



# **NLCD01-SRTM-NED SYNERGY IN KENTUCKY: POSSIBILITIES AND LIMITATIONS OF CANOPY HEIGHT DIFFERENTIAL ANALYSIS**

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**Commonwealth Office of Technology**

**USGS SRTM Workshop**  
**Reston, VA**  
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## **OUTLINE**

- Rationale
- Discovery and validation of C-SRTM
- First approximation: NLCD01 – SRTM – NED – qualitative/quantitative
- Preliminary conclusions



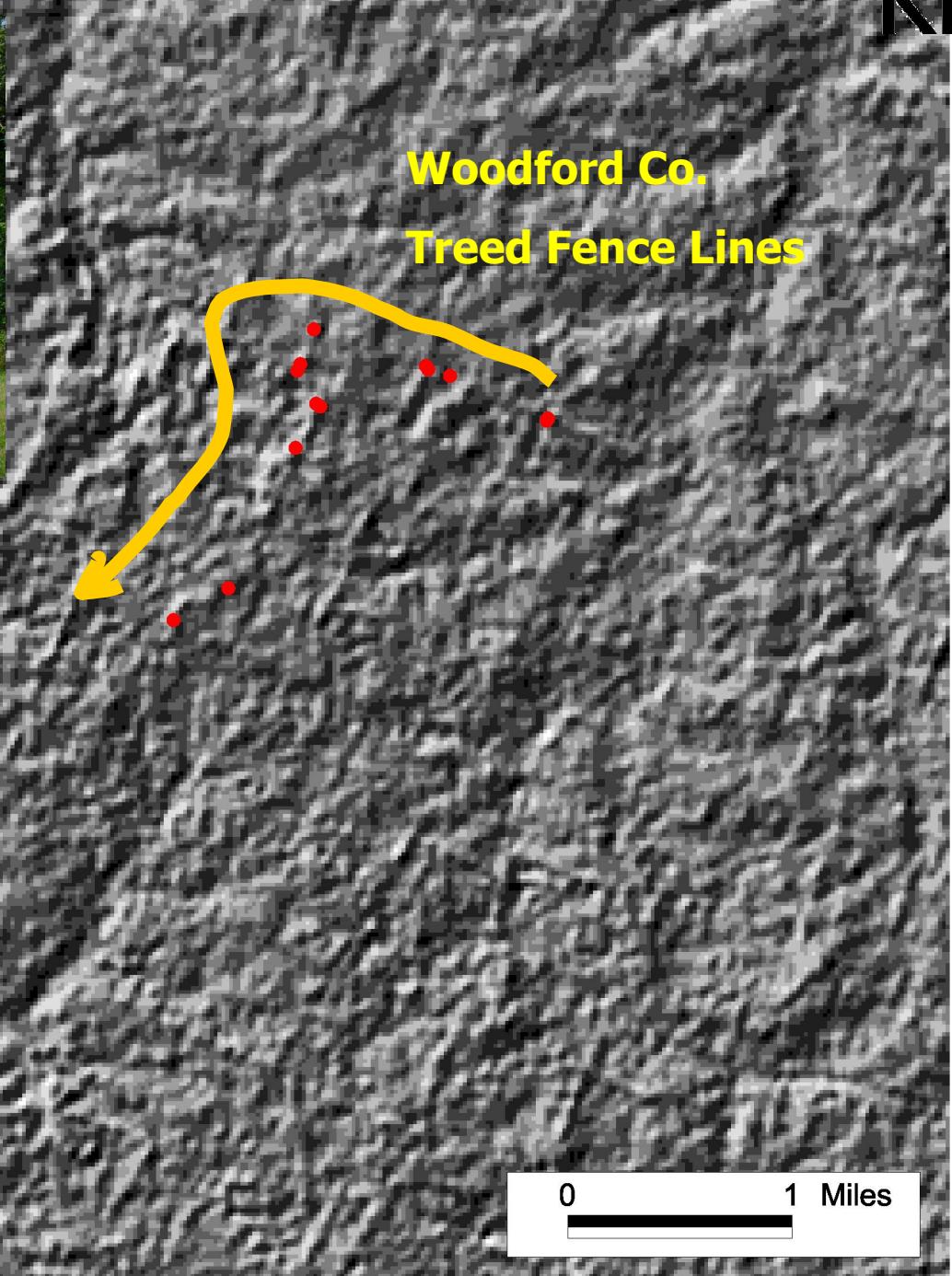
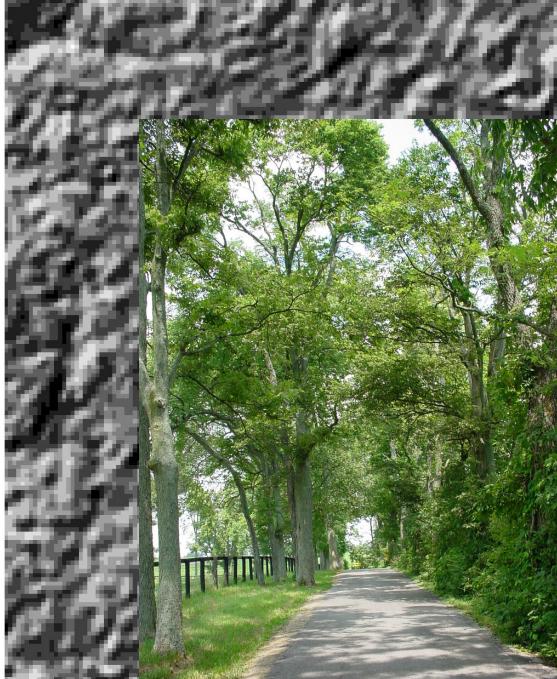
# Why?



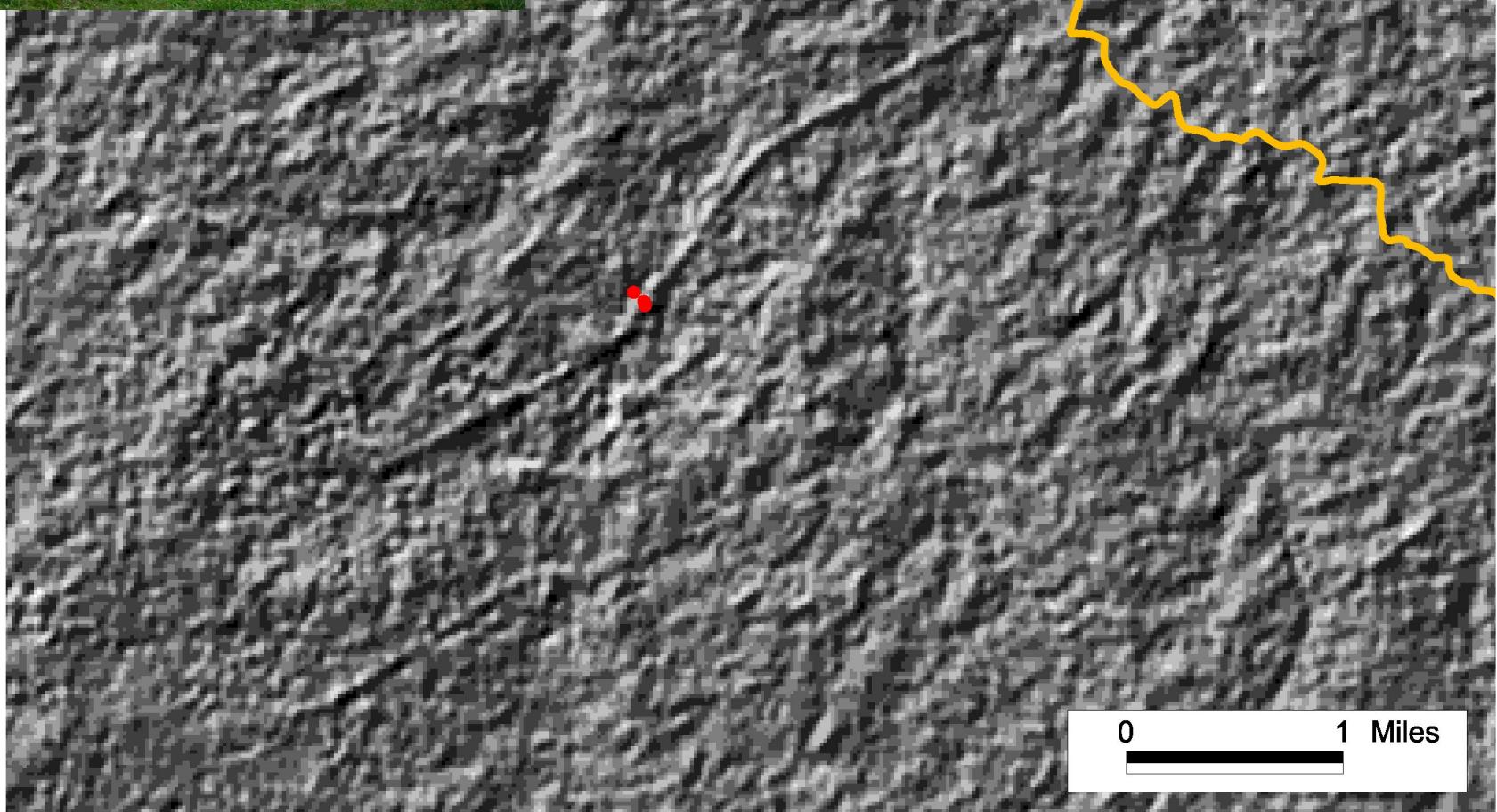
- *NLCD01 finished in Kentucky (USGS zones 47 and 53; ref. Dean Gesch's work)*  
\*\* available at USGS's Seamless DDS\*\*
- *Kentucky Landscape Snapshot Project (NASA funded: \$1.2 M) coming to a close;*  
<http://kls.ky.gov>
- *Kentucky Landscape Census (NASA funded: \$3.5 M) entering Change Detection Phase;*  
<http://klc.ky.gov>
- *Kentucky Watershed Modeling Information Portal (EPA funded; \$750K) starting;*  
<http://kls.kwmip.gov>

## *Discovery Phase*

- Method:  
*Hillshade + Visual Pattern Recognition +  
+ Field Visit + GPS + Digital Pictures . . .*





