Mapping Ecological Classification System Concepts

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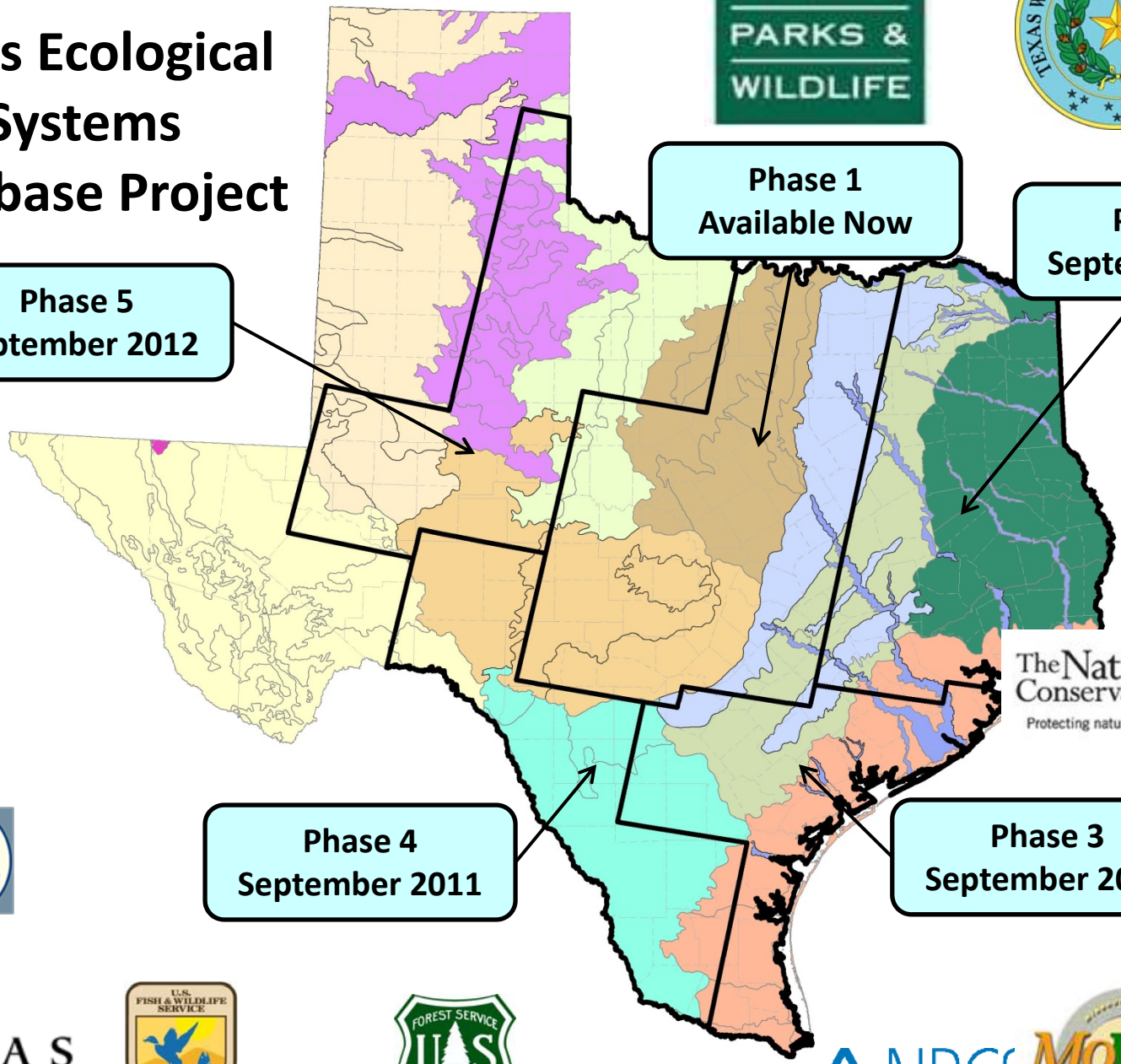
Historical Notes

- Several USFS staff have been involved
  - Initially Bill Bartush and Jason Engle (winter 2008/2009)
  - Project taken on by Tom Philipps with help from many
- Objectives have evolved
  - Initial idea was to improve the existing vegetation map and map ECS concepts by cooperating with TPWD land cover mapping effort
  - LTA revision was discussed, attempted, but abandoned (David Meriwether)
  - Heritage site boundary revision was attempted but not possible
  - Rare species potential habitat mapping and longleaf pine potential restoration areas have become higher priority

Process Notes

- TPWD project was leveraged (soils and existing vegetation mapping)
- Meeting and field trip with FS staff, spring 2008
- Built model, made presentations and responded to reviews with modifications via WebEx (7/16, 10/26, 11/5; other calls and discussions)
- Expect some revisions to come and will be available to FS staff for further discussions

