



Oklahoma Ecological Systems Classification & Mapping Project

David Diamond & Lee Elliott

diamonddd@missouri.edu

elliottle@missouri.edu





Methods – modeling concept is map overlay: Land Cover + Abiotic Attributes = Mapped Type

Crosstimbers: Deciduous Forest
Land Cover



Mapped as Six Different Current
Vegetation Types in one County

Flats

Typic Woodland
Soils



Sandy Soils



Prairie Soils



Crosstimbers: Post Oak Forest



Crosstimbers: Sandyland Post Oak
Forest



Ruderal Deciduous Woodland



Slopes



Crosstimbers: Post Oak Slope Forest

Floodplain and
Riparian Soils



South Central Interior: Floodplain
Hardwood Woodland



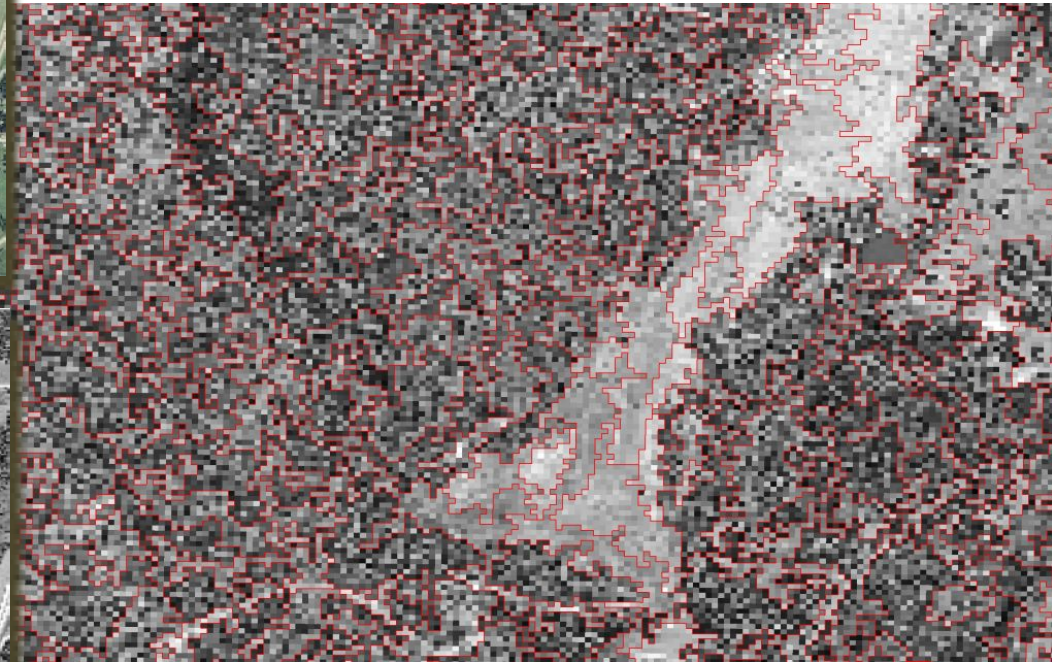
South Central Interior: Riparian
Deciduous Woodland

Visually homogeneous polygons (objects) – 10m Resolution

NAIP – 1m, county mosaic



Image Objects - eCognition

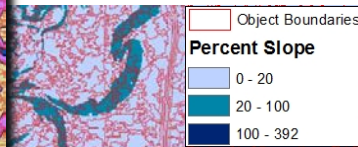
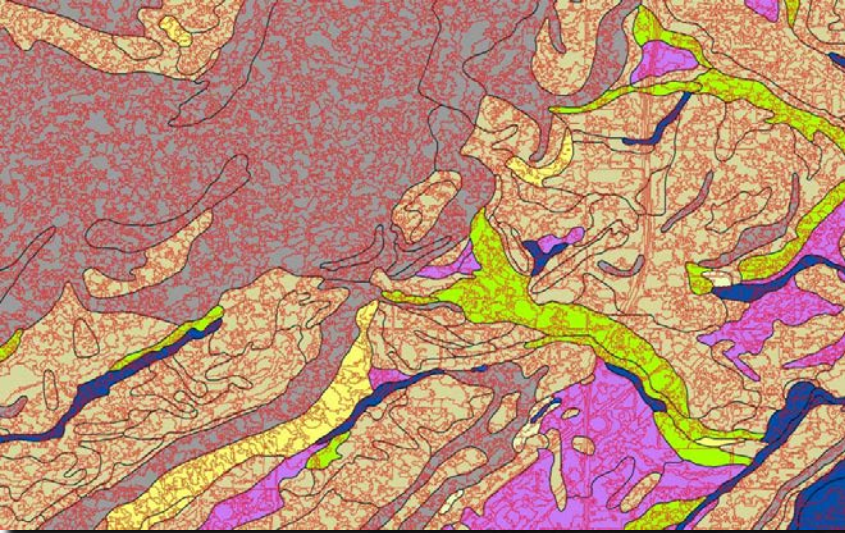


PCA (1st Component)
Resampled to 10m

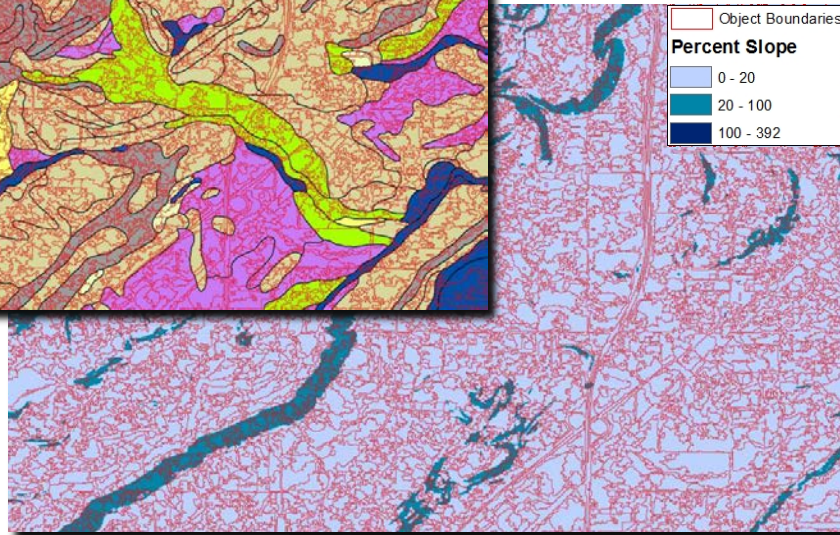
Polygons are small: each mapped patch contains many image objects

