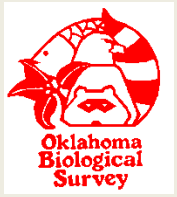
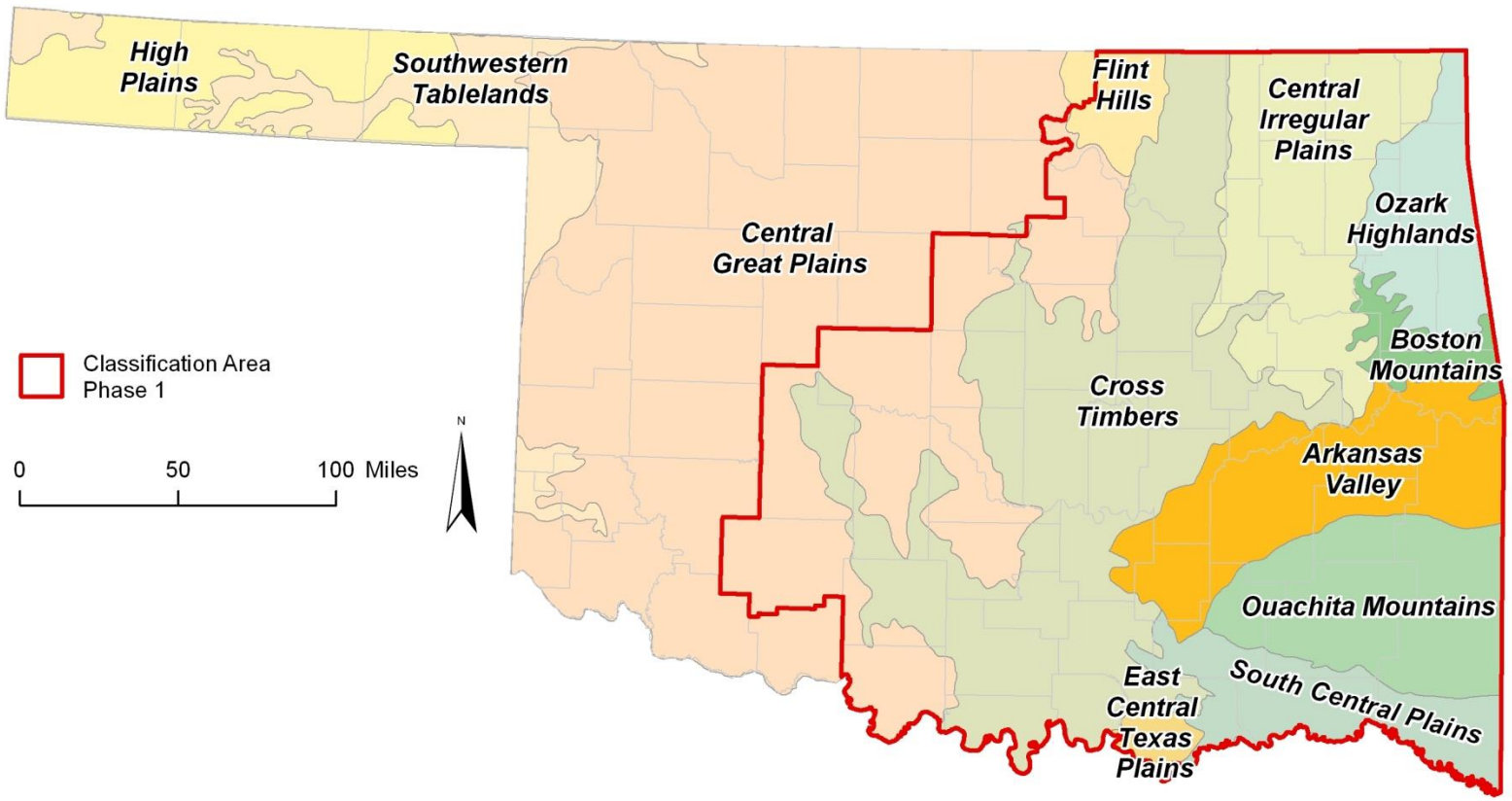
Developing a New Land Cover Map for Oklahoma

Bruce Hoagland, Dan Hough, Todd Fagin, and Kayti Ewing

Oklahoma Biological Survey




High Plains
Southwestern Tablelands
Flint Hills
Central Irregular Plains
Ozark Highlands
Central Great Plains
Boston Mountains
Cross Timbers
Arkansas Valley
Ouachita Mountains
East Central Texas Plains
South Central Plains
Classification Area Phase 1
0
50
100 Miles
N