Texas Ecological Systems Database Project



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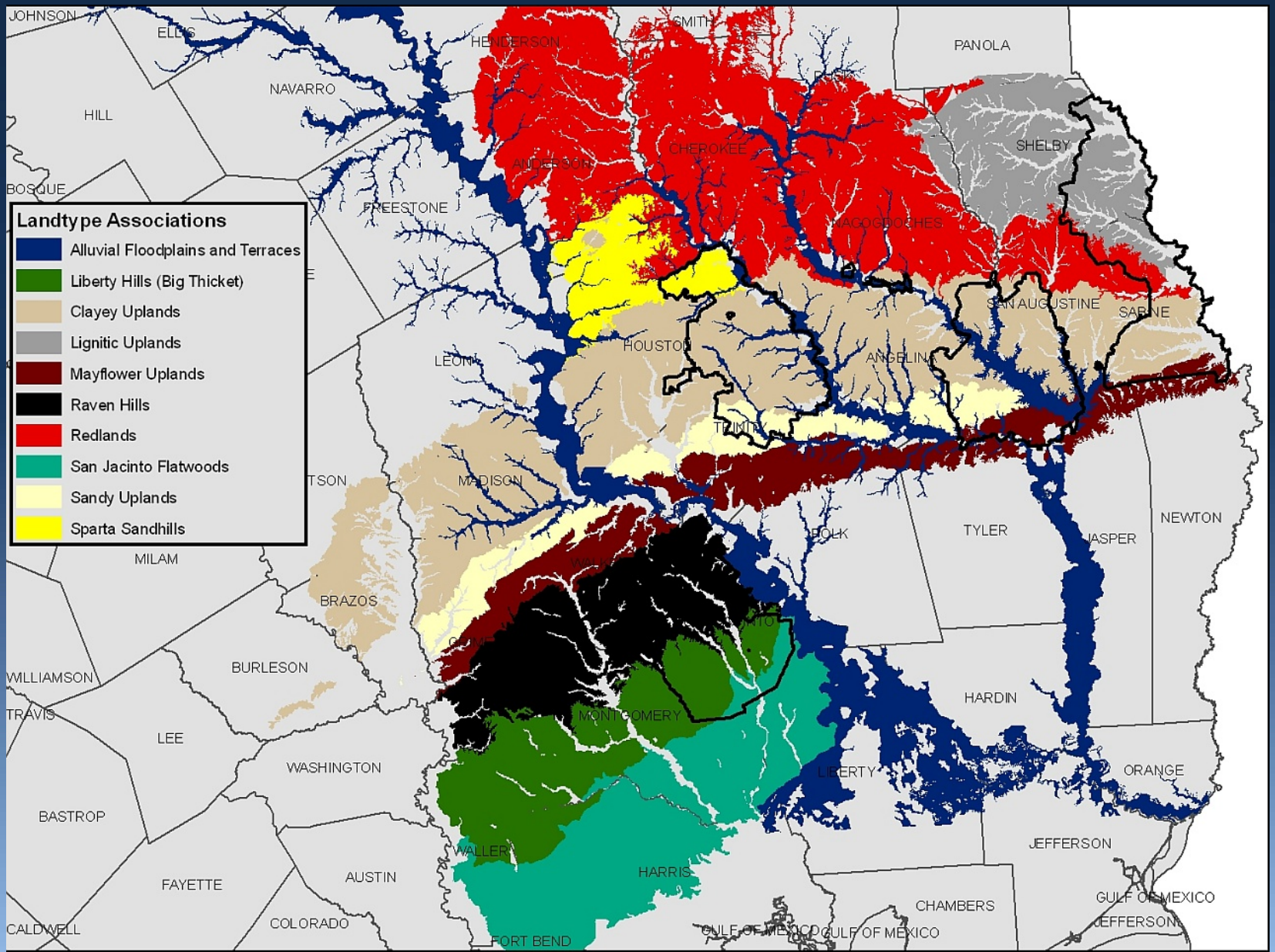
FIELD GUIDE

ECOLOGICAL CLASSIFICATION SYSTEM

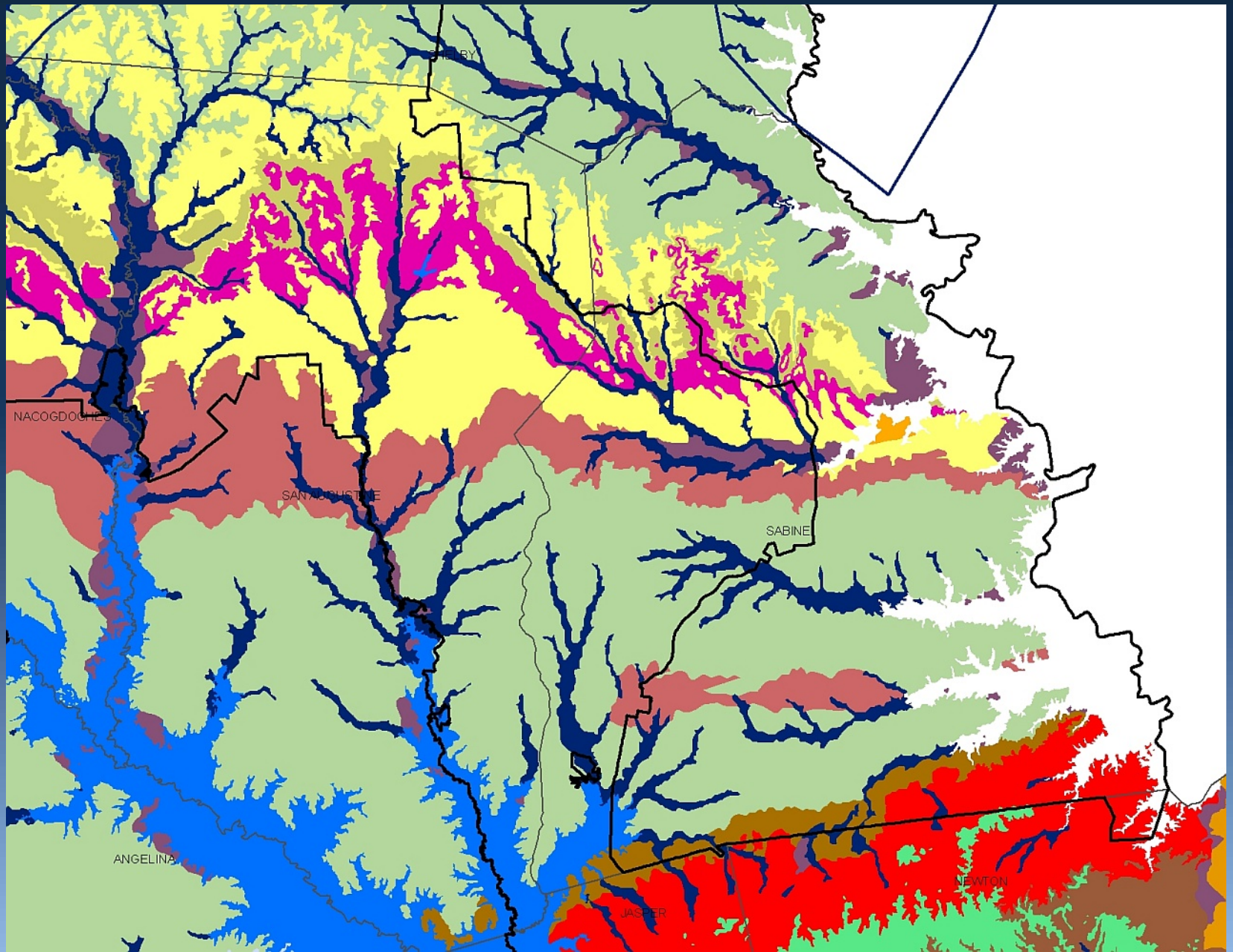
FOR THE NATIONAL FORESTS AND ADJACENT AREAS OF THE WEST GULF COASTAL PLAIN: 2nd APPROXIMATION

