ArcGIS Agricultural Land Use Maps from the Mississippi Cropland Data Layer

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Mississippi were critical to the success of this project.

The Cropland Data Layer in Mississippi

Cropland Data Layer Program Development

- Based on USDA-NASS programs started in the 1970s
- LARSYS software from Purdue University
- Produced state and county acreage estimates for major crops grown in a state
- Migrated system to a personal computer

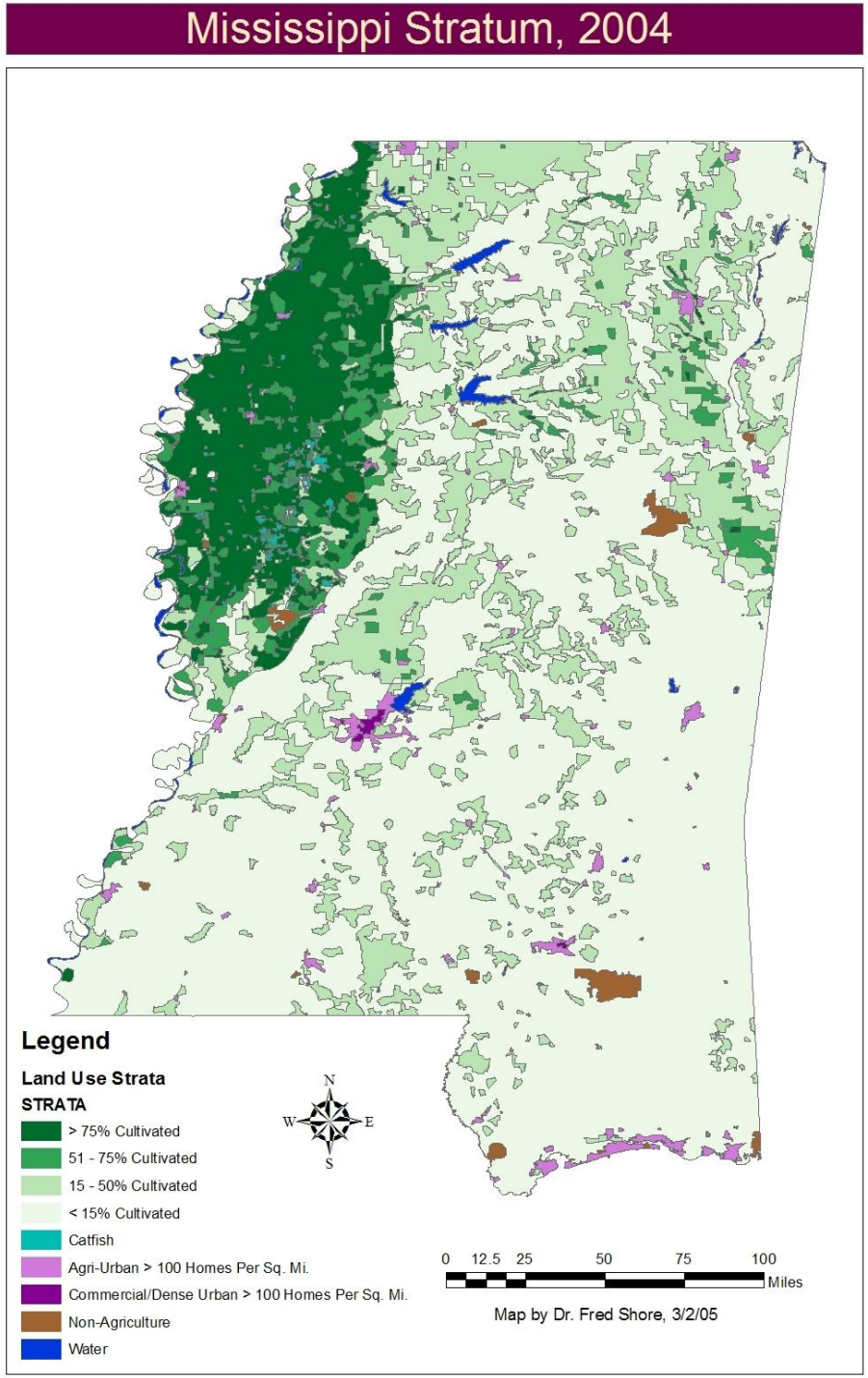
Mississippi Cropland Data Layer Project

- A cooperative project of USDA-NASS, Mississippi State University, and the Mississippi Department of Agriculture and Commerce
- Started in 1999 using the Peditor and RSP software programs of USDA-NASS
- Began creating the public domain Cropland Data Layer product

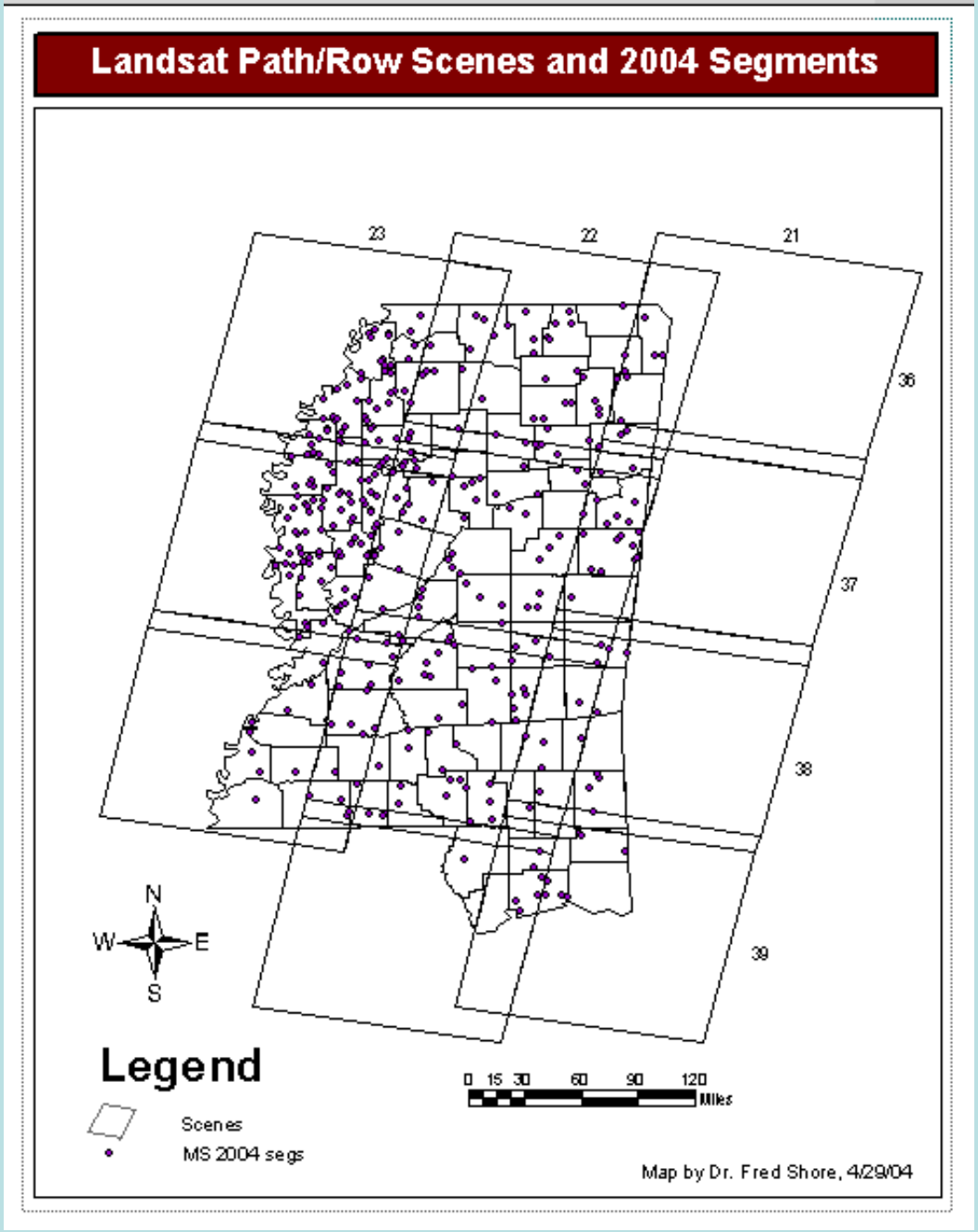
ESRI ArcGIS Applications

- Maps for use by the team generating the Cropland Data Layer product
- Maps to present information to clients

