssa biflora*, *Celtis laevigata*, and *Fraxinus pennsylvanica*. The patchy tall-shrub stratum (2-5 m in height) is dominated by *Carpinus caroliniana* and *Ilex decidua*. *Crataegus viridis*, *Vaccinium elliotii*, *Vaccinium arboreum*, *Ilex opaca*, *Halesia diptera*, and *Rhododendron canescens* are also associated with this stratum. In addition to regenerating canopy and tall-shrub species, the patchy short-shrub stratum (0.5-2m tall) contains *Sebastiania fruticosa*, *Rubus trivialis*, *Rubus argutus*, *Morus rubra*, and *Hypericum hypericoides*. The sparse to patchy herbaceous layer is approximately 10-30% cover and is dominated by *Viola* spp., *Dichantherium commutatum*, *Boehmeria cylindrica*, *Carex intumescens*, *Oxalis stricta*, *Lysimachia radicans*, *Dichantherium dichotomum* var. *dichotomum*, *Symphotrichum lateriflorum* (= *Aster lateriflorus*, and *Chasmanthium laxum*. Associates include *Impatiens capensis*, *Acalypha rhomboidea* (= *Acalypha virginica* var. *rhomboidea*), and *Mikania scandens* (Martin and Smith 1991, Allen 1993c).

Based on plots from eastern Texas, *Quercus phellos* is the single most important canopy species, ranging from strongly dominant to codominant with *Liquidambar styraciflua*. Other canopy and subcanopy trees include *Quercus michauxii*, *Quercus pagoda*, *Quercus nigra*, *Quercus lyrata*, *Ostrya virginiana*, *Ulmus americana*, and *Nyssa sylvatica*. The subcanopy is dominated by *Carpinus caroliniana*, followed closely by *Fraxinus caroliniana*, *Ilex decidua*, and individuals of species present in the canopy. The lower strata contain species typical of bottomland habitats in the region. Shrubs and woody vines include *Sebastiania fruticosa*, *Ampelopsis arborea*, *Berchemia scandens*, *Bignonia capreolata*, *Brunnichia ovata*, *Campsis radicans*, *Smilax bona-nox*, *Smilax rotundifolia*, and *Toxicodendron radicans*. Herbs may include *Chasmanthium laxum*, *Justicia ovata*, *Lysimachia lanceolata*, *Carex louisianica*, and *Carex tribuloides*. Some additional herbs found in a stand assigned here from the Angelina National Forest include *Chasmanthium latifolium*, *Justicia ovata*, *Ruellia* sp., *Symphotrichum* sp., *Panicum anceps*, *Phanopyrum gymnocarpon*, *Dichantherium* sp., *Lycopus virginicus*, *Carex frankii*, *Carex lupulina*, *Carex lurida*, *Elymus virginicus*, *Geum canadense*, *Gratiola* sp., *Oxalis* sp., *Yeatesia viridiflora*, *Matelea* sp., and *Trachelospermum difforme*.

Dynamics: Hydrologic regime is the principle natural disturbance and the main ecological process shaping the composition, structure and distribution of this community. This forest is typically inundated or saturated throughout the winter and early spring, and floods for 1 or 2 months during the growing season, with a 100-year average of at least 51 to 100 years (Smith 1988). Regeneration occurs chiefly in canopy gaps and is dependent on the hydrologic conditions at the time of germination and establishment (Smith 1988, Martin and Smith 1991).

This forest is generally a mature community, although some examples may be in a distributional flux in the sense that a major disturbance happened fairly recently (approximately 40 to 60 years ago) and is indicated by a bimodal canopy stage distribution of larger *Liquidambar styraciflua* individuals and smaller-diameter specimens of *Quercus phellos*, *Quercus laurifolia*, and *Quercus lyrata*.

Similar Associations:

Related Concepts:

- IIA6b. Sweetgum - Mixed Bottomland Oak Forest (Allard 1990) B
- Laurel Oak - Willow Oak (64) (USFS 1988) ?
- P1B3cVII13a. *Quercus phellos* (Foti et al. 1994) B
- Sweetgum - Nuttall Oak - Willow (62) (USFS 1988) ?
- Sweetgum - Willow Oak: 92 (Eyre 1980) ?
- Water Oak-Willow Oak Series (Diamond 1993) B

Classification Comments: Reported from the Cunningham Brake Research Natural Area of the Kisatchie National Forest (Kisatchie Ranger District) by Jackie Mohan, possibly as interpreted from Allen (1993).

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (2002-1-30): This bottomland forest is known only from the West Gulf Coastal Plain of Louisiana and Texas and is further restricted to alluvial substrates unusually rich in nutrients and/or somewhat high in pH.

High-ranked species: *Amsonia ludoviciana* (G3)

ELEMENT DISTRIBUTION

Range: This forest is found in the West Gulf Coastal Plain of Louisiana and Texas and possibly Arkansas.

Subnations: AR?, LA, TX

TNC Ecoregions: 40:P, 41:C

USFS Ecoregions: 232Fa:CCC, 232Fb:CCP, 232Fc:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allan and Flecker 1993, Allard 1990, Allen 1993c, Diamond 1993, Eppinette 1990, Eyre 1980, Foti et al. 1994, Martin and Smith 1991, Smith 1996a, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., USFS 1988

WEST GULF COASTAL PLAIN PINE-HARDWOOD FLATWOODS

LOBLOLLY PINE - WHITE OAK - AMERICAN BEECH / AMERICAN HOLLY / SARSAPARILLA-VINE - PARTRIDGEBERRY FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - *Quercus alba* - (*Fagus grandifolia*) / *Ilex opaca* / *Smilax pumila* - *Mitchella repens* Forest

Database Code: CEGLO07525

Formation: Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a)

Alliance: *Pinus taeda* - *Quercus (alba, falcata, stellata)* Forest Alliance (A.404)

ELEMENT CONCEPT

Summary: This acidic, mesic mixed forest of the West Gulf Coastal Plain may best be described as hardwood - loblolly forest. Taken together, hardwoods are more abundant and important than are pines, however, *Pinus taeda* may be the single most dominant species in the overstory with individual trees attaining large diameters and height. The core concept of this type are stands with a significant component of mesic site species in all strata, although somewhat slightly drier forms may be included as long as *Quercus alba* is important in the overstory. This type occurs in a variety of ecological settings in the region, including middle and lower slopes between uplands and stream bottoms and at the heads of drainages along small, intermittent streams on acid sandy loams, silt loams and silty clays, and mesic situations in flatwoods environments.

Environment: This type occurs in a variety of ecological settings in the region, including middle and lower slopes between uplands and stream bottoms and at the heads of drainages along small, intermittent streams on acid sandy loams, silt loams and silty clays, and mesic situations in flatwoods environments. Hydrology ranges from mesic-wet to dry-mesic. Soils are acidic and include silt loams, sandy loams, and silty clays. This forest occurs on mesic flats and middle and lower slopes between uplands and stream bottoms,

often on Caddo and Glenmora silt loams. It is also known from along small streams on Caddo-Guyton silt loams. Caddo soils are poorly drained, slowly permeable fine-silty, siliceous, thermic Typic Glossaqualfs occurring on broad flats in the terrace uplands, with slopes less than 1%. Glenmora soils are moderately well-drained, slowly permeable fine-silty, siliceous, thermic Glossaquic Paleudalf with slopes ranging from 1-3%, occurring on broad ridgetops and gentle side slopes in terrace uplands. Guyton soils are poorly drained, slowly permeable soils formed in loamy alluvium. They are fine-silty, siliceous, thermic Typic Glossaqualfs with slopes less than 1% occurring in broad flats and depressions, and along streams. Caddo, Glenmora, and Guyton soils are typically found near each other (Kilpatrick et al. 1986, Martin and Smith 1991, 1993).

Vegetation: This mixed forest is dominated by both *Pinus taeda* and mixed hardwoods. Associated hardwoods may include *Quercus alba*, *Quercus nigra*, *Quercus laurifolia*, *Quercus phellos*, *Nyssa sylvatica*, *Liquidambar styraciflua*, *Fagus grandifolia*, *Magnolia grandiflora* (diminishes greatly north of central Louisiana), *Quercus michauxii*, *Quercus pagoda*, *Acer rubrum*, *Carya alba*, *Carya cordiformis*, and less commonly *Quercus falcata*, *Quercus stellata*, and *Carya texana*. The subcanopy may include canopy species and *Ilex opaca* var. *opaca*, *Ostrya virginiana*, *Carpinus caroliniana*, *Prunus mexicana*, and *Cornus florida*. The short-shrub stratum may include canopy and subcanopy species, plus *Callicarpa americana*, *Symplocos tinctoria*, *Morella cerifera* (= *Myrica cerifera*), *Vaccinium elliotii*, *Viburnum dentatum*, and *Viburnum acerifolium*. Herbaceous species may include *Polystichum acrostichoides*, *Athyrium filix-femina* ssp. *asplenioides*, *Phegopteris hexagonoptera*, *Spigelia marilandica*, *Mitchella repens*, *Podophyllum peltatum*, *Phlox divaricata*, *Tipularia discolor*, *Arisaema triphyllum*, *Chasmanthium laxum*, and *Melica mutica* (NatureServe Ecology unpubl. data, Turner et al. unpubl. data).

Dynamics: The influence and historical importance of fire on this type are unknown. It occurs in areas where fire-return intervals were likely quite low and may have only burned when they occurred in proximity to pyrogenic communities (Martin and Smith 1993). Landers (1989) proposed that *Pinus taeda* habitats did not burn at all. In many areas where this vegetation is found in eastern Texas, there is no adjacent pyrogenic vegetation, suggesting that these area may not have burned regularly, if at all, although attempts are made to use prescribed fire in these areas at least once every 10 years (R. Evans pers. obs.).

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208) -- occurs downslope, on richer hardwood-dominated sites.
- *Pinus palustris* / *Quercus (laevis, myrtifolia)* / *Aristida beyrichiana* - *Chapmannia floridana* Woodland (CEGL008569) -- shortleaf-dominated.
- *Pinus taeda* - (*Pinus echinata*) - *Quercus falcata* - *Carya texana* / *Vaccinium arboreum* Forest (CEGL007528) -- may spatially co-occur; often found upslope or in somewhat drier areas.

Related Concepts:

- IA6e. Loblolly Pine - Shortleaf Pine - Oak Forest (Allard 1990) B
- Loblolly Pine - Hardwood (13) (USFS 1988) B
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Loblolly Pine-Oak Series (Diamond 1993) B
- Lower Slope Hardwood Forest (Marks and Harcombe 1981) B
- T1B3aIII5b. *Pinus taeda-Quercus (phellos, nigra, stellata)* (Foti et al. 1994) B
- White Oak - Loblolly Pine / *Callicarpa* Loamy Mesic Lower Slopes and Terraces (Turner et al. 1999) B

Classification Comments: The most floristically rich examples occur up slope of mesic ravines in the region. Flatwoods examples and those in related environments lack many of the vernal species which may occasionally be present in this type. With additional work and data these depauperate, presumably drier examples may merit recognition at a later date (R. Evans pers. obs. 2002). Additionally, there may be a slightly subcalcareous subtype along the southwestern periphery of the Upper West Gulf Coastal Plain (see plots SAMH.4, SAMH.2) (NatureServe unpubl. data).

CONSERVATION RANKING & RARE SPECIES

GRank: G3G4 (2001-5-22): This type is heavily altered throughout its natural range by human land-use practices.

High-ranked species: *Cypripedium kentuckiense* (G3), *Prenanthes barbata* (G3)

ELEMENT DISTRIBUTION

Range: This association is known from Louisiana and Texas and likely ranges into Arkansas and Oklahoma.

Subnations: AR, LA, OK?, TX

TNC Ecoregions: 31:C, 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 231Fa:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Dickson et al. 1993, Evans pers. comm., Eyre 1980, Foti et al. 1994, Harcombe and Neaville 1977, Hatchell 1964, Kilpatrick et al. 1986, Landers 1989, Marks and Harcombe 1981, Martin and Smith 1991, Martin and Smith 1993, NatureServe Ecology - Southeastern U.S. unpubl. data, Smith 1995b, Smith 1996a, Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, USFS 1988

WEST GULF COASTAL PLAIN SALINE GLADE

SPIKERUSH SPECIES - CLUBRUSH SPECIES - FIMBRY SPECIES - RUSH SPECIES SOUTHEASTERN COASTAL PLAIN INLAND SALT FLAT SPARSE VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Eleocharis* spp. - *Schoenoplectus* spp. - *Fimbristylis* spp. - *Juncus* spp. Southeastern Coastal Plain Inland Salt Flat Sparse Vegetation

Database Code: CEGLO07803

Formation: Temporarily flooded sand flats (VII.C.2.N.c)

Alliance: *Eleocharis* spp. - *Schoenoplectus* spp. - *Fimbristylis* spp. - *Juncus* spp. Temporarily Flooded Sparsely (A.1924) Vegetated Alliance

ELEMENT CONCEPT

Summary: This community is sparsely vegetated but has patches and zones dominated by various clonal wetland graminoids, including *Eleocharis* spp., *Schoenoplectus* spp. (= *Scirpus* spp.), *Fimbristylis* spp., *Juncus* spp., and *Spartina pectinata*. Forbs are scattered and include *Hibiscus moscheutos* ssp. *lasiocarpus*, *Pluchea* sp., *Phyla* sp., and *Alternanthera paronichyoides* var. *amazonica* (exotic). This community occurs on flats near perennial streams and is flooded by freshwater following rain events, but the soils are saline.

Environment: No information

Vegetation: No information

Dynamics: No information

Similar Associations:

Related Concepts: No information

Classification Comments: Additional information about this community is needed in order to clarify its composition and classification. Examples at Cypress Creek Saline (Natchitoches Parish, Louisiana) and Drakes Salt Flat (Winn Parish, Louisiana).

CONSERVATION RANKING & RARE SPECIES

GRank: G1? (1999-7-12): There are less than 6 known sites, most are altered.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range:

Subnations: LA

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie)

ELEMENT SOURCES

References: Southeastern Ecology Working Group n.d.

WEST GULF COASTAL PLAIN SEEPAGE SWAMP AND BAYGALL

(SWAMP BLACKGUM, BLACKGUM) - SWEETBAY - DIAMONDLEAF OAK / TITI - BIG GALLBERRY - TEXAS AZALEA FOREST

ELEMENT IDENTIFIERS

NVC association: *Nyssa (biflora, sylvatica)* - *Magnolia virginiana* - *Quercus laurifolia* / *Cyrilla racemiflora* - *Ilex coriacea* - *Rhododendron oblongifolium* Forest

Database Code: CEGLO07474

Formation: Saturated mixed broad-leaved evergreen - cold-deciduous forest (I.C.2.N.d)

Alliance: *Magnolia virginiana* - *Nyssa biflora* - (*Quercus laurifolia*) Saturated Forest Alliance (A.378)

ELEMENT CONCEPT

Summary: This broad-leaved, mixed evergreen-deciduous forest represents one of two described phases of "baygalls" in the West Gulf Coastal Plain, this type being the more southern-ranging type. The canopy is typically strongly dominated by *Nyssa sylvatica* and/or *Nyssa biflora*, *Magnolia virginiana*, and *Quercus laurifolia*. The herb stratum is typically dominated by the ferns *Woodwardia areolata*, *Osmunda regalis* var. *spectabilis*, *Osmunda cinnamomea*, *Woodwardia virginica*, and *Onoclea sensibilis*. This community is saturated for most of the year with much of the moisture originating as seepage flow from adjacent sandy uplands.

Environment: This seasonally flooded wetland forest occurs on deep, very acidic silt loams, fine sandy loam, and loamy fine sand soils with high organic content. Soils are typically mapped as Corrigan (Typic Albaqualf), Melhones (Humaqueptic Psammaquent), and possibly Osier (Typic Psammaquent). This community is known from the following intermediate and high Pleistocene Terraces and Tertiary uplands: Catahoula (Oligocene), Sparta, Fleming (Miocene) and possibly the Vicksburg (Oligocene) formations. It occurs primarily on floodplain flats and along small blackwater streams of low velocity. Nixon et al. (1983a) measured stream depths of 0.3-0.6 m and widths of less than 1 m at the time of their study. The fluctuating periods of inundation result in a wider stream channel (i.e., section that floods more often than 2 years out of every 3) that is often saturated, although sections of it are generally not inundated. This community also occurs downstream in flatwoods associated with drainages (Groat 1990, Martin et al. 1990, Martin and Smith 1991, Smith 1996a).

Vegetation: The canopy is typically strongly dominated by *Nyssa sylvatica* and/or *Nyssa biflora*, *Magnolia virginiana*, and *Quercus laurifolia*. The canopy may also contain other species, such as *Acer rubrum*, *Magnolia grandiflora*, *Ilex opaca* var. *opaca*, *Pinus taeda*, *Taxodium distichum*, and *Liquidambar styraciflua*, and sometimes *Quercus michauxii*. *Persea palustris*, *Persea borbonia*, *Acer rubrum*, *Ilex opaca* var. *opaca*, and other canopy species form the subcanopy. The diverse, relatively dense, and primarily evergreen tall-shrub stratum may be dominated by *Cyrilla racemiflora* and *Ilex coriacea* but often includes *Alnus serrulata*, *Photinia pyrifolia* (= *Aronia arbutifolia*), *Chionanthus virginicus*, *Itea virginica*, *Morella cerifera* (= *Myrica cerifera* var. *cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Persea palustris*, *Rhododendron canescens*, *Rhododendron oblongifolium*, *Styrax americanus*, *Viburnum nudum* var. *nudum*, *Viburnum dentatum*, and sometimes *Carpinus caroliniana*, *Sebastiania fruticosa*, and *Vaccinium virgatum*. Woody vines, especially *Smilax laurifolia* and *Decumaria barbara*, can be common. The herb stratum is typically dominated by the ferns *Woodwardia areolata*, *Osmunda regalis* var. *spectabilis*, *Osmunda cinnamomea*, *Woodwardia virginica*, and *Onoclea sensibilis*; other components include *Apteris aphylla*, *Athyrium filix-femina* ssp. *asplenioides*, *Chasmanthium laxum*, *Carex leptalea*, *Carex atlantica*, *Carex debilis*, *Carex lonchocarpa* (= *Carex folliculata* var. *australis*), *Eleocharis tortilis*, *Platanthera clavellata*, *Platanthera ciliaris*, *Platanthera cristata*, *Leersia virginica*, *Lycopus rubellus*, *Triadenum walteri* (= *Hypericum walteri*), *Boehmeria cylindrica*, and *Saururus cernuus*. *Woodwardia areolata* and *Eleocharis microcarpa* are common and important enough to be used as nominals.

Dynamics: No evidence of fire was observed in the example sampled by Martin and Smith (1991). Due to its sheltered topographic position along stream headwaters and moist conditions, streamhead occurrences of this community likely burned very infrequently. Occurrences in flatwoods, however, may have burned more frequently, typically during droughts. In addition, examples occurring in a matrix of frequently burned *Pinus palustris* communities may be influenced by the pulse of post-fire nutrients occurring in runoff from uplands (Schafale and Weakley 1990). This forest does not appear to be a disturbance-dependent community but specific successional trajectories are not currently known.

Similar Associations:

- *Magnolia virginiana* - *Nyssa (biflora, sylvatica)* - *Acer rubrum* / *Morella caroliniensis* / *Woodwardia areolata* Forest (CEGL007904) -- is distributed farther to the north.
- *Magnolia virginiana* - *Nyssa biflora* - *Magnolia grandiflora* / *Ilex coriacea* - *Viburnum nudum* var. *nudum* / *Solidago patula* var. *strictula* Forest (CEGL007473) -- of the East Gulf Coastal Plain contains a very open shrub layer and occurs on sticky clay soils with no peat accumulation; it is less acidic than other bay forests.

Related Concepts:

- Baygall community (Matos and Rudolph 1985) ?
- IIA2a. Bay Forest (Allard 1990) B
- Mill Creek Bayhead (Martin and Smith 1991) =
- Semi-Evergreen Broadleaf Acid Seep Forest (Bridges and Orzell 1989a) =
- Streamside Vegetation of the Big Thicket (Wilkinson 1982) ?
- Sweet Bay - Swamp Tupelo - Red Bay: 104 (Eyre 1980) B
- Sweet Bay - Swamp Tupelo - Red Maple (68) (USFS 1988) ?
- Sweetbay - Swamp Tupelo / *Osmunda* Loamy Wet Forested Seeps (Turner et al. 1999) B Sweetbay Magnolia Series (Diamond 1993) B
- Upper Prairie Creek/Upper Wet community (Nixon et al. 1983a) =
- Wet creek bottom vegetation (Nixon and Ward 1988) ?
- Wetland Baygall Shrub Thicket (Marks and Harcombe 1981) ?