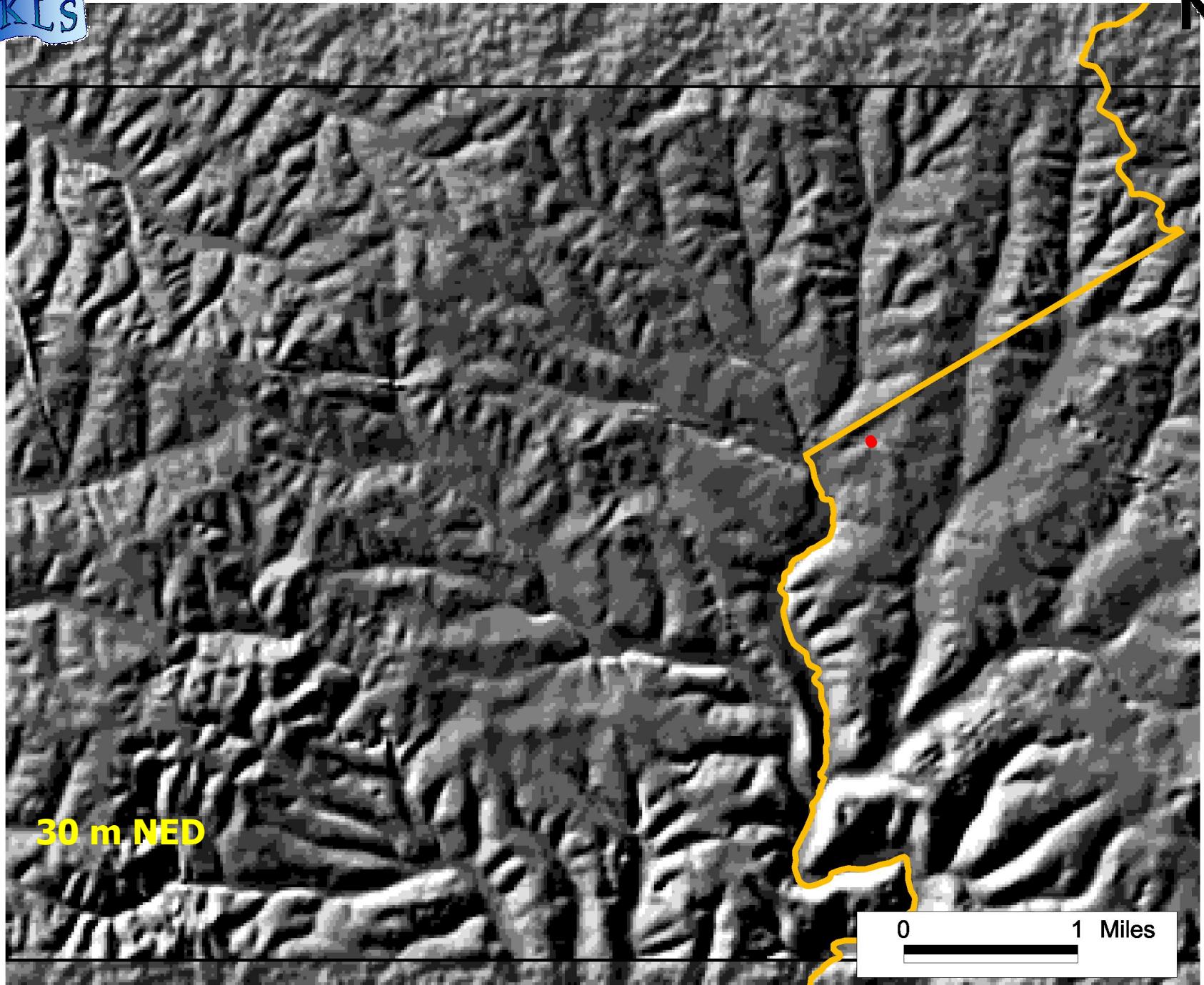


Fayette Co.

Old Railroad Grade

0

1 Miles





Fayette Co. - Landfill

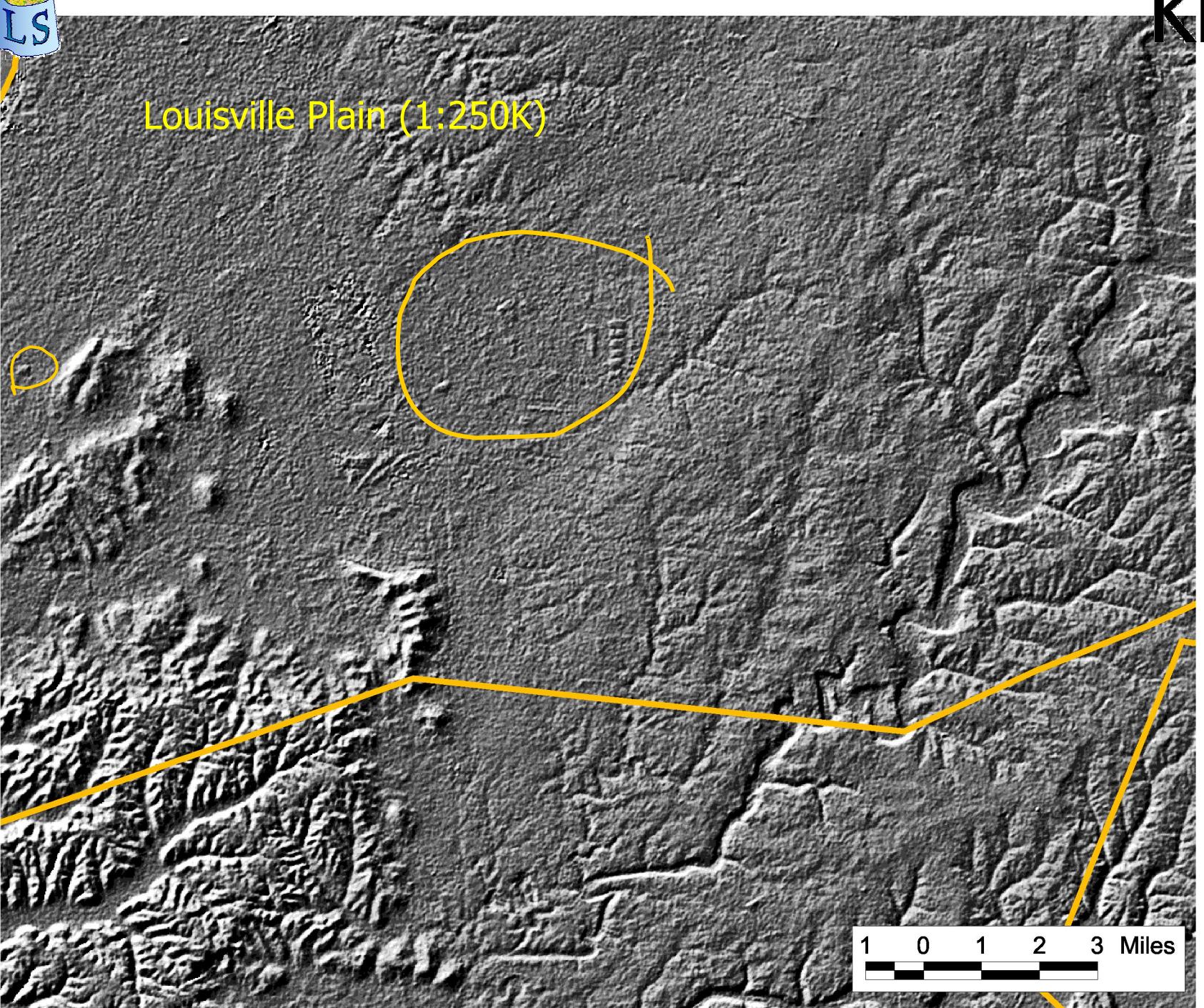
30 m SRTM

0

1 Miles

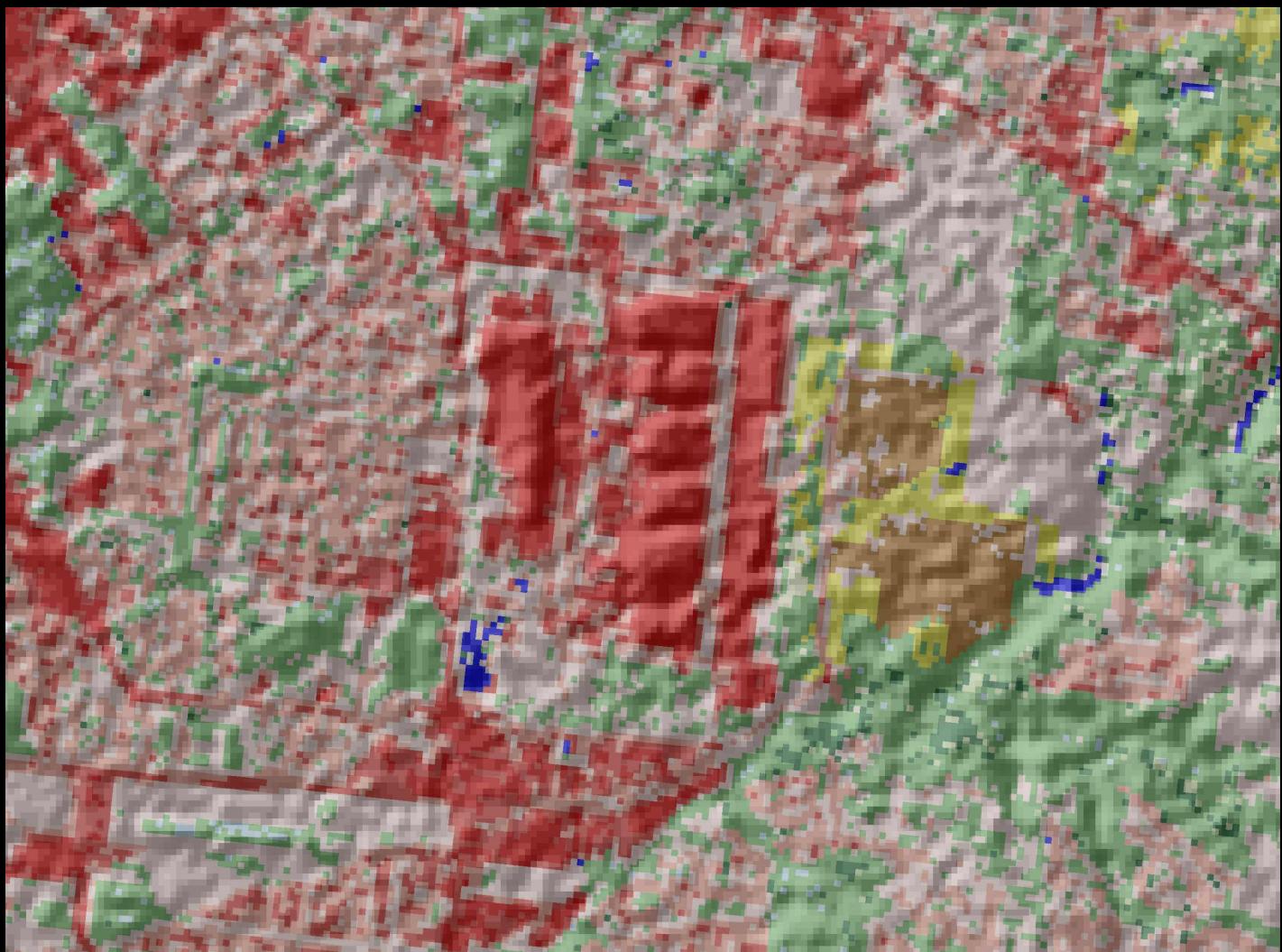


Louisville Plain (1:250K)



