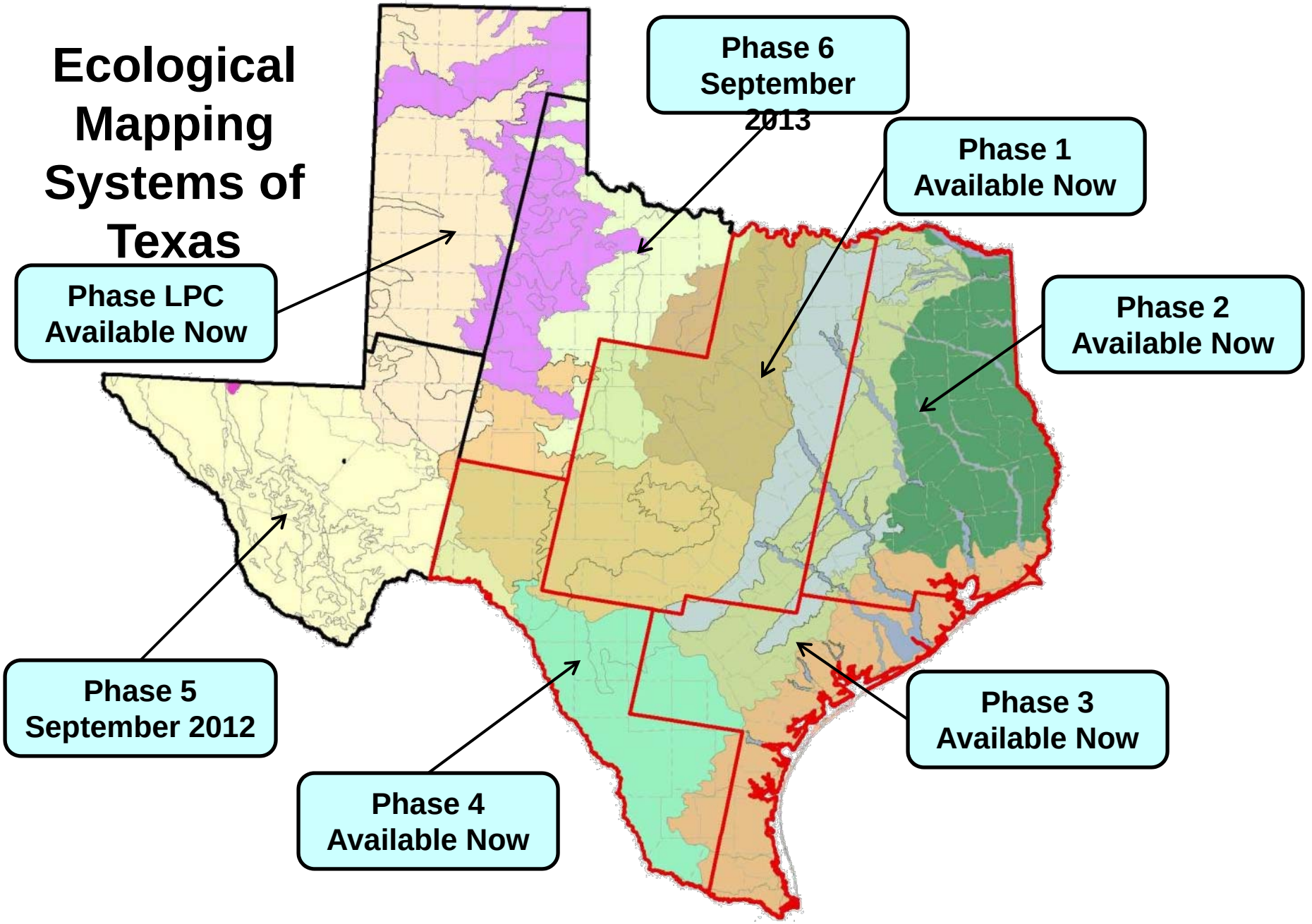
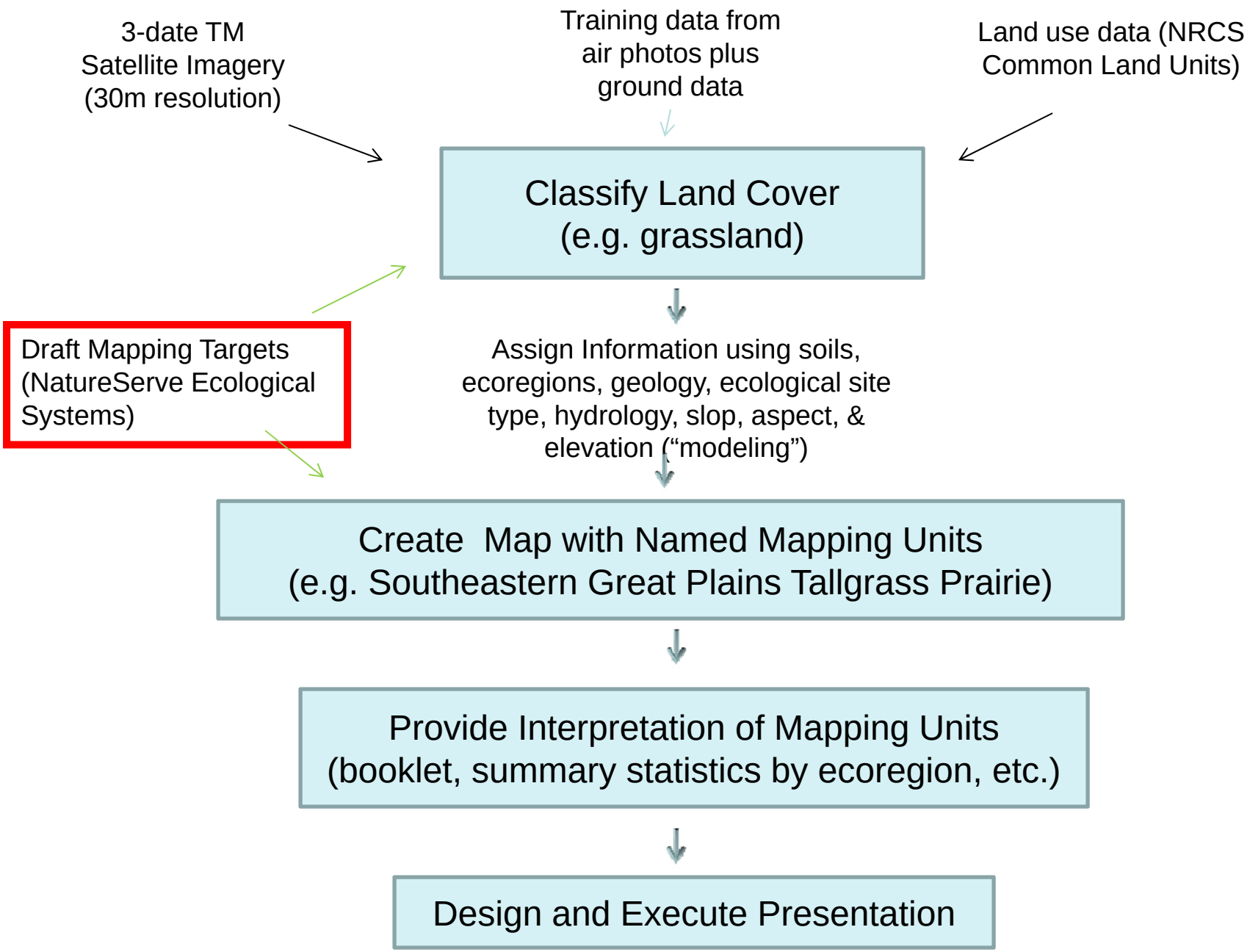
Mapping the Vegetation of Texas

Background

- TPWD wants better land cover for Texas
  - More land cover classes
  - Better spatial resolution
  - Better accuracy (overall 85%)
  - Better ecological interpretation
- Partners Required!
  - MoRAP, University of Missouri
  - TNC, Texas
  - NatureServe, Southeast Region
  - TNRIS
  - NRCS, TXFS, USFWS, others

Ecological Mapping Systems of Texas




3-date TM Satellite Imagery (30m resolution)
Training data from air photos plus ground data
Land use data (NRCS Common Land Units)
Classify Land Cover (e.g. grassland)
Draft Mapping Targets (NatureServe Ecological Systems)
Assign Information using soils, ecoregions, geology, ecological site type, hydrology, slop, aspect, & elevation ("modeling")
Create Map with Named Mapping Units (e.g. Southeastern Great Plains Tallgrass Prairie)
Provide Interpretation of Mapping Units (booklet, summary statistics by ecoregion, etc.)
Design and Execute Presentation

