The Mississippi Cropland Data Layer and Cotton

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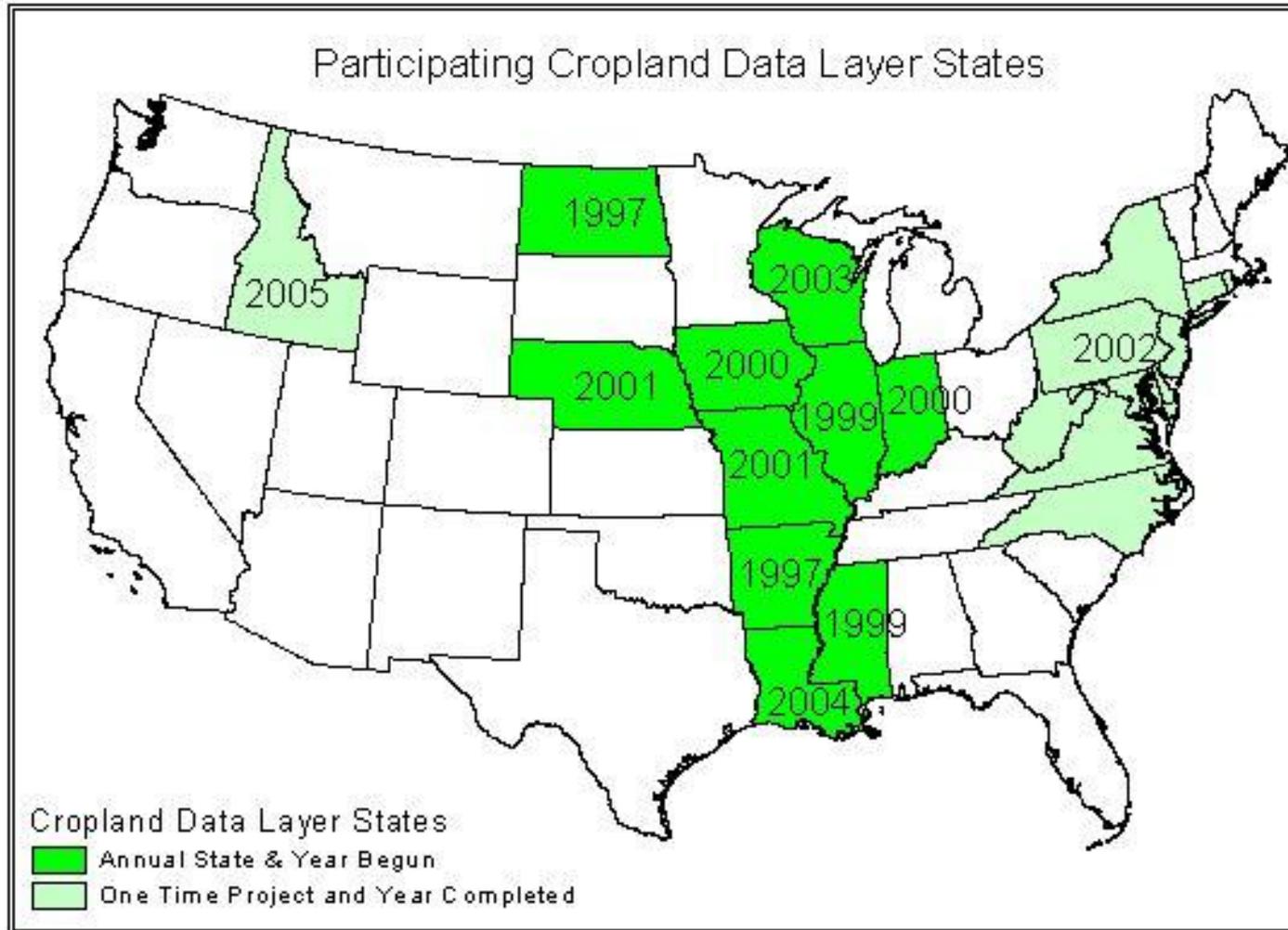Fairfax, VA, USA

MISSISSIPPI DEPARTMENT OF
AGRICULTURE
&COMMERCE

Mississippi State
UNIVERSITY
Extension
SERVICE

The Cropland Data Layer Project Status
Oklahoma and Washington Were Added for 2006

The Cropland Data Layer in Mississippi

- **Multi-temporal processing of satellite images based on USDA-NASS programs started in the 1970s and the LARSYS software from Purdue University.**