Texas Ecological Systems Classification Project

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Lee Elliott
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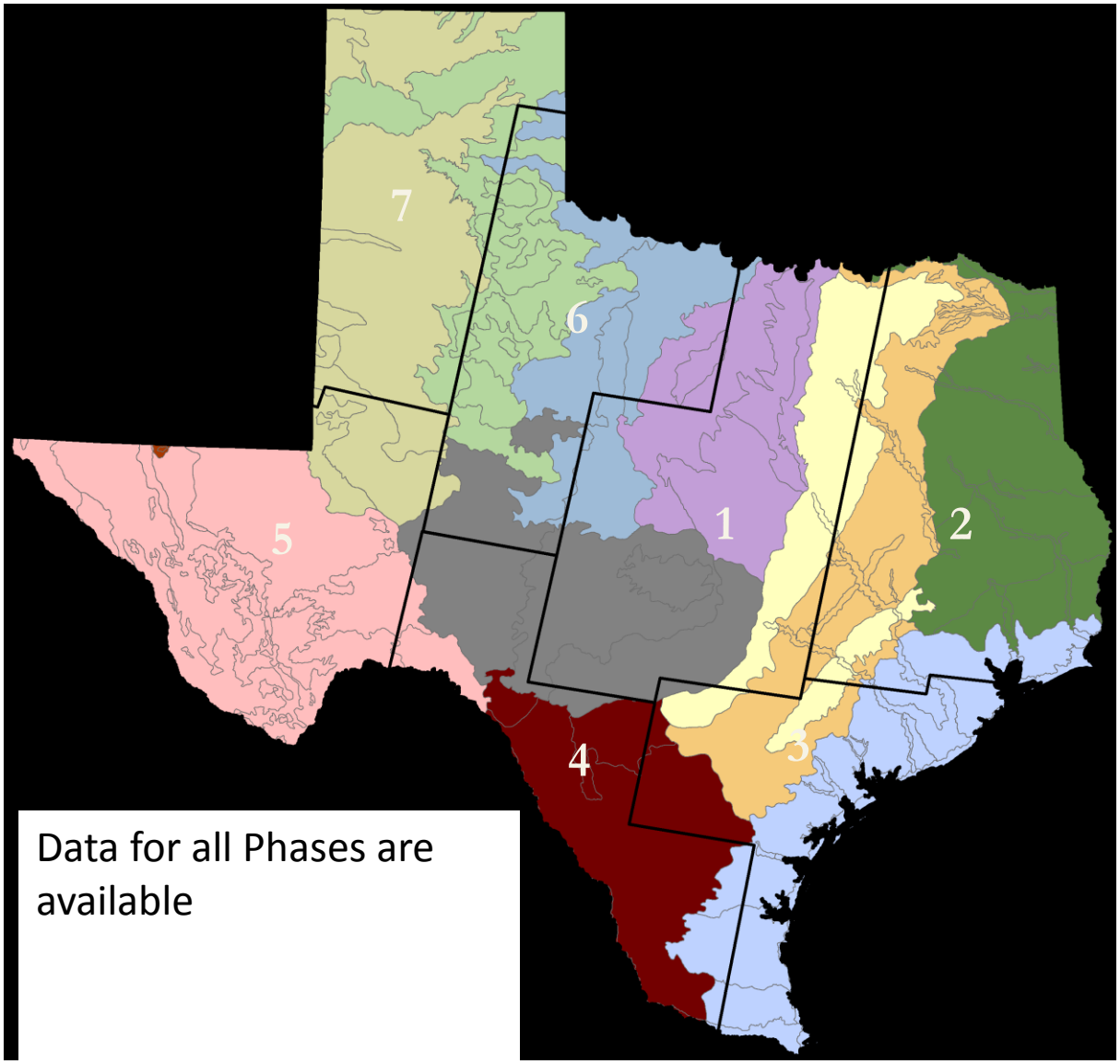
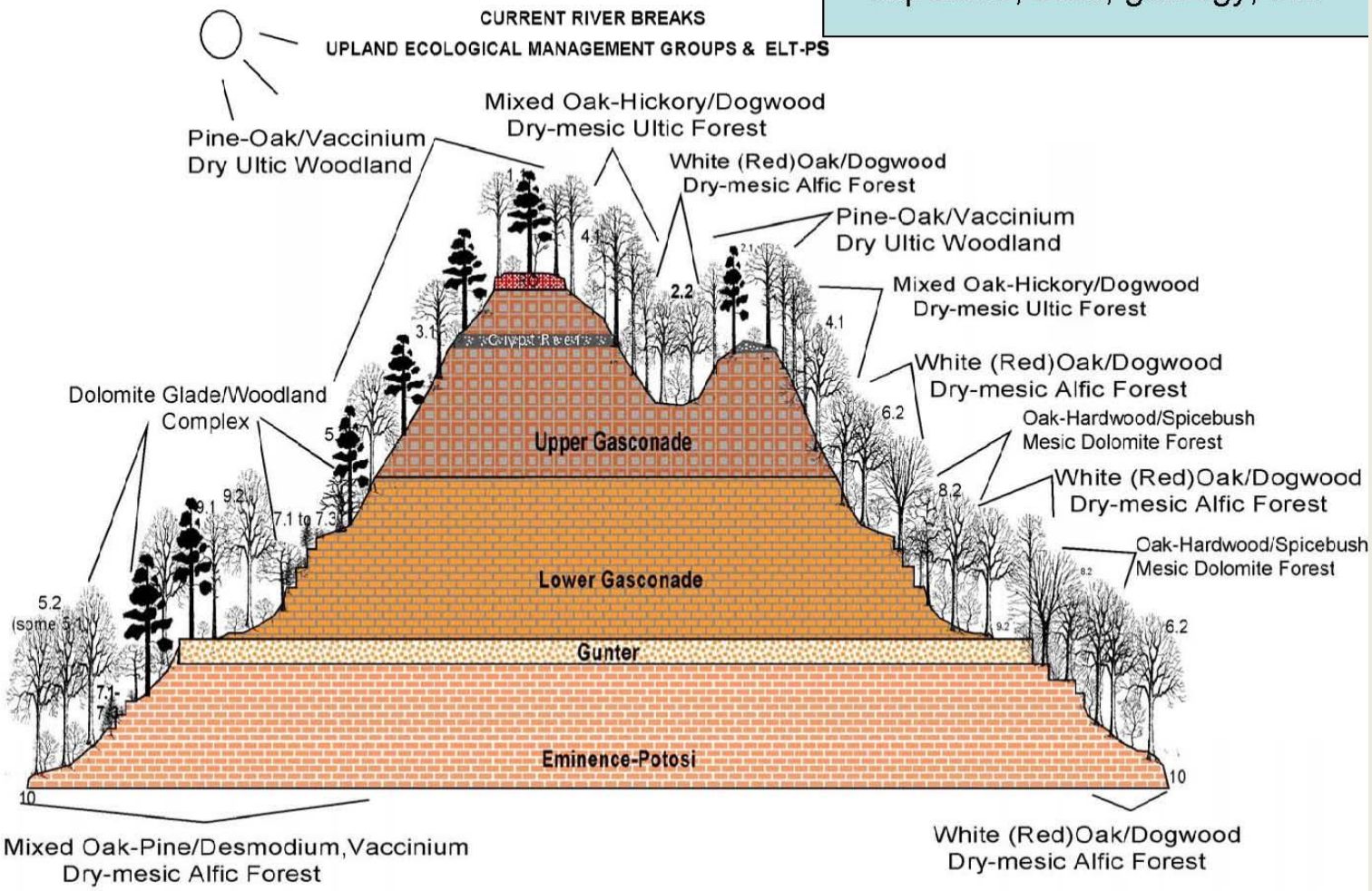
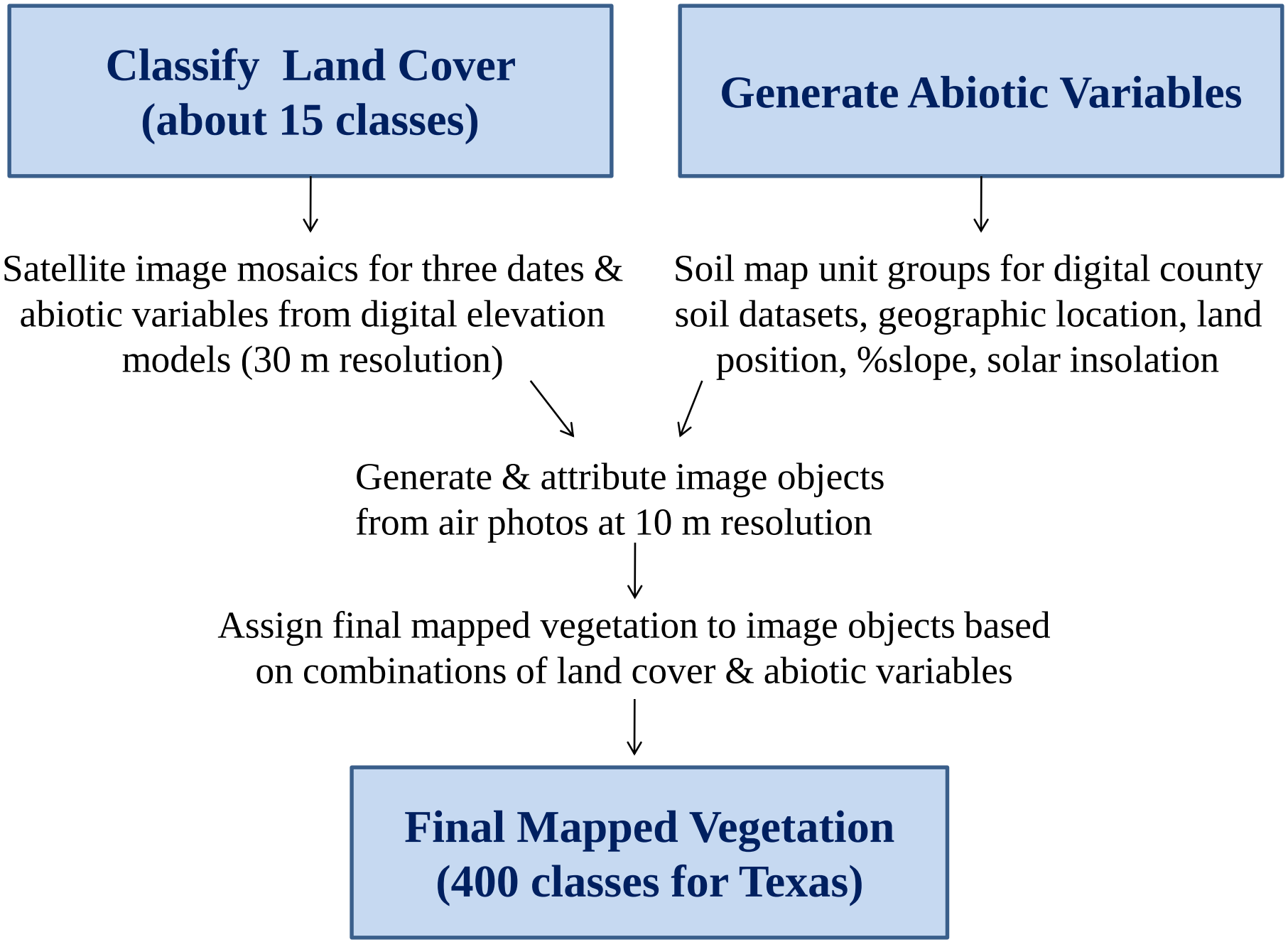
Judy Teague
Milo Pyne

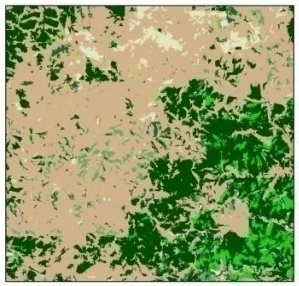


Data for all Phases are available

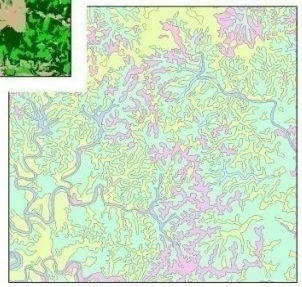
Vegetation is influenced by slope, exposure, soils, geology, etc.



