

Remote Sensing for Cropland Monitoring in Mississippi, 1999-2004

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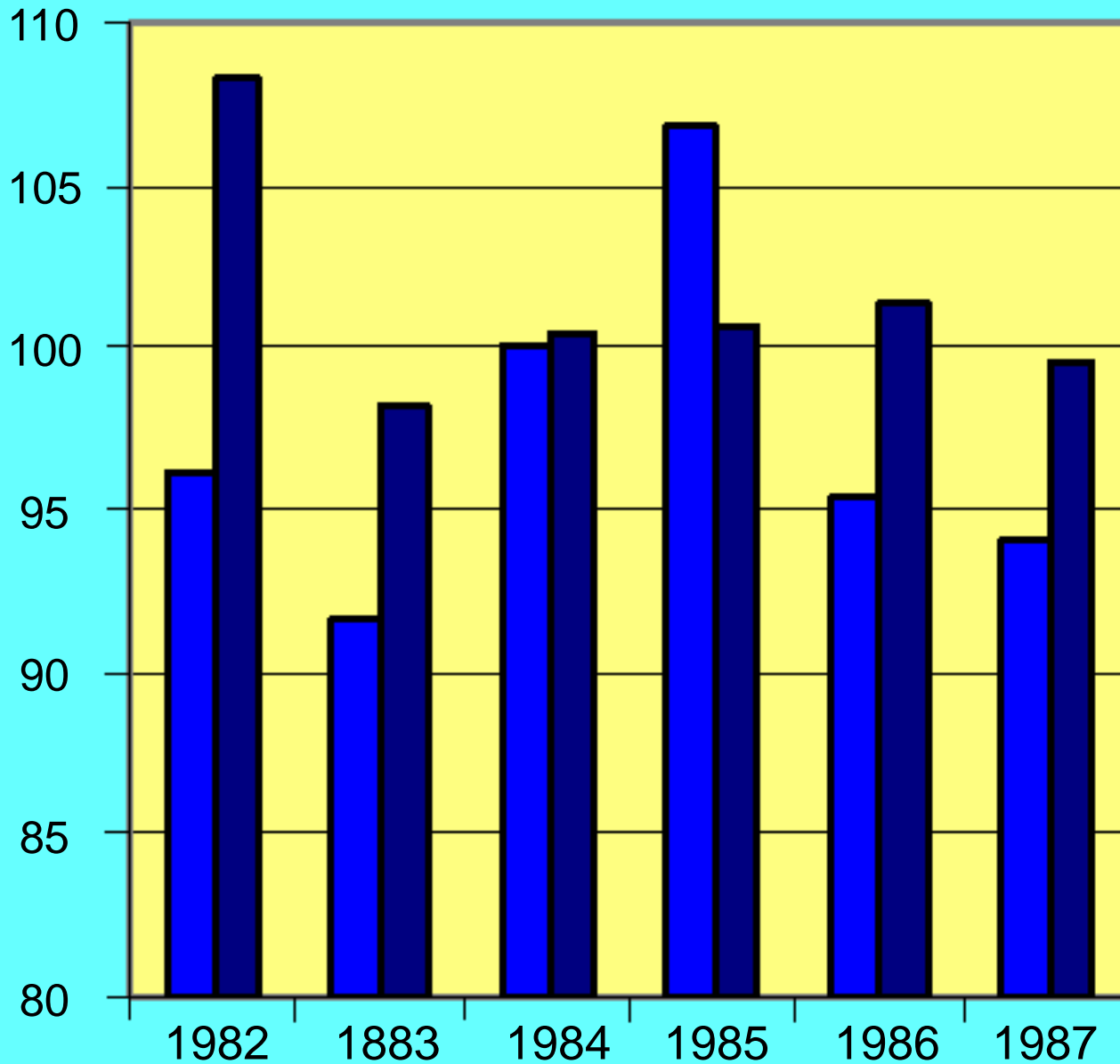


MISSISSIPPI DEPARTMENT OF
AGRICULTURE
& COMMERCE

Mississippi State
UNIVERSITY
Extension
SERVICE

Colorado Harvested Winter Wheat Estimates

Acres Estimate as Percent of Official USDA Estimate



Remote Sensing

Mean = 97.3
St. Dev. = 5.4

June Ag. Survey

Mean = 101.4
St. Dev. = 3.57

Data from J.D. Allen and G. A. Hanuschak, The Remote Sensing Applications Program of the National Agricultural Statistics Service: 1980-1987, USDA, NASS Staff Report No. SRB-88-08, 1988.

The Cropland Data Layer in Mississippi

- **Based on USDA/NASS programs started in the 1970s and the LARSYS software from Purdue University.**
- **Mississippi cooperative project started in 1999 using the Peditor and RSP software programs of NASS**
- **A cooperative project of NASS, Mississippi State University, and the Mississippi Department of Agriculture and Commerce**

Data Collection for the MS 2004 Cropland Data Layer

- **June Agricultural Survey area frame sample selection of 356 segments by strata, generally 1 square mile per segment.**
- **June Agricultural Survey field observations.**
- **Landsat 5 satellite imagery scenes with little or no clouds.**