Classification Comments: This type is the main upland bayhead swamp or baygall type of central and western Louisiana and eastern Texas.

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (1998-12-11): This community is naturally restricted to seasonally flooded to permanently saturated wetlands associated with headslope seepage areas or floodplains of small perennial streams. Herb-dominated seepage bogs that are fire-suppressed will often succeed to this forest community. Threats to this community include inundation by pond and reservoir construction, alteration of hydrological patterns by road construction, seismic surveying, or well-drilling, increased windthrow and microclimate modification caused by intensive silvicultural practices on adjacent uplands, herbicide use, and vegetation damage by feral hogs.

High-ranked species: *Bartonia texana* (G2), *Prenanthes barbata* (G3)

ELEMENT DISTRIBUTION

Range: This community occurs in the West Gulf Coastal Plain of Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Brooks et al. 1993, Diamond 1993, Eyre 1980, Groat 1990, Marks and Harcombe 1981, Martin and Smith 1991, Matos and Rudolph 1985, Nixon and Ward 1988, Nixon et al. 1983a, Schafale and Weakley 1990, Smith 1988c, Smith 1996a, Smith pers. comm., Soil Conservation Service 1990, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988, Wilkinson 1982

(SWEETBAY) / BIG GALLBERRY - EVERGREEN BAYBERRY SHRUBLAND

ELEMENT IDENTIFIERS

NVC association: (*Magnolia virginiana*) / *Ilex coriacea* - *Morella caroliniensis* Shrubland

Database Code: CEGLO03530

Formation: Saturated temperate broad-leaved evergreen shrubland (III.A.2.N.i)

Alliance: *Cyrilla racemiflora* - *Ilex coriacea* - (*Cliftonia monophylla*) Saturated Shrubland Alliance (A.802)

ELEMENT CONCEPT

Summary: This community is a broad-leaved evergreen shrubland, sometimes with scattered emergent small trees (sometimes approaching woodland physiognomy). It occurs as small shrub-dominated thickets of less than one acre to several acres in size, in a matrix of hillside bog and longleaf pine woodlands in the West Gulf Coastal Plain of Louisiana and Texas. Scattered trees, including *Magnolia virginiana*, *Nyssa biflora*, and *Acer rubrum* may be present. The tall-shrub stratum is dense and supports a variety of evergreen shrubs. Dominant and typical species include *Ilex coriacea*, *Morella cerifera* (= *Myrica cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Persea palustris*, *Alnus serrulata*, *Toxicodendron vernix*, *Vaccinium fuscatum*, *Viburnum nudum* var. *nudum*, *Photinia pyrifolia* (= *Aronia arbutifolia*), *Lyonia lucida*, and *Rhododendron oblongifolium*. *Smilax laurifolia* is often an abundant, entangling vine. The herbaceous stratum is sparse to moderately dense, depending on the overstory cover. This stratum is dominated by pteridophytes. *Osmunda cinnamomea*, *Osmunda regalis* var. *spectabilis*, *Woodwardia areolata*, *Onoclea sensibilis*, and *Woodwardia virginica* are typical. Scattered forbs and graminoids typical of open herbaceous seeps, such as *Rudbeckia scabrifolia*, *Solidago patula* var. *strictula*, *Carex* spp., *Dichanthelium* spp., may occur in more open examples of this woodland. *Sphagnum* spp. are generally an abundant ground cover in this community.

Environment: This community is known from the Western Gulf Coastal Plain of Louisiana and eastern Texas (Bridges and Orzell 1989a, Martin and Smith 1991, 1993, Grace and Smith 1995). It occurs on mid to lower slopes within or along narrow drains in the sandy hills of western Louisiana and eastern Texas, and receives enough seepage to possess permanently to semipermanently saturated conditions. The deep, poorly drained, strongly acidic, loamy fine sand soils have a high organic matter content and may be mapped as Osier loamy fine sand (Typic Psammaquent). The sandy soils overtop an impermeable layer, generally clay. This seepage community is known from the Sparta, Catahoula, Fleming (Blounts Creek Member), and Pleistocene High Terraces (Willis and Bentley in Texas; Williana, Citronelle, and Bentley in Louisiana) formations. Occurrences are never extensive, typically less than 0.4 hectare.

Vegetation: Stands are dense and generally dominated by tall shrubs, such as *Ilex coriacea*, *Morella cerifera* (= *Myrica cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Persea palustris*, *Alnus serrulata*, *Toxicodendron vernix*, *Vaccinium fuscatum*, *Viburnum nudum* var. *nudum*, *Photinia pyrifolia* (= *Aronia arbutifolia*), *Lyonia lucida*, and *Rhododendron oblongifolium*. Scattered trees, including *Magnolia virginiana*, *Nyssa biflora*, and *Acer rubrum* may be present. *Smilax laurifolia* is often an abundant, entangling vine. The herbaceous stratum is sparse to moderately dense, depending on the overstory cover. This stratum is dominated by pteridophytes. *Osmunda cinnamomea*, *Osmunda regalis* var. *spectabilis*, *Woodwardia areolata*, *Onoclea sensibilis*, and *Woodwardia virginica* are typical. Scattered forbs and graminoids typical of open herbaceous seeps, such as *Rudbeckia scabrifolia*, *Solidago patula* var. *strictula*, *Carex* spp., *Dichanthelium* spp., may occur in more open examples of this woodland. *Sphagnum* spp. are generally an abundant ground cover in this community.

Dynamics: According to Grace and Smith (1995) the degree of development of this type is dynamically related to fire frequency. These wooded seeps can only develop in areas that do not burn with great frequency or in areas that have been fire-suppressed for at least a few years. Unburned hillside bogs may succeed into wooded seeps; correspondingly, wooded seeps may revert to hillside bogs when subjected to increased fire frequency.

Occurrences within a *Pinus palustris* matrix are fire-suppressed seepage slope communities. Historically, growing-season fires likely burned into this community from the surrounding *Pinus palustris* woodlands and flatwoods, and regulated the successional status of

this community. Occurrences on seepage slopes in some *Pinus echinata* - *Pinus taeda* forests were likely always wooded due to the less frequent historical fire frequencies.

Similar Associations:

- *Magnolia virginiana* - *Nyssa (biflora, sylvatica)* - *Acer rubrum* / *Morella caroliniensis* / *Woodwardia areolata* Forest (CEGL007904) -- a more naturally wooded type, often downslope.
- *Nyssa (biflora, sylvatica)* - *Magnolia virginiana* - *Quercus laurifolia* / *Cyrilla racemiflora* - *Ilex coriacea* - *Rhododendron oblongifolium* Forest (CEGL007474) -- a more naturally wooded type, often downslope.
- *Sarracenia alata* - *Rhynchospora gracilentata* - *Rudbeckia scabrifolia* - *Schoenolirion croceum* Herbaceous Vegetation (CEGL004175) -- the herbaceous bog type.
- *Viburnum nudum var. nudum* - *Morella cerifera* - *Smilax laurifolia* Shrubland (CEGL007874) -- a related community at the periphery of the region.

Related Concepts:

- IIA2a. Bay Forest (Allard 1990) B
- IIC3a. Coastal Plain Seepage Shrub Slope (Allard 1990) B
- Sweet Bay - Swamp Tupelo - Red Bay (68) (USFS 1988) ?
- Sweetbay - Swamp Tupelo - Redbay: 104 (Eyre 1980) B
- Sweetbay - Swamp Tupelo / *Osmunda* Loamy Wet Forested Seeps (Turner et al. 1999) B
- Sweetbay Magnolia Series (Diamond 1993) B
- Wooded Seep (Martin and Smith 1991) ?
- Wooded Seep (Martin and Smith 1993) ?
- Wooded Seep (Grace and Smith 1995) ?

Classification Comments: *Ilex coriacea* is uncommon as far north as the Sparta Formation in Texas (R. Turner pers. comm.).

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (1998-1-22): This broad-leaved evergreen shrubland of the West Gulf Coastal Plain of Louisiana and eastern Texas occurs in naturally fire-sheltered situations associated with seepage bogs which receive enough seepage to possess permanently to semi-permanently saturated conditions. It is restricted to deep, poorly drained, strongly acidic, loamy fine sand soils with a high organic matter content which overtop an impermeable layer, generally of clay. Occurrences are never extensive, typically less than 0.4 hectare. While more common than related herbaceous or shrub-dominated types, this vegetation is limited to highly specialized topographic situations and is vulnerable to land-use change and hydrologic alteration, as well as the effects of fire exclusion. Historically, growing-season fires likely burned into this community from the surrounding *Pinus palustris* woodlands and flatwoods and regulated the successional status of this community. As time since last fire increases, the cover of shrubs and canopy species increases, and the herbs, particularly those typical of hillside seepage bog communities, decrease in abundance.

High-ranked species: *Rudbeckia scabrifolia* (G2G3)

ELEMENT DISTRIBUTION

Range: This shrubland is restricted to the West Gulf Coastal Plain of Louisiana and eastern Texas.

Subnations: LA, TX

TNC Ecoregions: 40:?, 41:C

USFS Ecoregions: 231Ef:???, 231Eh:???, 231Ei:???, 232Fa:CCC, 232Fb:CCC, 232Fe:CCC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF, Sam Houston?)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Diamond 1993, Eyre 1980, Grace and Smith 1995, Groat 1990, Martin and Smith 1991, Martin and Smith 1993, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, USFS 1988

SWEETBAY - (SWAMP BLACKGUM, BLACKGUM) - RED MAPLE / EVERGREEN BAYBERRY / NETTED CHAINFERN FOREST

ELEMENT IDENTIFIERS

NVC association: *Magnolia virginiana* - *Nyssa (biflora, sylvatica)* - *Acer rubrum* / *Morella caroliniensis* / *Woodwardia areolata* Forest

Database Code: CEGL007904

Formation: Saturated mixed broad-leaved evergreen - cold-deciduous forest (I.C.2.N.d)

Alliance: *Magnolia virginiana* - *Nyssa biflora* - (*Quercus laurifolia*) Saturated Forest Alliance (A.378)

ELEMENT CONCEPT

Summary: This broad-leaved, evergreen forest represents one of two described phases of "baygalls" in the West Gulf Coastal Plain. Key diagnostic species of this association include the nominals, *Magnolia virginiana*, *Nyssa sylvatica*, *Acer rubrum*, *Morella caroliniensis*, and *Woodwardia areolata*. Endemic to Texas, Louisiana, and southern Arkansas, this "northern" type lacks indicator species of related environments in the southern portions of the region, such as *Cyrilla racemiflora* and *Ilex coriacea*. This forest

occurs on saturated soils at the headwaters and margins of topographically flat creek bottoms associated with springs and seepage flow. These communities are invariably embedded within sandy slopes and uplands.

Environment: This forest occurs on saturated soils associated with springs and seepage flow at the headwaters and margins of topographically flat creek bottoms. The creek channels themselves tend to be highly meandering, often with multiple channels and extremely shallow banks. These communities are invariably embedded within adjacent sandy slopes and uplands. The deep, poorly drained, strongly acidic, loamy fine sand soils have a high organic matter content (Brooks et al. 1993). Van Kley (1999a) indicates that these habitats, mapped as the Betis series and Guyton complex on the Kisatchie Ranger District of Louisiana, are notably low in calcium and magnesium. Other examples of this type are mapped as Lovelady (Arenic Glossudalf), Rentzel (Arenic Plinthaquic Paleudult), and Osier (Typic Psammaquent). The sandy soils usually overtop an impermeable layer. These infertile soils have a high available water capacity with very slow ponded surface water runoff. This seepage community is known from sandy uplands throughout Louisiana and eastern Texas, including the Carrizo, Sparta, Willis (High Pleistocene Terraces), Bentley (Intermediate Terraces), Catahoula (Oligocene), Fleming (Miocene), Cockfield, Wilcox, and other formations. Surface soils are predominately sandy-textured and low in nutrients.

Vegetation: This association type primarily reflects the quantitative analysis of Brooks et al. (1993) in which the most important woody species were *Magnolia virginiana*, *Nyssa sylvatica*, *Acer rubrum*, *Liquidambar styraciflua*, and *Morella caroliniensis* (= *Myrica heterophylla*). *Pinus taeda* is present in most examples. *Nyssa biflora* apparently occurs in Louisiana examples (L. Smith pers. comm.). *Ilex opaca* may be present, but is more common in southern baygalls of the region (Brooks et al. 1993). Other important woody species in the shrub layer at a site in Nacogdoches County, Texas (Nixon et al. 1980b), included *Sambucus nigra* ssp. *canadensis* (= *Sambucus canadensis*), *Alnus serrulata*, *Vaccinium fuscum* (= *Vaccinium arkansanum*), and *Itea virginica*. Woody species such as *Fagus grandifolia* may be present along the edges but are usually absent from the interior due to intolerance to flooding. According to Brooks et al. (1993), the canopy stratum is strongly dominated by *Magnolia virginiana*, followed by *Nyssa sylvatica*, *Acer rubrum*, and *Liquidambar styraciflua*. Data from two additional plots on the national forests in Texas document *Nyssa sylvatica* as the dominant overstory tree (Turner et al. unpubl. data). The shrub stratum is dense and supports a variety of evergreen shrubs, although *Morella caroliniensis* is usually dominant. Other typical woody species include *Alnus serrulata* and *Itea virginica*, as well as *Vitis rotundifolia* and *Smilax laurifolia*. Other woody species present may include *Persea palustris*, *Toxicodendron vernix*, *Vaccinium fuscum*, *Viburnum nudum* var. *nudum*, *Photinia pyrifolia* (= *Aronia arbutifolia*), *Lyonia* spp., and *Rhododendron oblongifolium*. The herbaceous stratum is sparse to fairly dense, depending on the density of the overstory. This stratum is dominated by peridophytes, such as *Osmunda cinnamomea*, *Osmunda regalis* var. *spectabilis*, *Woodwardia areolata*, *Onoclea sensibilis*, and *Woodwardia virginica*. *Carex leptalea*, *Isotria verticillata*, *Solidago patula*, and *Eleocharis tortilis* may be present in some examples. Scattered forbs and graminoids typical of open herbaceous seeps may occur in more open examples of this forest. *Sphagnum* spp. are generally an abundant ground cover in this community.

Dynamics: No information

Similar Associations:

- *Nyssa (biflora, sylvatica) - Magnolia virginiana - Quercus laurifolia / Cyrilla racemiflora - Ilex coriacea - Rhododendron oblongifolium* Forest (CEGL007474) -- occurs in the same ecoregion but typically farther southward where species such as *Ilex coriacea* and *Cyrilla racemiflora* are found.

Related Concepts:

- Semi-Evergreen Broadleaf Acid Seep Forest (Bridges and Orzell 1989a) ?
- Sweetbay - Swamp Tupelo / *Osmunda* Loamy Wet Forested Seeps (Turner et al. 1999) B
- Sweetbay Magnolia Series (Diamond 1993) B

Classification Comments: This type is reasonably well documented and understood in the West Gulf Coastal Plain of both Louisiana and eastern Texas, including the Prairie Creek site on the Angelina National Forest of Nixon et al. (1983a) and the wet creek bottom community in Nacogdoches County, TX, of Nixon et al. (1980b). However, the ground flora is less well documented since the important studies by Nixon covered woody species only. See also Bridges and Orzell 1989b, Groat 1990, Martin and Smith 1991, Turner et al. 1999. The nominals chosen reflect the quantitative dominants from the Brooks et al. (1993) study with the exception that *Nyssa biflora* was retained although data from Brooks et al. (1993), Marks and Harcombe (1983), and unpublished plot data from the national forests in Texas do not indicate any *Nyssa biflora* present at all, rather the presence of *Nyssa sylvatica*. We believe that *Nyssa biflora* is actually present in this habitat but has been misidentified (Burckhalter 1992). According to Burckhalter's (1992) range map of *Nyssa biflora*, this species would only be present in the southern baygall type, *Nyssa (biflora, sylvatica) - Magnolia virginiana - Quercus laurifolia / Cyrilla racemiflora - Ilex coriacea - Rhododendron oblongifolium* Forest (CEGL007474), in east Texas only, but could be present in both the northern and the southern type in Louisiana.

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (2000-8-22): As currently defined this type occurs only west of the Mississippi River in the Gulf Coastal Plain ecoregions in Arkansas, Louisiana, and Texas. It is very rare and of limited distribution in Arkansas. The type occurs more commonly in Texas and Louisiana and possibly the best examples occur on U.S. Forest Service lands in both states. This community is naturally restricted to wetland seepage areas or floodplains of small perennial streams in areas which bisect deep sandy soils. Threats to this community include inundation by pond and reservoir construction, alteration of hydrological patterns by road construction, off-road

vehicle use, seismic surveying, or well-drilling, increased windthrow and microclimate modification caused by intensive silvicultural practices on adjacent uplands, herbicide use, and vegetation damage by feral hogs.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This type occurs only west of the Mississippi River in the Gulf Coastal Plain ecoregions in Arkansas, Louisiana, and Texas.

Subnations: AR, LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ed:CCC, 231Ef:CC?, 232Fe:CCC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Bridges and Orzell 1989a, Bridges and Orzell 1989b, Brooks et al. 1993, Burckhalter 1992, Diamond 1993, Groat 1990, Martin and Smith 1991, Nixon et al. 1980a, Nixon et al. 1980b, Nixon et al. 1983a, Smith 1996a, Smith pers. comm., Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, Van Kley 1999a

WEST GULF COASTAL PLAIN SMALL STREAM AND RIVER FOREST

AMERICAN BEECH - LOBLOLLY PINE - (SWEETGUM, SOUTHERN MAGNOLIA, WHITE OAK) SMALL STREAM FOREST

ELEMENT IDENTIFIERS

NVC association: *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Small Stream Forest

Database Code: CEGL007320

Formation: Temporarily flooded mixed evergreen - cold-deciduous forest (I.C.2.N.b)

Alliance: *Fagus grandifolia* - *Liquidambar styraciflua* - *Pinus taeda* - (*Magnolia grandiflora*) Temporarily Flooded Forest Alliance (A.1989)

ELEMENT CONCEPT

Summary: This West Gulf Coastal Plain, small stream, mesic forest is typically dominated by a combination of *Fagus grandifolia*, *Pinus taeda*, *Liquidambar styraciflua*, *Quercus alba*, and *Quercus nigra*. Midstory contains *Nyssa sylvatica* and a variety of other typical mesic species. The understory is typically dominated by *Mitchella repens* and *Smilax pumila*. The community is mesic overall but may include flora of more saturated sites in the region, such as *Athyrium filix-femina*, *Woodwardia areolata*, and *Eleocharis tortilis*, along the imbedded stream channel.

Environment: This forest occurs on knolls in and bordering small to intermediate streams in the Western Gulf Coastal Plain. The restriction to drier knolls is especially pronounced on intermediate-sized streams. Although this community experiences annual flooding generally 5 to 10 days a year, the flooding is never of long duration (usually not more than 2 days at a time). Soils are extremely variable in both texture and pH, but are often acidic sandy floodplain and natural levee soils mapped as Guyton (Martin and Smith 1991, L. Smith pers. comm. 1995).

This forest is found within the average annual floodplain of small streams in central and western Louisiana and eastern Texas. Examples have been documented on sandy soils, with low pH (4.7-5.3), and very low nutrients on the national forests in eastern Texas, one of which occurs on the Sparta Formation along the northern boundary of Angelina National Forest (Turner et al. unpubl. data). This type may also occur on acidic sandy loams and silt loams on other Pleistocene and Tertiary formations in the region. Hydrologically, it is characterized by short-duration flood events, on the order of 1-3 days per event, occurring a few times in an average year. This type has been documented on the Dallardsville soil series in east Texas.

Vegetation: Stands of this forest typically have canopies dominated by a combination of *Fagus grandifolia*, *Pinus taeda*, *Liquidambar styraciflua*, *Quercus alba*, and *Quercus nigra*. Other canopy species often present include *Magnolia grandiflora*, *Quercus laurifolia*, *Quercus michauxii*, *Quercus pagoda*, *Nyssa sylvatica*, *Nyssa biflora*, *Magnolia virginiana*, *Fraxinus americana*, *Ulmus alata*, *Acer rubrum*, *Carya alba*, *Carya glabra*, and *Quercus falcata*. Common midstory and understory species include *Carpinus caroliniana*, *Ilex opaca*, *Vaccinium elliotii*, *Viburnum dentatum*, *Halesia diptera*, *Hamamelis virginiana*, *Ostrya virginiana*, *Rhododendron canescens*, *Symplocos tinctoria*, *Sebastiania fruticosa*, *Asimina triloba*, *Sambucus nigra* ssp. *canadensis* (= *Sambucus canadensis*), *Itea virginica*, and others. *Arundinaria gigantea* is typically very common in patches. Vines are usually conspicuous and may include *Vitis rotundifolia*, *Smilax* spp., *Berchemia scandens*, *Campsis radicans*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Bignonia capreolata*. Herbaceous species often include *Athyrium filix-femina*, *Polystichum acrostichoides*, *Chasmanthium latifolium*, *Chasmanthium sessiliflorum*, *Arisaema triphyllum*, *Lobelia cardinalis*, *Polygonum* spp., and others.