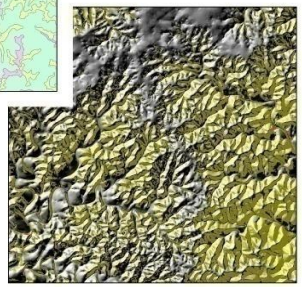

Classify Land Cover (about 15 classes)
Generate Abiotic Variables
Satellite image mosaics for three dates & abiotic variables from digital elevation models (30 m resolution)
Soil map unit groups for digital county soil datasets, geographic location, land position, %slope, solar insolation
Generate & attribute image objects from air photos at 10 m resolution
Assign final mapped vegetation to image objects based on combinations of land cover & abiotic variables
Final Mapped Vegetation (400 classes for Texas)



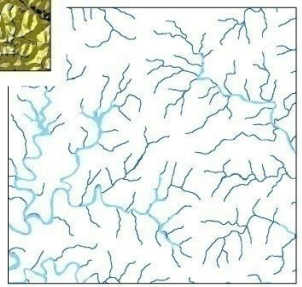
Land Cover



Digital County Soils

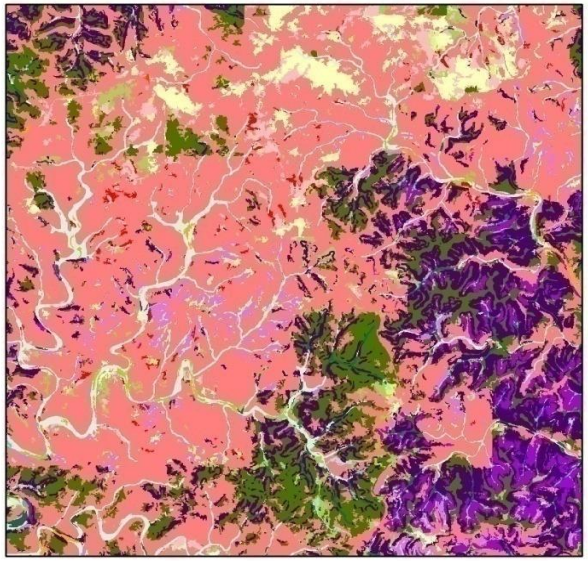


Slopes >20% in yellow
Cliffs (slopes>100%) in red

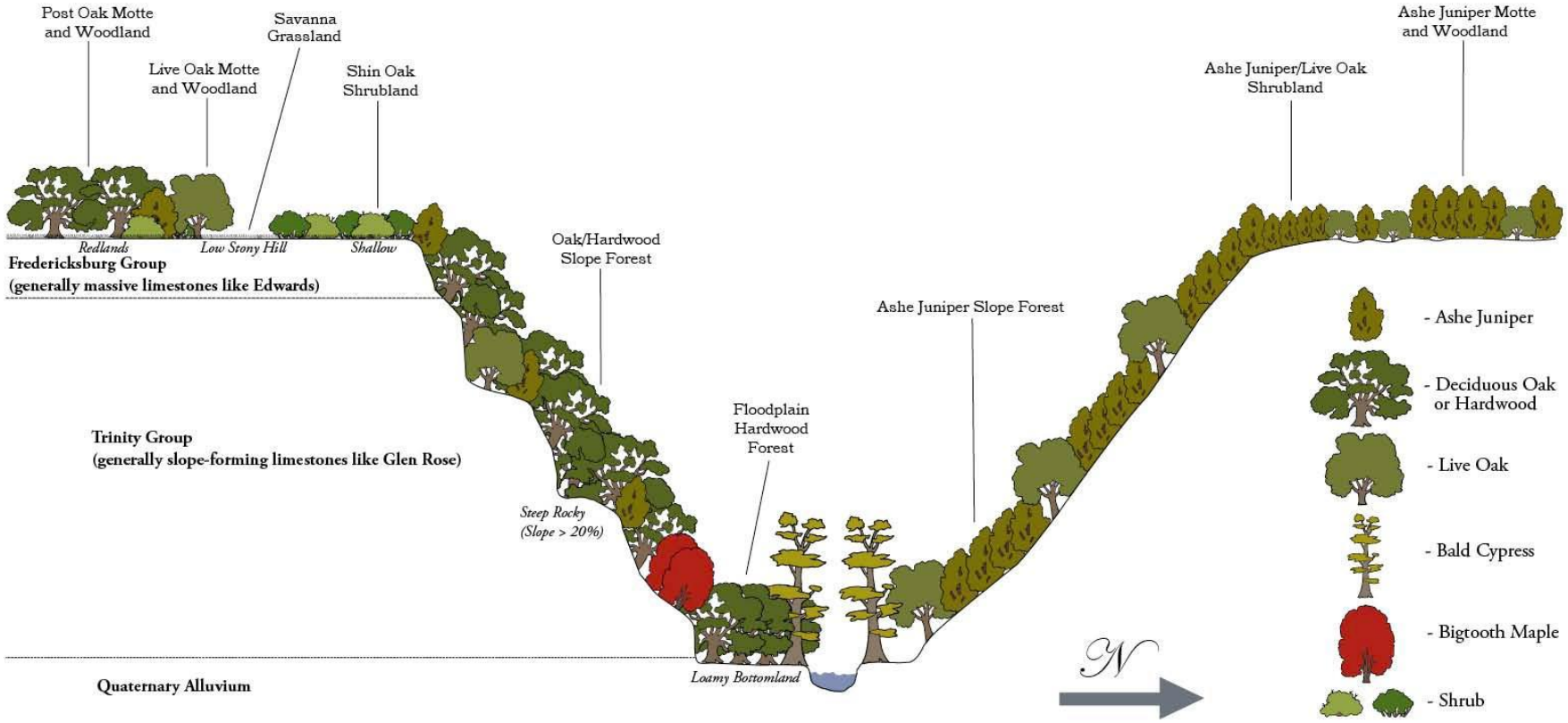


Floodplains & Riparian Zones

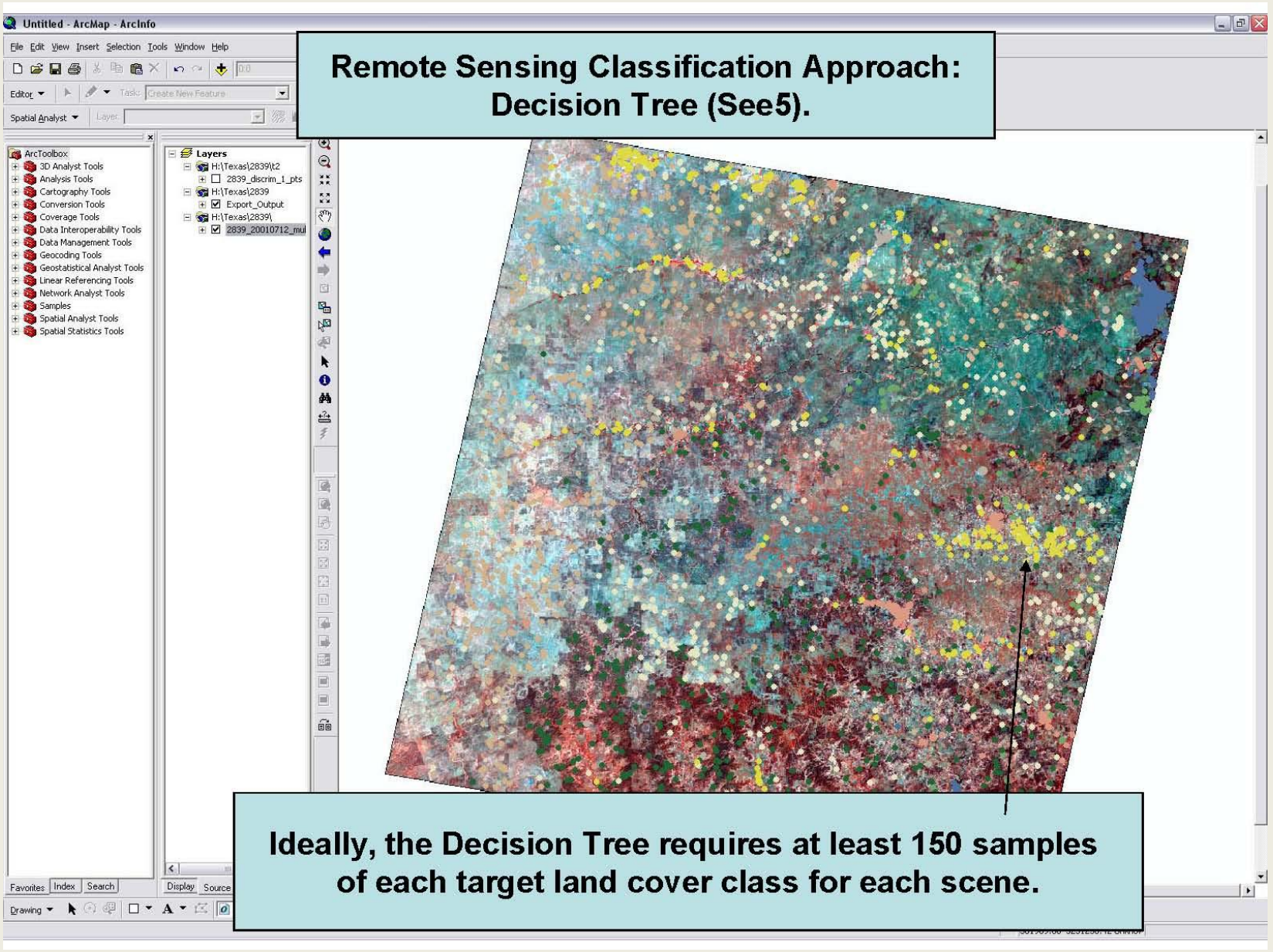
Final Mapped Vegetation Types



Representative Edwards Plateau Mapped Vegetation

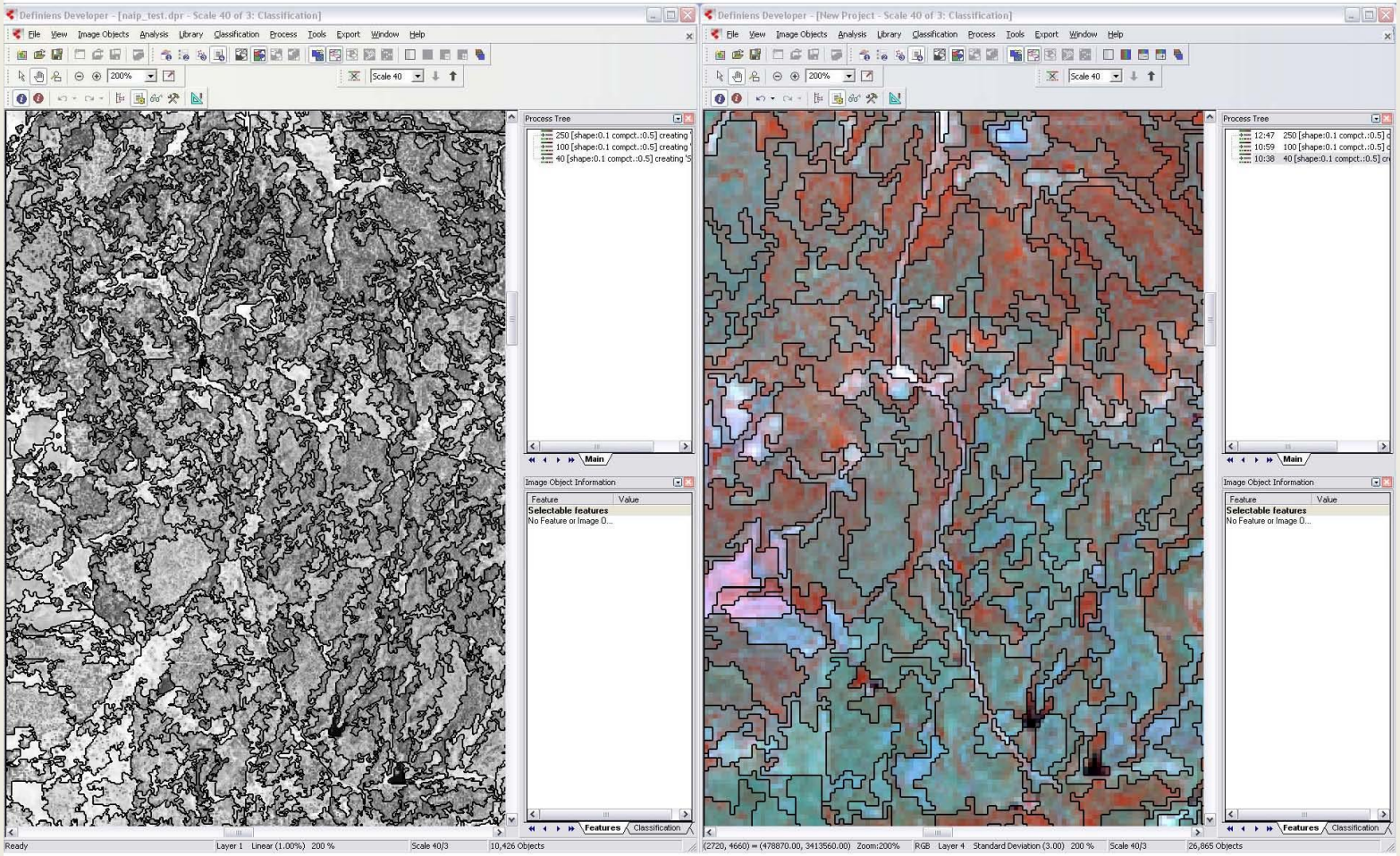


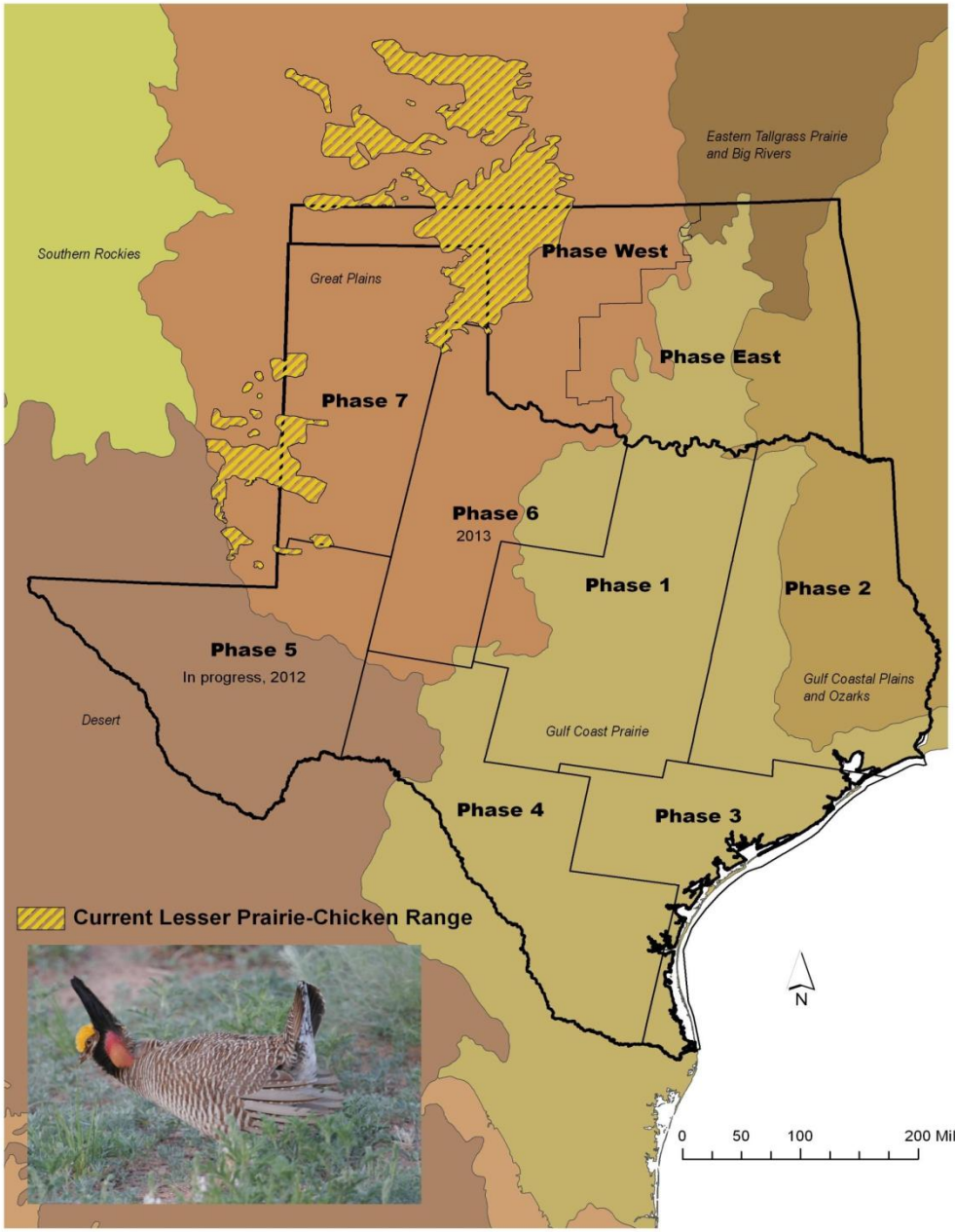
Remote Sensing Classification Approach: Decision Tree (See5).



Ideally, the Decision Tree requires at least 150 samples of each target land cover class for each scene.

