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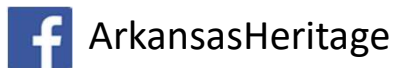
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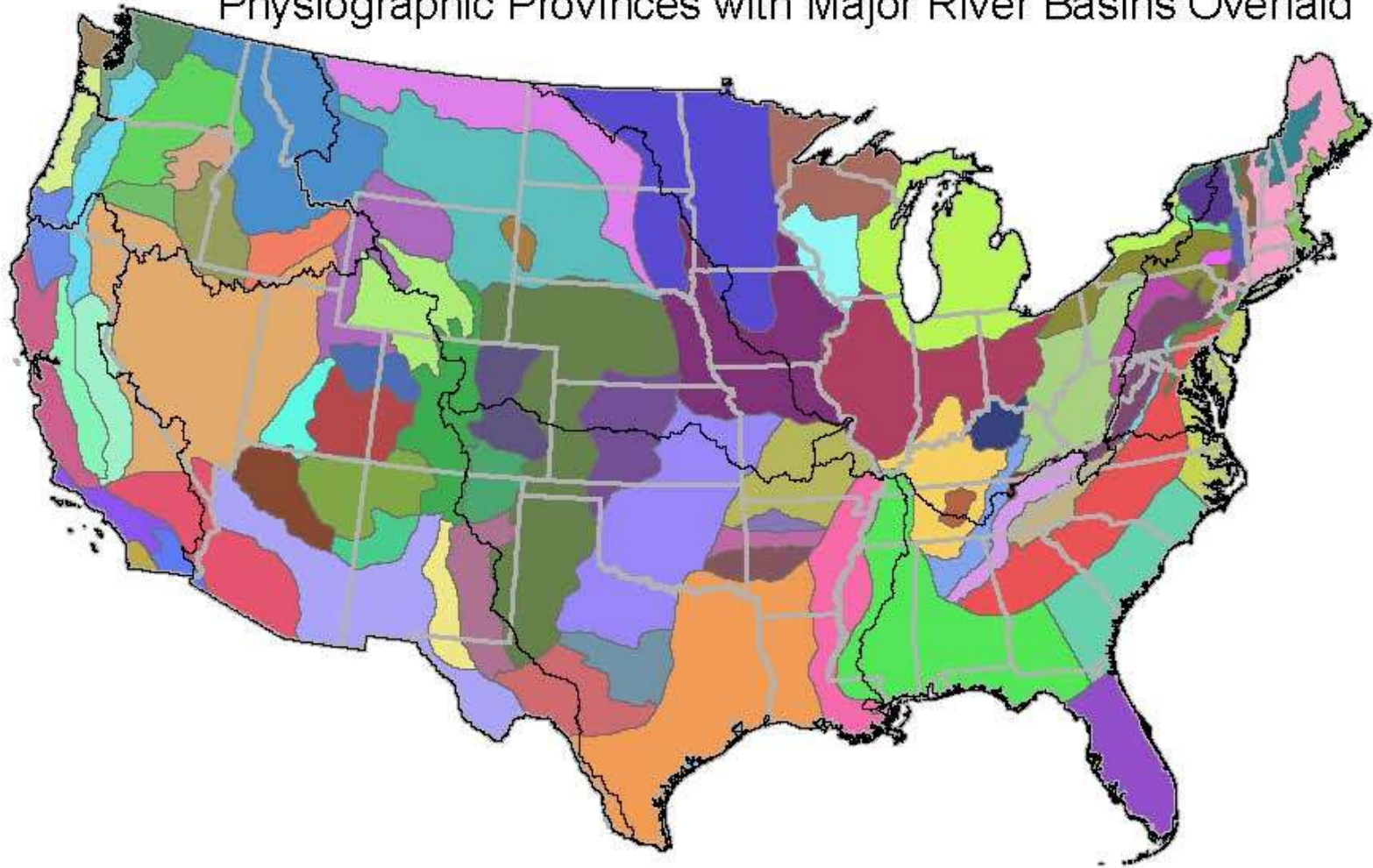
The Breath of the South Blows Over This Valley:

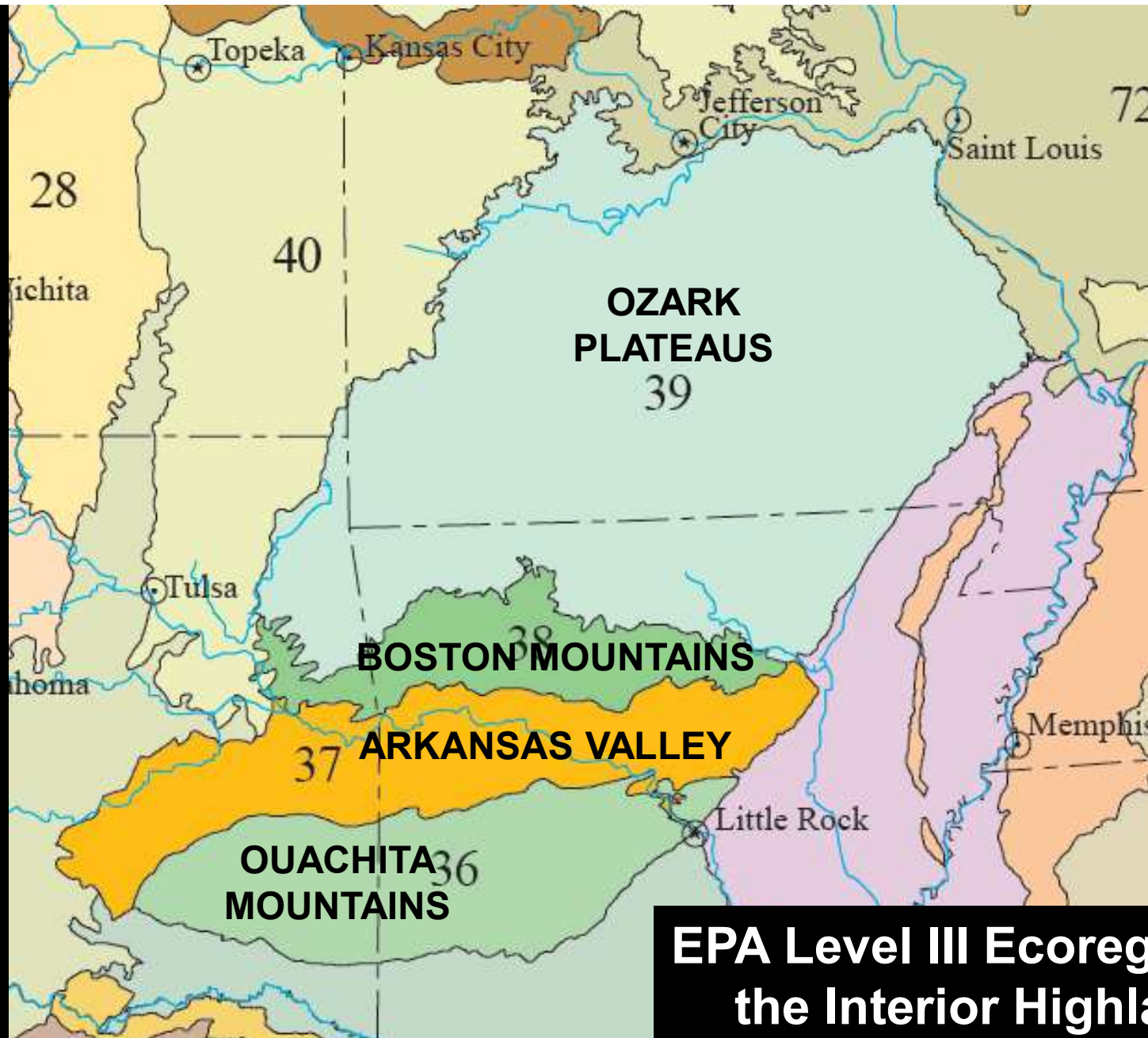
Relict Species and Plant Migrations Over
Time in Arkansas

presented to
Central Arkansas Master
Gardeners
January 15, 2019

Theo Witsell
ANHC Ecologist/Botanist

Physiographic Provinces with Major River Basins Overlaid





**EPA Level III Ecoregions of
the Interior Highlands**

http://www.epa.gov/wed/pages/ecoregions/ar_eco.htm

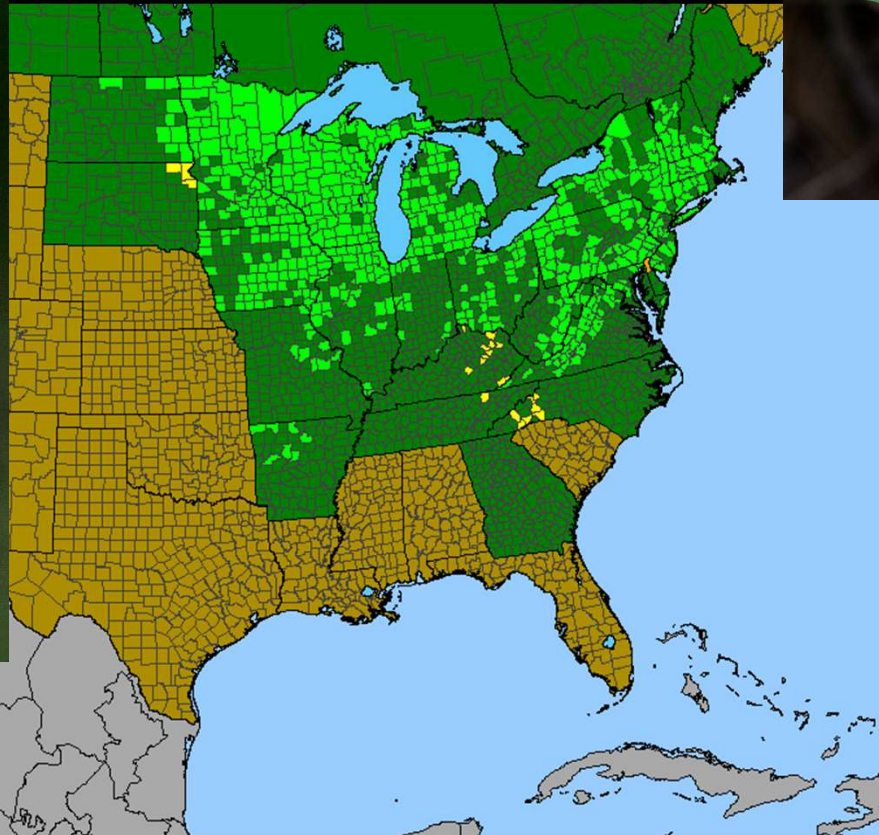
Cedar Sedge (*Carex*)



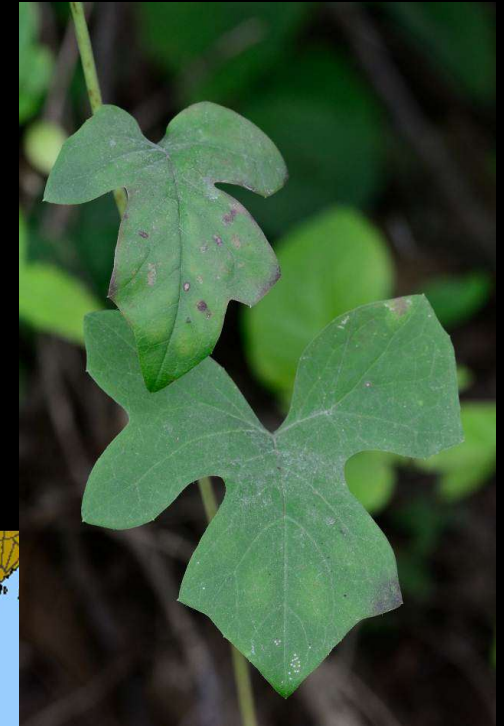
lugh W

White Rattlesnake Root (*Nabalus albus*)

Habitat: calcareous, rocky woodlands



(map generated on 11/2/2014)



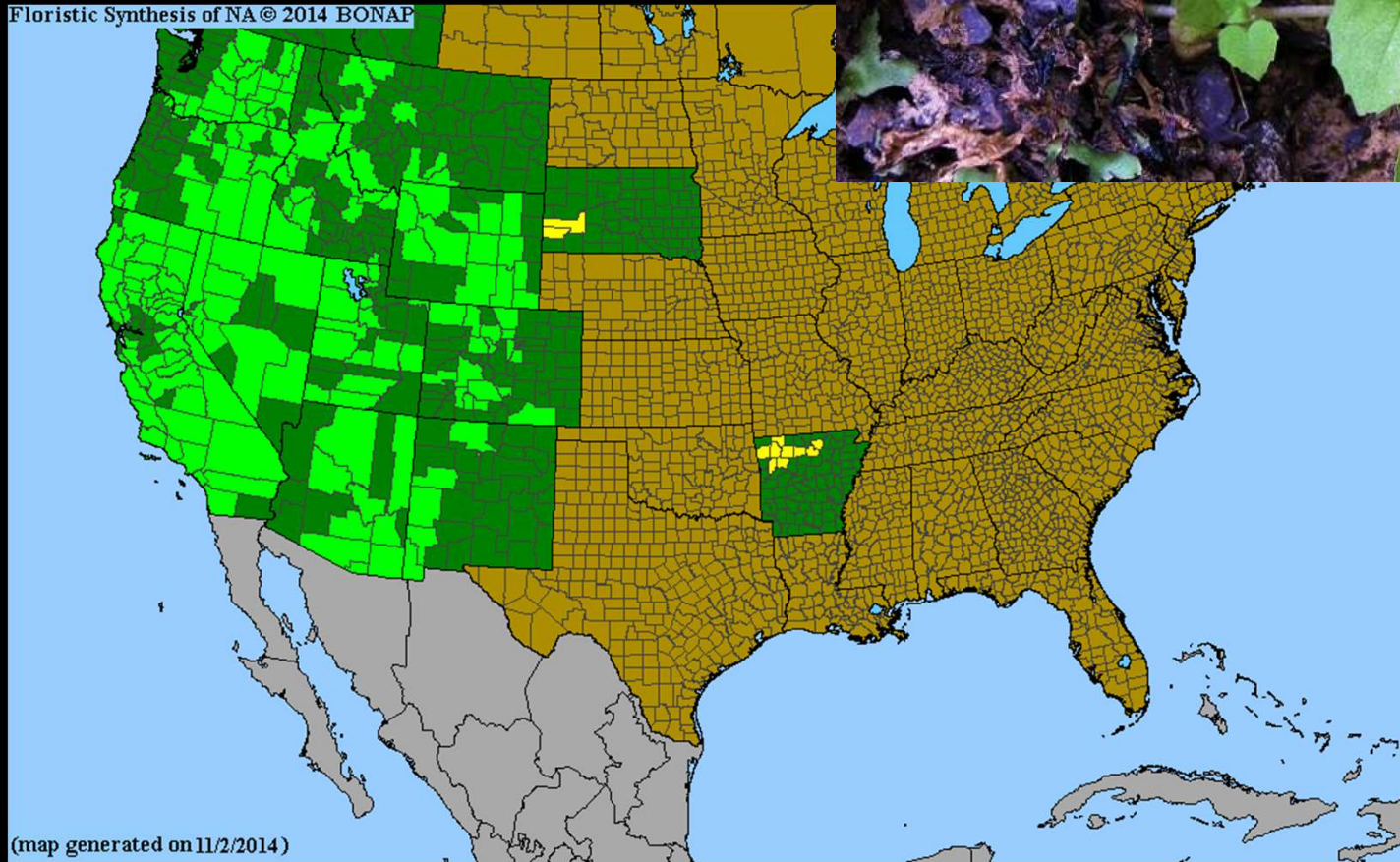
David Oakley

Yellow Monkey Flower (*Mimulus floribundus*)

Habitat: Wet or Mesic Bluffs on sandstone, shale, or limestone



Floristic Synthesis of NA © 2014 BONAP

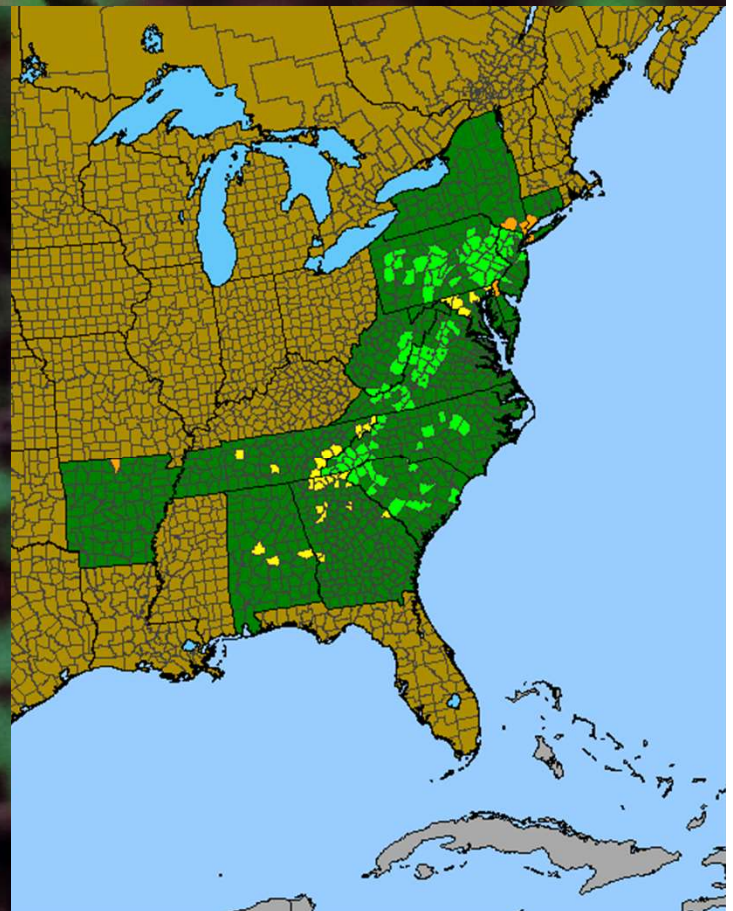


(map generated on 11/2/2014)

Craig Fraiser

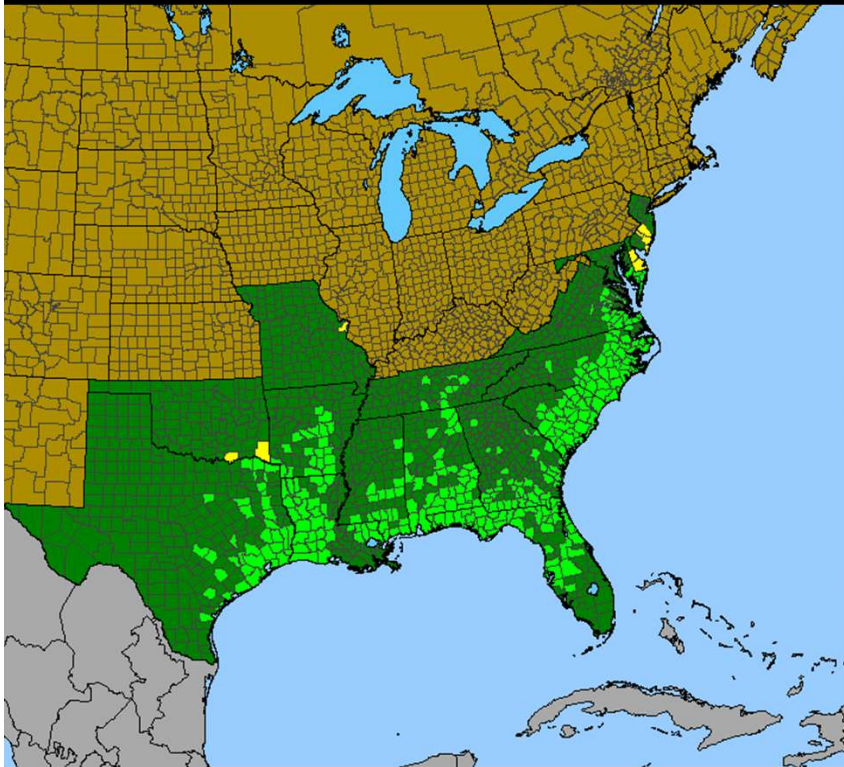
Broadleaf Bunchflower (*Veratrum latifolium* =
Melanthium hybridum = *Veratrum hybridum*)

Habitat: upland dry-mesic chert woodland



Narrow-leaf Seedbox (*Ludwigia linearis*)

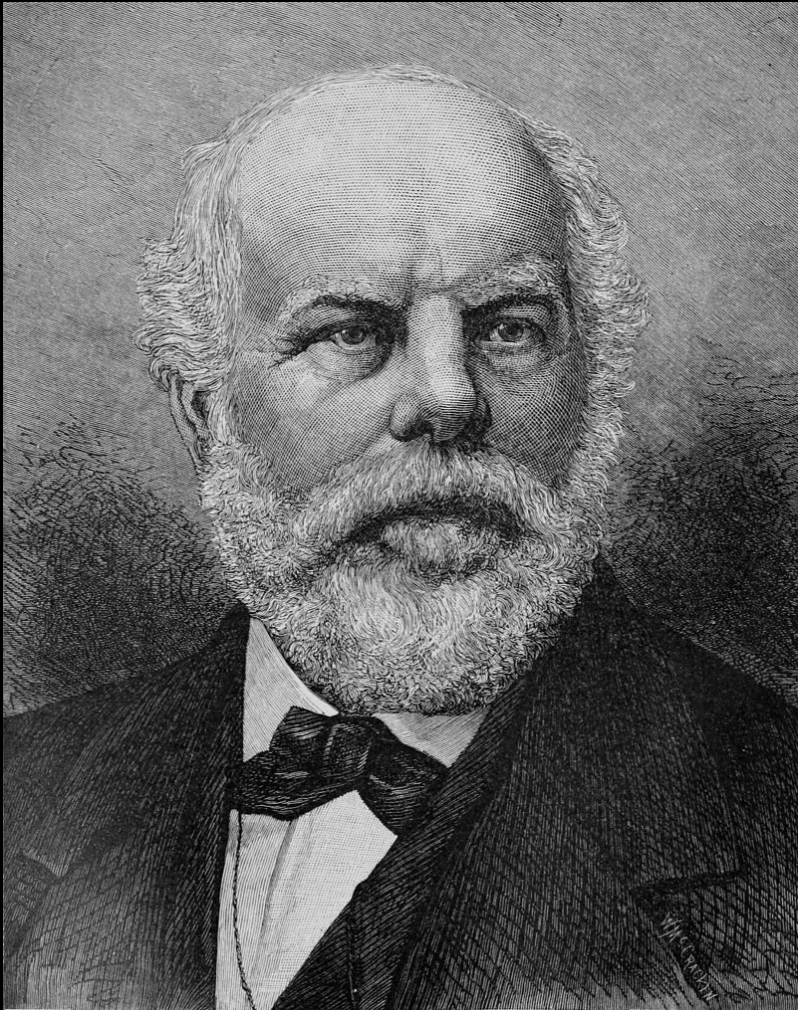
Habitat: sinkhole ponds, prairies



Ludwigia linearis

Gary P. Fleming
© DCR Natural Heritage

Bobby Hattaway



George Engelmann

1835 trip to

“The Hot Springs of Arkansas”



For the first time and with great pleasure our eyes light upon the majestic foliage of the magnolia, and the shiny green American cherry laurel; between them are stands of dwarf chestnuts and the strange-looking Aralia, clambering over the trunks of the trees and even out to the tips of the branches, where it bears its dark berries. The holly, with its dark green thick foliage, out of which smile the red berries, prevents successfully any penetration into this thicket. On the left a mountain rises up, and between the dry strands of scree thick bushes of wax myrtle grow. We are in another land: the breath of the South blows over this valley; nature grabs the spirit, the sadness wanes, our expectations rise, and after a sudden turn to the south the valley of the hot springs lies before us.