SSURGO Soil Groups

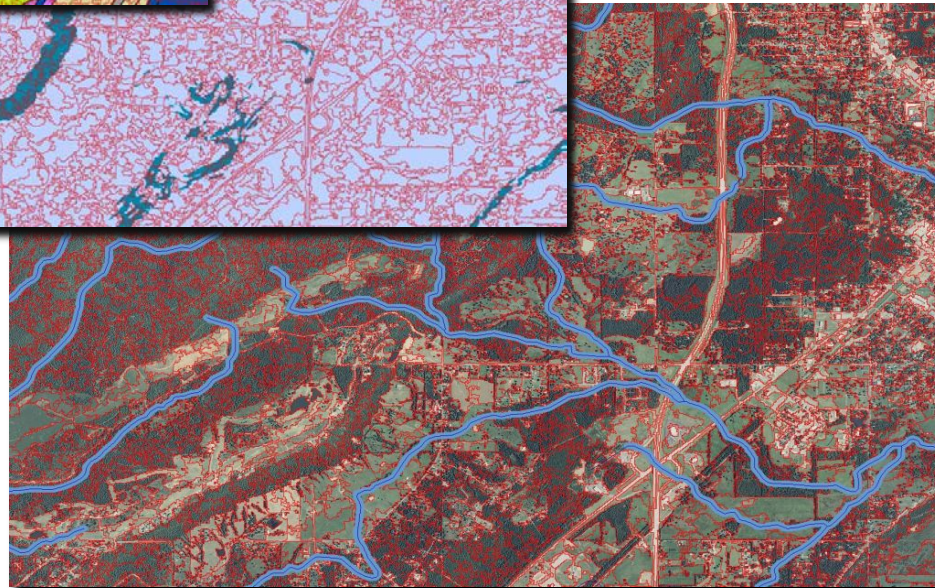
Objects + Attributes = Mapped Type



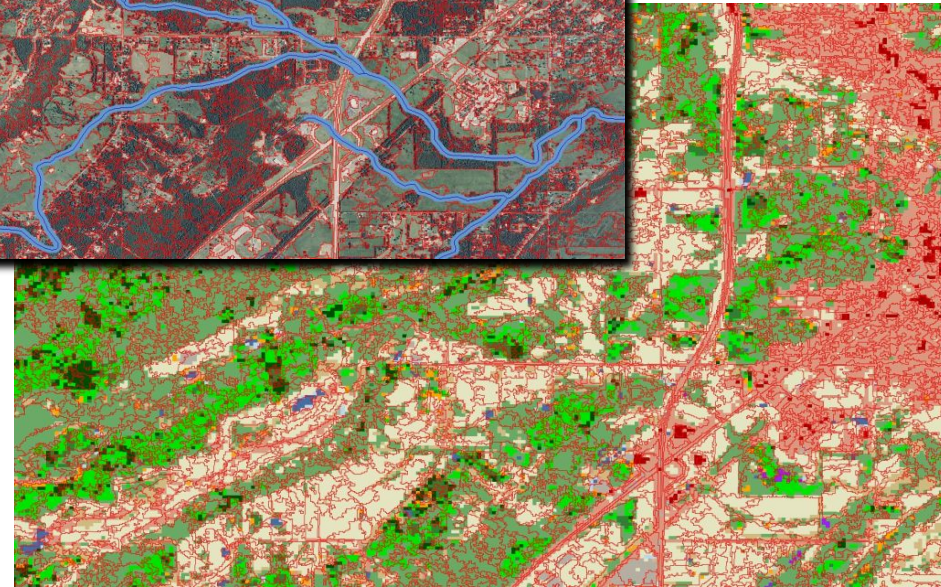
Slope



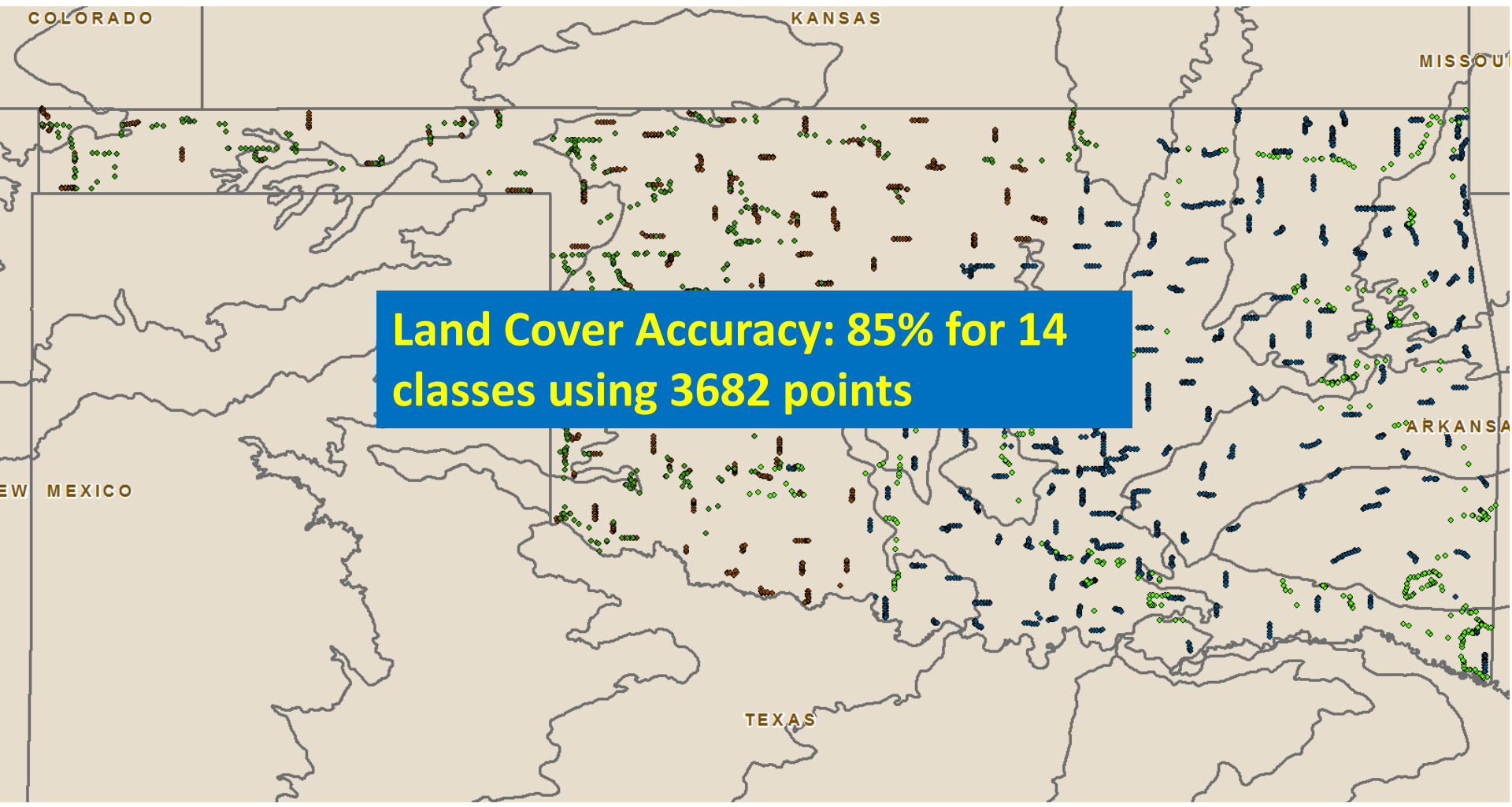
Hydrography



Landcover



Field Data are Useful: 3,714 georeferenced sample plots;
1,114 additional targeted, georeferenced points

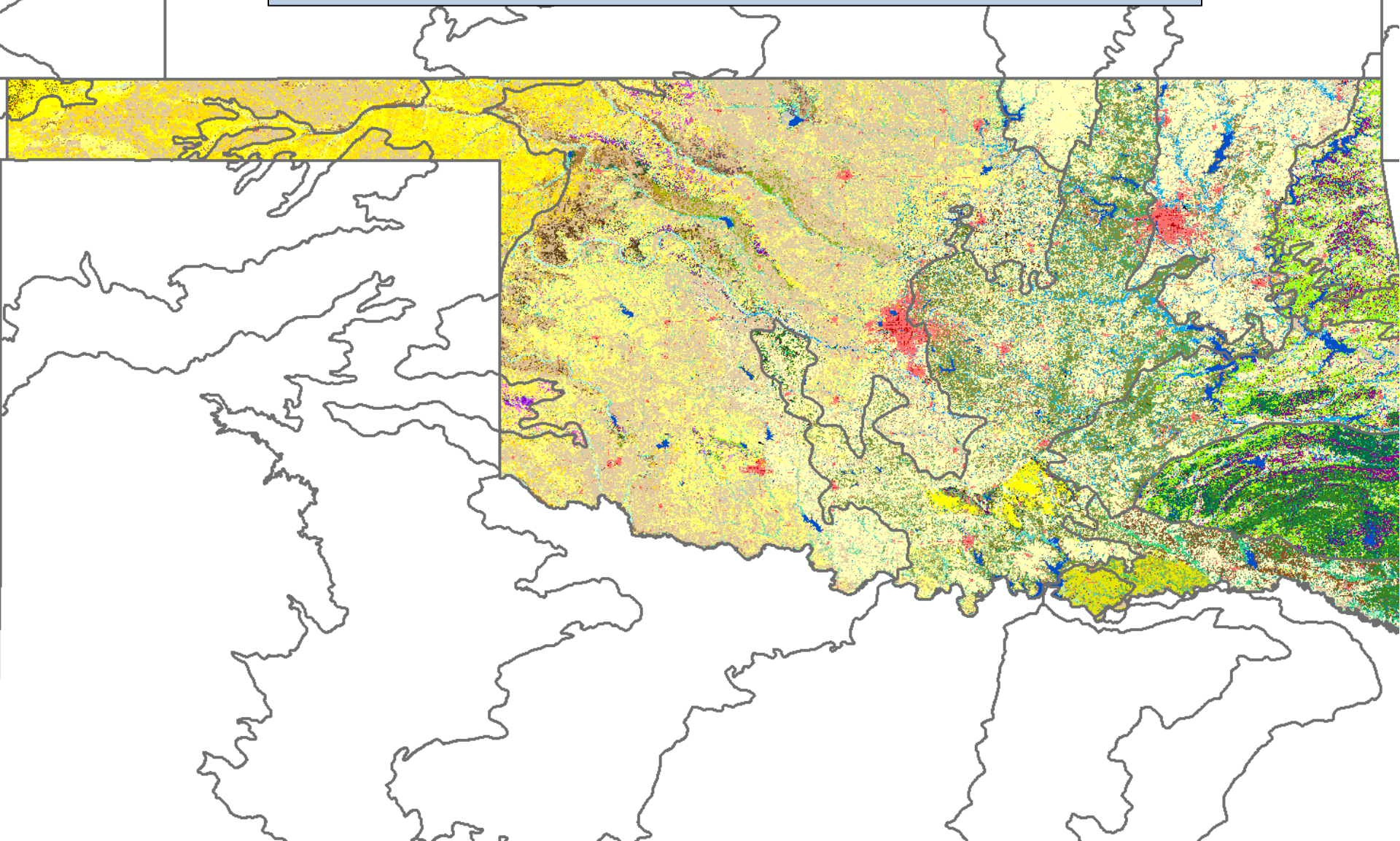


Some Statewide Summary Information from Georeferenced Field Plots

- Most Common in Herbaceous Layer
 - Bermudagrass (23.3% of plots)
 - Greenbriar (19.2%)
 - Field Brome (16.4%)
 - Little Bluestem was 7th most common (8.9%)
- Most Common Trees
 - Post Oak (16.7%)
 - Blackjack Oak (10.2%)
 - Pecan (9.7%)
 - Sugarberry (9.0%)
- Shrub Layer
 - Winged Elm (14.2%)
 - Eastern Redcedar (13.2%)