Image Objects – Improvement in Spatial Resolution




Eastern Tallgrass Prairie and Big Rivers
Southern Rockies
Great Plains
Phase West
Phase East
Phase 7
Phase 6
2013
Phase 1
Phase 2
Phase 5
In progress, 2012
Gulf Coastal Plains and Ozarks
Desert
Gulf Coast Prairie
Phase 4
Phase 3
Current Lesser Prairie-Chicken Range
N
0 50 100 200 Miles

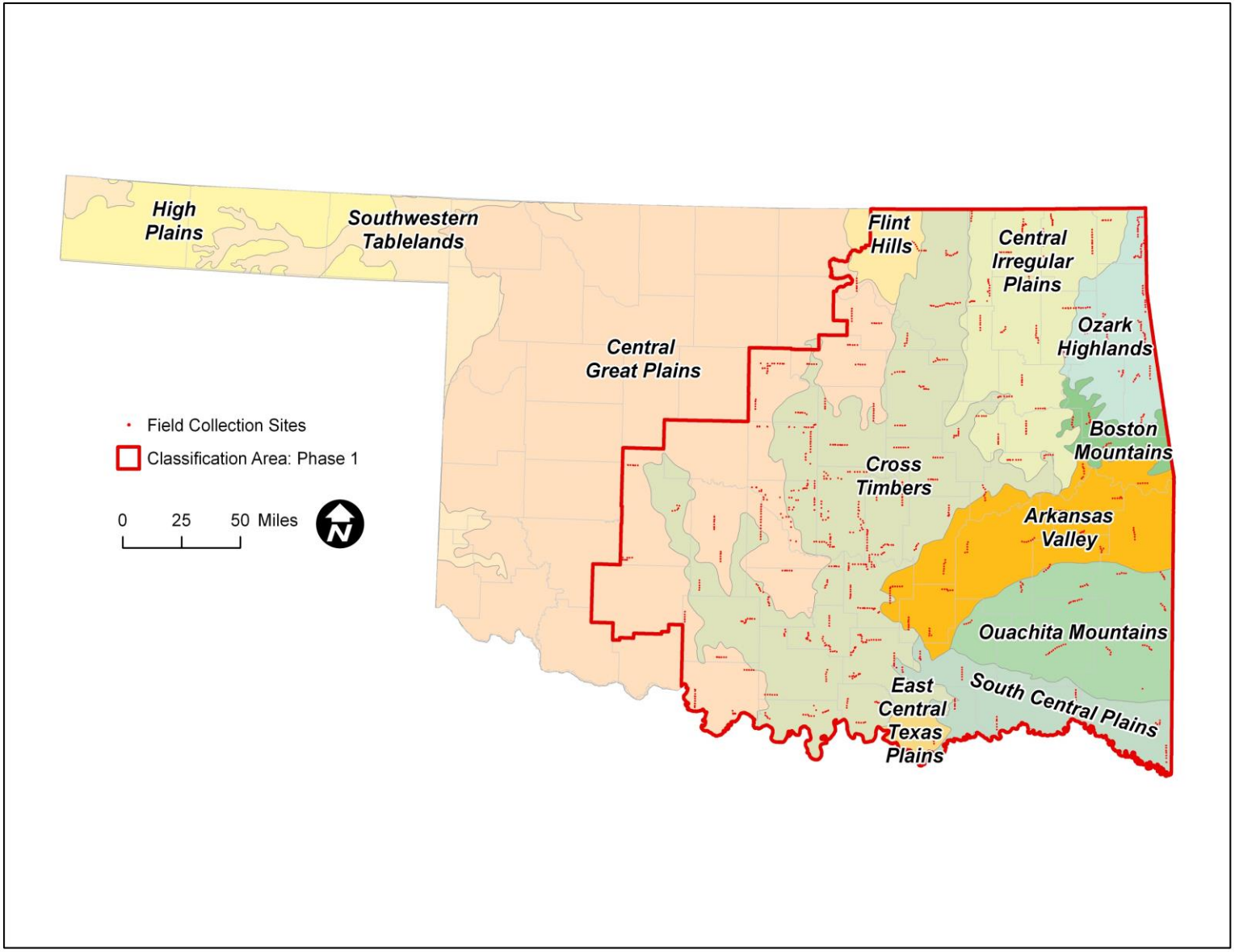
Field Data Collection

- Ground-Truthing Vegetation Cover and Ecological Systems:
- Methods and Progress
- 2,400 data points in Phase I
- 1,284 data points in Phase II