Site Type	USFS Types	Notes
Blackland Prairie	Dalea Herbaceous Dry Clayey Prairies	Only on Sam Houston
Flatwoods	White Oak-Loblolly Pine/Callicarpa Loamy Mesic Lower Slopes and Terraces	Sabine and Angelina probably mostly 30 or 16 maybe 19 (most is mapped along streams and 19 is supposed to be in upland depressions)
	Willow Oak-Loblolly Pine/Justicia-Bignonia Loamy Seasonally Wet Flatwoods	
	Willow oak/Justicia Clayey Wet Upland Depressions	
	Willow Oak-Loblolly Pine/Justicia-Bignonia Loamy Seasonally Wet Flatwoods	In Sam Houston (mainly on Willis, Lissie, or possibly Beaumont). Tiny area of flatwoods and clayey soils on Beaumont in S Angelina may be this.
Clay on High and Intermediate Landscape Positions	Shortleaf Pine-Post Oak/Chasmanthium Clayey Dry-Mesic Uplands	For most geology types, outside of Longleaf Pine range
Clay on High and Intermediate Landscape Positions	Longleaf Pine/Schizachyrium Clayey Dry-Mesic Uplands	Within range of Longleaf but not on or near Catahoula Formation
Clay on High and Intermediate Landscape Positions	Dalea Herbaceous Dry Clayey Prairies	W of Trinity mainly on Fleming and Willis formation which will occur in Sam Houston only
Post Oak Savanna soils and Typical soils at Intermediate Landscape Positions	Shortleaf Pine-Post Oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands	For most geology types, outside of Longleaf Pine range
Post Oak Savanna soils and Typical soils at Intermediate Landscape Positions	Shortleaf Pine (Longleaf Pine)-Post Oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands	Within range of Longleaf but not on or near Catahoula Formation
Post Oak Savanna soils and Typical soils at Intermediate Landscape Positions	Longleaf Pine/Schizachyrium Loamy Dry-Mesic Uplands	Within range of Longleaf on Catahoula or related formations, Sabine and Angelina forests
Typical soils at High Landscape Positions	Shortleaf Pine-Blackjack Oak/Schizachyrium Arenic Dry Uplands	For most geology types, outside of Longleaf Pine range
Typical soils at High Landscape Positions	Shortleaf Pine-(Longleaf Pine)-Blackjack Oak/Schizachyrium Arenic Dry Uplands	Within range of Longleaf but not on or near Catahoula Formation
Typical soils at High Landscape Positions	Longleaf Pine-Blackjack Oak/Schizachyrium Arenic Dry Uplands	Within range of Longleaf on Catahoula or related formations, Sabine and Angelina forests
Deep Sands at High Landscape Posotions	Shortleaf Pine-Bluejack Oak/Tragia Grossarenic Dry Uplands	For most geology types, outside of Longleaf Pine range
	Shortleaf Pine-Blackjack Oak/Schizachyrium Arenic Dry Uplands	
	Shortleaf Pine-(Longleaf Pine)-Bluejack Oak/Tragia Grossarenic Dry Uplands	Within range of Longleaf but not on or near Catahoula Formation
	Shortleaf Pine-(Longleaf Pine)-Blackjack Oak/Schizachyrium Arenic Dry Uplands	
	Longleaf Pine-Bluejack Oak/Tragia Grossarenic Dry Uplands	Within range of Longleaf on Catahoula or related formations, Sabine and Angelina forests
	Longleaf Pine-Blackjack Oak/Schizachyrium Arenic Dry Uplands	
Potential Weches Glades	Weches Glades or Shortleaf Pine-Post Oak/Chasmanthium Clayey Dry-Mesic Uplands	
Catahoula Barrens	Longleaf Pine/Schizachyrium Clayey Dry-Mesic Uplands	Typical
	Bigelowia-Callirhoe Clayey Dry-Mesic Catahoula Barrens	On actual "barren" sites
Large River Floodplain Soils	Baldcypress/Ceratophyllum Semi-Permanently Flooded Swamps	Floodplain soils with "Swamp" remote sensing results
	Water Elm/Justicia Clayey Regularly Flooded Swamps	
	Willow Oak-Laurel Oak/Bignonia Loamy/Clayey Seasonally Flooded River Floodplains	Floodplain soils with "Bottomland" remote sensing results
	Overcup Oak/Justicia Clayey/Loamy Seasonally to near Regularly Flooded Low River Floodplains	