June Agricultural Survey Segment Selection

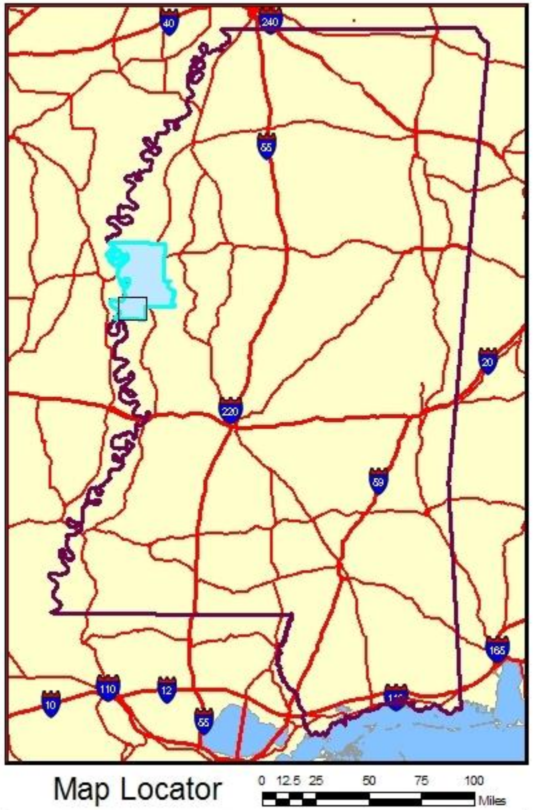


Mississippi Data Collection



Segment Locator Map

2004 Sample County Segments 6001 and 6010



Map Locator

Legend

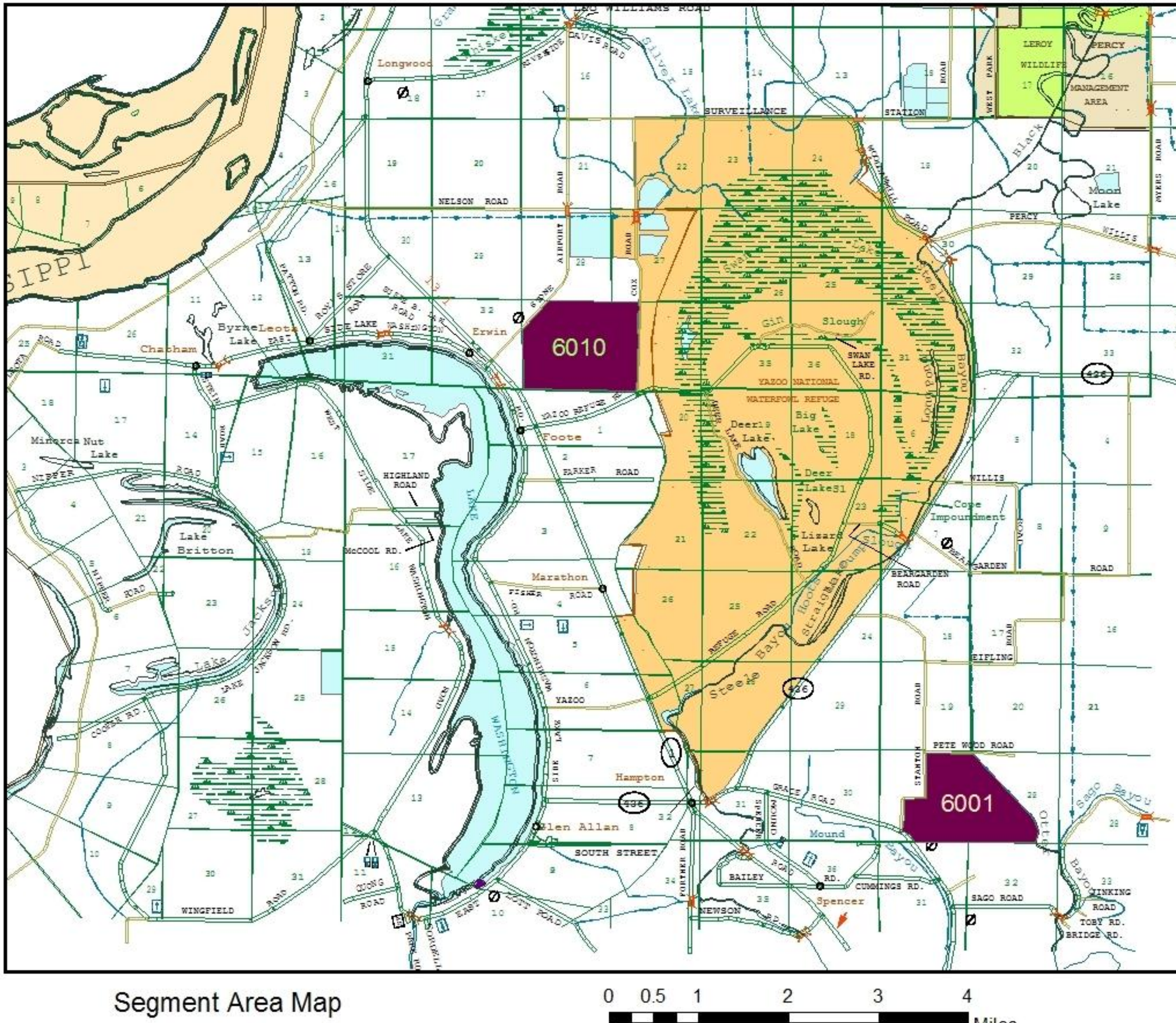
N
W E
S

OLD #
NEW #

Segments for the June Agricultural Survey

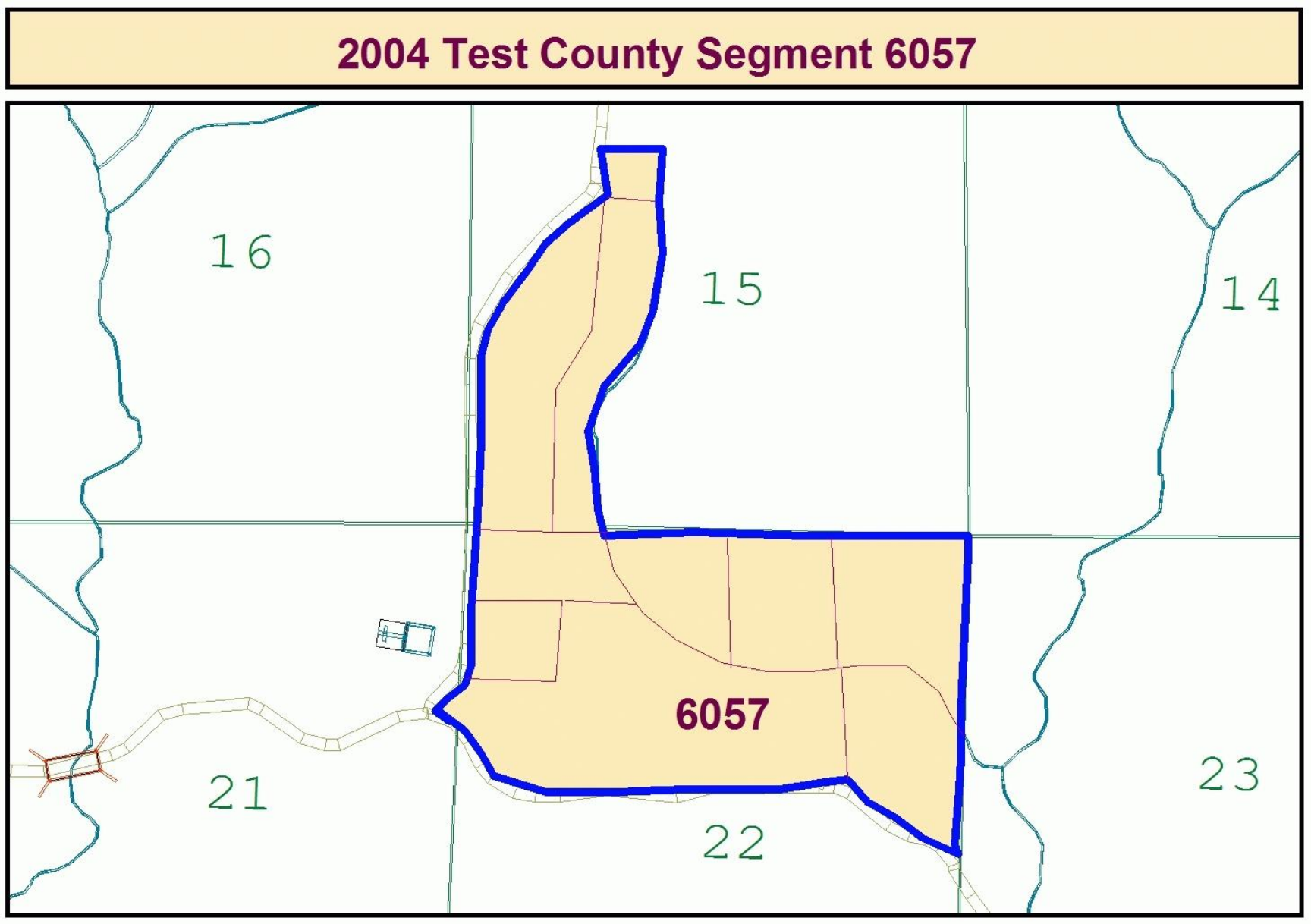
- National Forest
- National Park
- National WR
- State Park
- Wildlife MA
- City

USDA/NASS/MDAC/MSU
Map by Dr. Fred Shore



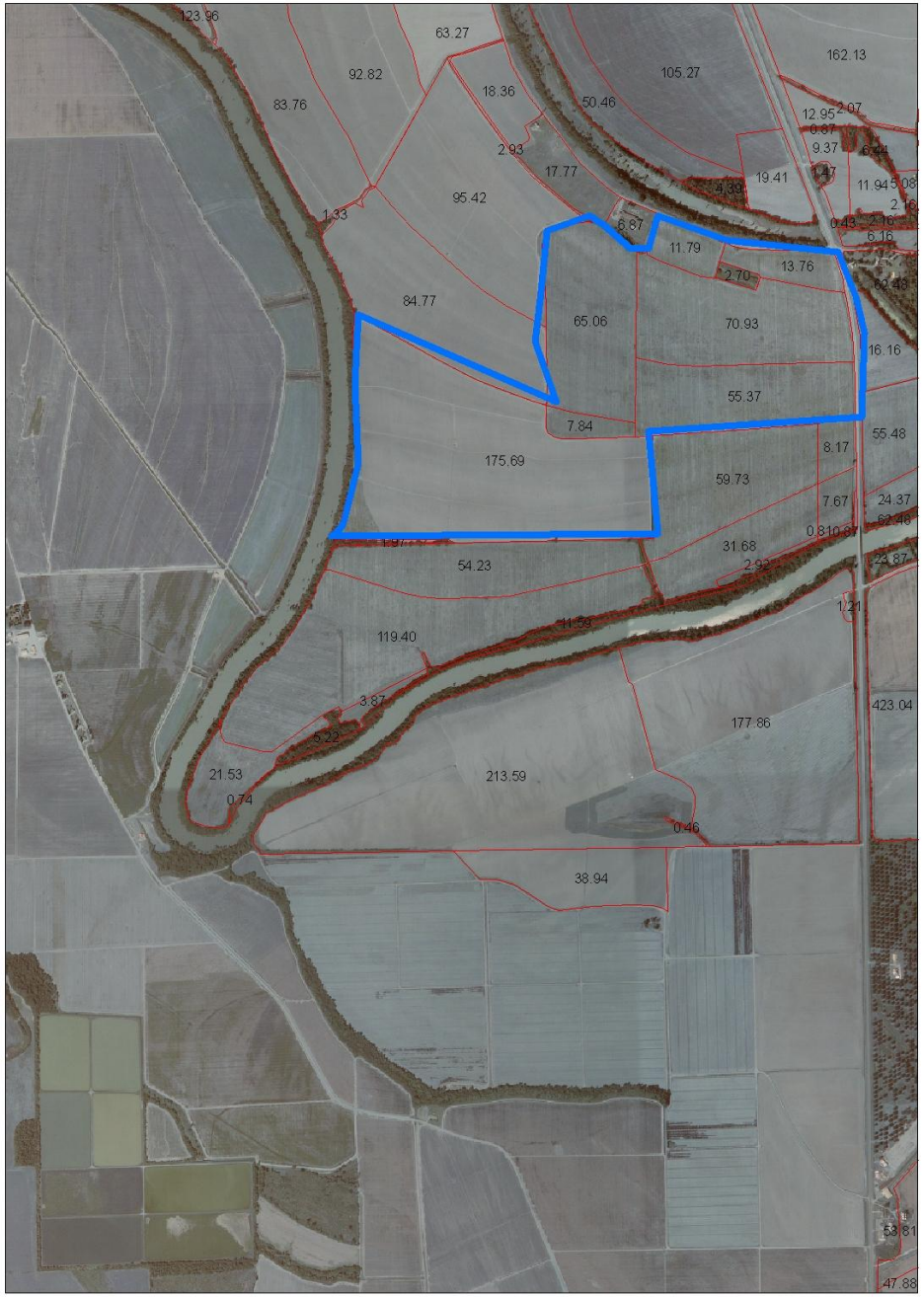
Segment Area Map

Segment Locator Map and Field Locations



Field/Segment Boundaries on a High Resolution Photo

The segment boundary is shown in blue and the field boundaries in red with acres shown for each field.