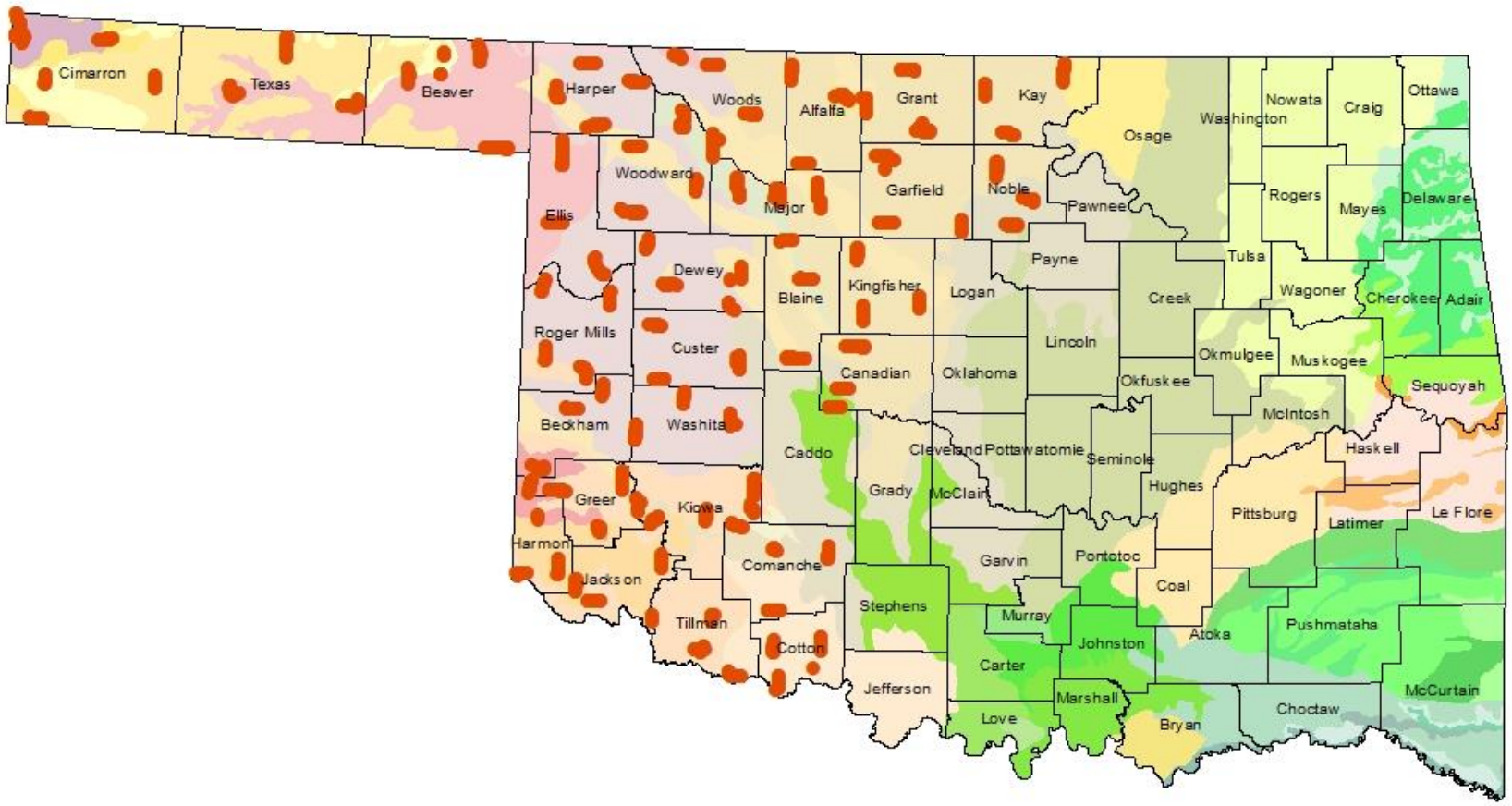
- At each data point:
  - Photographs taken
  - Dominant species recorded (tree, shrub, herbaceous)
  - %cover (tree,shrub, herbaceous)

Points classified after return

Phase I Field Data Points, 2,400



Phase II Field Data Points, 1,284



Eastern Ecological Systems

Juniper Woodland

Open Water/Marsh

Southeastern Great Plains Riparian Forest

Crosstimbers Oak Forest

Central Mixed Grass Prairie

Exotic Pasture

Eastern Ecological Systems

South Central Riparian Forest

Ashe Juniper Shrubland

South Central Large-Interior Floodplain

Pine Plantation (> 3 meters)

Agriculture

Ozark-Ouachita Riparian Forest

Eastern Ecological Systems

Central Interior Calcareous Glade and Barrens

West Gulf Coastal Plain Large River Floodplain Forest

Ashe Juniper Woodland

Southeastern Great Plains Tallgrass Prairie

Ozark-Ouachita Shortleaf Pine-Oak Forest

Orchard (Pecan)

Western Ecological Systems

Western Great Plains Riparian Mixed Forest

Western Great Plains Sandhill Steppe Barren (Sand Dune)

Western Great Plains Sandhill Steppe Deciduous Shrubland

Southern Rocky Mountain Pinyon-Juniper Woodland

Southern Rocky Mountain Pinyon-Juniper Woodland

Western Great Plains Saline Depression

Western Ecological Systems

Llano Estacado Caprock Escarpment and Breaks

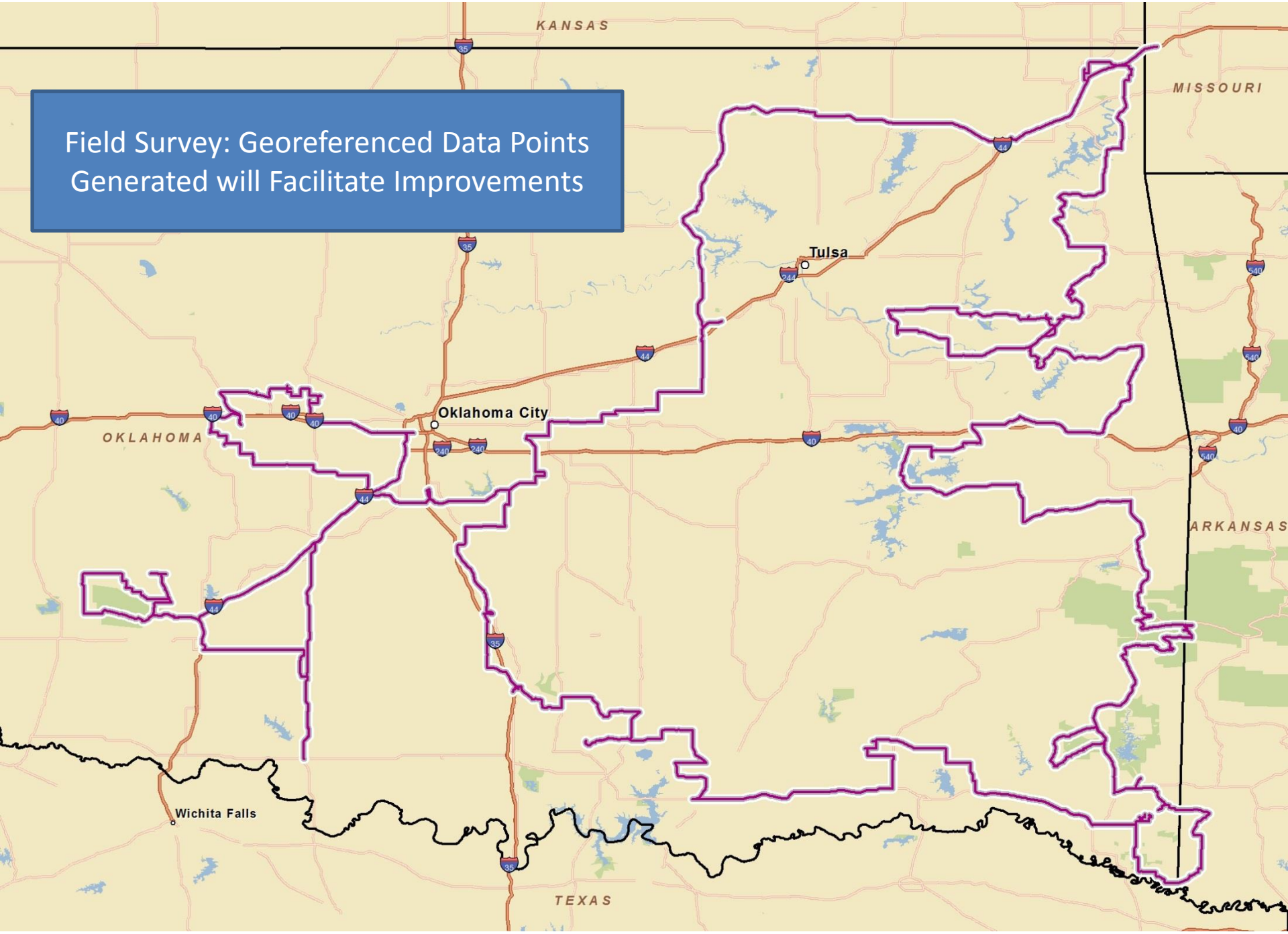
Southwestern Great Plains (Gypsum) Canyon