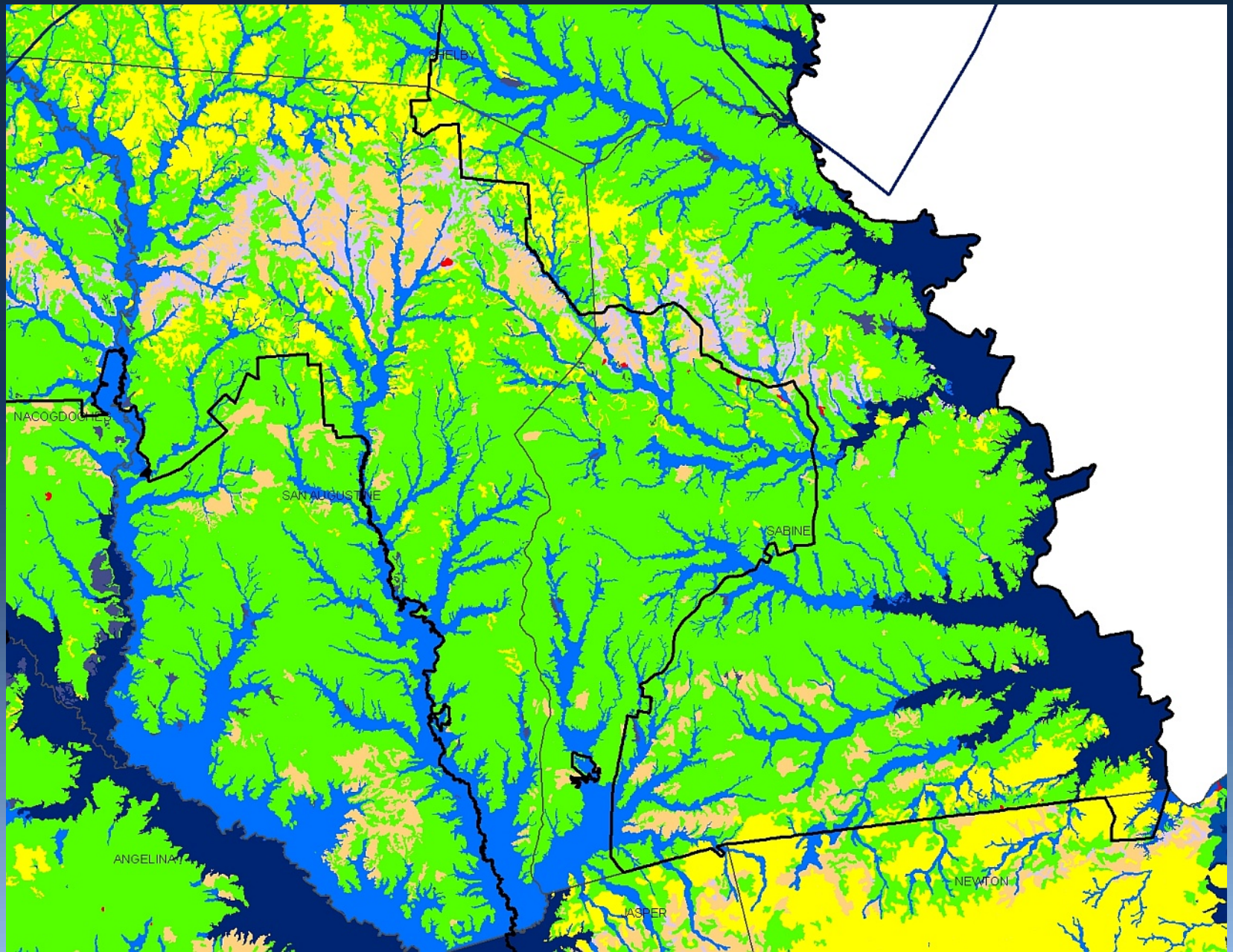
Landtype Associations



Geology – 250,000 Scale Layer



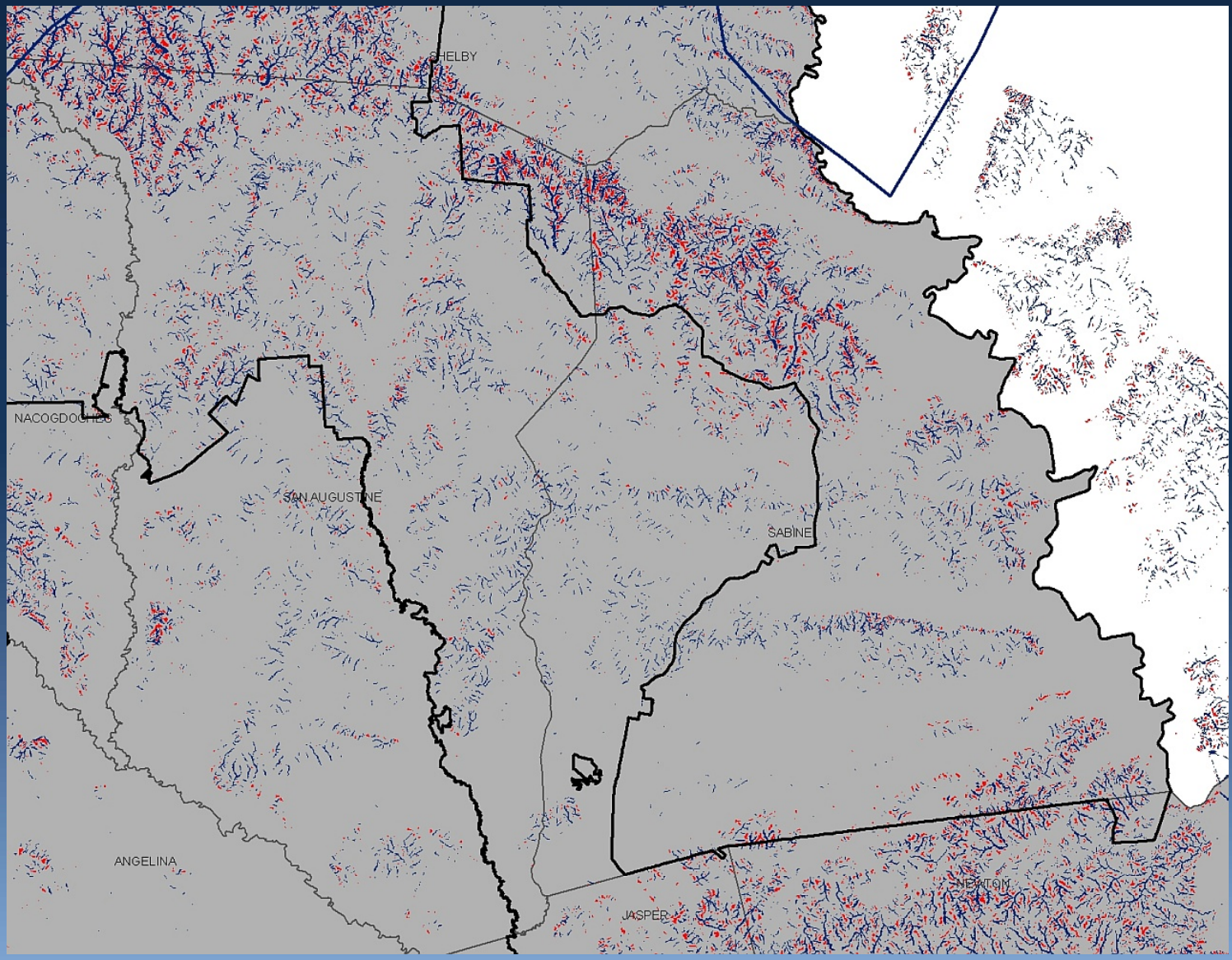
Soils – Generalized SSURGO Soil Types



Landscape Position – From Digital Elevation Model