166 Mapped Types; types and naming based on local modifications of the national Ecological Systems Classification

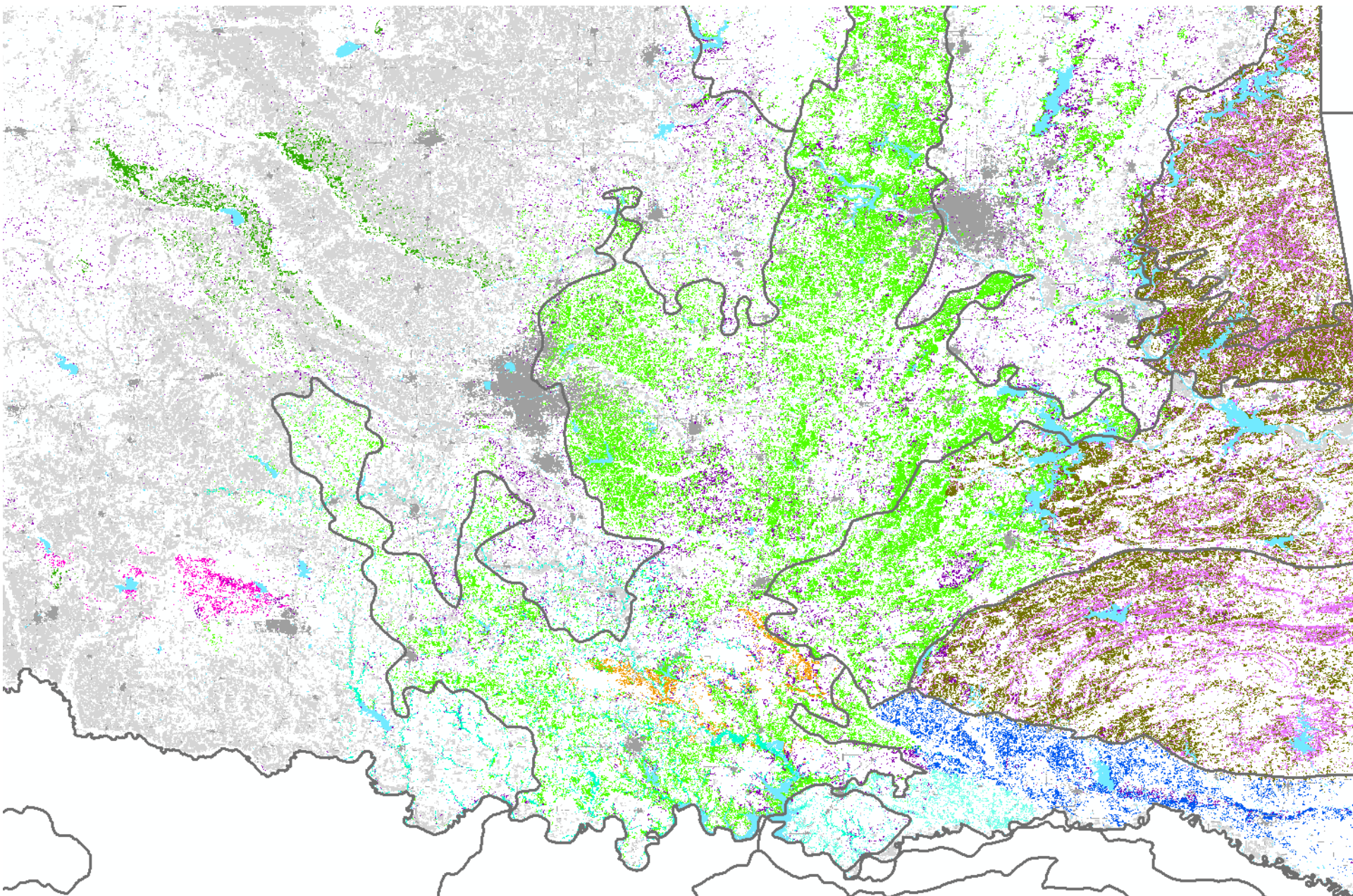


Some Statewide Summary Statistics

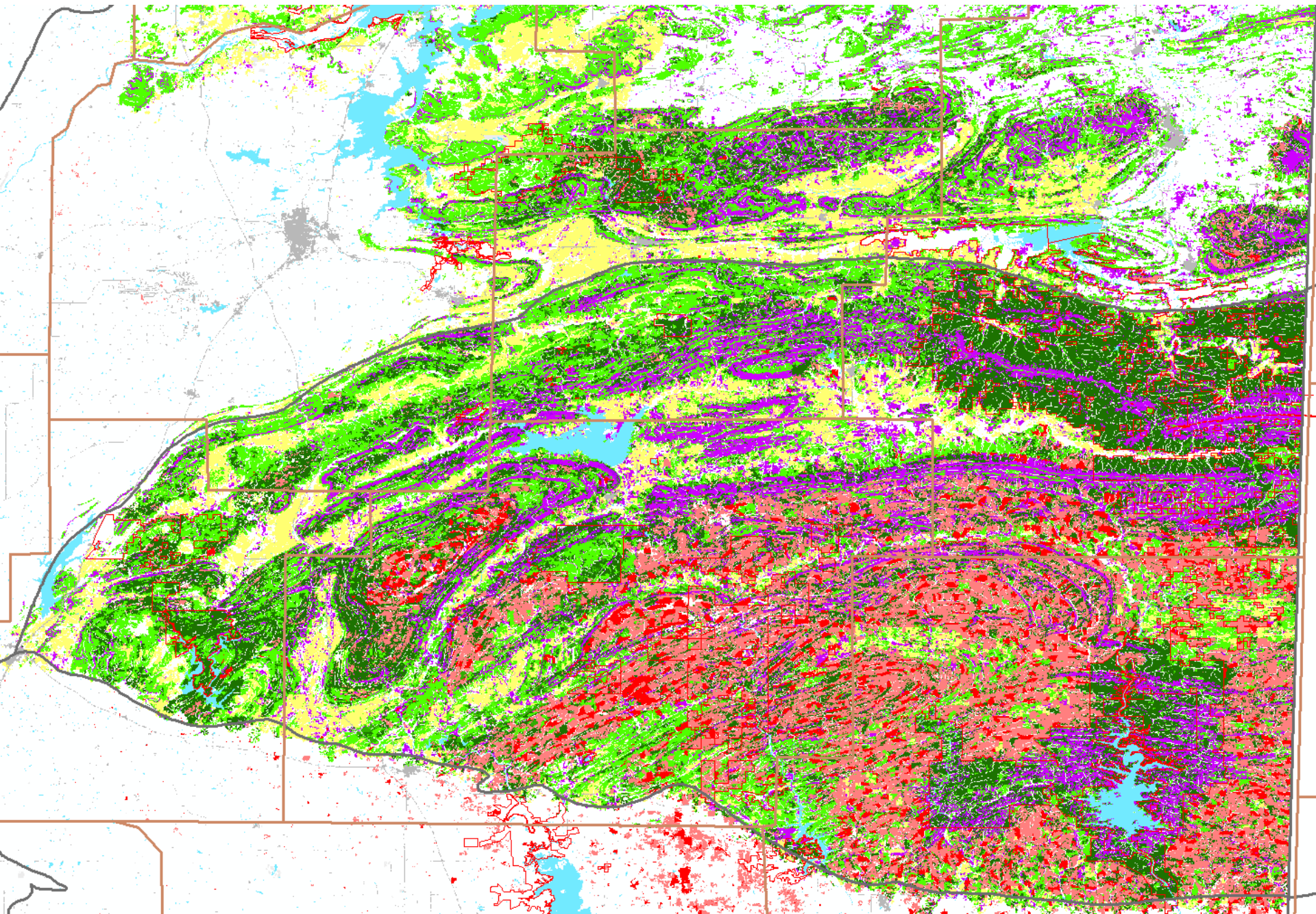
- 166 Types Mapped
 - Row Crops covered 2.8 million ha, 15.8%
 - Crosstimbers: Pasture/Prairie & Central Mixedgrass: Prairie/Pasture each made up more than 10%
 - Crosstimbers: Post Oak-Blackjack Oak Forest and Woodland covered >1 million ha (5.7%)
 - 87 (52.7%) types made up <10,000 hectares each; 42 make up more than 50,000 ha each
 - Urban areas covered 2.8% and water 1.8%