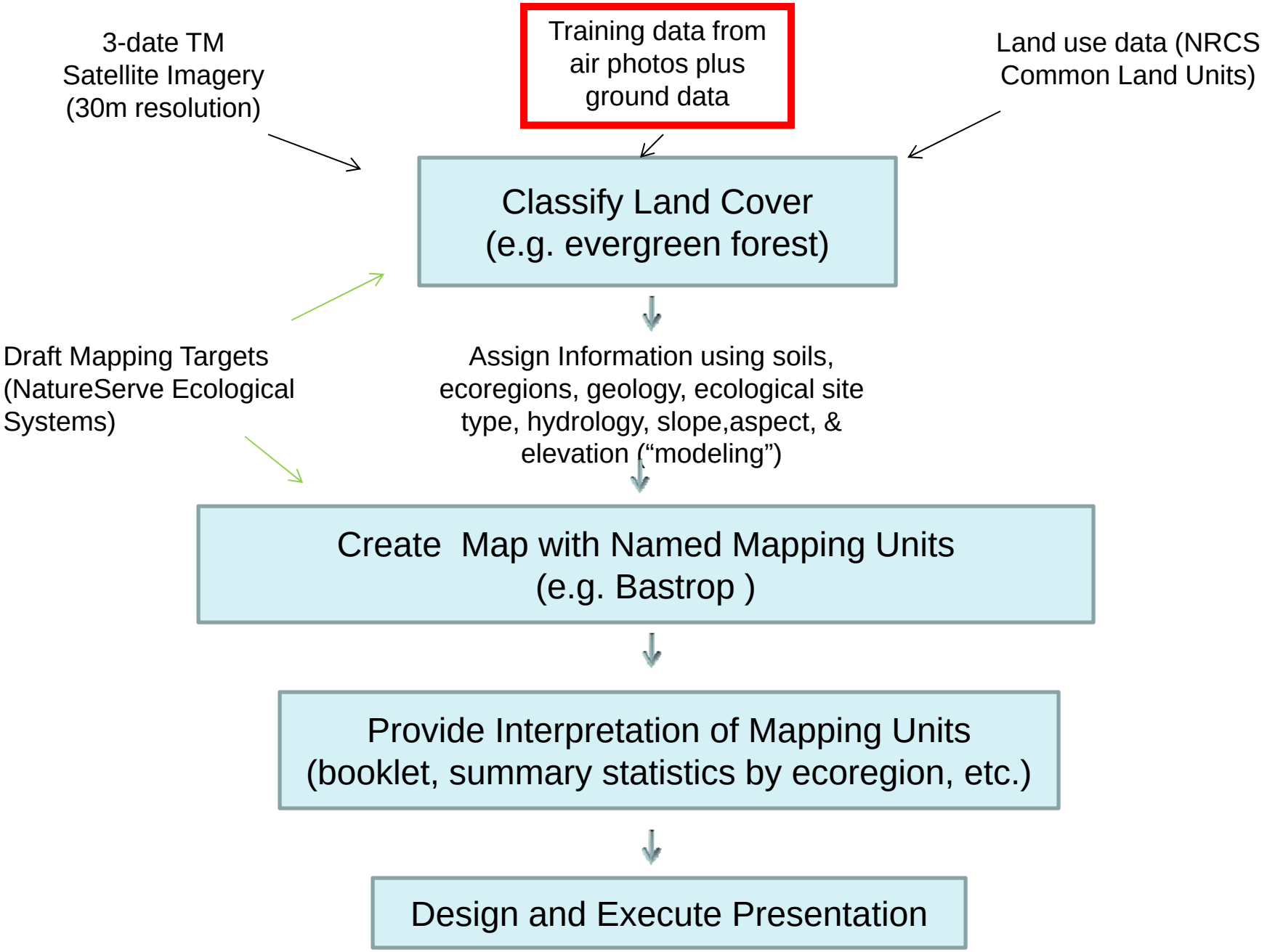
Ecological Systems

Ecological System

- East-Central Texas Plains Post Oak Savanna and Woodland

Mapping Targets/Subsystems

- Post Oak Savanna: Post Oak Motte and Woodland
- Post Oak Savanna: Post Oak / Redcedar Motte and Woodland
- Post Oak Savanna: Post Oak / Yaupon Motte and Woodland
- Post Oak Savanna: Oak / Hardwood Slope Forest
- Post Oak Savanna: Live Oak Motte and Woodland
- Post Oak Savanna: Savanna Grassland
- Post Oak Savanna: Oak / Redcedar Slope Forest
- Post Oak Savanna: Redcedar Slope Forest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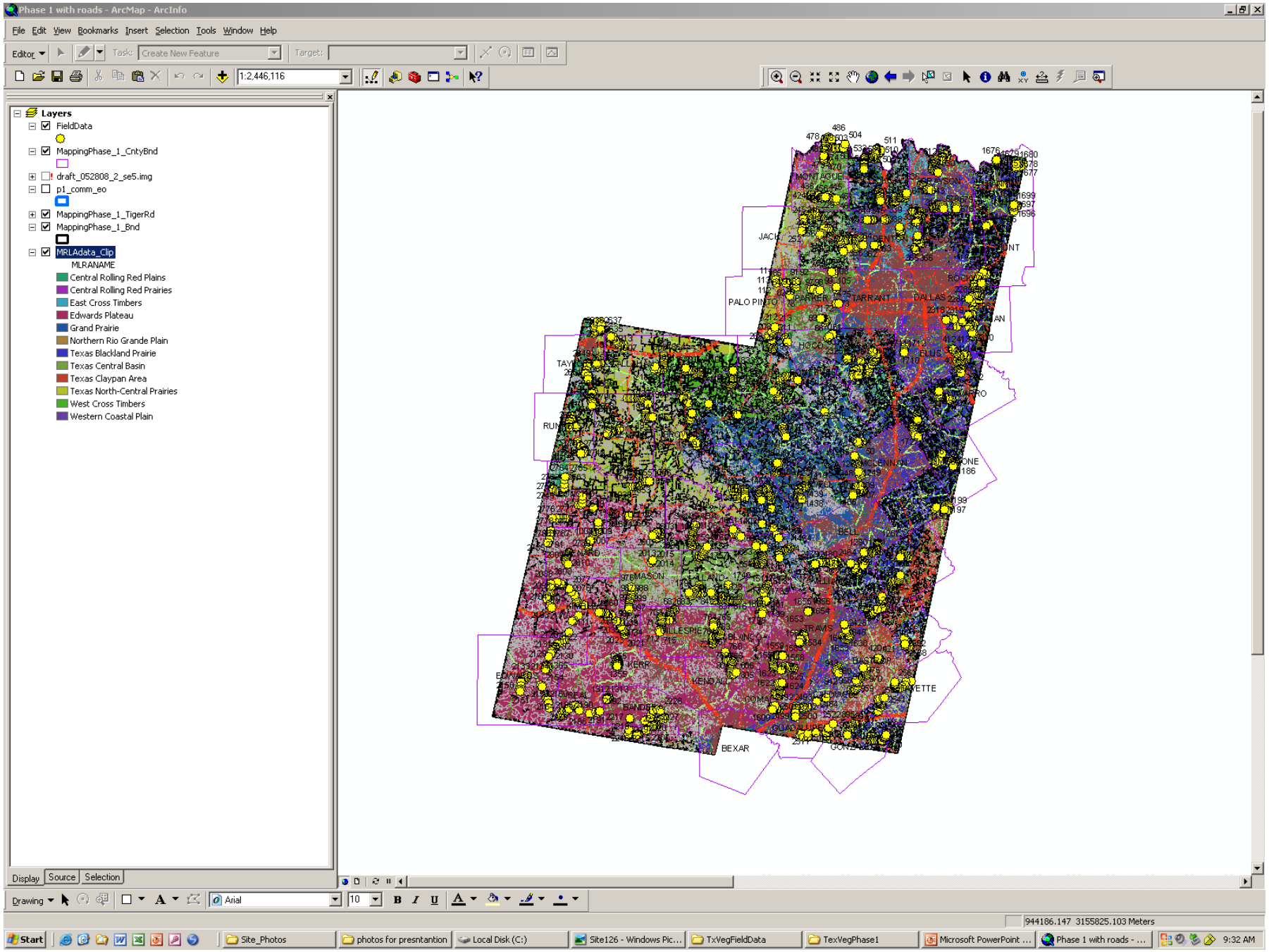
Design and Execute Presentation

Field Data Collection

- Roadside survey
- GPS Location (Lat/Long)
- Attributes
  - Land Cover
    - i.e.: grassland, shrubland
  - Percent cover