- **George Engelmann, 1835**







Important Ozark Habitats With Southeastern Plants

- Prairies

- Fens

- Acid Seeps

- Glades

- Woodlands

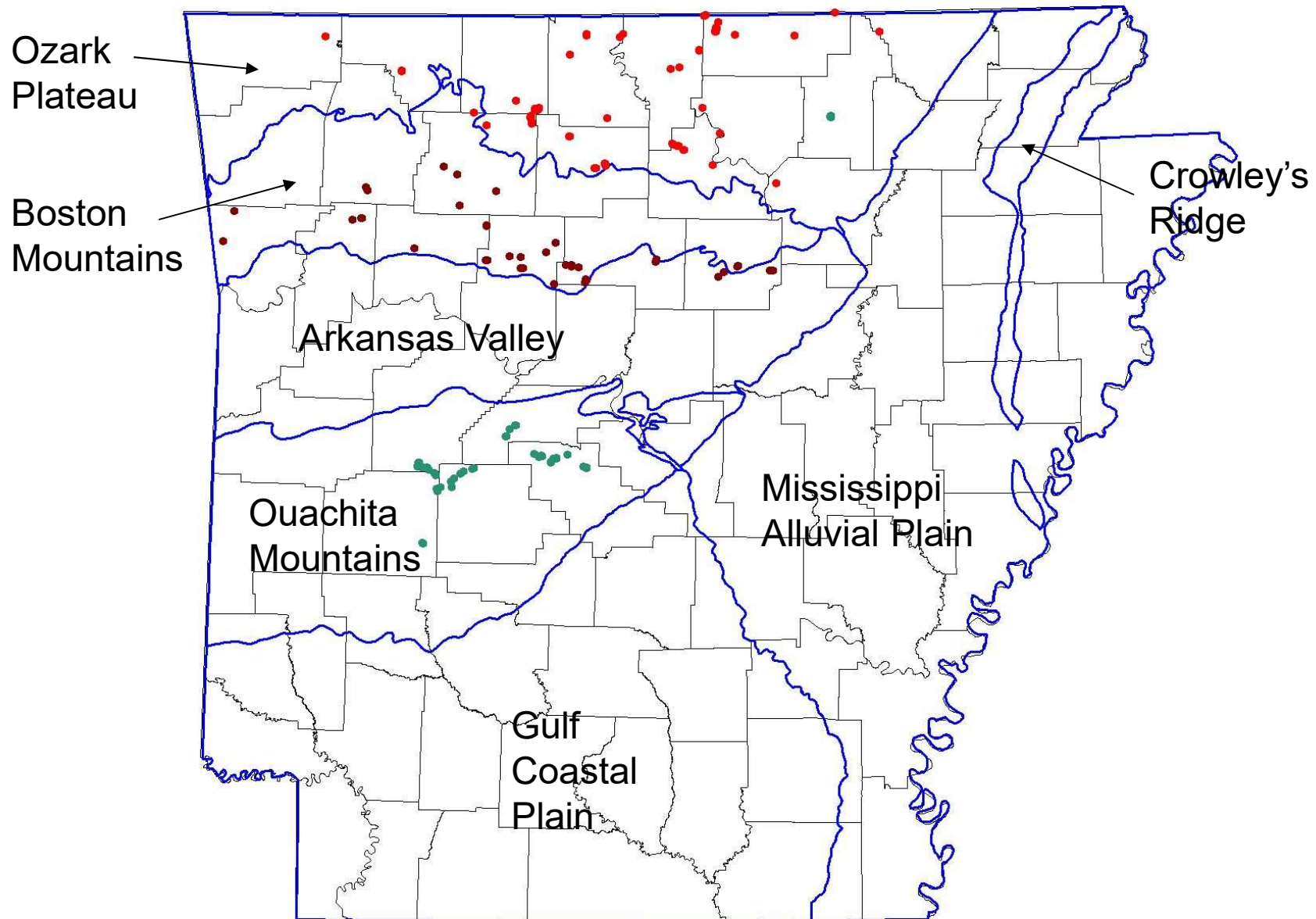
- Mesic Forests

- Sinkhole Ponds

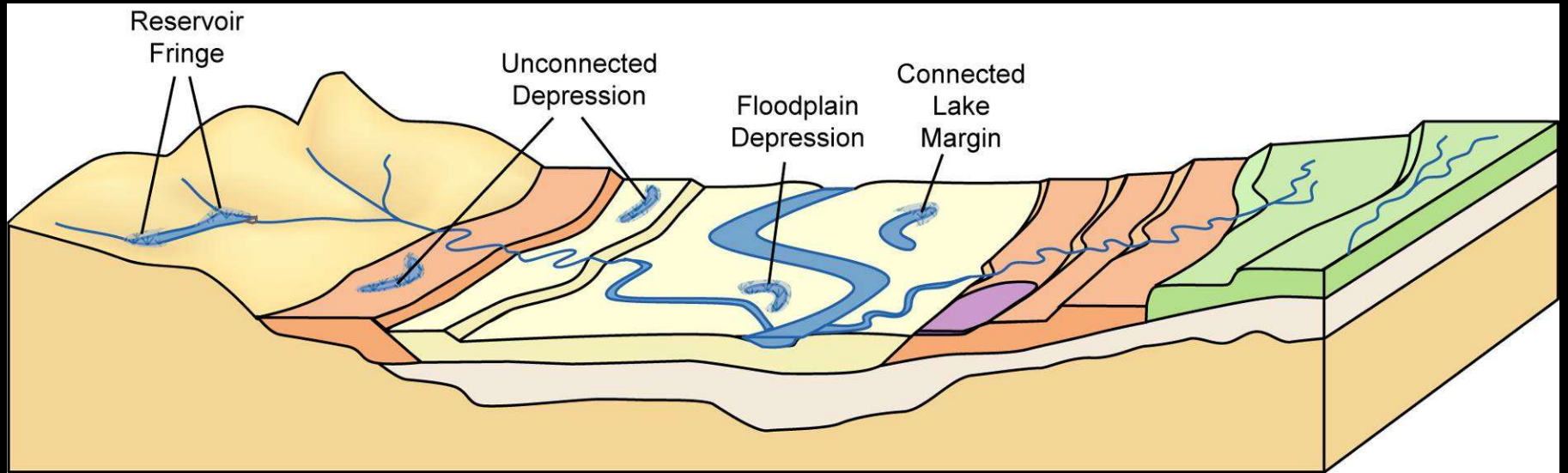
- Saline Barrens

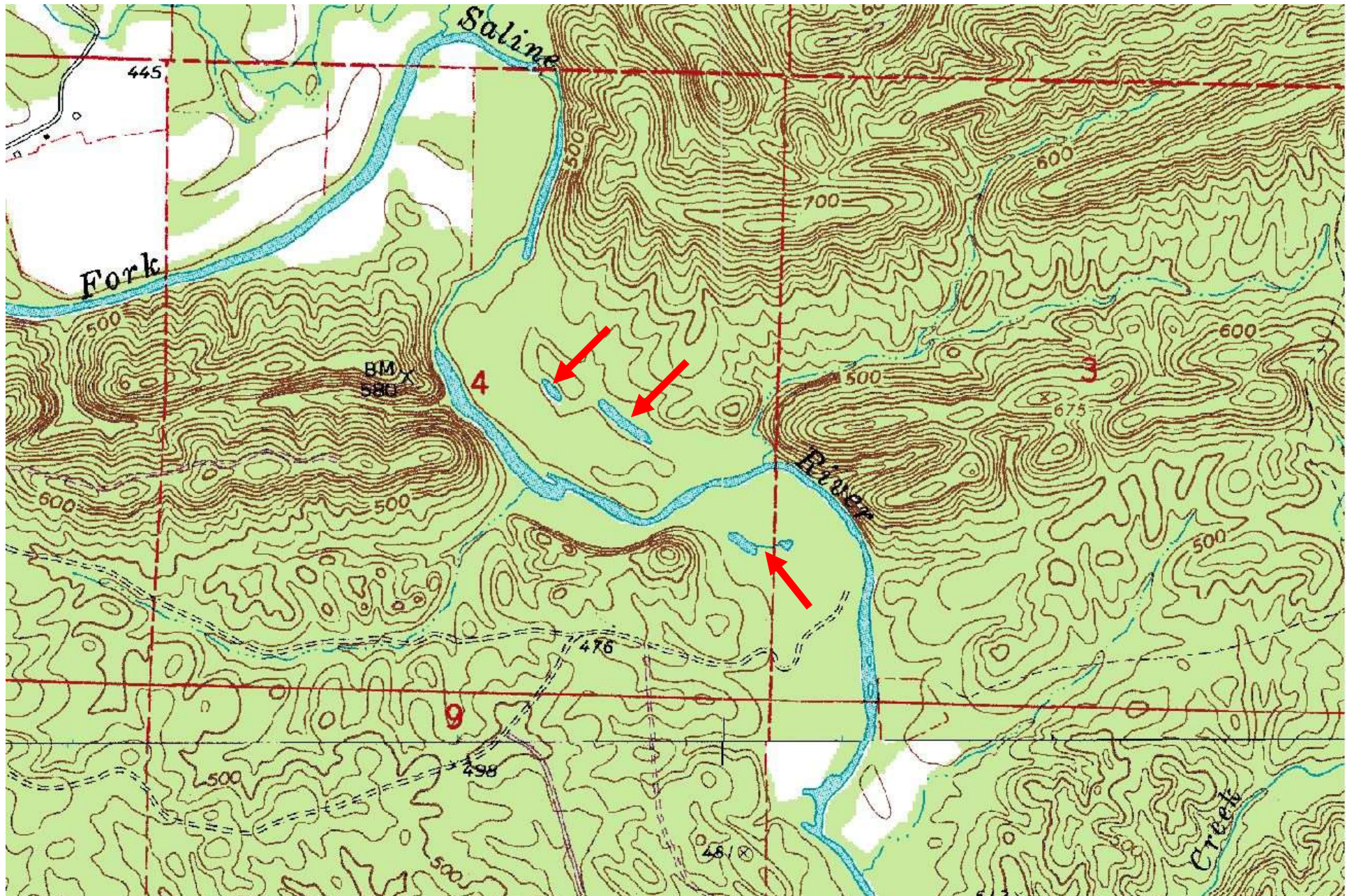
- Bluffs

- Riverscour

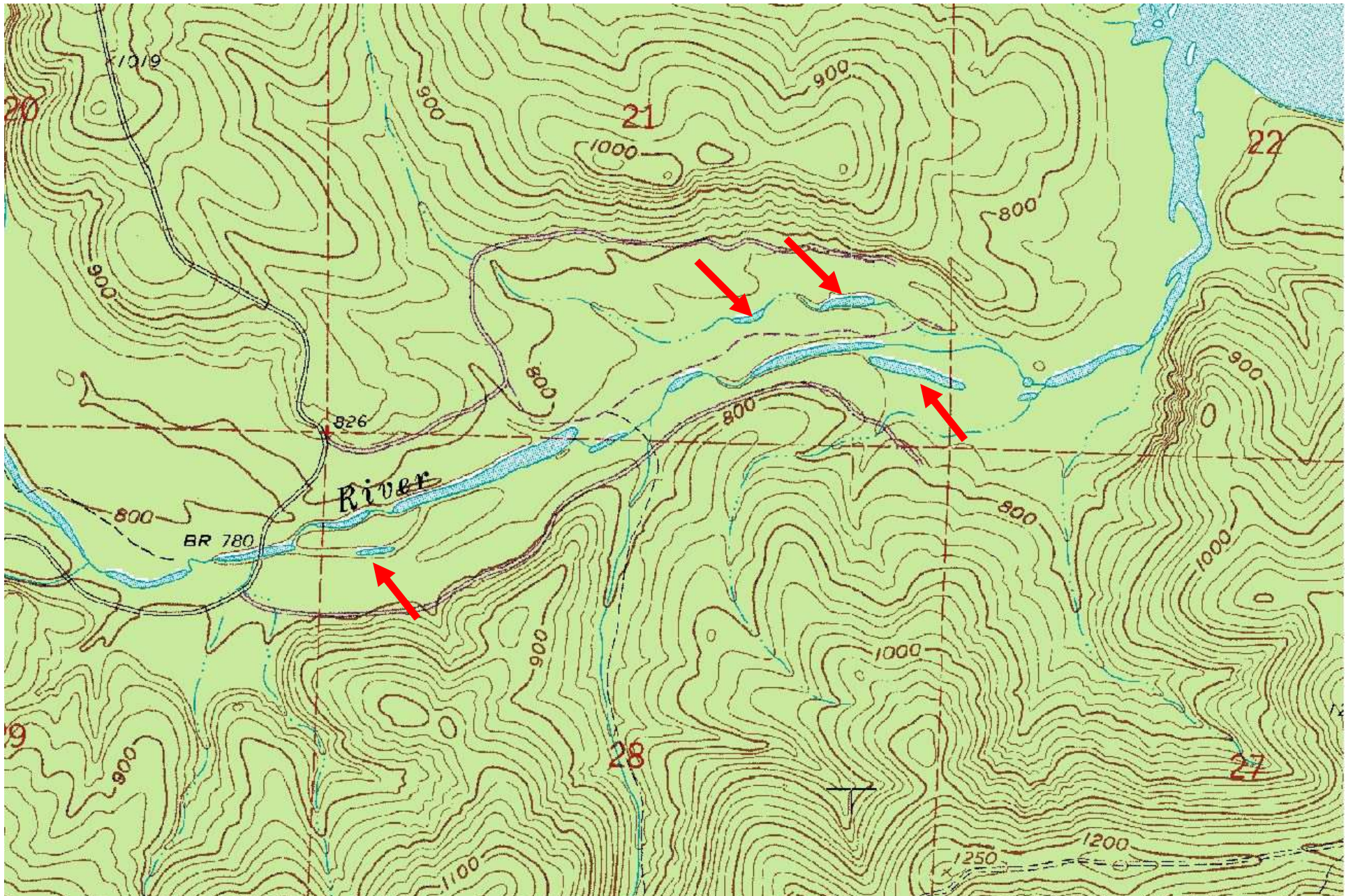


Map of EPA Level III Ecoregions showing known upland depression wetland sites.





Channel Scar Depression Ponds



Channel Scar Depression Ponds



Photo by Theo Witsell

Channel Scar Depression Ponds



Photo by Theo Witsell

Channel Scar Depression Ponds



Photo by Theo Witsell

Channel Scar Depression Wetland



Photo by John Pelton

Hypericum adpressum locality



Photo by John Pelton

Creeping St. John's Wort (*Hypericum adpressum*)

Habitat: channel scar ponds

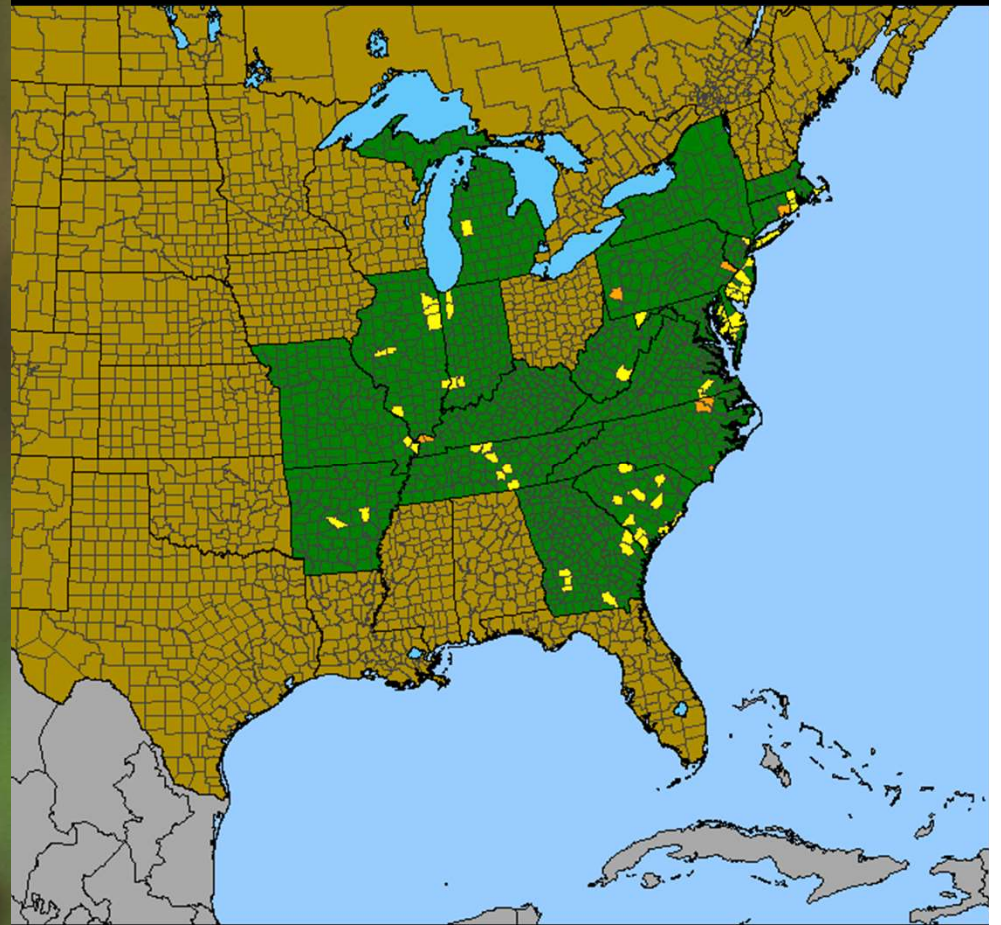




Photo by Theo Witsell

Channel Scar Depression Wetland

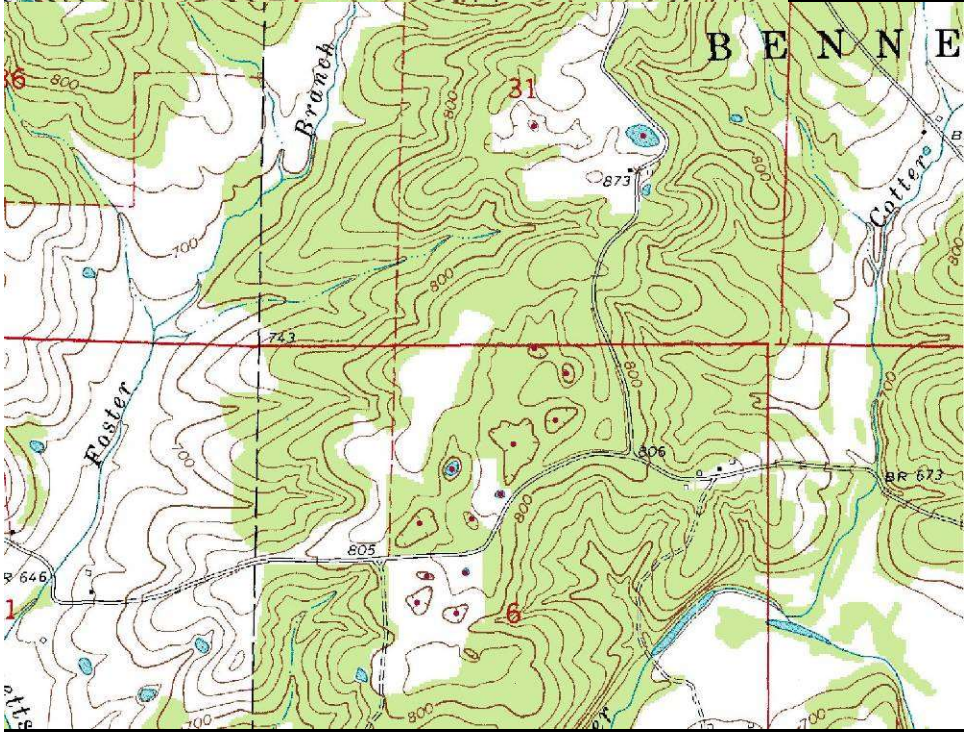
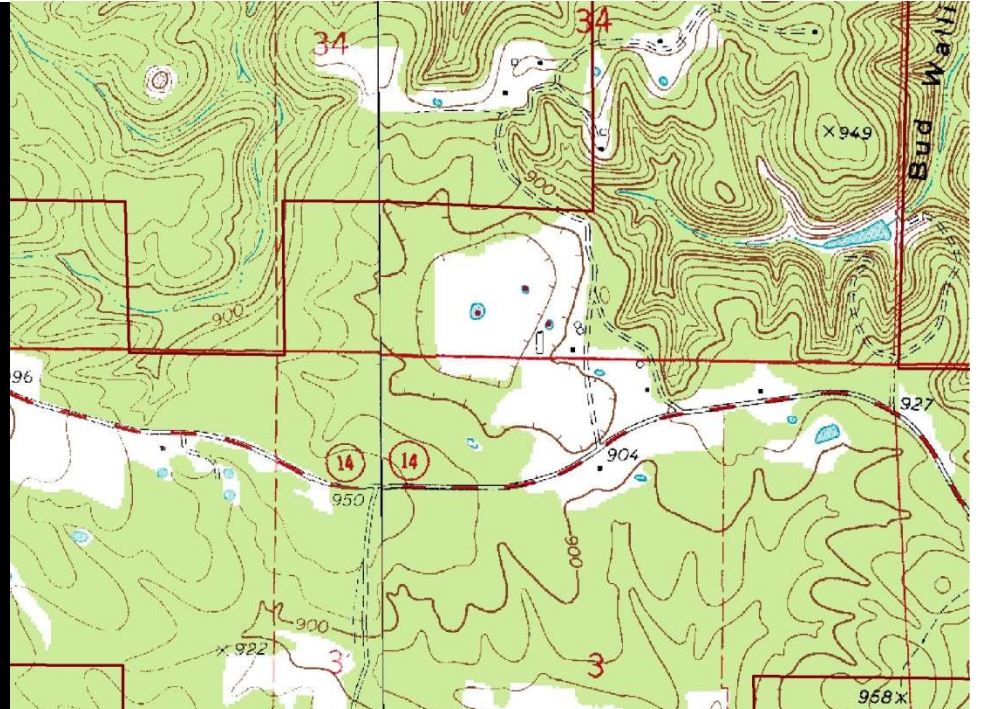
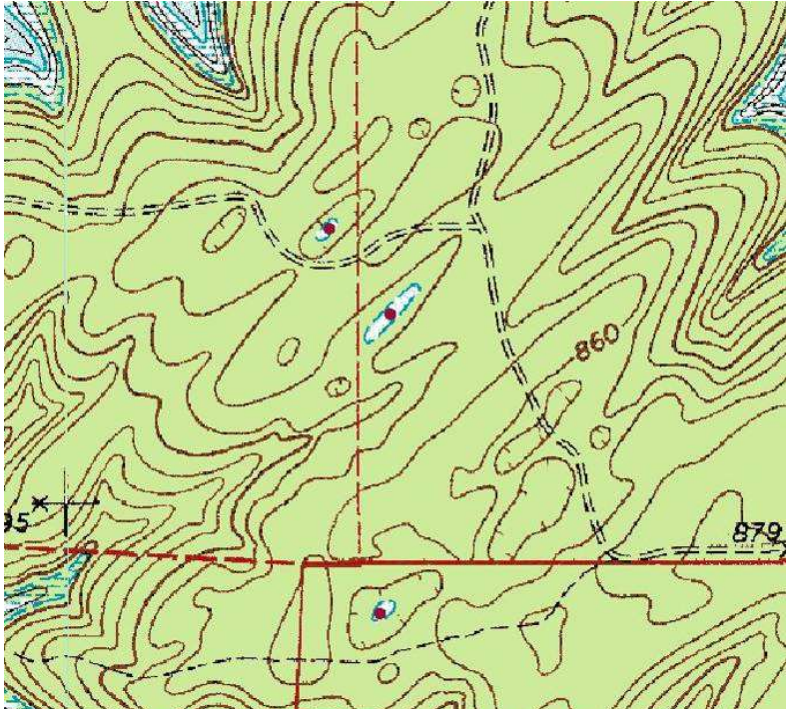




Photo: Keith Moon



Photo: Theo Witsell



Photo: Theo Witsell



Photo: Theo Witsell

Upland Karst Sinkhole Ponds

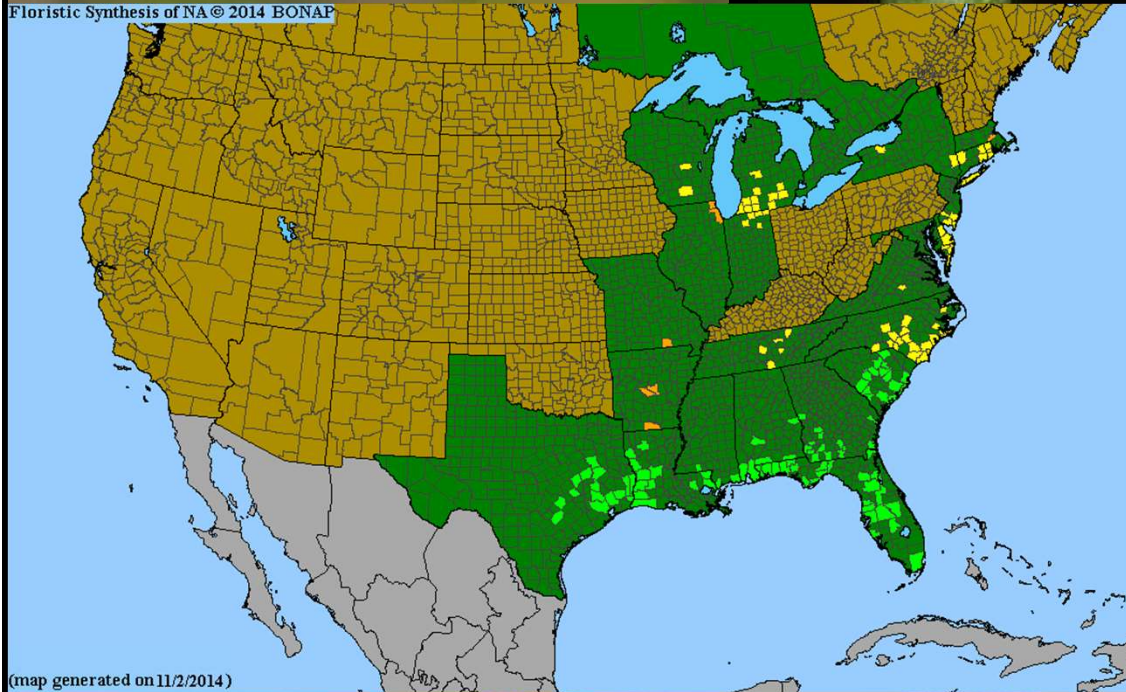


Photos: Theo Witsell

Horsetail Spikerush (*Eleocharis equisetoides*)

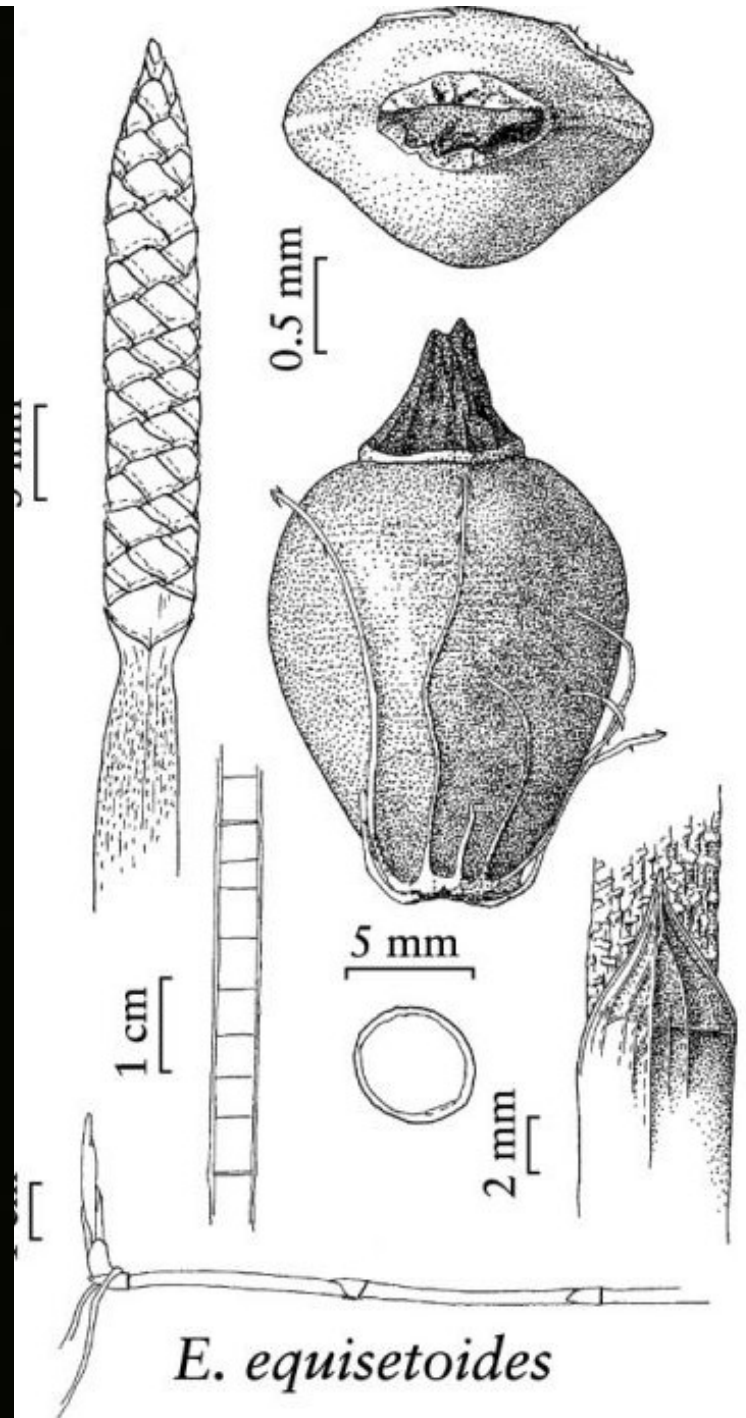
Habitat: sinkhole ponds

Floristic Synthesis of NA © 2014 BONAP



(map generated on 11/2/2014)