- **Mississippi project started in 1999 using the Public Domain Peditor and RSP software programs of NASS.**

- **A cooperative project of NASS, Mississippi State University, and the Mississippi Department of Agriculture and Commerce.**

Mississippi Agricultural Production

Mississippi's Rank Among States In Agricultural Commodities, 2004

Commodity	Production or Number	Unit	Rank
Crop			
All Cotton	2,346,000	bales	3
All Rice	16,146,000	cwt	4
Sorghum for Grain	1,422,000	bu	13
Sorghum for Silage	13,000	tons	20
Sweetpotatoes	2,601,000	cwt	3
Soybeans	61,500,000	bu	13
Winter Wheat	7,155,000	bu	29
All Hay	1,656,000	tons	32
Corn for Grain	59,840,000	bu	21
Corn for Silage	210,000	tons	41
All Pecans	1,000,000	lbs	10
Watermelons	378,000	cwt	13
Potted Poinsettias	203,000	pots sold	34
Livestock			
Catfish-foodsize	388,000,000	lbs sold	1
Broilers	827,800,000	number	4
Eggs	1,600,000,000	number	17
All Cattle & Calves [1]	1,070,000	number	30
Beef Cows [1]	564,000	number	21
Milk Cows [1]	26,000	number	36
Milk	379,000,000	lbs	37
Hogs & Pigs [2]	315,000	number	21
Honey	1,170,000	lbs	24

[1] January 1, 2005.
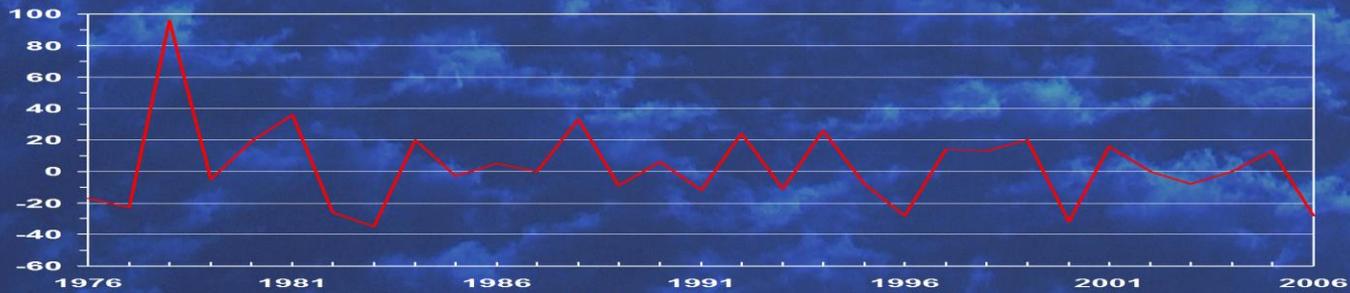[2] December 1, 2004.