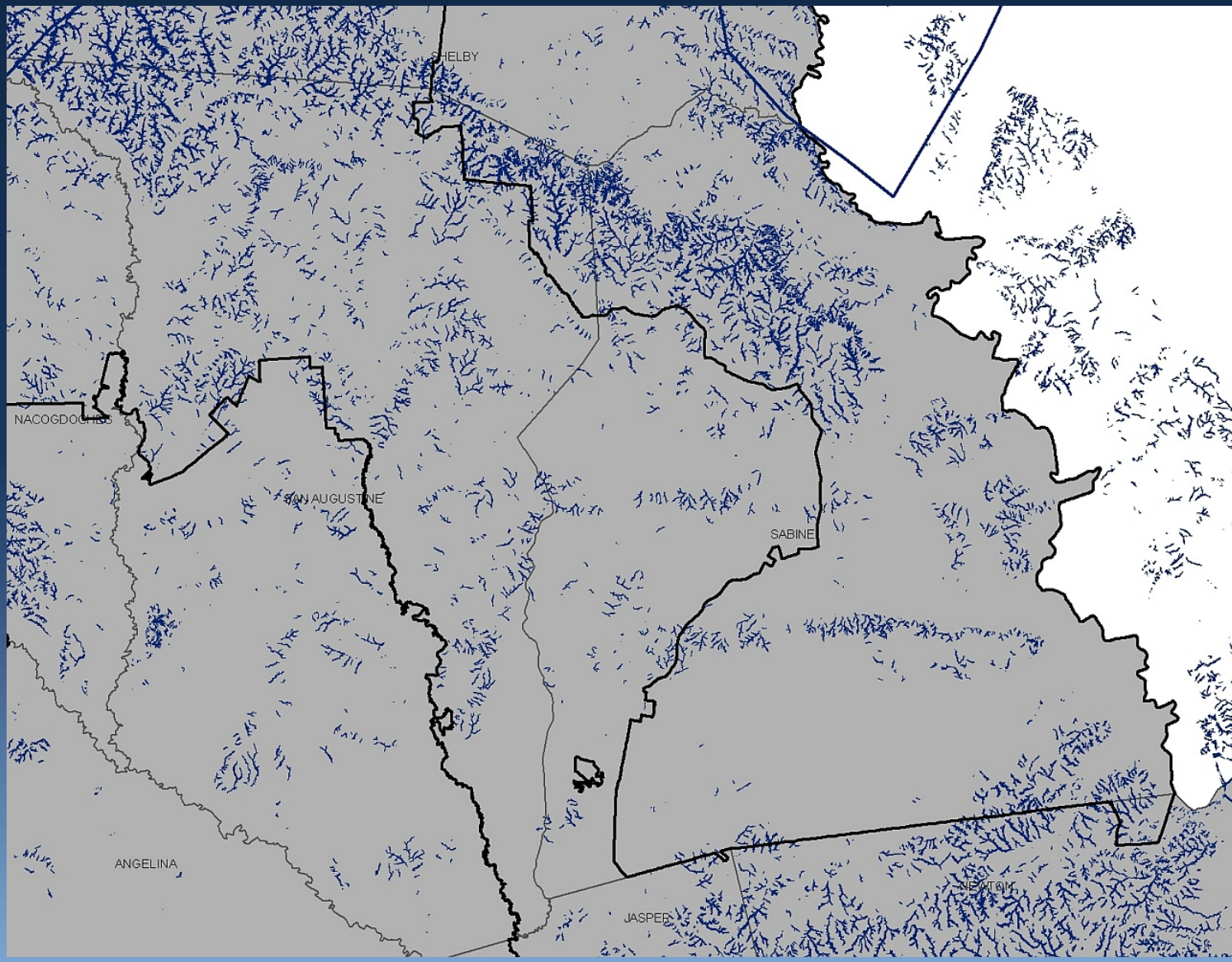
Determine relative topographic position of each pixel based on 100m radius using weighted average.

High (red) and low (dark blue) landscape positions identify mesic lower slopes and hilltop sites.