    - Woody components
      - CEG , BLEG
      - tree, shrub
    - Herbaceous
  - Dominant Species
    - “top three” species
      - trees, shrubs, herbaceous
  - Ecological Systems/Subsystems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MappingPhase_1_TigerRd
MappingPhase_1_Bnd
MRLAdata_Clip
MLRANAME
Central Rolling Red Plains
Central Rolling Red Prairies
East Cross Timbers
Edwards Plateau
Grand Prairie
Northern Rio Grande Plain
Texas Blackland Prairie
Texas Central Basin
Texas Claypan Area
Texas North-Central Prairies
West Cross Timbers
Western Coastal Plain
Display
Source
Selection
Drawing
Arial
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Phase 1 with roads - ...
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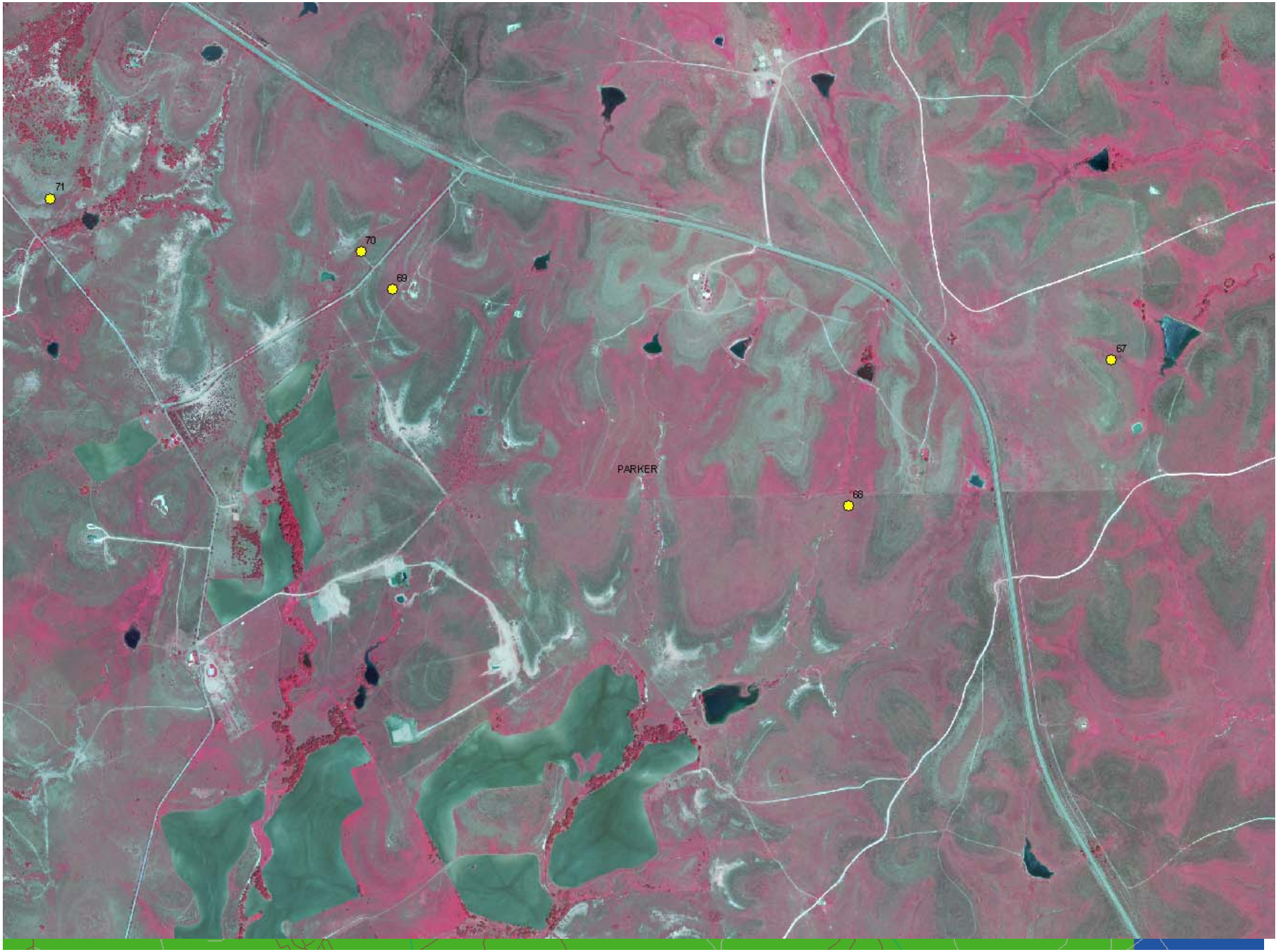
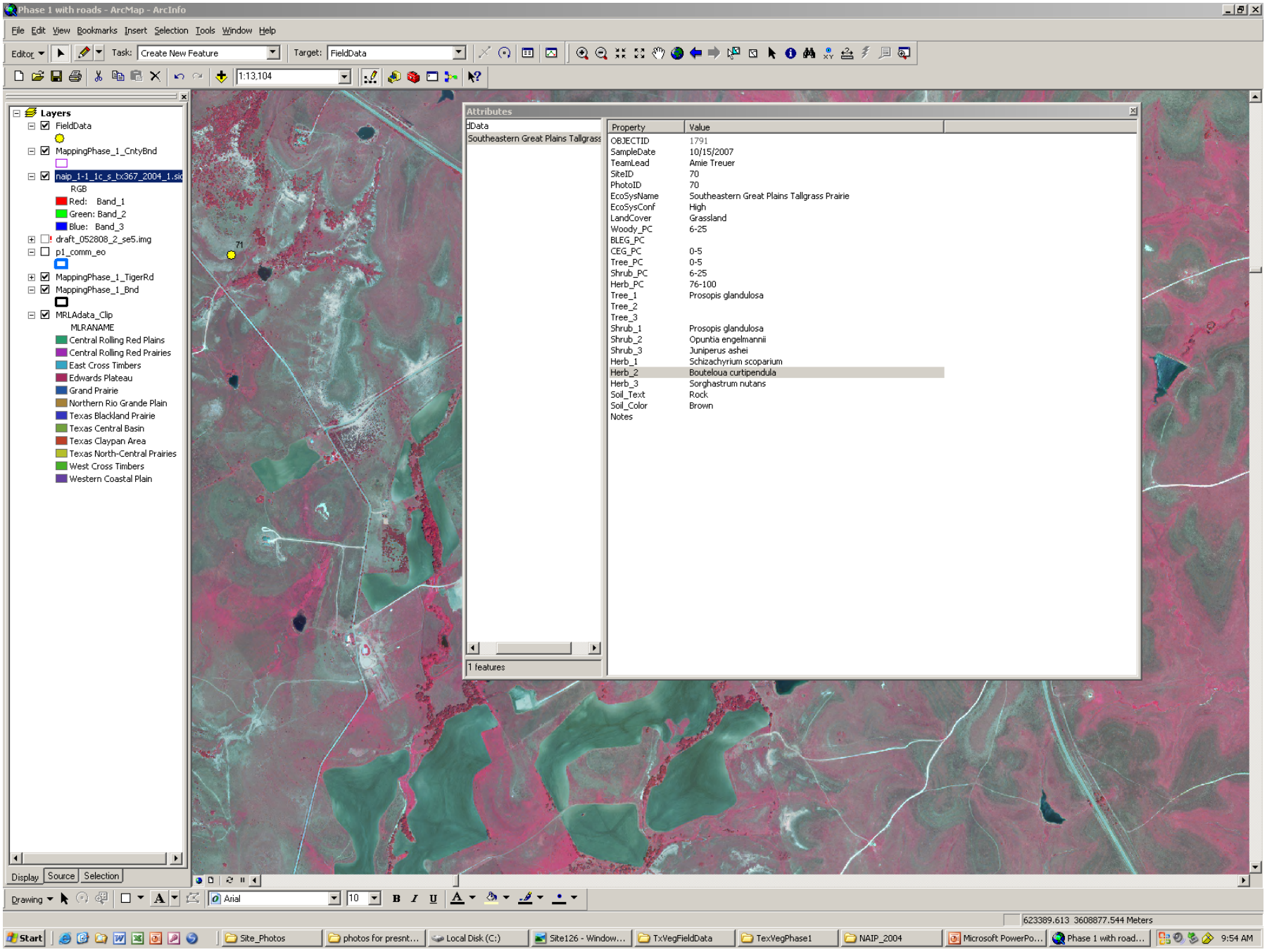