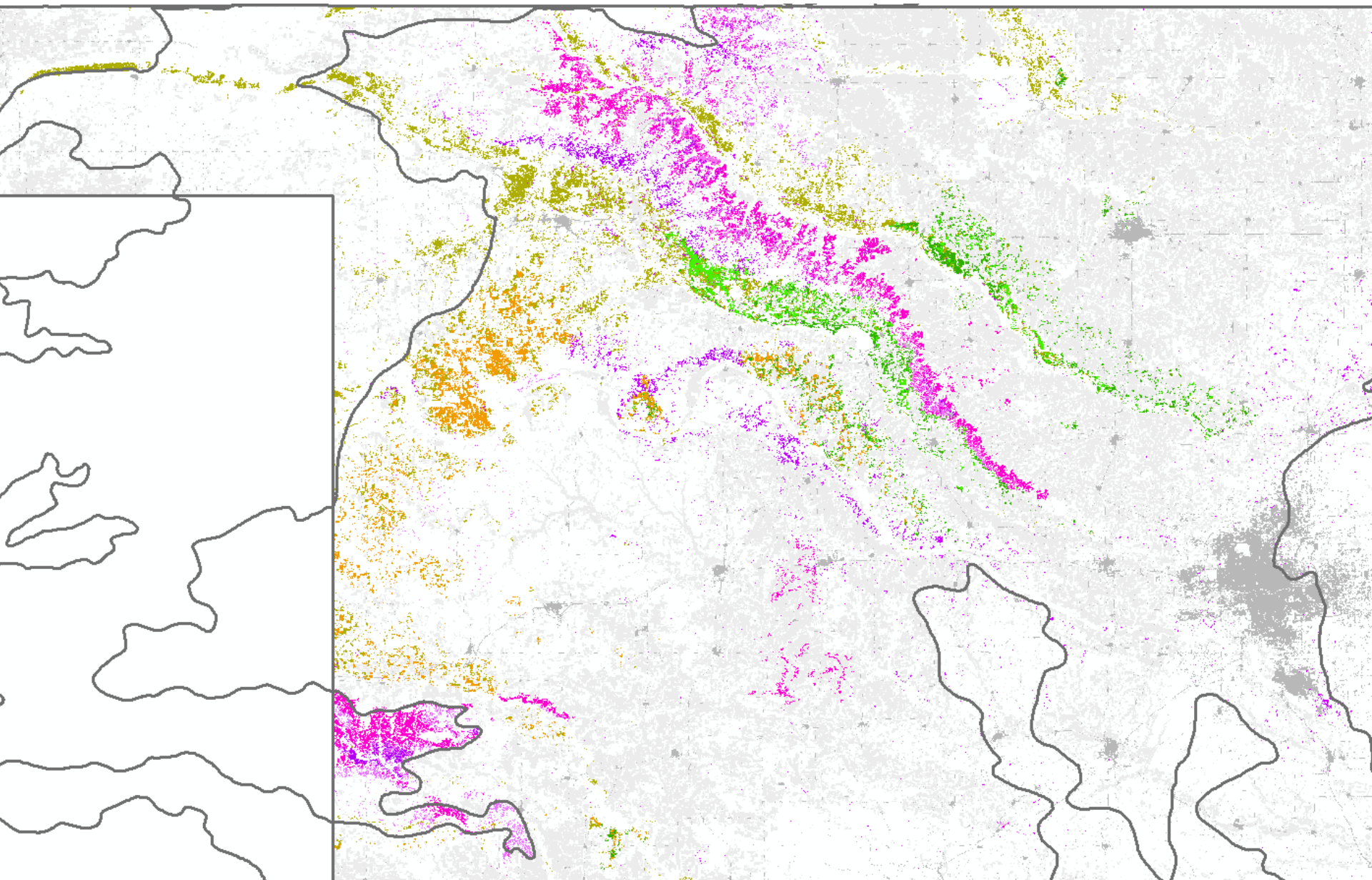
Major Upland Deciduous Oak Forests and Woodlands
(Urban and Row Crops are in gray)



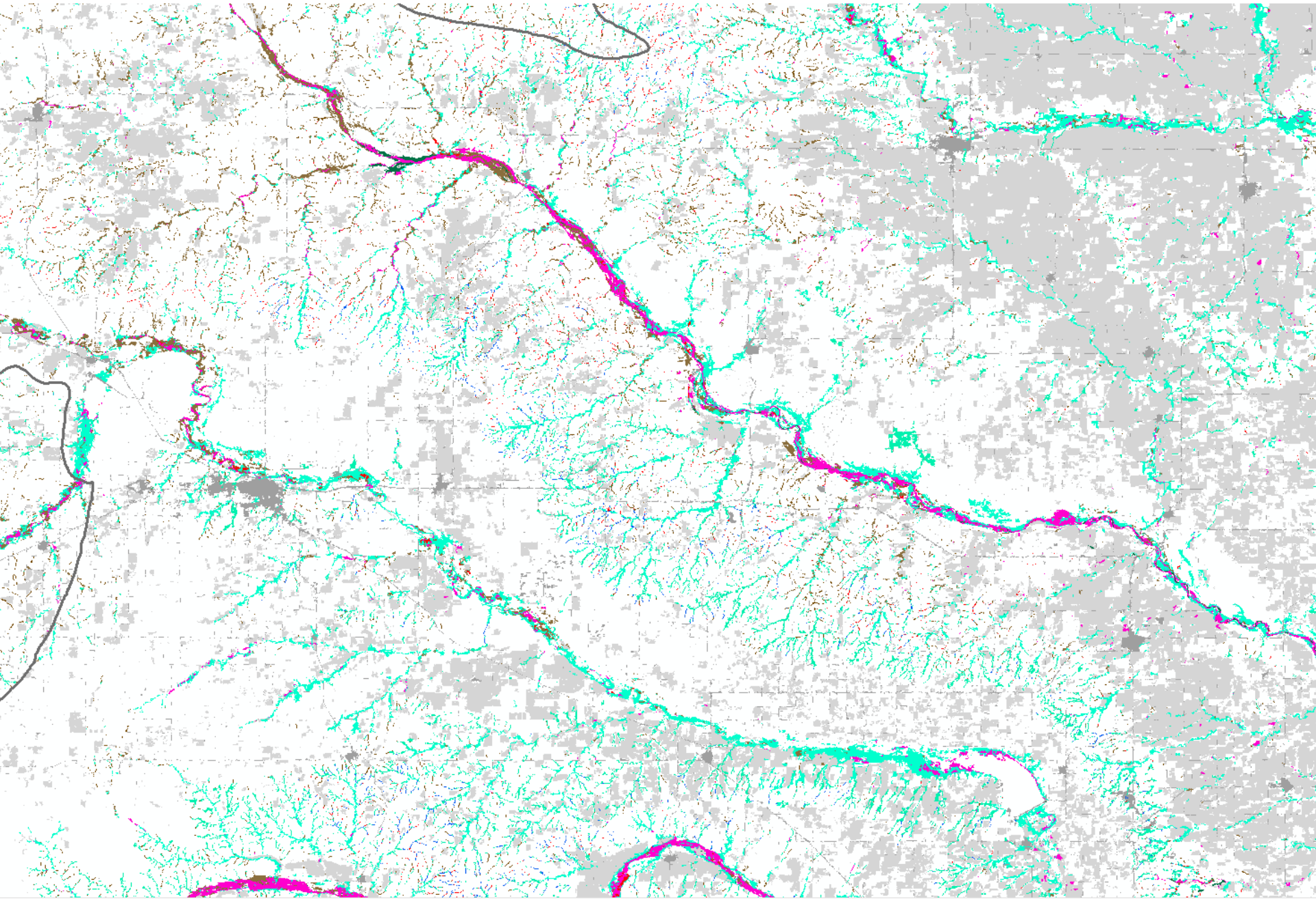
Ouachita Mountains Vegetation (pink/red are pine plantations)



Gyp & Canyon Types (pink, purple) long with Deep (Pleistocene) Sand
Types (green & olive); Havard Shin Oak in orange

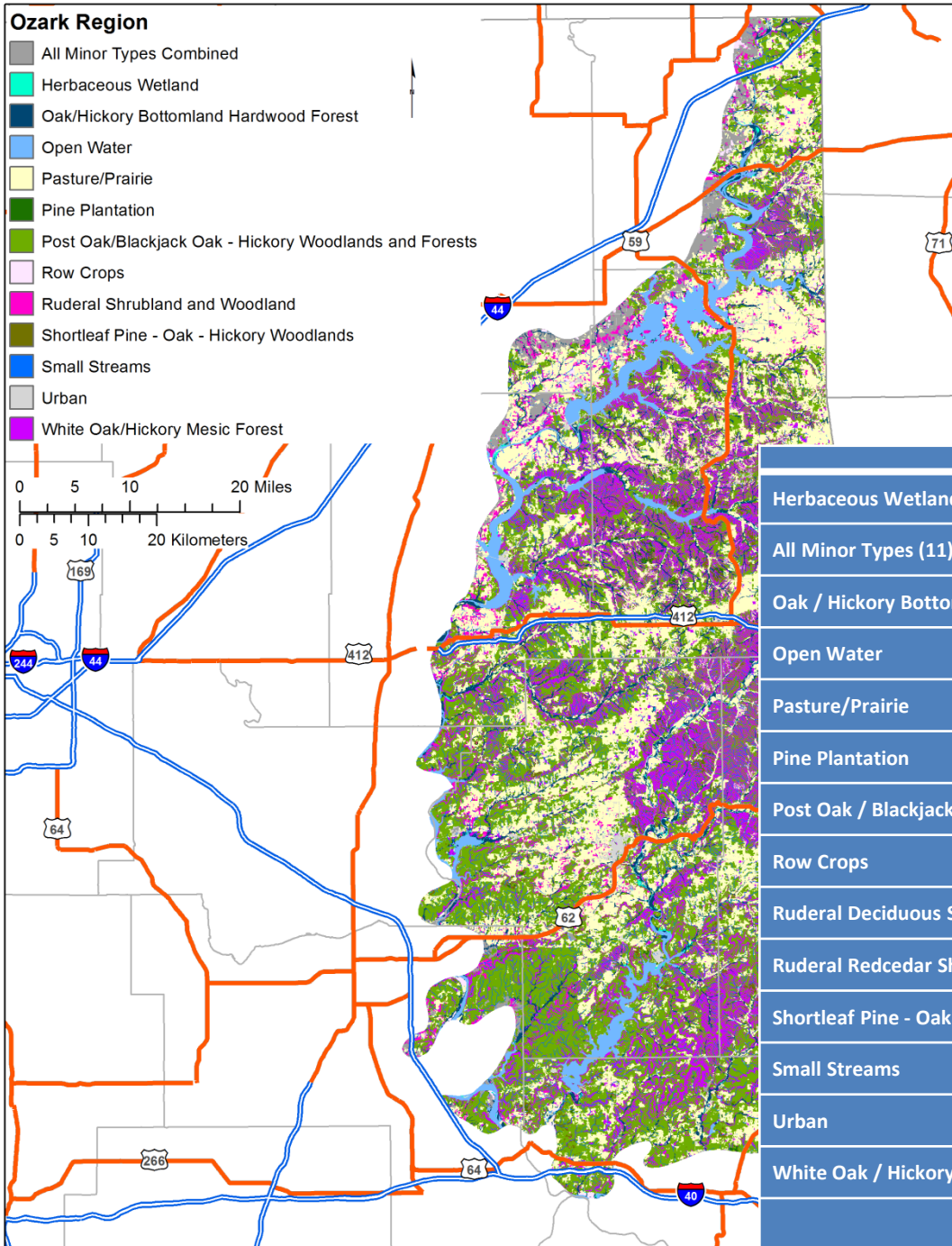
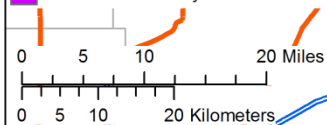