Dynamics: Most of this forest tends to be uneven-aged with the majority of regeneration occurring in canopy gaps. This is a disturbance-sensitive community, with the primary disturbance vectors being occasional to rare windthrows, diseases and pathogens.

Due to the isolated topographic position, nearly permanently wet soils, lack of available fuels and fire-sensitivity of canopy species,

fires are believed to play a very minor role in this community's dynamics. Fire scars, however, are occasionally found on *Fagus grandifolia* implying that limited fires may occur in very dry years and may have a role in creating canopy gaps (Smith 1991). Unless perturbed by a major disturbance, this community will likely persist for an undetermined length of time.

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208) -- is often adjacent to this riparian forest, but occurs on mesic slopes not receiving flooding and has richer ground cover, shrub and tree strata.
- *Magnolia grandiflora* - *Fagus grandifolia* - *Quercus alba* - *Pinus taeda* Forest (CEGL007903) -- similar but with *Magnolia grandiflora* dominance in the canopy.
- *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest (CEGL007901)
- *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899)

Related Concepts:

- American Beech - Southern Magnolia - *Mitchella* Loamy Moist-Mesic Stream Bottoms (Turner et al. 1999) B
- American Beech-Southern Magnolia Series (Diamond 1993) B
- Beech - Magnolia (69) (USFS 1988) ?
- IA8e. Beech - Magnolia Forest (Allard 1990) B
- IB5b. Coastal Plain Small Stream Swamp Forest (Allard 1990) B

Classification Comments: Both this association and *Magnolia grandiflora* - *Fagus grandifolia* - *Quercus alba* - *Pinus taeda* Forest (CEGL007903) represent the first ("driest") small stream forests that arise along the upper reaches of drainages. They are closely related to downstream small stream forests in the area, *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest (CEGL007901) and *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899), but these upper-stream-reach forests have a shorter hydro-period and are not as wet as the downstream types. They are common on small streams of the Winn, Kisatchie and Catahoula districts of Kisatchie National Forest. On the Kisatchie National Forest, *Magnolia grandiflora* is much more common on the Evangeline, southern Kisatchie, southern Catahoula, and Vernon ranger districts.

CONSERVATION RANKING & RARE SPECIES

GRank: G3 (1998-12-11): This association occurs on portions of the landscape where periodic fires were not common, and it was once prevalent on mesic middle and lower slopes along rivers and small streams throughout much of west-central Louisiana and eastern Texas. Intact occurrences of this association have now become relatively rare. During the early part of the 20th century, much of the landscape within its range was logged or converted to agricultural cropland. In addition, many of these highly productive sites have been converted to commercial pine plantations, eliminating the original hardwood-dominated community altogether. Once it is removed, this community is not readily restored. Current threats include increased erosion, windthrow, and microclimate modification caused by intensive silvicultural practices on adjacent uplands, herbicide use, and vegetation damage by feral hogs. A possible long-term threat is that of global climate change. Many species in this association occur at the southwestern limit of their range (McLeod 1975) and require periods of cold-stratification for their seeds to germinate (Nixon et al. 1980). Increased average temperatures may affect the ability of some of these species to germinate and survive (Kutner and Morse 1996).

High-ranked species: *Amsonia ludoviciana* (G3), *Cypripedium kentuckiense* (G3), *Prenanthes barbata* (G3), *Triphora trianthophora* (G3G4)

ELEMENT DISTRIBUTION

Range: This association is found in the West Gulf Coastal Plain within the range of *Fagus grandifolia*. Geographically within the West Gulf Coastal Plain of Louisiana, the type is much more common along small streams north of the range of *Magnolia grandiflora*.

Subnations: LA, TX?

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fa:CCC, 232Fe:CCC

Federal Lands: DOD (Fort Polk); USFS (Angelina, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Grace and Smith 1995, Kutner and Morse 1996, Martin and Smith 1991, Martin and Smith 1993, McLeod 1975, Nixon et al. 1980a, Smith 1996a, Smith pers. comm., Southeastern Ecology Working Group n.d., Turner et al. 1999, Turner et al. unpubl. data, USFS 1988

AMERICAN BEECH - SWEETBAY - (LONGLeAF PINE) / LONGLeAF SPIKEGRASS SANDHILL STREAMHEAD FOREST

ELEMENT IDENTIFIERS

NVC association: *Fagus grandifolia* - *Magnolia virginiana* - (*Pinus palustris*) / *Chasmanthium sessiliflorum* Sandhill Streamhead Forest

Database Code: CEGL007976

Formation: Mixed broad-leaved evergreen - cold-deciduous forest (I.C.2.N.a)

Alliance: *Fagus grandifolia* - *Magnolia grandiflora* Forest Alliance (A.369)

ELEMENT CONCEPT

Summary: This forest occurs west of the Mississippi River at narrow streamheads, lower slopes adjacent to sandy streambanks, and in the transition zone from bayheads to small stream forests. Due to juxtaposition between dry, sandy uplands (often with relictual *Pinus palustris*) and mesic stream courses, the flora of this community exhibits affinities to these different habitats. In addition, seepage is often present. The canopy of this association is dominated by some combination of *Magnolia virginiana*, *Magnolia grandiflora*, and *Fagus grandifolia*. A number of other deciduous species may also be present. A diverse herbaceous layer dominated by ferns, sphagnum moss, and sedges is usually present, ranging from sparse cover on the most uphill portions of this community to nearly 100% coverage in the wetter interior portions. Many of the species found in this type, including many of the herbs, are typical of "baygalls" or wet creek bottom habitats which invariably occur somewhat farther downslope.

Environment: This forest occurs west of the Mississippi River at the heads of narrow streams which originate in deep sandhills and also in the transition zone from bayheads to small stream forests. Topography may be steep relative to the surrounding landscape, and seepage flow tends to be concentrated here. The combination of rugged topography and moist conditions limits the effectiveness of fire in this habitat. Although frequent fire is important in the surrounding sandhill habitats, it rarely enters this type.

Vegetation: *Nyssa sylvatica* and *Acer rubrum* var. *drummondii* are typically present. Other canopy trees may include *Liquidambar styraciflua*, *Quercus falcata*, *Quercus michauxii*, *Quercus phellos*, *Nyssa biflora*, and *Quercus nigra*. The midstory and shrub layer may be dense with saplings of overstory trees and species such as *Asimina triloba*, *Carpinus caroliniana*, *Cephalanthus occidentalis*, *Hamamelis virginiana*, *Ilex opaca*, *Itea virginica*, *Lyonia ligustrina*, *Morella caroliniensis* (= *Myrica heterophylla*), *Rhododendron canescens*, *Vaccinium fuscum*, and *Viburnum nudum*. Woody vines often form dense tangles that may include *Berchemia scandens*, *Parthenocissus quinquefolia*, *Smilax glauca*, *Smilax laurifolia*, *Smilax rotundifolia*, and *Vitis rotundifolia*. A diverse herbaceous layer dominated by ferns, sphagnum moss, and sedges is usually present. Herbaceous species may include *Arisaema triphyllum* (= *Arisaema atrorubens*), *Athyrium filix-femina*, *Bartonia paniculata*, *Boehmeria cylindrica*, *Carex lurida*, *Carex retroflexa*, *Chasmanthium laxum*, *Commelina erecta*, *Commelina virginica*, *Cyperus plukenetii*, *Eupatorium perfoliatum*, *Juncus diffusissimus*, *Juncus effusus*, *Leersia oryzoides*, *Leersia virginica*, *Lobelia puberula* var. *mineolana*, *Ludwigia palustris*, *Mimulus alatus*, *Onoclea sensibilis*, *Osmunda cinnamomea*, *Osmunda regalis*, *Panicum anceps*, *Dichantherium scoparium*, *Platanthera clavellata*, *Saururus cernuus*, *Sparganium americanum*, *Triadenum walteri*, *Viola X primulifolia*, *Woodwardia areolata*, and *Woodwardia virginica* (NatureServe Ecology unpubl. data, Turner et al. unpubl. data). Many of the species found in this type, including most of the herbaceous species, are typical of "baygalls" or wet creek bottom habitats which invariably occur somewhat farther downslope. *Castanea pumila* is often found along the drier, more upland edge of this habitat. This type has elements of both typical acid mesic hardwood forests of the region, as well as baygalls, and may actually be considered to be intermediate between these two different types.

Dynamics: The combination of rugged topography and moist conditions limits the effectiveness of fire in this habitat. Although frequent fire is important in the surrounding sandhill habitats, it rarely enters this type.

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208)
- *Magnolia virginiana* - *Nyssa* (*biflora*, *sylvatica*) - *Acer rubrum* / *Morella caroliniensis* / *Woodwardia areolata* Forest (CEGL007904)

Related Concepts: No information

Classification Comments: This type has elements of both typical acid, mesic hardwood forests of the region (especially *Fagus grandifolia* - *Quercus alba* / *Ilex opaca* var. *opaca* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007208)) and baygalls (for example *Magnolia virginiana* - *Nyssa* (*biflora*, *sylvatica*) - *Acer rubrum* / *Morella caroliniensis* / *Woodwardia areolata* Forest (CEGL007904)) and may actually be considered to be intermediate between these different types. Several high-quality occurrences are known from Nevada and Ouachita counties, Arkansas, including PNA #23, Arkansas Oak Natural Area, and the Poison Springs State Forest. The type locality is in Ouachita County, Arkansas. An example of this type was observed by R.E. Evans and A.S. Weakley in Shelby County, TX.

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (2001-6-28): This type occurs within a narrow geographic region and is further limited by occurrence in areas of deep sandhills. Occurrences tend to be fairly small and are easily altered by activities in the surrounding sandhill matrix. Occurrences may be overlooked as 'depauperate' examples of either mesic hardwood forests or baygalls. The combination of rugged topography and moist conditions limits the effectiveness of fire in this habitat. Although frequent fire is important in the surrounding sandhill habitats, it rarely enters this type. Some stands have been impacted by removal of more valuable timber species. This type is thought to be present on the Angelina and Sabine national forests, Texas, where it is possible that some examples could be conserved.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is found in southern Arkansas, eastern Texas, and western Louisiana.

Subnations: AR, LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 231F:CC, 232Fe:CCC
Federal Lands: USFS (Angelina, Kisatchie?, Sabine NF)

ELEMENT SOURCES

References: NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Turner et al. unpubl. data

CHERRYBARK OAK - SWEETGUM - LOBLOLLY PINE FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest

Database Code: CEGLO07899

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Quercus (michauxii, pagoda, shumardii)* - *Liquidambar styraciflua* Temporarily Flooded Forest Alliance (A.291)

ELEMENT CONCEPT

Summary: This temporarily flooded floodplain forest occurs along intermediate-sized streams (as well as some larger river systems) in the West Gulf Coastal Plain of Louisiana and Texas. Its canopy dominants include *Quercus pagoda*, *Liquidambar styraciflua*, *Pinus taeda*, *Quercus michauxii*, and *Quercus laurifolia*. Other characteristic tree species include *Carya glabra*, *Quercus similis*, *Ulmus alata*, *Ulmus americana*, *Fraxinus* sp., *Quercus alba*, *Nyssa sylvatica*, and occasional *Taxodium distichum*. Understory trees include *Carpinus caroliniana*, *Crataegus marshallii*, *Symplocos tinctoria*, *Ostrya virginiana*, *Ulmus alata*, and (rarely) *Acer leucoderme*. Woody vines include *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Smilax rotundifolia*. Shrubs may include *Sambucus nigra* ssp. *canadensis* (= *Sambucus canadensis*), *Sebastiania fruticosa*, and *Ilex vomitoria*. The herb stratum is sparse but can include *Carex* spp., *Chasmanthium* spp., *Osmunda cinnamomea*, *Onoclea sensibilis*, and others. Soils are silt loams. It has a longer hydroperiod than *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Forest (CEGL007320). The type description is based on intermediate stream floodplains in central-northern Louisiana, but it is being applied more widely, including examples on larger rivers in Texas, such as the Neches. This type is presumed to be more prevalent outside the range of *Magnolia grandiflora*, but is presumed also to occur in parts of eastern Texas within that range.

Environment: This temporarily flooded floodplain forest was originally developed to cover intermediate-sized streams in the West Gulf Coastal Plain of Louisiana and Texas. It is also being generally applied to some larger river systems as the Neches River in Texas. Soils are silt loams. This association has a longer hydroperiod than *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Forest (CEGL007320).

Vegetation: The canopy dominants of stands of this type include *Quercus pagoda*, *Liquidambar styraciflua*, *Pinus taeda*, *Quercus michauxii*, and *Quercus laurifolia*. Other characteristic tree species include *Carya glabra*, *Carya illinoensis*, *Quercus similis*, *Ulmus alata*, *Ulmus americana*, *Fraxinus* sp., *Quercus alba*, *Nyssa sylvatica*, and occasional *Taxodium distichum*. Understory trees include *Carpinus caroliniana*, *Crataegus marshallii*, *Ilex opaca*, *Symplocos tinctoria*, *Ostrya virginiana*, *Prunus serotina*, *Ulmus alata*, and (rarely) *Acer leucoderme*. Woody vines include *Berchemia scandens*, *Bignonia capreolata*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*, *Smilax rotundifolia*, and *Vitis rotundifolia*. Shrubs may include *Arundinaria gigantea*, *Sambucus nigra* ssp. *canadensis* (= *Sambucus canadensis*), *Sebastiania fruticosa*, and *Ilex vomitoria*. The herb stratum is sparse but can include *Carex* spp., *Osmunda cinnamomea*, *Onoclea sensibilis*, and others. Additional herbs in a stand assigned to this type from the Sabine National Forest (Texas) include *Chasmanthium laxum*, *Botrychium dissectum* (= var. *obliquum*), *Mitchella repens*, *Polygonum virginianum*, *Carex* sp., *Elephantopus carolinianus*, *Oplismenus hirtellus* ssp. *setarius*, *Yeatesia viridiflora*, *Desmodium glutinosum*, *Dichantherium commutatum*, *Dioscorea villosa*, *Hypericum hypericoides*, and *Sanicula canadensis*.

Dynamics: No information

Similar Associations:

- *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Small Stream Forest (CEGL007320)
- *Magnolia grandiflora* - *Fagus grandifolia* - *Quercus alba* - *Pinus taeda* Forest (CEGL007903)
- *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest (CEGL007901) -- within the range of *Magnolia grandiflora* and with greater dominance by *Quercus michauxii*.

Related Concepts: No information

Classification Comments: Characteristic examples are known from Malaudos Creek, Winn District, Kisatchie National Forest (Natchitoches Parish, Louisiana). This association is related to *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest (CEGL007901), which occurs within the range of *Magnolia grandiflora*, and they may be difficult to differentiate. Additional information and assessment are needed. Both this association and *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest (CEGL007901) represent the intermediate ("wettest") stream forests that arise along the lower reaches of drainages. The theoretical difference between them is that this association occurs primarily outside the range of *Magnolia grandiflora* and CEGLO07901 occurs within the range of *Magnolia grandiflora*. They are both closely related to small stream forest ("drier") counterparts in their respective areas, *Magnolia grandiflora* - *Fagus grandifolia* - *Quercus alba* - *Pinus taeda* Forest (CEGL007903) and *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Forest (CEGL007320). The

lower-stream-reach forests have a longer hydroperiod and are wetter than the downstream types. The upstream counterpart to this association is *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Forest (CEGL007320).

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (1999-12-13): This association was once prevalent along the floodplains of intermediate streams throughout much of north-central Louisiana. Intact occurrences of this association have now become relatively rare. During the mid-19th and early 20th centuries, much of the landscape within its range was logged or converted to agricultural cropland. In addition, many of these highly productive sites have been converted to commercial pine plantations, eliminating the original hardwood-dominated community altogether. Current threats include logging, conversion to agroforestry uses, agrochemical drift and runoff from adjacent areas, and vegetation damage by feral hogs. The degree of uncertainty in the rank reflects the need for further inventory to assess the remaining number of occurrences of this type and the relationship between this and similar types.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest occurs in the West Gulf Coastal Plain of Louisiana and Texas.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 231Ea:PPP, 232Fa:CCC, 232Fc:CCC

Federal Lands: USFS (Angelina, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Smith 1996a, Southeastern Ecology Working Group n.d.

LOBLOLLY PINE - SWEETGUM - (WATER OAK, WILLOW OAK) / IRONWOOD - PARSLEYLEAF HAW STREAM BOTTOM FOREST

ELEMENT IDENTIFIERS

NVC association: *Pinus taeda* - *Liquidambar styraciflua* - *Quercus (nigra, phellos)* / *Carpinus caroliniana* - *Crataegus marshallii* Stream Bottom Forest

Database Code: CEGL004911

Formation: Temporarily flooded mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.b)

Alliance: *Pinus taeda* - *Quercus (phellos, nigra, laurifolia)* Temporarily Flooded Forest Alliance (A.437)

ELEMENT CONCEPT

Summary: This type represents small stream floodplain forests west of the Mississippi River in Oklahoma, Arkansas, Texas, and possibly Louisiana. The vegetation tends to be dominated by *Pinus taeda* and a variety of hardwood species, including *Liquidambar styraciflua*, *Quercus nigra*, and *Quercus phellos*.

Environment: This type is found along small stream channels on acidic soils. These areas may be fairly narrow or somewhat broader depending upon individual stream and floodplain characteristics. Short-duration flooding may occur during limited periods of the year. Soils at a Texas plot location were predominately silty and low in nutrients (Turner et al. unpubl. data).

Vegetation: In addition to *Pinus taeda*, *Liquidambar styraciflua*, *Quercus nigra* and *Quercus phellos*, other important species found in plots attributed to this type from Texas included *Quercus falcata*, *Quercus pagoda*, *Quercus stellata*, *Fraxinus americana*, *Nyssa sylvatica*, *Ulmus alata*, *Nyssa biflora*, *Acer rubrum*, and *Quercus shumardii*. The shrub layer may include *Forestiera ligustrina*, *Fraxinus americana*, *Callicarpa americana*, *Crataegus marshallii*, *Ilex opaca*, *Ilex vomitoria*, *Sebastiania fruticosa*, *Chionanthus virginicus*, *Viburnum rufidulum*, *Celtis tenuifolia*, and *Arundinaria gigantea*. Important understory species in some examples may include *Mitchella repens*, *Carex striatula*, *Carex blanda*, *Carex abscondita*, *Carex albicans* var. *australis* (= *Carex physorhyncha*), *Chasmanthium sessiliflorum*, *Dichantheium boscii*, *Dichantheium commutatum*, *Elephantopus carolinianus*, *Parthenocissus quinquefolia*, *Smilax rotundifolia*, and *Carex lupulina*.

Dynamics: No information

Similar Associations:

- *Pinus taeda* - *Quercus phellos* - *Quercus nigra* Forest (CEGL007910)

Related Concepts:

- Loblolly Pine - Hardwood: 82 (Eyre 1980) B

Classification Comments: This vegetation may occur along small streams and rivers at the northern periphery of the Gulf Coast Prairies and Marshes Ecoregion in eastern Texas in the vicinity of Beaumont. Larger floodplain forests of the region with similar composition may be considered under *Pinus taeda* - *Quercus phellos* - *Quercus nigra* Forest (CEGL007910). The compositional components of this type may need to be reconsidered. Some of the species listed above may not be considered "typical" but appeared in plots which crossed both chemical and topographical gradients. An as-yet undefined small stream calcareous forest is needed.

CONSERVATION RANKING & RARE SPECIES

GRank: G3 (2000-7-14): This type is endemic to the West Gulf Coastal Plain and the periphery of adjacent ecoregions. The environment is fairly widespread within the region, but has been heavily degraded. Increased emphasis on Streamside Management Zone protection by the forestry industry will help to perpetuate this type. Large intact examples are exceedingly rare, especially with mature overstory.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is known from Arkansas, Oklahoma and Texas and likely ranges into Louisiana.