71
70
69
67
PARKER
68


Phase 1 with roads - ArcMap - ArcInfo
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Green: Band_2
Blue: Band_3
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MappingPhase_1_Bnd
MRLAdata_Clip
MLRANAME
Central Rolling Red Plains
Central Rolling Red Prairies
East Cross Timbers
Edwards Plateau
Grand Prairie
Northern Rio Grande Plain
Texas Blackland Prairie
Texas Central Basin
Texas Claypan Area
Texas North-Central Prairies
West Cross Timbers
Western Coastal Plain
Display Source Selection
71
Attributes
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Southeastern Great Plains Tallgrass
1 features
Property Value
OBJECTID 1791
SampleDate 10/15/2007
TeamLead Amie Treuer
SiteID 70
PhotoID 70
EcoSysName Southeastern Great Plains Tallgrass Prairie
EcoSysConf High
LandCover Grassland
Woody_PC 6-25
BLEG_PC
CEG_PC 0-5
Tree_PC 0-5
Shrub_PC 6-25
Herb_PC 76-100
Tree_1 Prosopis glandulosa
Tree_2
Tree_3
Shrub_1 Prosopis glandulosa
Shrub_2 Opuntia engelmannii
Shrub_3 Juniperus ashei
Herb_1 Schizachyrium scoparium
Herb_2 Bouteloua curtipendula
Herb_3 Sorghastrum nutans
Soil_Text Rock
Soil_Color Brown
Notes
Drawing Arial 10
623389.613 3608877.544 Meters
Start
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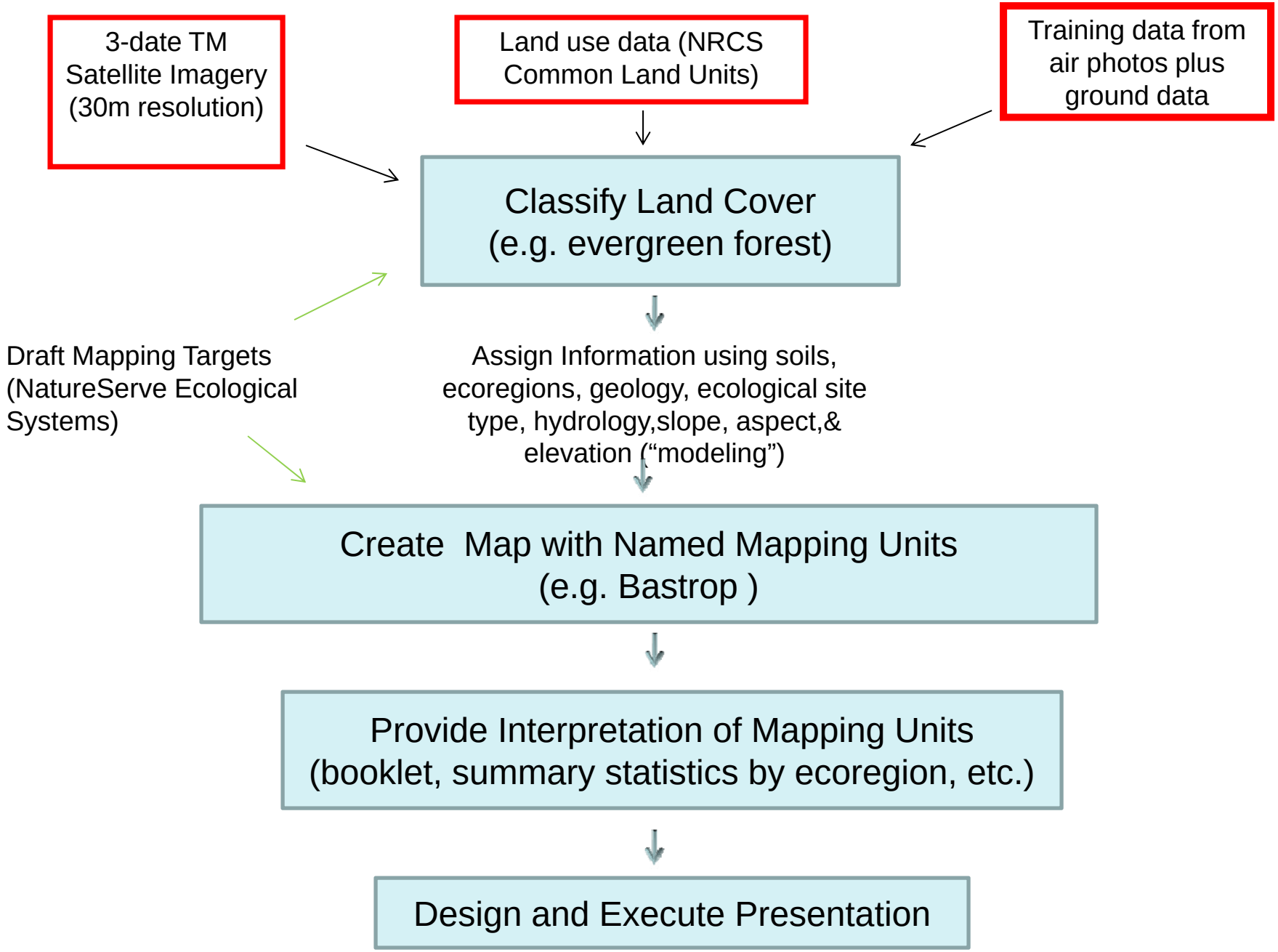
Site126 - Window...
TxVegFieldData
TexVegPhase1
NAIP_2004
Microsoft PowerPo...
Phase 1 with road...
9:54 AM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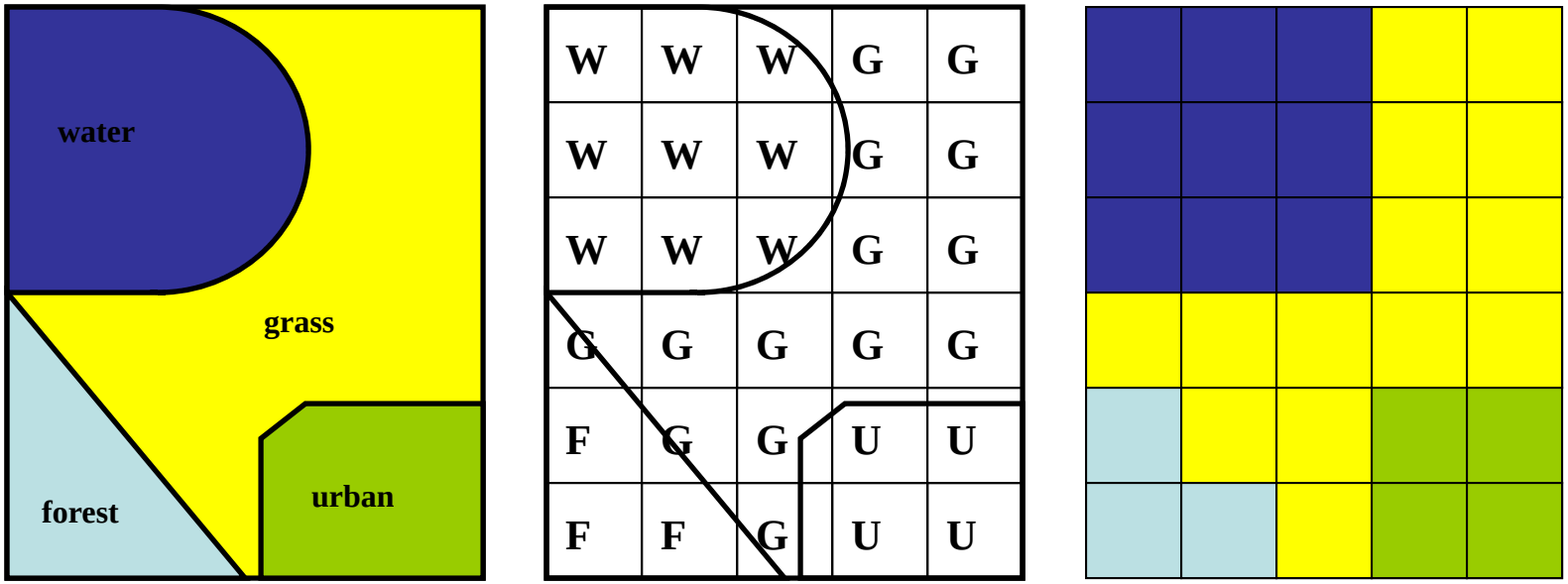
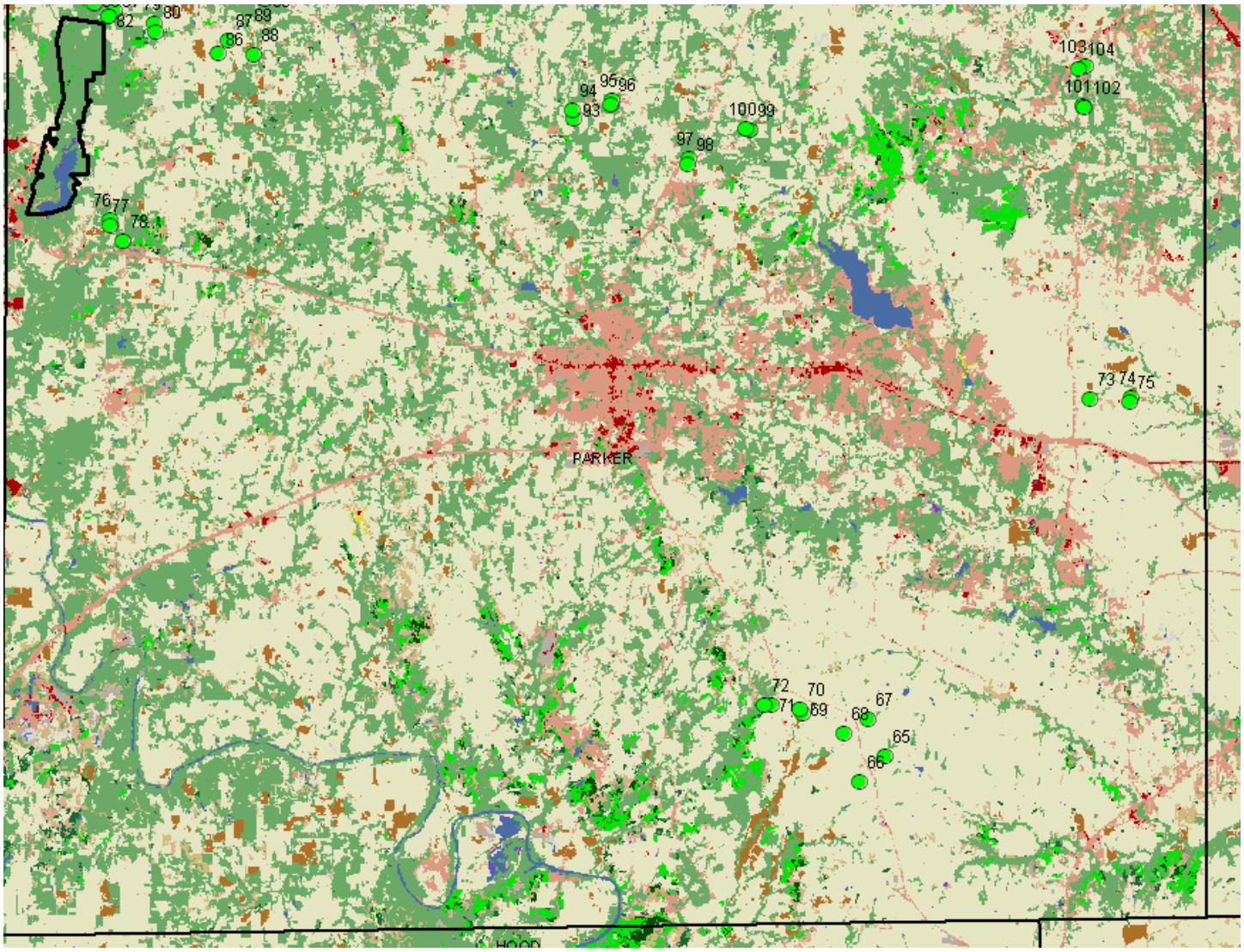
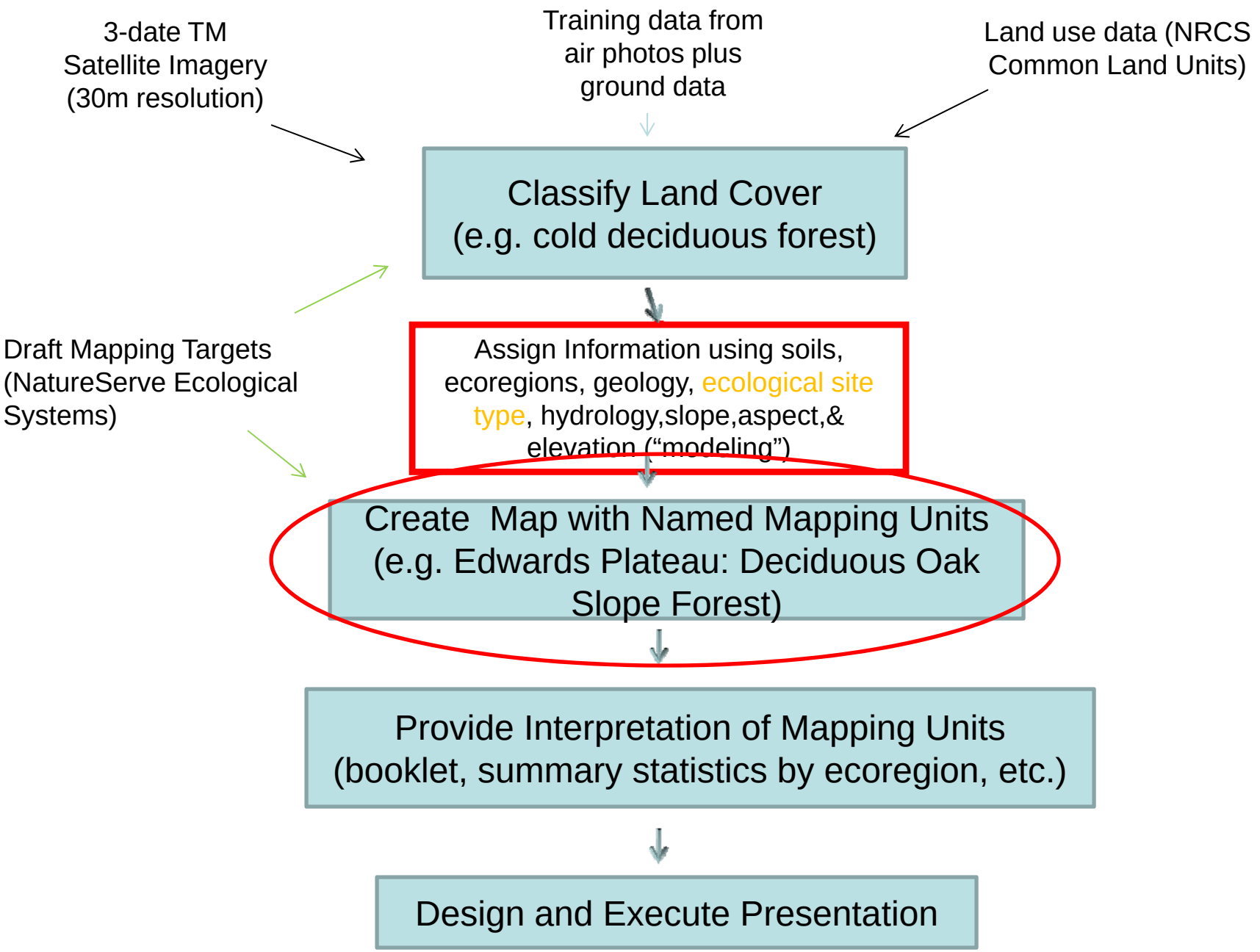
Design and Execute Presentation

Initial Classification of Pixels

- Create a land cover raster by coding each pixel with a value that represents the land cover type over the majority of that cell's area
- When finished, every cell will have a coded value
- Average TM scene is about 34.9 x10^6 pixels