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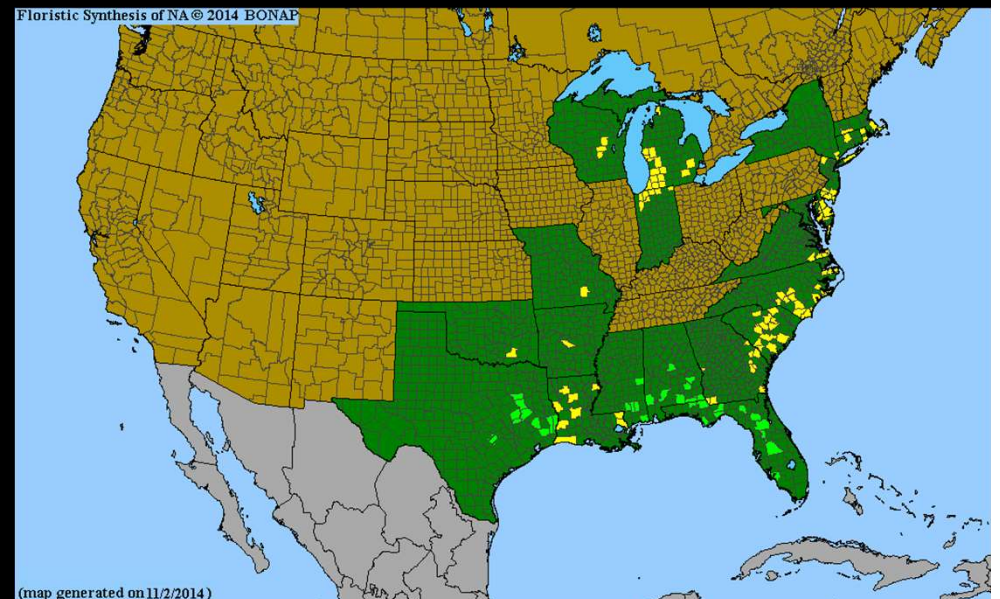
E. equisetoides

Longbeak Bald-rush (*Rhynchospora scirpodes*)

Habitat: sinkhole ponds



Floristic Synthesis of NA © 2014 BONAP



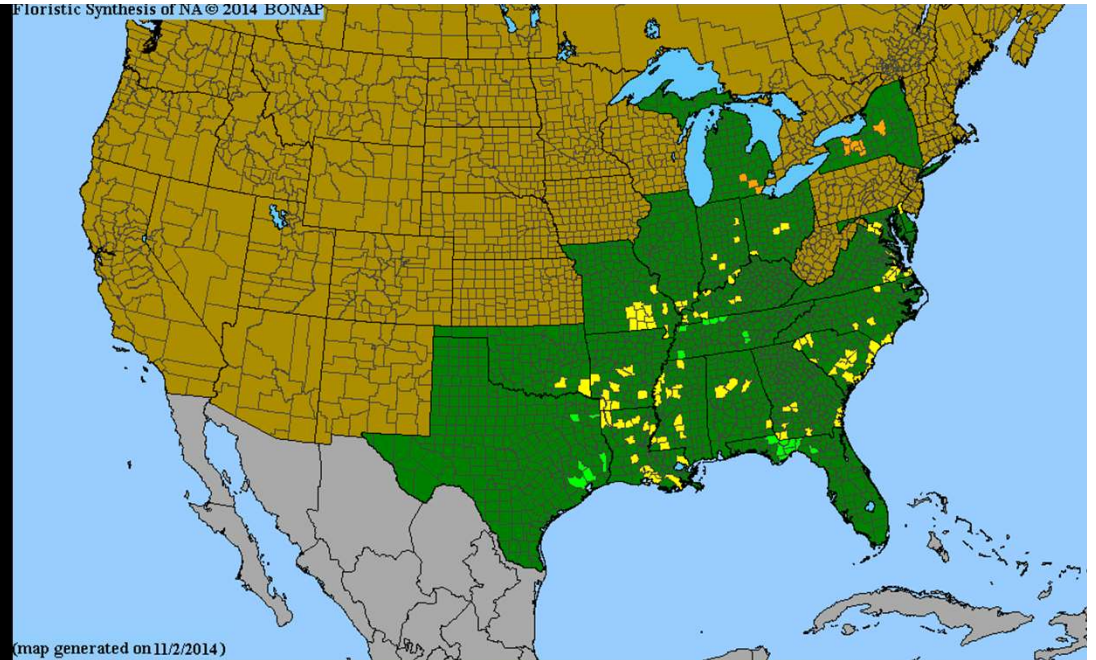
(map generated on 11/2/2014)

Cypress-knee Sedge; Epiphytic Sedge (*Carex decomposita*)

Habitat: sinkhole ponds



Floristic Synthesis of NA © 2014 BONAP

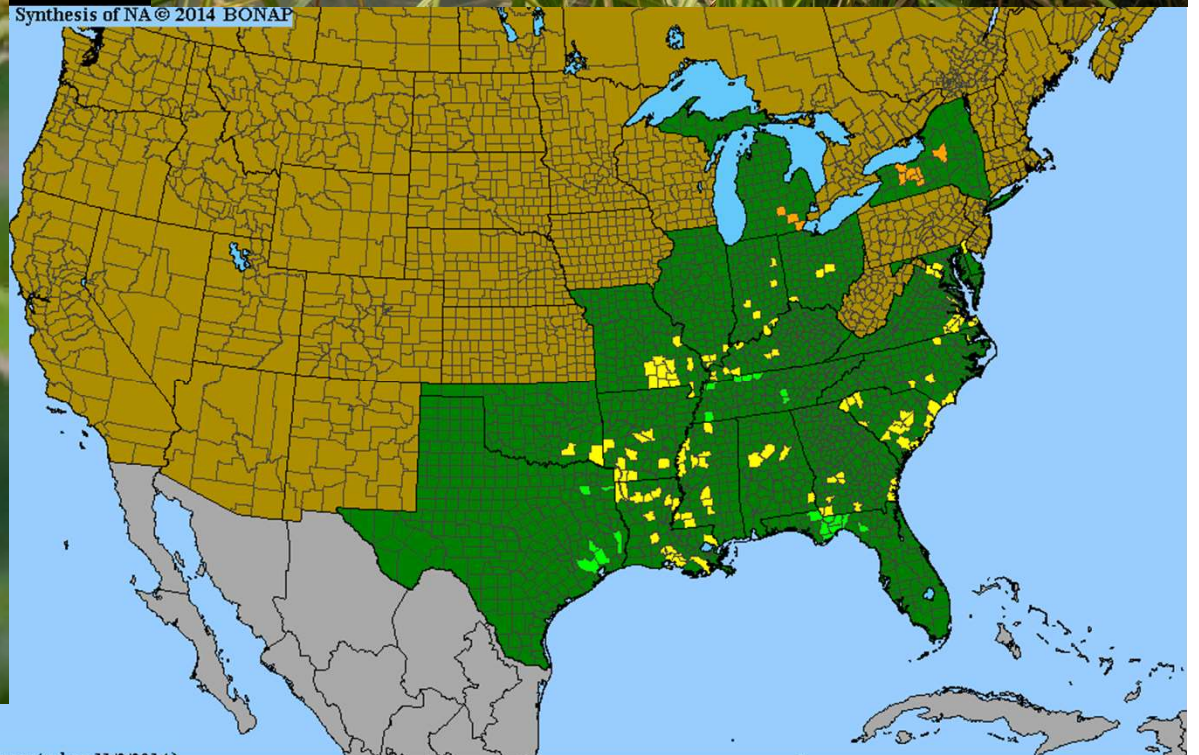


Bottlebrush Sedge (*Carex comosa*)

Habitat: sinkhole ponds



Synthesis of NA © 2014 BONAP

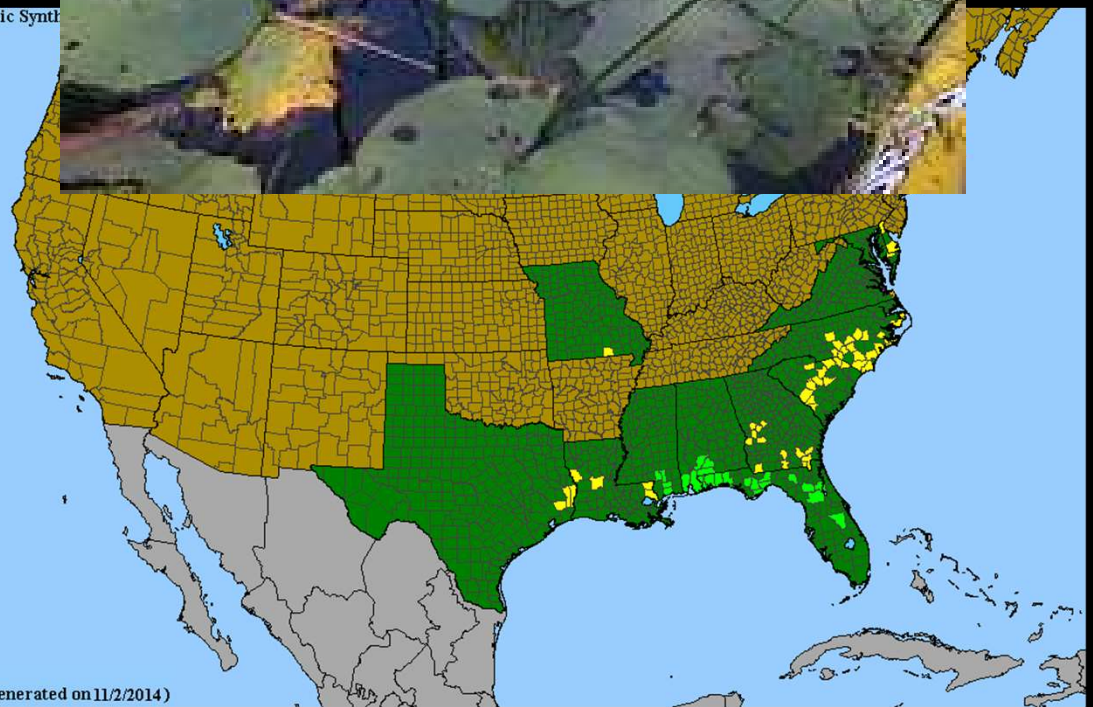


Canby's Bulrush (*Schoenoplectus etuberculatus*)

Habitat: sinkhole ponds



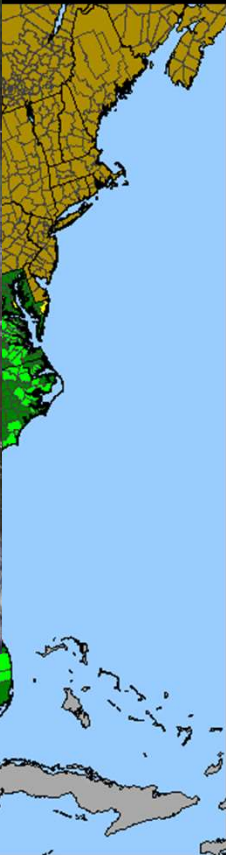
Floristic Synth



(map generated on 11/2/2014)

Southern Wild Rice (*Zizaniopsis miliacea*)

onds,

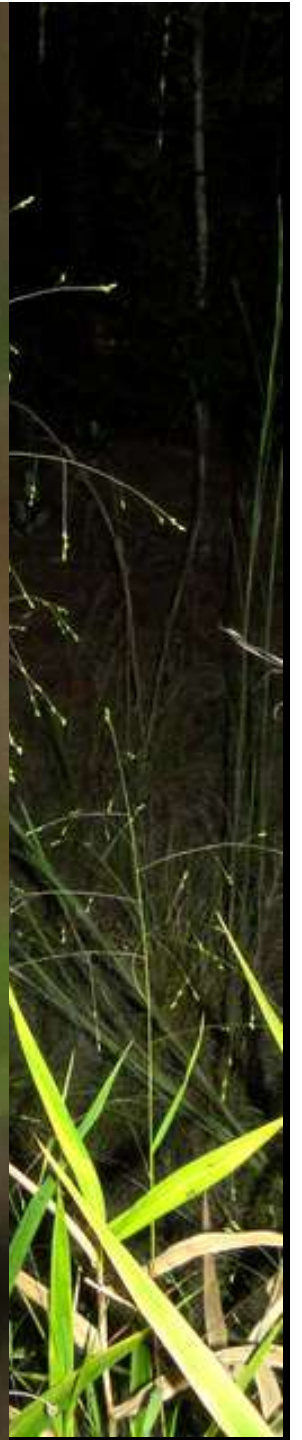
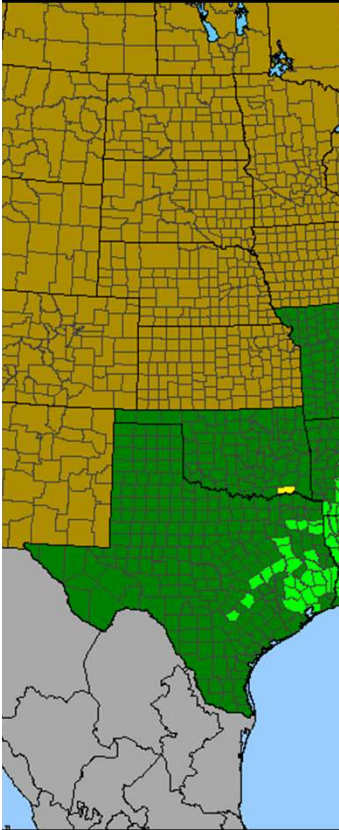


Giant cut grass
Zizaniopsis miliacea
Photo by Vic Ramey

© 2002 University of Florida

Warty Panic (*Panicum verrucosum*)

Habitat: sinkh



Corkwood (*Leitneria floridana*)

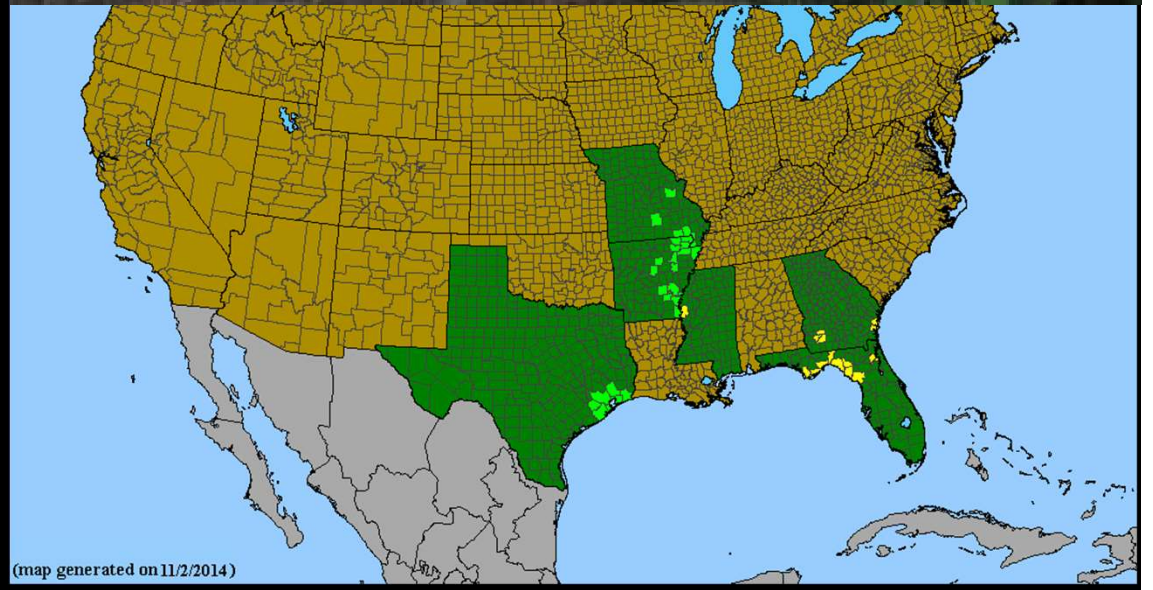
Habitat: sinkhole ponds



Alan Cressler



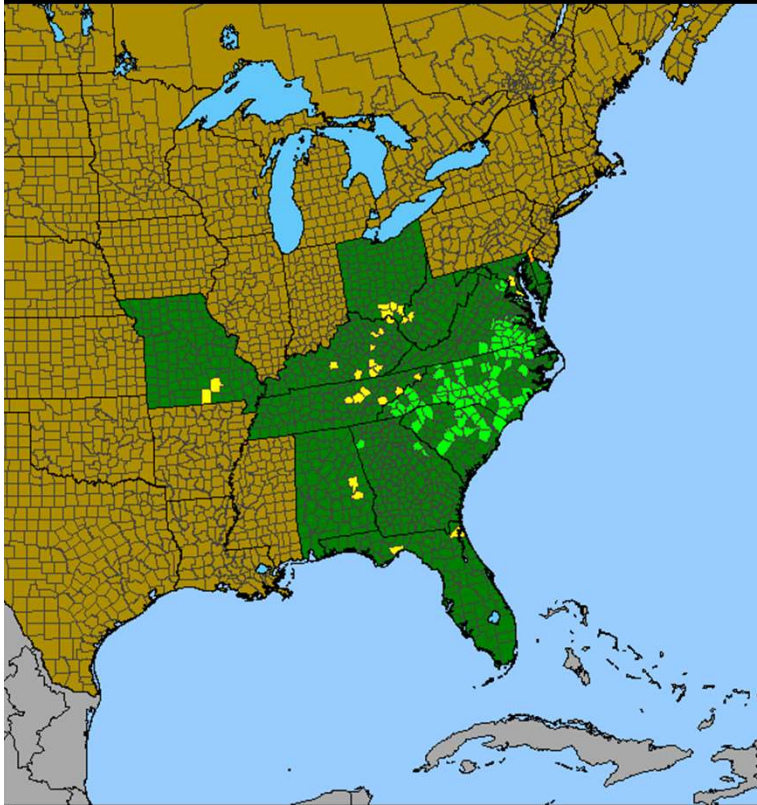
Randy Stewart



(map generated on 11/2/2014)

Short's Hedge-hyssop (*Gratiola viscidula*)

Habitat: sinkhole ponds



Kenneth Lawless



Photo by Jennifer Akin/ANHC

Tallgrass Prairie (Cherokee Prairie Natural Area, Franklin County)



Photo by Bill Holimon/ANHC

Tallgrass Prairie (Baker Prairie Natural Area, Boone County)



Photo by Bill Holimon/ANHC

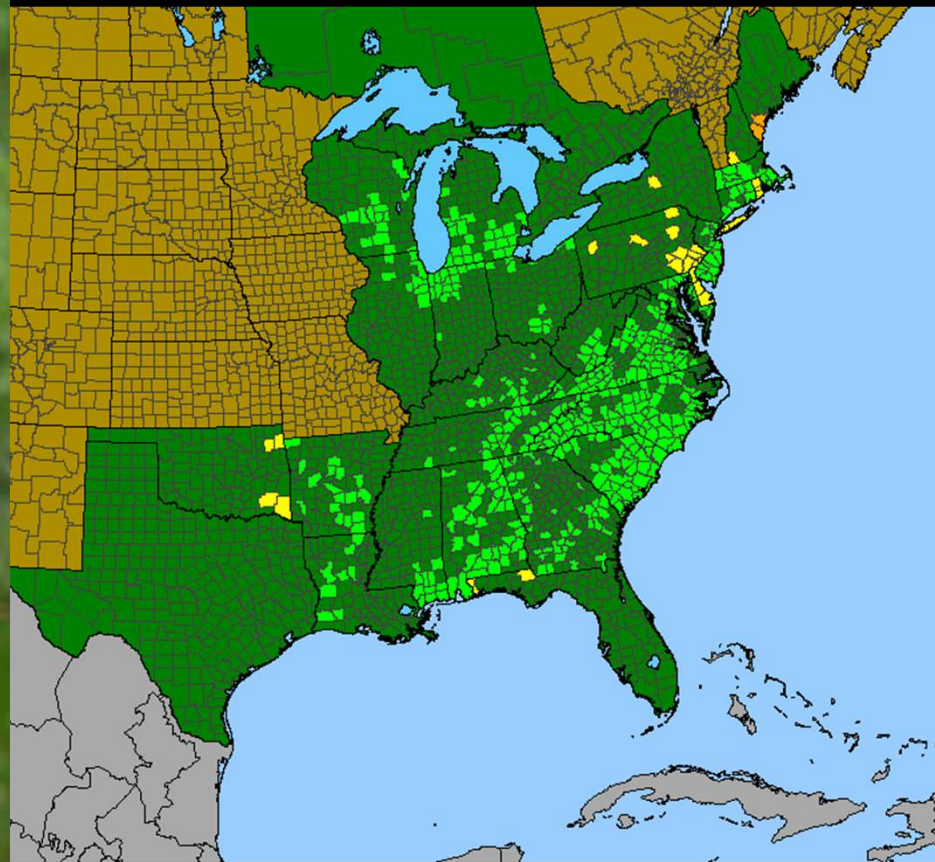
Tallgrass Prairie (Baker Prairie Natural Area, Boone County)

© 2001 Eleanor Saulys



White Colic-root (*Aletris farinosa*)

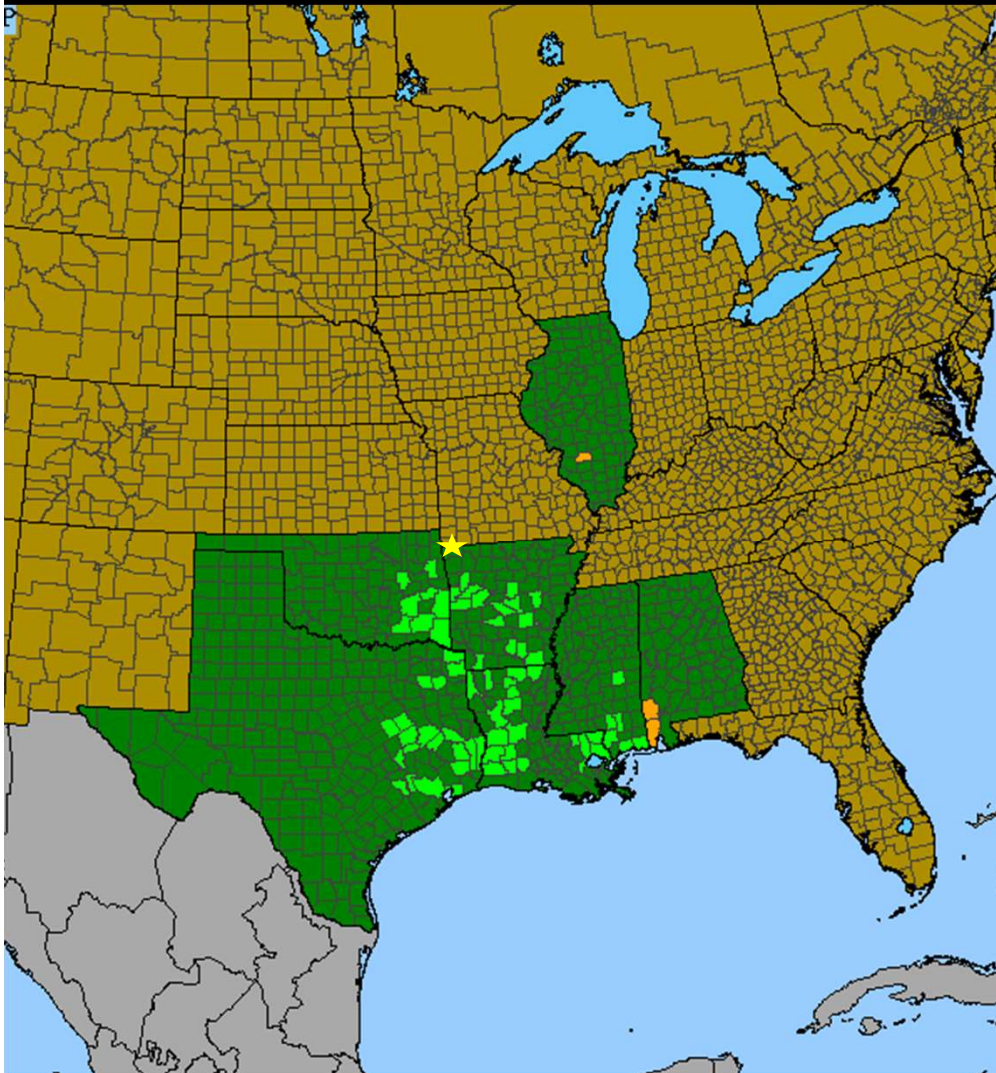
Habitat: Mesic prairies; open flatwoods





Single-stemmed Leather-root (*Orbexilum simplex*)

Habitat: flat, seasonally wet prairies







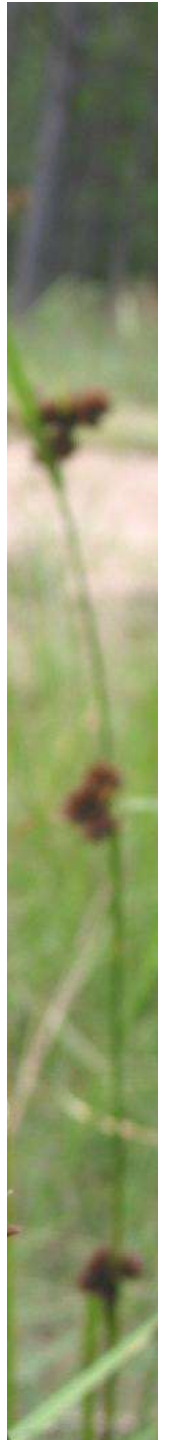
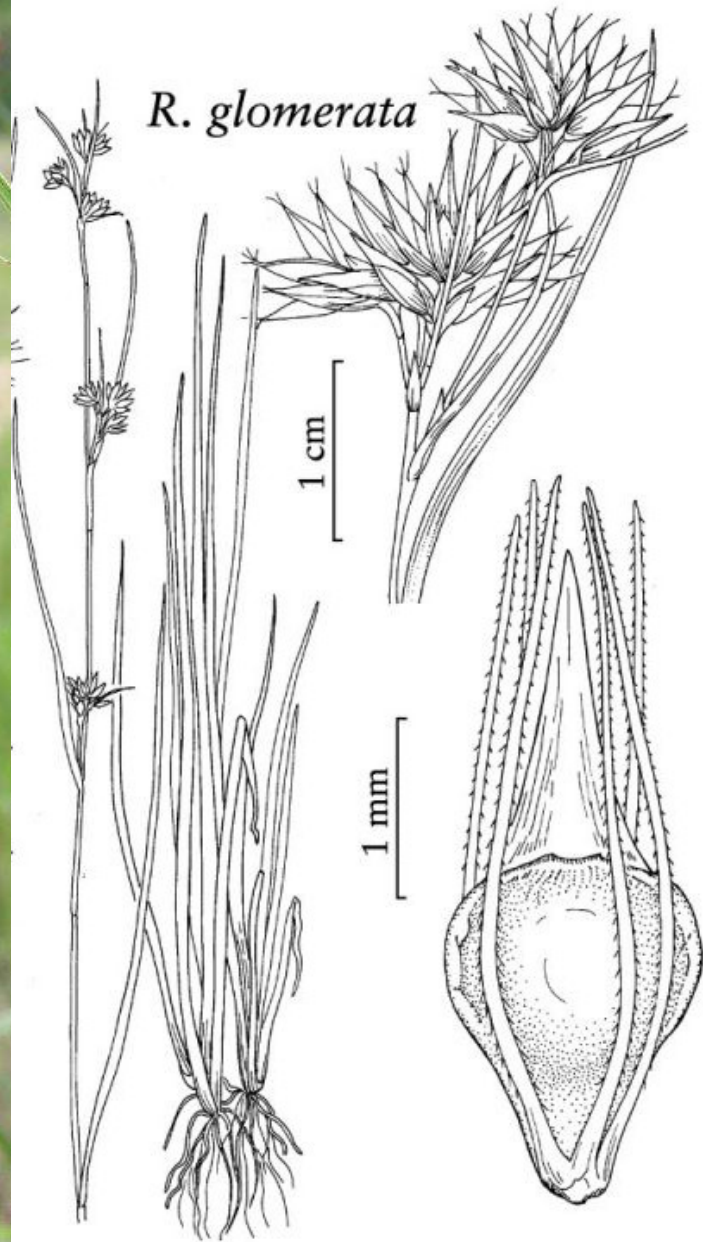
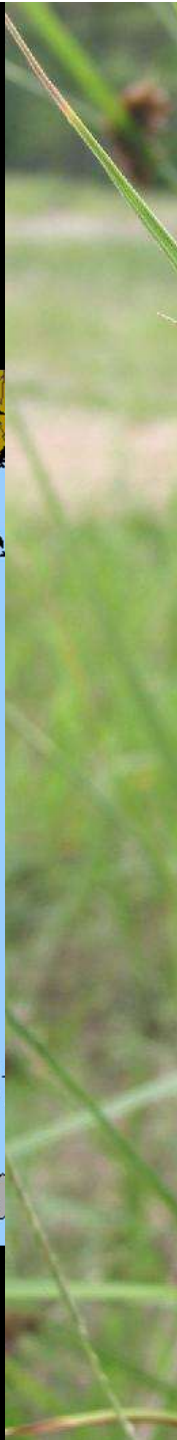
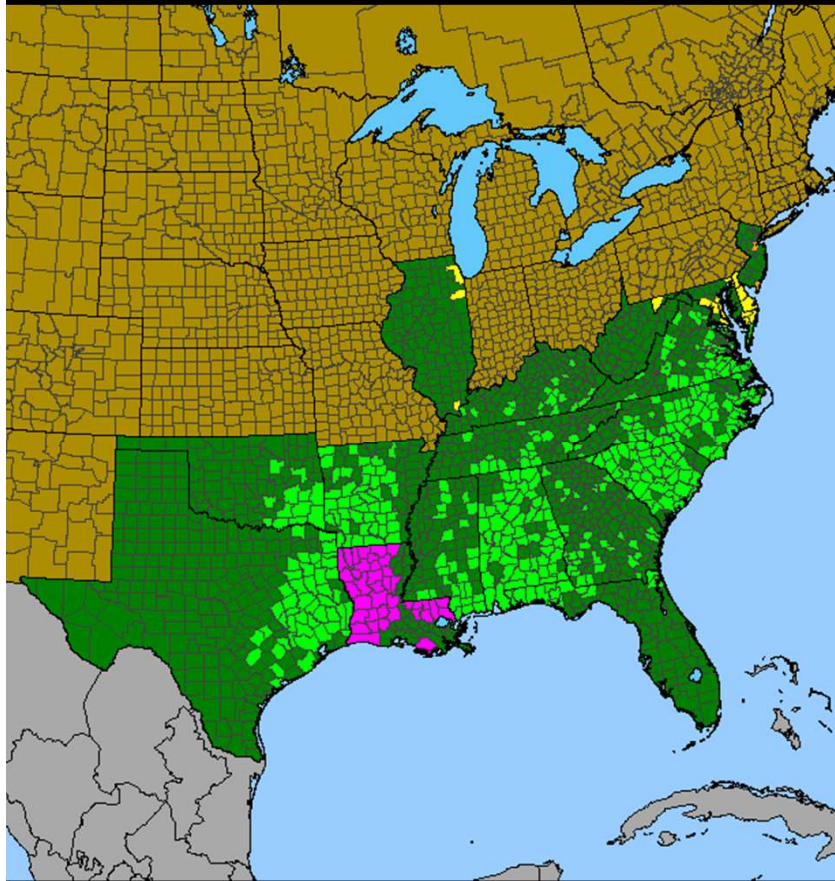