Last Update - 01/20/2006
Next Update Expected - 01/20/2007

Planting Decisions
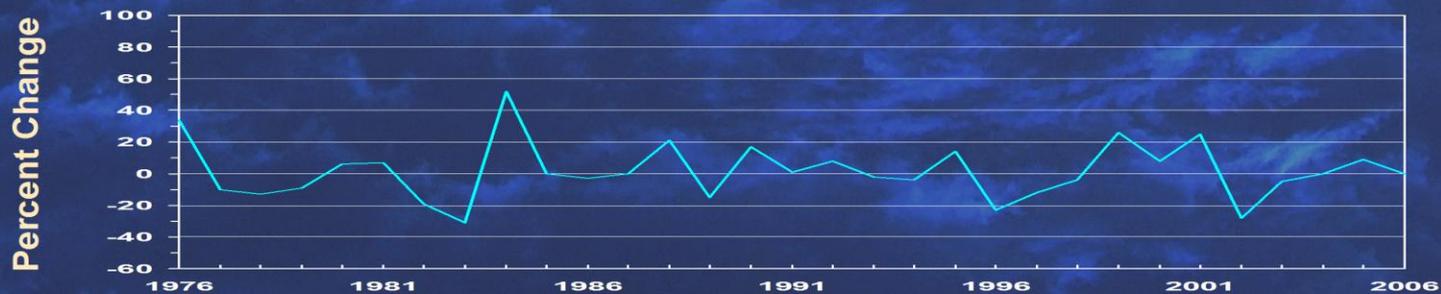

Mississippi Crop Planted Acreage
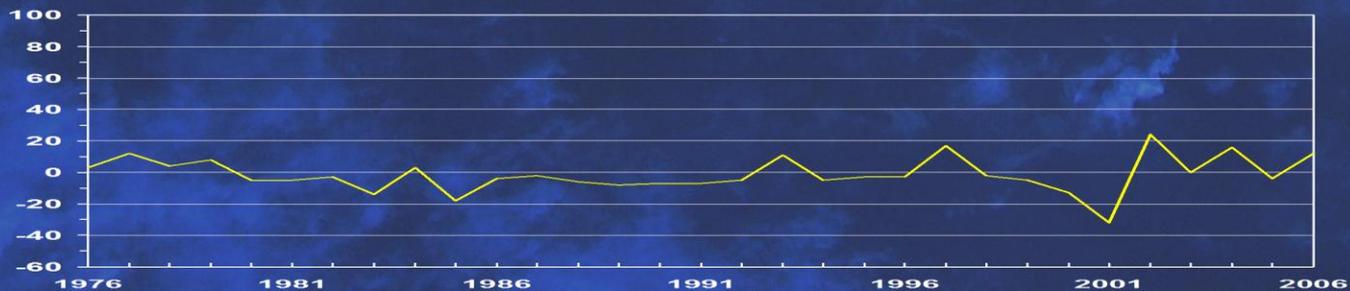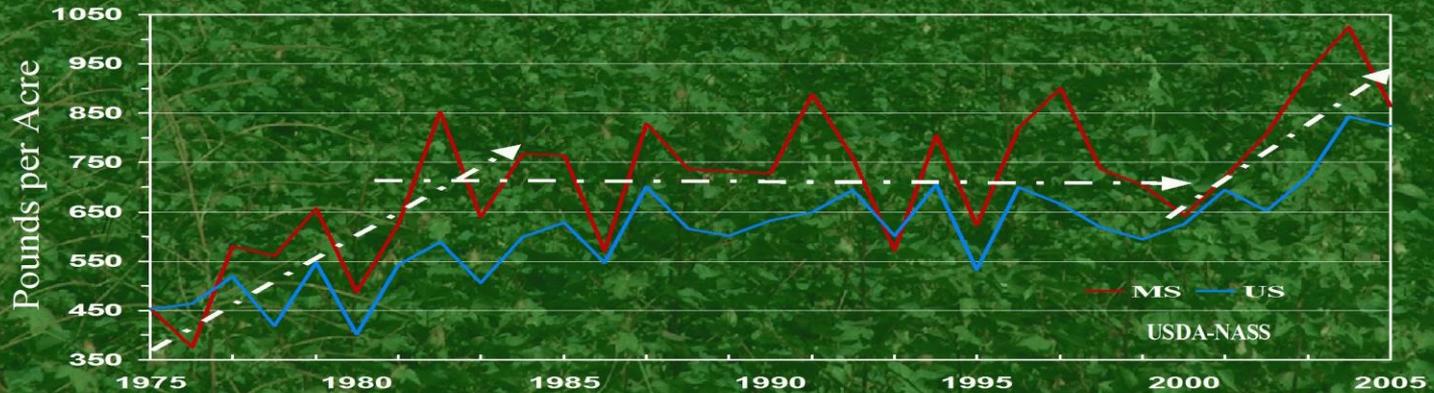(Percent Change Each Year)