Subnations: AR, LA?, OK, TX

TNC Ecoregions: 31:C, 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 231Ej:CCC, 232Fa:CCP, 232Fe:CCC

Federal Lands: USFS (Davy Crockett, Kisatchie, Sabine NF, Sam Houston)

ELEMENT SOURCES

References: Blair and Hubbell 1938, Duck and Fletcher 1945, Eyre 1980, Harcombe and Neaville 1977, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Turner et al. unpubl. data, Zanoni et al. 1979

NUTTALL OAK - OVERCUP OAK FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus texana* - *Quercus lyrata* Forest

Database Code: CEGLO07407

Formation: Seasonally flooded cold-deciduous forest (I.B.2.N.e)

Alliance: *Quercus texana* - (*Quercus lyrata*) Seasonally Flooded Forest Alliance (A.331)

ELEMENT CONCEPT

Summary: This bottomland forest occurs in the floodplain of rivers and possibly large streams in parts of the West Gulf Coastal Plain and in the Mobile-Tensaw Delta and the Mississippi River Alluvial Plain. Canopy dominants are *Quercus lyrata*, *Quercus texana*, *Quercus nigra*, *Liquidambar styraciflua*, *Celtis laevigata* var. *laevigata*, *Ulmus americana*, *Fraxinus pennsylvanica*, and *Carya aquatica*. Depressions within the community may contain *Taxodium distichum* and *Nyssa aquatica*. Understory and shrub strata are sparse and include *Diospyros virginiana*, *Carpinus caroliniana*, *Ilex decidua*, and *Acer rubrum*. Common woody vines include *Bignonia capreolata*, *Parthenocissus quinquefolia*, *Berchemia scandens*, *Toxicodendron radicans*, *Vitis rotundifolia*, and *Campsis radicans*. Ground cover is very sparse; species include *Carex* spp., *Saururus cernuus*, *Boehmeria cylindrica*, *Chasmanthium* sp., *Mitchella repens*, and *Polygonum* spp. Soils are organic dark brown silt loams including Perry clay. Duration of flooding is relatively long with lower spots being permanently saturated. Mature examples of this community have sparse shrub strata and a very sparse herbaceous layer.

Environment: This closed-canopied forest occurs in the floodplains of intermediate to large alluvial (brownwater) rivers and is frequently flooded. It often occupies poorly drained low flats, sloughs, and low ridges. This forest may be inundated for up to 40% of the growing season (Wharton et al. 1982, Foti 1994b). The highly organic, very dark brown silt loam soil is often mapped as Perry clay (Martin and Smith 1991).

Vegetation: This bottomland forest has a canopy cover of approximately 60-100%, typically 70-80%, and is dominated by *Quercus texana*, *Quercus lyrata*, *Carya aquatica*, and *Liquidambar styraciflua*. In disturbed examples *Liquidambar styraciflua* may become as dominant as *Quercus texana* and *Quercus lyrata*. Canopy associates include *Quercus nigra*, *Acer rubrum*, *Fraxinus pennsylvanica*, and *Ulmus americana*. The sparse tall-shrub stratum (2-5 m in height) is dominated by *Carpinus caroliniana*, *Ilex decidua*, and *Acer rubrum*. The short-shrub stratum (mean cover 3%) and herbaceous stratum (mean cover 7%) are extremely sparse. Scattered herbaceous plants include *Carex* spp., *Saururus cernuus*, *Polygonum* spp., *Tradescantia* spp., *Panicum* spp., *Boehmeria cylindrica*, *Mitchella repens*, and *Chasmanthium* spp. Woody vines (mean cover of 10%) are the most significant component of the understory; dominants include *Campsis radicans*, *Vitis rotundifolia*, *Toxicodendron radicans*, *Berchemia scandens*, *Parthenocissus quinquefolia*, and *Bignonia capreolata*.

Dynamics: Flooding is the principle natural disturbance, and the hydrologic regime is the main ecological process shaping the composition, structure and distribution of this community. This forest is typically inundated or saturated throughout the winter and early spring, and is inundated for 20-40% of the growing season (Wharton et al. 1982, Foti 1994b). Regeneration occurs chiefly in canopy gaps and is dependent on the hydrologic conditions at the time of germination and establishment (Smith 1988, Martin and Smith 1991). No evidence of fire was observed in the old-growth example of this community sampled by Martin and Smith (1991).

This is typically a late seral community, with younger more recently disturbed examples having a greater cover of *Liquidambar styraciflua*. Such occurrences may also have a bimodal age and stage structure due to the relatively small size of the *Quercus* species.

Similar Associations:

Related Concepts:

- IIA5a. Overcup Oak - Water Hickory Bottomland Forest (Allard 1990) B
- Overcup Oak - Water Hickory (65) (USFS 1988) ?
- Overcup Oak - Water Hickory Bottomland Forest (Oberholster 1993) B
- Overcup Oak - Water Hickory: 96 (Eyre 1980) ? Overcup Oak-Water Hickory Series (Diamond 1993) ?
- P1B3c11b. *Quercus lyrata-Carya aquatica-Quercus texana-Fraxinus* spp. (Foti et al. 1994) ?
- P1B3cV. *Quercus nuttallii* (Foti et al. 1994) ?

Classification Comments: This is a Martin and Smith (1991) type with data known from the Kisatchie Bayou and Gibbs Slough Bottom on the Kisatchie Ranger District. Assessment is needed to determine appropriateness for the Mississippi River Alluvial Plain.

CONSERVATION RANKING & RARE SPECIES

GRank: G3G4 (1999-12-4): Bottomland hardwood forests are threatened by logging, conversion to agroforestry and agriculture, hydrological alteration, and agrochemical runoff and drift from adjacent areas. Further study is needed to clarify the degree of uncertainty in the rank. The relationship of this community to similar communities needs clarification.

High-ranked species: *Sideroxylon thornei* (G2)

ELEMENT DISTRIBUTION

Range: This bottomland forest is known from the East Gulf and West Gulf coastal plains and the Mississippi Alluvial Plain; it occurs in Alabama, Arkansas, Louisiana, Mississippi and eastern Texas, and may also occur in the Mississippi Alluvial Plain farther north in Missouri.

Subnations: AL, AR, LA, MS, TX?

TNC Ecoregions: 40:?, 41:C, 42:C, 53:C

USFS Ecoregions: 232Bs:CCC, 232Fa:CCC, 232Fc:CC?, 234Aa:CP?

Federal Lands: USFS (Delta, Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Diamond 1993, Eyre 1980, Foti 1994b, Foti et al. 1994, Martin and Smith 1991, Oberholster 1993, Smith 1988c, Smith 1996a, Southeastern Ecology Working Group n.d., USFS 1988, Wharton et al. 1982, Wieland 1994a, Wieland 1994b, Wieland 2000b

SOUTHERN MAGNOLIA - AMERICAN BEECH - WHITE OAK - LOBLOLLY PINE FOREST**ELEMENT IDENTIFIERS**

NVC association: *Magnolia grandiflora - Fagus grandifolia - Quercus alba - Pinus taeda* Forest

Database Code: CEGLO07903

Formation: Temporarily flooded mixed evergreen - cold-deciduous forest (I.C.2.N.b)

Alliance: *Fagus grandifolia - Liquidambar styraciflua - Pinus taeda - (Magnolia grandiflora)* Temporarily Flooded Forest Alliance (A.1989)

ELEMENT CONCEPT

Summary: This forest is found within the average annual floodplain of small streams in central and western Louisiana, generally on acidic sandy loams and silt loams on both Pleistocene and Tertiary formations. Hydrologically, it is characterized by short-duration flood events, on the order of 1-3 days per event, occurring a few times in an average year. It is closely related to *Fagus grandifolia - Pinus taeda - (Liquidambar styraciflua, Magnolia grandiflora, Quercus alba)* Forest (CEGL007320) but differs mainly by having *Magnolia grandiflora* as a dominant or codominant species. Geographically within the West Gulf Coastal Plain of Louisiana, the type is present along small streams within the range of *Magnolia grandiflora* (mainly south of CEGLO07320). This forest is typically dominated by a combination of *Magnolia grandiflora, Fagus grandifolia, Pinus taeda, Quercus alba, Liquidambar styraciflua, Nyssa sylvatica,* and *Quercus nigra*. Other canopy species often present include *Quercus laurifolia, Quercus michauxii, Quercus pagoda, Nyssa biflora, Magnolia virginiana, Liriodendron tulipifera, Ulmus alata, Acer rubrum, Prunus serotina, Carya alba, Carya glabra,* and *Quercus falcata*. Common midstory and understory species include *Carpinus caroliniana, Ilex opaca, Viburnum dentatum, Halesia diptera, Hamamelis virginiana, Cornus florida, Rhododendron canescens, Symplocos tinctoria, Vaccinium elliottii, Sambucus canadensis, Itea virginica,* and others. *Arundinaria gigantea* is typically very common in patches. Vines are usually conspicuous and may include *Vitis rotundifolia, Smilax* spp., *Berchemia scandens, Campsis radicans, Parthenocissus quinquefolia, Toxicodendron radicans,* and *Bignonia capreolata*. Herbaceous species often include *Athyrium filix-femina, Polystichum acrostichoides, Chasmanthium latifolium, Chasmanthium sessiliflorum, Arisaema triphyllum, Lobelia cardinalis, Polygonum* spp., and others. It is common on small streams of the Evangeline and Vernon districts of Kisatchie National Forest. Prominent examples occur in Louisiana, on the Evangeline District of Kisatchie National Forest.

Environment: No information

Vegetation: Stands of this forest typically have canopies dominated by a combination of *Magnolia grandiflora, Fagus grandifolia, Pinus taeda, Quercus alba, Liquidambar styraciflua, Nyssa sylvatica,* and *Quercus nigra*. Other canopy species often present include *Quercus laurifolia, Quercus michauxii, Quercus pagoda, Nyssa biflora, Magnolia virginiana, Liriodendron tulipifera, Ulmus alata,*

Acer rubrum, *Prunus serotina*, *Carya alba*, *Carya glabra*, and *Quercus falcata*. Common midstory and understory species include *Carpinus caroliniana*, *Ilex opaca*, *Viburnum dentatum*, *Halesia diptera*, *Hamamelis virginiana*, *Cornus florida*, *Rhododendron canescens*, *Symplocos tinctoria*, *Vaccinium elliotii*, *Sambucus canadensis*, *Itea virginica*, and others. *Arundinaria gigantea* is typically very common in patches. Vines are usually conspicuous and may include *Vitis rotundifolia*, *Smilax* spp., *Berchemia scandens*, *Campsis radicans*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Bignonia capreolata*. Herbaceous species often include *Athyrium filix-femina*, *Polystichum acrostichoides*, *Chasmanthium latifolium*, *Chasmanthium sessiliflorum*, *Arisaema triphyllum*, *Lobelia cardinalis*, *Polygonum* spp., and others.

Dynamics: No information

Similar Associations:

- *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Small Stream Forest (CEGL007320) -- similar but lacking *Magnolia grandiflora* dominance in the canopy.
- *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest (CEGL007901)
- *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899)

Related Concepts: No information

Classification Comments: Both this association and *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Forest (CEGL007320) represent the first ("driest") small stream forests that arise along the upper reaches of drainages. The theoretical difference between them is that this association occurs within the range of *Magnolia grandiflora* and CEGL007320 occurs primarily outside the range of *Magnolia grandiflora*. They are both closely related to intermediate stream forest counterparts in their respective areas, *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest (CEGL007901) and *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899). The upper-stream-reach forests have a shorter hydroperiod and are not as wet as the downstream types. The downstream counterpart to this association is CEGL007901.

CONSERVATION RANKING & RARE SPECIES

GRank: G3G4 (1999-12-13): This association was once prevalent on lower slopes along the upper reaches of small streams throughout much of west-central Louisiana within the range of *Magnolia grandiflora*. Intact occurrences of this association have now become relatively rare. During the mid-19th and early 20th centuries, much of the landscape within its range was logged or converted to agricultural cropland. In addition, many of these highly productive sites have been converted to commercial pine plantations, eliminating the original hardwood-dominated community altogether. Current threats include logging, conversion to agroforestry uses, agrochemical drift and runoff from adjacent areas, and vegetation damage by feral hogs. The degree of uncertainty in the rank reflects the need for further inventory to assess the remaining number of occurrences of this type and the relationship between this and similar types.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest is found within the average annual floodplain of small streams in central and western Louisiana.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231:?, 232Fa:CCC

Federal Lands: DOD (Fort Polk); USFS (Kisatchie)

ELEMENT SOURCES

References: Grace and Smith 1995, Martin and Smith 1991, Martin and Smith 1993, Smith 1996a, Southeastern Ecology Working Group n.d.

SWAMP CHESTNUT OAK - WATER OAK - LOBLOLLY PINE / IRONWOOD FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus michauxii* - *Quercus nigra* - *Pinus taeda* / *Carpinus caroliniana* Forest

Database Code: CEGL007901

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Quercus* (*michauxii*, *pagoda*, *shumardii*) - *Liquidambar styraciflua* Temporarily Flooded Forest Alliance (A.291)

ELEMENT CONCEPT

Summary: This is an association that was once prevalent along intermediate streams throughout much of the West Gulf Coastal Plain of west-central Louisiana within the range of *Magnolia grandiflora*. Typical canopy species include *Quercus michauxii*, *Quercus nigra*, *Pinus taeda*, *Magnolia grandiflora*, *Quercus pagoda*, *Magnolia virginiana*, *Acer rubrum*, and *Quercus laurifolia*. *Taxodium distichum* and *Nyssa aquatica* are present in depressional inclusions in the floodplain. The midstory is dominated by *Carpinus caroliniana*. *Toxicodendron radicans* is a common woody vine. Herb layer species include numerous *Carex* spp., *Cardamine bulbosa*, *Rudbeckia laciniata* var. *laciniata*, *Phanopyrum gymnocarpon* (= *Panicum gymnocarpon*), and *Solidago patula* var. *strictula* (= *Solidago salicina*). This type occurs in the floodplains of small to intermediate streams on acidic silty to sandy

substrates, in the West Gulf Coastal Plain of central Louisiana. Characteristic examples occur on Loving Creek (Rapides Parish, Louisiana).

Environment: This is an association that was once prevalent along intermediate streams throughout much of west-central Louisiana within the range of *Magnolia grandiflora*. Both this association and *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899) represent the intermediate ('wettest') stream forests that arise along the lower reaches of drainages in the floodplains of small to intermediate streams on acidic silty to sandy substrates, in the West Gulf Coastal Plain of central Louisiana.

Vegetation: Typical canopy species include *Quercus michauxii*, *Quercus nigra*, *Pinus taeda*, *Magnolia grandiflora*, *Quercus pagoda*, *Magnolia virginiana*, *Acer rubrum*, and *Quercus laurifolia*. *Taxodium distichum* and *Nyssa aquatica* are present in depressional inclusions in the floodplain. The midstory is dominated by *Carpinus caroliniana*. *Toxicodendron radicans* is a common woody vine. Herb layer species include numerous *Carex* spp., *Cardamine bulbosa*, *Rudbeckia laciniata* var. *laciniata*, *Phanopyrum gymnocarpon* (= *Panicum gymnocarpon*), and *Solidago patula* var. *strictula* (= *Solidago salicina*). This type occurs in the floodplains of small to intermediate streams on acidic silty to sandy substrates, in central Louisiana.

Dynamics: No information

Similar Associations:

- *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Small Stream Forest (CEGL007320)
- *Magnolia grandiflora* - *Fagus grandifolia* - *Quercus alba* - *Pinus taeda* Forest (CEGL007903)
- *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899) -- occurring primarily outside of the range of *Magnolia grandiflora*, with greater dominance by *Quercus pagoda*.

Related Concepts: No information

Classification Comments: This association is related to *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899), and they may be difficult to differentiate. Additional information and assessment are needed. Both this association and *Quercus pagoda* - *Liquidambar styraciflua* - *Pinus taeda* Forest (CEGL007899) represent the intermediate ("wettest") stream forests that arise along the lower reaches of drainages. The theoretical difference between them is that this association occurs within the range of *Magnolia grandiflora* and CEGL007899 occurs primarily outside the range of *Magnolia grandiflora*. They are both closely related to small stream forest ("drier") counterparts in their respective areas, *Magnolia grandiflora* - *Fagus grandifolia* - *Quercus alba* - *Pinus taeda* Forest (CEGL007903) and *Fagus grandifolia* - *Pinus taeda* - (*Liquidambar styraciflua*, *Magnolia grandiflora*, *Quercus alba*) Forest (CEGL007320). The lower-stream-reach forests have a longer hydroperiod and are wetter than the downstream types. The upstream counterpart to this association is *Magnolia grandiflora* - *Fagus grandifolia* - *Quercus alba* - *Pinus taeda* Forest (CEGL007903).

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (1999-12-16): This association was once prevalent along intermediate streams throughout much of west-central Louisiana within the range of *Magnolia grandiflora*. Intact occurrences of this association have now become relatively rare. During the mid-19th and early 20th centuries, much of the landscape within its range was logged or converted to agricultural cropland. In addition, many of these highly productive sites have been converted to commercial pine plantations, eliminating the original hardwood-dominated community altogether. Current threats include logging, conversion to agroforestry uses, agrochemical drift and runoff from adjacent areas, and vegetation damage by feral hogs. The degree of uncertainty in the rank reflects the need for further inventory to assess the remaining number of occurrences of this type and the relationship between this and similar types.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association occurs in west-central Louisiana within the range of *Magnolia grandiflora*.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Ea:CCC, 232Fa:PPP, 232Fb:PPP

Federal Lands: USFS (Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Smith 1996a, Southeastern Ecology Working Group n.d.

WATER OAK - SWEETGUM - (LOBLOLLY PINE) / AMERICAN HOLLY - BLACK Highbush Blueberry / White-edge Sedge Temporarily Flooded Forest

ELEMENT IDENTIFIERS

NVC association: *Quercus nigra* - *Liquidambar styraciflua* - (*Pinus taeda*) / *Ilex opaca* - *Vaccinium fuscatum* / *Carex debilis* Temporarily Flooded Forest

Database Code: CEGL007984

Formation: Temporarily flooded cold-deciduous forest (I.B.2.N.d)

Alliance: *Quercus* (*phellos*, *nigra*, *laurifolia*) Temporarily Flooded Forest Alliance (A.292)

ELEMENT CONCEPT

Summary: This floodplain forest community occurs on temporarily flooded terraces along small streams and small rivers in the West Gulf Coastal Plain. The temporarily high water table leads to frequent tree falls and gaps. This plant community floods occasionally, and water stands for relatively short duration. *Quercus nigra* is the dominant tree, with *Liquidambar styraciflua* being a common component. Constant tree-fall disturbance leads to a high component of *Liquidambar styraciflua* in the overstory. Other tree species include *Carya ovata*, *Nyssa sylvatica*, *Pinus taeda* (present only as stumps in some examples), *Quercus shumardii*, *Quercus alba*, and *Ulmus americana*. *Ilex opaca* is the dominant understory tree with *Acer rubrum* var. *rubrum*, *Carpinus caroliniana*, *Crataegus marshallii*, *Diospyros virginiana*, *Ulmus alata*, *Celtis laevigata*, and *Fraxinus pennsylvanica*. In addition, *Juglans nigra* will be present in some stands as a subcanopy or canopy component. The shrub layer is often sparse except in tree-fall gaps and includes *Vaccinium fuscum*, and *Vaccinium virgatum* and *Sebastiania fruticosa* in more southerly examples. *Sabal minor* may be present within its range. Woody vines are an important component of this community and may be present in high cover values. Vine species include *Vitis rotundifolia*, *Ampelopsis arborea*, *Amphicarpaea bracteata*, *Berchemia scandens*, *Bignonia capreolata*, *Campsis radicans*, *Cocculus carolinus*, *Parthenocissus quinquefolia*, *Smilax bona-nox*, *Smilax rotundifolia*, *Trachelospermum difforme*, and *Toxicodendron radicans*. The herbaceous layer is moderately dense with *Symphytotrichum lanceolatum* (= *Aster lanceolatus*), *Carex complanata*, *Carex debilis*, *Carex glaucoidea*, *Galium obtusum* ssp. *obtusum*, *Sanicula canadensis*, *Trachelospermum difforme*, *Tridens strictus*, and occasional stands of *Arundinaria gigantea*. Little leaf litter is present.

Environment: These forests occur on slightly elevated, relatively well-drained, acidic (?), sandy soils in floodplains and terraces. Some stands attributed here contain taxa regarded as not strongly acid-loving components. The inclusion of these plots may have somewhat broadened the overall concept.