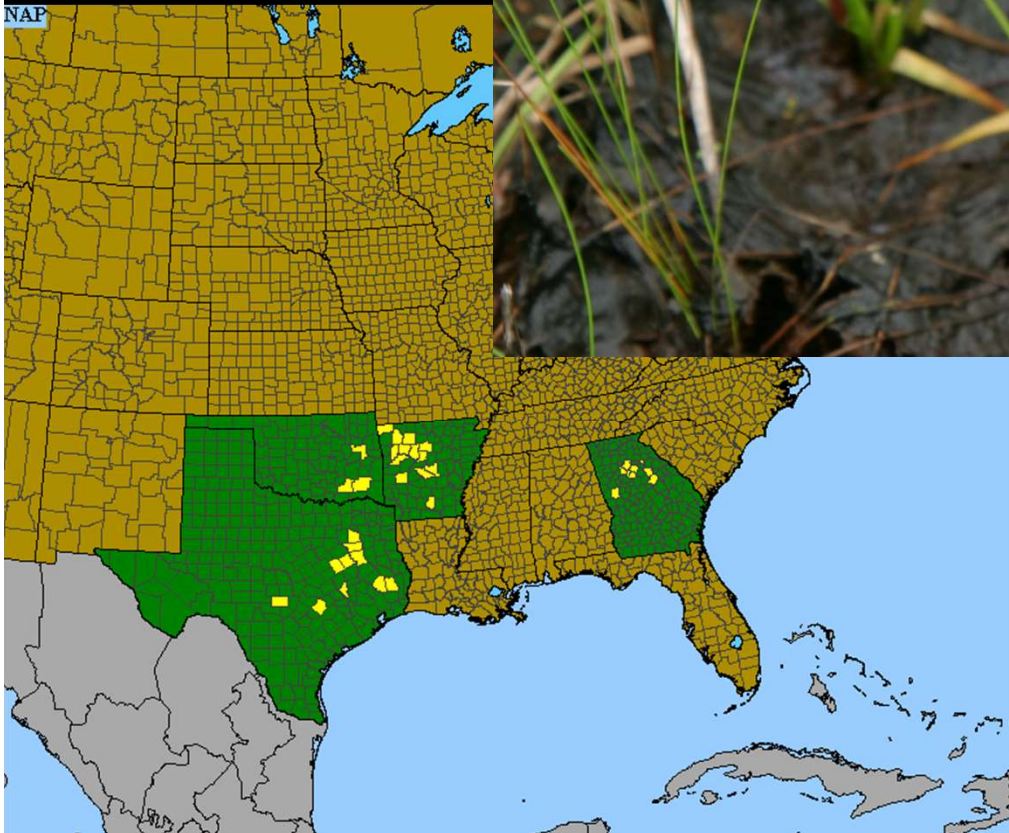
Clustered Beak-Sedge
(Rhynchospora glomeratus)

Habitat: wet prairies



**Small-headed
Pipewort
(*Eriocaulon
koernickianum*)**

**Habitat: seeps in
prairies, sandstone
glades, & igneous
glades**



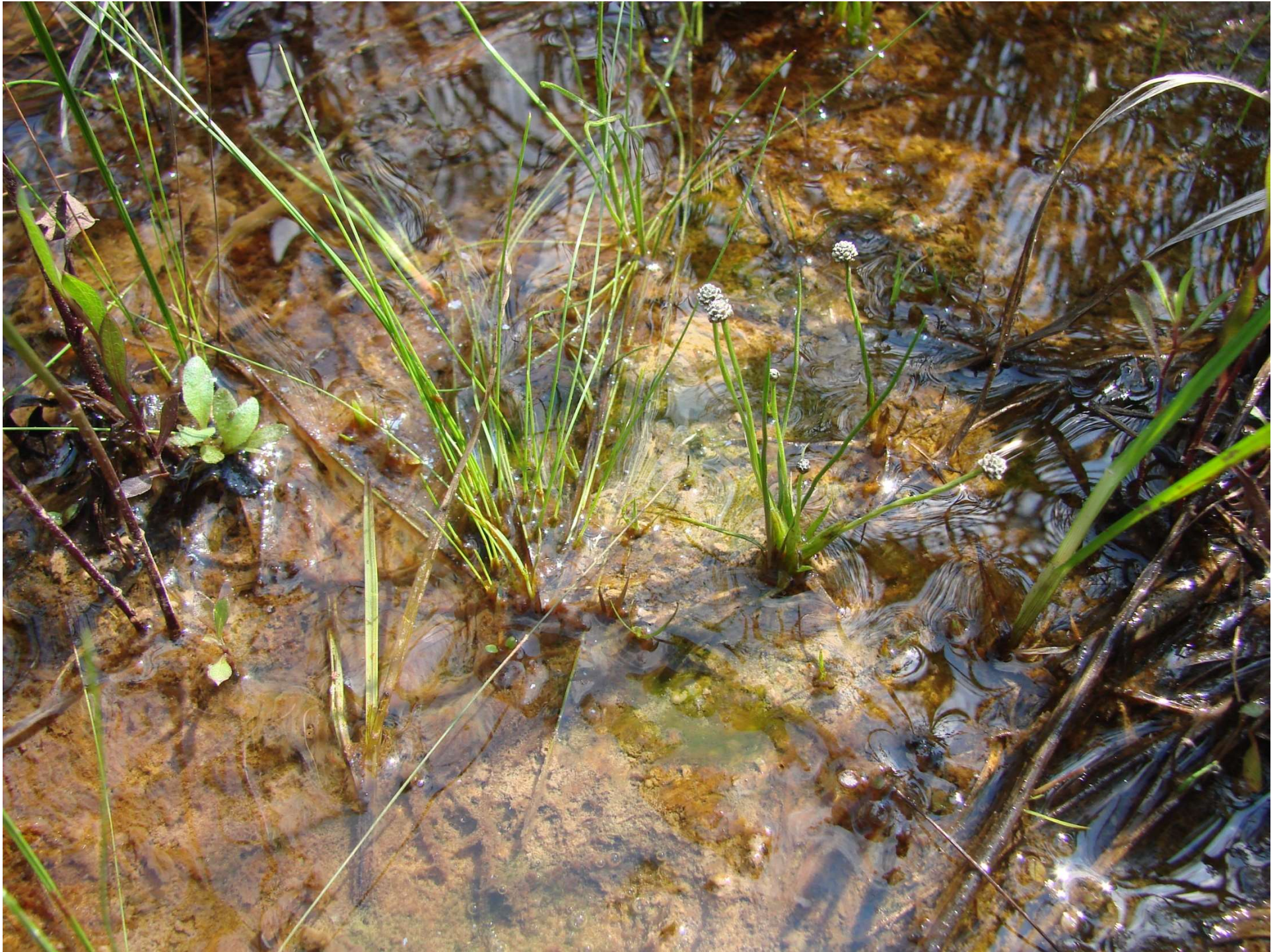




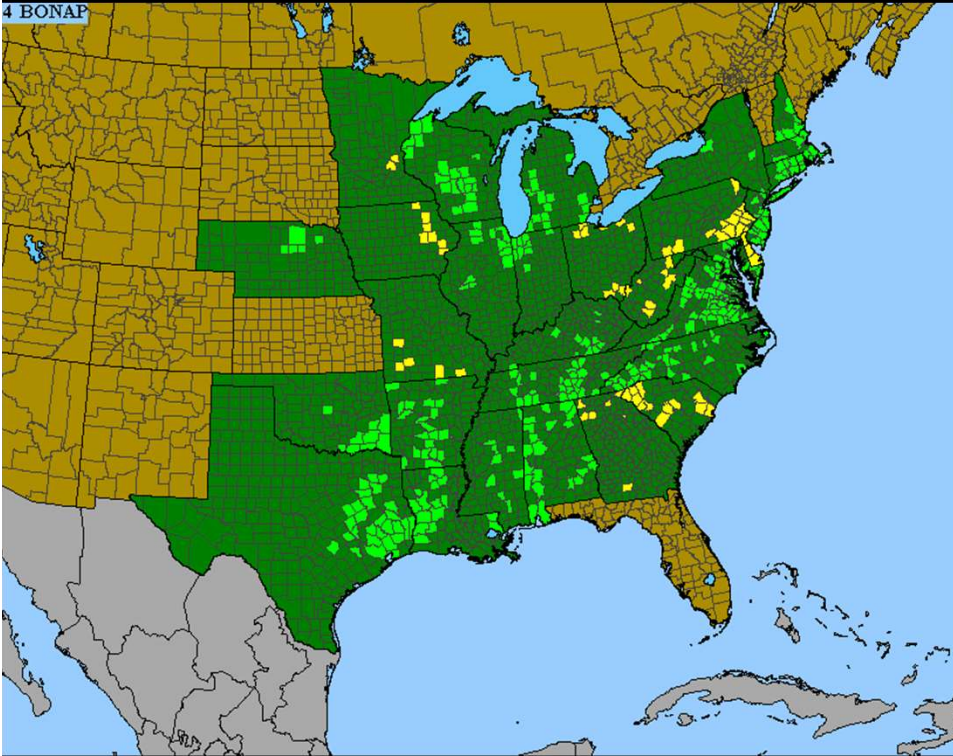
Photo courtesy of ANHC

Eriocaulon kornickianum (small-headed pipewort)

Twisted Yellow-eyed Grass (*Xyris torta*)

**Habitat: sandstone riverscour, prairies,
sandy seeps, fens**

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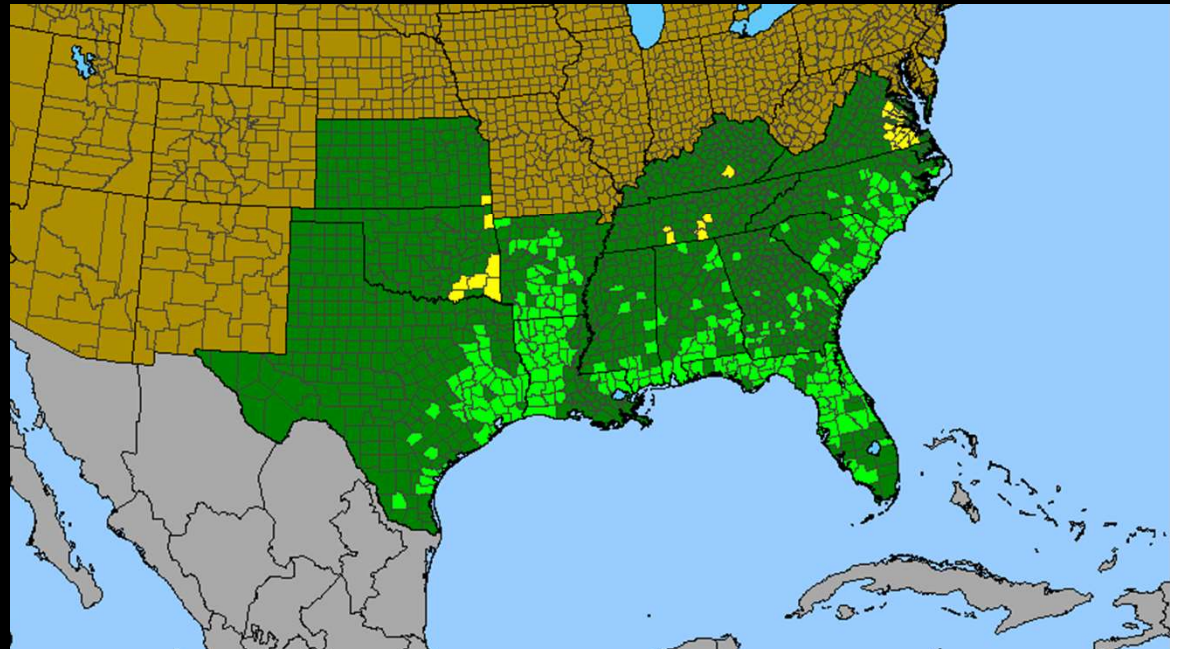


Sundew (*Drosera brevifolia*)

**Habitat: prairies, sandstone glades
seeps**

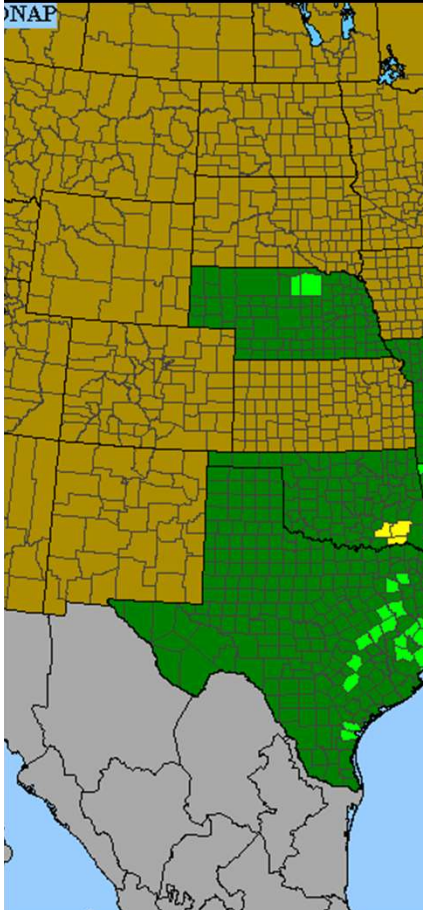


Photos by John Pelton



Zigzag Bladderwort
(*Sagittaria subulata*)

**Habitat: seeps in prairies,
glades, fens**

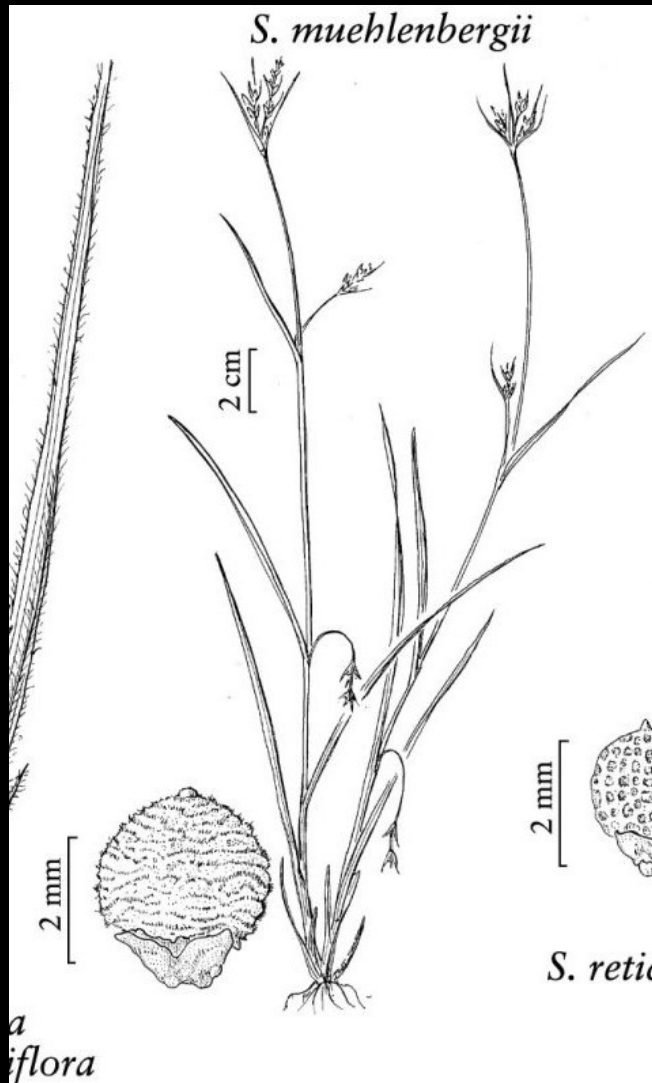


Muhlenberg's Nutsedge (*Scleria muehlenbergii*)

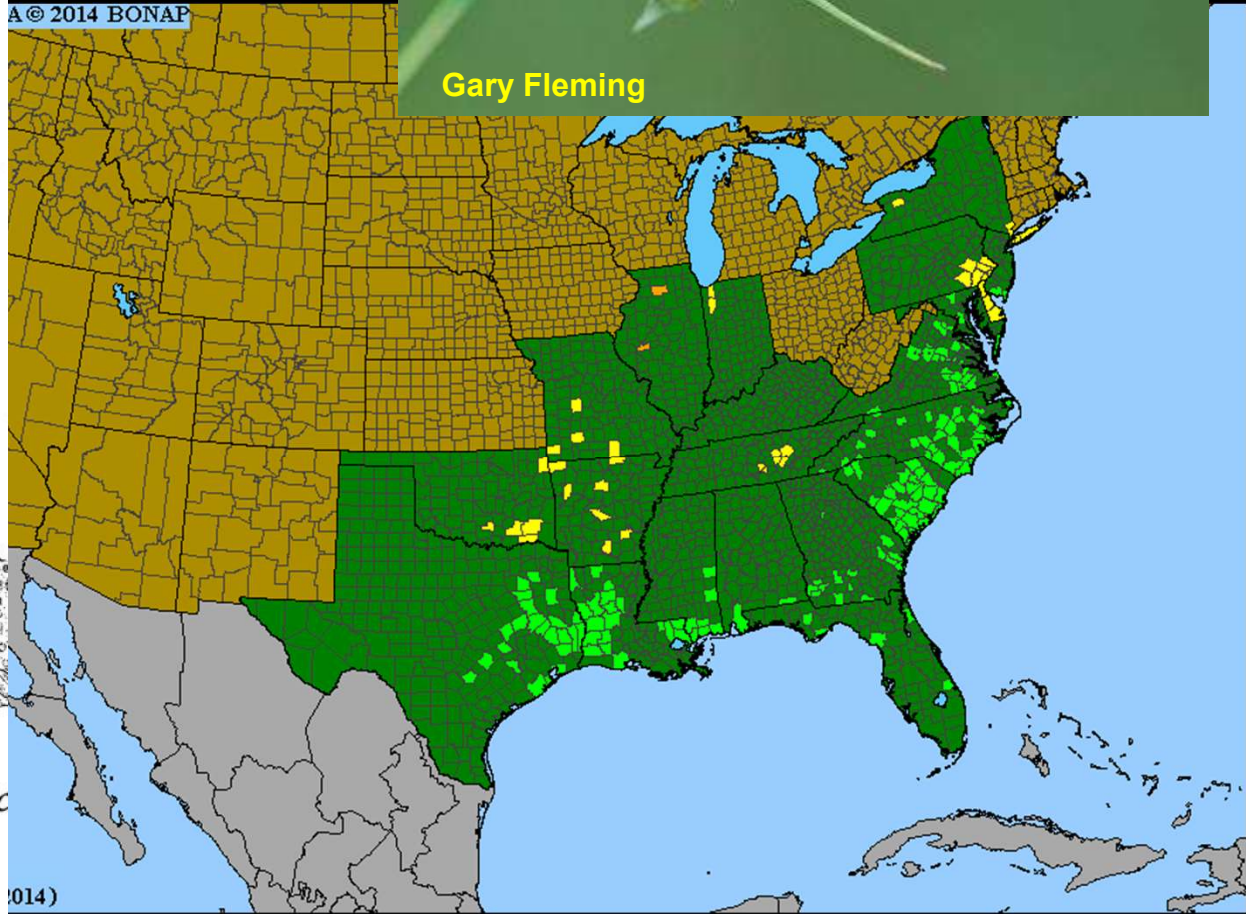
Habitat: prairie swales, open seeps, wet sandstone glades



Gary Fleming



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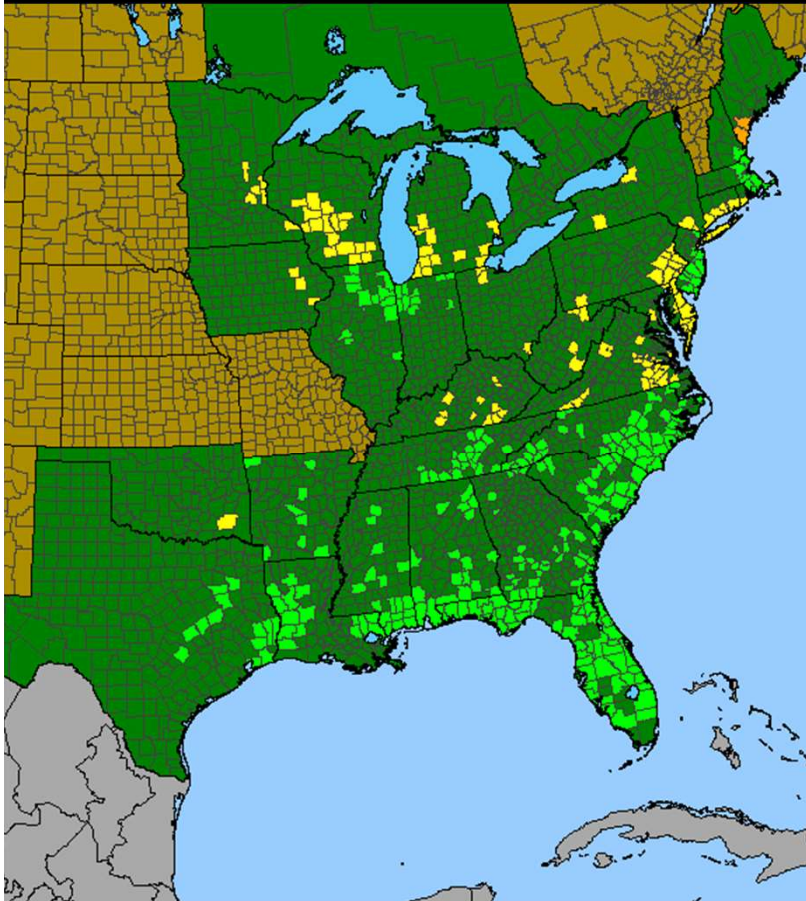


S. retic

(2014)

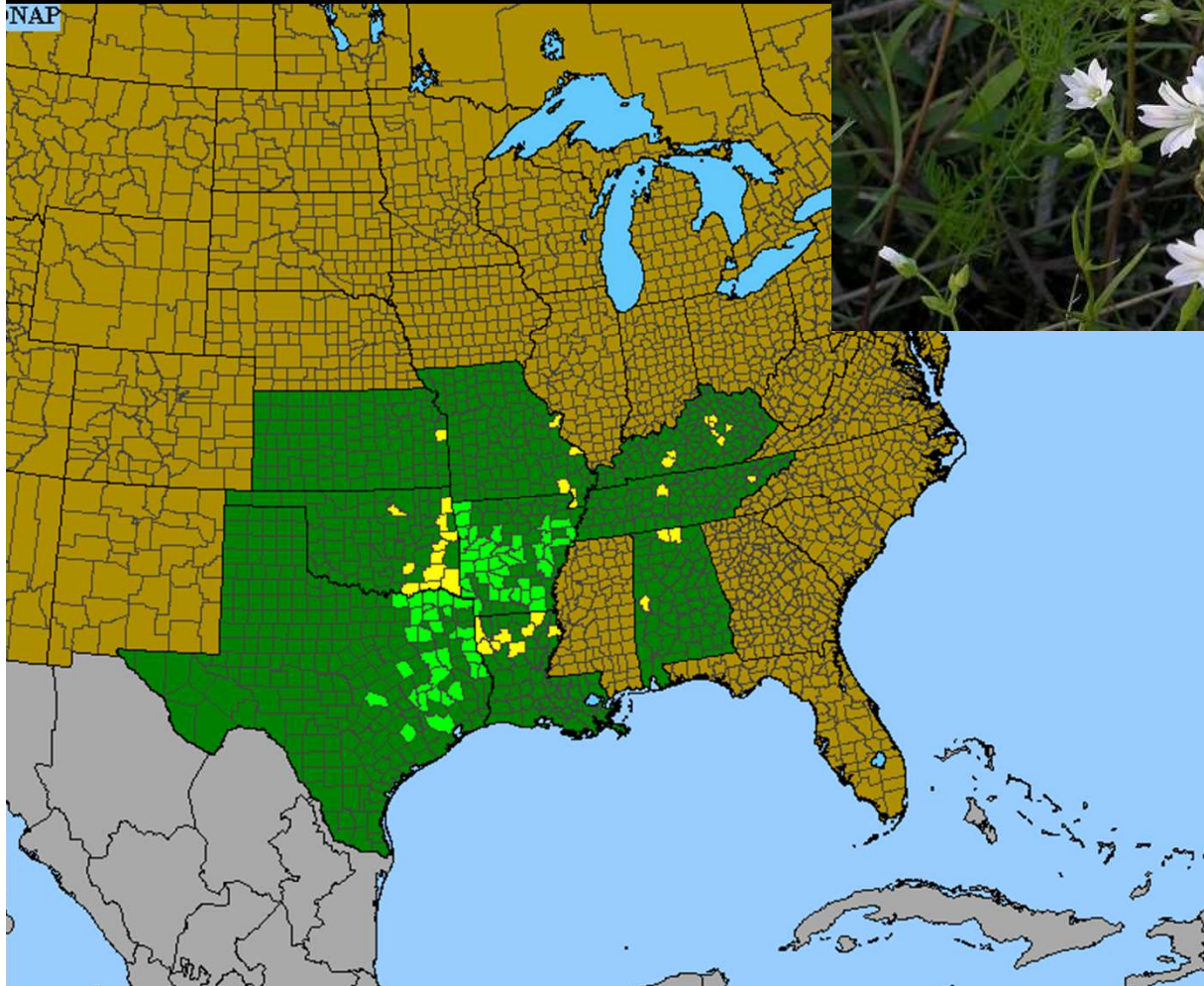
Drumheads; Cross-leaved Polygala
(Polygala cruciata)