Bottomland and Riparian Types were Mapped



Ozark Region

- All Minor Types Combined
- Herbaceous Wetland
- Oak/Hickory Bottomland Hardwood Forest
- Open Water
- Pasture/Prairie
- Pine Plantation
- Post Oak/Blackjack Oak - Hickory Woodlands and Forests
- Row Crops
- Ruderal Shrubland and Woodland
- Shortleaf Pine - Oak - Hickory Woodlands
- Small Streams
- Urban
- White Oak/Hickory Mesic Forest



Regional Summary Information for the Comprehensive Wildlife Strategy

Land Cover Type	Area (acres)	Percent
Herbaceous Wetland	5,294	0.259%
All Minor Types (11) Combined	36,456	1.785%
Oak / Hickory Bottomland Hardwood Forest	93,407	4.574%
Open Water	88,383	4.328%
Pasture/Prairie	569,930	27.909%
Pine Plantation	4,156	0.204%
Post Oak / Blackjack Oak - Hickory Woodlands and Forests	715,875	35.056%
Row Crops	6,082	0.298%
Ruderal Deciduous Shrubland and Woodland	34,281	1.679%
Ruderal Redcedar Shrubland and Woodland	2,162	0.106%
Shortleaf Pine - Oak - Hickory Woodlands	2,121	0.104%
Small Streams	108,671	5.322%
Urban	37,072	1.815%
White Oak / Hickory Mesic Forest	338,196	16.561%
	2,042,086	100.000%

MoRAP Current Vegetation

Deep Fork Wildlife Management Area

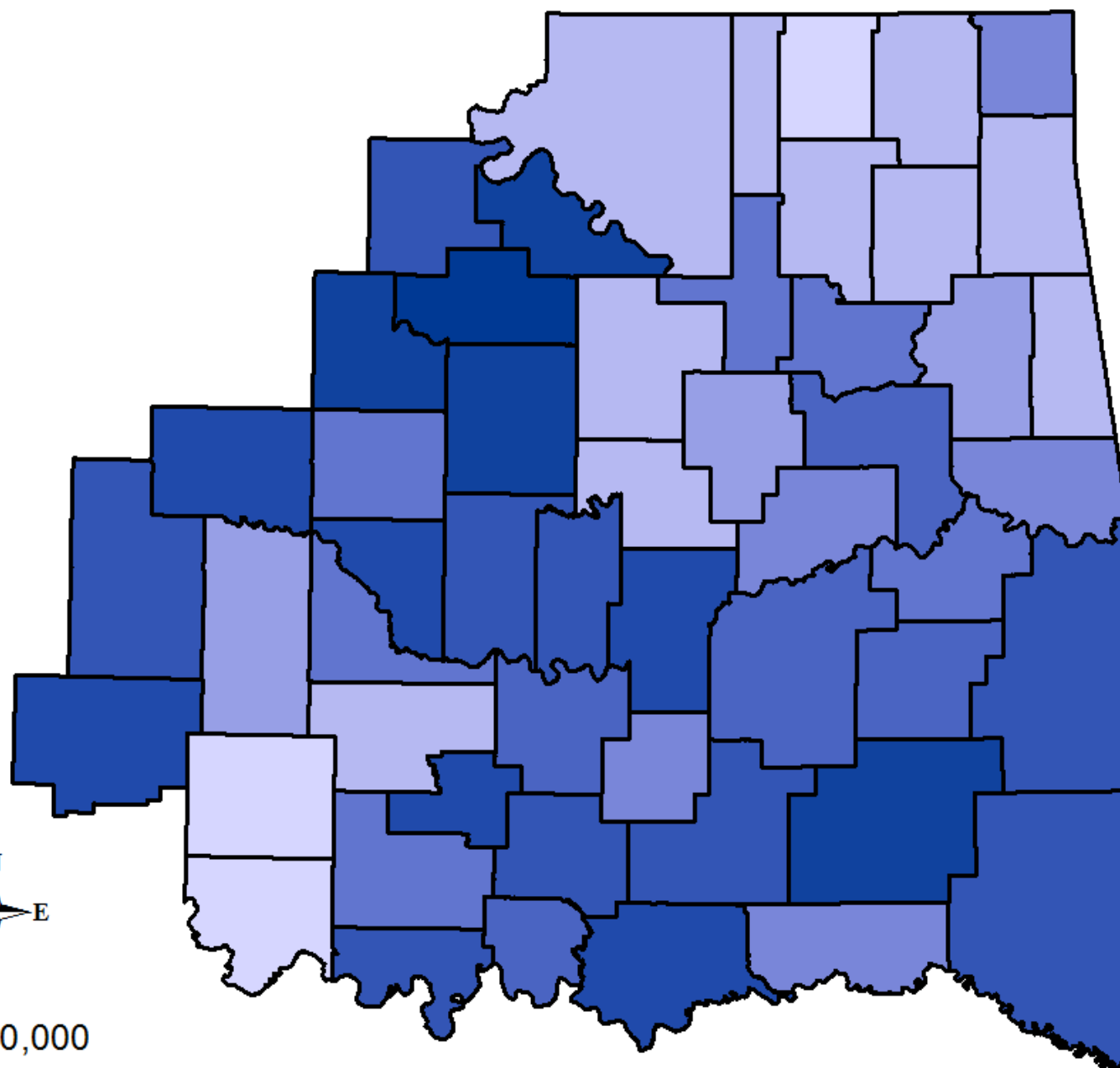
Okmulgee Game Management Area

-  Riparian and Foodplain Deciduous Shrubland and Young Woodland (often ruderal)
-  Ruderal Deciduous Shrubland and Woodland
-  Ruderal Mixed and Juniper Shrubland and Woodland
-  Shrubland and Woodland with Juniper - Not Clearly Ruderal