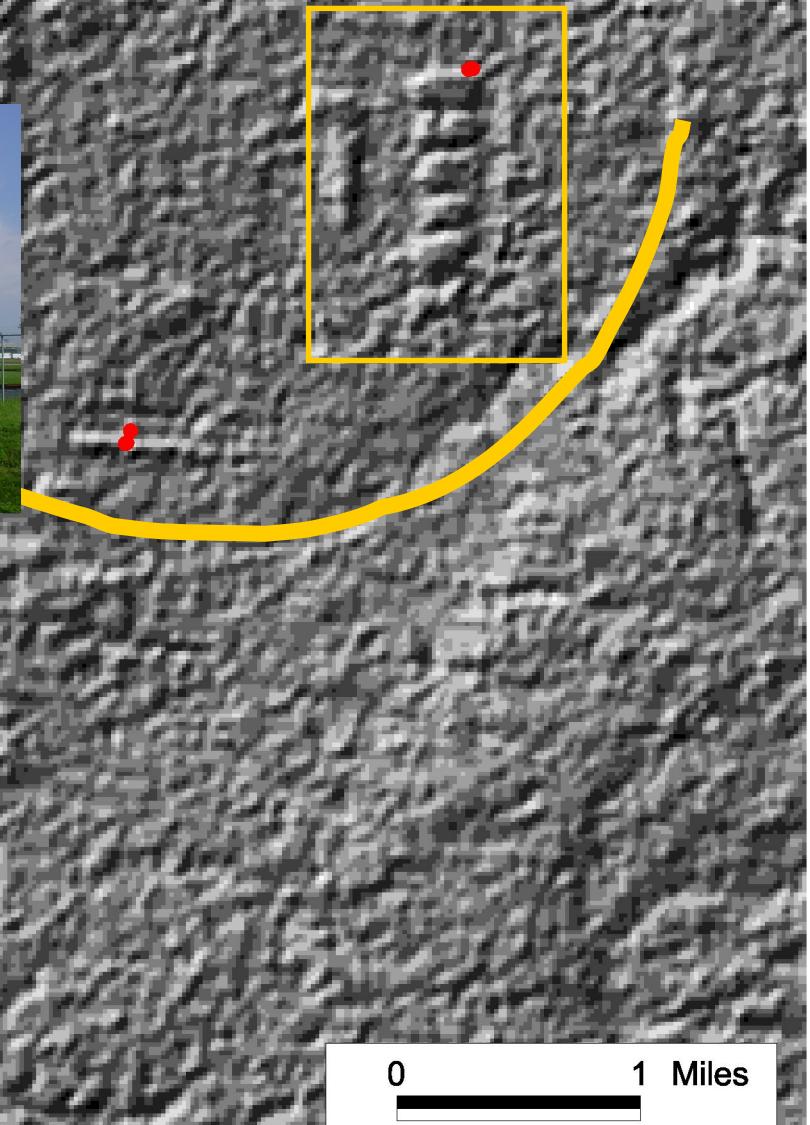
1 0 1 2 3 Miles

A horizontal scale bar with tick marks at 1, 0, 1, 2, and 3 miles. The segment from 0 to 1 is black, while the segments from 1 to 2 and 2 to 3 are white.