Mississippi Cropland Data Layer, 2004

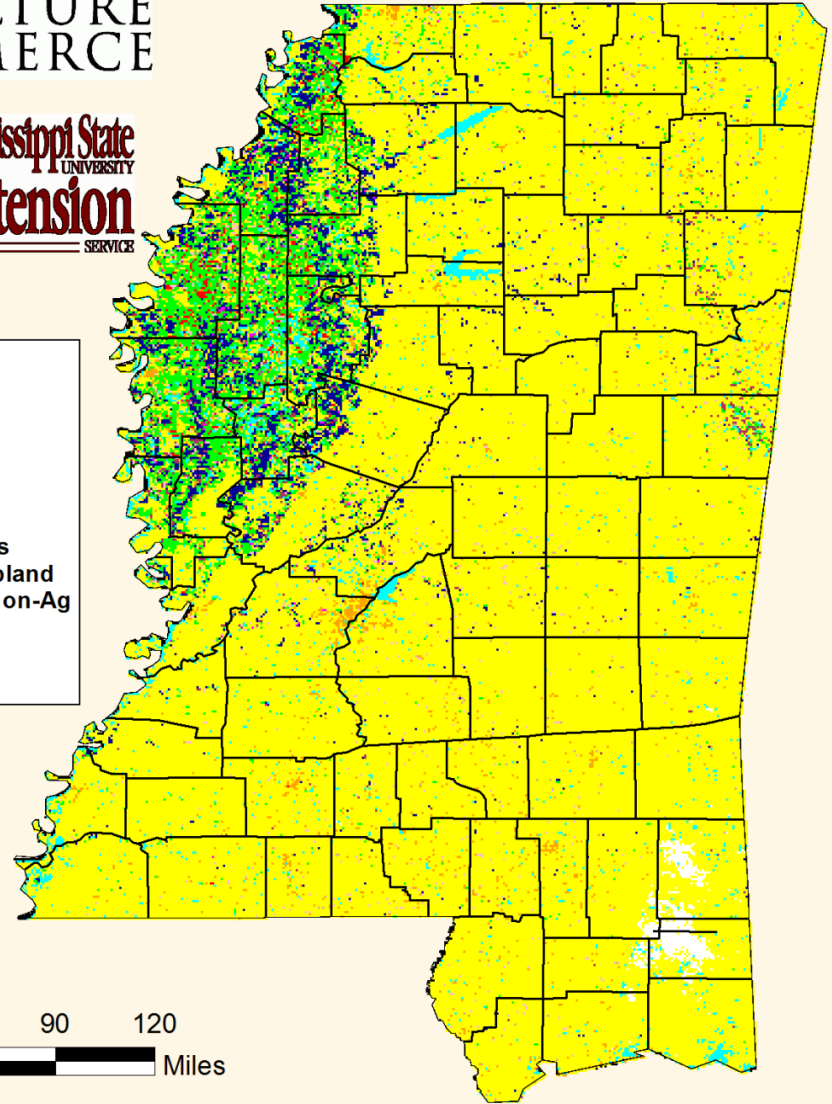
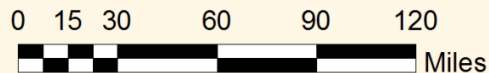
MISSISSIPPI DEPARTMENT OF
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& COMMERCE**



Mississippi State
UNIVERSITY
Extension
SERVICE

CROPS

- Corn
- Cotton
- Rice
- Sorghum
- Soybeans
- Hay/Other Crops
- Fallow/Idle Cropland
- Trees/Pasture/Non-Ag
- Clouds
- Urban
- Water



The Mississippi Cropland Data Layer, 2004

November 13, 2001

Biloxi, Mississippi

September 2, 2005

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MAPPING THE DESTRUCTION

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Comparative Satellite imagery of power outages caused accross the Gulf Coast region pre- and post-Hurricane Katrina
(Image source: U.S. Air Force image)



Comparative Satellite imagery of power outages caused across the Gulf Coast region pre- and post-Hurricane Katrina
(Image source: U.S. Air Force image)



Comparative Satellite imagery of power outages caused accross the Gulf Coast region pre- and post-Hurricane Katrina
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Comparative Satellite imagery of power outages caused across the Gulf Coast region pre- and post-Hurricane Katrina
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Comparative Satellite imagery of power outages caused accross the Gulf Coast region pre- and post-Hurricane Katrina
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After Katrina, Landsat 5 View