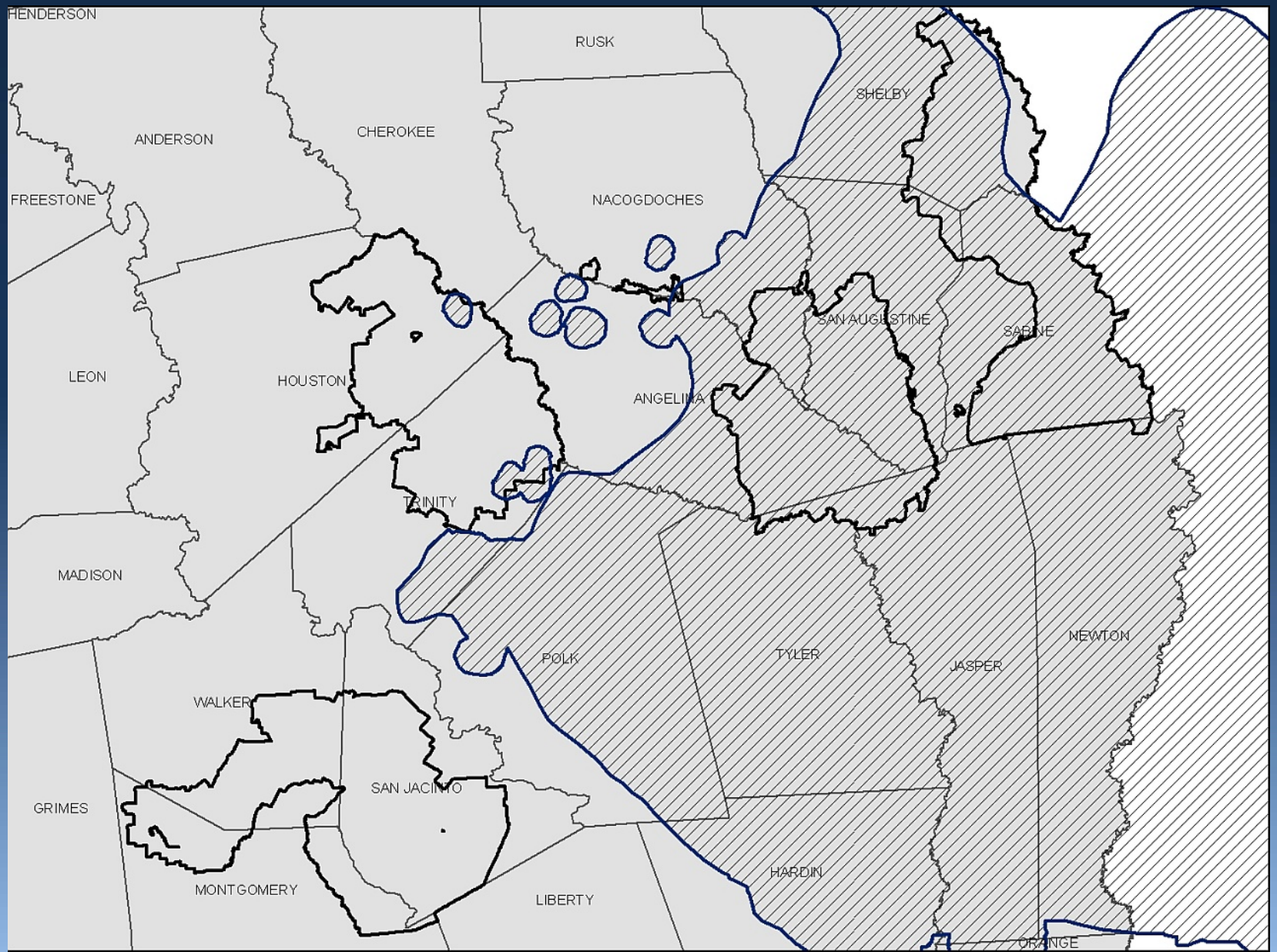


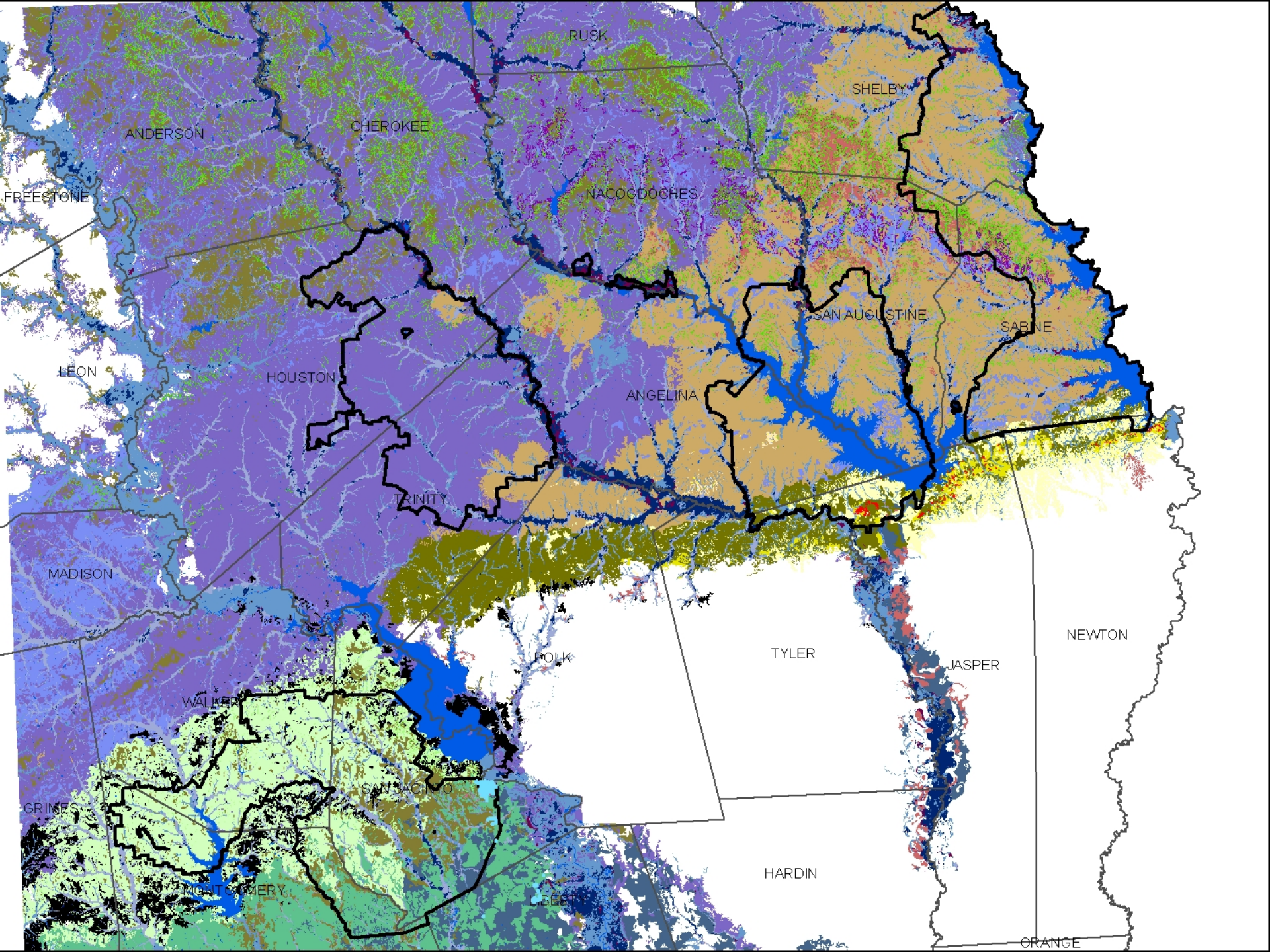
Ravines

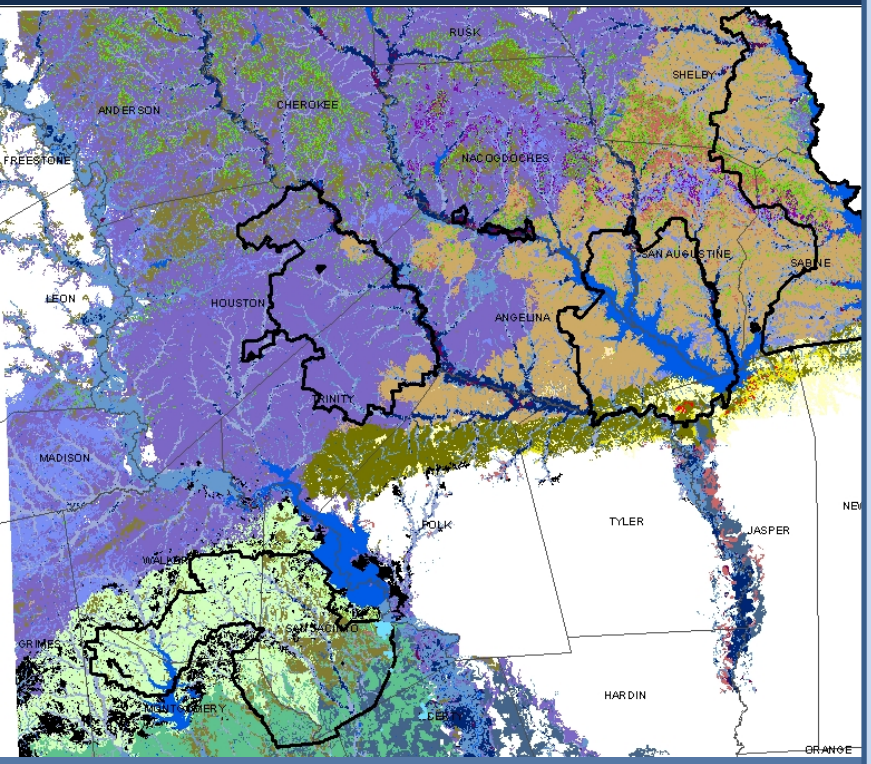
Combined Low Landscape Position with Slopes > 20% within 20 m of those Low Sites where they are juxtaposed



Range of Longleaf Pine Used in Modeling




RUSK
SHELBY
ANDERSON
CHEROKEE
FREESTONE
NACOGDOCHES
SAN AUGUSTINE
SABINE
LEON
HOUSTON
ANGELINA
TRINITY
MADISON
NEWTON
POLK
TYLER
JASPER
WALKER
SAN JACINTO
GRIMES
HARDIN
MONTGOMERY
BEE
ORANGE