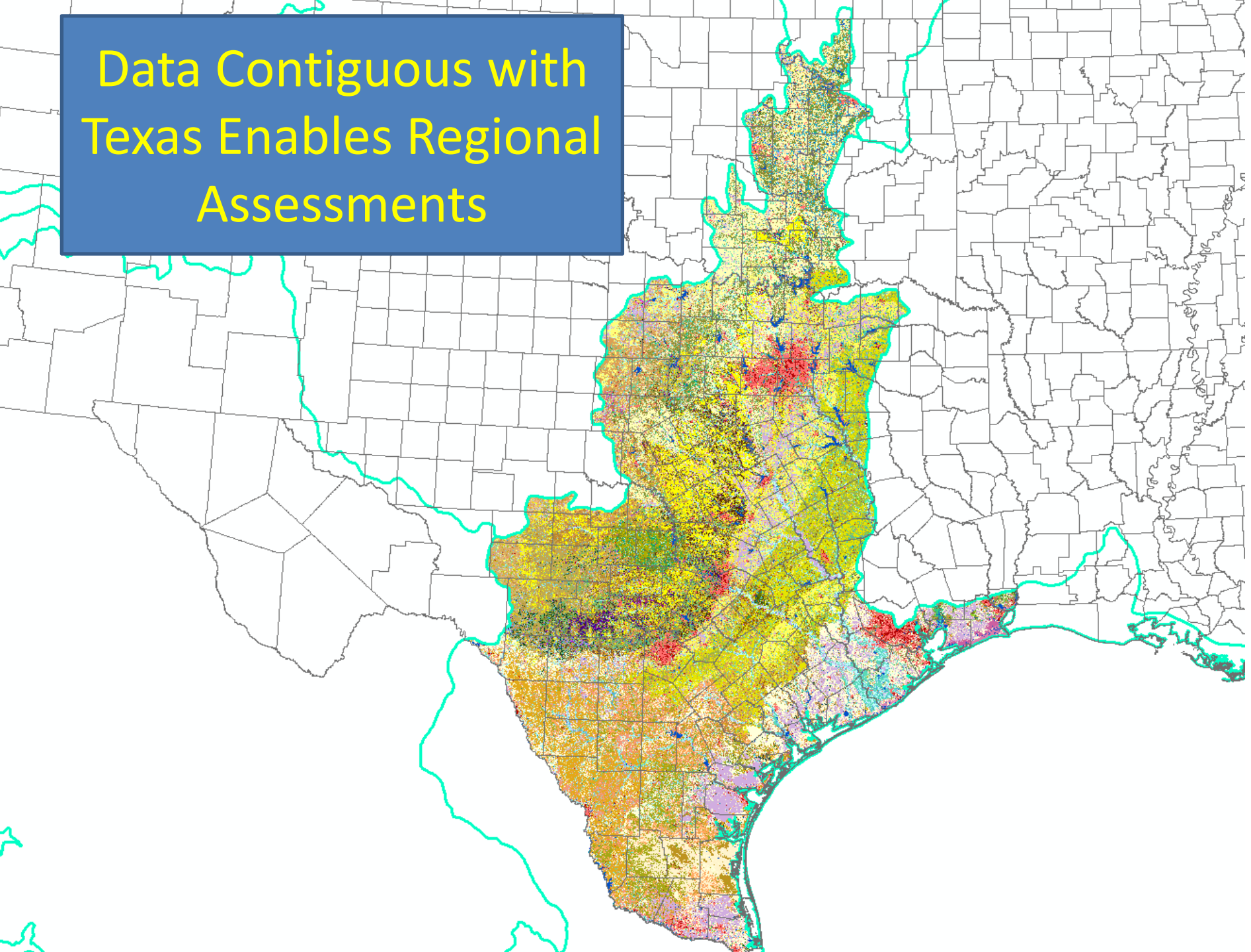
1:250,000

Ruderal Mixed and Juniper Shrubland and Woodland

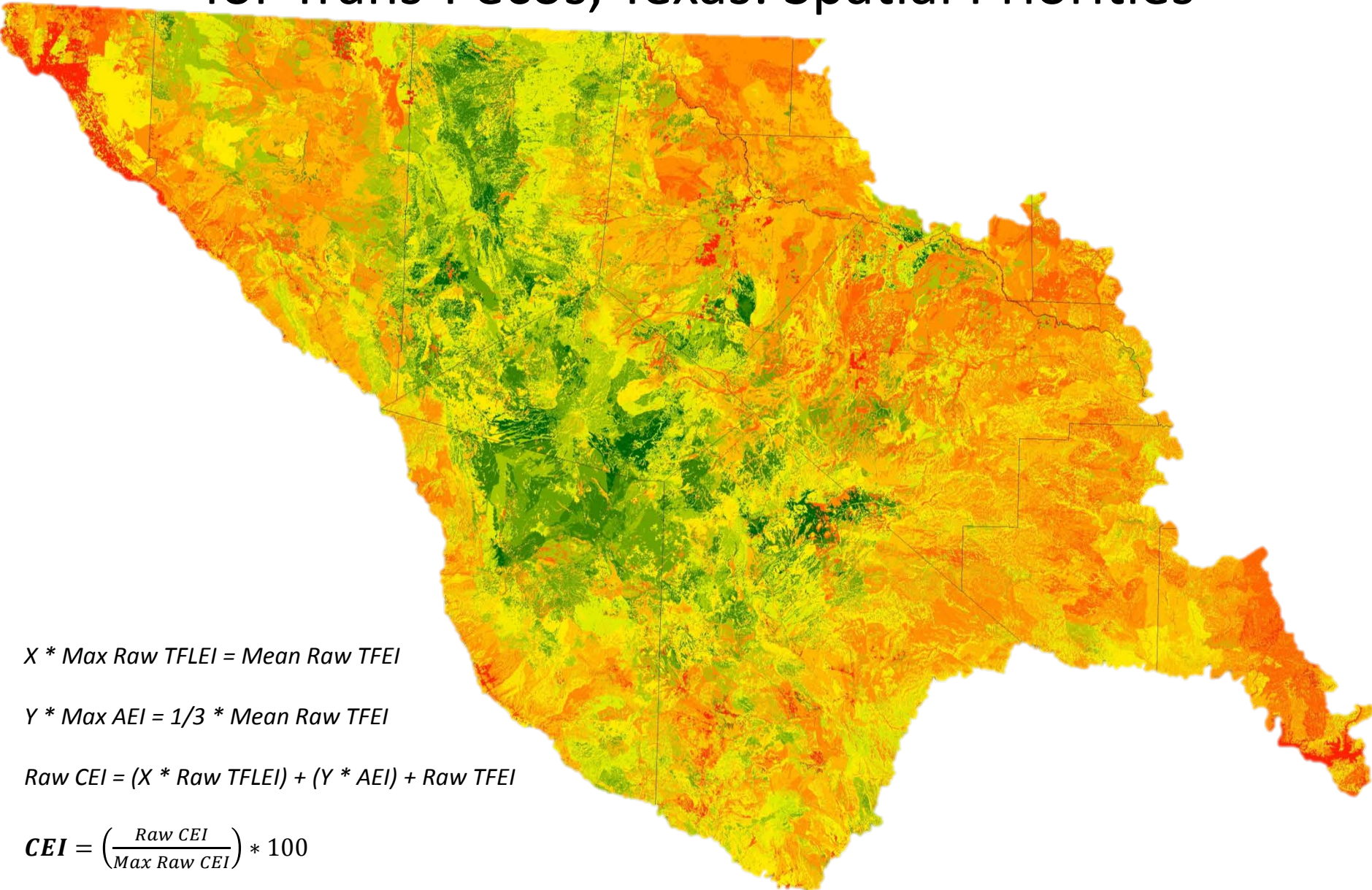


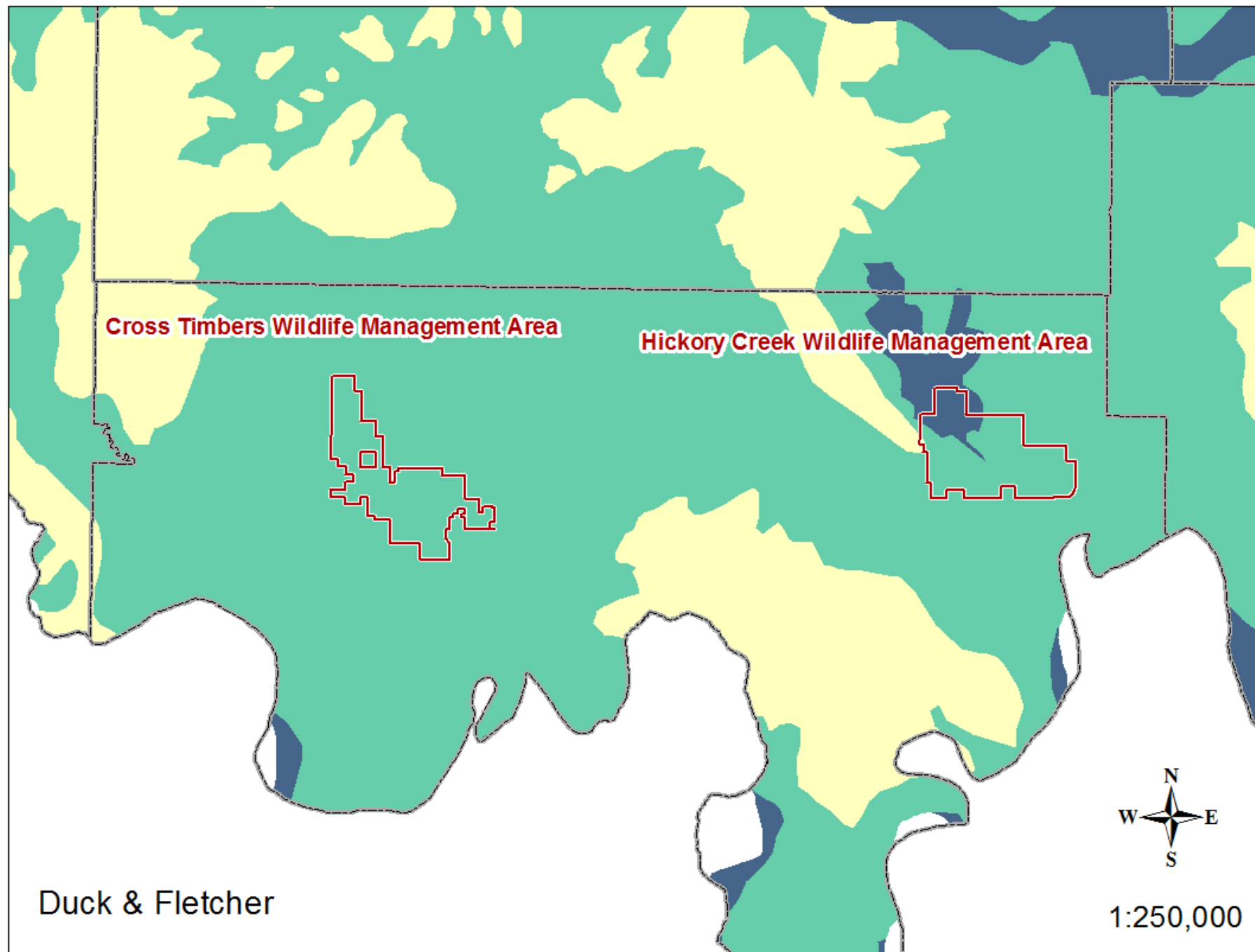
1:2,000,000