Western Great Plains Sand Prairie

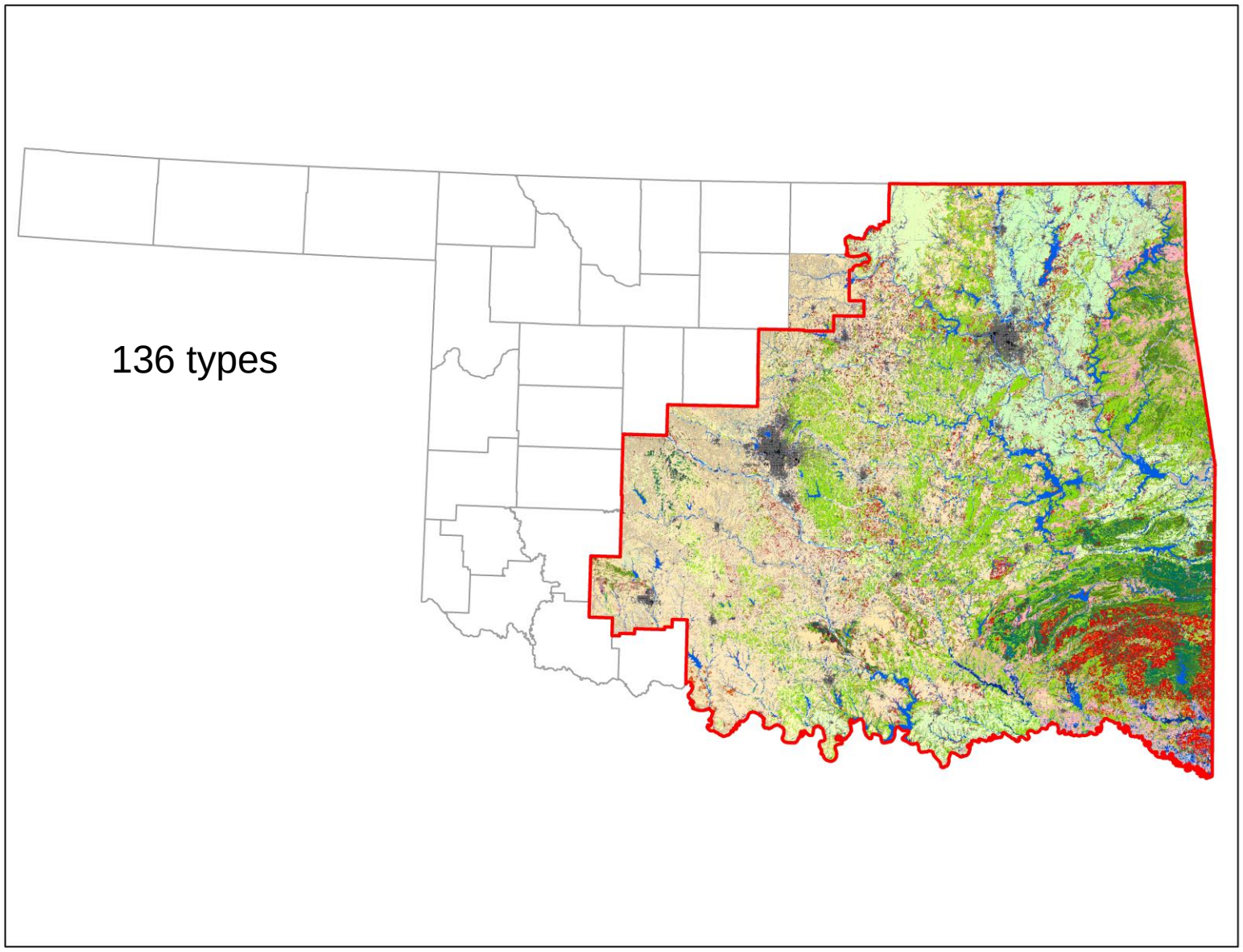
Wichita Mountain Granitic Mixed Woodland

Western Great Plains Mesquite Woodland and Shrubland

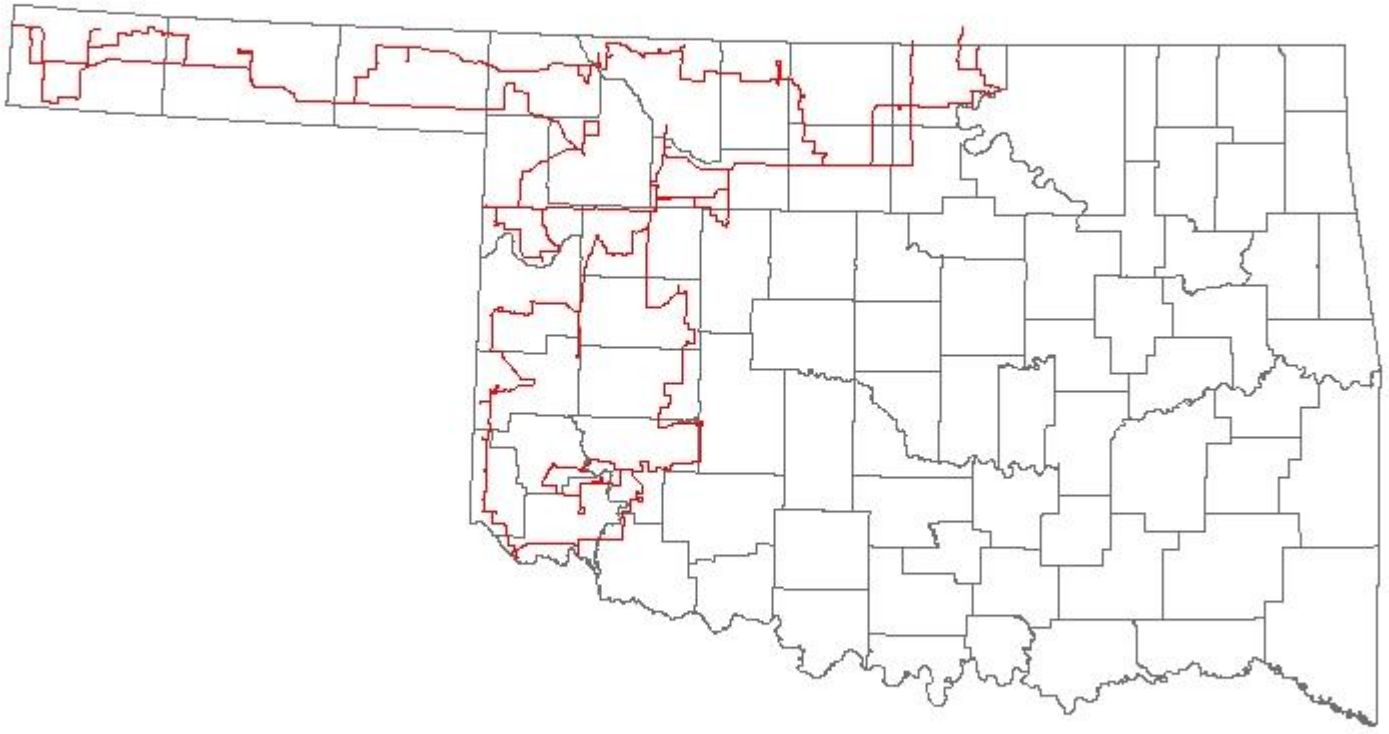
Western Great Plains Shortgrass Prairie


Field Survey: Georeferenced Data Points Generated will Facilitate Improvements
KANSAS
MISSOURI
Tulsa
Oklahoma City
OKLAHOMA
ARKANSAS
Wichita Falls
TEXAS