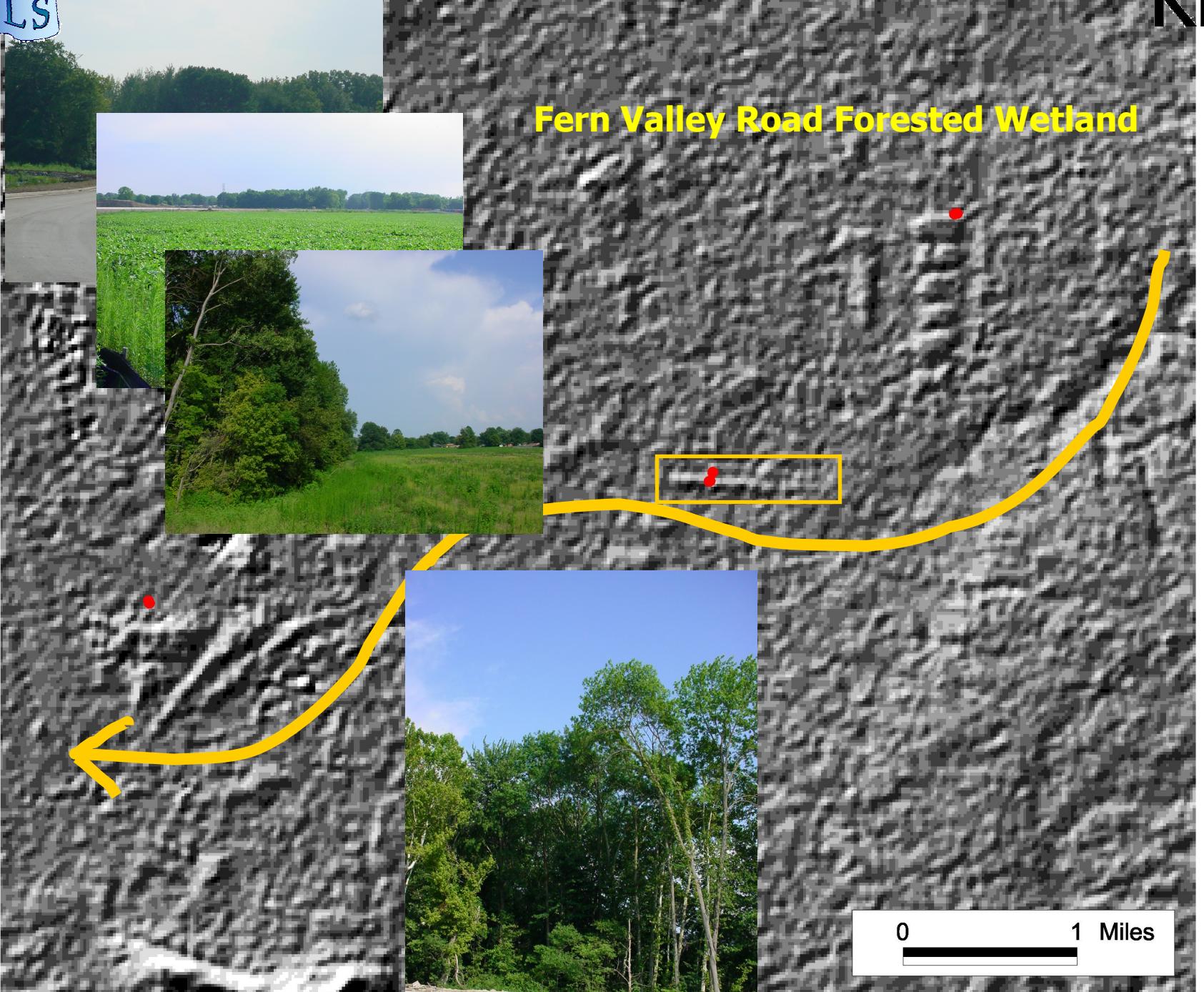


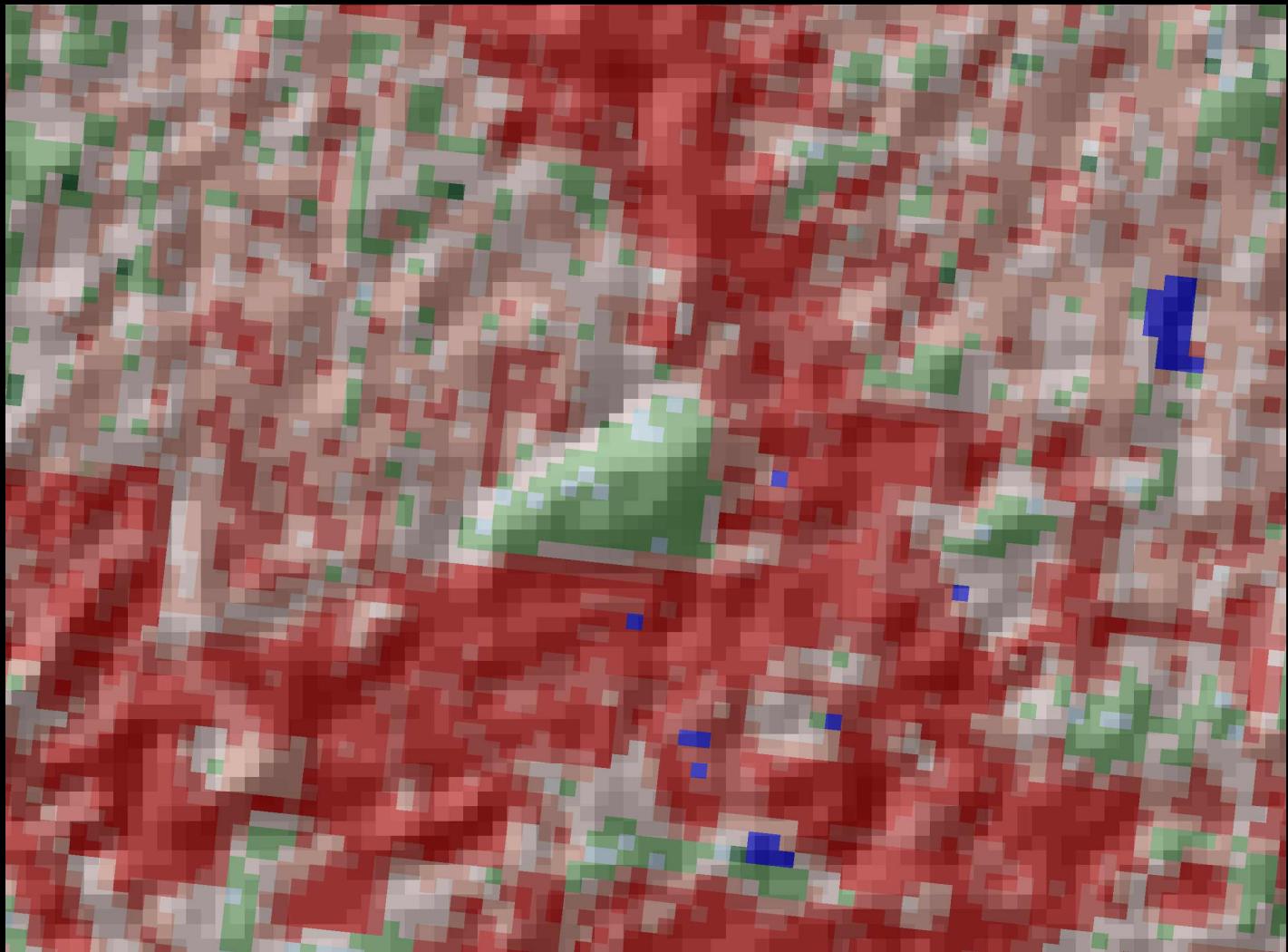
## General Electric Plant

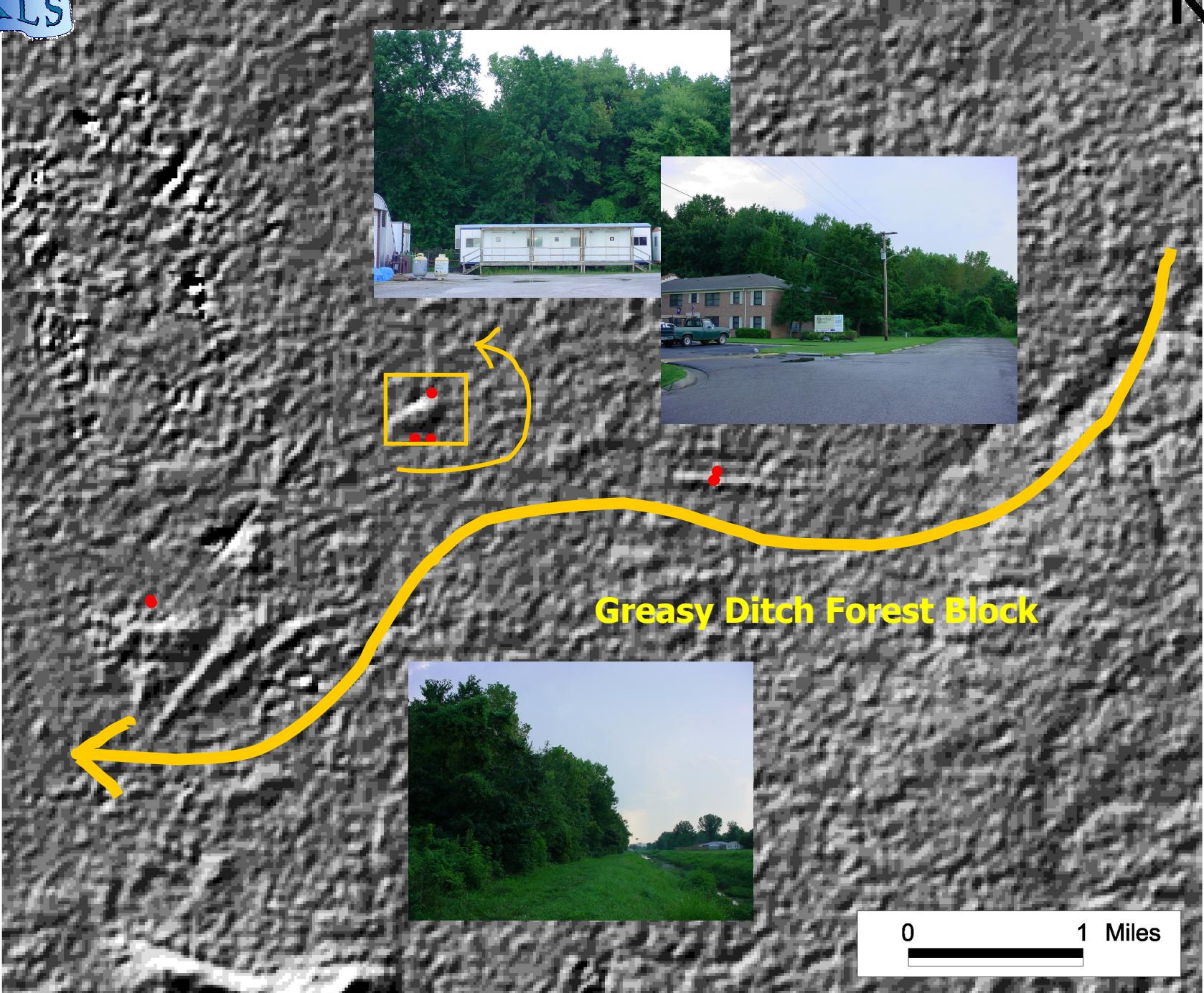




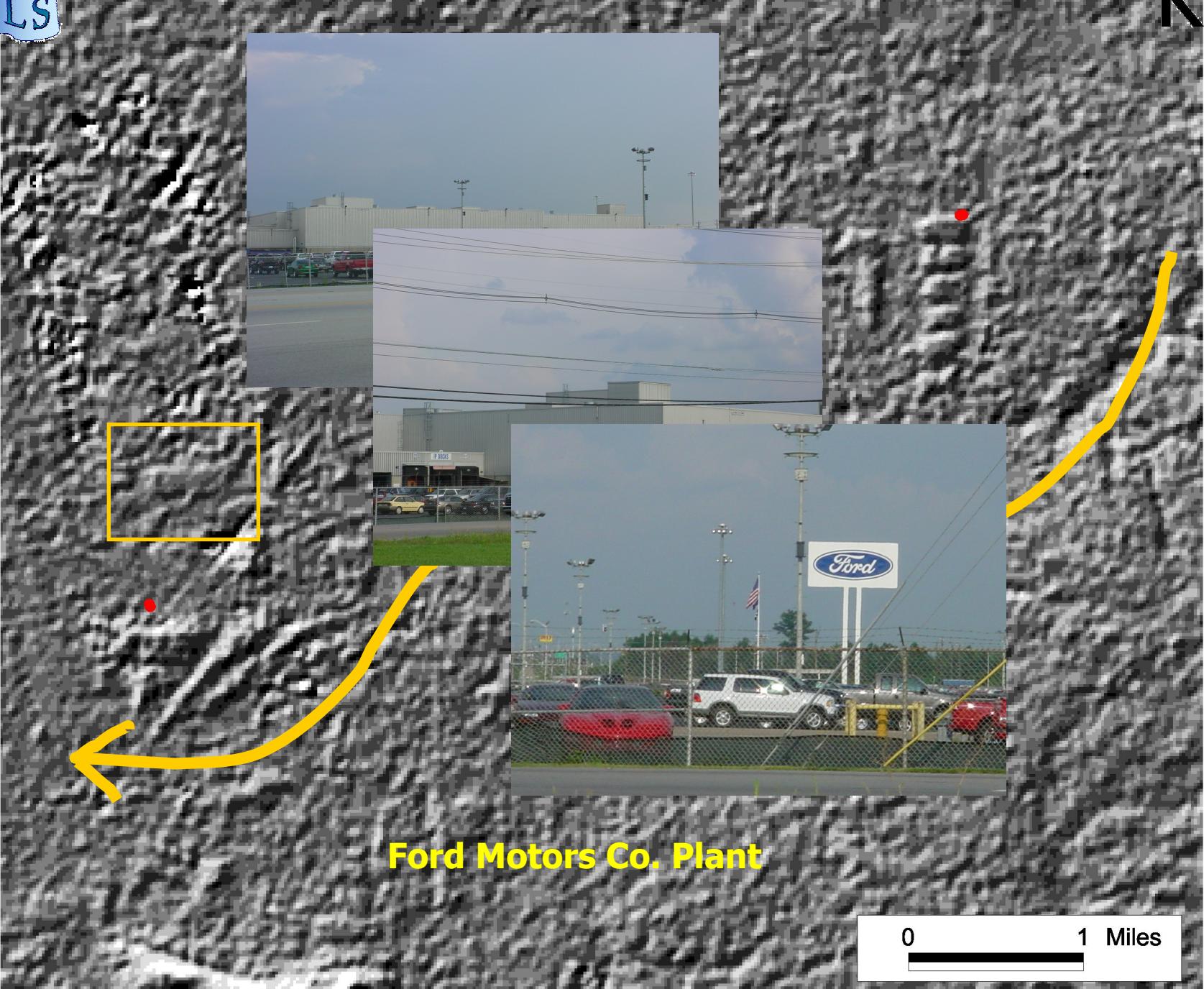
## Fern Valley Road Forested Wetland







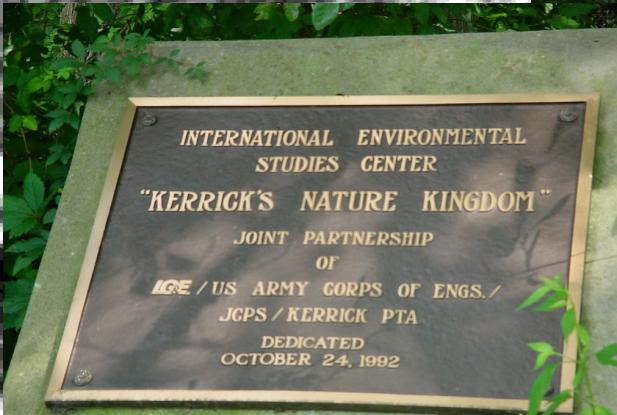
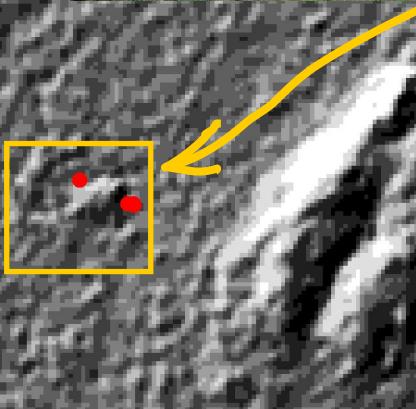
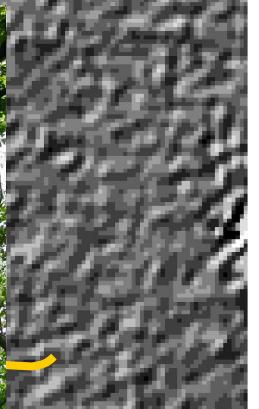
0 1 Miles