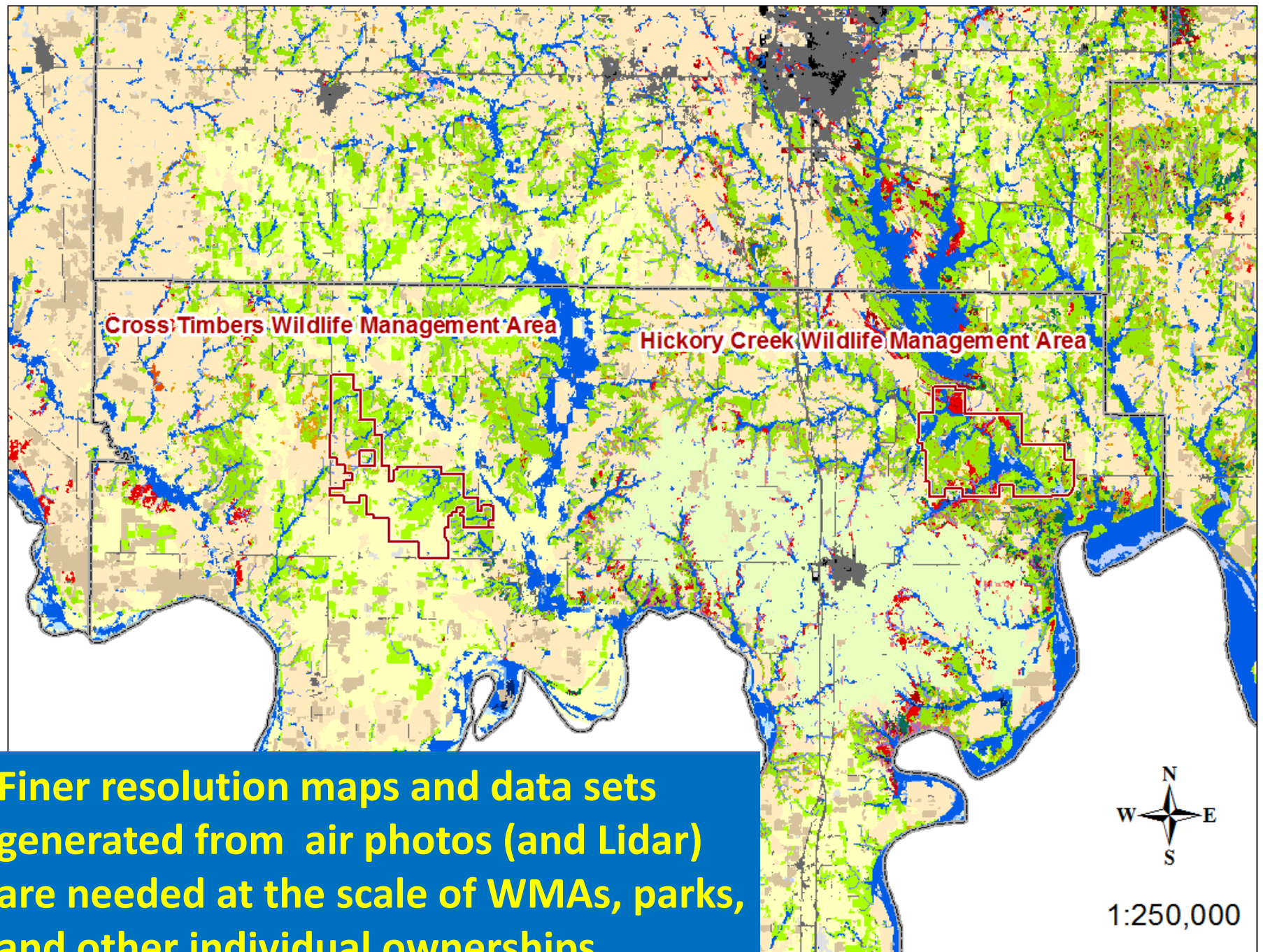
Data Contiguous with
Texas Enables Regional
Assessments



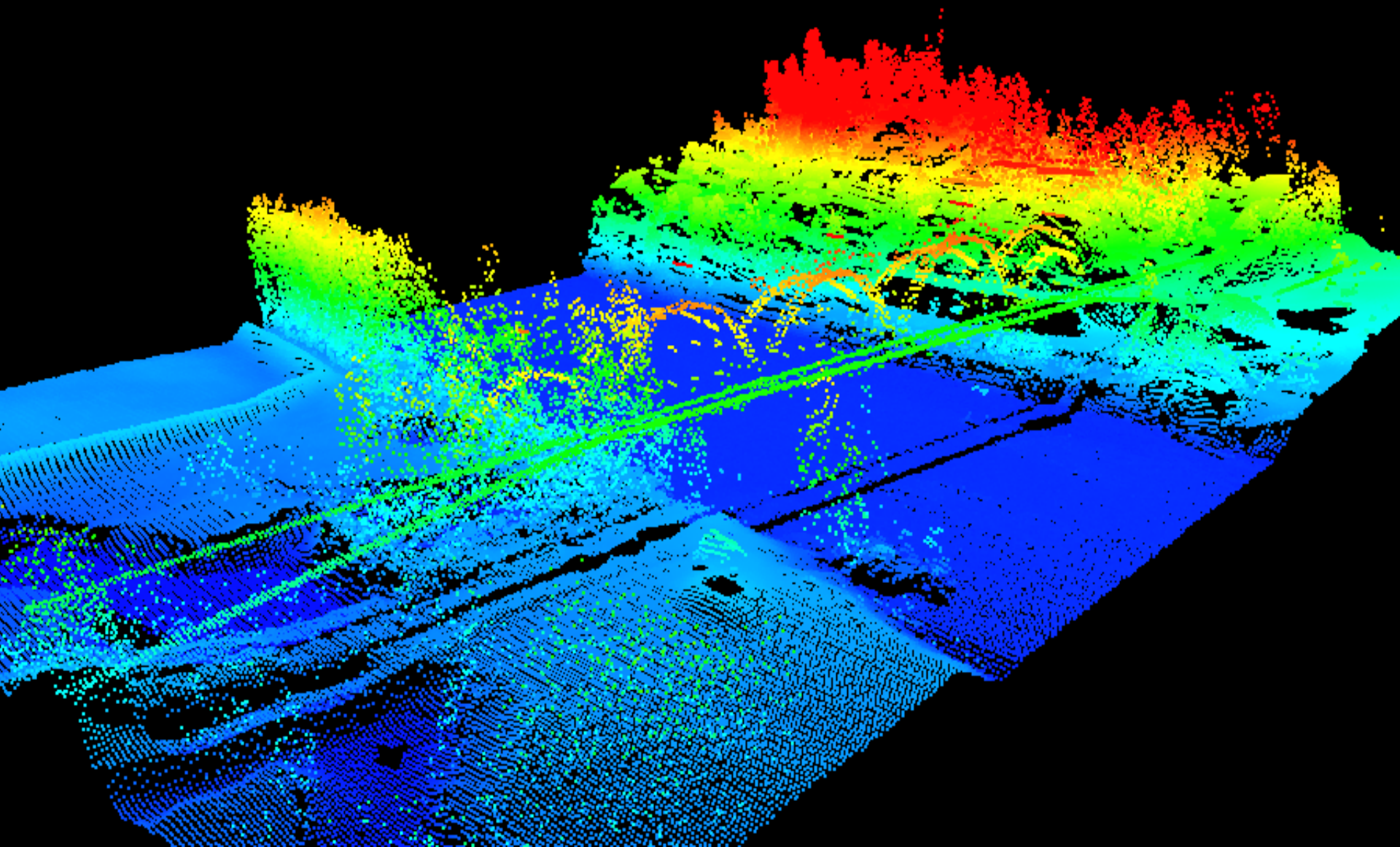
Species Modeling: Composite Ecological Index for Trans-Pecos, Texas: Spatial Priorities