Vegetation: *Quercus nigra* is the dominant tree in stands of this type, with *Liquidambar styraciflua* being a common to codominant component. The canopy is moderately tall (80+ feet) and generally closed, although constant tree-fall disturbance leads to a high component of *Liquidambar styraciflua* in the overstory. Other tree species include *Carya alba*, *Carya ovata*, *Nyssa sylvatica*, *Pinus taeda* (present only as stumps in some examples), *Quercus shumardii*, *Quercus alba*, and *Ulmus americana*. *Ilex opaca* is the dominant understory tree with *Acer rubrum* var. *rubrum*, *Carpinus caroliniana*, *Celtis laevigata*, *Cercis canadensis*, *Cornus florida*, *Crataegus marshallii*, *Diospyros virginiana*, *Fraxinus pennsylvanica*, *Morus rubra*, *Ostrya virginiana*, *Ulmus alata*, and *Ulmus rubra*. In addition, *Juglans nigra* will be present in some stands as a subcanopy or canopy component. The shrub layer is often sparse except in tree-fall gaps and includes *Asimina triloba*, *Callicarpa americana*, *Forestiera ligustrina*, *Frangula caroliniana*, *Vaccinium fuscum*, and *Vaccinium virgatum* and *Sebastiania fruticosa* in more southerly examples. *Sabal minor* may be present within its range. Woody vines are an important component of this community and may be present in high cover values. Vine species include *Vitis rotundifolia*, *Ampelopsis arborea*, *Amphicarpaea bracteata*, *Berchemia scandens*, *Bignonia capreolata*, *Campsis radicans*, *Cocculus carolinus*, *Parthenocissus quinquefolia*, *Smilax bona-nox*, *Smilax glauca*, *Smilax rotundifolia*, *Trachelospermum difforme*, and *Toxicodendron radicans*. The herbaceous layer is moderately dense with *Symphytotrichum lanceolatum* (= *Aster lanceolatus*), *Carex complanata*, *Carex debilis*, *Carex glaucoidea*, *Chasmanthium sessiliflorum*, *Galium obtusum* ssp. *obtusum*, *Sanicula canadensis*, *Trachelospermum difforme*, *Tridens strictus*, and occasional stands of *Arundinaria gigantea*. Some additional herbs and herbaceous vines may include *Ageratina altissima*, *Elephantopus carolinianus*, *Melothria pendula*, *Oplismenus hirtellus* ssp. *setarius* (= *Oplismenus setarius*), *Polygonum virginianum*, and *Verbesina virginica*. Little leaf litter is present.

Dynamics: The high water table leads to frequent tree falls and gaps. This plant community floods occasionally, and water stands for relatively short duration.

Similar Associations:

Related Concepts:

- IIA6b. Sweetgum - Mixed Bottomland Oak Forest (Allard 1990) B
- Sweetgum - Willow Oak: 92 (Eyre 1980) B
- Water Oak-Willow Oak Series (Diamond 1993) B
- Willow Oak - Laurel Oak / *Bignonia* Loamy Wet-Mesic Stream Bottoms (Turner et al. 1999) B

Classification Comments: Approximately 1200 to 1600 hectares of this community (actually the former CEGLO07841 now merged here) occur on the Ouachita National Forest - Tiak District (R. Basterache pers. comm.). This type accommodates the former *Quercus nigra* - *Liquidambar styraciflua* / *Sebastiania fruticosa* - *Toxicodendron radicans* Forest (CEGL007369) which is no longer recognized as distinct. The type location is in Dallas County, Arkansas. Examples are known from Big Cypress Unique Area and Pond Creek National Wildlife Refuge.

CONSERVATION RANKING & RARE SPECIES

GRank: G4? (2002-1-30): In Arkansas, this type is apparently reasonably common, although no high-quality examples are known (D. Zollner pers. comm.). Some stands are located on the national forests in Oklahoma and Texas, but these do not necessarily receive any formal protection.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is found in the West Gulf Coastal Plain of southern Arkansas, eastern Texas, western Louisiana, and southeastern Oklahoma.

Subnations: AR, LA, OK, TX

TNC Ecoregions: 39:P, 40:C, 41:C

USFS Ecoregions: 231Eg:CCC, 231Eh:CCC, 232F:CC, M231:C

Federal Lands: DOD (Pine Bluff Arsenal?); USFS (Angelina, Davy Crockett, Kisatchie, Ouachita, Sabine NF, Sam Houston); USFWS (Pond Creek)

ELEMENT SOURCES

References: Allard 1990, Allen 1993b, Basterache pers. comm., Blair and Hubbell 1938, Bruner 1931, Diamond 1993, Eyre 1980, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Nixon and Raines 1976, Osborn 1941, Smith 1996a, Southeastern Ecology Working Group n.d., Turner et al. 1999, Zollner pers. comm.

WEST GULF COASTAL PLAIN SOUTHERN CALCAREOUS PRAIRIE

LITTLE BLUESTEM - MISSOURI CONEFLOWER - NARROWLEAF GUMWEED - (CUSP GAYFEATHER) HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Schizachyrium scoparium* - *Rudbeckia missouriensis* - *Grindelia lanceolata* - (*Liatris mucronata*) Herbaceous Vegetation

Database Code: CEGL007930

Formation: Tall sod temperate grassland (V.A.5.N.a)

Alliance: *Schizachyrium scoparium* - *Sorghastrum nutans* Herbaceous Alliance (A.1198)

ELEMENT CONCEPT

Summary: This upland prairie of the West Gulf Coastal Plain of Texas and western Louisiana occurs in small, isolated patches on calcareous soils derived from the Fleming geologic formation. This herbaceous community is dominated by graminoids, composites, and legumes, with occasional emergent woody growth. Dominant and characteristic species in forb-dominated occurrences are locally variable but may include *Dalea compacta* var. *compacta*, *Rudbeckia missouriensis*, *Rudbeckia hirta*, *Acacia angustissima*, *Liatris mucronata*, *Eustoma exaltatum* ssp. *russellianum* (= *Eustoma russellianum*), *Grindelia lanceolata*, *Agalinis heterophylla*, *Stenosiphon linifolius*, *Carex microdonta*, *Carex cherokeeensis*, *Neptunia lutea*, *Indigofera miniata* (= *Indigofera miniata* var. *leptosepala*), *Salvia azurea*, *Palafoxia reverchonii*, *Onosmodium molle* ssp. *occidentale* (= *Onosmodium occidentale*), *Liatris mucronata*, and *Euphorbia bicolor*. Occurrences rich in graminoids are dominated by *Sorghastrum nutans*, and *Schizachyrium scoparium*. The combination of periodic fire, soil chemistry, and physical properties is thought to be important in maintaining this community in a landscape otherwise historically dominated by forests.

Environment: This herbaceous community occurs on the Dough Hills Member of the Fleming Formation on uplands over stiff, alkaline, calcareous clays with very high shrink-swell characteristics. Generally classified as Vertisols, these soils typically have pH values 7.5 to 8.0, are olive-gray to gray-black in color, and often contain limestone nodules or marine mollusk shells. The combination of periodic fire, high soil pH and extreme physical soil properties are thought to be important in maintaining this community. The hydrology ranges from dry to mesic (Smith and Craig 1990).

This type is found on Ferris and Houston Black soils on the Sam Houston National Forest (Walker County, Texas) near the periphery of the Pineywoods, as well as on the Tahoula series (Newton County) near the Louisiana border (R. Evans pers. obs.). Based on data from four Ferris soil sites, pH ranged from 5.6-6.2. Interestingly, the upper surface texture of three of these sites was 68, 76, and 80% sand, while the other (SHNF 6010A) was 44% sand and 44% clay. This latter site was the only one with unusually high calcium and magnesium levels. Exposed rock and bare soil are present at some sites, presumably due to past disturbances; these patches tend to be covered with *Nostoc* spp.

Vegetation: The grass component of these prairies is usually poorly developed and often weedy in nature, due to past soil disturbances and livestock grazing. However, species may include *Paspalum pubiflorum*, *Schizachyrium scoparium*, *Muhlenbergia capillaris*, *Sporobolus compositus*, *Panicum virgatum*, *Sorghastrum nutans*, *Andropogon gerardii*, *Bouteloua rigidisetata*, *Bouteloua hirsuta*, *Andropogon virginicus*, *Andropogon glomeratus*, and *Aristida oligantha*. Other species present include *Euphorbia bicolor*, *Heliotropium tenellum*, *Salvia azurea*, *Astragalus distortus*, *Rhynchosia minima*, *Asclepias viridiflora*, *Solidago altissima*, *Symphotrichum oolentangiense* (= *Aster oolentangiensis*), *Symphotrichum drummondii* (= *Aster drummondii*), and *Manfreda virginica*. Some examples have scattered *Juniperus virginiana* var. *virginiana*, *Sideroxylon lanuginosum*, *Crataegus spathulata*, and *Crataegus crus-galli*. Dominant and characteristic species are locally variable but may include *Dalea compacta* var. *compacta*, *Rudbeckia missouriensis*, *Rudbeckia hirta*, *Acacia angustissima*, *Eustoma exaltatum* ssp. *russellianum* (= *Eustoma russellianum*), *Grindelia lanceolata*, *Agalinis heterophylla*, *Stenosiphon linifolius*, *Carex microdonta*, *Carex cherokeeensis*, *Neptunia lutea*, *Indigofera miniata* (= *Indigofera miniata* var. *leptosepala*), *Onosmodium molle* ssp. *occidentale* (= *Onosmodium occidentale*), *Liatris mucronata*, and *Euphorbia bicolor*, all of which are rare or absent in the Pineywoods region as a whole, except in this community. Two especially unusual species (*Penstemon cobaea* and *Allium stellatum*) have only been documented at the "Lone Wolf" or "Windham Prairie" site in Polk County for which this type was first described.

In Louisiana, these upland herbaceous communities are treeless openings dominated by graminoids, composites, and legumes. These areas are typically 1 to 30 ha in size and occur within a forest matrix. Dominant species vary within and among occurrences. Common grasses include *Sporobolus clandestinus*, *Sporobolus vaginiflorus* var. *ozarkanus* (= *Sporobolus ozarkanus*), *Andropogon gyrans*, *Schizachyrium scoparium*, *Muhlenbergia capillaris*, *Andropogon glomeratus*, *Andropogon gerardii*, and *Sorghastrum nutans*. Other herbaceous species include *Acacia angustissima*, *Ambrosia psilostachya*, *Arnoglossum plantagineum*, *Callirhoe papaver*, *Coreopsis lanceolata*, *Dalea candida*, *Dalea purpurea*, *Delphinium carolinianum*, *Desmanthus illinoensis*, *Echinacea pallida*, *Echinacea purpurea*, *Gaillardia aestivalis*, *Galactia volubilis*, *Hedyotis nigricans*, *Mimosa strigillosa*, *Neptunia lutea*, *Penstemon digitalis*, and *Ruellia humilis*. *Nostoc* sp. may occur on wetter patches. Scattered woody species may include *Crataegus* sp., *Sideroxylon lanuginosum*, *Berchemia scandens*, *Diospyros virginiana*, *Cornus drummondii*, *Juniperus virginiana* var. *virginiana*, *Ilex decidua*, *Smilax bona-nox*, *Fraxinus americana*, and *Gleditsia triacanthos*. Many of the species used as nominals are distributed largely west of the geographic areas in which these prairies occur. They tend to become increasingly less common in more eastern examples, especially those in Louisiana.

Dynamics: All known examples are surrounded by a matrix of pine- and pine-hardwood-dominated forests. This community occurs in a matrix of infrequently burned calcareous forests. The historical fire frequency of this grassland is estimated to range from 5 to 20 years. Calcareous woody species such as *Juniperus virginiana*, *Fraxinus americana*, and *Gleditsia triacanthos* invade this community and change the physiognomy as a result of fire suppression.

Similar Associations:

- *Pinus palustris* / *Quercus marilandica* / *Schizachyrium tenerum* - *Muhlenbergia expansa* - *Bigelovia nuttallii* - *Packera obovata* Woodland (CEGL003597) -- "Fleming Glades" occurs on predominantly highly acidic silt loams of the Fleming Formation, but contain patches of prairie-like vegetation on inclusionary calcareous clays; also occurs in a matrix of acidic *Pinus palustris* communities and thus experienced a historical fire regime that was more frequent than the calcareous herbaceous community.
- *Schizachyrium scoparium* - *Marshallia caespitosa* - *Nemastylis geminiflora* Herbaceous Vegetation (CEGL004022) -- "Morse Clay Prairie" is a calcareous prairie community known from Morse Clay alluvium deposits on historical floodplains of the Red River on Pleistocene Prairie Terraces and Pleistocene Intermediate Terraces.
- *Schizachyrium scoparium* - *Panicum flexile* - *Carex microdonta* Herbaceous Vegetation (CEGL004021) -- "Cook Mountain Calcareous Prairie" also occurs on calcareous clays; however, it does not occur on alluvial deposits on the former Red River floodplain but on the Cook Mountain Formation of the Claiborne Group in Winn, Sabine and Natchitoches parishes.

Related Concepts:

- ID4d. Fleming Calcareous Prairie (Allard 1990) ?

Classification Comments: This community was originally described from Polk County, Texas, but conceptually extended to include all other Fleming prairies within the Pineywoods vegetation area of eastern Texas. At a later date, the closely related and overlapping Fleming prairies of western Louisiana were merged into this type as well. At the Polk County site this community is associated with poorly defined calcareous forests that include *Quercus shumardii*, *Quercus nigra*, *Cornus drummondii*, *Carya ovata*, *Tilia americana* var. *caroliniana*, *Acer barbatum*, *Fraxinus americana*, *Cercis canadensis*, *Ostrya virginiana*, *Diospyros virginiana*, and *Viburnum rufidulum*.

CONSERVATION RANKING & RARE SPECIES

GRank: G1 (2002-1-31): This community is naturally rare in the West Gulf Coastal Plain, occurring only sporadically where areas of Vertisol soils are present. No high-quality examples are known. All known existing examples have been heavily degraded by past land uses, many more have been completely converted to other land uses. More than 20 examples occur on Sam Houston National Forest, but all continue to be threatened by a variety of factors. Primary threats to this community include fire suppression, livestock grazing, oil and gas exploration, soil harvesting, and impacts from road development and vehicle use. Given the loss of much of the original ground cover grass layer, these sites will require extensive and committed efforts to restore.

High-ranked species: *Aimophila aestivalis* (G3), *Pituophis ruthveni* (G2Q)

ELEMENT DISTRIBUTION

Range: This association is known from the West Gulf Coastal Plain and Upper West Gulf Coastal Plain of Texas. It is also known from Vernon and Rapides parishes of central-western Louisiana.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fa:CCC

Federal Lands: USFS (Kisatchie, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Craig et al. 1987, Evans pers. comm., Hart and Lester 1993, Smith 1996a, Smith and Craig 1990, Southeastern Ecology Working Group n.d., Turner et al. unpubl. data

ELEMENT IDENTIFIERS

NVC association: *Schizachyrium scoparium* - *Marshallia caespitosa* - *Nemastylis geminiflora* Herbaceous Vegetation

Database Code: CEGLO04022

Formation: Tall sod temperate grassland (V.A.5.N.a)

Alliance: *Schizachyrium scoparium* - *Sorghastrum nutans* Herbaceous Alliance (A.1198)

ELEMENT CONCEPT

Summary: This calcareous prairie community is restricted to the Morse Clay in northwestern Louisiana and adjacent Arkansas. It is dominated by grasses and forbs with scattered shrubby vegetation and, occasionally, trees. Typical grasses include *Schizachyrium scoparium*, *Andropogon glomeratus*, and *Aristida* spp. Other common species include *Manfreda virginica*, *Baptisia nuttalliana*, *Arnoglossum plantagineum*, *Dalea purpurea*, *Eryngium yuccifolium*, *Houstonia purpurea* var. *calycosa*, *Monarda fistulosa*, *Nemastylis geminiflora*, *Neptunia lutea*, *Mimosa nuttallii* (= *Mimosa quadrivalvis* var. *nuttallii*), *Panicum virgatum*, *Parthenium hispidum*, *Asclepias viridis*, *Marshallia caespitosa* var. *signata*, *Delphinium carolinianum*, *Echinacea pallida*, and *Asclepias tuberosa*. Typical woody components include *Crataegus* spp., *Pinus echinata*, *Prunus angustifolia*, *Ilex decidua*, and *Cercis canadensis*. This community occurs in the Coastal Plain of southwestern Arkansas and western Louisiana and is associated with alluvium deposits in the former Red River floodplain. It occurs over Morse Clay on historic alluvial deposits, areas that are not part of the active floodplain. Soils are typically alkaline clays, with high shrink-swell character, and gilgai microtopography. The combination of periodic fire, high soil pH, and extreme physical soil properties are thought to be important in maintaining this community in a landscape otherwise dominated by forests (at least historically). This community is known from Bossier, Caddo, Red River, Rapides, and Natchitoches parishes in Louisiana and from Lafayette, Columbia, (and possibly Little River) counties in Arkansas.

Environment: This calcareous prairie is known from Morse Clay alluvium deposits on historical floodplains of the Red River on Pleistocene Prairie Terraces and Pleistocene Intermediate Terraces. These areas are not part of the active floodplain. Soils are typically alkaline clays, with high shrink-swell character and gilgai microtopography.

Vegetation: This open prairie community is dominated by grasses and forbs with scattered shrubby vegetation and, occasionally, trees. Typical grasses include *Schizachyrium scoparium*, *Andropogon glomeratus*, and *Aristida* spp. Other common species include *Manfreda virginica*, *Baptisia nuttalliana*, *Arnoglossum plantagineum*, *Dalea purpurea*, *Eryngium yuccifolium*, *Houstonia purpurea* var. *calycosa*, *Monarda fistulosa*, *Nemastylis geminiflora*, *Neptunia lutea*, and *Mimosa nuttallii* (= *Mimosa quadrivalvis* var. *nuttallii*). Typical woody components include *Crataegus* spp., *Pinus echinata*, *Prunus angustifolia*, *Ilex decidua*, and *Cercis canadensis*.

Dynamics: This is a pyrogenic community. Fire suppression precipitates invasion by woody species.

Similar Associations:

- *Schizachyrium scoparium* - *Panicum flexile* - *Carex microdonta* Herbaceous Vegetation (CEGL004021) -- "Keiffer Prairie" also occurs on calcareous clays; however, it does not occur on alluvial deposits on the former Red River floodplain but on the Cook Mountain Formation of the Claiborne Group in Winn, Sabine and Natchitoches parishes.
- *Schizachyrium scoparium* - *Rudbeckia missouriensis* - *Grindelia lanceolata* - (*Liatris mucronata*) Herbaceous Vegetation (CEGL007930) -- "Fleming Glade" is another calcareous prairie community that occurs on the Dough Hills Member of the Fleming Formation in Vernon and Rapides parishes.

Related Concepts:

- ID4b. Morse Clay Calcareous Prairie (Allard 1990) ?
- T5A1a1b. *Panicum virgatum* (Foti et al. 1994) ?
- T5A1a1c. *Andropogon gerardii* - *Sorghastrum avenaceum* (Foti et al. 1994) ?

Classification Comments: Similar communities occur over calcareous clays in other parts of the southeastern United States. More study is needed to clearly define the vegetative distinctions among these communities, as well as with other tallgrass communities in the southeastern and midwestern United States. *Nemastylis geminiflora* was chosen as a nominal species because it is indicative of clayey, calcareous substrates and its presence helps distinguish this calcareous prairie from others in Louisiana and Arkansas. LAPS type. Name changed 7-99 at suggestion of Latimore Smith; *Andropogon glomeratus* is weedy and not diagnostic and has been replaced with the more diagnostic *Marshallia caespitosa*.

CONSERVATION RANKING & RARE SPECIES

GRank: G1G2 (1997-12-31): This community has a limited distribution, and undisturbed examples are rare. Primary threats include disturbance by grazing and logging, fire suppression, and invasion by exotic plant species.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This calcareous prairie community is restricted to the Morse Clay in northwestern Louisiana and adjacent Arkansas. It is known from Bossier, Caddo, Red River, Rapides, and Natchitoches parishes in Louisiana and from Lafayette, Columbia, and, possibly, Little River counties in Arkansas.

Subnations: AR, LA, OK?, TX?
TNC Ecoregions: 40:C, 41:C
USFS Ecoregions: 231Ea:CCC
Federal Lands: USFS (Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Foti 1994b, Foti et al. 1994, Smith 1996a, Southeastern Ecology Working Group n.d.