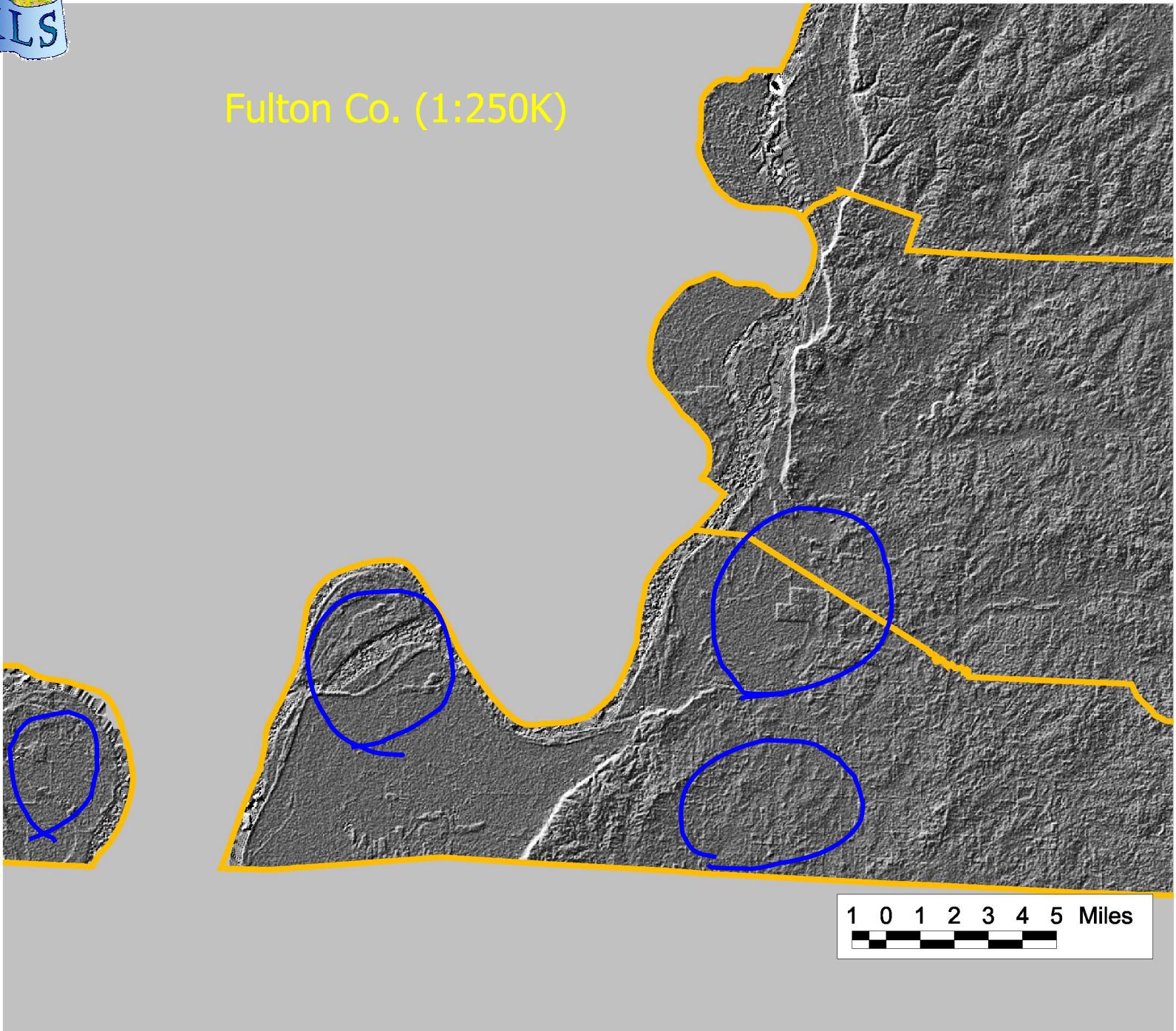
Outer Loop Waste Mgmt. Facility

0 1 Miles



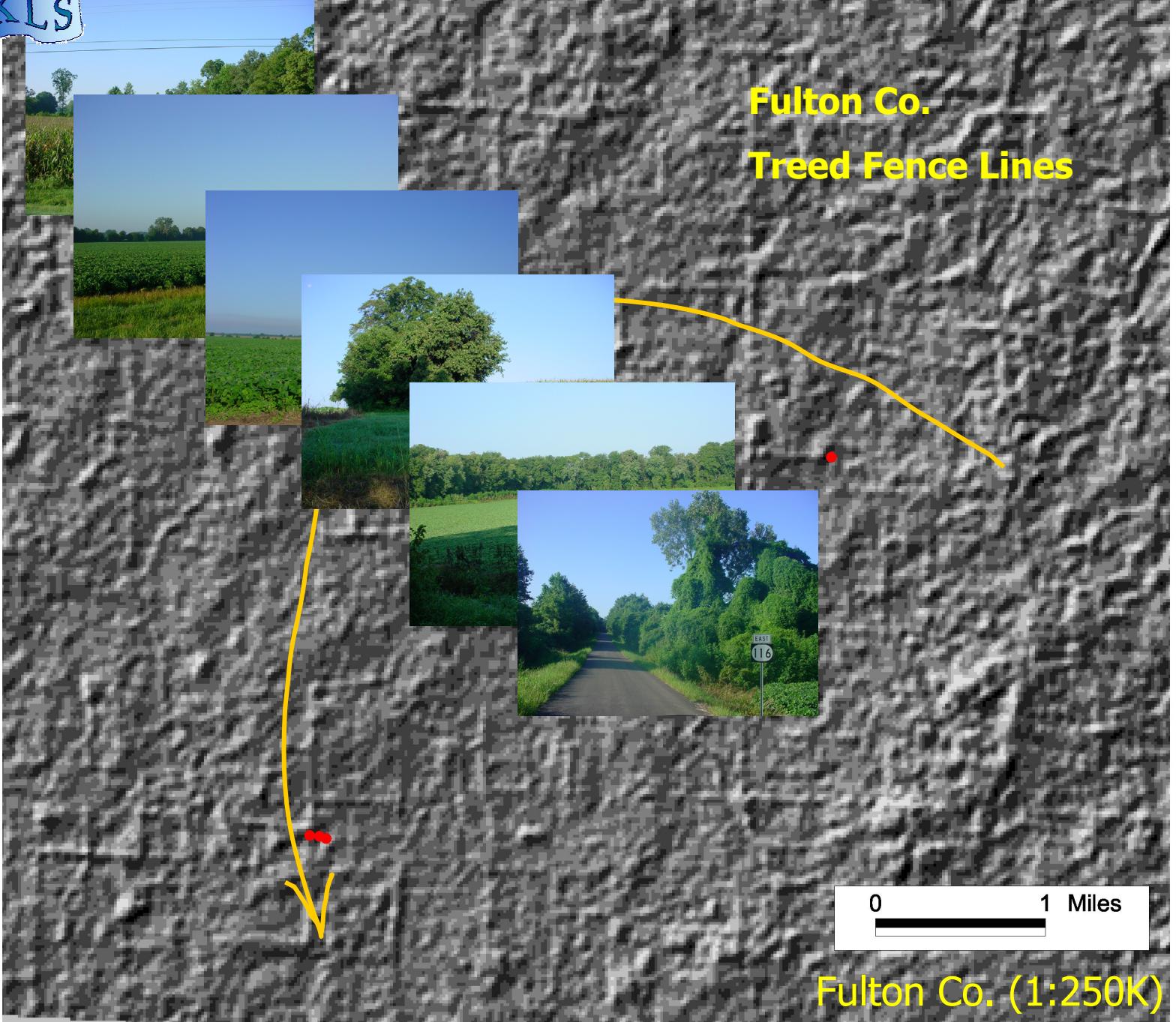


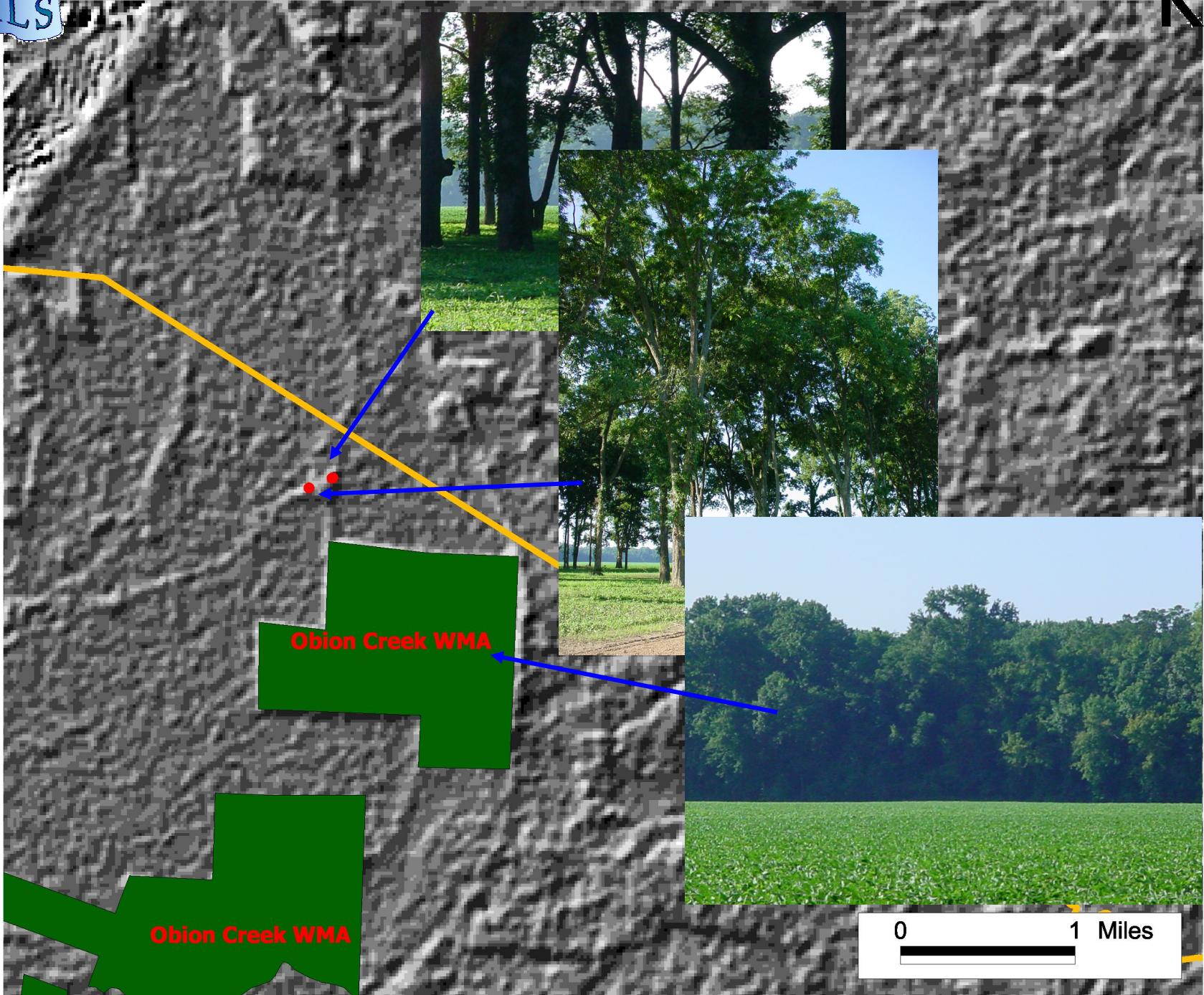
Fulton Co. (1:250K)

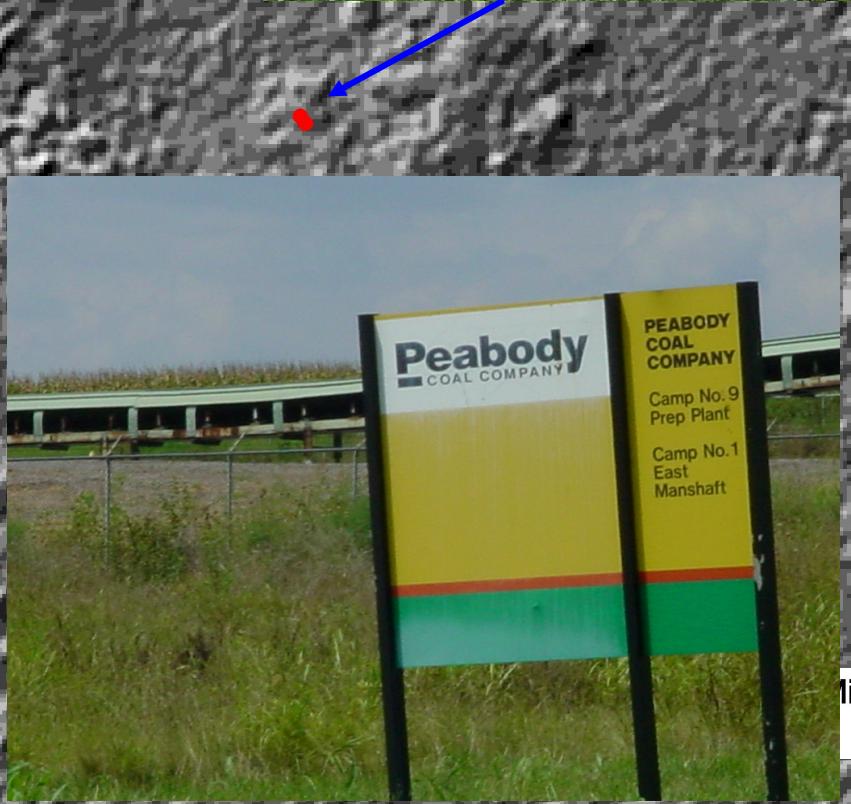
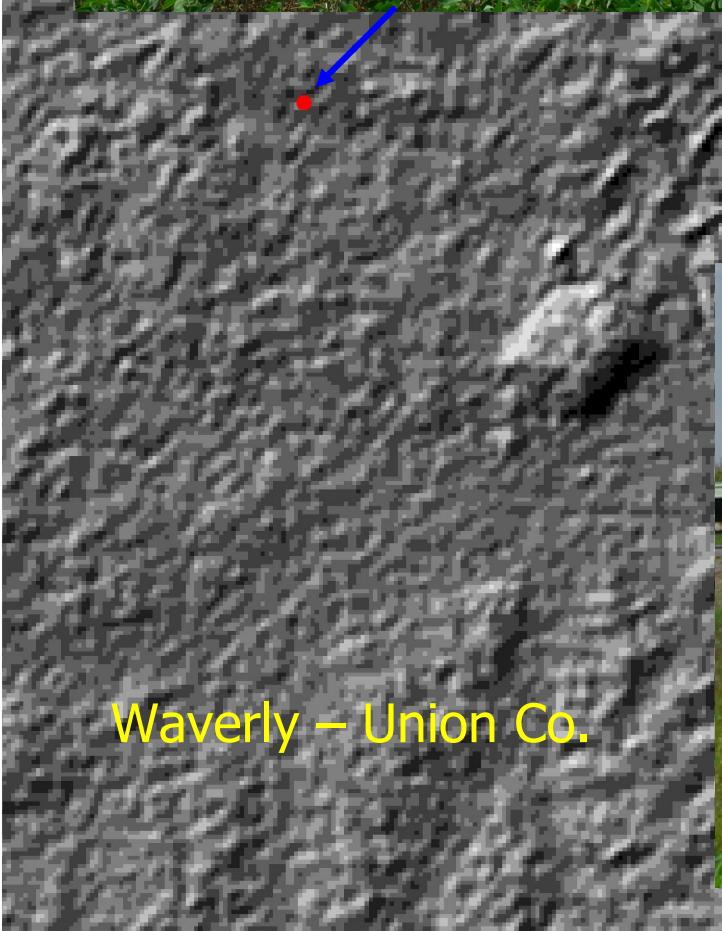