USGS Global Visualization Viewer

Sensor Resolution Map Layers Tools Help



WRS-2 Path /Row: 22 39 Go
Lat/Long: 30.3 -90.1 Go

Max Cloud: 100%

Scene Information:
ID: 5022039000525010
Cloud Cover: 0% Qty: 9
Date: 2005/9/7

Sep 2005 Go

Prev Scene Next Scene

Landsat 4-5 TM Scene List

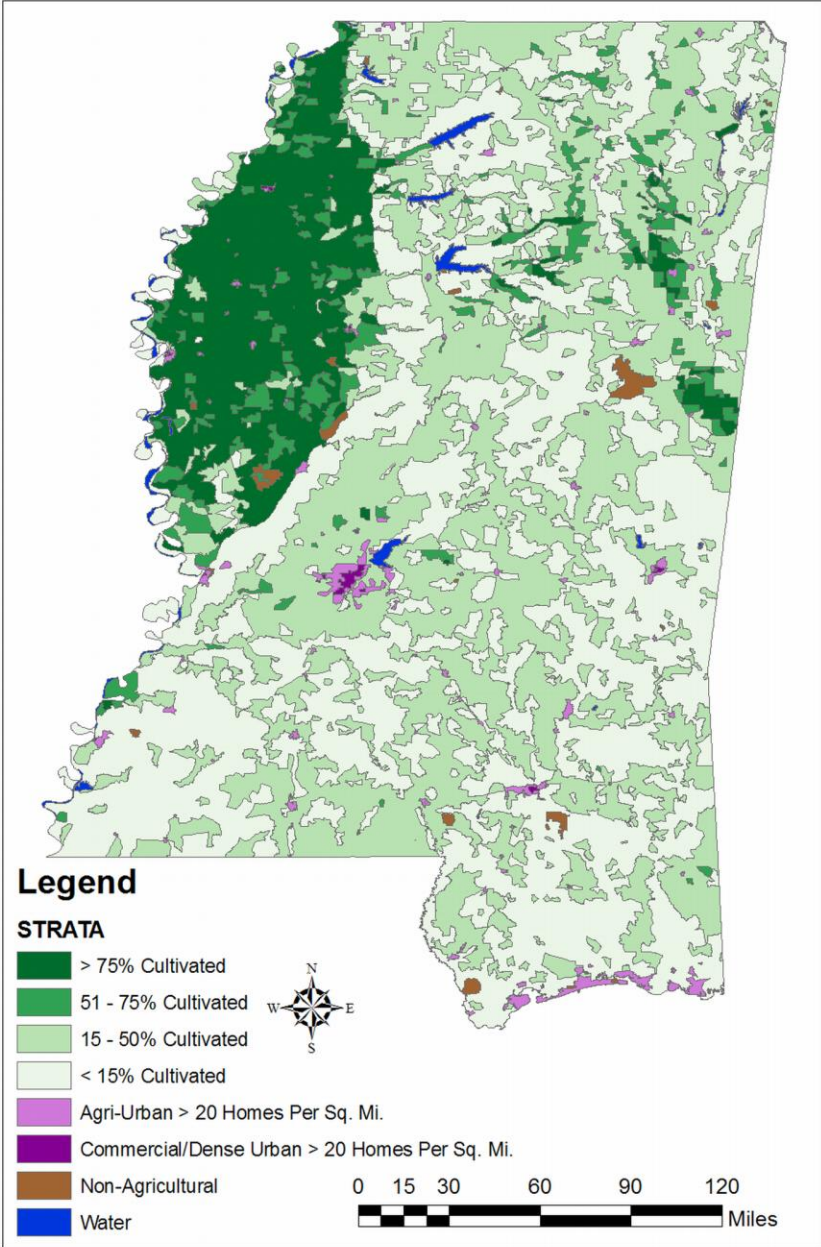
Add Delete Order

Landsat 4-5 TM 240m No Limits Set Lat/Long: 30.210290, -90.759159 degrees