- American Beech-White Oak/Mitchella Loamy Moist-Mesic Steep Slopes and Ravines
- Baldcypress/Ceratophyllum Semi-Permanently Flooded Swamps
- Bottomland
- Catahoula or Longleaf Pine/Schizachyrium Clayey Dry-Mesic Uplands
- Dalea Herbaceous Dry Clayey Prairies
- Drosera Sandy/Loamy Wet Herbaceous Seeps
- Laurel Oak-Loblolly Pine/Callicarpa Loamy Mesic Lower Slopes and Terraces
- Loblolly Pine-Post Oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Slopes and Uplands
- Loblolly Pine-Southern Red Oak/Callicarpa Loamy Mesic Lower Slopes and Terraces
- Loblolly Pine-White Oak/Callicarpa-Chasmanthium Sandy/Loamy Dry-Mesic Slopes and Uplands
- Longleaf Pine-(Shortleaf Pine)-Blackjack Oak/Schizachyrium Arenic Dry Uplands
- Longleaf Pine-Blackjack Oak/Schizachyrium Arenic Dry Uplands
- Longleaf Pine-Bluejack Oak/Tragia Grossarenic Dry Uplands
- Longleaf Pine/Schizachyrium Clayey Dry-Mesic Uplands
- Longleaf Pine/Schizachyrium Loamy Dry-Mesic Uplands
- Overcup Oak/Justicia Clayey/Loamy Seasonally to near Regularly Flooded Low River Floodplains
- Shortleaf Pine-(Longleaf Pine)-Blackjack Oak/Schizachyrium Arenic Dry Uplands
- Shortleaf Pine-(Longleaf Pine)-Bluejack Oak/Tragia Grossarenic Dry Uplands
- Shortleaf Pine-(Longleaf Pine)-Post Oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands
- Shortleaf Pine-Blackjack Oak/Schizachyrium Arenic Dry Uplands
- Shortleaf Pine-Bluejack Oak/Tragia Grossarenic Dry Uplands
- Shortleaf Pine-Post Oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands
- Shortleaf Pine-Post Oak/Chasmanthium Clayey Dry-Mesic Uplands
- Small Stream and Riparian
- Sweetbay-Swamp Tupelo/Osmunda Loamy Wet Forested Seeps
- Temporarily Flooded Bottomlands
- Weches or Shortleaf Pine-Post Oak/Chasmanthium Clayey Dry-Mesic Uplands
- White Oak-Loblolly Pine/Callicarpa Loamy Mesic Lower Slopes, Mounds, and Terraces
- Willow Oak-Loblolly Pine/Justicia-Bignonia Loamy Seasonally Wet Flatwoods
- Willow oak/Justicia Clayey Wet Upland Depressions

Mapping Caveats

Land_Type	LTP	LTA	Map_Rules	Caveats
Mesic Slopes and Terraces	American Beech-White Oak/Mitchella Loamy Moist-Mesic Steep Slopes and Ravines	Raven Hills, Lignitic Uplands, Redlands	narrow, moist valleys and ravines, mainly north of the Catahoula geologic surface	ravines map in limited areas; small streams may be continuous but not mapped the same; in fire-prone landscapes this type may contain more pines; White oak-Loblolly type mapped to the S and E seems similar - needs examined
Floodplain Swamps	Baldcypress/Ceratophyllum Semi-Permanently Flooded Swamps	Alluvial Floodplains and Terraces	direct overlay from remote sensing results	accuracy depends entirely on remote sensing results
Clayey Uplands	Bigelowia-Callirhoe Clayey Dry-Mesic Catahoula Barrens	Catahoula Uplands	shallow soils mainly over Catahoula geologic surface	soil map units contain soils of variable depth so "shallow soil" map units contain some deeper soils that are not barrens and "deeper soil" map units contain some shallow soils that are barrens
Minor Stream Bottoms	Cedar Elm-Hackberry/Justicia Loamy Wet-Mesic Stream Bottoms	Liberty Hill Uplands, Raven Hills	stream bottoms outside of larger rivers	stream bottom soils not well mapped so streams of various sizes are included; the subtle but important slight variations in elevation and hydrology are not captured by available GIS data
Clayey Uplands	Dalea Herbaceous Dry Clayey Prairies	Raven Hills, Catahoula Uplands	clayey soils mainly over Fleming or Catahoula geologic surfaces	soils are not perfectly mapped; influence of fire within the landscape was not accounted for directly so these areas may have been more wooded or less wooded
Sandy/Loamy Uplands	Drosera Sandy/Loamy Wet Herbaceous Seeps	Catahoula Uplands	bogs identified by on-the-ground workers were burned in to the coverage	only bogs known from ground surveys are included since no available GIS data can reliably identify habitats on which glades are likely
Mesic Slopes and Terraces	Laurel Oak-Loblolly Pine/Callicarpa Loamy Mesic Lower Slopes and Terraces	Liberty Hill Uplands	low landscape positions	low landscape positions were identified for limited areas where topography is relatively steep; narrow valleys and toe slopes are likely included but not gentle lower slopes; influence of landscape scale fire is not accounted for
Sandy/Loamy Uplands	Loblolly Pine-Post Oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Slopes and Uplands	Liberty Hill Uplands, Raven Hills	gentle uplands primarily on Fleming and Willis geologic surfaces	interplay between shortleaf and loblolly pine may be driven by landscape scale fire; geologic surfaces not perfectly mapped; soil variation included is quite broad and soil map unit concepts circumscribe much variation
Mesic Slopes and Terraces	Loblolly Pine-Southern Red Oak/Callicarpa Loamy Mesic Lower Slopes and Terraces	Raven Hills	low landscape positions	low landscape positions mapped in limited, relatively steep areas; mesic slopes not well mapped; small streams may merge with narrow valleys but are mapped differently; influence of landscape scale fire not known
Sandy/Loamy Uplands	Loblolly Pine-White Oak/Callicarpa-Chasmanthium Sandy/Loamy Dry-Mesic Slopes and Uplands	San Jacinto Flatwoods, Liberty Hill Uplands	gentle uplands primarily south of Fleming geologic surface	geological surfaces are not well mapped, and use of these for mapping may result in the perception that boundaries between types are "hard" when they are not; landscape scale fire may influence the dominance of pines versus hardwoods
Sandy/Loamy Uplands	Longleaf Pine-(Shortleaf Pine)-Blackjack Oak/Schizachyrium Arenic Dry Uplands	Redlands	gentle uplands with sandy or loamy soils within the range of longleaf pine	pre-settlement community concept is not clear but may indicate a mainly longleaf or mixed shortleaf/longleaf type; fire and landscape context not mapped; soils map units include significant variation in depth and sand
Clayey Uplands	Longleaf Pine/Schizachyrium Clayey Dry-Mesic Uplands	Catahoula Uplands, Sandy Uplands	gentle uplands, primarily over the Catahoula geologic surface, within the range of longleaf pine	a shortleaf-post oak type may be mapped on similar soils just off of the Catahoula formation, which shows that the conceptual mapping does not consider landscape context and fire effects
	Longleaf Pine/Schizachyrium Loamy Dry-Mesic		gentle uplands primarily over soils developed on the Catahoula geologic surface or on Willis caps on the	similar soils to the north of this type may be mapped as a shortleaf (longleaf) post oak type which shows that the