**Habitat: prairie swales, open seeps,
pine flatwoods**



Sandwort (*Minuartia muscorum*)

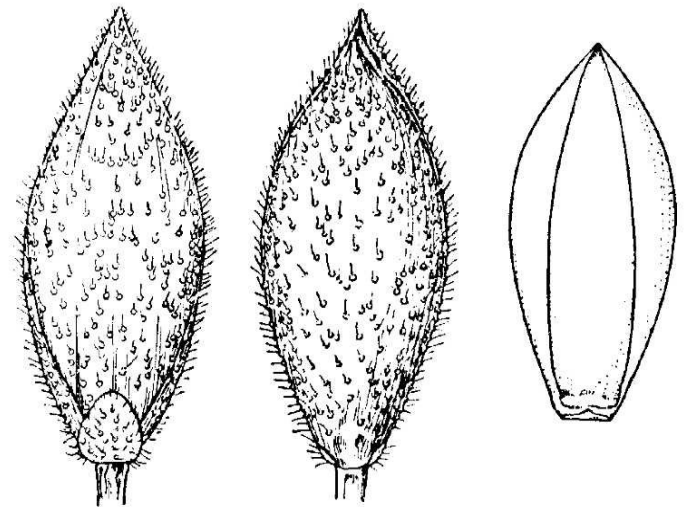
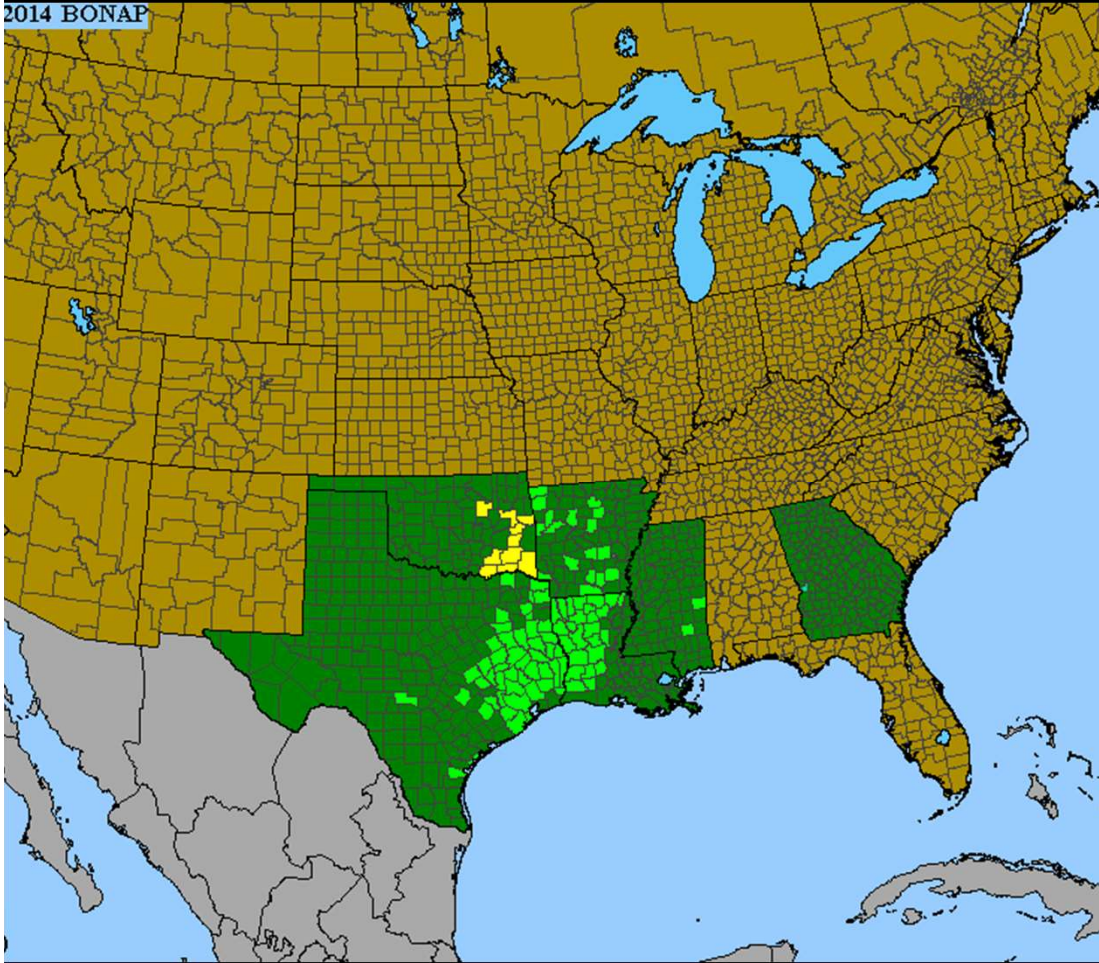
**Habitat: prairie swales, open seeps,
pine flatwoods**



**Prairie Panicgrass (*Panicum
brachyanthum*)**

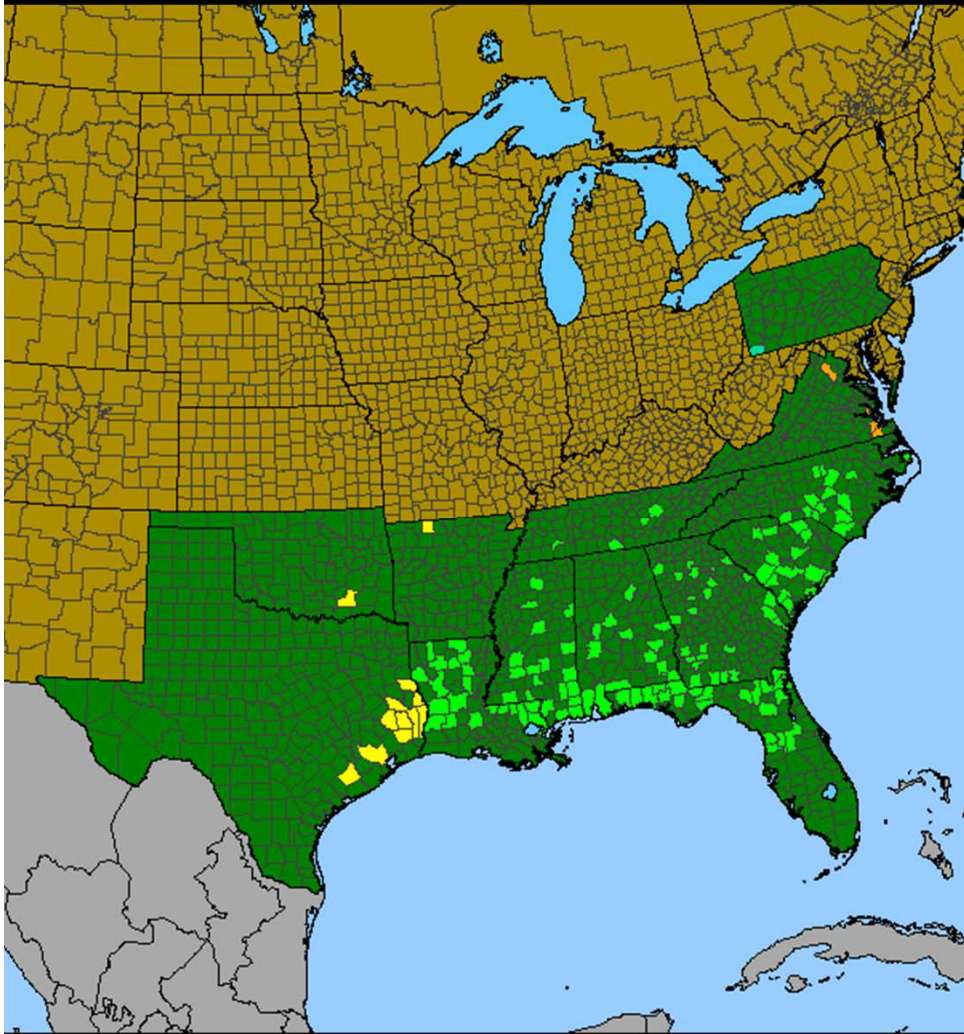
Habitat: prairies, glades, flatwoods

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Longleaf Wedgescale (*Sphenopholis filiformis*)

Habitat: prairie

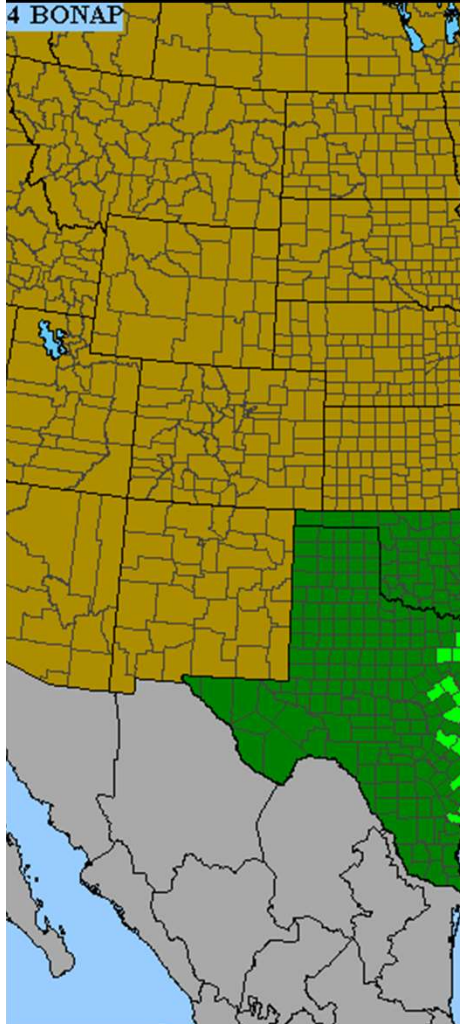


**Rosemary Rock-rose (*Crocanthemum
rosmarinifolium* = *Helianthemum
rosmarinifolium*)**

**Habitat: prairies, sandy
dry sandstone ledge**



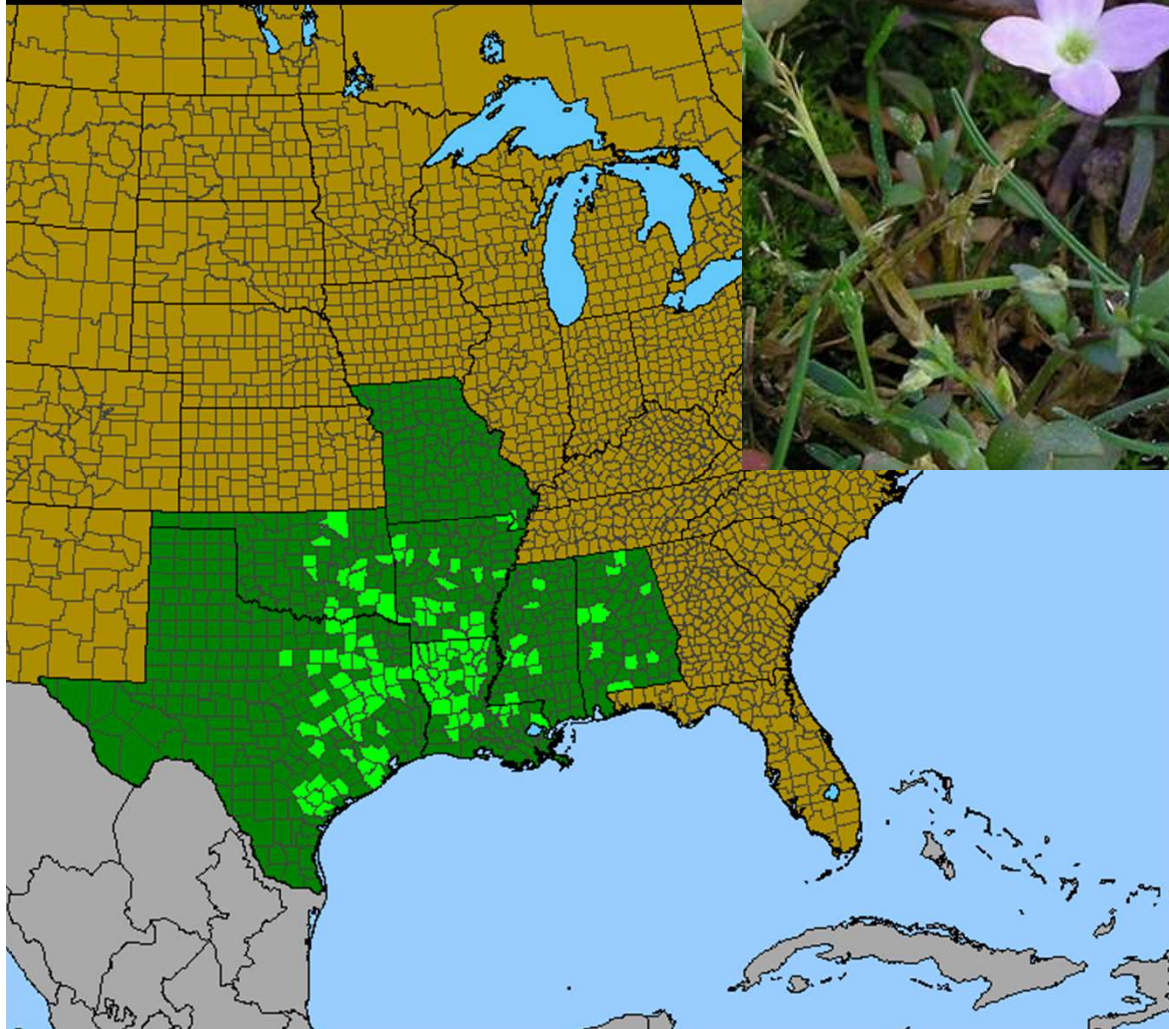
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Bobby Hattaway

Rose Bluets (*Houstonia rosea*)

**Habitat: prairies, saline barrens,
disturbed open areas**





Streamside Fen



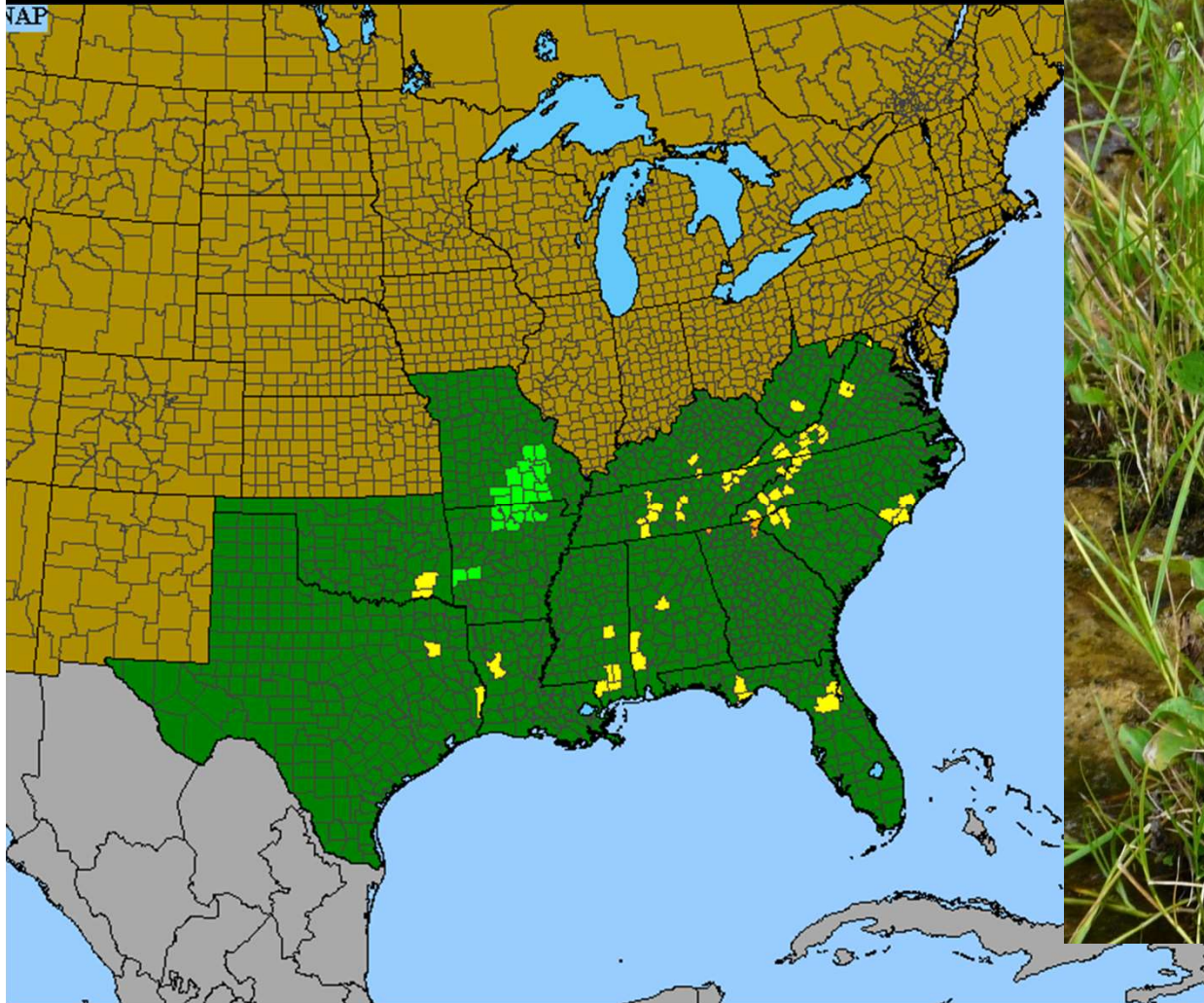
Fen



Fen

Large-leaved Grass-of-Parnassus
(Parnassia grandifolia)

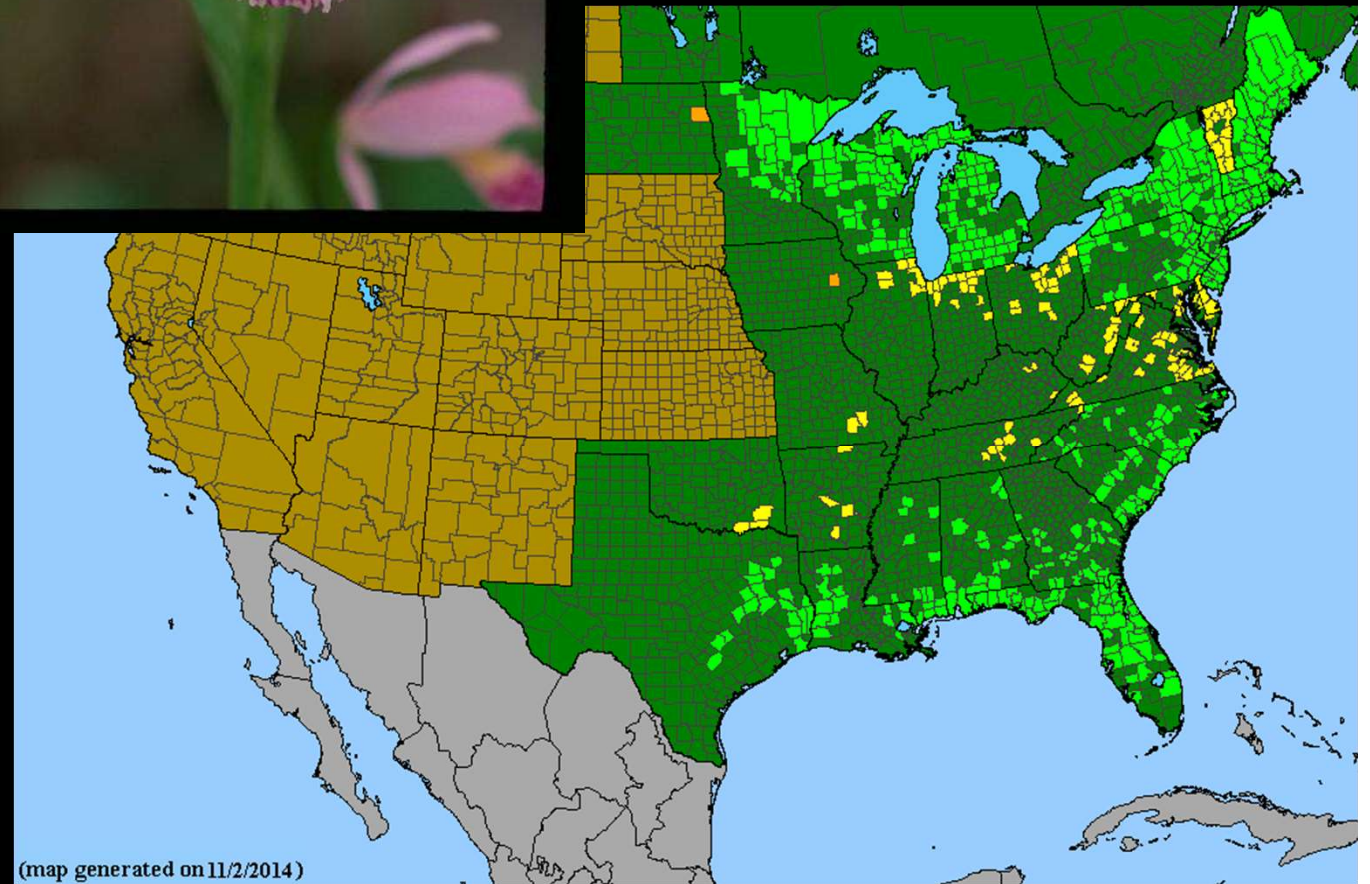
Habitat: fens





**Snake-mouth; Rose Pogonia
Orchid (*Pogonia ophioglossoides*)**

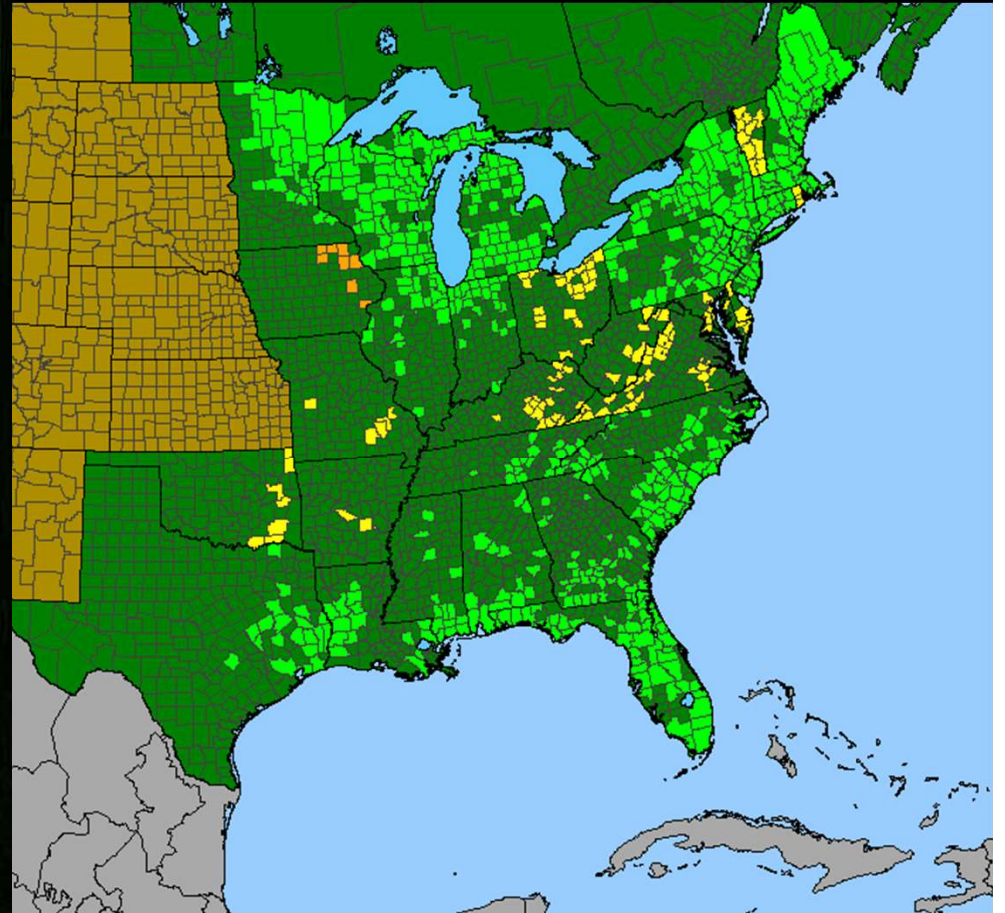
Habitat: fens



(map generated on 11/2/2014)

Tuberous Grass-pink Orchid
(Calopogon tuberosus)