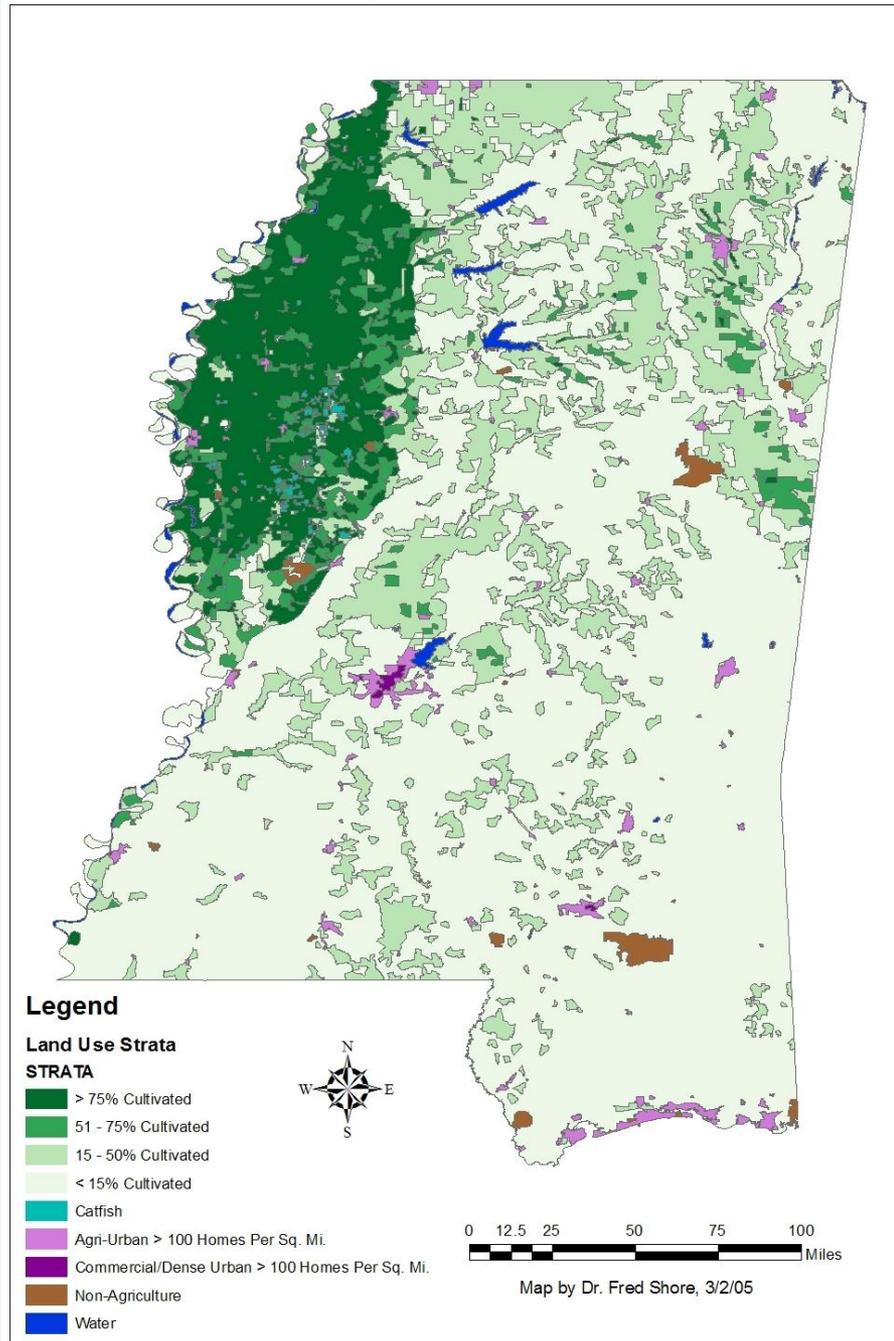# Mississippi Cotton Yield Changes, 1975-2005