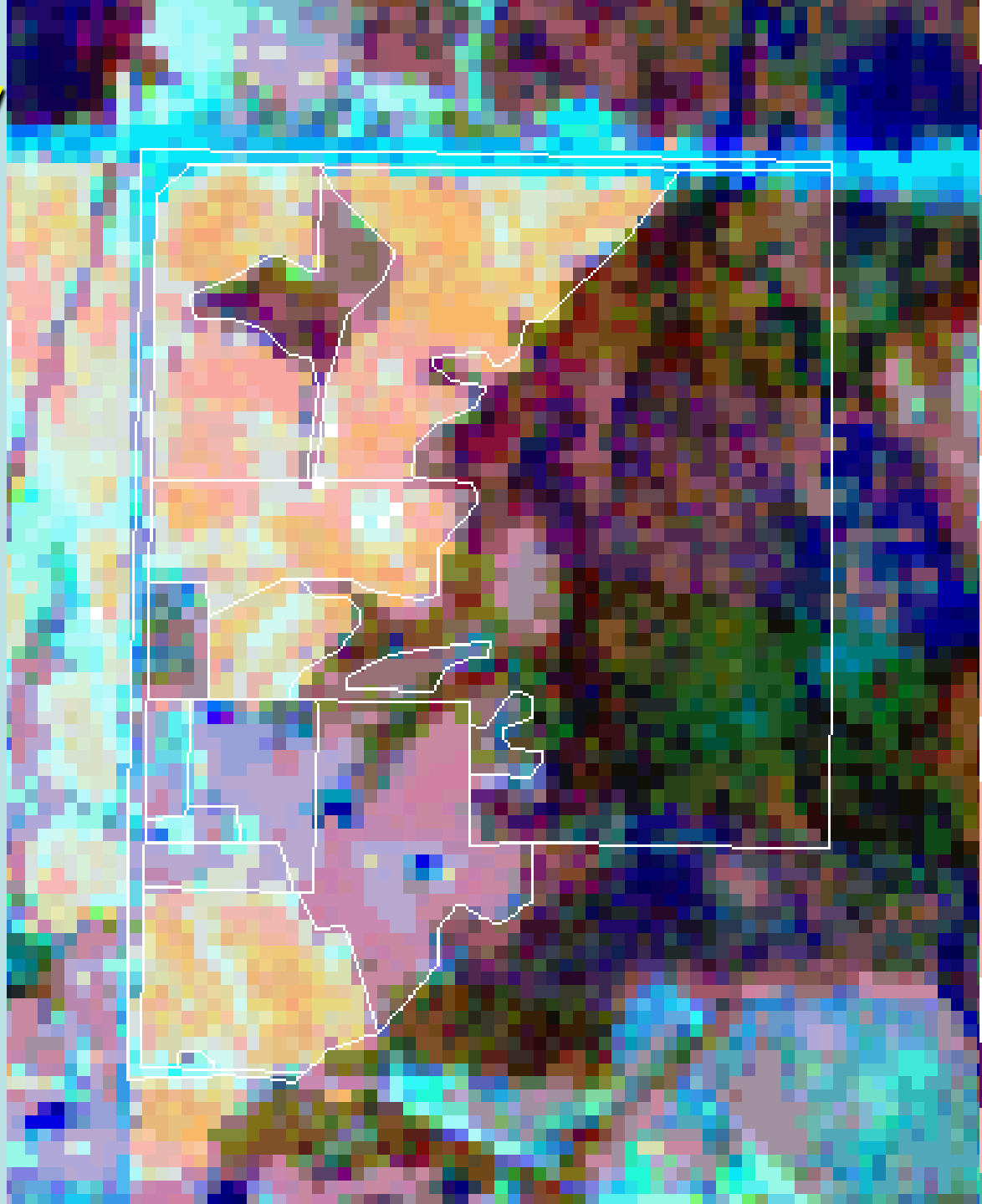


2005 Segment 6030, Test County

MSU, USDA-NASS, MDAC Map by Dr. Fred Shore, 6/7/05

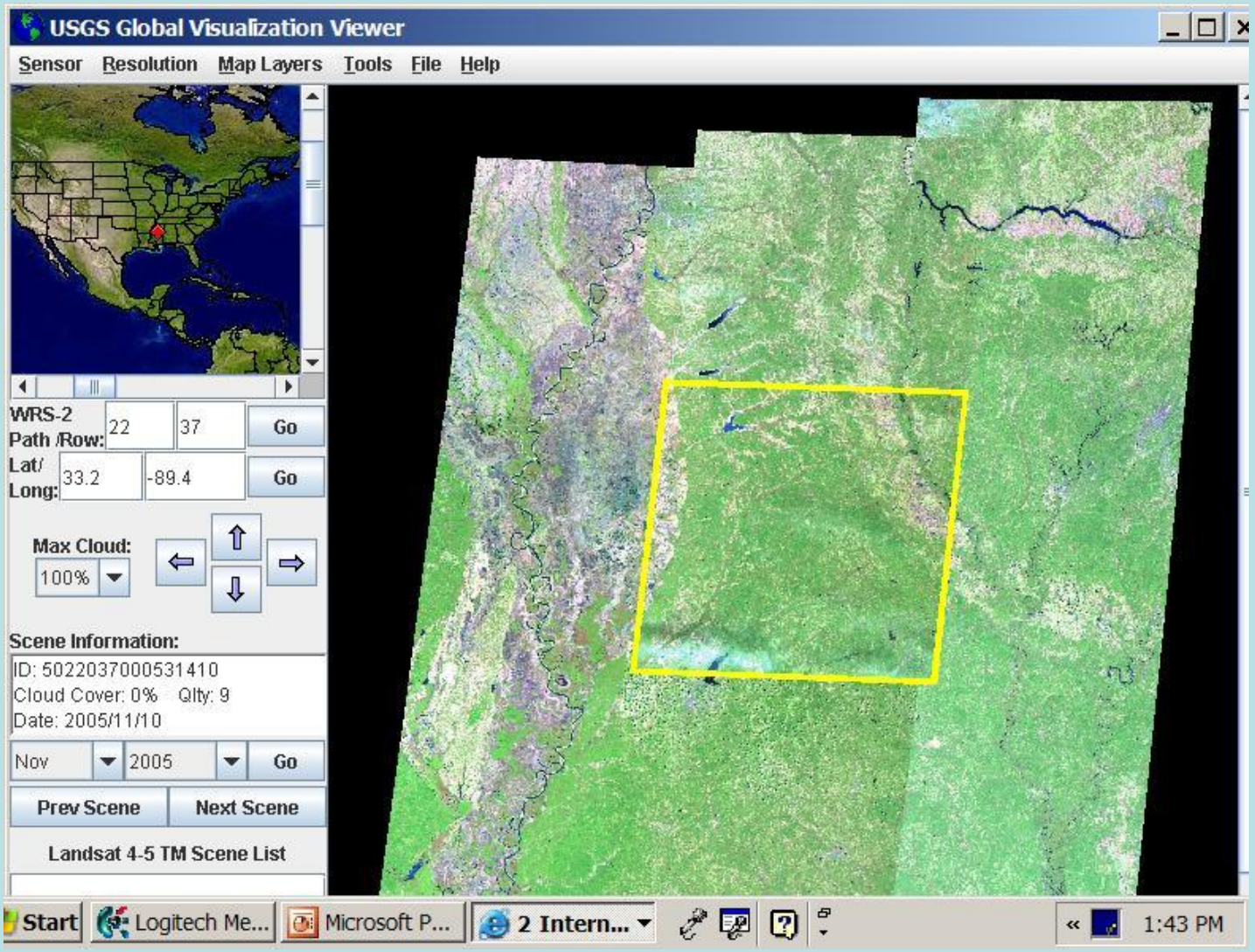
Field Boundary Digitizing

With the help of a Landsat image, training field boundaries are digitized.



MS Landsat Scenes 2005

Each scene, bounded in yellow, is easy to select using the USGS Viewer.



Indian Remote Sensing (IRS)

RESOURCESAT-1 Advanced Wide Field Sensor (AWiFS) scene 280-48-A, 9/04/05. Each scene covers 350 km^2 at an average resolution of 56 m (vs. Landsat TM scenes at 185 km^2 and 30 m resolution).

Shown as false color IR: Band 5 (SWIR) / Band 3 (red) / and Band 2 (green) as red/green/blue. An additional IR band is also obtained (vs. 7 bands for Landsat TM scenes).