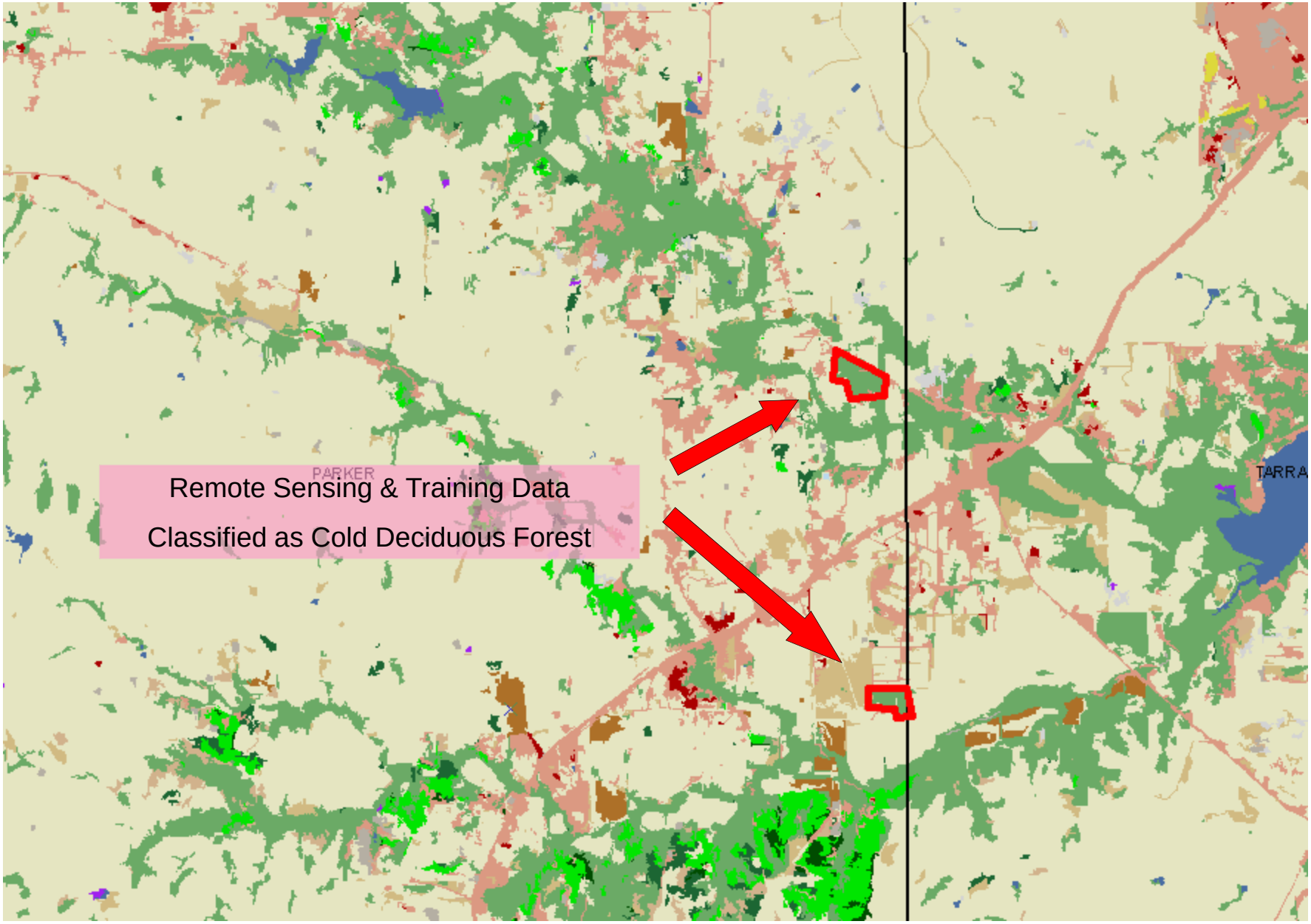


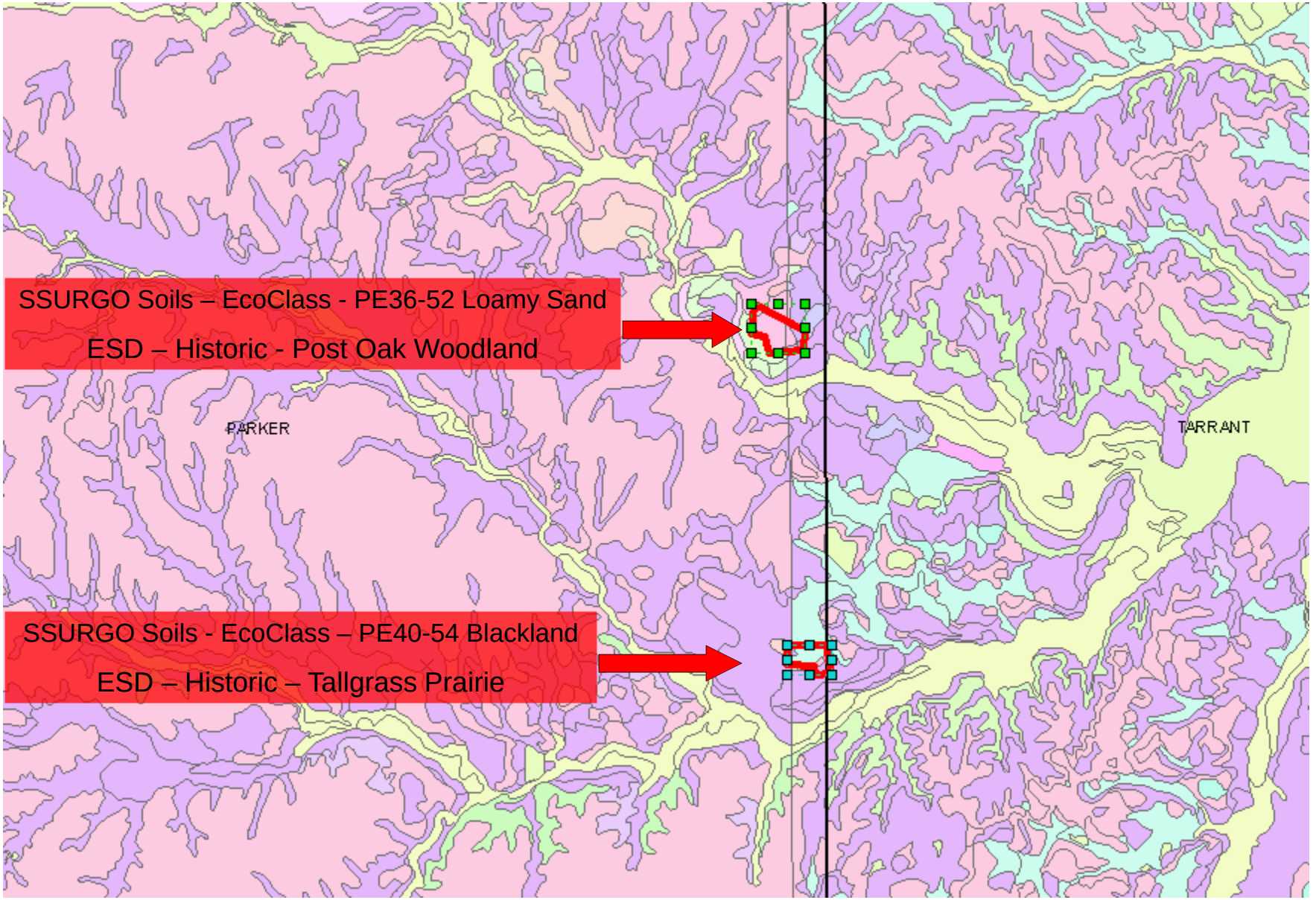

Land Cover Class
Barren
Barren/Impervious
BLEG Forest
CD Forest
CD Mixed Forest
CD Shrub
CEG Forest
Crop
EG Shrub
Grass Farm
Grassland
Marsh
Swamp
Urban High
Urban Low
Water
State Park
PARKER
HOOD

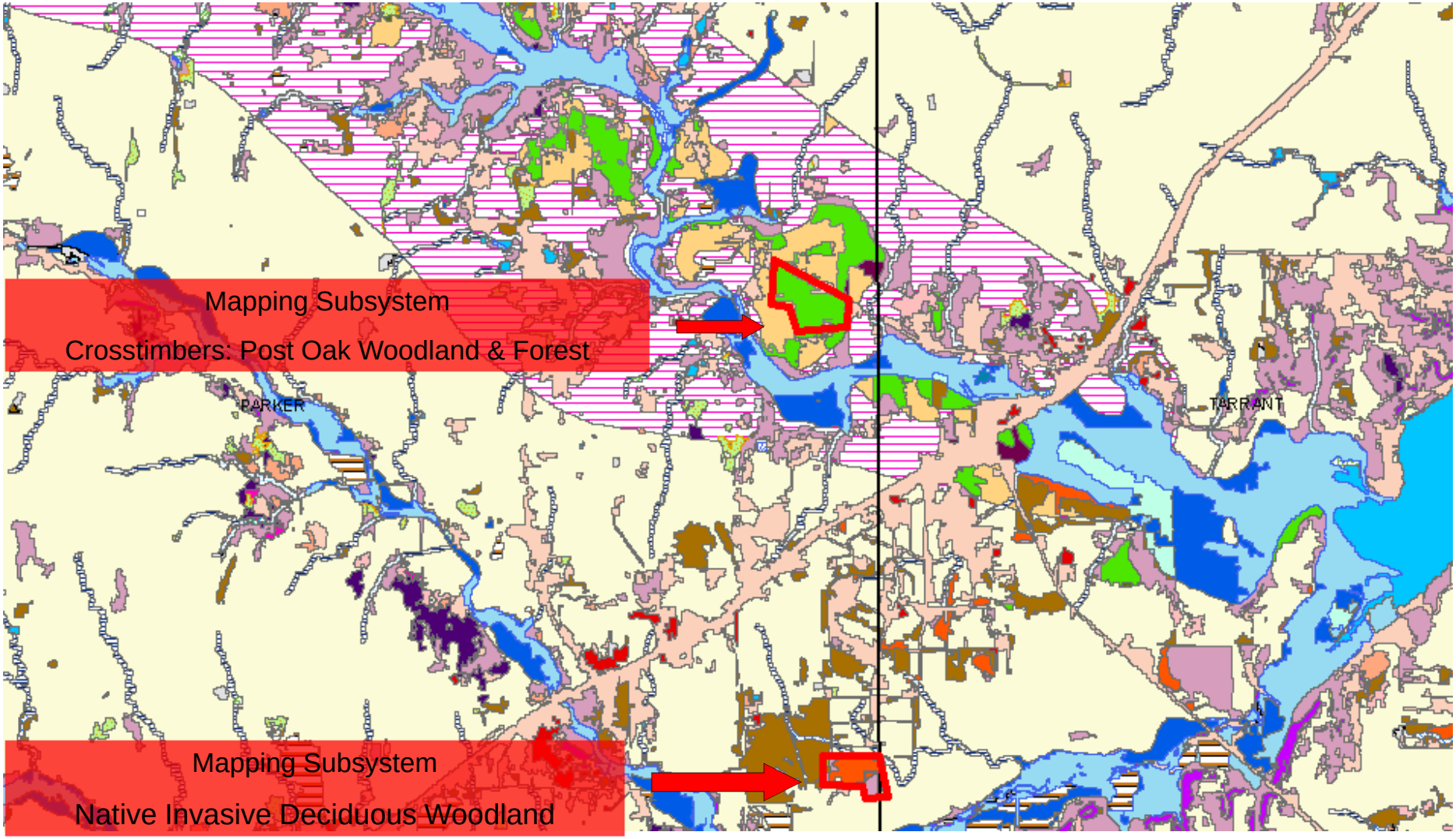

3-date TM Satellite Imagery (30m resolution)
Training data from air photos plus ground data
Land use data (NRCS Common Land Units)
Classify Land Cover (e.g. cold deciduous forest)
Draft Mapping Targets (NatureServe Ecological Systems)
Assign Information using soils, ecoregions, geology, ecological site type, hydrology,slope,aspect,& elevation ("modeling")
Create Map with Named Mapping Units (e.g. Edwards Plateau: Deciduous Oak Slope Forest)
Provide Interpretation of Mapping Units (booklet, summary statistics by ecoregion, etc.)
Design and Execute Presentation