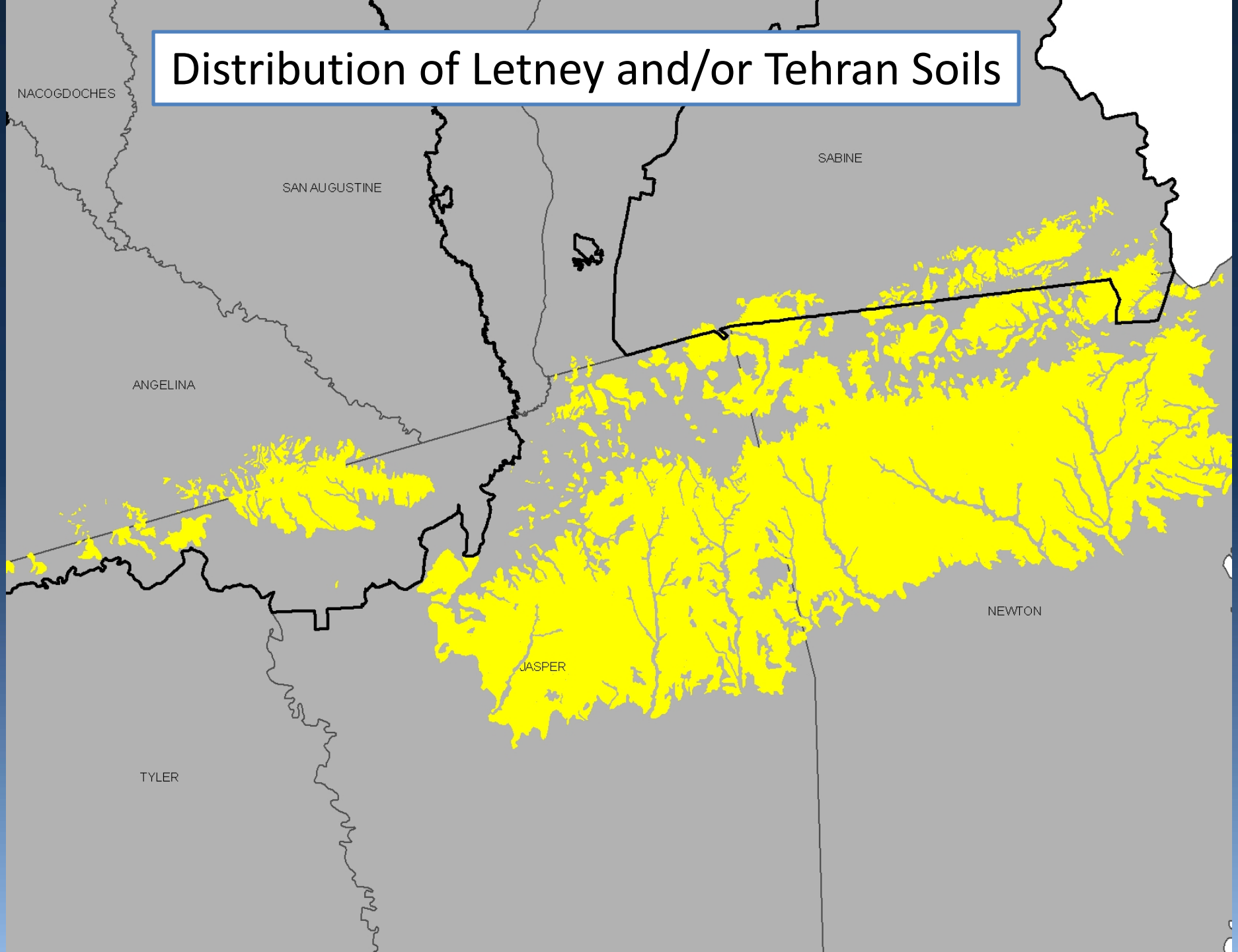
Catahoula Barrens

Element Type	Name	% < 50m (n)
Barrens		37% (51)
Watch Plant	*Phemeranthus parviflorum*	100% (1)
Watch Plant	*Gratiola flava*	100% (5)
Sensitive Plant	*Schoenolirion wrightii*	94% (16)
Sensitive Plant	*Spiranthes parksii*	100% (1)

Ravines

Element Type	Name	% < 50 m (n)
Sensitive Plant	*Amorpha paniculata*	100% (6)
Sensitive Plant	*Apteria aphylla*	73% (62)
Watch Plant	*Brachyelytrum erectum*	83% (30)
Watch Plant	*Calopogon tuberosus*	80% (10)
Sensitive Plant	*Cypripedium kentuckiense*	73% (63)
Watch Plant	*Erythronium rostratum*	78% (9)
Watch Plant	*Isotria verticillata*	100% (10)
Sensitive Plant	*Prenanthes barbata*	86% (15)
Watch Plant	*Sanguinaria canadensis*	100% (22)
Sensitive Plant	*Silene subciliata*	82% (11)
Watch Plant	*Thaspium trifoliatum*	81% (21)
Sensitive Plant	*Trillium texanum*	86% (42
Watch Plant	*Uvularia perfoliata*	90% (21)

Tehran and/or Letney Soils

Sensitive Plant	*Agrimonia incisa*	85% (103)
Sensitive Plant	*Cyperus grayoides*	89% (9)
Sensitive Plant	*Eriocaulon texense*	75% (8)
Watch Plant	*Amorpha canescens*	88% (17)
Watch Plant	*Calopogon tuberosus*	70% (10)
Watch Plant	*Eriogonum longifolium*	84% (50)
Watch Plant	*Tetragonotheca ludoviciana*	67% (33)

Distribution of Letney and/or Tehran Soils