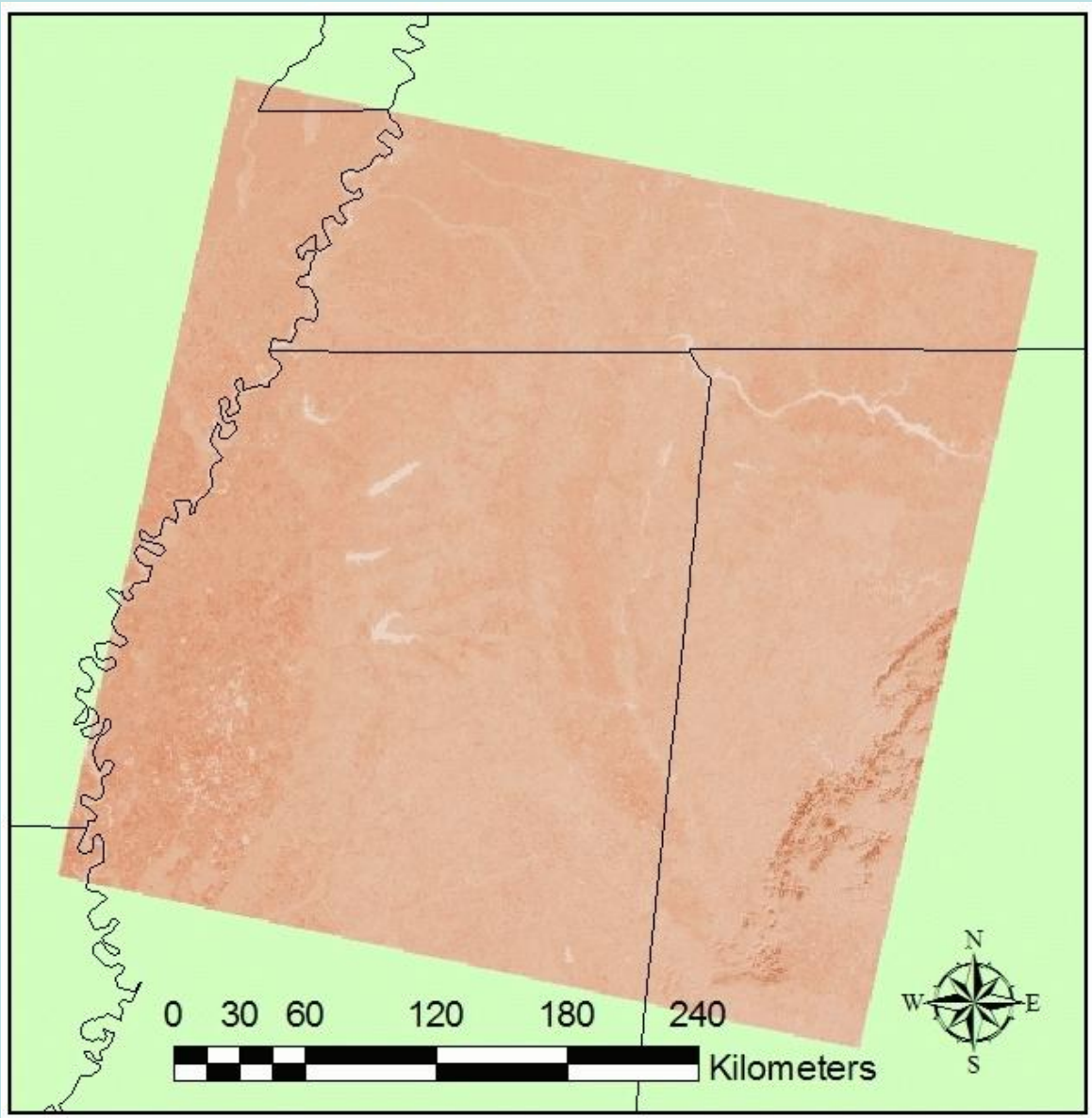


Image Processing Using Multi-temporal Scenes for MS CDL, 2004

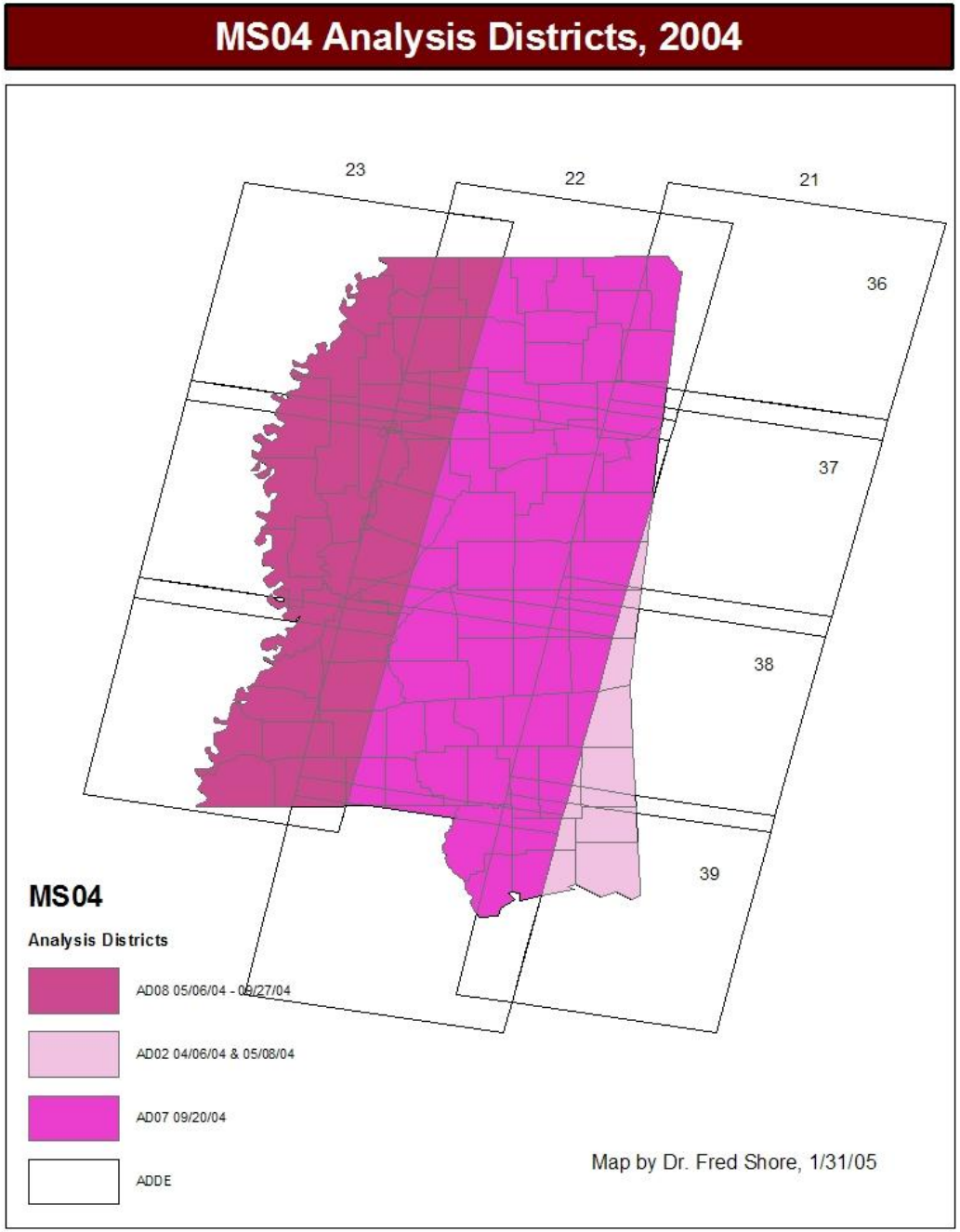
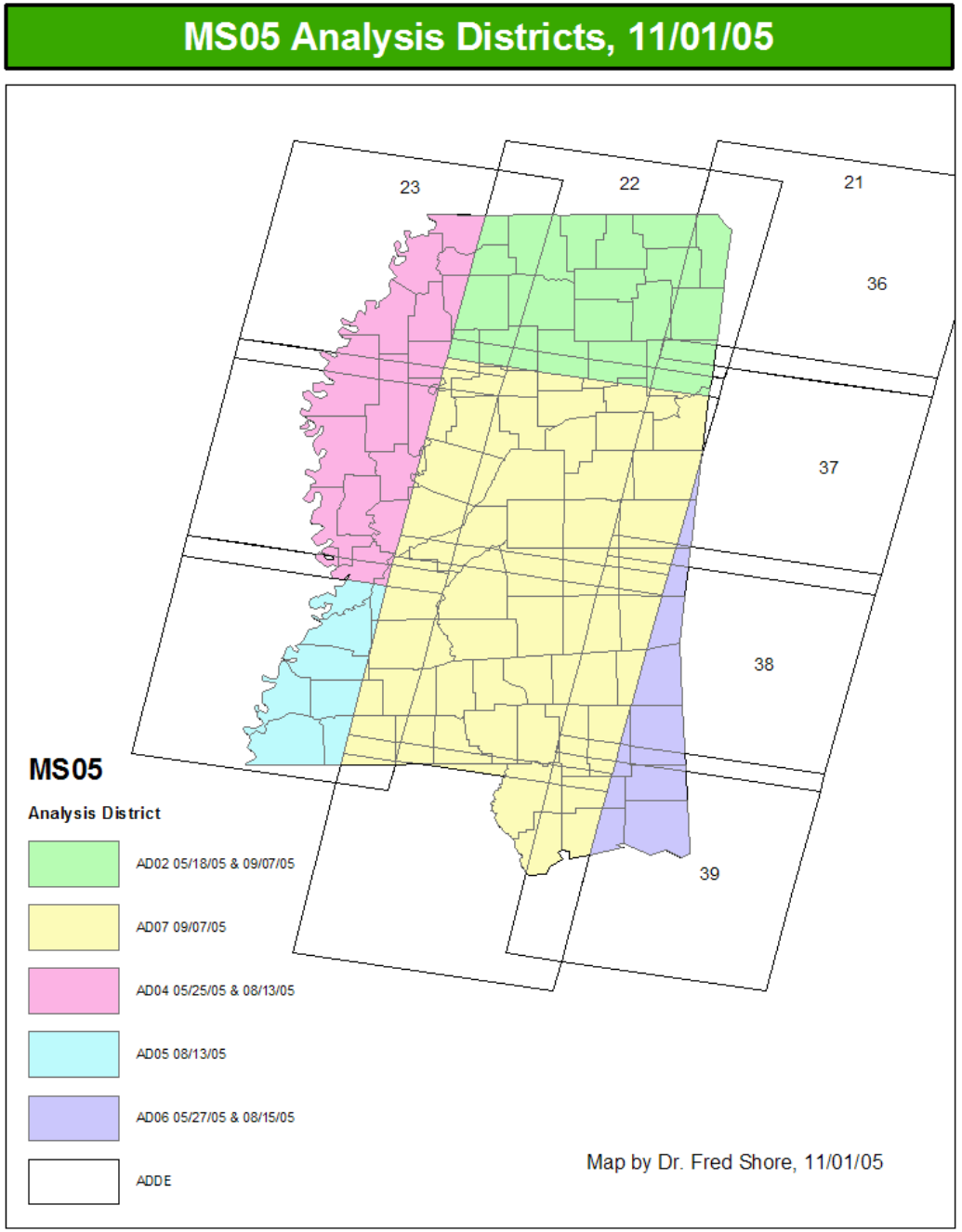
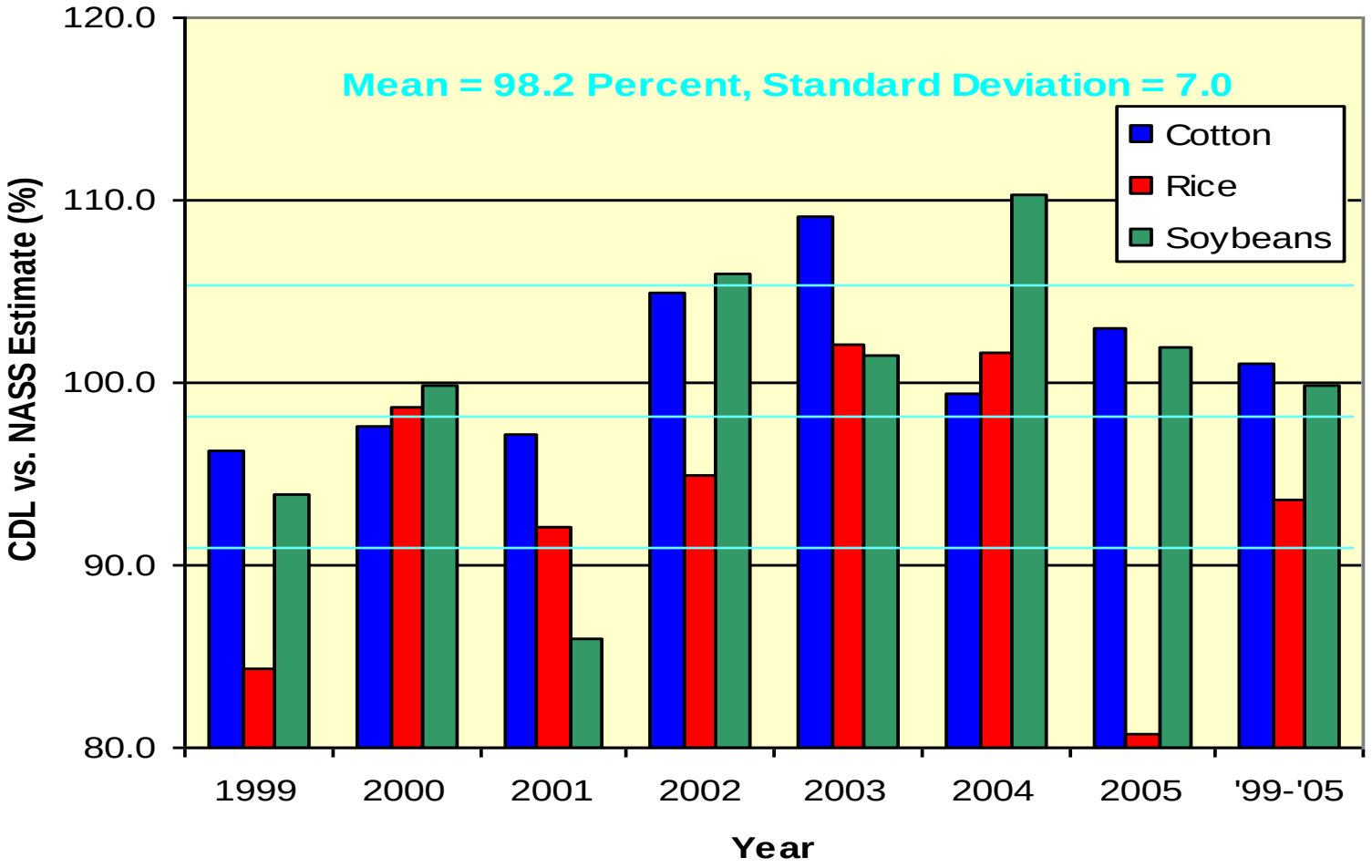