Warning: Applet Window

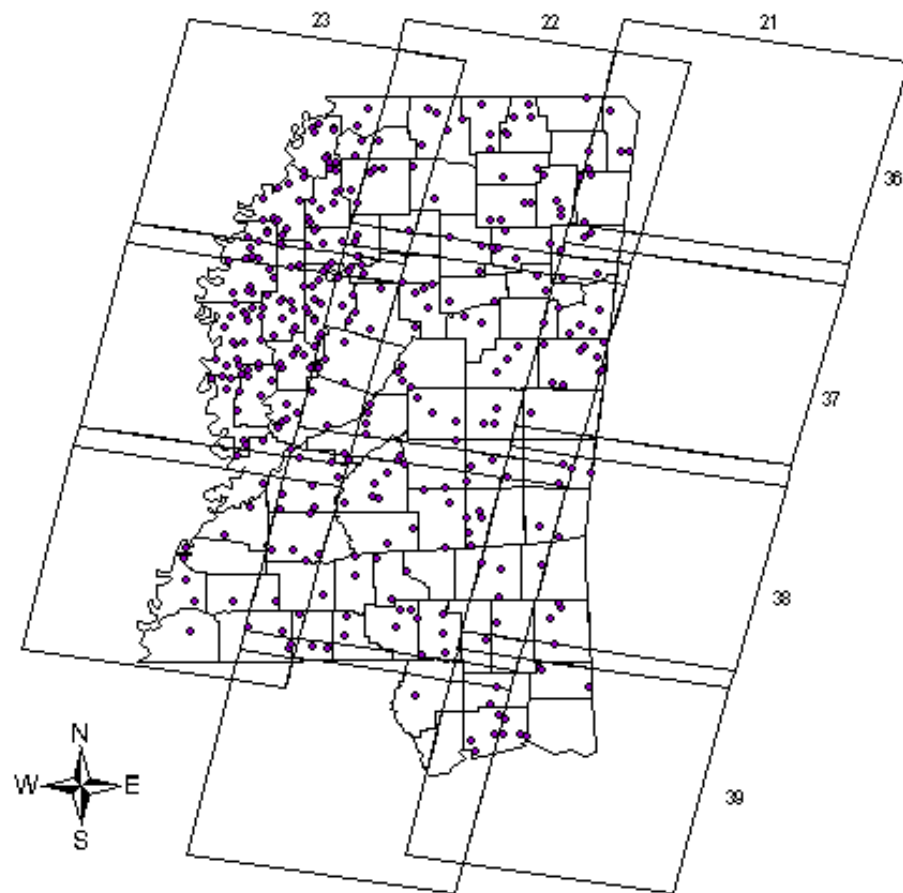
USGS

June Agricultural Survey Segment Selection



Mississippi Data Collection

Landsat Path/Row Scenes and 2004 Segments

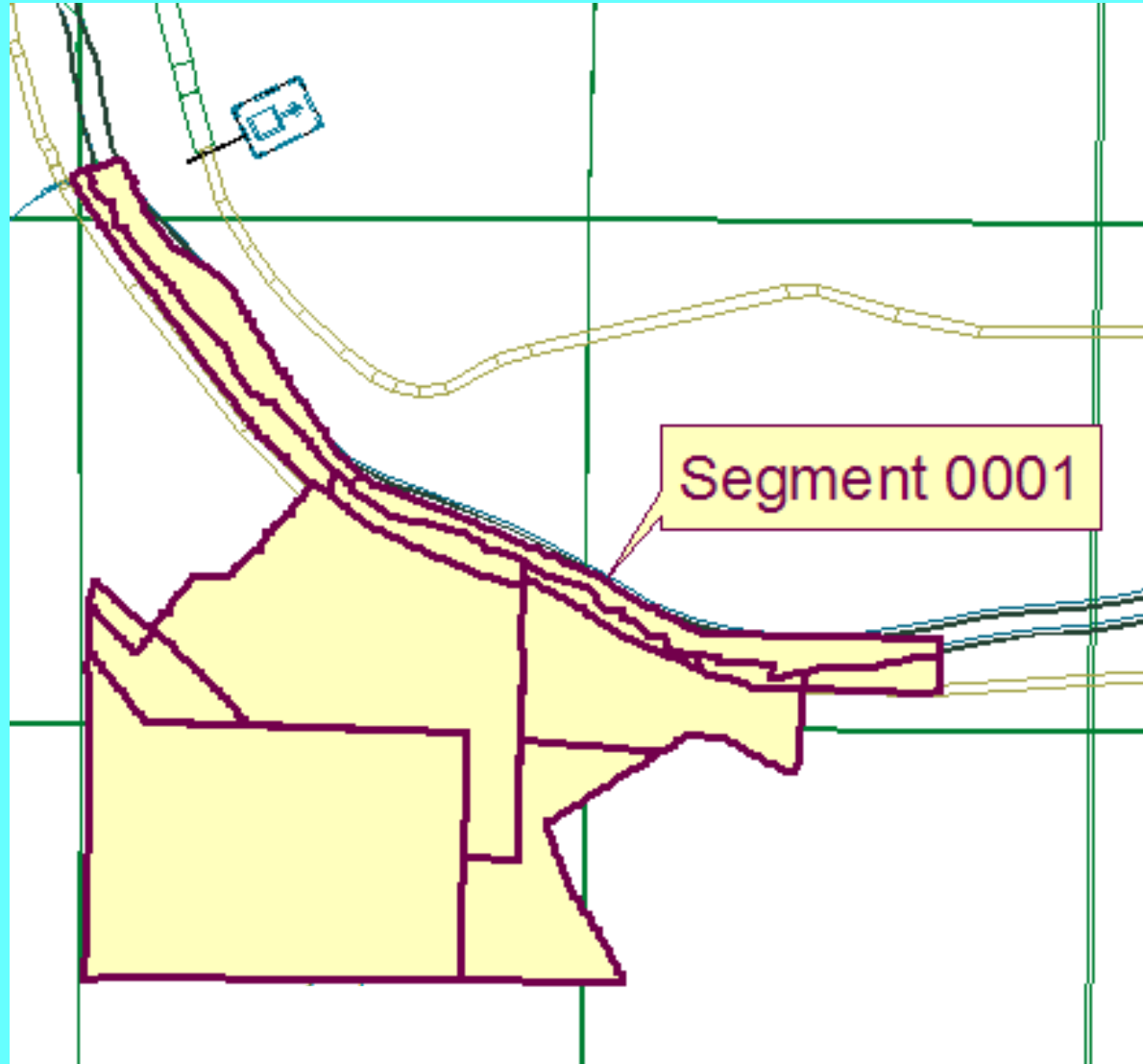


Legend

- Scenes
- MS 2004 segs

Map by Dr. Fred Shore, 4/29/04

Segment Locator Map and Field Locations

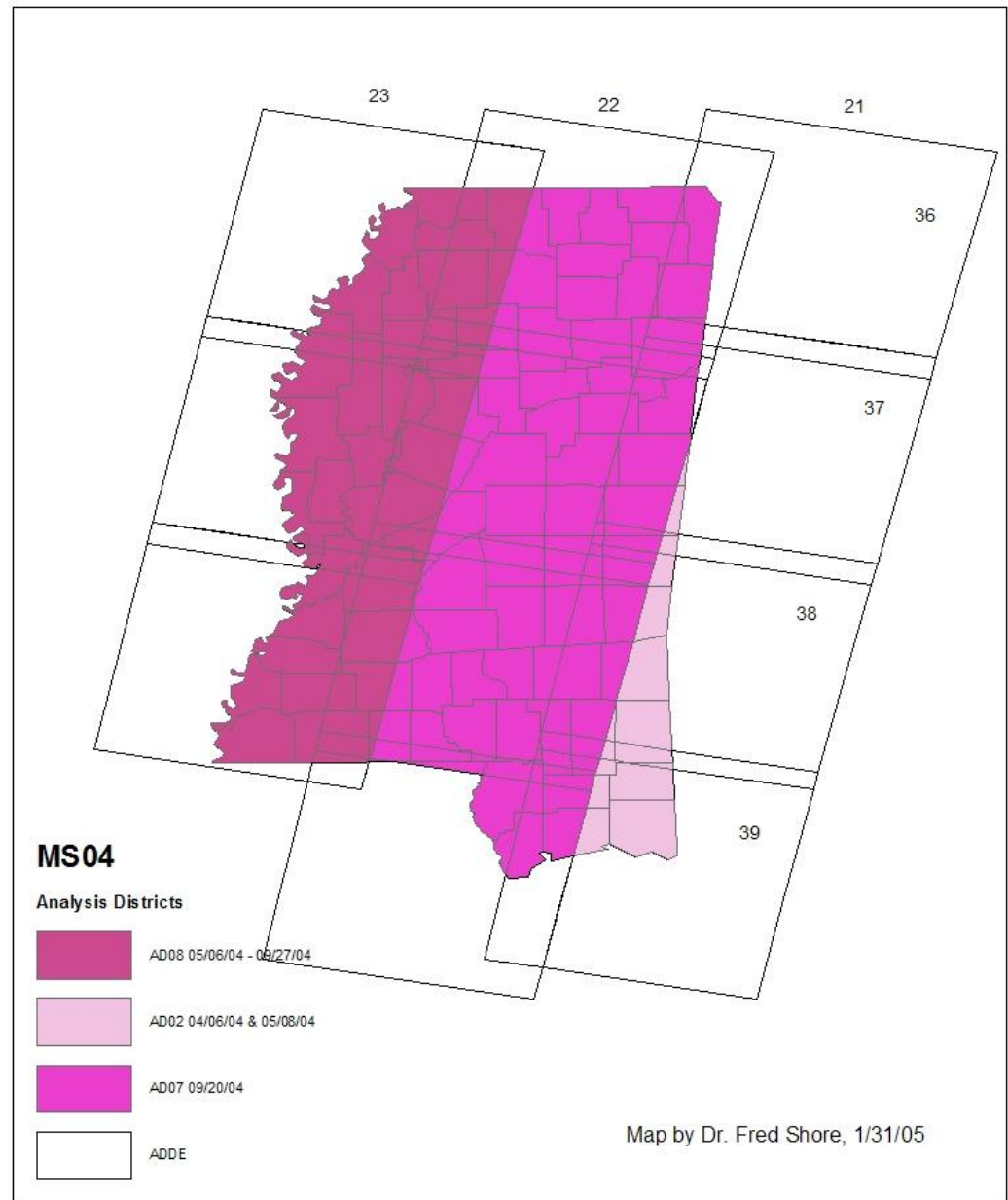