Fulton Co.  
Treed Fence Lines



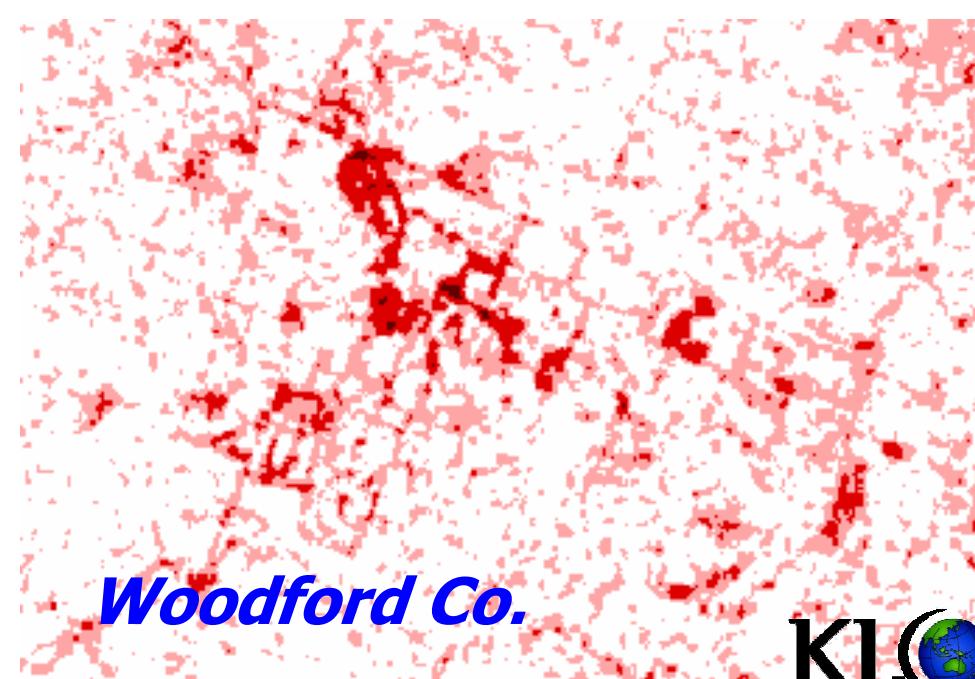
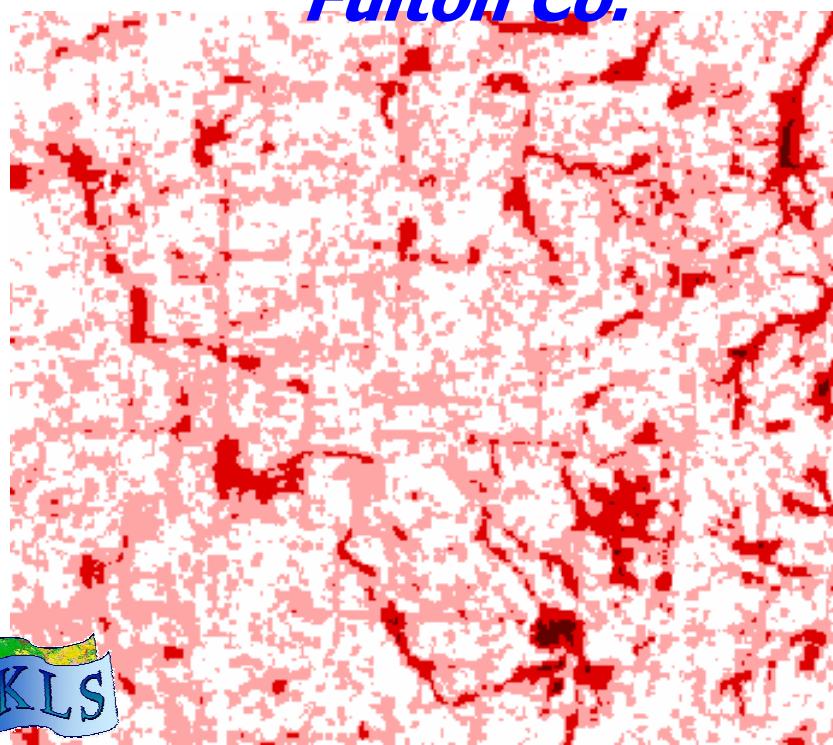
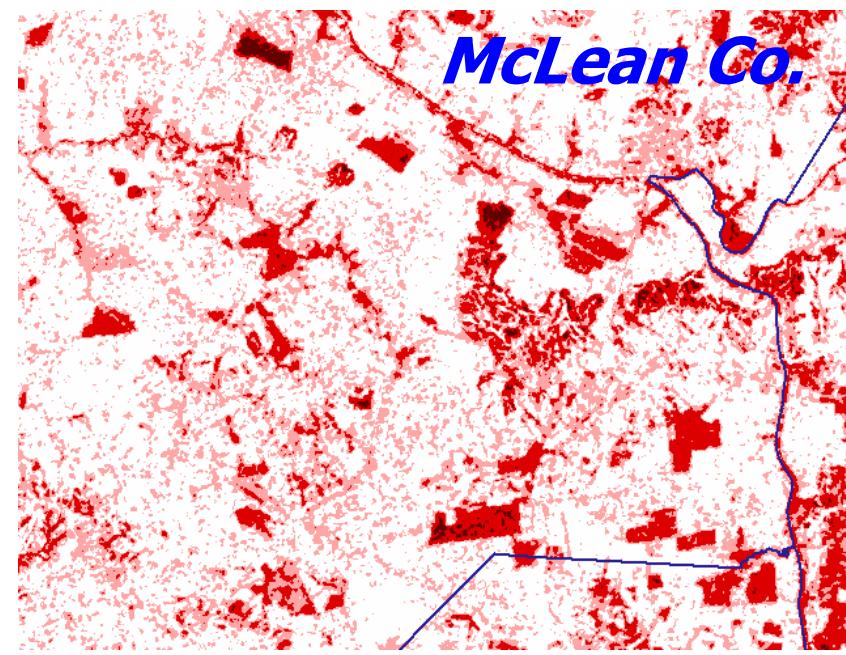
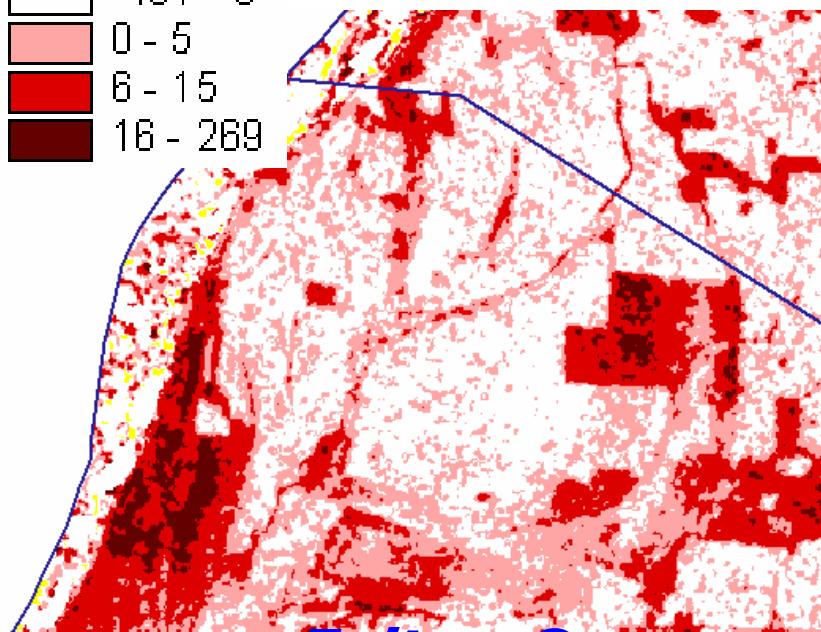
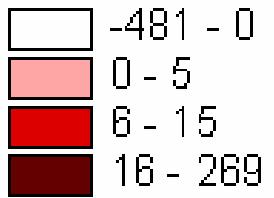


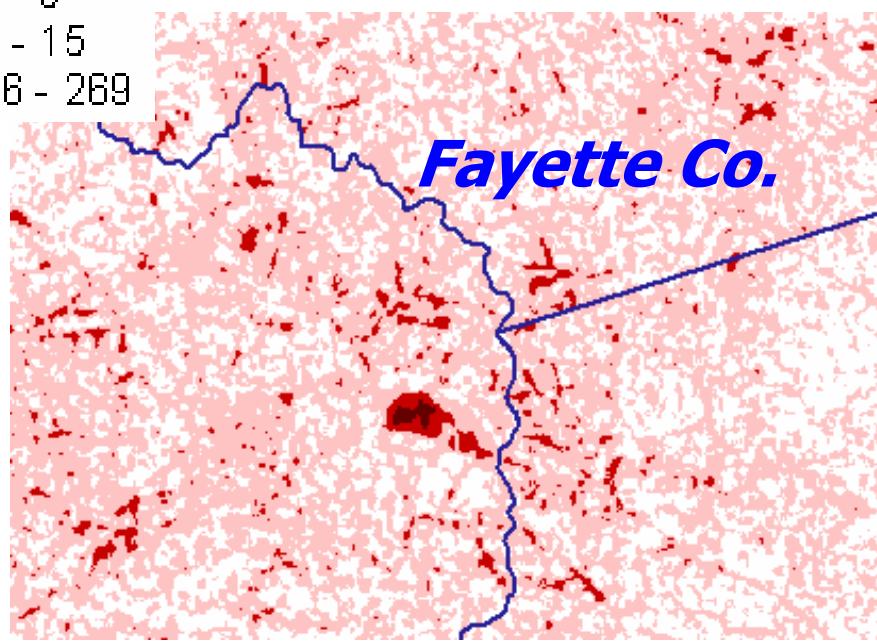
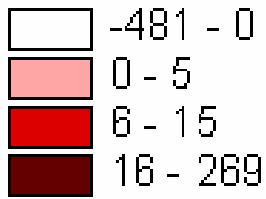


## ***A first approximation to forest canopy estimation:***

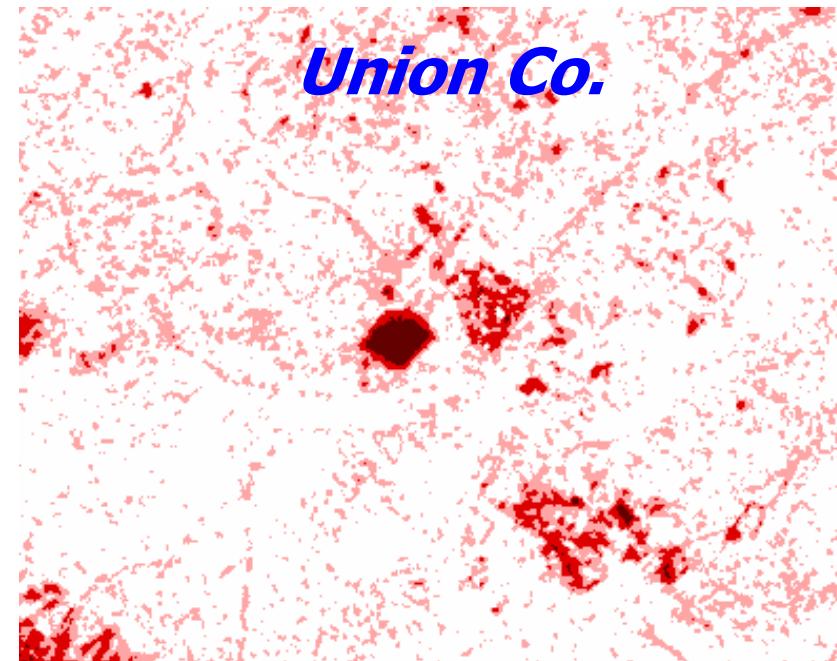
### *Method:*

- *NED as "bare earth" elevation*
- *C-SRTM as "somewhere in the canopy elevation"*
- *Overlay with NLCD01; per-pixel analysis*