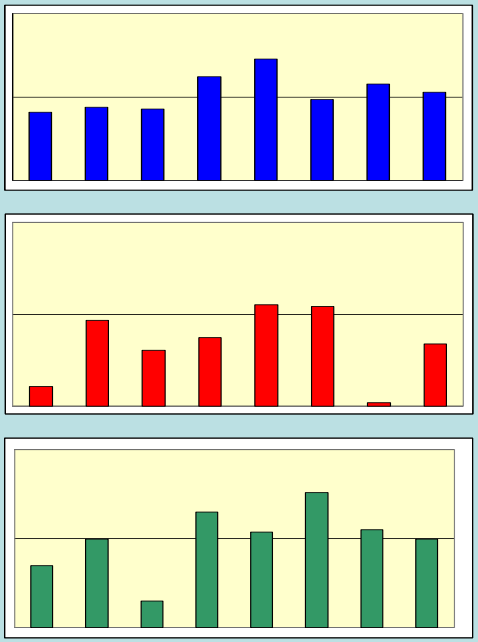
Image Processing for MS CDL, 2005



Mississippi Major Crop Planted Acres Estimates, 1999-2005
Cropland Data Layer Value as Percent of the Official Estimate



Cropland Data Layer Indications vs. NASS Official Estimates in Percentages of Official Estimates by Crop, Planted Acres

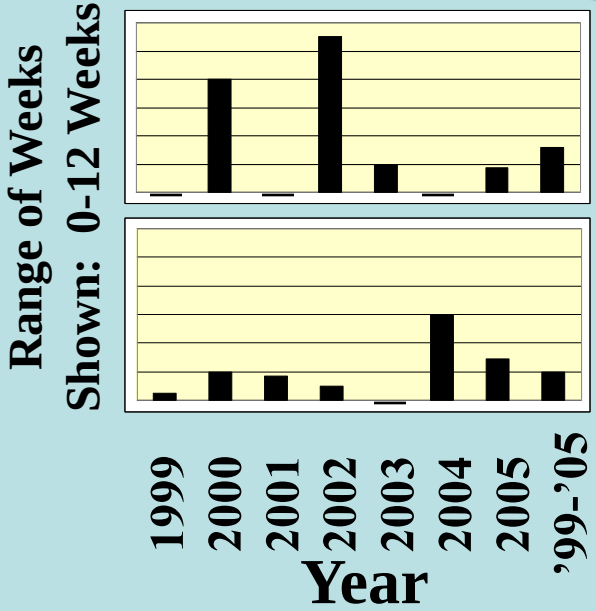


Cotton, Mean = 101.1 %, St. Dev. = 4.8

Rice, Mean = 93.5 %, St. Dev. = 8.4

Soybeans, Mean = 99.9 %, St. Dev. = 8.0

Scene Date vs. Optimum Date (Delta Area)



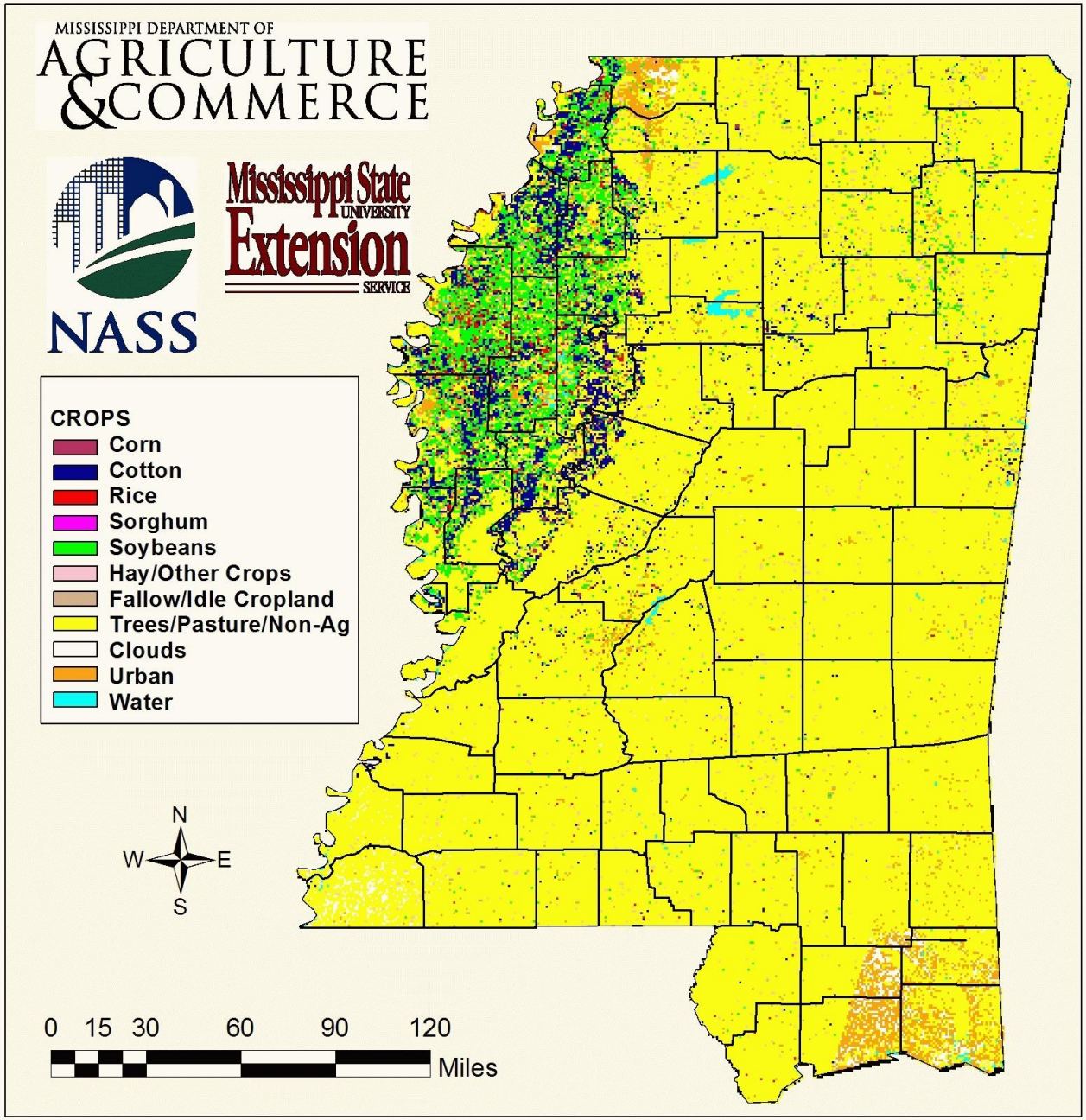
Early Scene Dates, Mean = 3.2 Weeks, St. Dev. = 4.4