Modeling Synopsis

- Examined SSURGO, GAT, Ecological Site Types (ESTs)
- Modeled:
  - Historic vegetation to ESTs and to soils (Ecoclass)
  - Interpretation of current land cover to ESTs and soils (e.g. evergreen forest on site type XX is ZZ mapping system)
- Rules applied: (Decision Tree)
  - Slope,aspect,elevation,landscape postion, hydrology,& EPA ecoregion

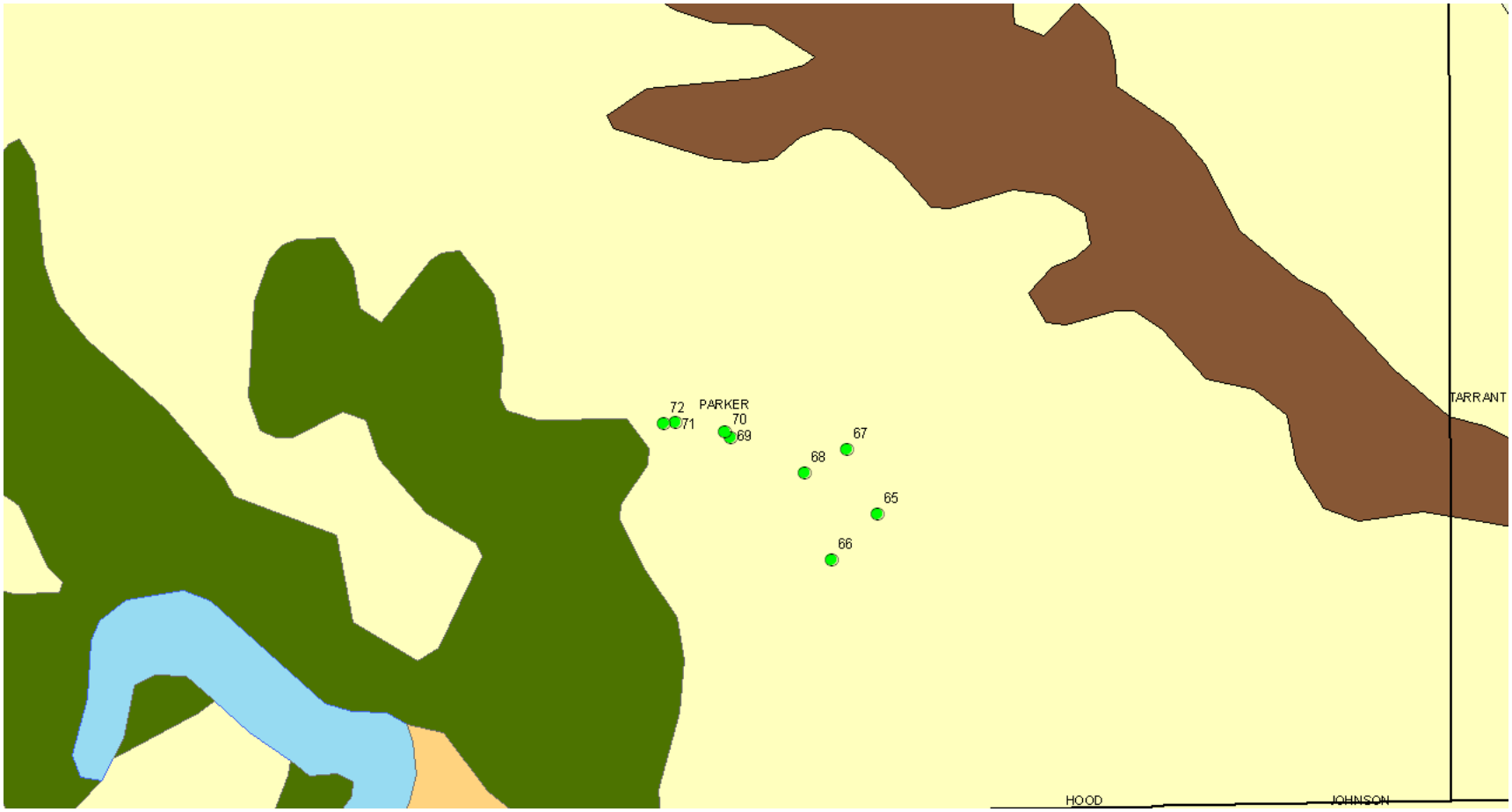

Remote Sensing & Training Data
Classified as Cold Deciduous Forest
PARKER
TARRA


SSURGO Soils – EcoClass - PE36-52 Loamy Sand
ESD – Historic - Post Oak Woodland
PARKER
TARRANT
SSURGO Soils - EcoClass – PE40-54 Blackland
ESD – Historic – Tallgrass Prairie


Mapping Subsystem
Crosstimbers: Post Oak Woodland & Forest
PARKER
TARRANT
Mapping Subsystem
Native Invasive Deciduous Woodland

1984
Vegetation Types of Texas

- Bluestem Grassland
- Lake Granbury
- Oak-Mesquite-Juniper Parks/Woods
- Post Oak Woods, Forest, and Grassland Mosaics
- Silver Bluestem-Texas Wintergrass Grassland



Ecological Systems

- Barren / Non-urban
- Barren / Urban
- Blackland Prairie Disturbance or Tame Grassland
- Crosstimbers Deciduous Slope Forest
- Crosstimbers Deciduous-Juniper Slope Forest
- Crosstimbers Live Oak Forest and Woodland
- Crosstimbers Post Oak Forest and Woodland
- Crosstimbers Post Oak-Juniper Forest and Woodland
- Crosstimbers Sandyland Oak Woodland
- Crosstimbers Savanna Grassland
- East-Central Texas Plains Post Oak Motte and Woodland
- Edwards Plateau Ashe Juniper Dry-Mesic Slope Forest and Woodland
- Edwards Plateau Deciduous Dry-Mesic Slope Forest and Woodland
- Edwards Plateau Floodplain Deciduous Forest and Woodland
- Edwards Plateau Limestone Ashe Juniper Motte and Forest
- Edwards Plateau Limestone Deciduous Motte and Woodland
- Edwards Plateau Limestone Deciduous-Evergreen Motte and Woodland
- Edwards Plateau Limestone Evergreen Shrubland and Shrub Motte
- Edwards Plateau Limestone Evergreen Slope Shrubland
- Edwards Plateau Limestone Live Oak Motte and Forest
- Edwards Plateau Limestone Savanna Grassland
- Edwards Plateau Limestone Shin Oak Shrubland and Shrub Motte
- Edwards Plateau Limestone Shin Oak Slope Shrubland
- Edwards Plateau Live Oak Dry-Mesic Slope Forest and Woodland
- Edwards Plateau Oak-Ashe Juniper Dry-Mesic Slope Forest and Woodland
- Grass Farm
- Marsh
- Native Invasive: Deciduous Woodland
- Native Invasive: Juniper Shrubland
- Native Invasive: Juniper Woodland
- Native Invasive: Mesquite Shrubland
- Open Water
- Rowcrops
- Southeastern Great Plains Floodplain Deciduous Forest and Woodland
- Southeastern Great Plains Floodplain Deciduous Shrubland
- Southeastern Great Plains Floodplain Evergreen Shrubland
- Southeastern Great Plains Floodplain Herbaceous Vegetation
- Southeastern Great Plains Floodplain Juniper Forest and Woodland
- Southeastern Great Plains Floodplain Live Oak Forest and Woodland
- Southeastern Great Plains Floodplain Mixed Deciduous Forest and Woodland
- Southeastern Great Plains Riparian Deciduous Forest and Woodland
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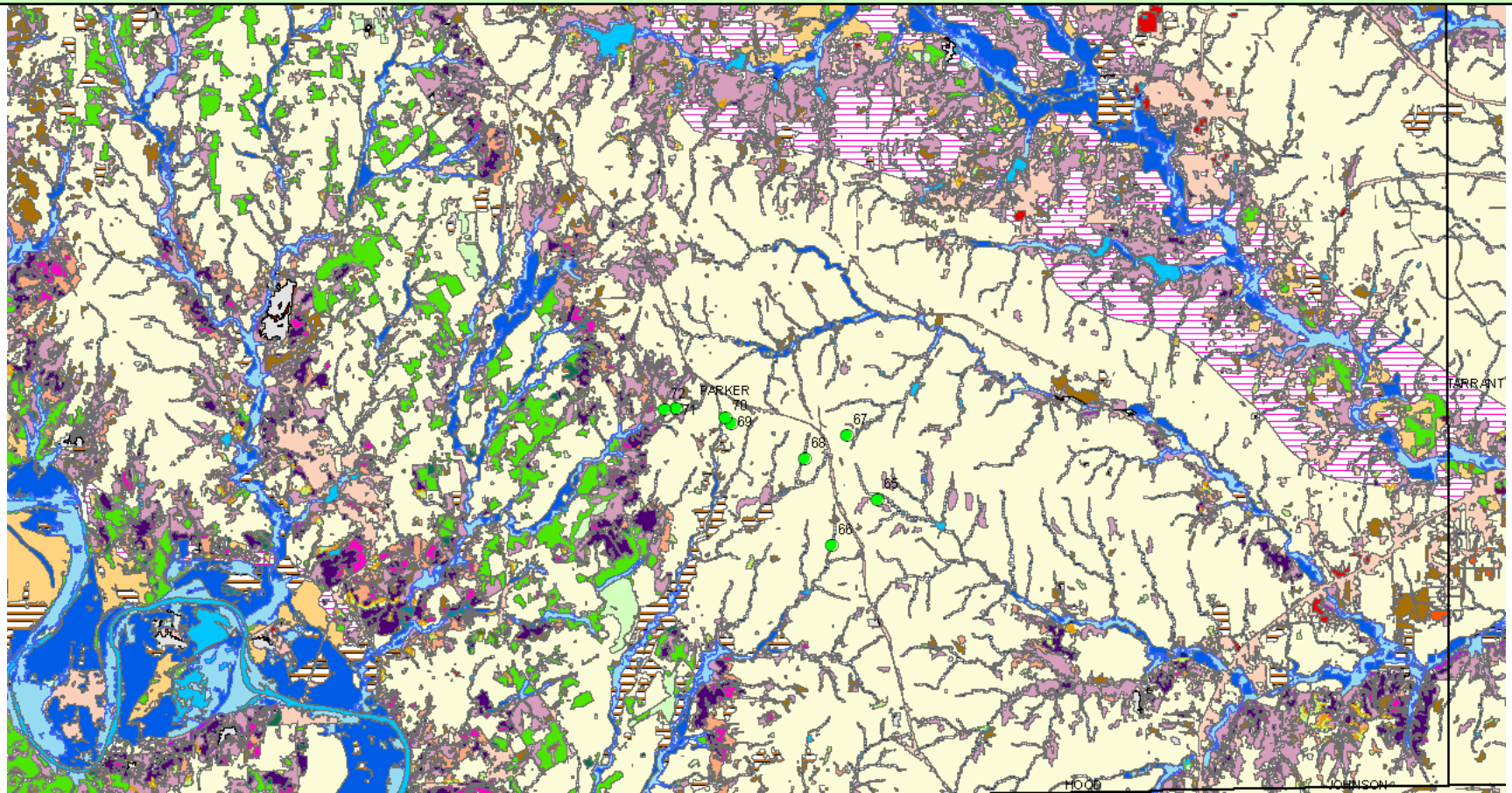
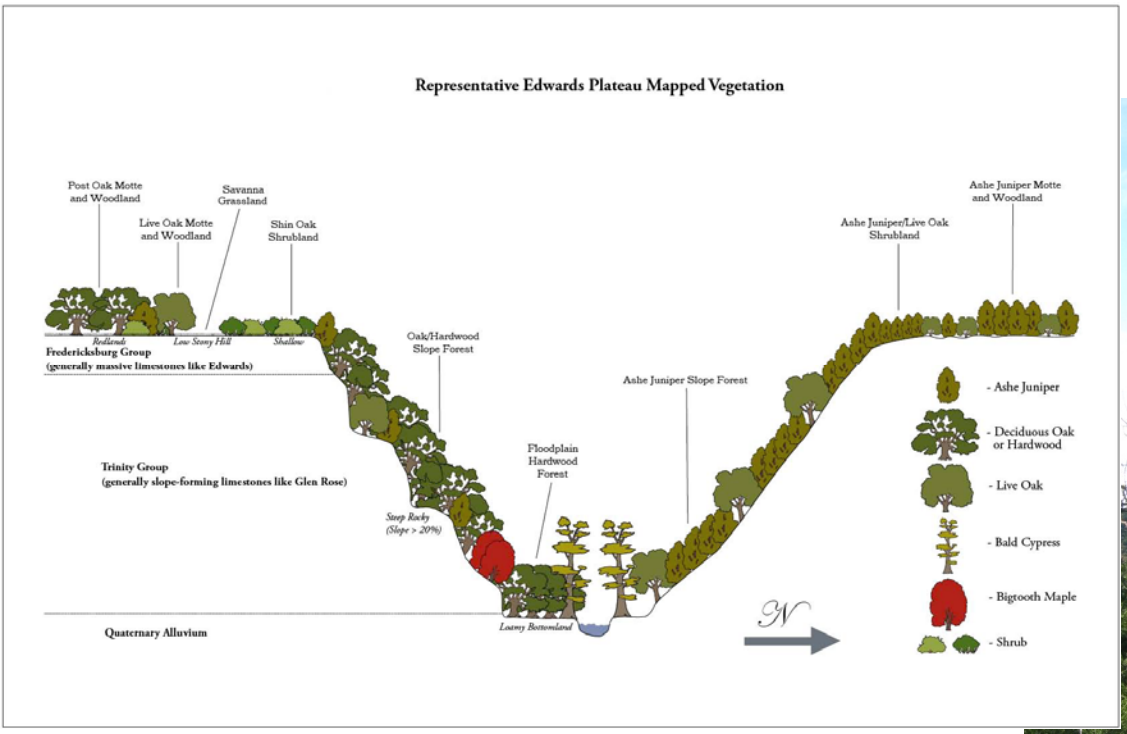
- Southeastern Great Plains Riparian Juniper Forest and Woodland
- Southeastern Great Plains Riparian Live Oak Forest and Woodland
- Southeastern Great Plains Riparian Mixed Deciduous Forest and Woodland
- Southeastern Great Plains Tallgrass Prairie
- Southeastern Great Plains Wooded Cliff/Bluff
- Swamp
- Urban High Intensity
- Urban Low Intensity