(SRTM-NED)

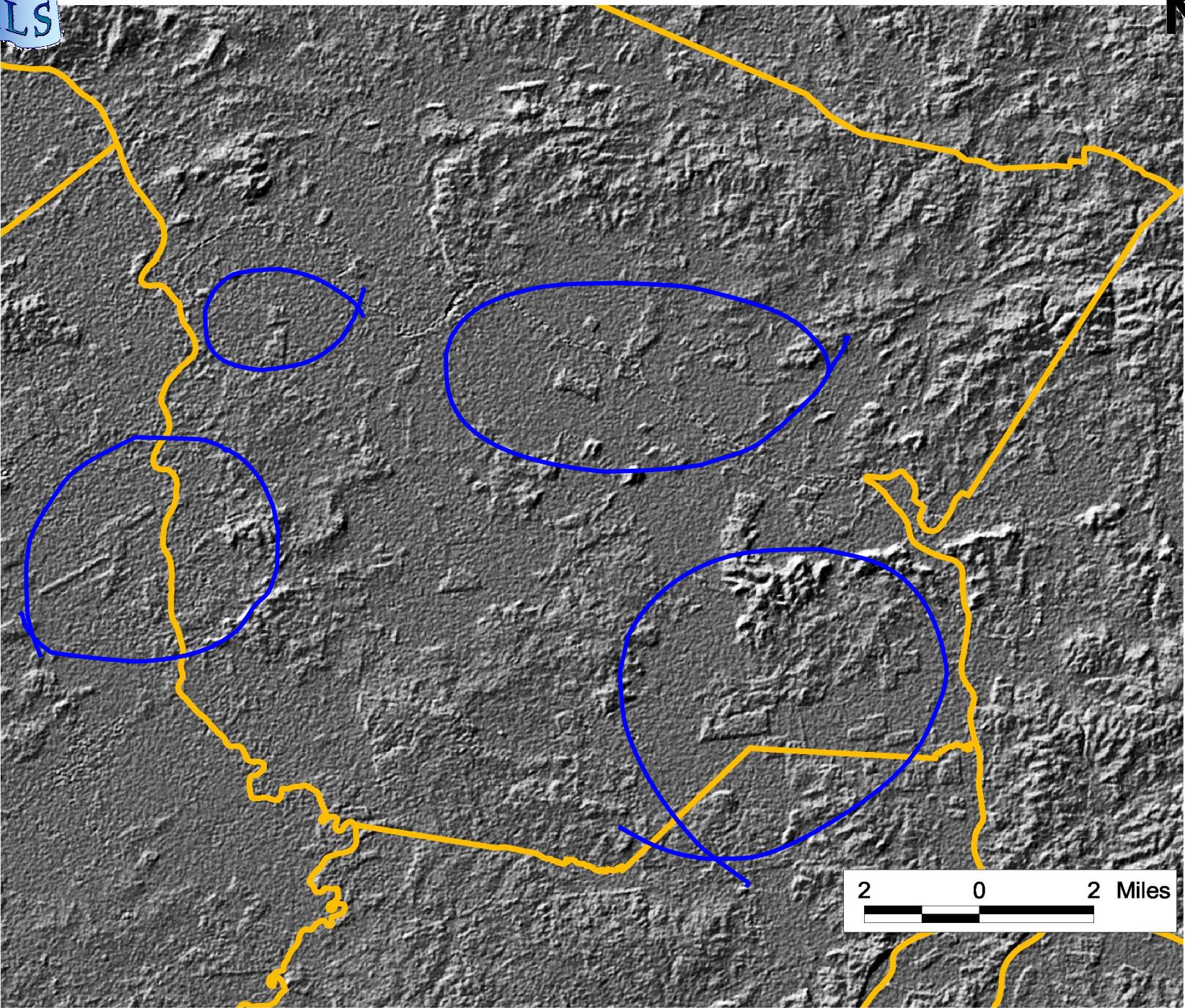




- Bare Rock/Sand/Clay
- Commercial/Industrial
- Deciduous Forest
- Emergent Herbaceous Wetlands
- Evergreen Forest
- High Intensity Residential
- Low Intensity Residential
- Mixed Forest
- Open Water
- Pasture/Hay
- Quarries/Strip Mines/Gravel Pits
- Row Crops
- Small Grains
- Transitional
- Urban/Recreational Grasses
- Woody Wetlands

- "High Relief":  $SRTM-NED >= 2 m$
- "Low Relief":  $SRTM-NED < 2 m$

NLCD92	<i>SRTM Low Relief</i>	<i>SRTM High Relief</i>
Forested	0.238	0.762
Other	0.731	0.269