Multi-Temporal Crop Signatures

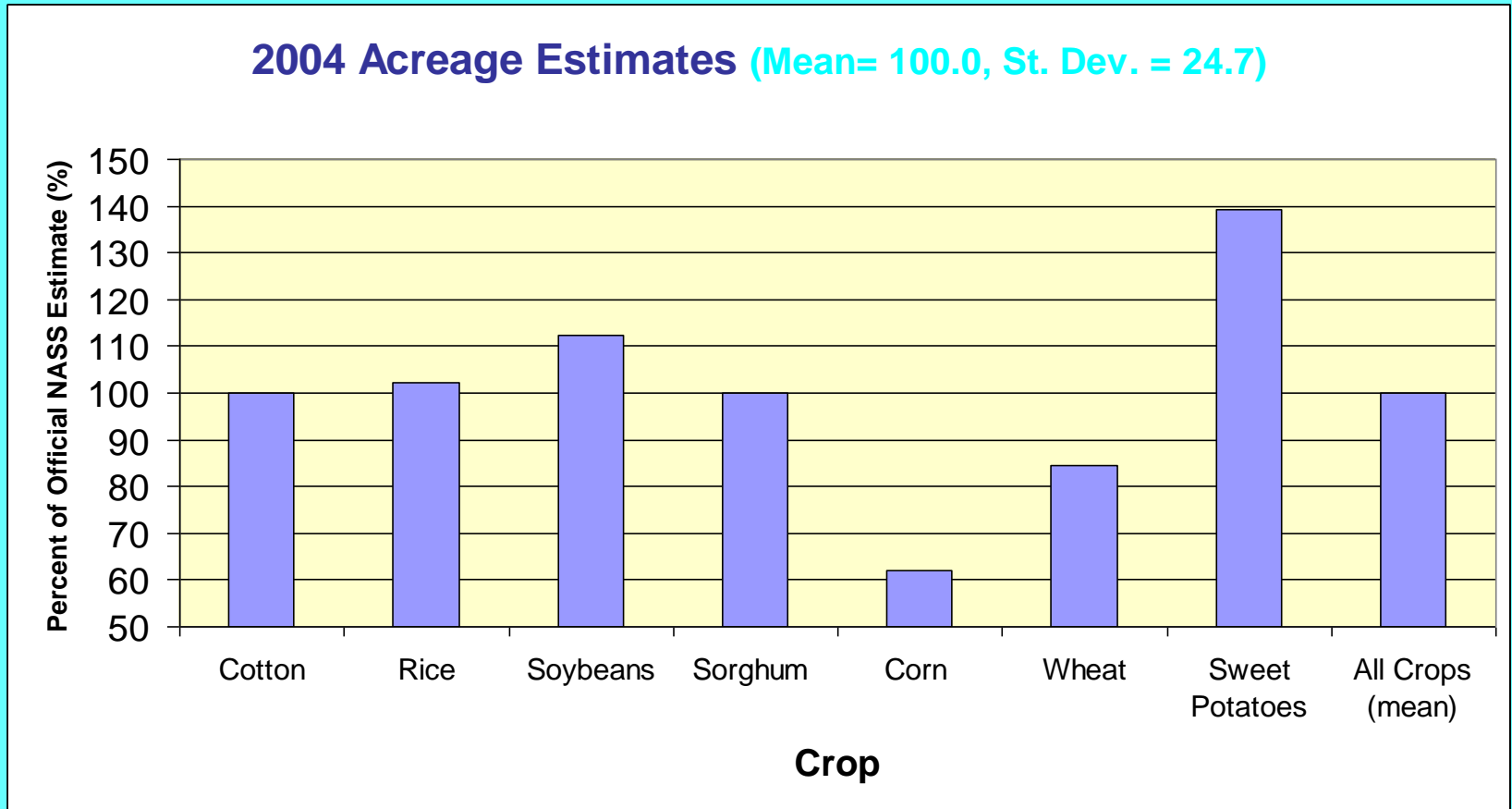
- **Computer processing using Peditor and RSP.**
- **Use of two Landsat scenes of different dates with 7 bands each.**
- **Use of the ground truth data from the June Agricultural Survey.**
- **Clustering the crop signatures and training the classifier.**
- **Classification of all scenes and making the mosaic.**