Late Scene Dates, Mean = 2.0 Weeks, St. Dev. = 2.0

The Mississippi Cropland Data Layer, 2005

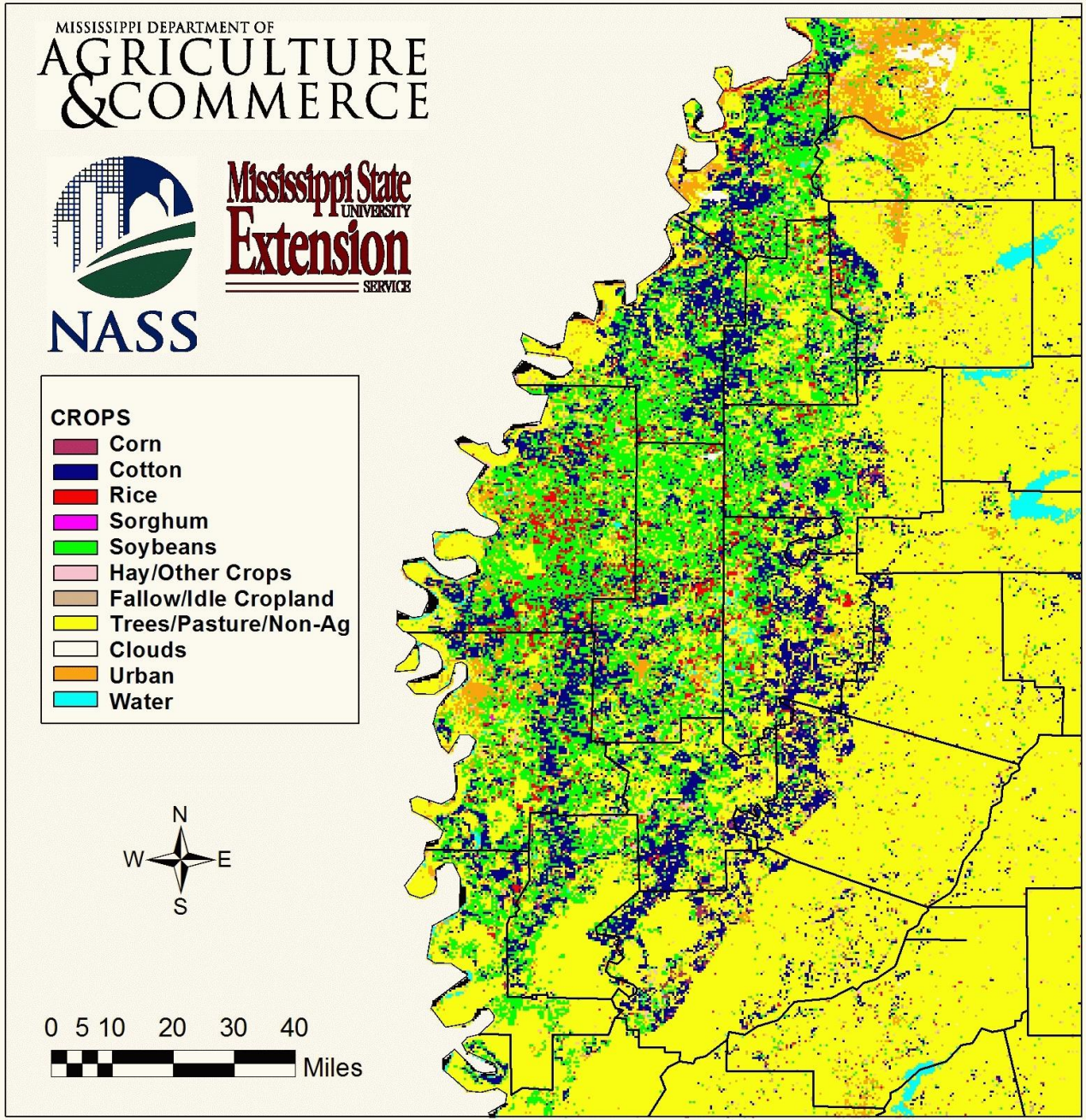
The Cropland Data Layer classifications from satellite images, the June Agricultural Survey, and image processing.

Mississippi Cropland Data Layer, 2005

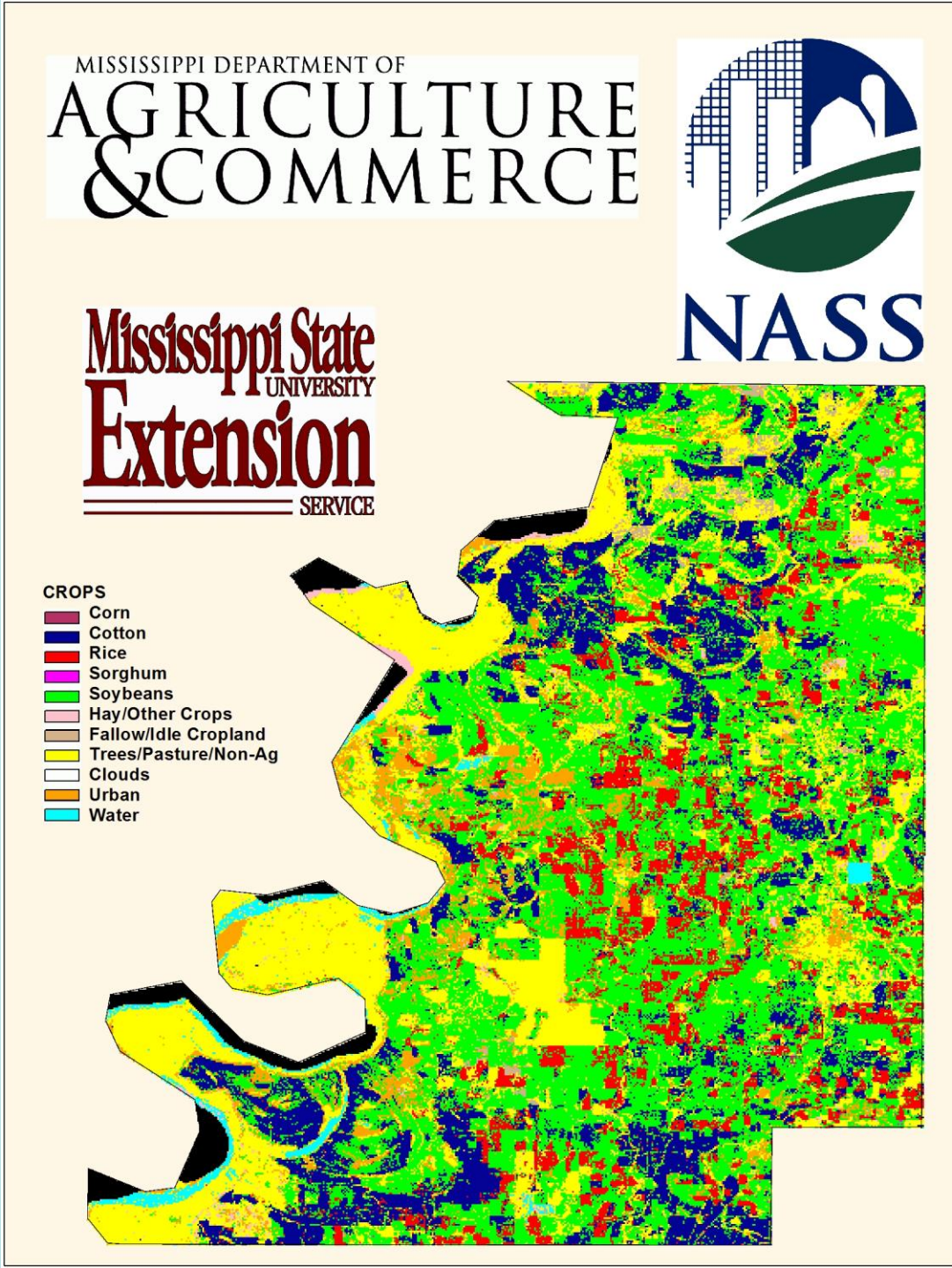


The Mississippi Delta, 2005

Mississippi Delta, Cropland Data Layer, 2005



Bolivar County Cropland Data Layer, 2005



Locating a Processing Plant

2004 Sweet Potatoes Vardaman - Houston Area

Cropland Data Layer Crops

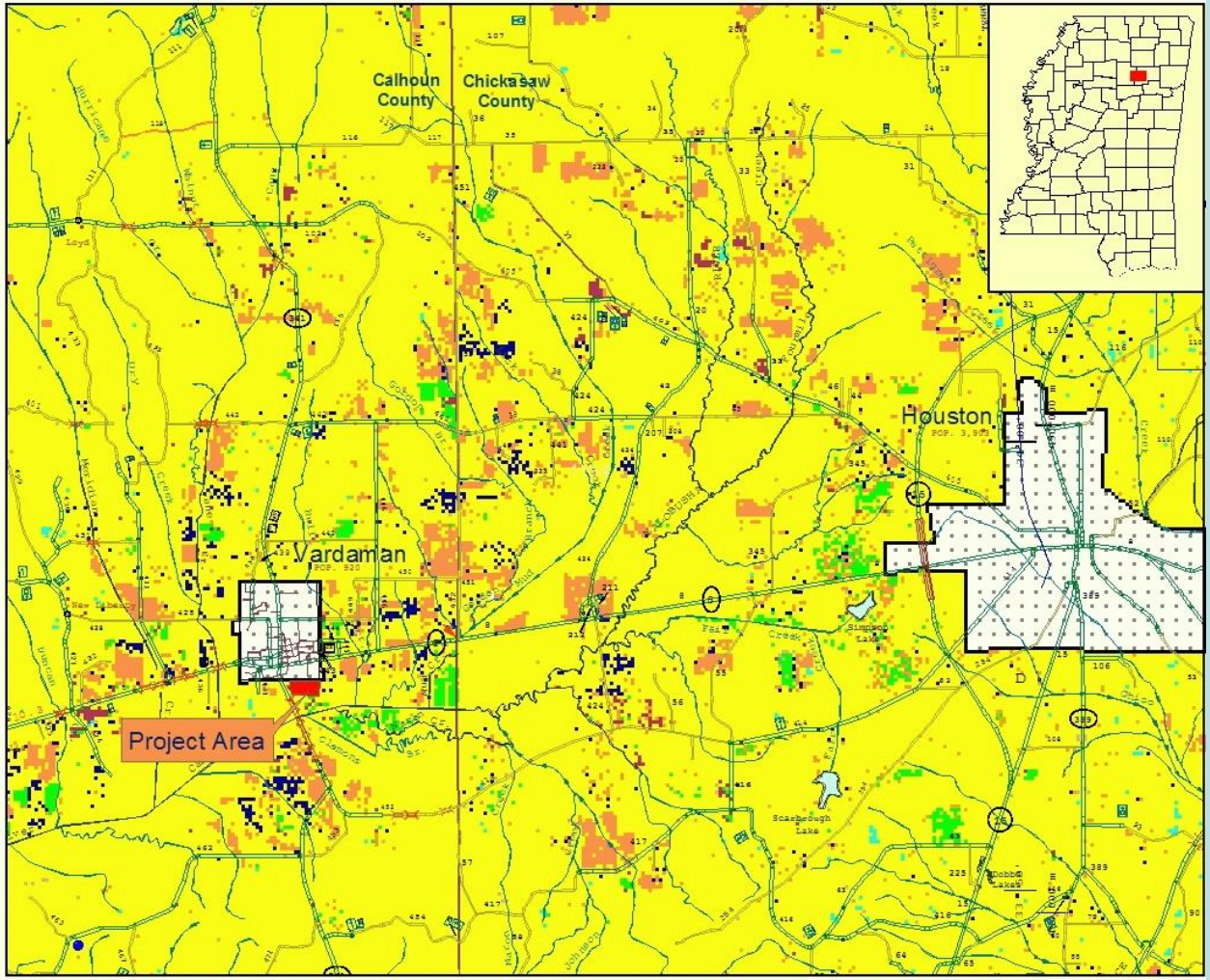
- Corn
- Cotton
- Soybeans
- Sweet Potatoes
- Trees/Pasture/Non-Ag