Cotton Yields 1975-2005

Cotton yields in Mississippi and the United States increased steady for decades. However, during the 1980's yield increases remained relatively flat. Since 2000, cotton yields have resumed their historic advances.
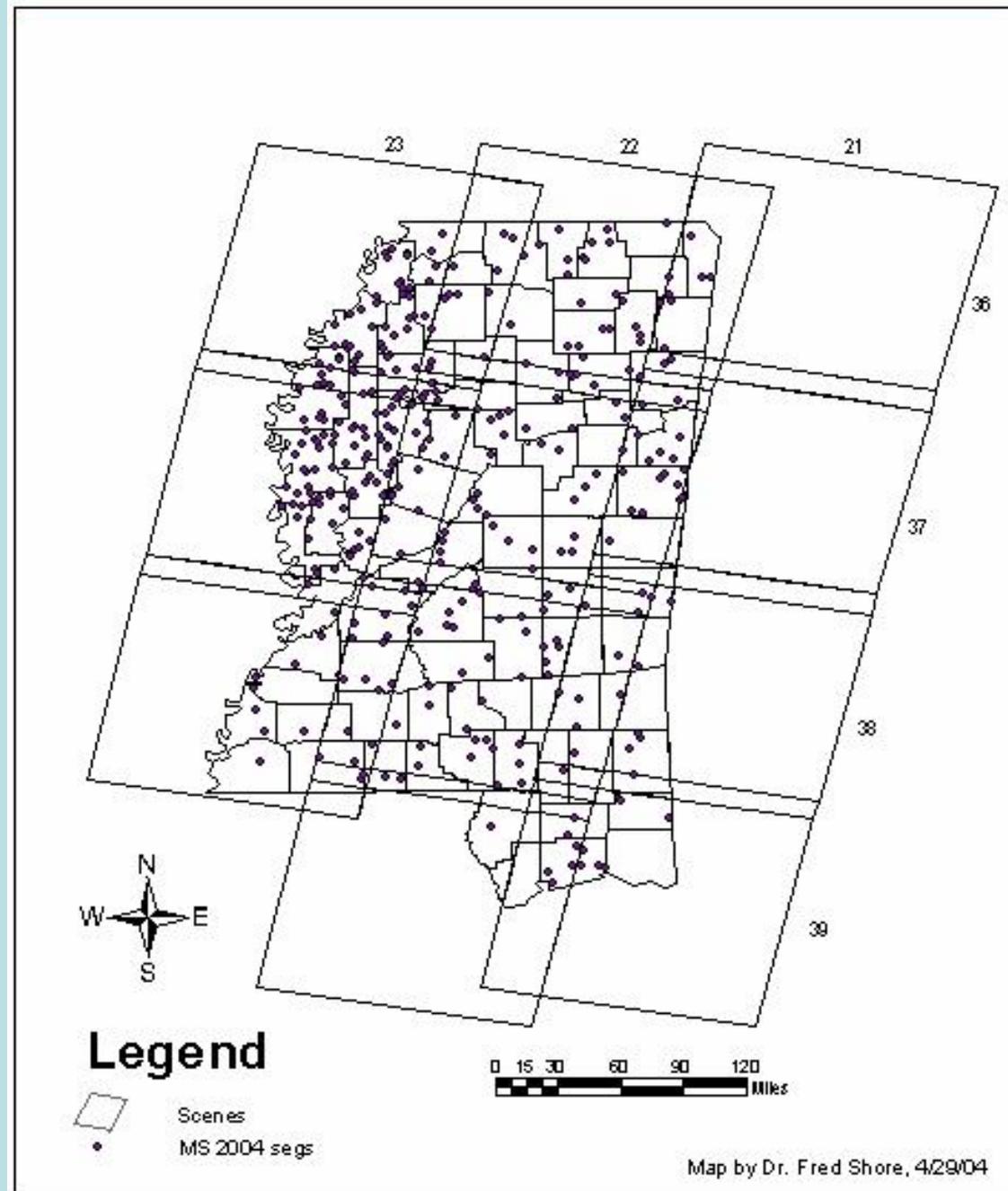
June Agricultural Survey (JAS) Segment Selection

This map shows the stratification of the State based on agricultural land use as revealed by satellite imagery. Statistically weighted selection of study segments in each strata allows direct expansion of crop acreages to give the JAS State-wide crop acreage estimates.

Legend

Land Use Strata
STRATA

- > 75% Cultivated
- 51 - 75% Cultivated
- 15 - 50% Cultivated
- < 15% Cultivated
- Catfish
- Agri-Urban > 100 Homes Per Sq. Mi.
- Commercial/Dense Urban > 100 Homes Per Sq. Mi.
- Non-Agriculture
- Water