Products/Enduring Value

- Potential natural vegetation
- Existing vegetation using an improved classification
- Interpretive Booklet
  - Topo-sequences / landscape profiles of potential and existing vegetation
  - Interpretation of the current land cover (e.g. dynamics, management)
  - Photos
- Ground truth dataset (around 10,000 points)
- User will build their own added value:
  - Context (local, regional, statewide)
  - Management options
  - Conservation opportunity areas
  - Ecological significance and risk (riverine/aquatics as well)
  - Species habitat modeling
  - Development of educational and interpretive materials
  - Change detection



Interpretive Booklet

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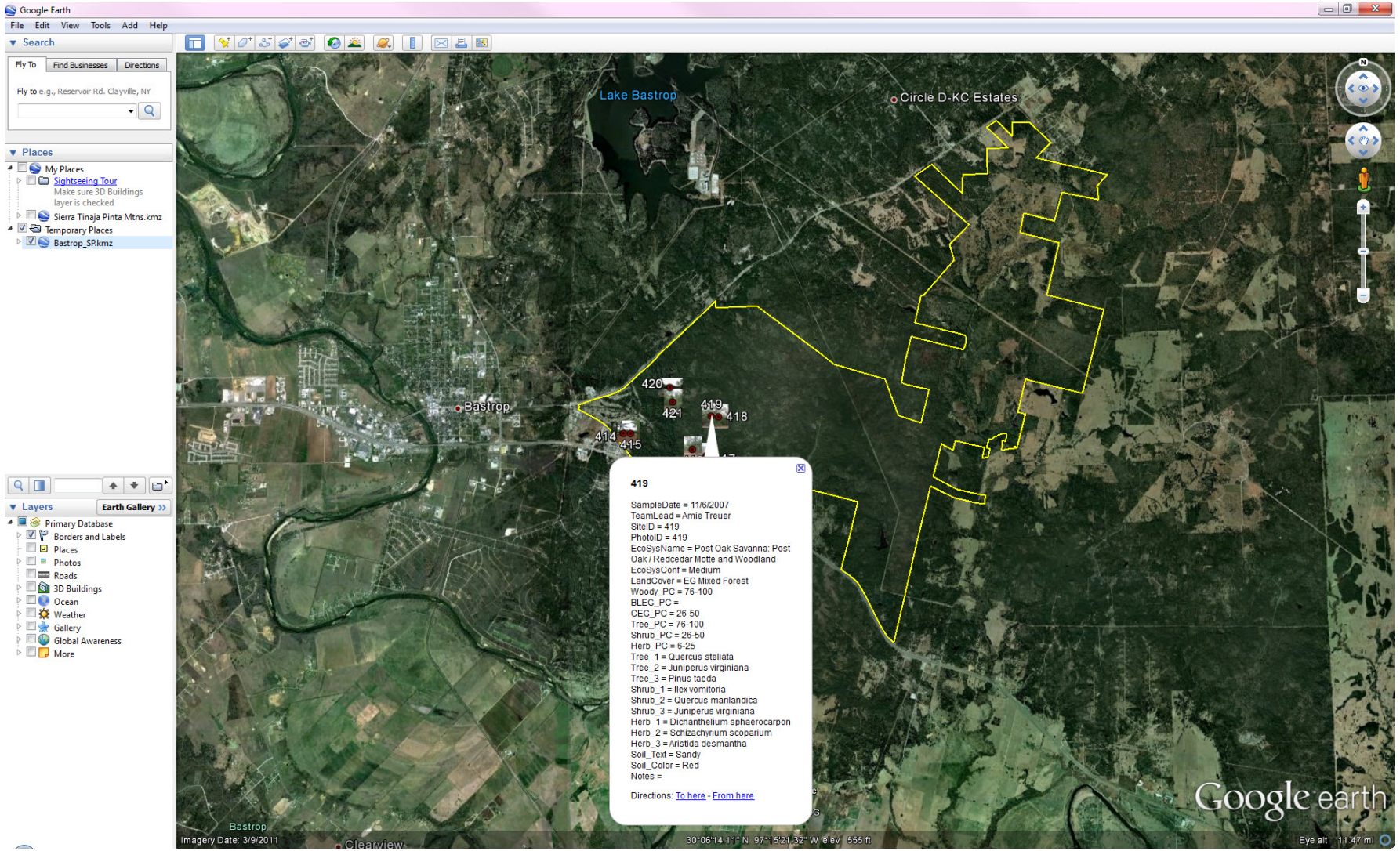
Google Earth