N W E S

USDA-NASS Official Estimates
15,300 Harvested Acres in Mississippi
Average Yield of 170 Cwt./acre

USDA-Farm Service Agency
Planted Acre Estimates
Calhoun County 6,770 acres
Chickasaw County 5,290 acres

MDAC/USDA-NASS/MSU
Map by Dr. Fred Shore



Vardaman - Houston Area Map

Multiyear Overlays Cotton

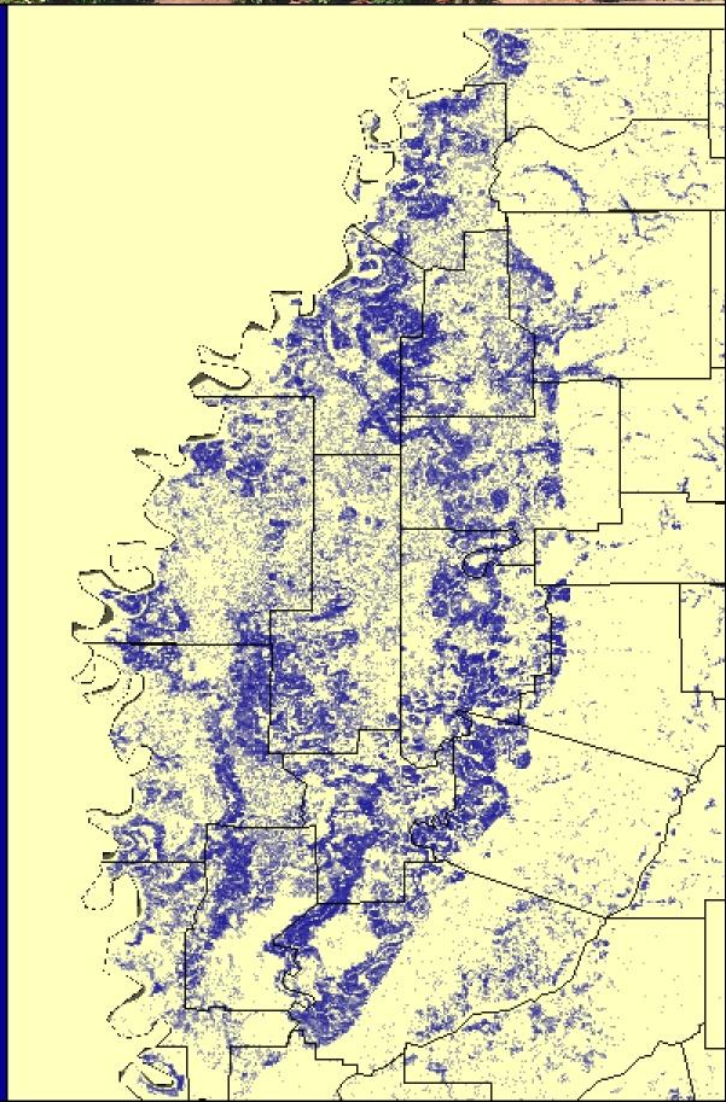
The variation of land use for cotton in the Delta over a 6 year period is shown in this map.

The darker the shade of blue the more years of cotton land use with some land used for cotton every year.

In the crescent moon-shaped part of northwestern Mississippi known as The Delta, cotton is usually planted in sandy soil along existing or ancient rivers and creeks.

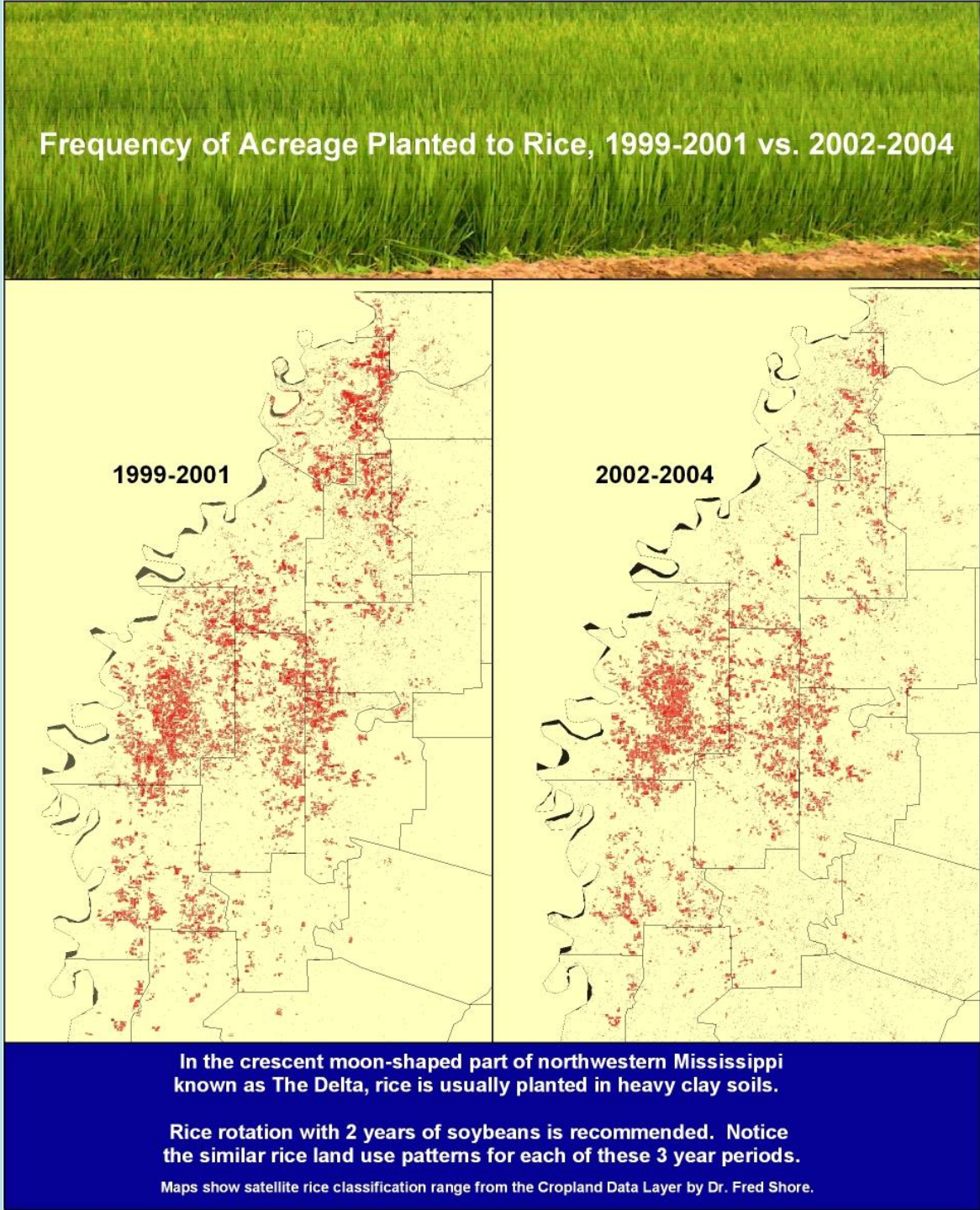
Cotton crop rotations are used but high cotton prices can lead to the same land being used for cotton every year.

Map shows satellite cotton classification range from the Cropland Data Layer by Dr. Fred Shore.



Multiyear Overlays Rice

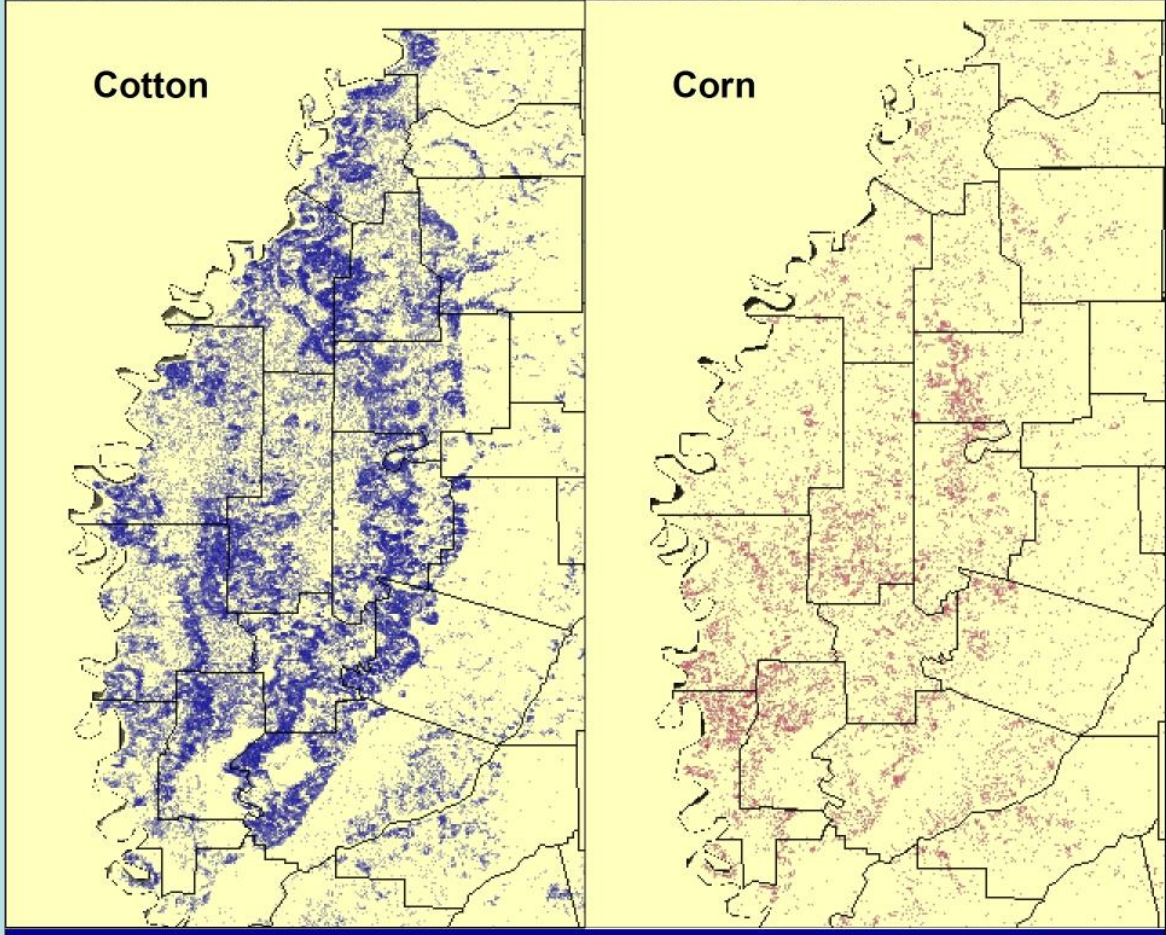
With the three year rotation schedule, comparing two 3-year periods gives similar land use areas. Note that the shade of red color is even indicating a single year of rice land use per location.