Image Processing for MS CDL, 2004

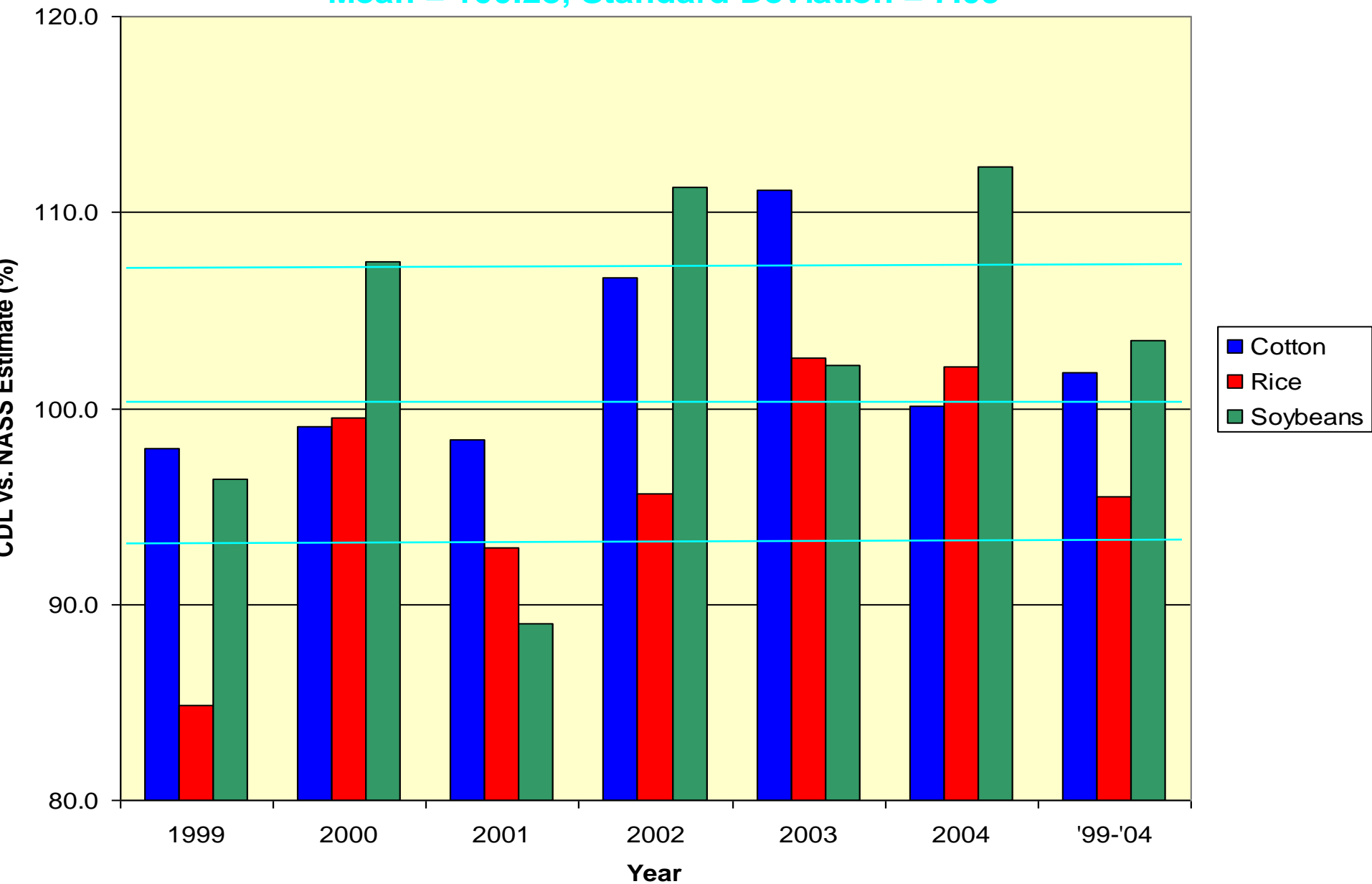
MS04 Analysis Districts, 2004



Mississippi State-Wide Cropland Data Layer Acreage Estimation Results, 2004

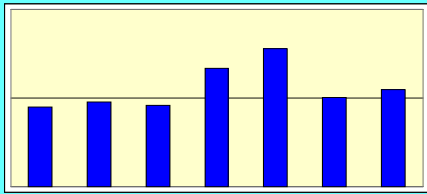


Mississippi Major Crop Estimates, 1999-2004
Cropland Data Layer Value as Percent of the Official Estimate
Mean = 100.28, Standard Deviation = 7.09

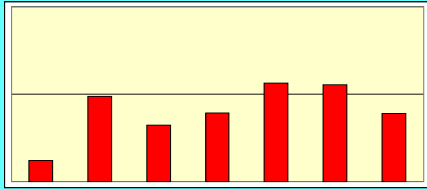


Cropland Data Layer Indications vs. NASS Official Estimates in Percentages by Crop

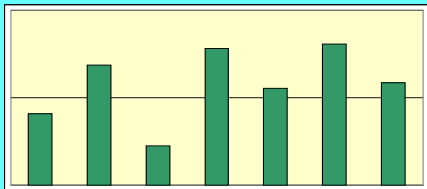
Percent of Range Shown: 80-120%



Cotton, Mean + 101.9 %, ST. Dev. = 5.4



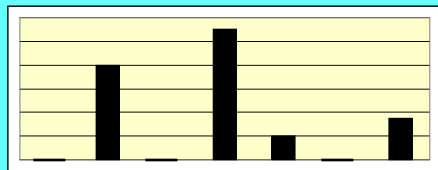
Rice, Mean = 95.5 %, St. Dev. = 6.7



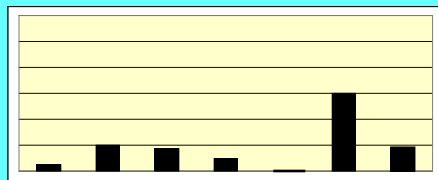
Soybeans, Mean = 103.5 %, St. Dev. = 9.1