Habitat: fens

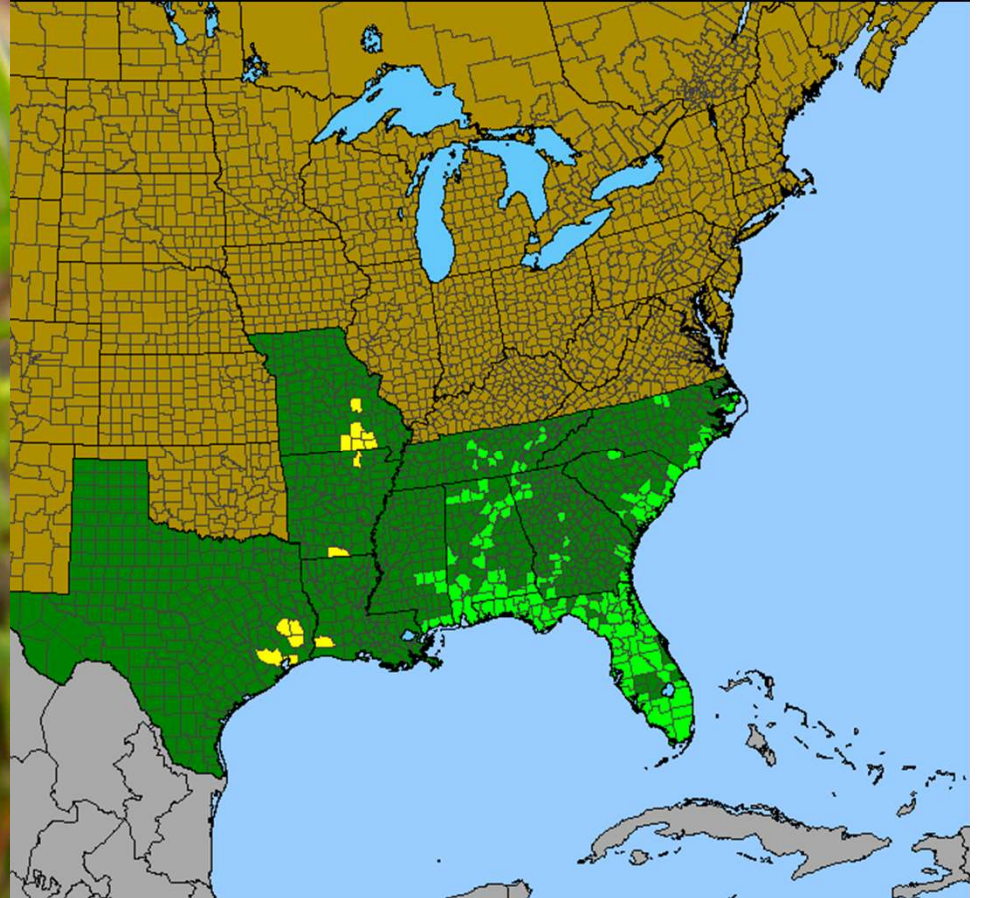


SMALLFRUIT
PRIMROSEWILLOW
Ludwigia microcarpa



Creeping Seedbox (*Ludwigia
microcarpa*)

Habitat: fens



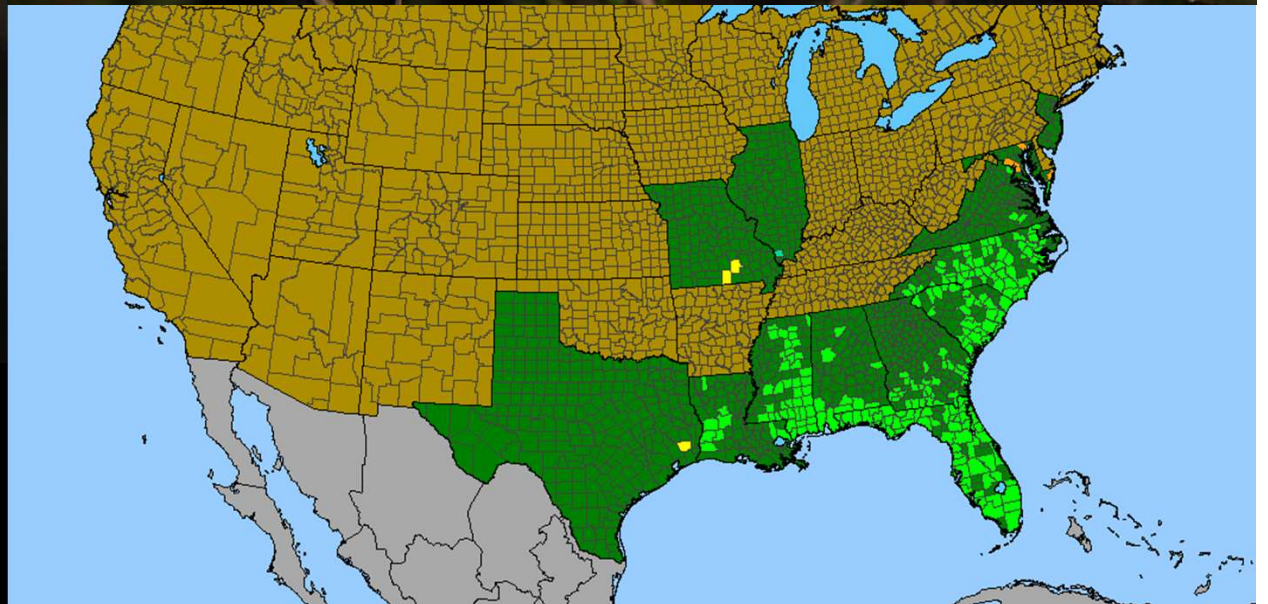
© 2014 Lorel

Florida Yellow Flax (*Linum floridanum*)

Habitat: fens

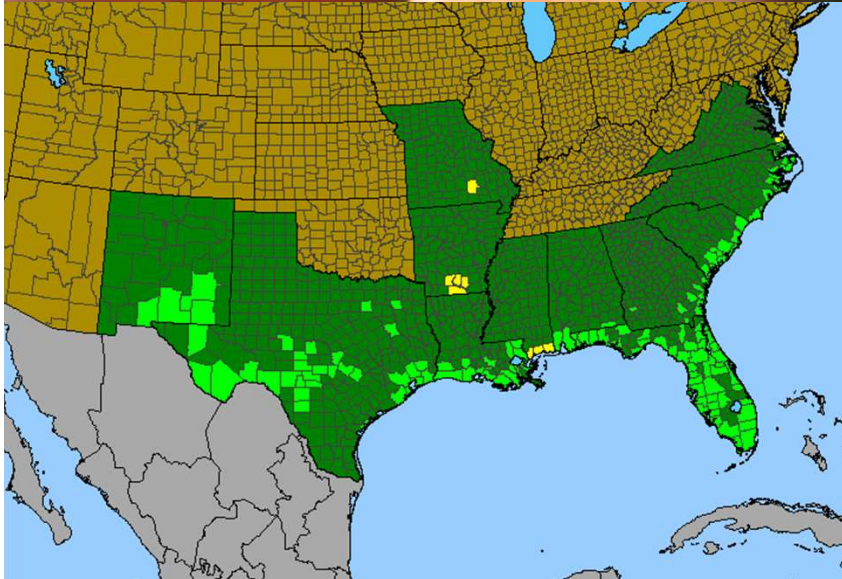


Wayne Matchett



Saw-grass (*Cladium jamaicense*)

Habitat: fens



Justin Thomas



Photo by Craig Frasier

Spring



Photo by Theo Witsell

Wooded Seep

*Platanthera
ciliaris*



*Platanthera
cristata*



*Cypripedium
kentuckiense*





Photo: Brent Baker/ANHC

Rimrock Sandstone Glades on the White River

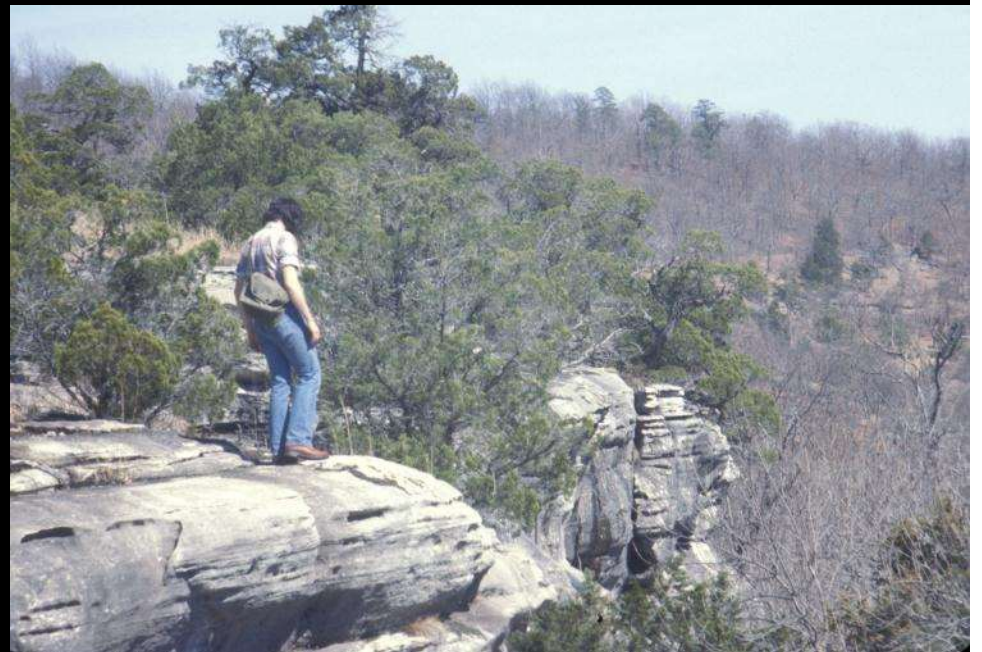








Photo: Theo Witsell

Limestone Glade and Woodland (Devil's Eyebrow Natural Area, Benton County)



“Bald Knob” Dolomite Glade, White River Hills (Taney County, Missouri)

“We stood a moment to contemplate the sublime and beautiful scene before us, which was such an assembly of rocks and water—of hill and valley—of verdant woods and naked peaks—of native fertility and barren magnificence...” – Henry Rowe Schoolcraft, 1818-1819

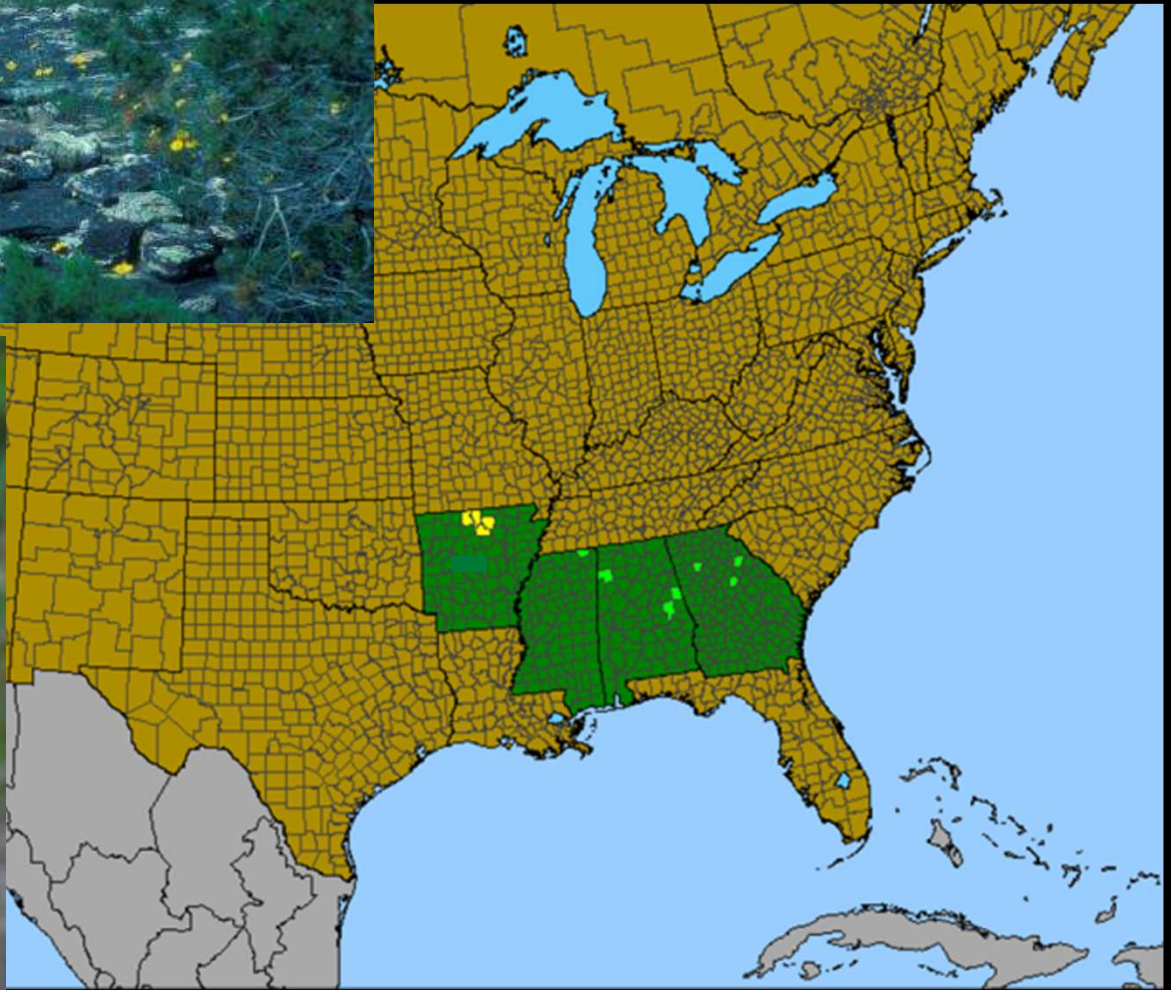


Photo: Paul Nelson

Dolomite Glade and Woodland, Mark Twain National Forest (near Ava, Missouri)

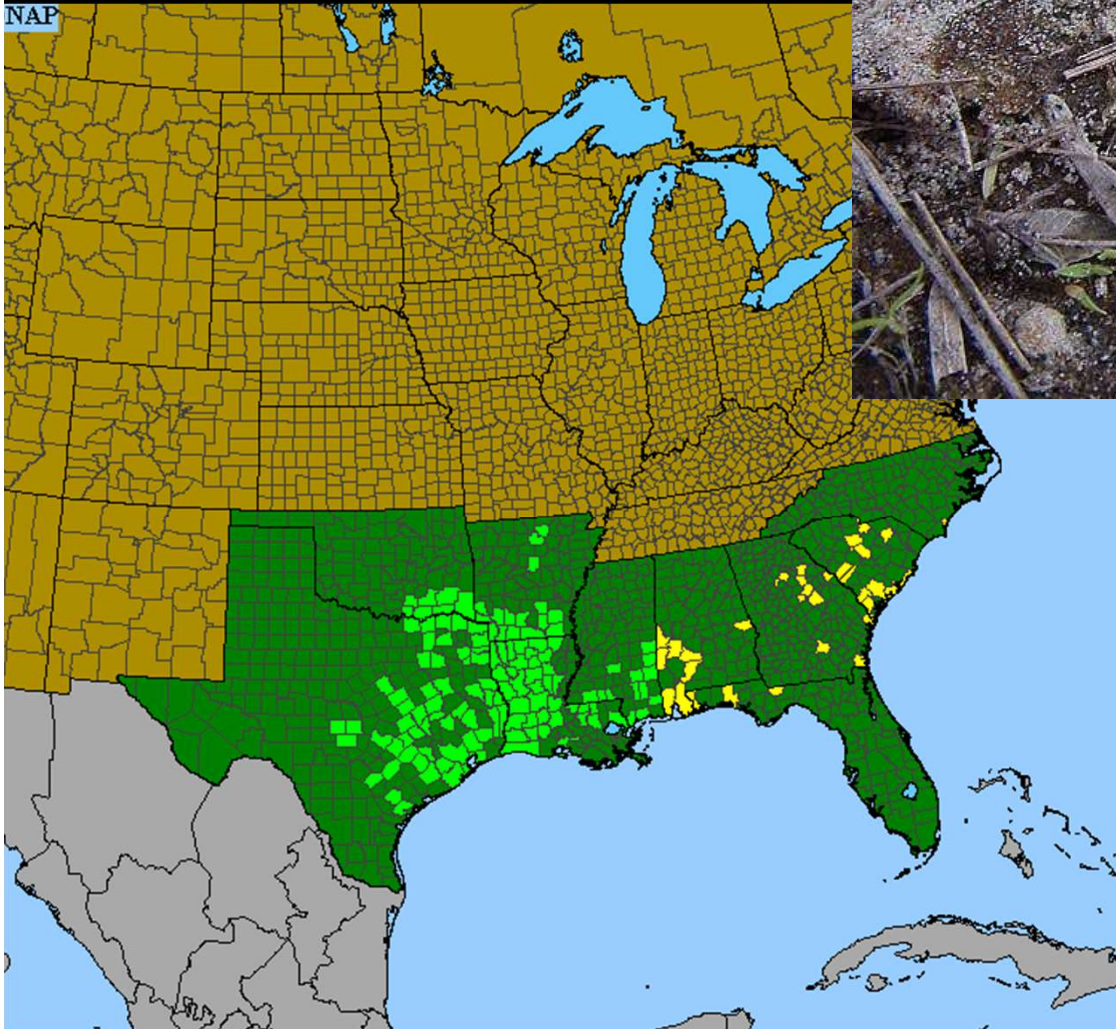
Flatrock Tickseed (*Coreopsis grandiflora* var. *saxicola*)

Habitat: sandstone glades



**Little People (*Lepuropetalon
spathulatum*)**

**Habitat: prairies, glades, and
saline barrens**



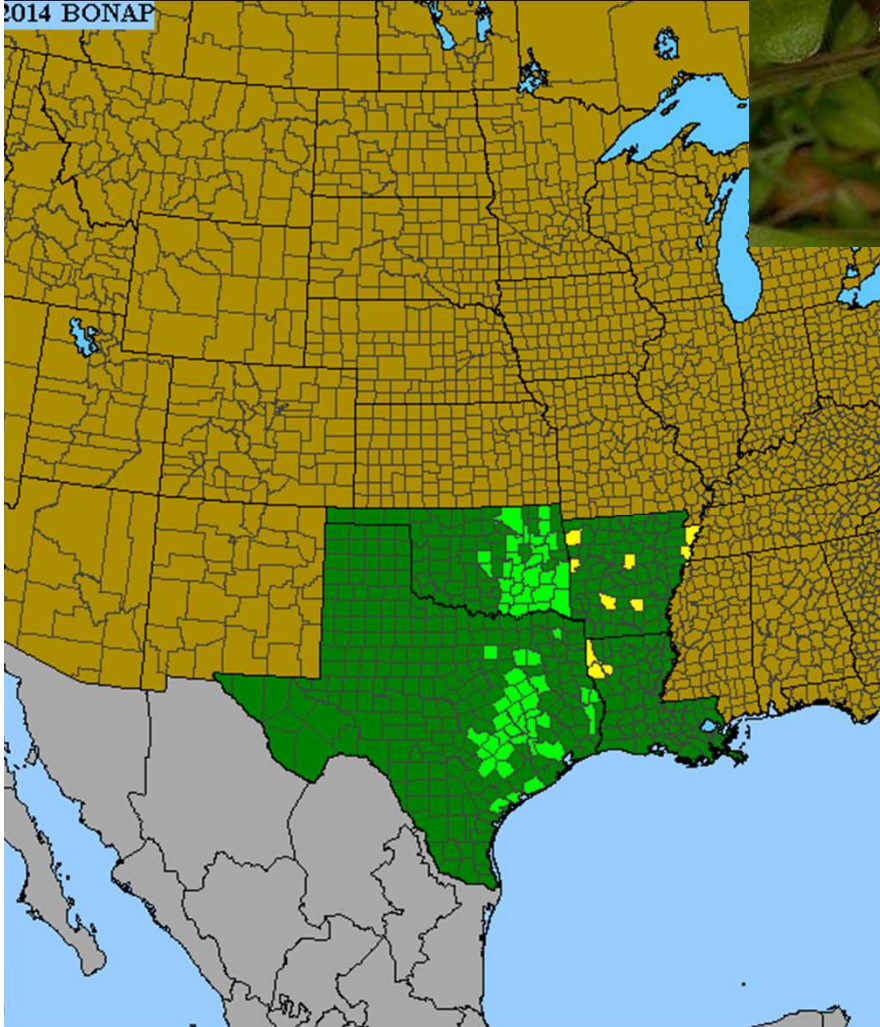
Drummond's Sandwort
(Minuartia drummondii)

Habitat: prairies, glades, and saline barrens

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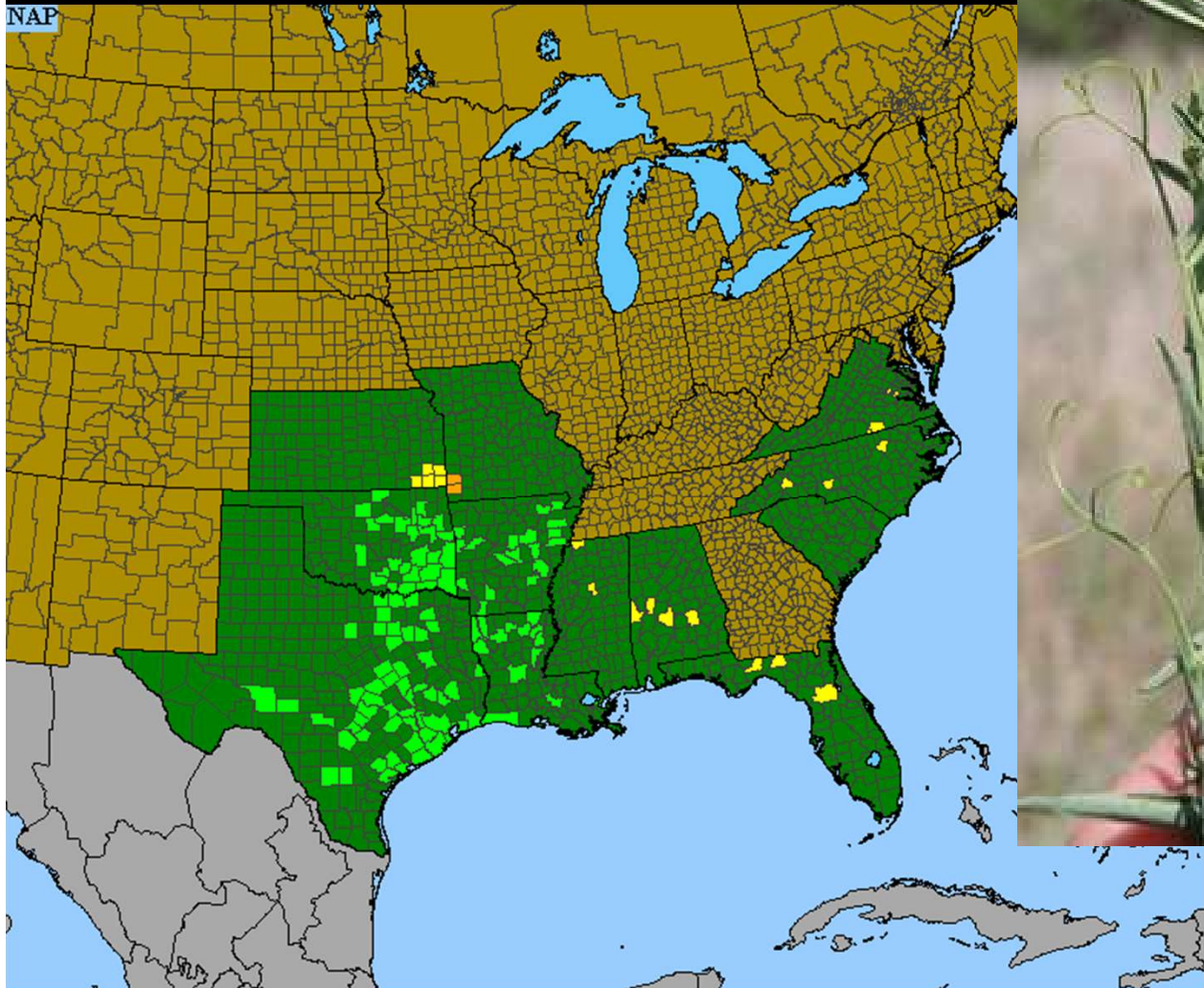


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Low Vetchling (*Lathyrus pusillus*)

Habitat: prairies, glades, and open woodlands



Tiana Rehman

Gulf Coast bulrush (*Isolepis pseudosetacea* = *Scirpus molestus*)

Habitat: glades, prairies, saline barrens

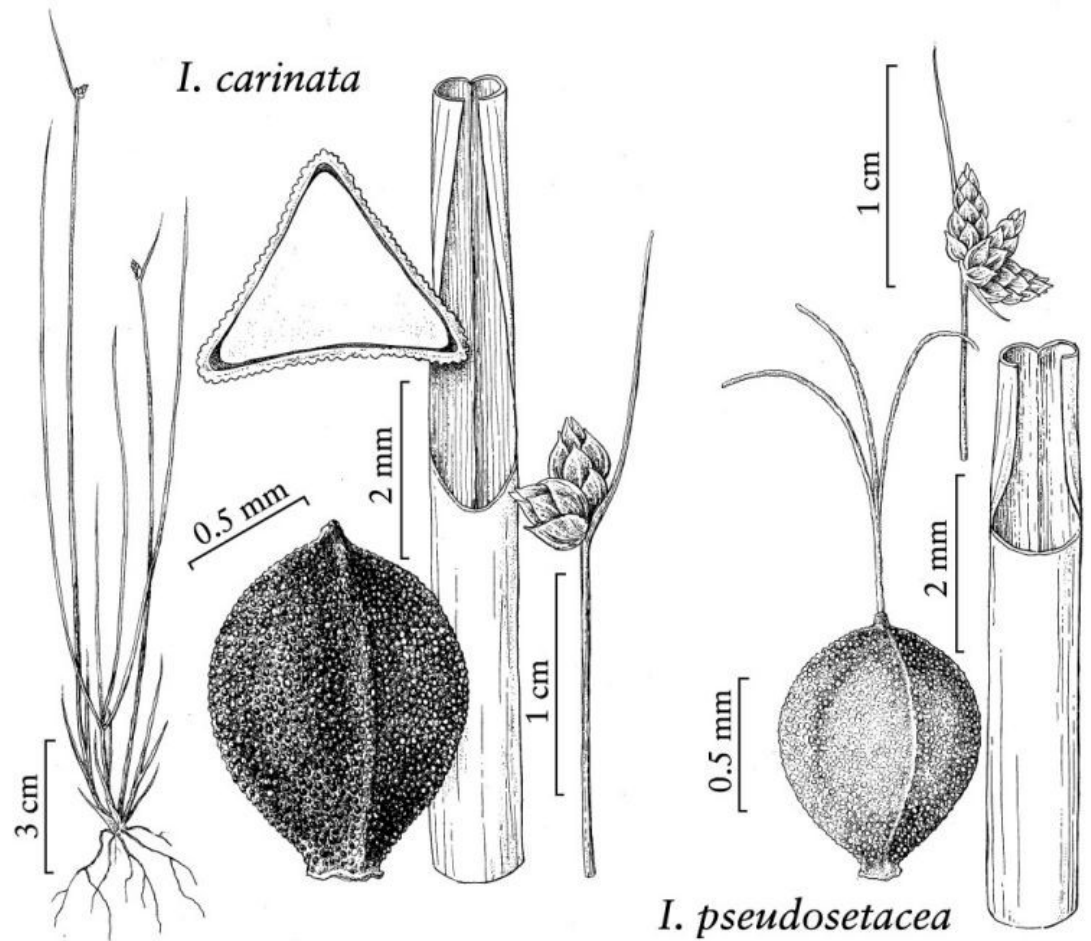
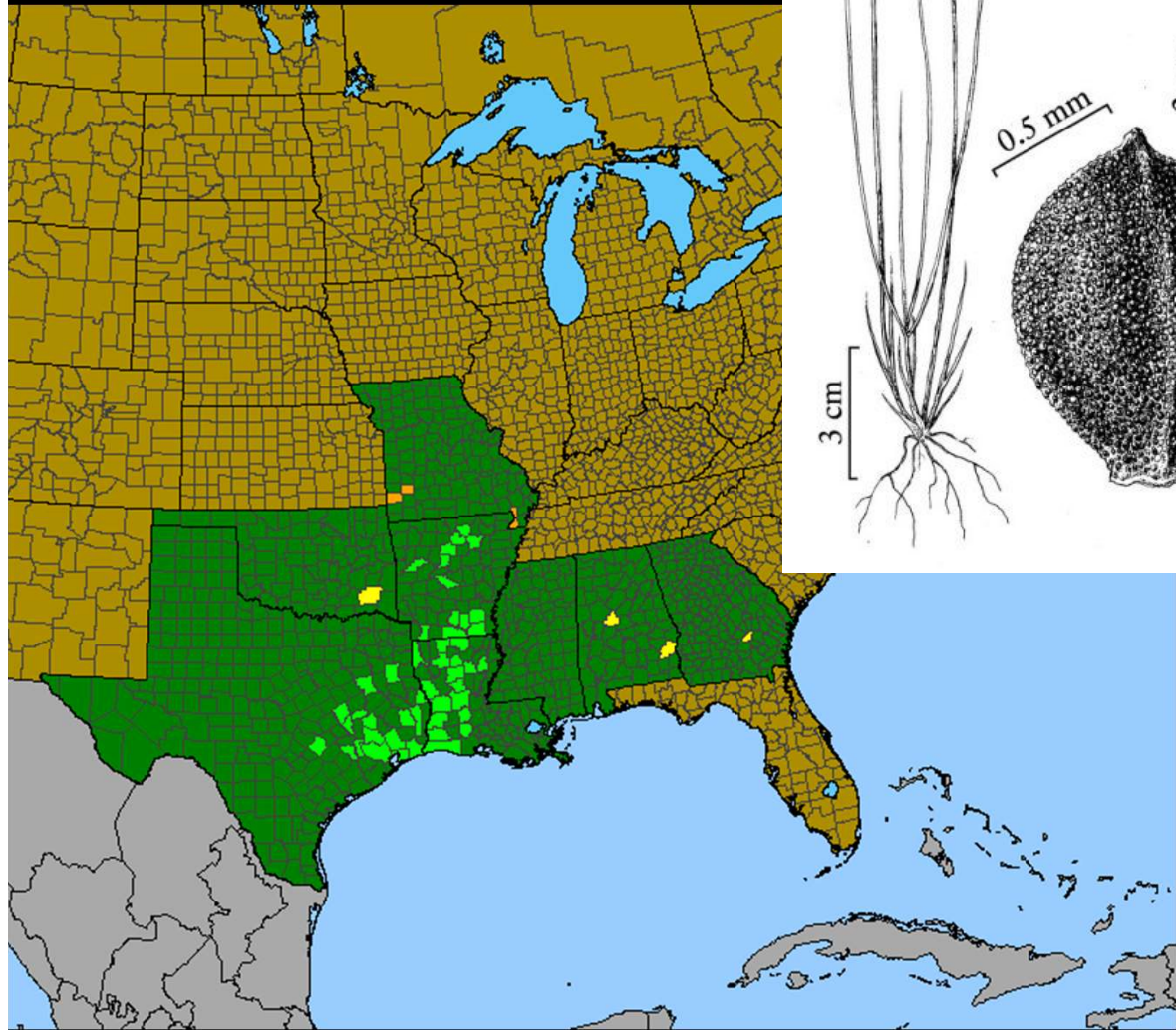