Comparing Crop Overlays Cotton and Corn

Similar land use patterns are observed for these crops. Corn in the Delta is primarily grown in rotation with cotton.

Frequency of Acreage Planted to Cotton vs. Corn, 1999-2004



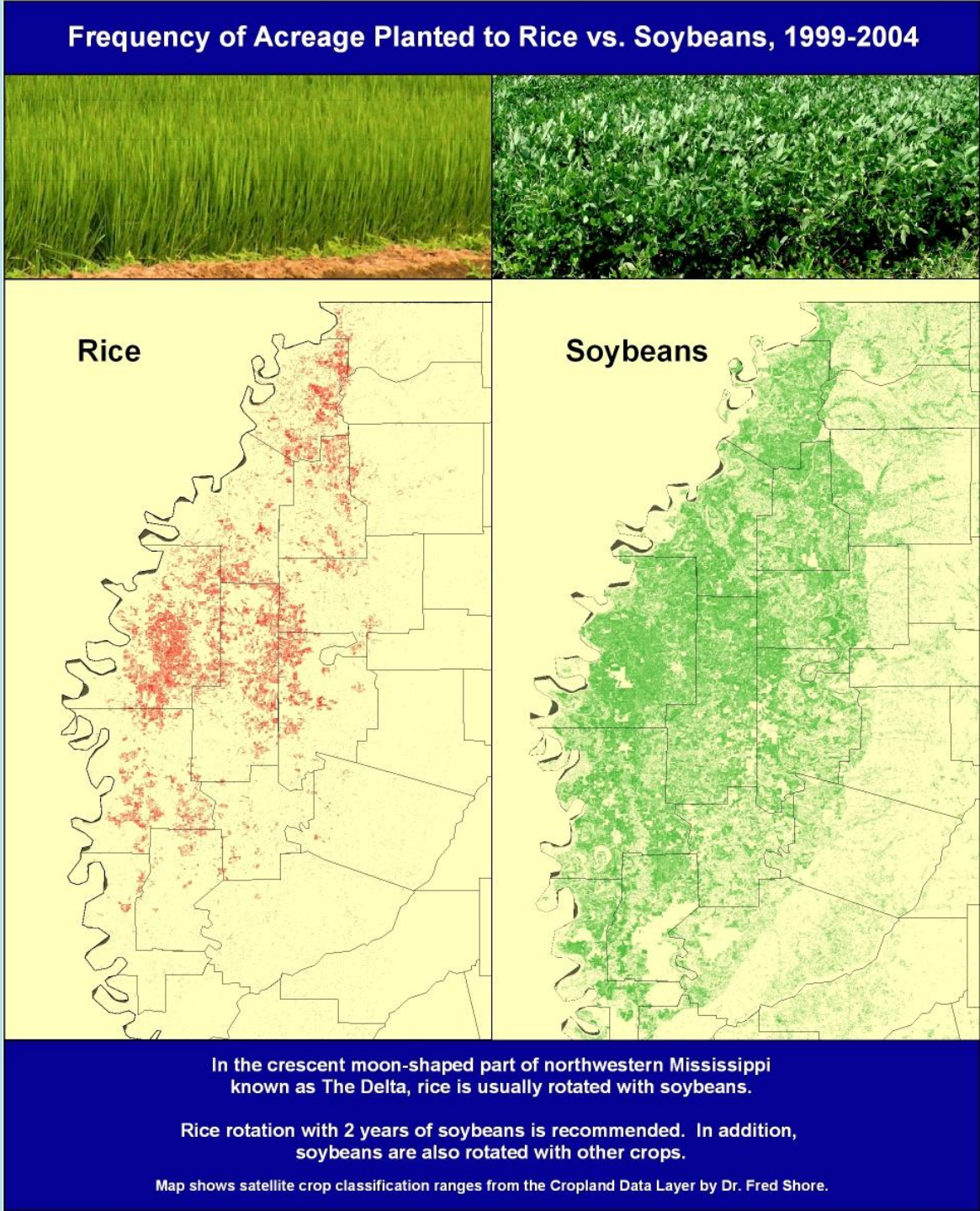
In the crescent moon-shaped part of northwestern Mississippi known as The Delta, cotton is often rotated with corn.

Cotton is the most profitable crop in Mississippi and the yields of cotton following corn can be much improved.

Map shows satellite crop classification ranges from the Cropland Data Layer by Dr. Fred Shore.

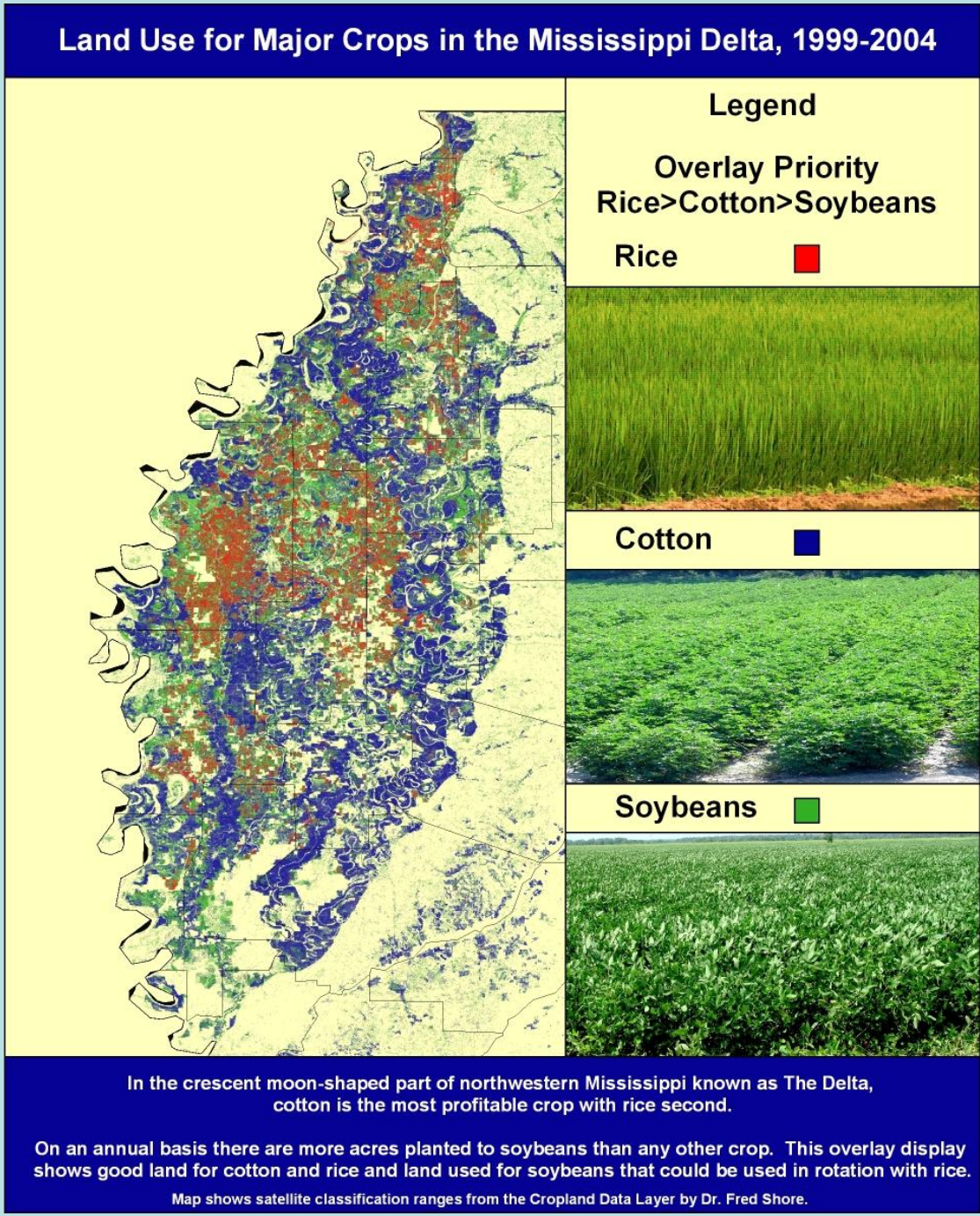
Comparing Crop Overlays Rice and Soybeans

The rotation of land from rice to soybeans is evident. Soybeans are grown in most areas of the Delta.



Crop Overlays by Priority

Overlaying soybeans with cotton and then overlaying both with rice reveals that potential rice acreage is nearly equivalent to the cotton acreage.



Conclusions

ArcGIS maps are:

- **Help for the Field Enumerators in finding the USDA-NASS study segments.**
- **Quality control maps for Supervisors to check the field data vs. Farm Service Agency images and field outlines.**
- **Presentation of the Geotiff Cropland Data Layer to determine land use for the year.**
- **Displays of overlays of multiple year Cropland Data Layer maps for individual crops allow land suitability and crop rotation determinations.**
- **Good public relation tools for Mississippi agriculture.**

Annual Cropland Data Layers are available on disk from USDA-NASS (800) 727-9540 and on-line at www.mdac.state.ms.us and http://www.nass.usda.gov/research/Cropland/SARS1a.htm.