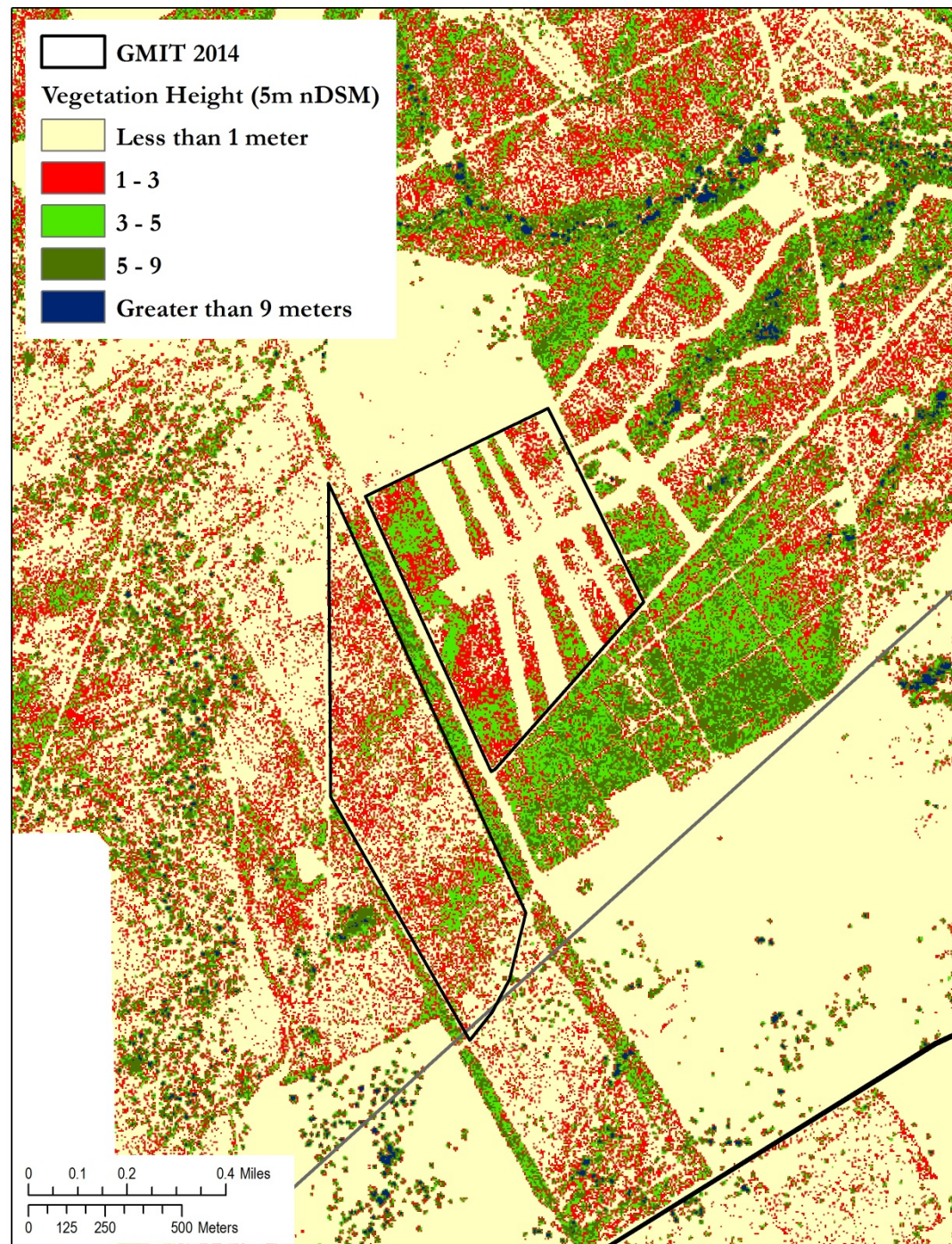






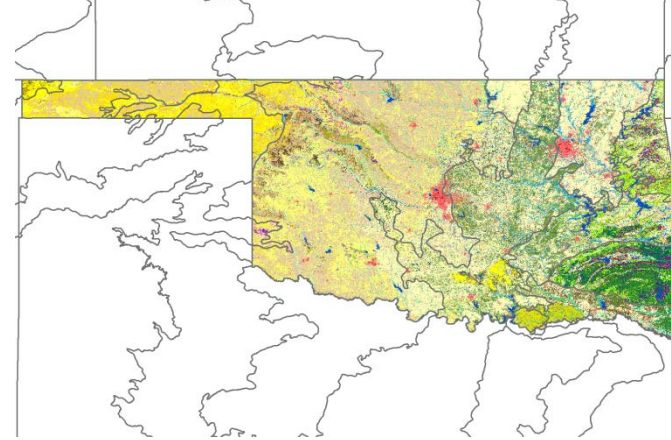
Lidar Point Cloud: enables ground surface and vegetation height and density assessments



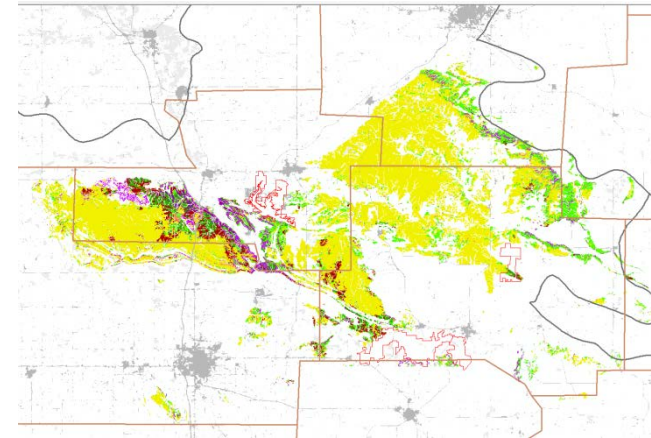


Product List

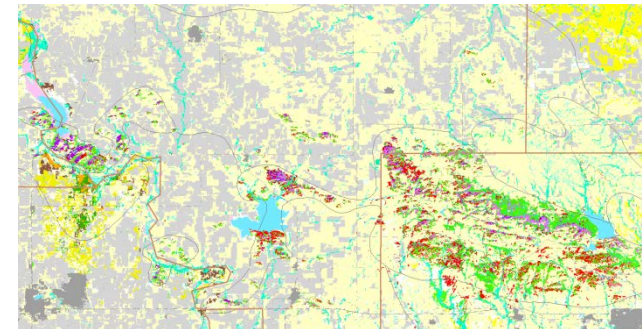
- Databases
 - Raster vegetation map
 - Vector vegetation map
 - Abiotic variables attributed to image objects
 - Field data
 - Plot data
 - Photos
- Interpretive Materials
 - Interpretive booklet
 - Methods
 - Short type descriptions
 - Range maps
 - Statewide statistics (area, percent)
 - Ecological systems (mapped type) descriptions
 - National context & standard identifier
 - More extensive species lists with a focus on concepts
 - Includes abiotic setting: geology, landform, soils



Arbuckle Mountains Types



Wichita Mountains Types



Noteworthy Improvements: Eastern Oklahoma

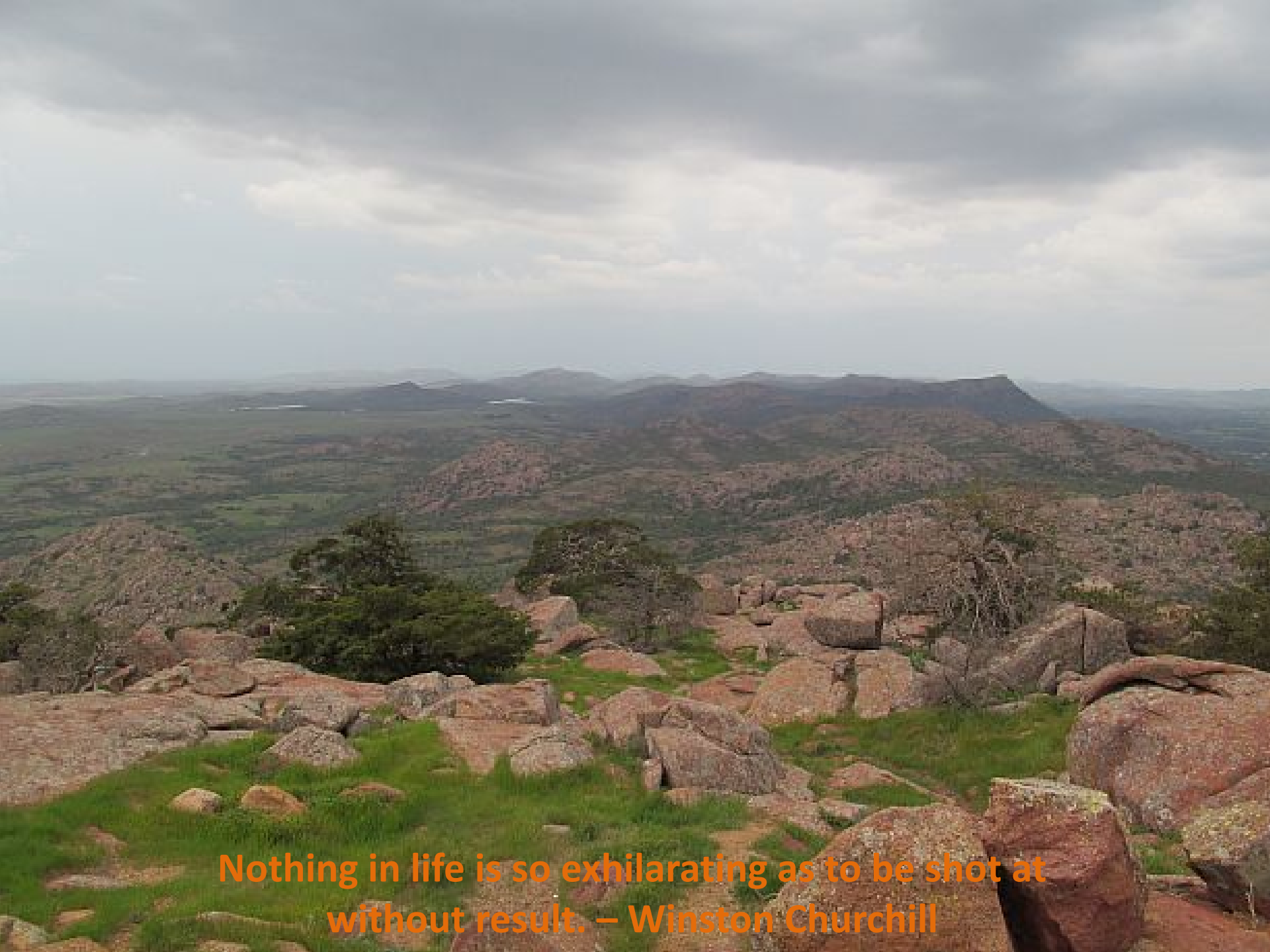
- Bottomland and riparian types mapped throughout the state
- Ruderal shrublands and woodlands mapped throughout the state
- Pine plantations mapped in SE Oklahoma
- Arbuckle Mountain types mapped
- Drier versus wetter oak-hickory types mapped in Ouachita and Ozark Regions
- Slope types (>20% slope) mapped in Ouachita and Ozark Region
- Northern outliers mapped in SE Oklahoma: calcareous grasslands, Grand Prairie, Blackland, Post Oak Savanna, West Gulf Coastal Plain types
- Sandyland woodland and shrubland types mapped



Noteworthy Improvements: Western Oklahoma

- Unique deep Pleistocene sand woodlands mapped (mainly blackjack oak)
- Havard shin oak type mapped
- Sand sagebrush and deep sand grasslands mapped
- Gyp and canyon types mapped
- Recently retired, planted grasslands mapped in panhandle
- Black Mesa suite of types mapped
- Mesquite type mapped in SW Oklahoma
- Wichita Mountain types mapped (including western outliers)





Nothing in life is so exhilarating as to be shot at without result. – Winston Churchill