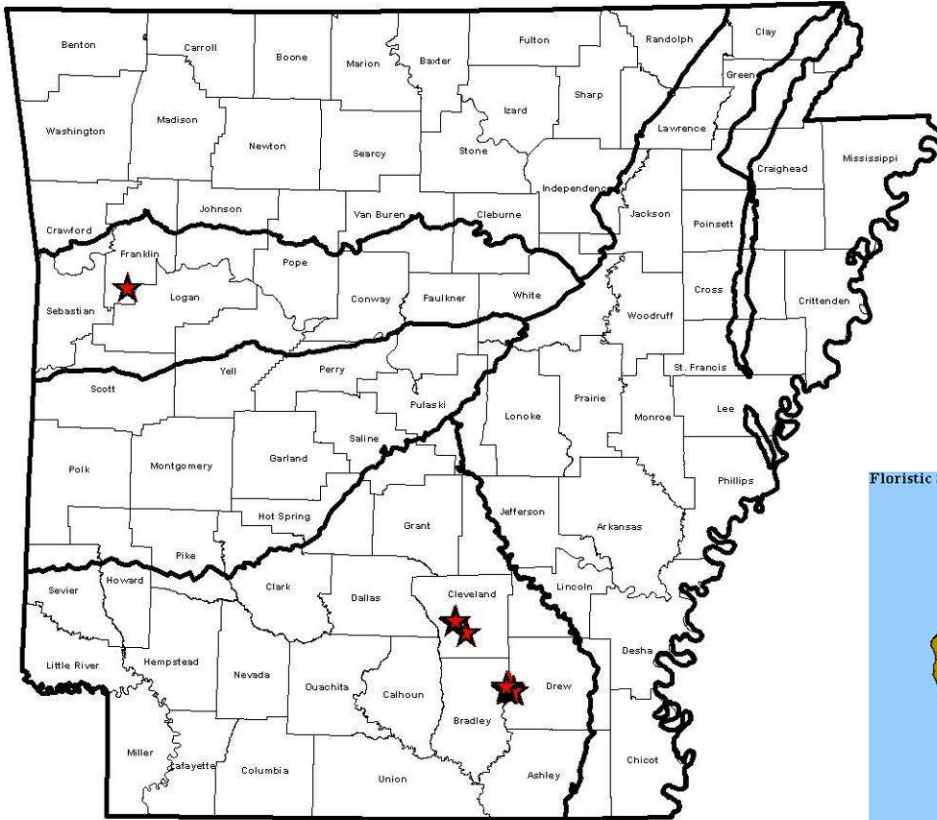


Photo: Theo Witsell/ANHC

Oak Savanna, Tallgrass Prairie, and Saline Barrens (Fort Chaffee, Franklin County)

geocarpon

(*Geocarpon minimum*)



G2S2

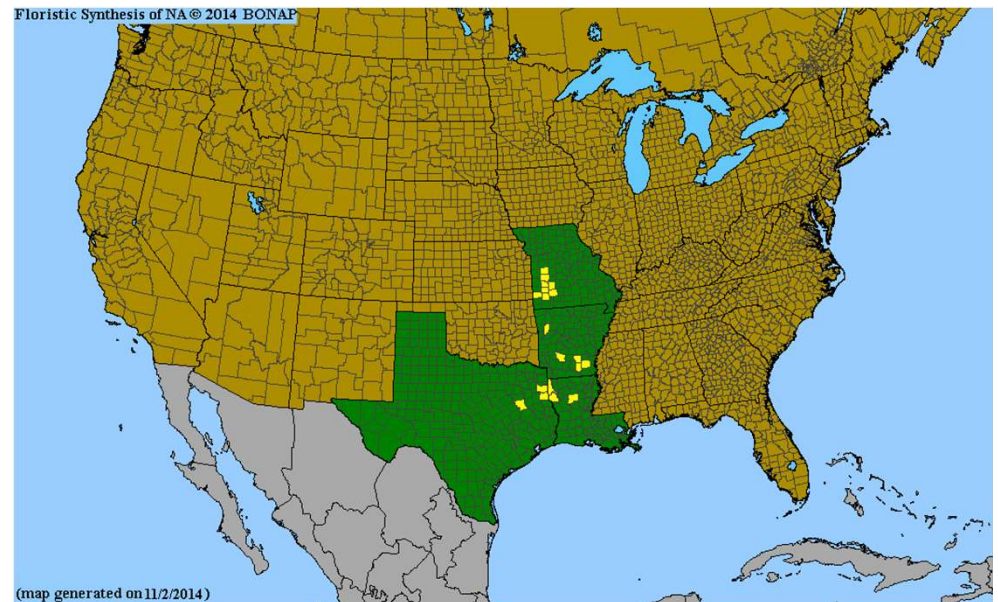
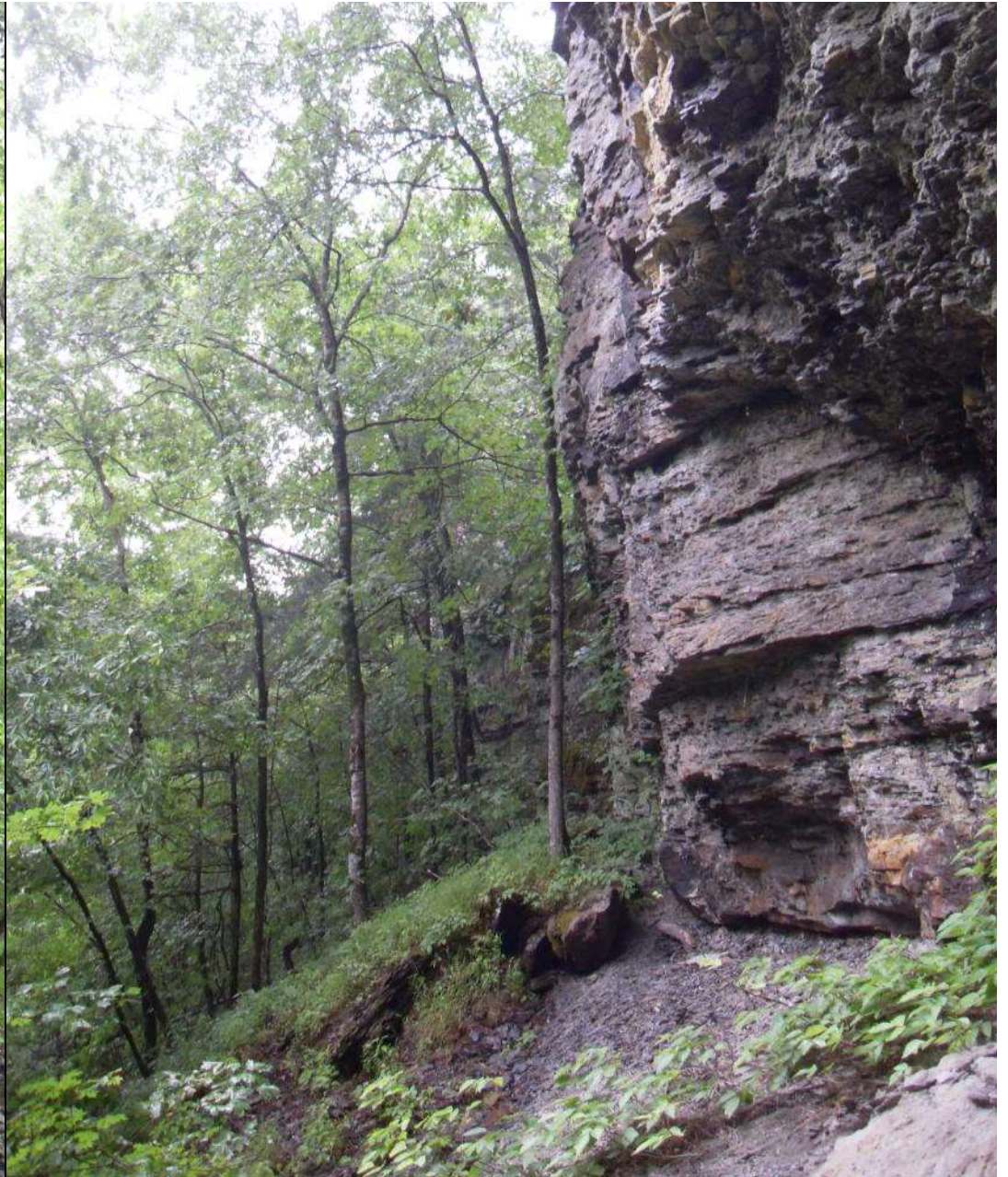




Photo: whiteriverescape.com

Big Bluff – Upper Buffalo River



Photos: Brent Baker

Bluff & Talus – Gulf Mountain WMA



Photo: Theo Witsell/ANHC

“The Nar’s” of the Buffalo River

Ozark Grass (*Limnodea arkansana*)

Habitat: Calcareous bluffs, glades, and barrens

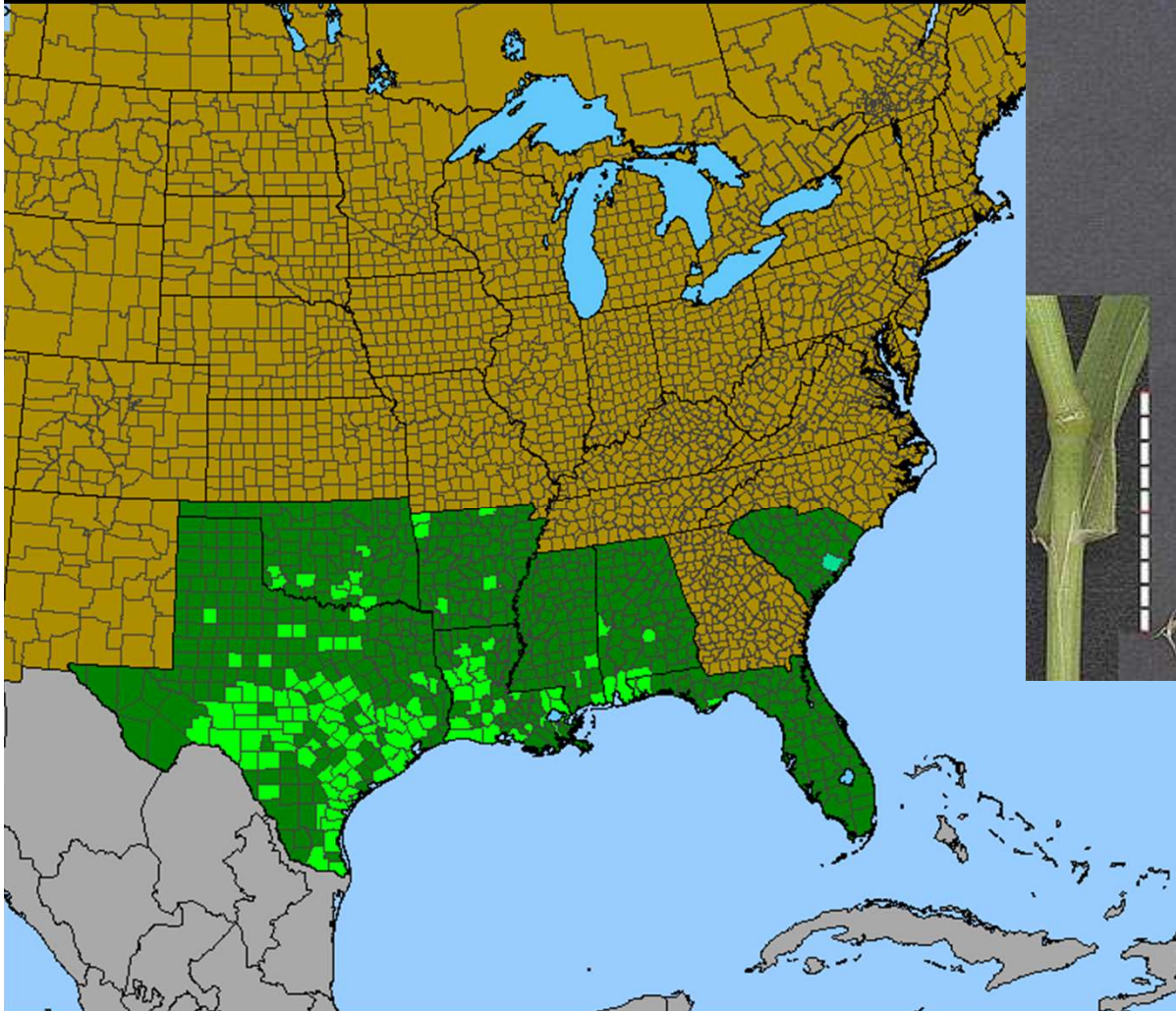




Photo: Craig Fraiser

Ovate-leaf Catchfly (*Silene ovata*)

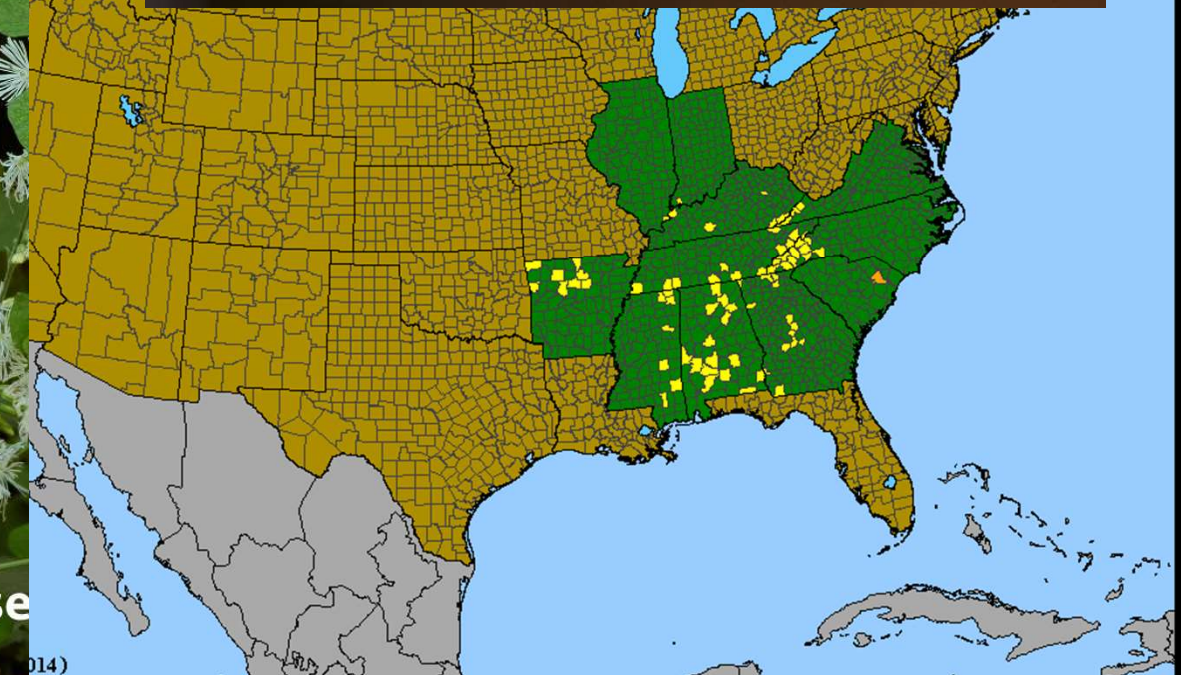
Habitat: Mesic bluffs and talus; ledges, stream banks in deep hollows



© 2014 BC

014)

Photo by Hugh & Carol Nourse

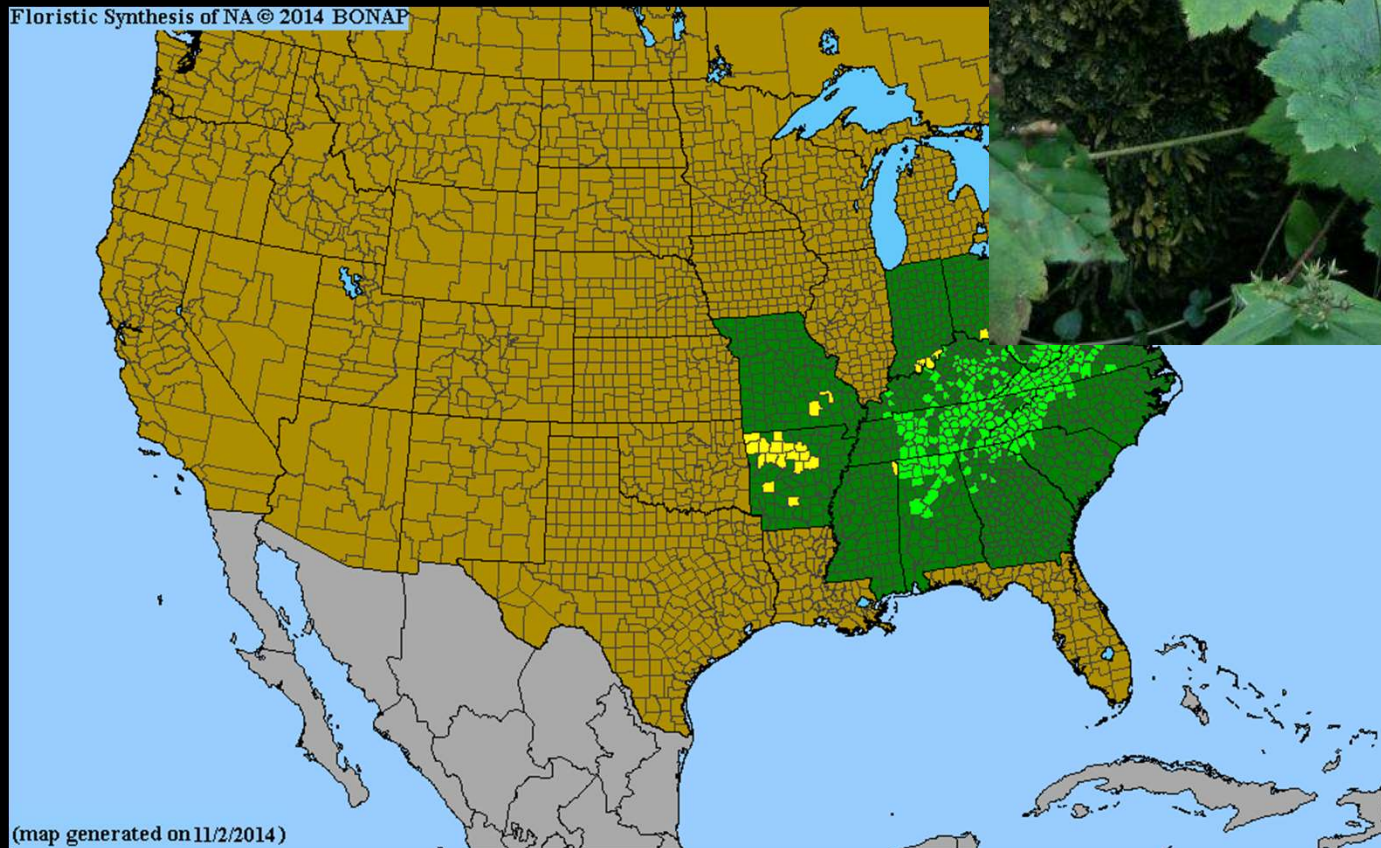


**Arkansas Alumroot (*Heuchera villosa*
var. *arkansana*)**

**Habitat: Sandstone Bluffs (rarely
limestone bluffs)**



Floristic Synthesis of NA © 2014 BONAP



(map generated on 11/2/2014)

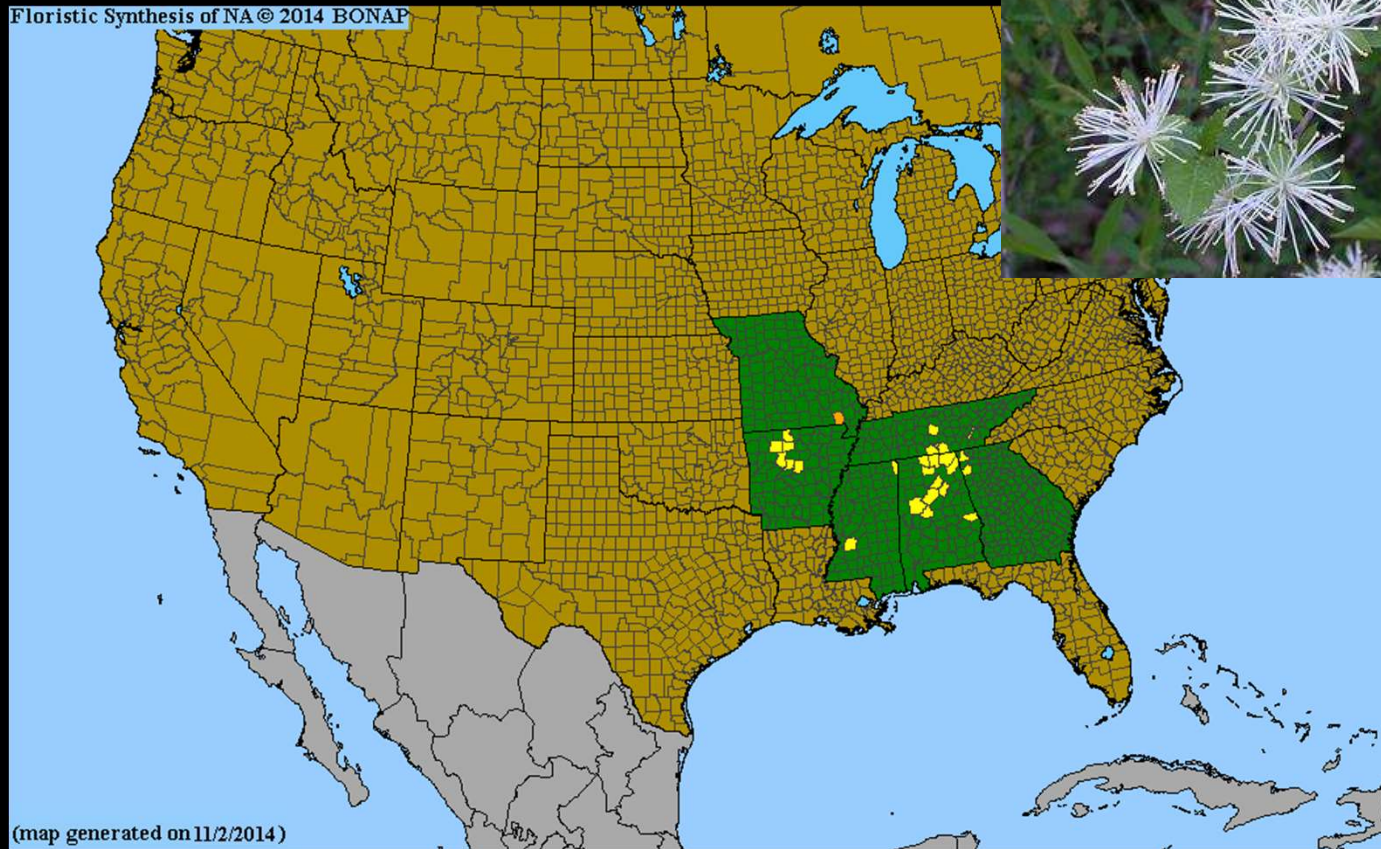
Craig Fraiser

Alabama Snow-wreath (*Neviusia alabamensis*)

Habitat: Mesic bluffs and talus; steep, rocky slopes



Floristic Synthesis of NA © 2014 BONAP



Craig Fraiser

(map generated on 11/2/2014)



Photo: John Andre/USFS

Post Oak Woodland (Ozark National Forest, Pope County)



John Andre

Post Oak Woodland (Ozark National Forest, Van Buren County)