Landsat Scene Date vs. Optimum Date (Delta Area)

Range of Weeks Shown: 0-12 Weeks



Early Scene, Mean = 3.5 Weeks, St. Dev. = 4.8



Late Scene, Mean = 1.9 Weeks, St. Dev. = 2.2

1999
2000
2001
2002
2003
2004
'99-'04
Year

The Basic Cropland Data Layer Presentation

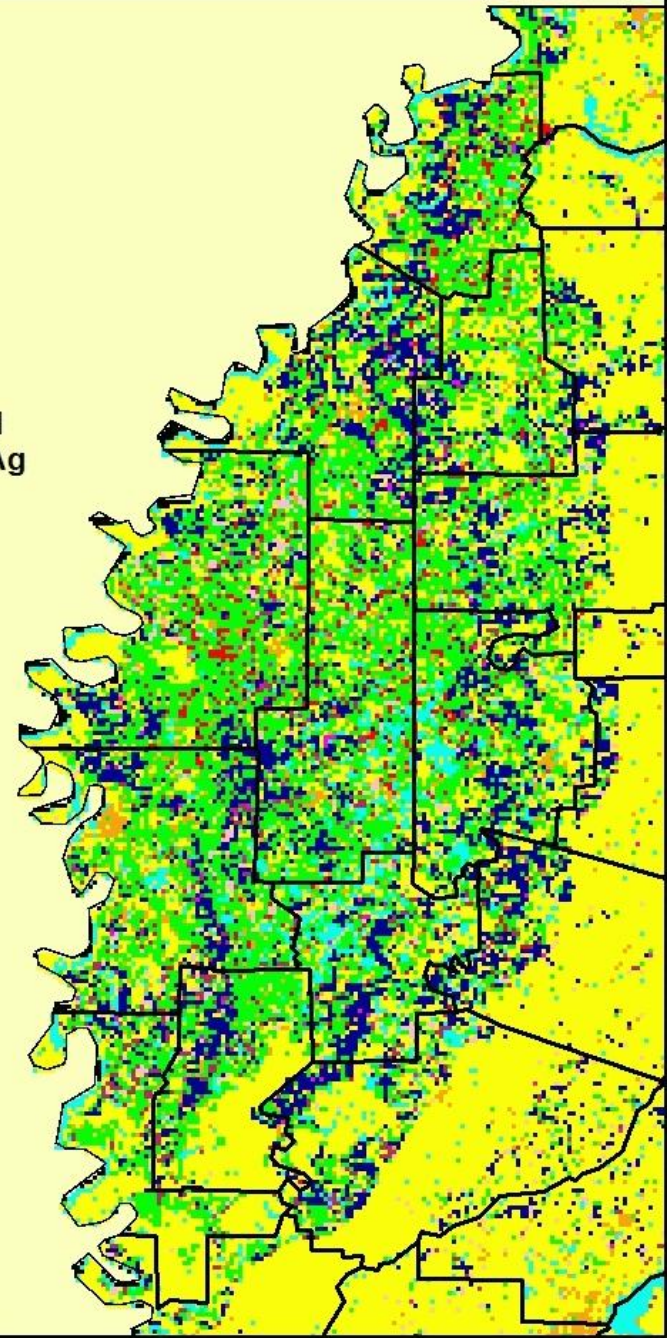
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USDA-NASS/MDAC/MSU