LITTLE BLUESTEM - WIRY PANICGRASS - LITTLE-TOOTH SEDGE HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Schizachyrium scoparium* - *Panicum flexile* - *Carex microdonta* Herbaceous Vegetation

Database Code: CEG004021

Formation: Tall sod temperate grassland (V.A.5.N.a)

Alliance: *Schizachyrium scoparium* - *Sorghastrum nutans* Herbaceous Alliance (A.1198)

ELEMENT CONCEPT

Summary: This upland herbaceous community of west-central Louisiana is characterized by treeless openings dominated by perennial grasses, composites, and legumes, with scattered clumps of shrubby vegetation. These floristically diverse areas are typically less than 1-8 hectares in size and occur within a forest matrix. Grasses include *Schizachyrium scoparium*, *Andropogon glomeratus*, *Andropogon gerardii*, *Sporobolus* spp., *Setaria parviflora*, *Panicum flexile*, *Aristida* spp., *Paspalum floridanum*, and *Sorghastrum nutans*. This herb-dominated community develops on soils derived from marly clays and chalk of marine origin. These soils are typically silty clay loams, clays, and silt loams that are well-drained, slowly permeable, and alkaline (pH 7.5-8.0). Subsurface clay layers have calcareous concretions and shrink-swell properties. This community occurs in a nearly level to gently rolling landscape, on ridgetops and gentle slopes that often border small streams. Moisture regimes are typically dry to dry-mesic. The combination of frequent fire, high soil pH and extreme physical soil properties are thought to be important in maintaining this community. This community occurs in west-central Louisiana and is associated with outcrops of the Cook Mountain Formation. It is known from Winn, Sabine, and Natchitoches parishes. Other characteristic species include *Carex cherokeensis*, *Hedyotis nigricans*, *Dalea candida*, *Dalea purpurea*, *Ruellia humilis*, *Desmanthus illinoensis*, *Salvia azurea*, *Sporobolus vaginiflorus* var. *ozarkanus* (= *Sporobolus ozarkanus*), *Sporobolus compositus* var. *compositus*, *Helenium autumnale*, *Koeleria macrantha*, *Silphium laciniatum*, *Echinacea pallida*.

Environment: This herbaceous-dominated community of west-central Louisiana develops on soils derived from marly clays and chalk of marine origin. These soils are typically silty clay loams, clays, and silt loams that are well-drained, slowly permeable, and alkaline (pH 7.5-8.0). Subsurface clay layers have calcareous concretions and shrink-swell properties. This community occurs in a nearly level to gently rolling landscape, on ridgetops and gentle slopes that often border small streams. Elevations range from 150-250 feet above mean sea level and average annual rainfall is 127-140 cm (Smith et al. 1989). Moisture regimes are typically dry to dry-mesic. The combination of frequent fire, high soil pH, and extreme physical soil properties are thought to be important in maintaining this community.

Vegetation: This upland herbaceous community is characterized by treeless openings dominated by perennial grasses, composites, and legumes, with scattered clumps of shrubby vegetation. These floristically diverse areas are typically less than 1 to 8 hectares in size and occur within a forest matrix. Grasses include *Schizachyrium scoparium*, *Andropogon glomeratus*, *Andropogon gerardii*, *Sporobolus* spp., *Setaria parviflora*, *Panicum flexile*, *Aristida* spp., *Paspalum floridanum*, and *Sorghastrum nutans*. Other common species include *Ruellia humilis*, *Silphium laciniatum*, *Dalea candida*, *Dalea purpurea*, *Ambrosia psilostachya*, *Solidago* spp., *Silphium laciniatum*, *Helenium autumnale*, *Gaillardia aestivalis* var. *flavovirens*, *Echinacea pallida*, *Liatris* spp., *Neptunia lutea*, *Galactia* spp., *Desmanthus illinoensis*, *Delphinium carolinianum*, *Ruellia humilis*, *Callirhoe papaver*, *Asclepias tuberosa*, *Oenothera speciosa*, *Gaura longiflora*, and *Ranunculus sardous*. Prominent woody species may include *Crataegus* spp., *Berchemia scandens*, *Diospyros virginiana*, *Juniperus virginiana* var. *virginiana*, *Fraxinus americana*, *Ilex decidua*, *Cornus drummondii*, *Ulmus alata*, *Sideroxylon lanuginosum* ssp. *lanuginosum*, *Prunus mexicana*, and *Rubus* spp. (Smith et al. 1989).

Dynamics: The combination of frequent fire, high soil pH, and extreme physical soil properties are thought to be important in maintaining this community. In the absence of fire, calciphilic woody species such as *Fraxinus americana*, *Gleditsia triacanthos*, *Juniperus virginiana*, and *Crataegus* spp. may invade and alter the physiognomy of this community to a shrubland, woodland, or forest.

Similar Associations:

- *Schizachyrium scoparium* - *Marshallia caespitosa* - *Nemastylis geminiflora* Herbaceous Vegetation (CEGL004022) -- is a calcareous prairie community known from Morse Clay alluvium deposits on historical floodplains of the Red River on Pleistocene Prairie Terraces and Pleistocene Intermediate Terraces.
- *Schizachyrium scoparium* - *Rudbeckia missouriensis* - *Grindelia lanceolata* - (*Liatris mucronata*) Herbaceous Vegetation (CEGL007930) -- is another calcareous prairie community that occurs on the Dough Hills Member of the Fleming Formation in Vernon and Rapides parishes, LA.

- *Schizachyrium scoparium* - *Sorghastrum nutans* - *Dalea purpurea* - *Silphium integrifolium* Jackson Prairie Herbaceous Vegetation (CEGL004020)

Related Concepts:

- ID4e. Cook Mountain Calcareous Prairie (Allard 1990) B
- Keiffer Calcareous Prairie (Smith 1989) ?

Classification Comments: This community has a limited distribution and most remaining sites are significantly disturbed. Feral pigs forage in these open areas, damaging the soil surface and herbaceous strata. In most prairie remnants, species composition has been altered by the introduction of exotic weedy species. This community occurs within calcareous forests that include species such as *Quercus stellata*, *Quercus shumardii*, *Quercus alba*, *Fagus grandifolia*, *Fraxinus americana*, *Carya myristiciformis*, *Gleditsia triacanthos*, *Pinus taeda*, and *Pinus echinata*. Historically these prairie openings were burned regularly (perhaps every 5-15 years) by lightning-generated fires. Similar communities occur on calcareous clays, associated with different geologic formations, in other parts of Louisiana. More study is needed to clearly define the vegetative distinctions among these communities, as well as with similar tallgrass communities in the southeastern and midwestern United States. Moved to the V.A.5.N.a *Schizachyrium scoparium* - *Sorghastrum nutans* Herbaceous Alliance (A.1198) 11-96; formerly in the V.A.5.N.a *Schizachyrium scoparium* - *Andropogon glomeratus* Herbaceous Alliance. This association is closely related to *Schizachyrium scoparium* - *Sorghastrum nutans* - *Dalea purpurea* - *Silphium integrifolium* Jackson Prairie Herbaceous Vegetation (CEGL004020); additional information is needed to clarify their relationship. Name changed 7-99 at suggestion of Latimore Smith; *Andropogon glomeratus* is weedy and not diagnostic and has been replaced with the more diagnostic *Panicum flexile*. This type provisionally includes prairies on the Cane River Formation ("shell hill prairie"), documented from Natchitoches Parish, and possibly also in southern Bienville parishes, Louisiana; further information is needed to more definitively classify these prairie occurrences. This type also provisionally includes prairies likely occurring on the Wilcox Group in Louisiana.

CONSERVATION RANKING & RARE SPECIES

GRank: G1 (1997-12-31): This community has a limited distribution, and remaining sites are significantly disturbed. Feral pigs forage in these open areas, damaging the soil surface and herbaceous strata. Species composition has been altered by the introduction of exotic weedy species.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This community occurs in west-central Louisiana. It is known from Winn, Sabine, and Natchitoches parishes.

Subnations: LA

TNC Ecoregions: 40:?, 41:C

USFS Ecoregions: 231Ea:CCC

Federal Lands: USFS (Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Martin and Smith 1991, Smith 1989, Smith 1996a, Smith et al. 1989, Southeastern Ecology Working Group n.d.

LITTLE BLUESTEM - YELLOW INDIANGRASS JACKSON PRAIRIE HERBACEOUS VEGETATION

ELEMENT IDENTIFIERS

NVC association: *Schizachyrium scoparium* - *Sorghastrum nutans* Jackson Prairie Herbaceous Vegetation

Database Code: CEGLO04721

Formation: Tall sod temperate grassland (V.A.5.N.a)

Alliance: *Schizachyrium scoparium* - *Sorghastrum nutans* Herbaceous Alliance (A.1198)

ELEMENT CONCEPT

Summary: This upland herbaceous community is characterized by treeless openings dominated by perennial grasses, composites, and legumes, with scattered clumps of shrubby vegetation. These floristically diverse areas are typically less than 1-8 hectares in size and occur within a calcareous forest matrix. Grasses include *Schizachyrium scoparium*, *Andropogon gerardii*, *Danthonia spicata*, *Sporobolus* spp., *Bouteloua curtipendula* (rarely), *Paspalum floridanum* and *Sorghastrum nutans*. Characteristic forbs include *Dalea candida*, *Ruellia humilis*, *Desmanthus illinoensis*, *Koeleria macrantha*, *Silphium integrifolium*, *Arnoglossum plantagineum*, *Asclepias tuberosa*, *Baptisia nuttalliana*, *Callirhoe papaver*, *Coreopsis lanceolata*, *Gaillardia aestivalis*, *Houstonia purpurea* var. *calycosa* (= *Hedyotis purpurea* var. *calycosa*), *Brickellia eupatorioides* (= *Kuhnia eupatorioides*), *Manfreda virginica*, *Neptunia lutea*, *Salvia lyrata*, *Echinacea purpurea*, *Delphinium carolinianum*, *Ratibida pinnata*, and others. The community develops on ridgetops and upper slopes on exposures of marine-derived calcareous clays associated with the Jackson Formation in the local landscape. These clays are well-drained, slowly permeable, and alkaline (pH 7.5-8.0). They have calcareous concretions, gypsum (selenite) crystals and high shrink-swell properties. Numerous types of marine fossils are present in some local exposures (especially at Copenhagen Prairie). Moisture regimes are typically dry to dry-mesic. The combination of periodic fire, high soil pH and extreme physical soil properties are thought to be important in maintaining this community in a landscape otherwise dominated by forests (at least

historically). This community occurs in central Louisiana and is known mainly from Caldwell Parish (Copenhagen Prairie), but also is known from northern Grant Parish (including the historic Tancock Prairie) and Sabine Parish.

Environment: No information

Vegetation: No information

Dynamics: No information

Similar Associations:

- *Schizachyrium scoparium* - *Panicum flexile* - *Carex microdonta* Herbaceous Vegetation (CEGL004021)
- *Schizachyrium scoparium* - *Sorghastrum nutans* - *Dalea purpurea* - *Silphium integrifolium* Jackson Prairie Herbaceous Vegetation (CEGL004020)

Related Concepts: No information

Classification Comments: This association is closely related to *Schizachyrium scoparium* - *Sorghastrum nutans* - *Dalea purpurea* - *Silphium integrifolium* Jackson Prairie Herbaceous Vegetation (CEGL004020) (Jackson Prairie of Mississippi) and *Schizachyrium scoparium* - *Panicum flexile* - *Carex microdonta* Herbaceous Vegetation (CEGL004021) (Cook Mountain Prairie); additional information is needed to clarify their relationship.

CONSERVATION RANKING & RARE SPECIES

GRank: G1 (1999-12-4): This prairie association is naturally very restricted in range and environmental setting. It is only known from small areas of calcareous soils overlying the Jackson Formation in north-central Louisiana where it is associated with calcareous forests and woodlands. Only a few high-quality examples are known, and these are currently receiving conservation attention. However, remaining unprotected examples are vulnerable to logging and conversion to agroforestry uses, fire-suppression, overgrazing, damage from off-road vehicles, and contamination by agrochemical drift from its use in adjacent areas.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This community occurs in central Louisiana and is known mainly from Caldwell Parish (Copenhagen Prairie), but also is known from northern Grant Parish (including the historic Tancock Prairie) and Sabine Parish.

Subnations: LA

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie)

ELEMENT SOURCES

References: Martin and Smith 1991, Smith 1996a, Southeastern Ecology Working Group n.d.

LITTLEHIP HAW - ROUGHLEAF DOGWOOD - SUPPLEJACK SHRUBLAND

ELEMENT IDENTIFIERS

NVC association: *Crataegus spathulata* - *Cornus drummondii* - *Berchemia scandens* Shrubland

Database Code: CEGL003879

Formation: Temperate cold-deciduous shrubland (III.B.2.N.a)

Alliance: *Crataegus spathulata* Shrubland Alliance (A.900)

ELEMENT CONCEPT

Summary: This shrubland is dominated by *Crataegus spathulata*, *Crataegus crus-galli*, *Crataegus berberifolia*, *Crataegus engelmannii*, *Berchemia scandens*, *Cornus drummondii*, *Diospyros virginiana*, *Juniperus virginiana* var. *virginiana*, *Ilex decidua*, *Sideroxylon lanuginosum* ssp. *lanuginosum*, *Prunus mexicana*, *Frangula caroliniana*, and *Rubus* spp. The tall-shrub stratum (2-5 m high) ranges from 25-60% cover. Open examples include a sparse to patchy ground cover. Grasses include *Schizachyrium scoparium*, *Andropogon glomeratus*, *Andropogon gerardii*, *Sporobolus* spp., *Setaria parviflora*, *Panicum flexile*, *Aristida* spp., *Paspalum floridanum*, and *Sorghastrum nutans*. This successional shrubland community develops on soils derived from marly clays and chalk of marine origin. These soils are typically silty clay loams, clays, and silt loams that are well-drained, slowly permeable, and alkaline (pH 7.5-8.0). Subsurface clay layers have calcareous concretions, weathered limestone aggregations and shrink-swell properties. This community typically occupies 1-8 hectares within calcareous forests dominated by *Pinus taeda* or *Quercus* spp. This community occurs in a nearly level to gently rolling landscape, on ridgetops and on gentle slopes that often border small streams. Moisture regimes are typically dry to dry-mesic. This community results from fire suppression of calcareous prairies but may also have occurred naturally in spatially or temporally fire-sheltered situations. It is associated with outcrops of the Cook Mountain Formation from western Winn Parish, west-central Louisiana and outcrops of the Fleming Formation in southeast Texas.

Environment: This successional shrubland community occurs on outcrops of the Cook Mountain geologic formation and develops on soils derived from marly clays and chalk of marine origin. These soils are typically silty clay loams, clays, and silt loams that are well drained, slowly permeable, and alkaline (pH 7.5-8.0). Subsurface clay layers have calcareous concretions, weathered limestone aggregations and shrink-swell properties. This community occurs in a nearly level to gently rolling landscape, on ridgetops and on gentle slopes that often border small streams. Moisture regimes are typically dry to dry-mesic.

Vegetation: This shrubland is dominated by *Crataegus spathulata*, *Crataegus* spp., *Berchemia scandens*, *Cornus drummondii*, *Diospyros virginiana*, *Juniperus virginiana* var. *virginiana*, *Ilex decidua*, *Sideroxylon lanuginosum* ssp. *lanuginosum*, *Prunus mexicana*, and *Rubus* spp. The tall-shrub stratum (2-5 m tall) ranges from approximately 25-60% cover. Open examples include a sparse to patchy ground cover. Grasses include *Schizachyrium scoparium*, *Andropogon glomeratus*, *Andropogon gerardii*, *Sporobolus* spp., *Setaria parviflora*, *Aristida* spp., *Paspalum floridanum*, and *Sorghastrum nutans*. Other common species include *Ruellia humilis*, *Silphium laciniatum*, *Dalea candida*, *Dalea purpurea*, *Ambrosia psilostachya*, *Solidago* spp., *Silphium laciniatum*, *Helenium autumnale*, *Gaillardia aestivalis* var. *flavovirens*, *Echinacea pallida*, *Liatris* spp., *Neptunia lutea*, *Galactia* spp., *Desmanthus illinoensis*, *Delphinium carolinianum*, *Ruellia humilis*, *Callirhoe papaver*, *Asclepias tuberosa*, *Oenothera speciosa*, *Gaura longiflora*, and *Ranunculus sardous*.

Dynamics: No information

Similar Associations:

Related Concepts:

- ID4e. Cook Mountain Calcareous Prairie (Allard 1990) B
- Southern Redcedar: 73 (Eyre 1980) B

Classification Comments: This type is probably natural but also has increased because of fire exclusion. For conservation target purposes, it can be treated as a complex with the several herbaceous prairie types with which it typically co-occurs. Similar vegetation on the Sam Houston National Forest occurring on calcareous soils derived from the Fleming Formation is classed here.

CONSERVATION RANKING & RARE SPECIES

GRank: G2 (2001-1-30): This community occurred naturally in fire-protected situations associated with calcareous prairies of the Coastal Plain of Louisiana. Its natural extent was very limited by the very rare edaphic conditions necessary for prairie formation and maintenance in the Coastal Plain of Louisiana. Because of fire suppression, these prairie shrublands have expanded in extent, and some examples of this association likely represent an undesirable increase in shrub cover of a grass-dominated prairie. Still, this type is natural and is extremely limited in extent.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is known only from the West and Upper West Gulf Coastal Plain of Louisiana and Texas.

Subnations: LA, TX

TNC Ecoregions: 40:C, 41:C

USFS Ecoregions: 231Eh:CCC, 232Fa:CCC

Federal Lands: USFS (Kisatchie, Sam Houston)

ELEMENT SOURCES

References: Allard 1990, Allen 1993c, Eyre 1980, Martin and Smith 1991, Smith 1996a, Smith et al. 1989, Southeastern Ecology Working Group n.d.

SHUMARD OAK - WHITE ASH - NUTMEG HICKORY / SOUTHERN ARROW-WOOD / CHEROKEE SEDGE FOREST

ELEMENT IDENTIFIERS

NVC association: *Quercus shumardii* - *Fraxinus americana* - *Carya myristiciformis* / *Viburnum dentatum* / *Carex cherokeensis* Forest

Database Code: CEGLO07194

Formation: Lowland or submontane cold-deciduous forest (I.B.2.N.a)

Alliance: *Quercus shumardii* - *Quercus pagoda* Forest Alliance (A.252)

ELEMENT CONCEPT

Summary: This West Gulf Coastal Plain calcareous forest is currently known only from the Keiffer Prairie Research Natural Area on the Kisatchie National Forest, Louisiana, but related vegetation may also be present on the Fleming geological formation in eastern Texas. It is described as the 'typical' Keiffer forest surrounding open pockets of Keiffer Prairie herbaceous vegetation. This type is known only from soils mapped as Hollywood silty clay loam or Oktibbeha silt loam. The hardwood canopy is dominated by *Carya myristiciformis*, *Fraxinus americana*, and a strong woody vine stratum. Other associated species include *Liquidambar styraciflua*, *Ulmus alata*, *Quercus shumardii*, *Quercus stellata*, *Pinus taeda*, *Frangula caroliniana*, *Cornus florida*, *Cornus drummondii*, *Cercis canadensis*, *Toxicodendron radicans*, *Berchemia scandens*, *Parthenocissus quinquefolia*, *Chasmanthium sessiliflorum*, *Sanicula canadensis*, *Dichanthelium commutatum* (= *Panicum commutatum*), *Tropocarpus aethusae*, and *Galium circaezans*.

Environment: This mesic community has developed on Eocene age marly clays associated with an outcrop of the Cook Mountain geologic formation. The soils are mapped as Hollywood silty clay loams and Oktibbeha silt loams, although Vaiden and Bellwood soils may be present. These clayey soils are generally slightly acidic to circumneutral in the surface layer, with basic subsoil. They possess high shrink-swell characteristics. Relief ranges from gently rolling to highly dissected; this community occurs on some low ridges and side slopes, where frequently the upper acidic clay soil has eroded away exposing a stiff, calcareous clay at the surface.

This forest is adjacent to herbaceous openings and often flanks small upland streams (Smith et al. 1989, Martin and Smith 1991, Allen 1993c).