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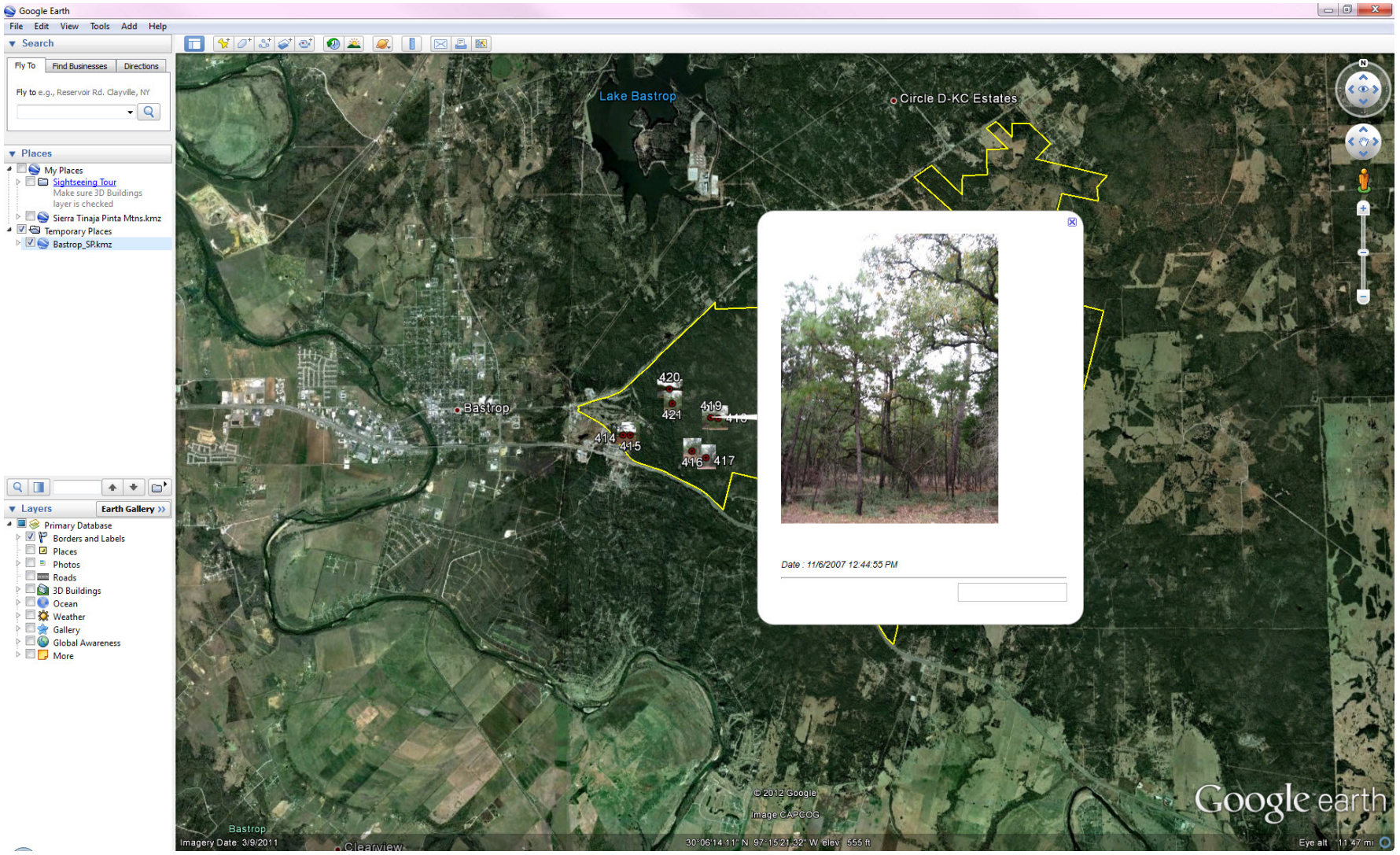
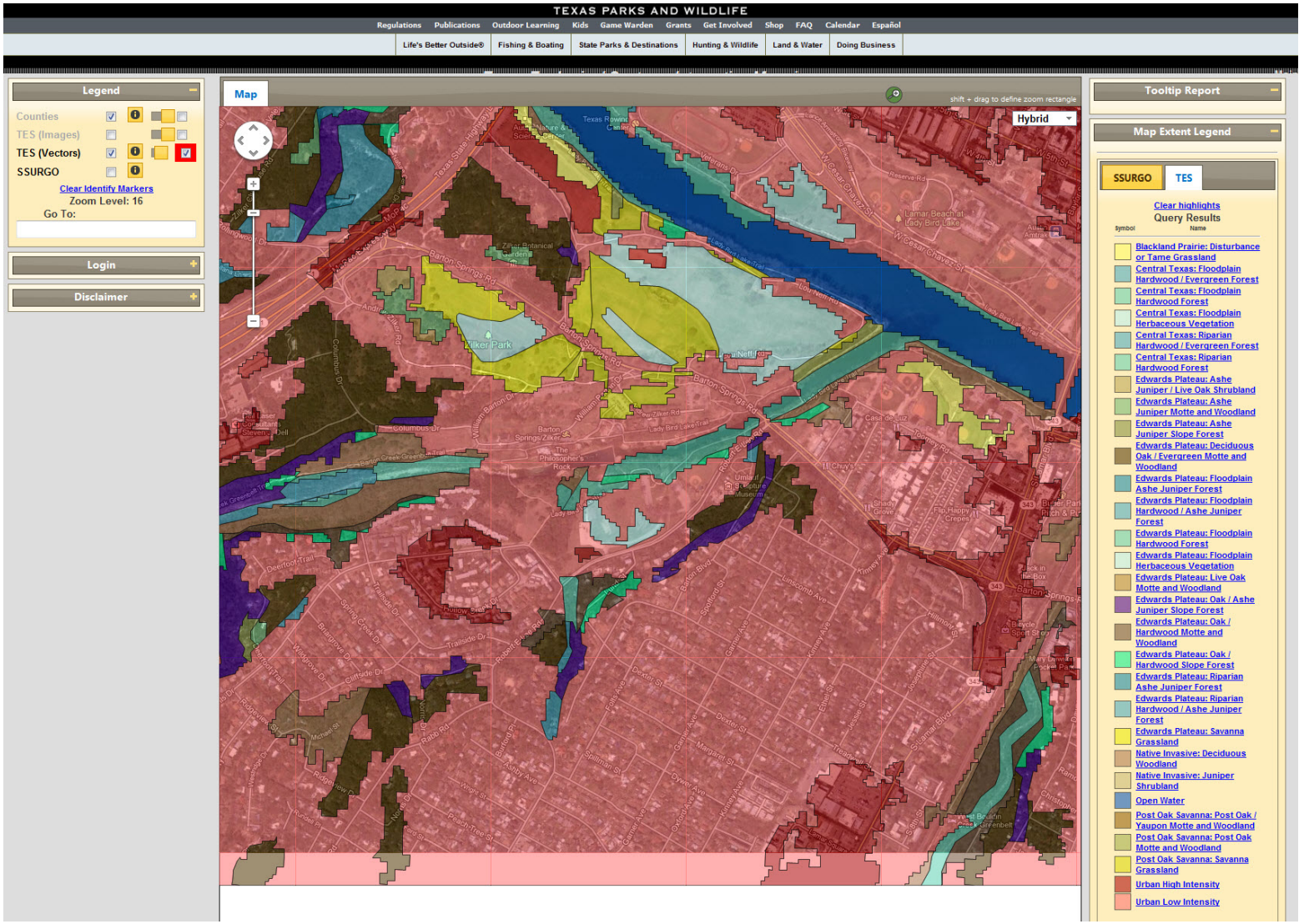


Web Application



Web Application

Edwards Plateau:Riparian Mixed Forest

Lost Maples State Natural Area

Ecological System: Edwards Plateau Riparian

Common Name: Edwards Plateau: Riparian Hardwood/Ashe Juniper Forest

Description of the Ecological System:
According to the *"Texas Ecological Systems Phase 1 Interpretive Guide"*, Ashe Juniper and plateau live oak trees frequently dominate this mixed forest. Cedar elm, American sycamore, green ash, and sugar hackberry are also common.

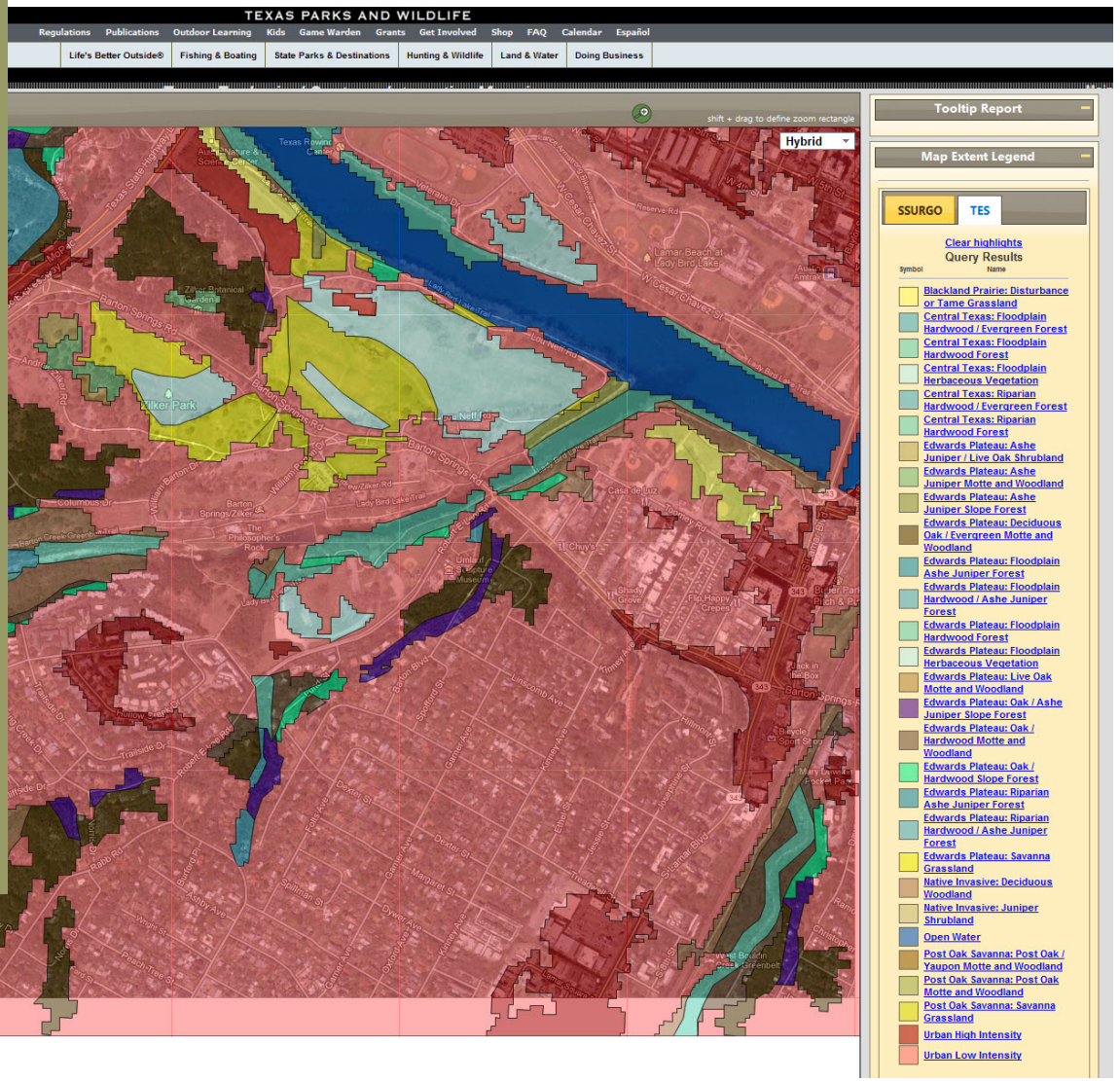
Description of Location 2/19/2008:
This particular site is dominated by American sycamore, little walnut, and ashe juniper trees. The undergrowth shrubs consist of Ashe juniper, American sycamore, and Texas mountain-laurel. Herbaceous species include Jamaica swamp sawgrass and saw greenbrier.

Texas Parks and Wildlife Department Ecological Systems Classification Project

Data Collection and Photograph by: Amie Treuer

TEXAS PARKS & WILDLIFE

Diamond, David, and Lee Elliot. Texas Ecological Systems Project:Phase 1 Interpretive Booklet. Interpretive Guide, Texas Parks and Wildlife Department, Missouri Resource Assessment Partnership, 2010, 139.



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Questions?