Map by Dr. Fred Shore



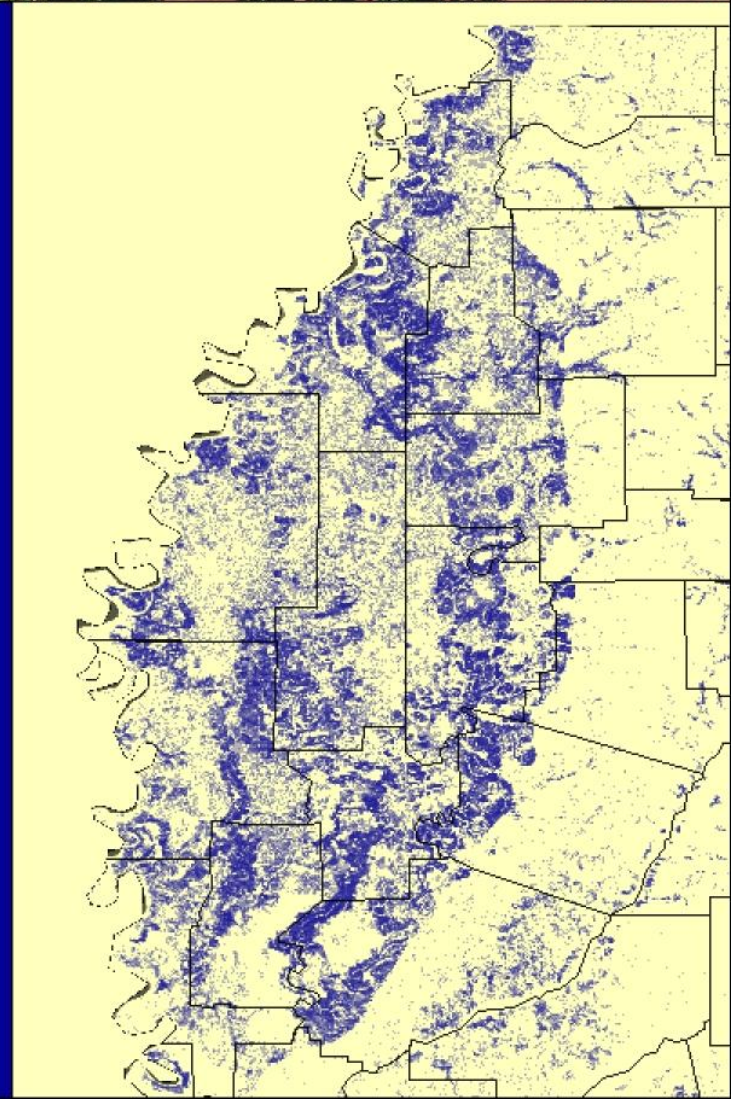
Multiyear Overlays Cotton



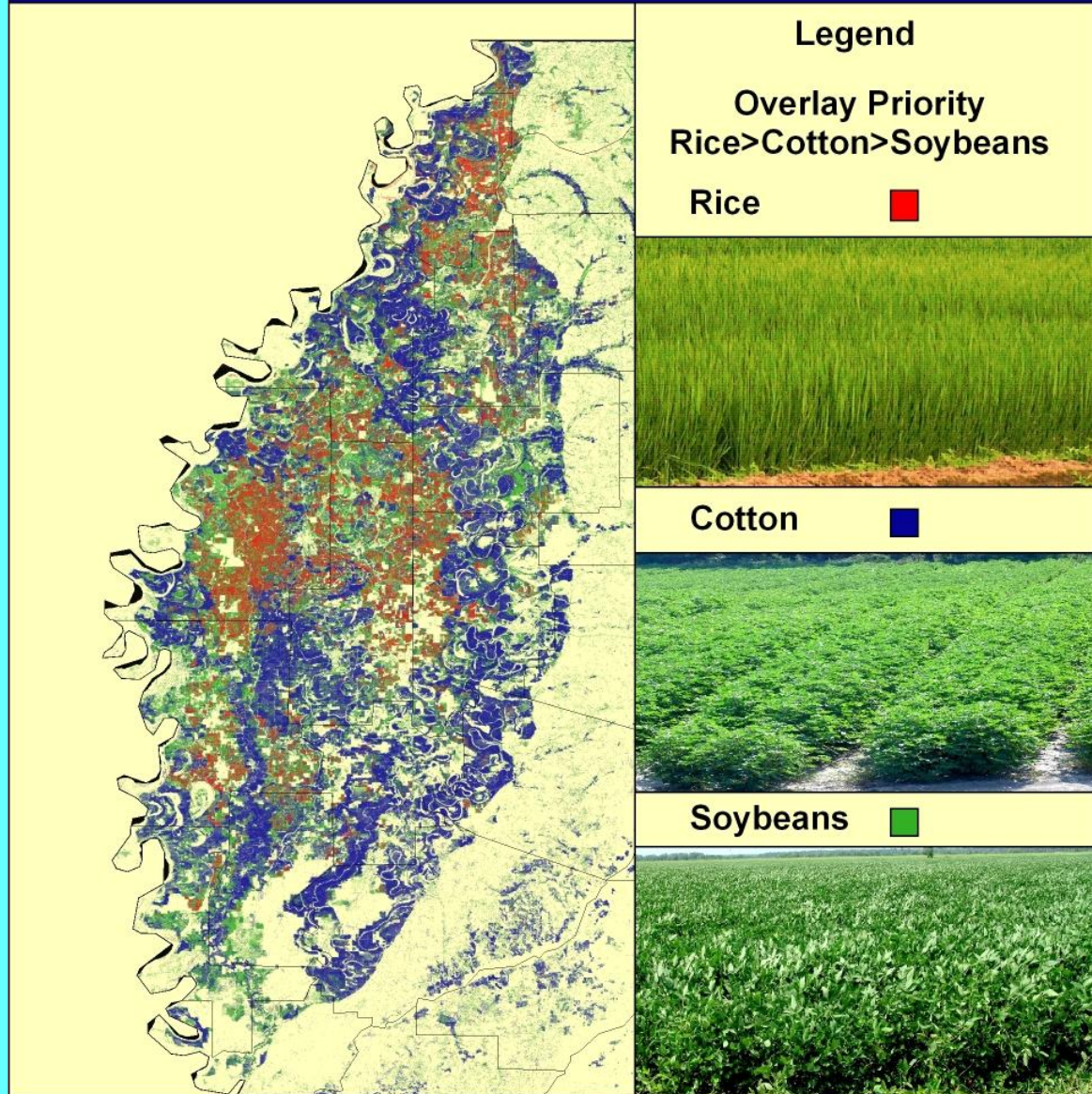
In the crescent moon-shaped part of northwestern Mississippi known as The Delta, cotton is usually planted in sandy soil along existing or ancient rivers and creeks.

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.



Crop Overlays by Priority



In the crescent moon-shaped part of northwestern Mississippi known as The Delta, cotton is the most profitable crop with rice second.

On an annual basis there are more acres planted to soybeans than any other crop. This overlay display shows good land for cotton and rice and land used for soybeans that could be used in rotation with rice.

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

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Results

- **The Cropland Data Layer for Mississippi vs. the official USDA-NASS estimate gave a 0.26% difference from the mean with a standard deviation of 7.5% for the major crops in this 6 year period.**
- **The optimum date of Landsat scene selection for the multi-temporal processing is less critical than previously thought.**
- **GIS presentations can be multiyear to allow better land use determinations.**
- **Further Cropland Data Layer information is available at www.mdac.state.ms.us and www.nass.usda.gov/ms/.**