Map for Phase I

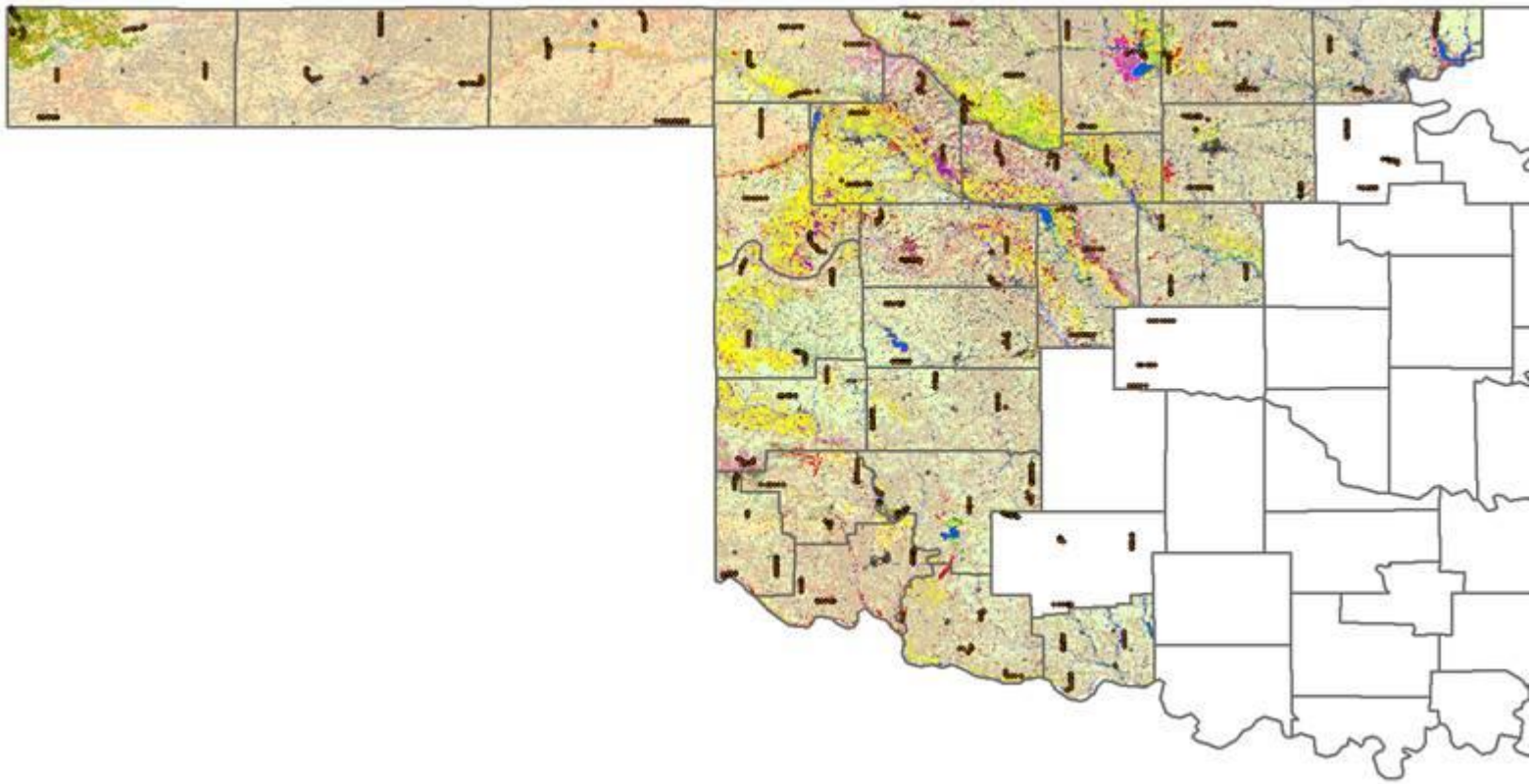


Field Survey for Phase 2



2,184 miles

Draft Map for Phase 2

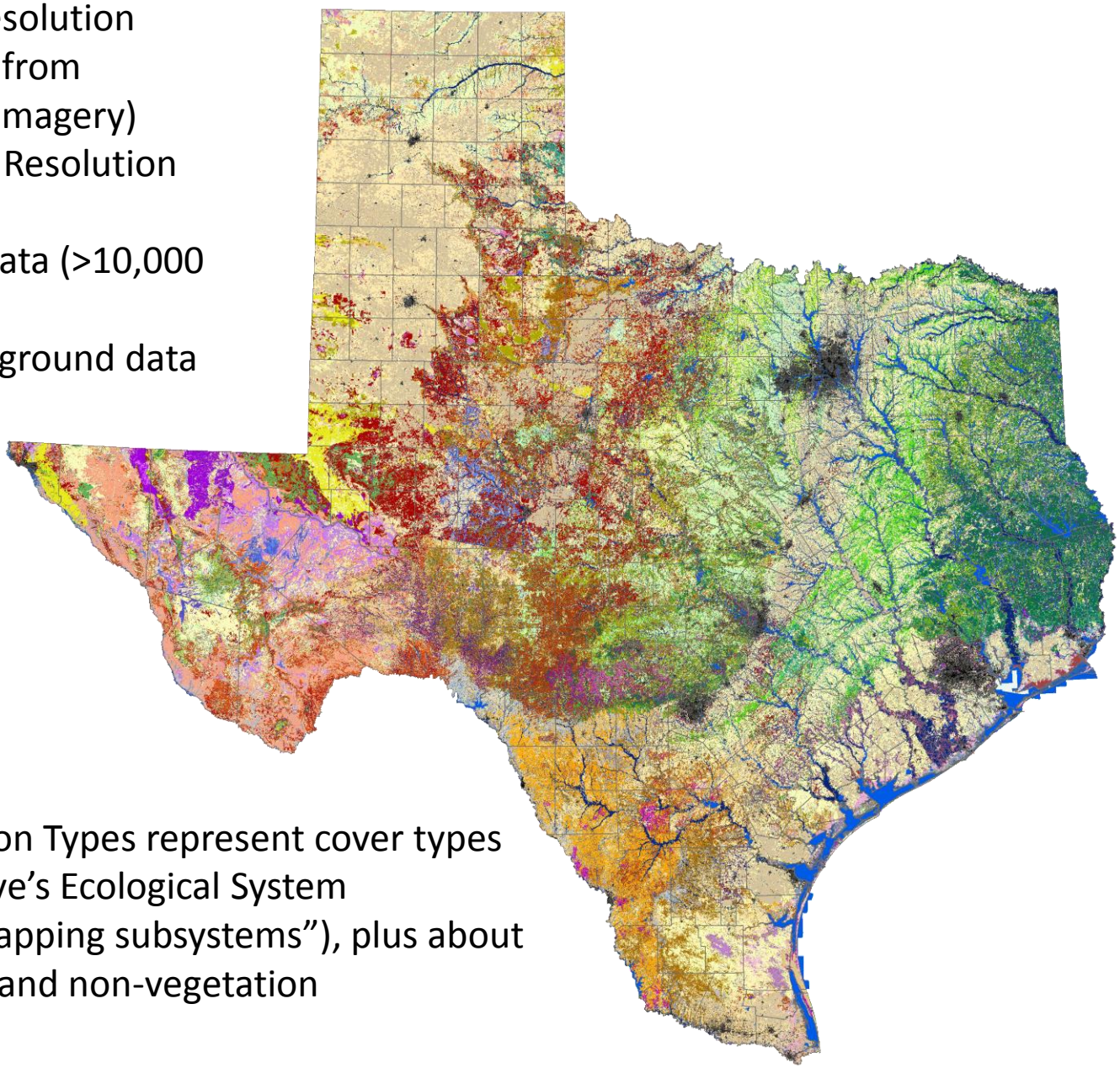


Improvements Over Existing Maps

- Increased thematic resolution (about 20x more mapped types than NLCD)
- Increased spatial resolution (30 m to 10 m resolution)
- Greater use of ground-based data (over 3,600 data points)
- Nationally-recognized classification system; adheres to relevant FGDC standards
- Seamless coverage across state boundaries

Current Vegetation Types of Texas

- Higher Spatial Resolution (polygons at 10m from resampled aerial imagery)
- Higher Thematic Resolution (about 391 types)
- Field Collected Data (>10,000 points collected)
- Agreement with ground data 74% to 90%



Mapped Vegetation Types represent cover types within NatureServe's Ecological System Classification ("mapping subsystems"), plus about 19 invasive types and non-vegetation