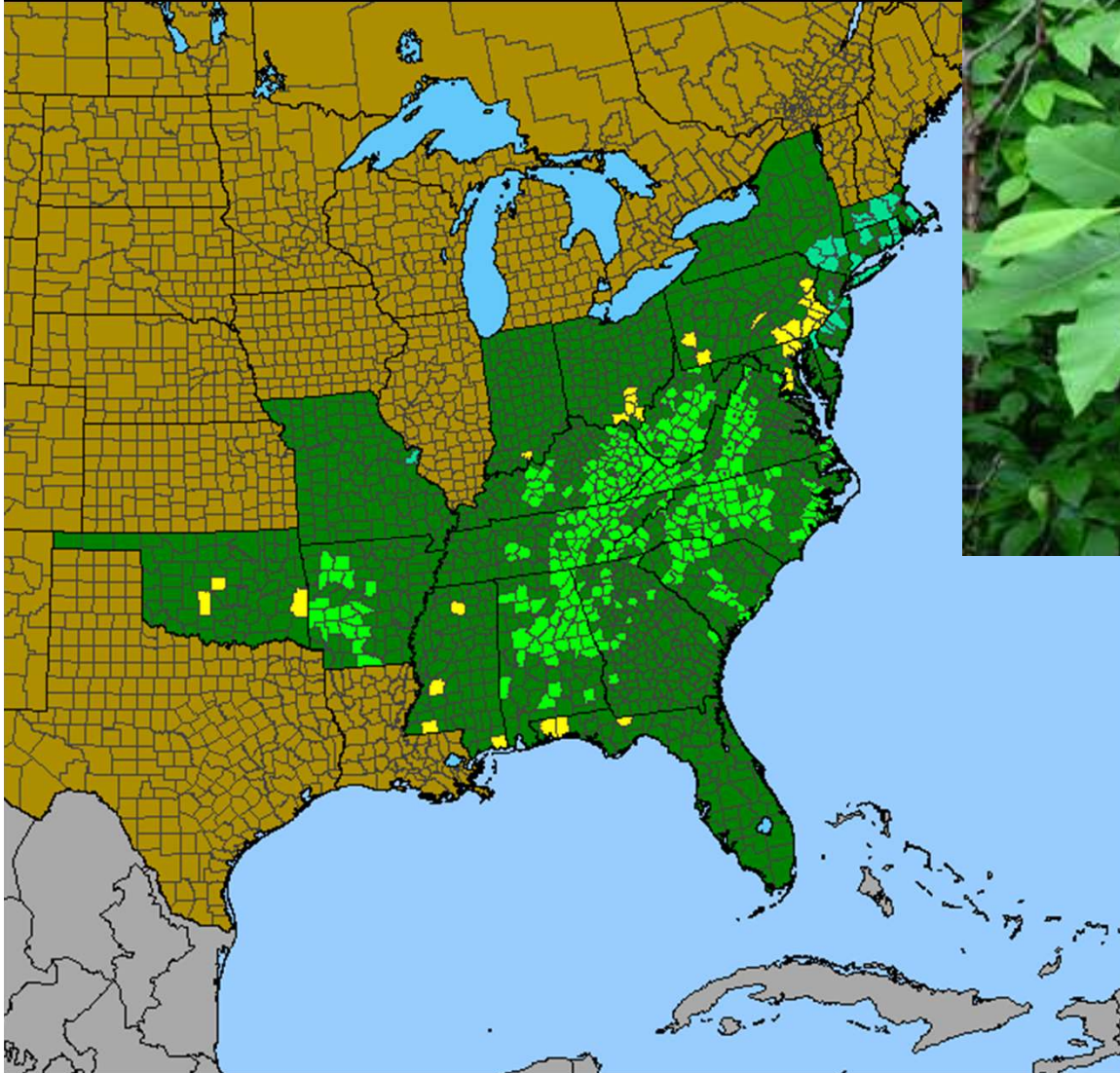


Photo: McRee Anderson/TNC

Post Oak Woodland (Fort Chaffee, Sebastian County)

Umbrella Magnolia (*Magnolia tripetala*)

Habitat: mesic forests, often below bluffs; box canyons



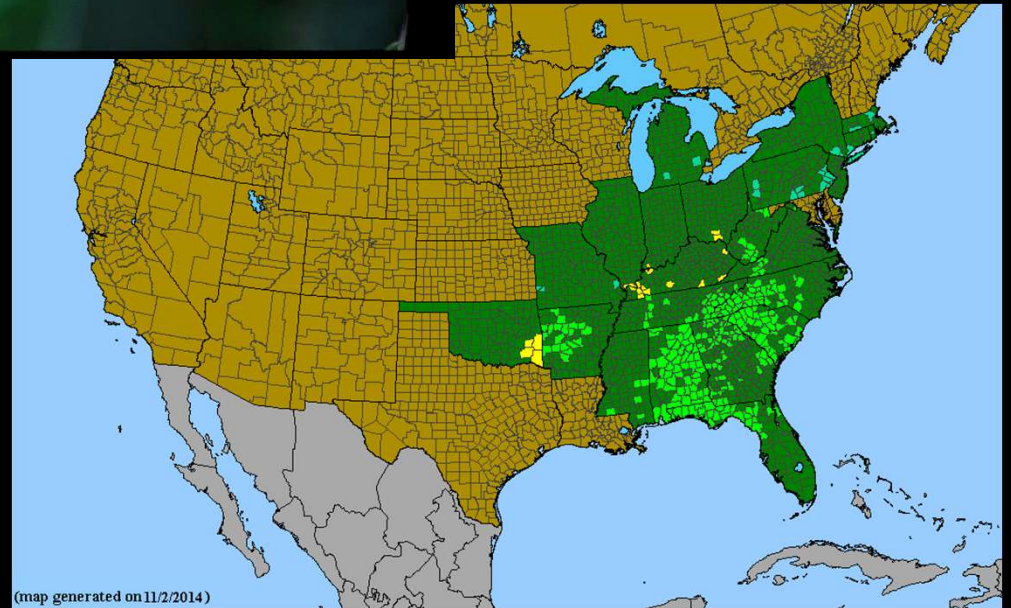


Southeasternflora.com

John Pelton

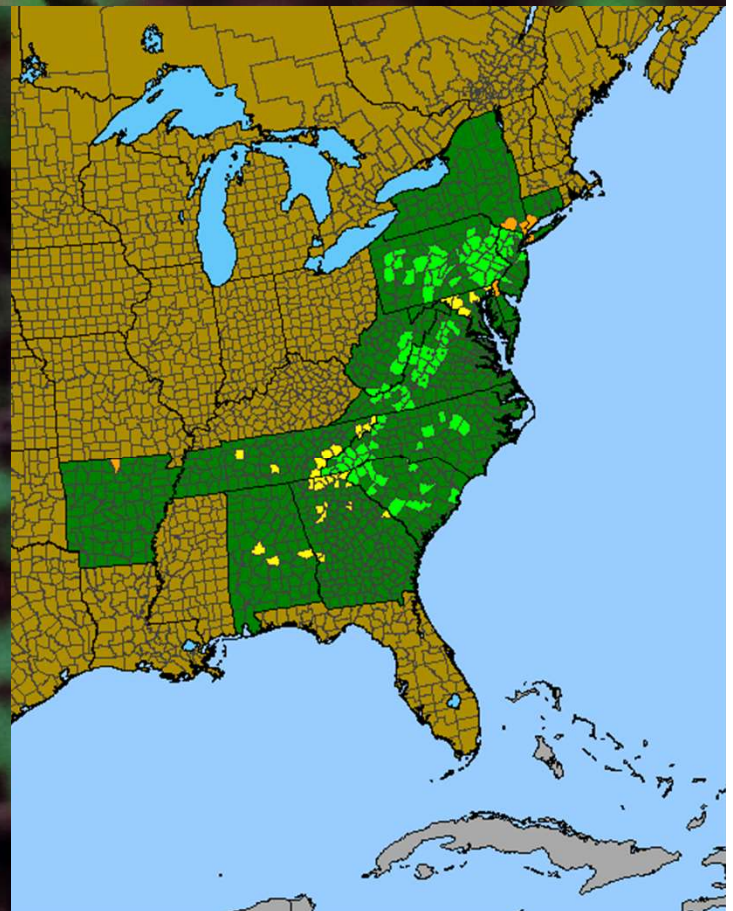
Carolina Silverbells (*Halesia carolina*)

Habitat: Mesic Forests



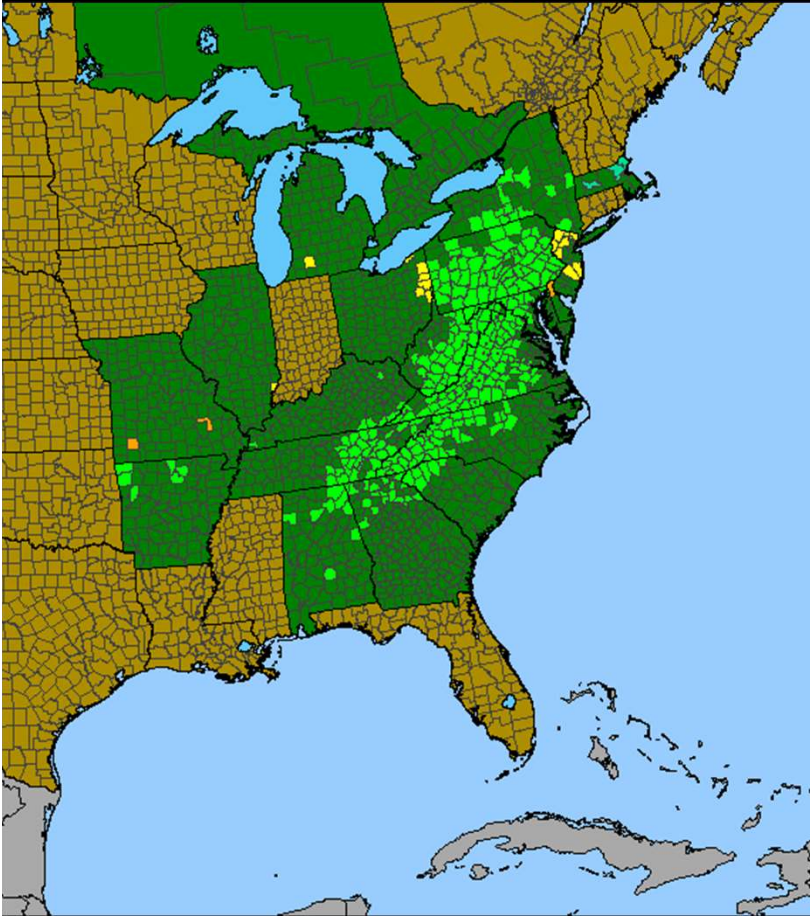
Broadleaf Bunchflower (*Veratrum latifolium* =
Melanthium hybridum = *Veratrum hybridum*)

Habitat: upland dry-mesic chert woodland



Bowman's Root (*Gillenia trifoliata*)

Habitat: mesic to dry-mesic upland woods

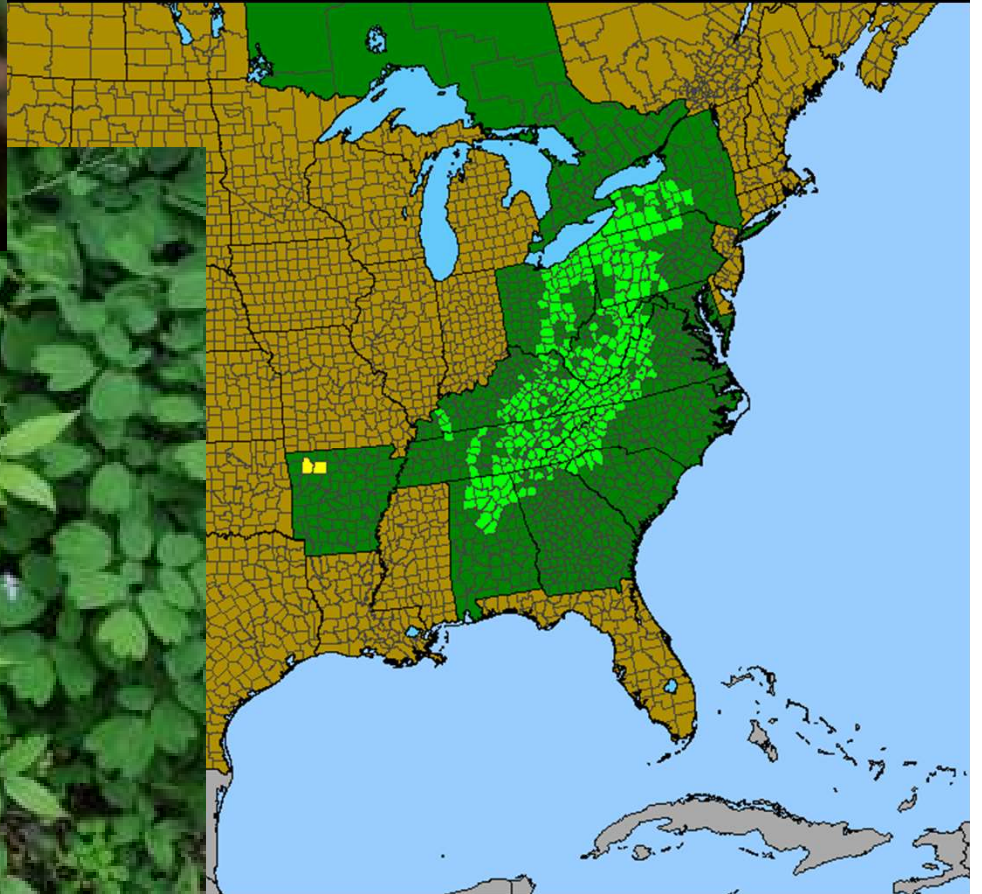




Dan Busemeyer, Illinois Natural History Survey

**Yellow Mandarin (*Prosartes lanuginosa*
= *Disporum lanuginosum*)**

**Habitat: Mesic acidic forests, often
below bluffs; box canyons**



Witch-elder (*Fothergilla major*)

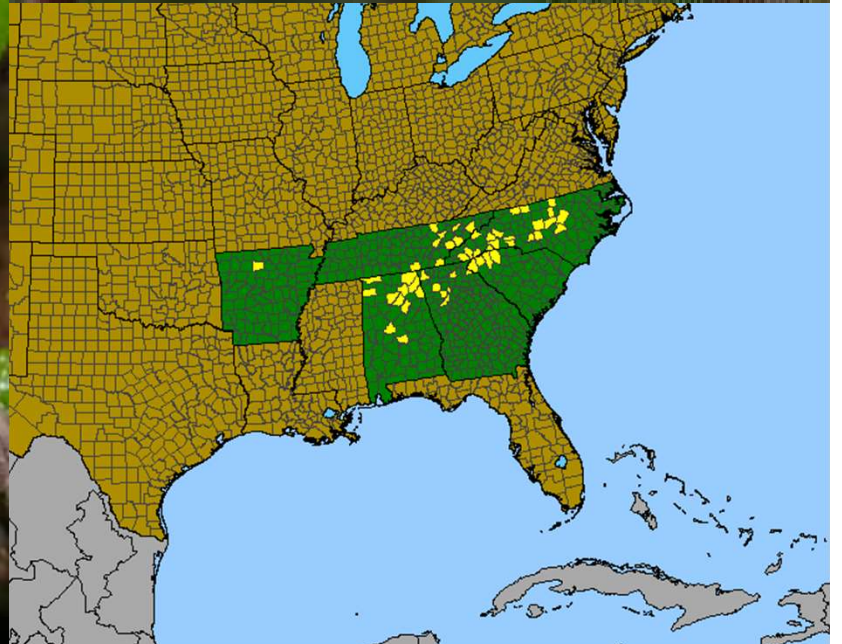
Habitat: Sandstone talus and woodlands

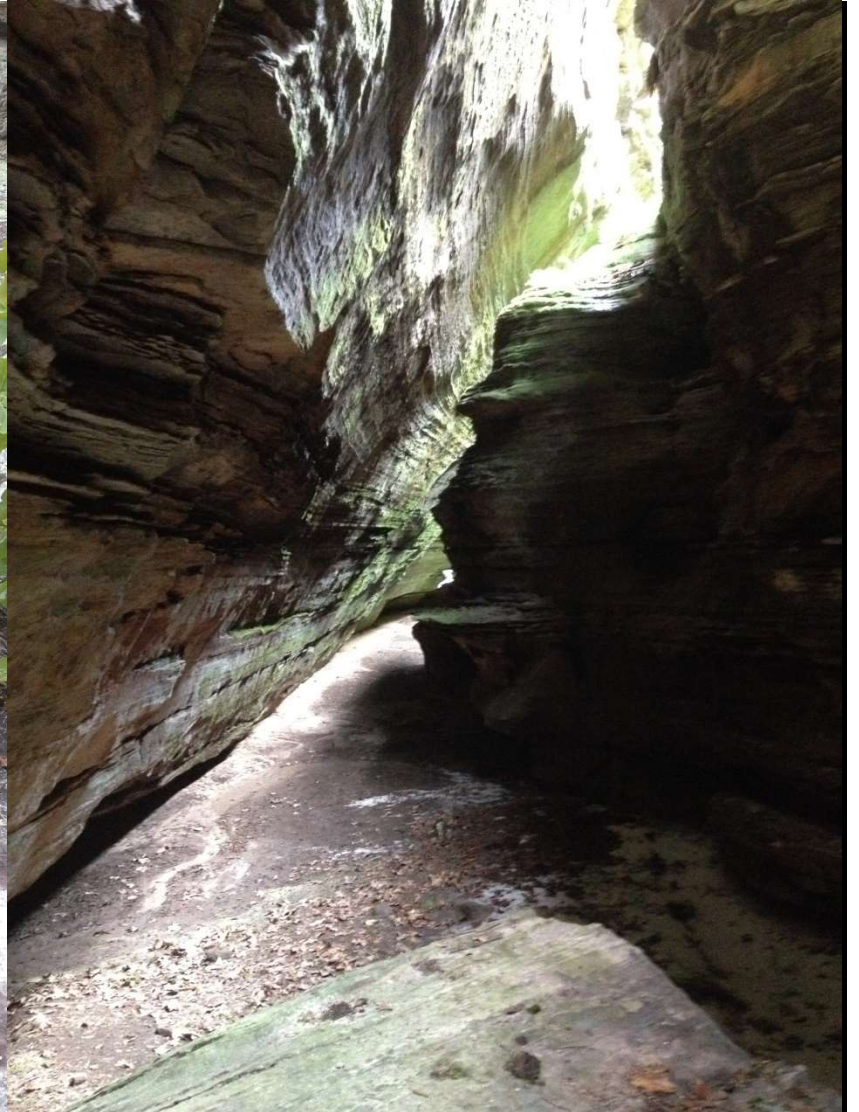


©2004 Will Cook



©2011 Will Cook

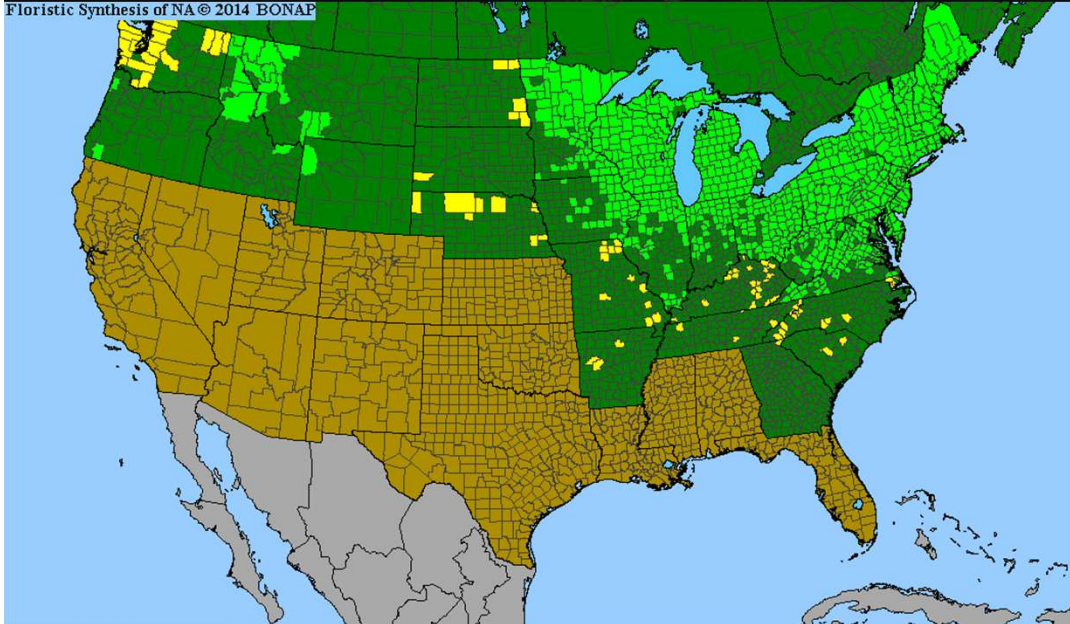




Slot Canyon – private land, Baxter Co.
1 ft wide near top, 30-40 ft deep, 350 ft long

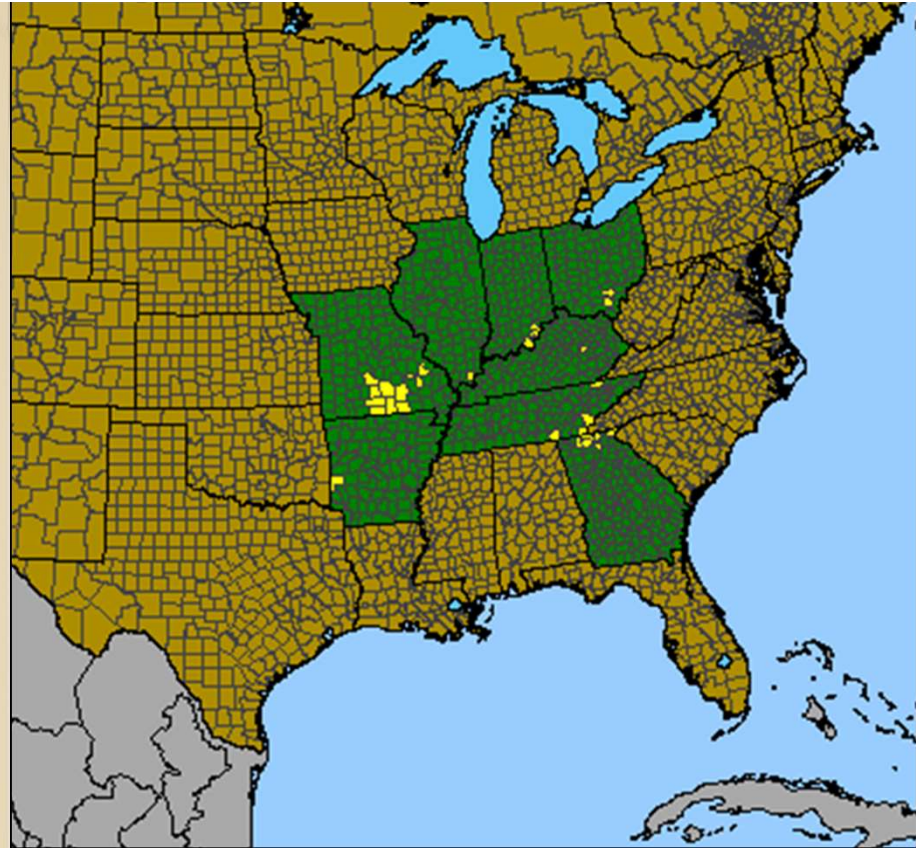
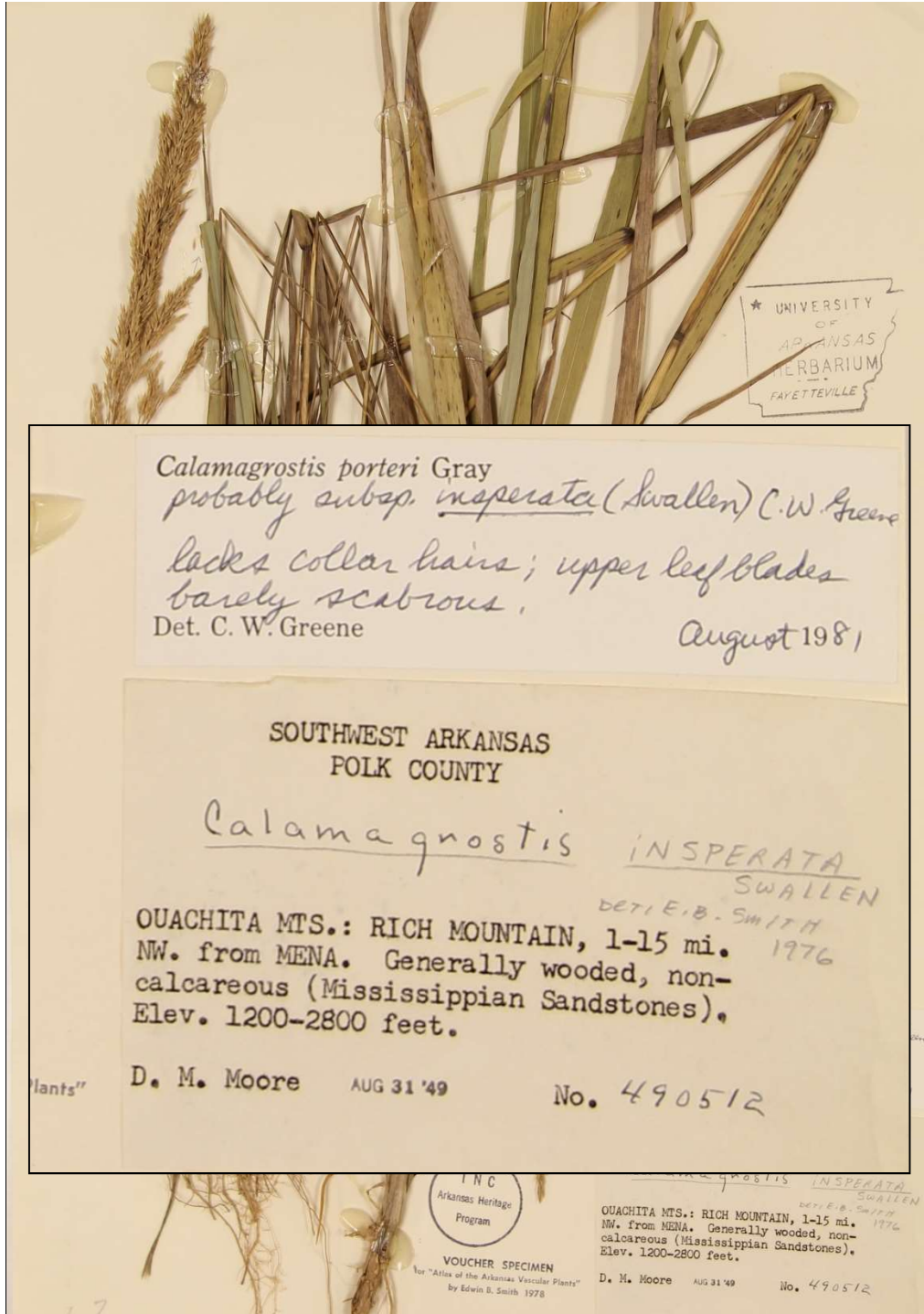


Floristic Synthesis of NA © 2014 BONAP



Cool, moist, protected site with rare northern flora located in dry sandstone glade

Big population of spinulose wood fern (*Dryopteris carthusiana*) – a new site for one of rarest ferns in AR



Ofer Hollow Reed Grass (*Calamagrostis porteri* ssp. *insperata*)

One of the rarest grasses in North America

Was known in Arkansas only from a single 1949 specimen from Rich Mountain – never relocated despite many searches



Second population found on Mount Magazine in 2015, and more found in June, 2016.

Both Rich Mountain and Mount Magazine are high elevation "sky island" habitats with cooler temperatures and "relict species" left over from cooler times long ago.

Arkansas Natural Heritage Commission



www.naturalheritage.org