Vegetation: The deciduous canopy of this forest typically ranges from 60-100% cover and is dominated by *Carya myristiciformis*, *Fraxinus americana*, *Liquidambar styraciflua*, *Quercus shumardii*, and *Quercus stellata*. Other canopy species include *Quercus alba*, *Fagus grandifolia*, *Pinus taeda*, and *Pinus echinata*. *Acer barbatum* and *Acer leucoderme* may occur in the subcanopy. The patchy (approximately 10-30% cover) tall-shrub stratum (2-5 m high) is dominated by *Cornus florida*, *Cornus drummondii*, *Ulmus alata*, *Fraxinus americana*, *Viburnum dentatum*, *Ilex decidua*, *Viburnum rufidulum*, and *Frangula caroliniana*. The patchy (approximately 20-40% cover) short-shrub stratum (less than 2 m tall) is dominated by *Viburnum dentatum*, *Frangula caroliniana*, *Cercis canadensis*, and *Cornus florida*. *Chasmanthium sessiliflorum*, *Dichantherium commutatum*, and *Carex cherokeensis* are dominants in the sparse to patchy graminoid stratum. Other graminoids include *Scleria oligantha* and *Dichantherium boscii*. Forbs include *Sanicula canadensis*, *Tropocarpus aethusae*, *Galium circaezans*, *Symphyotrichum drummondii* (= *Aster drummondii*), *Spigelia marilandica*, *Oxalis violacea*, *Lithospermum tuberosum*, *Aristolochia serpentaria*, *Agrimonia microcarpa*, and *Ruellia humilis*. Other calciphilic species associated with this community include *Crataegus berberifolia*, *Crataegus crus-galli*, *Crataegus marshallii*, *Crataegus spathulata*, *Crataegus viridis*, *Gleditsia triacanthos*, *Juniperus virginiana*, *Aesculus pavia*, and *Ostrya virginiana* (Smith et al. 1989, Allen 1993c).

Dynamics: This mesic community is somewhat topographically protected from fire, often occurring along small streams, and does not burn frequently. However, it does occur in a complex with more frequently burned herbaceous vegetation and historical fire intervals are currently unknown. This forest community may result from fire exclusion of *Crataegus spathulata* - *Cornus drummondii* - *Berchemia scandens* Shrubland (CEGL003879).

Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Acer (barbatum, leucoderme)* / *Solidago auriculata* Forest (CEGL007207) -- is a slightly drier, wider ranging calcareous forest occurring on slopes, and does not contain *Carya myristiciformis* as a dominant.

Related Concepts:

- IA8b. Coastal Plain Calcareous Mesic Forest (Allard 1990) B
- White Oak (54) (USFS 1988) ?
- White Oak: 53 (Eyre 1980) B

Classification Comments: The description was developed from plot data from Allen (1993).

CONSERVATION RANKING & RARE SPECIES

GRank: G1Q (1999-12-4): As described, this forest association is naturally very restricted in range and environmental setting. It is only known from the Keiffer Prairie Research Natural Area on the Kisatchie National Forest in Winn Parish, Louisiana, where it is associated with calcareous prairie openings. Known occurrences are surrounded by agroforestry and pastures and are threatened by feral hogs and agrochemical runoff and drift. Remaining unprotected examples are vulnerable to logging and conversion to agroforestry uses, overgrazing, other land-use changes, and damage from off-road vehicles. The taxonomic relationship between this association and other calcareous forests present in the West and Upper West Gulf Coastal Plain needs further study. The rank indicates that if this type were combined with other calcareous forests types, that broader definition may result in the type becoming less rare.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This West Gulf Coastal Plain calcareous forest is currently known only from the Keiffer Prairie Research Natural Area on the Kisatchie National Forest, Louisiana, but may also be present on the Sam Houston National Forest in eastern Texas.

Subnations: LA, TX?

TNC Ecoregions: 40:?, 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: USFS (Kisatchie, Sam Houston?)

ELEMENT SOURCES

References: Allard 1990, Allen 1993a, Allen 1993c, Eyre 1980, Martin and Smith 1991, Smith 1996a, Smith et al. 1989, Southeastern Ecology Working Group n.d., USFS 1988

WEST GULF COASTAL PLAIN WET HARDWOOD FLATWOODS

SWAMP BLACKGUM - DIAMONDLEAF OAK / PEATMOSS SPECIES DEPRESSION FOREST

ELEMENT IDENTIFIERS

NVC association: *Nyssa biflora* - *Quercus laurifolia* / *Sphagnum* spp. Depression Forest

Database Code: CEGL007390

Formation: Seasonally flooded cold-deciduous forest (I.B.2.N.e)

Alliance: *Nyssa (aquatica, biflora, ogeche)* Floodplain Seasonally Flooded Forest Alliance (A.323)

ELEMENT CONCEPT

Summary: This forest occurs in shallow depressions along streams in western Louisiana and in relict stream sloughs in the pine flatwoods of southwestern Louisiana. It includes occurrences that do and do not receive overbank flooding. In the flatwoods, this forest generally occurs just downslope from *Quercus laurifolia* - *Liquidambar styraciflua* - *Nyssa biflora* - *Acer rubrum* / *Sabal minor* Forest (CEGL007804). Flooding occurs for 4-6 months a year. The acidic silty soils are overlain by organic muck and leaf litter but are not as peaty and are slightly less acidic than East Gulf and Atlantic coastal plains *Nyssa biflora* forests. In addition to *Nyssa biflora* and *Quercus laurifolia*, this forest also may contain *Liquidambar styraciflua* and *Acer rubrum* in the canopy. A poorly developed shrub layer of *Ilex verticillata* and *Itea virginica* may also be present. *Sphagnum* forms a dense, continuous ground cover. This community is known from the West Gulf Coastal Plain.

Environment: This forest occurs in broad, shallow depressions and oxbows characterized by ponding along streams and in first bottoms in western Louisiana and in relict stream sloughs in the pine flatwoods of southwestern Louisiana. It includes occurrences that do and do not receive overbank flooding. Flooding occurs for 4 to 6 months a year, with the source being channel overflow and precipitation. The acidic silty soils are overlain by organic muck and leaf litter but are not as peaty and are slightly less acidic than East Gulf and Atlantic coastal plains *Nyssa biflora* forests.

Vegetation: This broad-leaved forest is dominated by *Nyssa biflora* and *Quercus laurifolia*. Other species that may be associated with the canopy include bottomland oaks and hardwoods including *Liquidambar styraciflua*, *Acer rubrum*, *Quercus michauxii*, and *Magnolia virginiana*. The canopy cover ranges from 60-100%. Tall- and short-shrub strata are sparse, with scattered to nearly absent individuals of *Vaccinium elliotii*, *Lyonia lucida*, *Itea virginica*, *Cyrilla racemiflora*, *Cephalanthus occidentalis*, *Persea palustris*, *Ilex opaca*, *Carpinus caroliniana*, *Toxicodendron pubescens*, *Ilex decidua*, *Rhododendron canescens*, *Rhododendron oblongifolium*, or *Rubus argutus*. In some occurrences *Tillandsia usneoides* and *Pleopeltis polypodioides* ssp. *polypodioides* are epiphytic on the canopy species. *Sphagnum* spp. form a dense ground cover. The herbaceous cover ranges from sparse to patchy and is dominated by *Carex* spp., *Onoclea sensibilis*, *Chasmanthium* spp., *Scleria* spp., *Boehmeria cylindrica*, and *Dichantherium boscii* (Bridges and Orzell 1989b, Martin and Smith 1991, L. Smith pers. comm. 1995, Grace and Smith 1995).

Dynamics: Flooding is the primary natural disturbance in this community, bringing pulses of alluvium and nutrients, preventing invasion by less flood-tolerant species, and decreasing seedling establishment by the canopy dominants (Sharitz and Mitsch 1993).

Similar Associations:

- *Nyssa biflora* / *Itea virginica* - *Cephalanthus occidentalis* Depression Forest (CEGL007434) -- represents upland ponds dominated by *Nyssa*; it is wetter, being semipermanently flooded, and is not associated with streams.
- *Quercus laurifolia* - *Magnolia virginiana* - *Nyssa biflora* / *Chasmanthium ornithorhynchum* Forest (CEGL007472) -- is confined to streamheads and occurs on sticky clay soils with no peat accumulation and with typically little *Sphagnum* cover.
- *Taxodium distichum* - *Nyssa biflora* - *Magnolia virginiana* - *Acer rubrum* Forest (CEGL007902)

Related Concepts:

- IIA4d. Tupelo Swamp (Allard 1990) B
- Water Tupelo - Swamp Tupelo: 103 (Eyre 1980) ?

Classification Comments: Rank and alliance placement of this association need assessment. Originally named for depression type on Kisatchie National Forest (Vernon District, Drakes Creek Gum Pond) within stream floodplains; but the concept is now expanded to include types in relict stream sloughs in flatwoods of southwestern Louisiana. This type is conceptually related to *Taxodium distichum* - *Nyssa biflora* - *Magnolia virginiana* - *Acer rubrum* Forest (CEGL007902) but is apparently drier. This type incorporates examples in western Louisiana formerly considered under *Nyssa biflora* / *Itea virginica* - *Cephalanthus occidentalis* Depression Forest (CEGL007434).

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (1999-12-3): This forest occurs in shallow depressions along streams in western Louisiana and in relict stream sloughs in the pine flatwoods of southwestern Louisiana. It is a component of the endangered Longleaf Pine Ecosystem of the West Gulf Coastal Plain. Threats include hydrological alterations, logging, conversion of drier portions and adjacent areas to commercial forest plantations or agriculture, and suppression of the natural fire regime. Further study is needed to clarify the degree of uncertainty in the rank. The relationship of this community to similar communities needs clarification.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest occurs in shallow depressions along streams in western Louisiana and in relict stream sloughs in the pine flatwoods of southwestern Louisiana.

Subnations: AR?, LA, TX?

TNC Ecoregions: 41:C

USFS Ecoregions: 232F:CC

Federal Lands: USFS (Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989b, Eyre 1980, Grace and Smith 1995, Martin and Smith 1991, Mitsch and Gosselink 1993, Sharitz and Mitsch 1993, Smith pers. comm., Southeastern Ecology Working Group n.d.

ELEMENT IDENTIFIERS

NVC association: *Quercus phellos* - *Quercus similis* / *Crataegus marshallii* - *Crataegus spathulata* / *Chasmanthium laxum* Forest

Database Code: C EGL007363

Formation: Seasonally flooded cold-deciduous forest (I.B.2.N.e)

Alliance: *Quercus phellos* Seasonally Flooded Forest Alliance (A.330)

ELEMENT CONCEPT

Summary: This West Gulf Coastal Plain flatwoods forest is dominated by *Quercus phellos* and *Quercus similis*. It occurs over somewhat poorly drained, predominantly acidic, silt loams overlying clays on secondary or "high" stream terraces deposited during the Pleistocene. These sites are periodically flooded and ponded with standing water, but overbank flooding occurs only rarely. This type is known from Louisiana and Texas, and may occur in southwestern Arkansas. *Pinus taeda* often occurs along the periphery of most examples and may be a significant component of the canopy in disturbed examples. Several species of *Crataegus*, including *Crataegus viridis*, *Crataegus opaca*, *Crataegus marshallii*, *Crataegus spathulata*, and *Crataegus brachyacantha*, are characteristic of both the subcanopy and understory. The understory of this community is typically patchy, with large open spaces occurring between dense patches of shrubs. The short-shrub stratum is often characterized by *Sabal minor*. The cover of the ground layer is typically sparse but ranges from 50-75% cover in areas with shorter hydroperiods. It is often characterized and dominated by *Chasmanthium laxum*. Some of the soils on which this community occurs, including the Guyton, Diboll, and Fuller series, are Natraqualfs (i.e., soils with high salt content).

Environment: This forest occurs over somewhat poorly drained, predominantly acidic, silt loams overlying clays. Soils include the Anacoco series in Louisiana, where the community occurs on secondary stream terrace flats which receive periodic flooding and ponding. In eastern Texas, this association typically occurs on Pleistocene terraces that have been reworked by wind into mounds and depressions occurring at very localized scales. Some of these soils, including the Guyton, Diboll, and Fuller series, are Natraqualfs (with high salt content). Periodic flooding occurs in these areas but is not typically related to overbank flooding.

Vegetation: This forest is dominated by *Quercus phellos* and *Quercus similis*. Other canopy components may include *Quercus pagoda* and *Quercus nigra*. *Pinus taeda* often occurs along the periphery of most examples and may be a significant component of the canopy in disturbed examples. The subcanopy may include *Quercus similis*, *Nyssa biflora*, *Ulmus alata*, and several species of *Crataegus*, including *Crataegus viridis*, *Crataegus opaca*, *Crataegus marshallii*, *Crataegus spathulata*, and *Crataegus brachyacantha*, which are also characteristic of the shrub stratum. The patchy understory may also include *Ilex decidua*, *Diospyros virginiana*, *Gleditsia triacanthos*, *Ilex vomitoria*, and is sometimes dominated by *Sabal minor*. Other components of the sparse to dense ground cover include *Carex louisianica*, *Dichantherium boscii*, *Panicum rigidulum* var. *rigidulum*, and *Sphagnum lescurii*.

Dynamics: Periodic flooding, insect and pathogen outbreaks, and infrequent blowdowns are likely the most important/only natural disturbance vectors in this community. This forest probably represents a topographic/edaphic climax. When it is disturbed or cut, species such as *Pinus taeda* and *Acer rubrum* become much more abundant or dominant.

Similar Associations:

- (*Quercus laurifolia*) / *Crataegus opaca* - *Crataegus viridis* Forest (CEGL007386) -- often occurs in slightly lower landscape positions near this community in eastern Texas.

Related Concepts:

- IIA6a. Willow Oak Forest (Allard 1990) ?
- Laurel Oak - Willow Oak (64) (USFS 1988) ?
- Willow Oak - Water Oak - Diamondleaf (Laurel) Oak: 88 (Eyre 1980) ?
- Willow Oak / *Justicia* Clayey Wet Upland Depressions (Turner et al. 1999) B

Classification Comments: Examples are also found on the Pleistocene terraces on the Sabine, Davy Crockett, and Angelina national forests in eastern Texas (R. Turner pers. comm.). In eastern Texas this association often co-occurs with (*Quercus laurifolia*) / *Crataegus opaca* - *Crataegus viridis* Forest (CEGL007386). This community is known from examples at Devils Swamp (Natchitoches Parish, Louisiana), the Angelina National Forest (Cook Mountain Geologic Formation, San Augustine County), and on the southern portion of the Kisatchie District of the Kisatchie National Forest.

CONSERVATION RANKING & RARE SPECIES

GRank: G3? (1999-12-3): As defined, this type is endemic to a narrow geographic area of eastern Texas and western Louisiana (and possibly adjacent Arkansas). It occurs on secondary stream terraces which, although periodically flooded during the year, only rarely receive overbank flooding. Such habitats may have been historically uncommon in the region, and many have been heavily altered by past land-uses, including conversion to other vegetation types. Possibly the best examples of this type are known on National Forest lands, although none are known to be specifically protected. Unprotected examples are threatened by logging and conversion to agroforestry and other land uses, as well as by hydrologic alterations. Further study is needed to clarify the degree of uncertainty in the rank. The relationship of this community to similar communities needs clarification.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This forest association is known from western Louisiana and eastern Texas; it may also occur in adjacent southwestern Arkansas.

Subnations: AR?, LA, TX

TNC Ecoregions: 40:P, 41:C

USFS Ecoregions: 231E:PP, 232Fe:CCC

Federal Lands: USFS (Angelina, Davy Crockett, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Eyre 1980, Kerr et al. 1980, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Thomas and Allen 1993, Turner et al. 1999, USFS 1988

WEST GULF COASTAL PLAIN WET LONGLEAF PINE SAVANNA AND FLATWOODS

LONGLEAF PINE - (SHORTLEAF PINE, LOBLOLLY PINE) / (SWEETGUM) / LITTLE BLUESTEM WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* - *Pinus (echinata, taeda)* / (*Liquidambar styraciflua*) / *Schizachyrium scoparium* Woodland

Database Code: C EGL003609

Formation: Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a)

Alliance: *Pinus palustris* Woodland Alliance (A.520)

ELEMENT CONCEPT

Summary: This association includes various regenerated, silviculturally altered, and/or naturally fire-suppressed *Pinus palustris* woodlands in Louisiana and Texas, primarily the West Gulf Coastal Plain. It is broadly defined to represent the wide variation which can be present in semi-natural and/or fire-suppressed longleaf pine stands. This type is recognized by the presence of *Pinus echinata* and/or *Pinus taeda* in the overstory (abundant enough to constitute 25-75% of the canopy density) along with *Pinus palustris*. It includes silviculturally managed stands of *Pinus palustris* as well as fire-suppressed or otherwise ecologically disturbed longleaf pine forests with oaks or other hardwoods that may enter the canopy. This association tentatively applies to longleaf stands along the range periphery of the species in Texas, where stands are heavily mixed in the overstory.

Environment: As broadly defined, this type extends across a moisture gradient from mesic flats to xeric ridgetops. Soil textures can be extremely variable from fine-textured silty soils to sandy loam soils overlying clay, and coarse-textured sands. Some specific soil series from examples in Louisiana include Smithdale, Ruston, Betis, and Briley. Some examples may be naturally occurring, unmanaged types still suffering from fire suppression, in which the areas are naturally sheltered from frequent fire.

Vegetation: *Pinus taeda* is generally a codominant on more mesic sites and flats, while *Pinus taeda* and/or *Pinus echinata* may codominate on drier sites. *Pinus echinata* tends to be the only codominant pine on xeric sites. The vegetation tends to have a patchy understory due to fire suppression. Depending on the moisture regime, understory species may include *Liquidambar styraciflua*, *Quercus alba*, *Quercus stellata*, *Quercus falcata*, and *Quercus hemisphaerica*. Part of the canopy (but typically not more than 25%) may be composed of these or other hardwood species. Shrubs that may be present, depending on fire history and moisture, include *Cornus florida*, *Callicarpa americana*, *Ostrya virginiana*, *Ilex vomitoria*, and *Vaccinium arboreum*. Herbaceous cover is sparse to fairly dense, and is typically dominated by *Schizachyrium scoparium*. The ground cover is greatly decreased in stands with a high canopy cover.

Dynamics: This type can result from partial thinning or regeneration cutting of formerly pure longleaf stands and/or from infrequent burning of plantations and naturally regenerated stands.

Similar Associations:

- *Pinus palustris* / *Quercus (falcata, stellata)* - *Liquidambar styraciflua* - *Carya texana* / *Schizachyrium scoparium* Woodland (CEGL003576) -- also ranked GM with conceptual overlap in the West Gulf Coastal Plain.

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Loblolly Pine-Hardwood (13) (USFS 1988) ?
- Longleaf Pine (21) (USFS 1988) ?
- Longleaf Pine - Scrub Oak: 71 (Eyre 1980) B Shortleaf Pine - Oak: 76 (Eyre 1980) B
- Shortleaf Pine-Oak (11) (USFS 1988) ?

Classification Comments: More information is needed on vegetation reported from the East Gulf Coastal Plain of Louisiana (232Ba), which is tentatively included here as well. This type was apparently first described from the Kisatchie Ranger District on dry to dry-mesic acidic sandy loams. Variability is primarily determined by burning and thinning frequencies; more open examples having denser shrub and herbaceous strata. The moisture regime and other site conditions also affect the floristic composition of the

vegetation. It is primarily disturbed through silvicultural management techniques such as burning and thinning; prescribed burns generally occur at three-year intervals.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2001-6-25): This association consists of various regenerated, silviculturally altered, and/or naturally fire-suppressed *Pinus palustris* stands in the West Gulf Coastal Plain. It is broadly defined to represent the wide variation which can be present in semi-natural and/or fire-suppressed longleaf pine stands, and is not in and of itself a conservation target, although examples may provide habitat for rare and threatened plant and animal species.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This association is found in the West Gulf Coastal Plain of the United States.

Subnations: LA, TX

TNC Ecoregions: 40:P, 41:C, 53:C

USFS Ecoregions: 231Ea:CPP, 232Ba:CCC, 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: USFS (Angelina, Davy Crockett?, Kisatchie, Sabine NF)

ELEMENT SOURCES

References: Allard 1990, Allred and Mitchell 1955, Burns and Honkala 1990a, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Reed 1982, Smith pers. comm., Southeastern Ecology Working Group n.d., Turner 1935b, USFS 1988

LONGLEAF PINE / SAVANNA ERYNGO - BEAKSEDGE SPECIES - (TOOTHACHE GRASS) WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Eryngium integrifolium* - *Rhynchospora* spp. - (*Ctenium aromaticum*) Woodland

Database Code: CEGLO03646

Formation: Saturated temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.f)

Alliance: *Pinus palustris* - *Pinus (elliottii, serotina)* Saturated Woodland Alliance (A.578)

ELEMENT CONCEPT

Summary: This is a saturated longleaf pine woodland community of central to west-central Louisiana, presumably ranging into adjacent or related areas of Texas. The *Pinus palustris* canopy in frequently burned, relict stands is typically open. Shrubs are absent to patchy. The herbaceous layer in this woodland is well-developed and very species-rich. Dominants include *Ctenium aromaticum* (within its range, east of the Sabine River), *Muhlenbergia expansa*, *Rhynchospora plumosa*, *Rhynchospora globularis*, *Rhynchospora glomerata*, *Rhynchospora* spp., *Panicum virgatum*, *Eriocaulon decangulare*, *Eryngium integrifolium*, *Rhexia lutea*, and *Eupatorium* spp. Residual stands of this community are known from intermediate and high Pleistocene terraces. Soils are poorly drained to very poorly drained, acidic, silt loams and also perhaps fine sandy loams. Average fire-return time historically was believed to be 1-3 years, few remaining examples are subject to such frequencies. This community is geographically isolated from the larger belt of *Pinus palustris* flatwoods that occurs in southwestern Louisiana and southeastern Texas. For now, this community includes poorly studied variants which occur on the Fleming Formation in central Louisiana and Texas ('Westcentral Tertiary Flatwoods Variant' of Smith 1995a); further study of these may reveal that they warrant recognition.