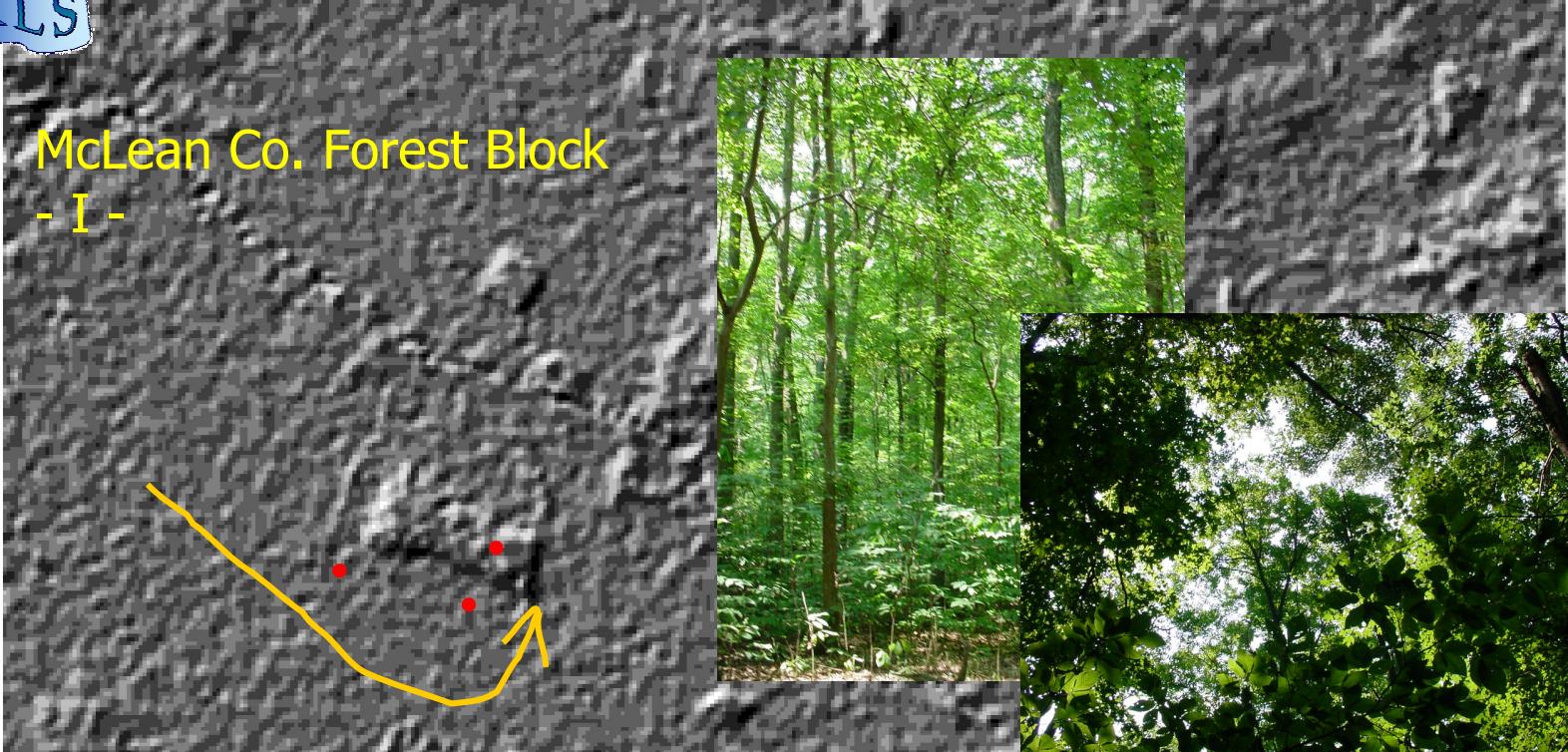


2 0 2 Miles



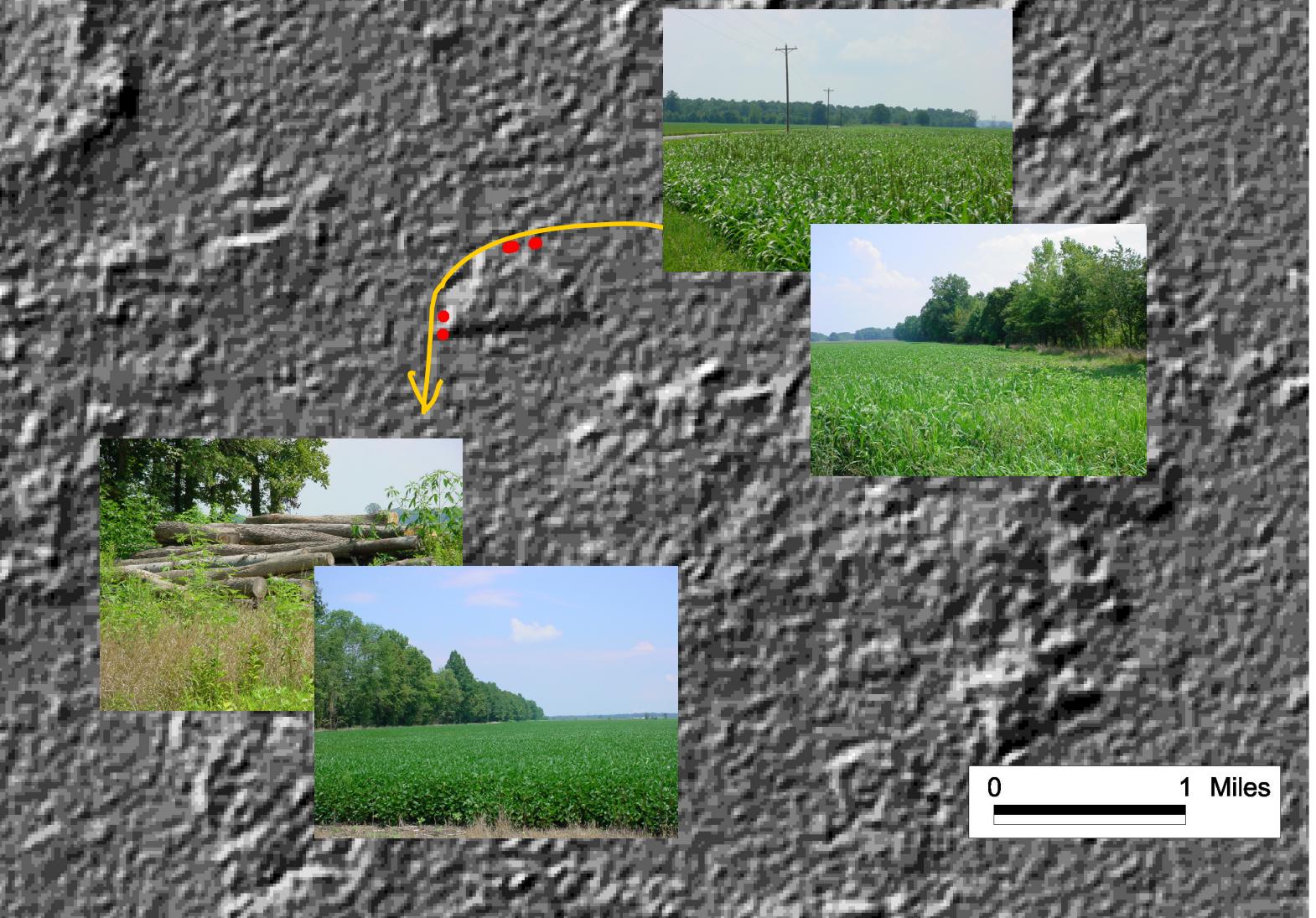
## McLean Co. Forest Block

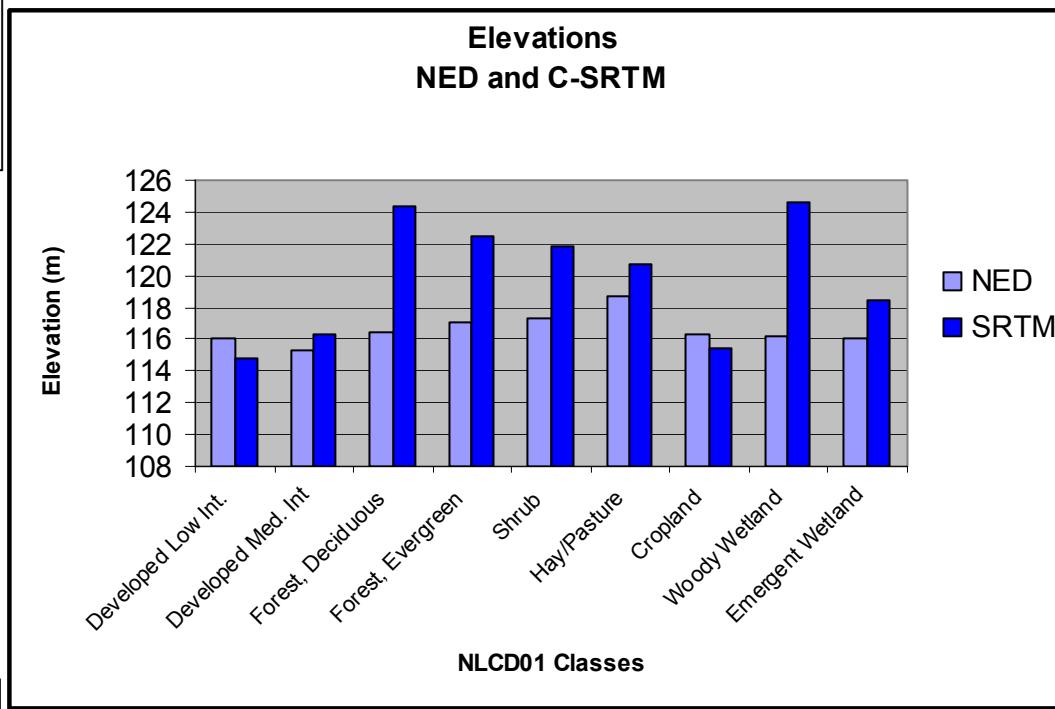
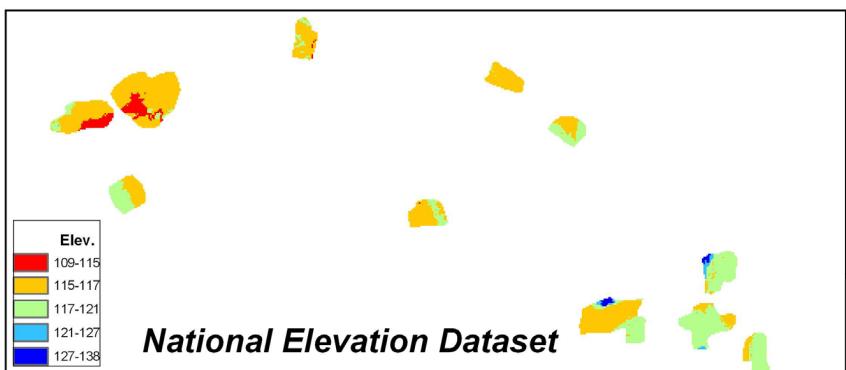
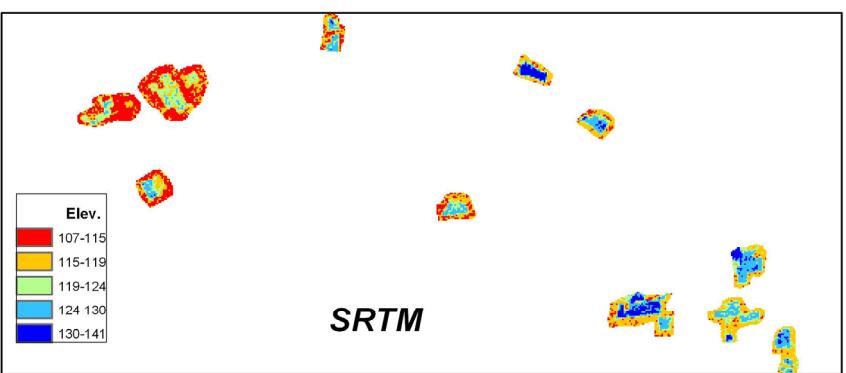
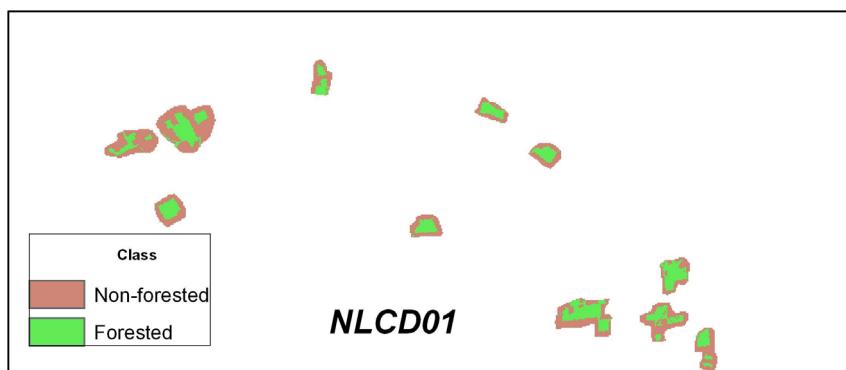
- I -



## McLean Co. Forest Block

- II -

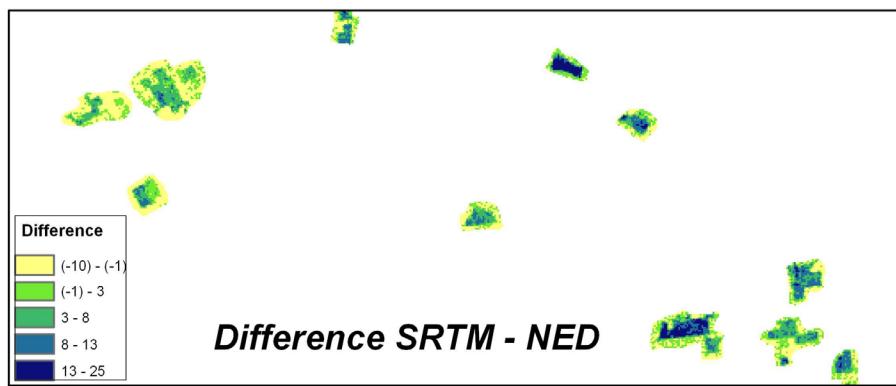
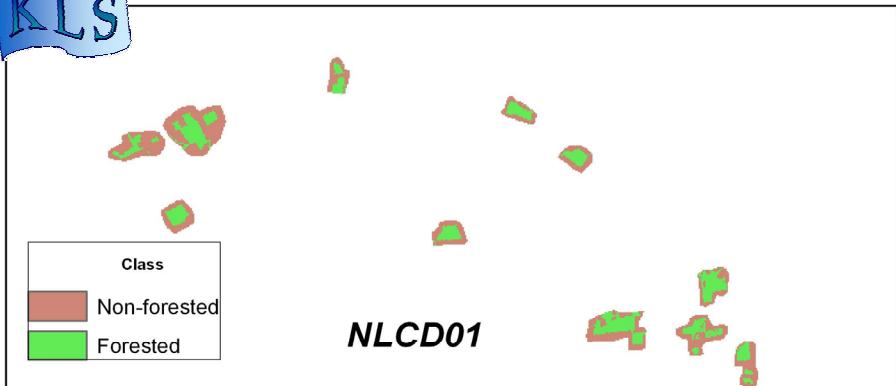




*Overall Mean C-SRTM: 119.9*

*Overall Mean NED: 116.6 m*

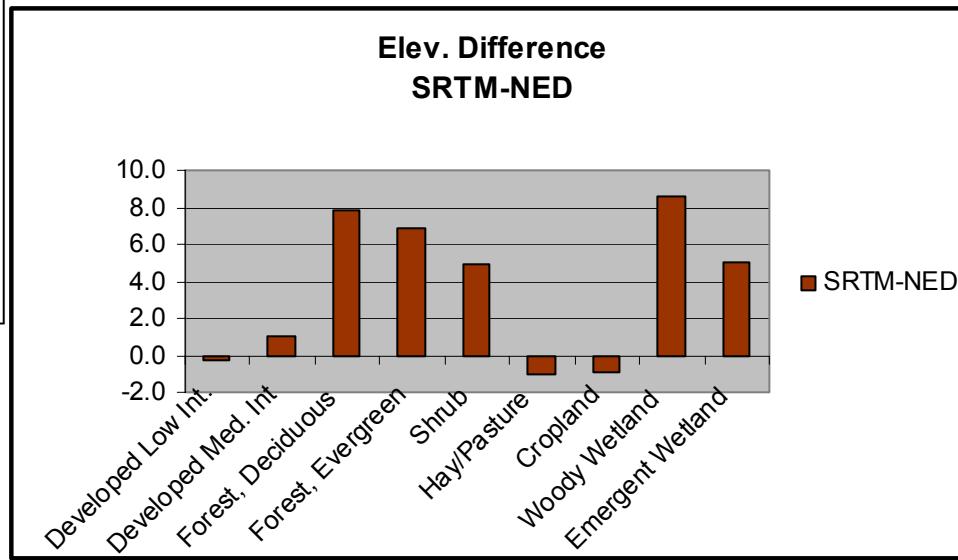
*Overall Mean Difference: 3.6 m*



*CV NED range: 1.9% - 5.8%*

*CV C-SRTM range: 3.5 to 5.5%*

*Abs.CV Difference range: 53% to 918%*



## ***Conclusions***

- *SRTM data "noisy" but reflect a more current and accurate Kentucky landscape (esp. wrt Dean Gesch's presentation)*
- *Linear and polygonal "high relief" image features validated, trutched as forested and other landmarks*
- *Elevation differences match NLCD01 canopy delineations of forested areas in "flat" relief areas*