Environment: This saturated longleaf pine woodland community occurs in central to west-central Louisiana, presumably ranging into adjacent Texas. Residual stands of this community are known from intermediate and high Pleistocene terraces. Soils are poorly drained to very poorly drained, acidic, silt loams and also perhaps fine sandy loams. Average fire-return time is one to three years. It is geographically isolated from the larger belt of *Pinus palustris* flatwoods that occurs in southwestern Louisiana and southeastern Texas (Correll and Johnston 1970, Bridges and Orzell 1989a, Martin and Smith 1991, 1993, R. Stewart pers. comm. 1995). Denser stands are drier than open stands due to the higher rate of water loss from evapotranspiration. Although saturated soils persist from December through June, the top few inches of soil are dry by August and remain so until November (R. Stewart pers. comm. 1995).

Vegetation: The *Pinus palustris* canopy ranges from 10% (in fire-frequented, thinned plantations) to 100% (in fire-frequented, unthinned plantations) cover. The cover in fire-frequented relict stands averages 30%. Shrubs are absent to very patchy. The herbaceous layer in this woodland is extremely rich, although less so in unthinned plantations. The ground cover ranges from 50-80%. Dominants include *Ctenium aromaticum*, *Muhlenbergia expansa*, *Schizachyrium scoparium*, *Rhynchospora plumosa*, *Rhynchospora globularis*, *Rhynchospora glomerata*, *Rhynchospora* spp., *Panicum virgatum*, *Eriocaulon decangulare*, *Eryngium integrifolium*, *Rhexia lutea*, and *Eupatorium* spp. Other forb species include *Polygala incarnata*, *Liatris pycnostachya*, *Chaptalia tomentosa*, *Coreopsis linifolia*, *Pogonia ophioglossoides*, *Rhexia alifanus*, *Lachnocaulon anceps*, *Spiranthes vernalis*, and *Xyris ambigua*. Although more abundant in the inclusional seepage bogs, *Drosera capillaris*, *Utricularia cornuta*, *Utricularia juncea*, and *Utricularia subulata* may be scattered in open examples of this community. Unthinned plantations, however, have much fewer heliophytic species like *Ctenium aromaticum*, *Sarracenia alata*, and *Xyris ambigua*, but do contain *Pycnanthemum albescens* and *Pycnanthemum tenuifolium*. *Lycopodiella caroliniana* and *Sphagnum* spp. may be components of the open examples of this community (Correll and Johnston 1970, Martin and Smith 1991, 1993, R. Stewart pers. comm. 1995).

Dynamics: Plantation stands are managed silviculturally. Both relict and plantation occurrences are fire-frequented, with a fair to rich ground layer. Ground fires historically and currently occur in this community even during relatively high moisture conditions, and have return times of 1 to 3 years. The chief natural fire season in Louisiana is believed to be late March through June (Martin and Smith 1991, 1993). Growing-season fires in the Gulf have very different ecological effects than dormant-season fires in terms of forb and graminoid flowering and shrub mortality.

The time since the last fire event greatly affects the shrub cover, the herbaceous layer and the regeneration of *Pinus palustris*. Shrub covers greatly increase with fire suppression, and both the diversity and the cover of the herbaceous layer are dramatically decreased.

Fire-suppression will cause a tremendous decrease in the richness and the cover of the herbaceous layer. This community will succeed to a *Pinus palustris* / *Morella cerifera* - *Morella caroliniensis* - *Persea palustris* wetland forest in the absence of fire.

With the continuation of fire suppression, the *Pinus palustris* canopy will approach an even-aged structure. Eventually the canopy may become mixed as *Liquidambar styraciflua*, *Nyssa sylvatica*, *Acer rubrum*, and *Pinus taeda* enter this stratum.

Similar Associations:

Related Concepts:

- IIB1i. West Gulf Coastal Plain Longleaf Pine Savanna (Allard 1990) B
- IIF3b. Wetland Plantation (Hardwood or Conifer) (Allard 1990) B
- Longleaf Pine / *Schizachyrium* - *Drosera* Fine-Sandy Wet Flatwoods (Turner et al. 1999) B Longleaf Pine-Beakrush Series (Diamond 1993) B
- Longleaf Pine: 70 (Eyre 1980) B
- Western Wet Longleaf Pine Savannah -- High Terrace Variants (Smith 1995a) ?
- Western Wet/Mesic Longleaf Pine Savannah/Flatwoods (Smith 1996a) B

Classification Comments: At present, this community includes poorly studied variants which occur on the Fleming Formation in central Louisiana; further study of these may reveal that they warrant recognition. It is unclear if this association is found in Texas; *Ctenium aromaticum* is not known from Texas, and stands of this association in that state would lack this nominal.

CONSERVATION RANKING & RARE SPECIES

GRank: G2G3 (1997-8-11): This saturated longleaf pine woodland community occurs in central to west-central Louisiana, possibly ranging into adjacent or related areas of Texas. Soils are poorly drained to very poorly drained acidic fine sandy loams or silt loams. Average fire-return time is one to three years. It is topographically isolated from the larger belt of *Pinus palustris* flatwoods that occurs in southwestern Louisiana and central eastern Texas. It is part of the endangered Longleaf Pine Ecosystem, which once dominated the Coastal Plain landscape of the southeastern United States, and depends on frequent, low-intensity, growing-season fires to control understory vegetation and for the reproduction of *Pinus palustris*. *Pinus palustris*-dominated saturated woodlands are susceptible to the effects of fire suppression, over-grazing, hydrologic alteration, or conversion to commercial forest plantations or agriculture. Remaining examples are highly threatened by development, conversion, and alteration of fire regimes. Most of those occurrences which have not been destroyed are severely degraded.

High-ranked species: *Aimophila aestivalis* (G3), *Ambystoma cingulatum* (G2G3), *Amsonia ludoviciana* (G3), *Drymarchon couperi* (G3), *Picoides borealis* (G3), *Pteroglossaspis ecristata* (G2)

ELEMENT DISTRIBUTION

Range: This saturated longleaf pine woodland community is found in central to west-central Louisiana, possibly ranging into adjacent or related areas of Texas.

Subnations: LA, TX?

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCP

Federal Lands: USFS (Angelina?, Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Correll and Johnston 1970, Diamond 1993, Dickson et al. 1993, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Smith 1995a, Smith 1996a, Smith pers. comm., Southeastern Ecology Working Group n.d., Stewart pers. comm., Turner et al. 1999

LONGLEAF PINE / WAX-MYRTLE - EVERGREEN BAYBERRY - BIG GALLBERRY WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus palustris* / *Morella cerifera* - *Morella caroliniensis* - *Ilex coriacea* Woodland

Database Code: CEGLO07162

Formation: Saturated temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.f)

Alliance: *Pinus palustris* - *Pinus (elliottii, serotina)* Saturated Woodland Alliance (A.578)

ELEMENT CONCEPT

Summary: This association includes fire-suppressed longleaf pine flatwoods of the West Gulf Coastal Plain of Louisiana and presumably Texas. The canopy is strongly dominated by *Pinus palustris*, which generally accounts for over 75% of the total cover. Other canopy species may include *Liquidambar styraciflua*, *Nyssa sylvatica*, *Acer rubrum*, *Pinus taeda*, and possibly exotic *Pinus elliottii* var. *elliottii* from nearby plantations. Shrubs and shrubby vines are frequently dense, and include *Morella cerifera* (= *Myrica cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Persea palustris*, *Smilax bona-nox*, *Smilax laurifolia*, *Smilax pumila*, *Smilax rotundifolia*, and *Rubus* spp. Where the shrubs and canopy are very dense, the ground cover is suppressed and has a cover of approximately 5%; in thinned plantations, the more open canopies allow a low-diversity ground cover of 30% or less. The lower strata in this situation are dominated by the short shrubs *Hypericum fasciculatum* and *Hypericum hypericoides* ssp. *hypericoides*, as well as *Hypericum mutilum*, with some *Viola* spp. and occasional *Carex* spp. and *Scleria* spp. Residual stands of this community are known from intermediate and high Pleistocene terraces. Soils are poorly drained to very poorly drained, acidic, fine sandy loams or silt loams. This is a fire-suppressed community, which no longer experiences the historic 1- to 3-year fire interval. The total canopy cover is variable; it can range from 90% or more in dense unthinned planted stands to 25% in recently thinned stands. Residual natural stands usually have canopy closures of between 60 and 80%. This community occurs in central to central western Louisiana, and is topographically isolated from the larger belt of *Pinus palustris* flatwoods that occurs in southwestern Louisiana and central eastern Texas. This community is known from the Vernon, southern Catahoula, southern Evangeline, and southern Kisatchie Ranger Districts of the Kisatchie National Forest.

Environment: Residual stands of this community are known from intermediate and high Pleistocene terraces. Soils are poorly drained to very poorly drained, acidic, fine sandy loams or silt loams (Martin and Smith 1991, 1993). Denser stands are drier than open stands due to the higher rate of water loss through vegetative use and evapotranspiration. Although saturated soils persist from December through June, the top few inches of soil are dry by August and remain so until November (R. Stewart pers. comm.). This community is known from the Vernon, southern Catahoula, southern Evangeline, and southern Kisatchie ranger districts of the Kisatchie National Forest.

Vegetation: The canopy is strongly dominated by *Pinus palustris*, which generally accounts for over 75% of the total cover. Other canopy species may include *Liquidambar styraciflua*, *Nyssa sylvatica*, *Acer rubrum*, *Pinus taeda*, and possibly exotic *Pinus elliottii* var. *elliottii* from nearby plantations. *Magnolia virginiana* has also been included as a component (Turner et al. 1999). Shrubs and shrubby vines are frequently dense, and include *Morella cerifera* (= *Myrica cerifera*), *Morella caroliniensis* (= *Myrica heterophylla*), *Persea palustris*, *Smilax bona-nox*, *Smilax laurifolia*, *Smilax pumila*, *Smilax rotundifolia*, and *Rubus* spp. Where the shrubs and canopy are very dense, the ground cover is suppressed and has a cover of approximately 5%; in thinned plantations, the more open canopies allow a low-diversity ground cover of 30% or less. The lower strata in this situation are dominated by the short shrubs *Hypericum fasciculatum* and *Hypericum hypericoides* ssp. *hypericoides*, as well as *Hypericum mutilum*, with some *Viola* spp. and occasional *Carex* spp. and *Scleria* spp.

Dynamics: This is a fire-suppressed community, which no longer experiences the historic one- to three-year fire interval. The total canopy cover is variable; it can range from 90% or more in dense unthinned planted stands to 25% in recently thinned stands. Residual natural stands usually have canopy closures of between 60-80%. This community occurs in central to central western Louisiana, and is topographically isolated from the larger belt of *Pinus palustris* flatwoods that occurs in southwestern Louisiana and central eastern Texas.

Plantation stands are managed silviculturally. Residual occurrences are fire-suppressed, leading to the increase in shrub and canopy cover. Frequent ground fires historically occurred in these relict stands even during relatively high moisture conditions, and likely had return times of 1 to 3 years. The chief natural fire season in Louisiana is believed to be late March through June (Martin and Smith 1991, 1993). Growing-season fires in the Gulf Coastal Plain have very different ecological effects than dormant season fires on forb and graminoid flowering and shrub mortality.

The time since the last fire event greatly affects the shrub cover, the herbaceous layer and the regeneration of *Pinus palustris*. Shrub covers greatly increase with fire suppression, and both the diversity and the cover of the herbaceous layer are dramatically decreased. The natural regeneration of *Pinus palustris* in this fire-suppressed forest has been curtailed or halted by the lack of exposed soil for germination and safe sites for regeneration.

With the initiation of frequent prescribed burns, it has been observed that this forest community can be restored at least partially to the open woodland with extremely rich herbaceous layer that historically comprised one of the dominant plant communities in this region (R. Stewart pers. comm.). With the continuation of fire suppression, the *Pinus palustris* canopy will approach an even-age structure. Eventually the canopy may become mixed as *Liquidambar styraciflua*, *Nyssa sylvatica*, *Acer rubrum*, and *Pinus taeda* enter this stratum.

Similar Associations:

Related Concepts:

- IIB1i. West Gulf Coastal Plain Longleaf Pine Savanna (Allard 1990) B
- IIF3b. Wetland Plantation (Allard 1990) B
- Longleaf Pine (21) (USFS 1988) ?

- Longleaf Pine/*Schizachyrium-Drosera* Fine-Sandy Wet Flatwoods Landtype Phase (Turner et al. 1999) B
- Longleaf Pine: 70 (Eyre 1980) B

Classification Comments: Related vegetation with a more open canopy experiences a greater fire frequency and is wetter. The natural regeneration of *Pinus palustris* in this fire-suppressed forest has been curtailed or halted by the lack of exposed soil for germination and sites for regeneration. With the initiation of frequent prescribed burns, it has been observed that this forest community can be restored at least partially to the open woodland with extremely rich herbaceous layer that historically comprised one of the dominant plant communities in this region. With the continuation of fire suppression, the *Pinus palustris* canopy will approach an even-aged structure. Eventually the canopy may become mixed as *Liquidambar styraciflua*, *Nyssa sylvatica*, *Acer rubrum*, and *Pinus taeda* enter this stratum.

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (1997-12-1): No information

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This fire-suppressed longleaf pine flatwoods association is found in the West Gulf Coastal Plain of Louisiana and Texas.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 232Fa:CCC

Federal Lands: NPS (Big Thicket); USFS (Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Bridges and Orzell 1989a, Dickson et al. 1993, Eyre 1980, Hatchell 1964, Martin and Smith 1991, Martin and Smith 1993, Martin et al. 1993, Smith 1996a, Southeastern Ecology Working Group n.d., Stewart pers. comm., Turner et al. 1999, USFS 1988

SLASH PINE - (LONGLAUF PINE) / WAX-MYRTLE - BIG GALLBERRY WOODLAND

ELEMENT IDENTIFIERS

NVC association: *Pinus elliotii* var. *elliotii* - (*Pinus palustris*) / *Morella cerifera* - *Ilex coriacea* Woodland

Database Code: CEGLO07157

Formation: Saturated temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.f)

Alliance: *Pinus palustris* - *Pinus (elliotii, serotina)* Saturated Woodland Alliance (A.578)

ELEMENT CONCEPT

Summary: This association does not represent natural vegetation. The core concept includes stands of *Pinus elliotii* var. *elliotii* outside the natural range of the species in the West Gulf Coastal Plain of Texas and Louisiana. This association may be best thought of as a degraded form of *Pinus palustris* / *Rhynchospora elliotii* - *Lobelia flaccidifolia* - *Platanthera nivea* - (*Helenium drummondii*) Woodland (CEGL007802) which represents the natural longleaf pine-dominated flatwoods of the region. Examples can be highly variable in condition and composition, as partly indicated by the amount of *Pinus palustris* present. Stands may develop after heavy silvicultural management (consisting of planted or seed tree/shelterwood-regenerated stands) to unmanaged, naturalized stands resulting from fire suppression. All examples are believed to occur on former *Pinus palustris* sites, and some examples may still contain enough *Pinus palustris* to qualify this species as a codominant (comprising 25-75% of the canopy). The canopy closure varies with management, and at some stages may exceed 60%. Most managed and thinned examples will generally range below 60% cover, and several apparently unmanaged examples in the Big Thicket National Preserve retain open, woodland structure. In silviculturally managed examples, burning frequency generally increases in stands after 15 years of age when trees are more resistant to mortality. Shrubs range from very patchy in frequently burned sites to dense in examples that have not burned for more than five years. Shrubs include *Morella caroliniensis* (= *Myrica heterophylla*), *Morella cerifera* (= *Myrica cerifera*), *Ilex coriacea*, *Viburnum nudum* var. *nudum*, *Vaccinium elliotii*, and *Callicarpa americana*. Little herbaceous cover occurs under denser canopies, while more open examples may include a fairly dense ground cover of *Schizachyrium scoparium*, *Muhlenbergia expansa*, *Ctenium aromaticum*, and *Carex* spp. Soils range from poorly drained to very poorly drained, fine sandy loams or silt loams. The variable hydrology includes forests with soils saturated in winter, early spring, and periodically throughout the growing season. This vegetation occurs in the West Gulf Coastal Plain of Louisiana and Texas, outside the natural range of *Pinus elliotii* var. *elliotii*.

Environment: Soils on which this type occurs range from poorly drained to very poorly drained, fine sandy loams or silt loams. The variable hydrology includes forests with soils saturated in winter, early spring, and periodically throughout the growing season. Examples can be highly variable, ranging from heavily silviculturally managed vegetation consisting of planted or seed tree/shelterwood-regenerated *Pinus elliotii* var. *elliotii* to unmanaged, 'naturalized' stands resulting from fire suppression.

Vegetation: This evergreen forest consists of planted or seed tree/shelterwood-regenerated *Pinus elliotii* var. *elliotii* and *Pinus palustris* comprising over 75% of the canopy. The total canopy cover ranges from 60-100%. *Liquidambar styraciflua* may be in the understory or subcanopy but comprises less than 25% of the canopy. Shrubs range from very patchy in frequently burned sites to dense in examples that have not burned for several (over 5) years and include *Morella caroliniensis* (= *Myrica heterophylla*), *Morella*

cerifera (= *Myrica cerifera*), *Ilex coriacea*, *Viburnum nudum* var. *nudum*, *Vaccinium elliotii*, and *Callicarpa americana*. Little herbaceous cover occurs under denser canopies, while more open examples may include a fairly dense ground cover of *Schizachyrium scoparium*, *Muhlenbergia expansa*, *Ctenium aromaticum*, and *Carex* spp.

Dynamics: This forest is primarily disturbed through silvicultural management techniques such as burning and thinning. This forest is initially planted as a seedling/sapling phase and progresses relatively quickly (9 to 12 years) to a forest physiognomy. This forest is likely cut before it succeeds to another community.

Similar Associations:

- *Pinus palustris* / *Eryngium integrifolium* - *Rhynchospora* spp. - (*Ctenium aromaticum*) Woodland (CEGL003646) -- high-quality longleaf flatwoods in parts of the region.
- *Pinus palustris* / *Morella cerifera* - *Morella caroliniensis* - *Ilex coriacea* Woodland (CEGL007162) -- fire-suppressed flatwoods of the region without *Pinus elliotii*.
- *Pinus palustris* / *Rhynchospora elliotii* - *Lobelia flaccidifolia* - *Platanthera nivea* - (*Helenium drummondii*) Woodland (CEGL007802) -- high-quality longleaf flatwoods of the region.
- *Pinus palustris* / *Sporobolus silveanus* - *Muhlenbergia capillaris* - *Chaetopappa asteroides* Woodland (CEGL003654) -- saline flatwood of the region.

Related Concepts:

- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Longleaf Pine - Slash Pine: 83 (Eyre 1980) B
- Slash Pine (22) (USFS 1988) B

Classification Comments: This association was formerly placed in II.A.4.N.f *Pinus elliotii* Saturated Temperate Woodland Alliance (A.574).

CONSERVATION RANKING & RARE SPECIES

GRank: GNA (modified/managed) (2002-5-16): This association includes heavily silviculturally managed vegetation as well as unmanaged, 'naturalized' stands resulting from fire suppression. It is not in and of itself a conservation target, although examples may provide habitat for rare and threatened plant and animal species.

High-ranked species: No information

ELEMENT DISTRIBUTION

Range: This vegetation occurs in the West Gulf Coastal Plain of Louisiana and Texas, outside the natural range of *Pinus elliotii* var. *elliotii*.

Subnations: LA, TX

TNC Ecoregions: 41:C

USFS Ecoregions: 232Ea:CPP, 232Fa:CCC, 232Fb:CCP, 232Fe:CCP

Federal Lands: NPS (Big Thicket); USFS (Kisatchie)

ELEMENT SOURCES

References: Allard 1990, Burns and Honkala 1990a, Eyre 1980, Hatchell 1964, Martin et al. 1993, Southeastern Ecology Working Group n.d., USFS 1988

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