0   12.5   25   50   75   100
Miles

Map by Dr. Fred Shore, 3/2/05

Study Segments

This map locates each of the JAS study segments (356 in 2004) with the location of Landsat scenes (11 scenes minimum). The field data and imagery are processed to obtain the Cropland Data Layer.
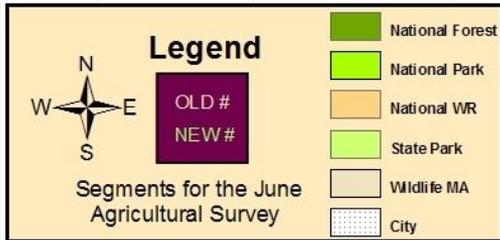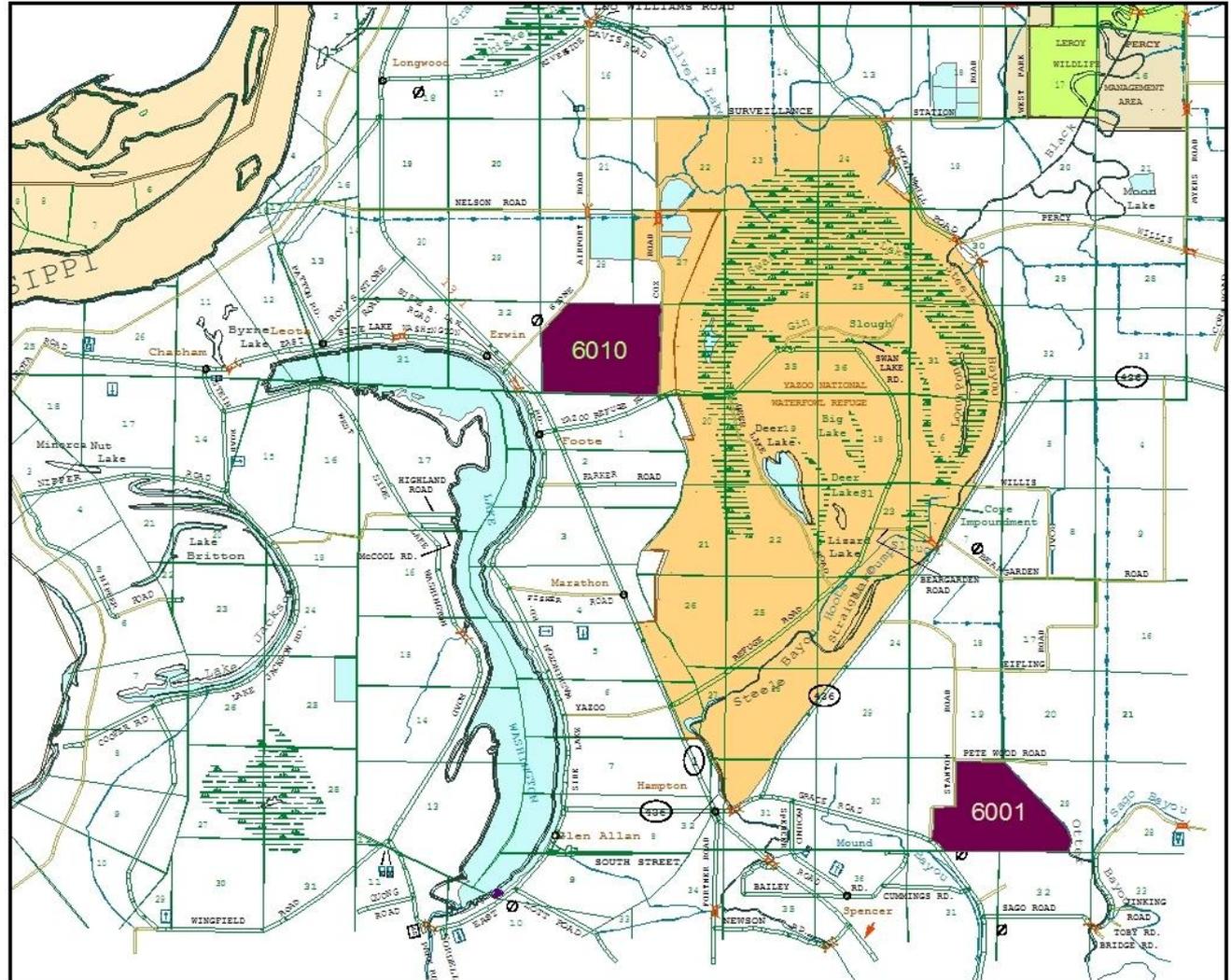

Landsat Path/Row Scenes and 2004 Segments

Legend

Scenes

MS 2004 segs

0 15 30 60 90 120 Miles

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

Cotton Objective Yield Segments, 2006

With the importance of cotton, the cotton yield is estimated periodically throughout the growing season using selected fields.

Legend

• 06COYSegs Events

Map by Dr. Fred Shore, 7/18/06

Segment Locator Map

2004 Washington County Sample Segments 6001 and 6010

Map Locator

0 12.5 25   50   75   100
Miles

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

6010

6001

Segment Area Map

0   0.5   1   2   3   4
Miles

MS Landsat Scenes 2006

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

Indian Remote Sensing (IRS)

AWiFS scenes each cover 350 km² at an average resolution of 56 m (vs. Landsat TM scenes at 185 km² and 30 m resolution).

Shown as false color IR: Band 5 (short wave IR) / 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).

Indian Remote Sensing (IRS)
RESOURCESAT-1
Advanced Wide Field Sensor (AWiFS)
Scene 280-48-A, 9/04/05
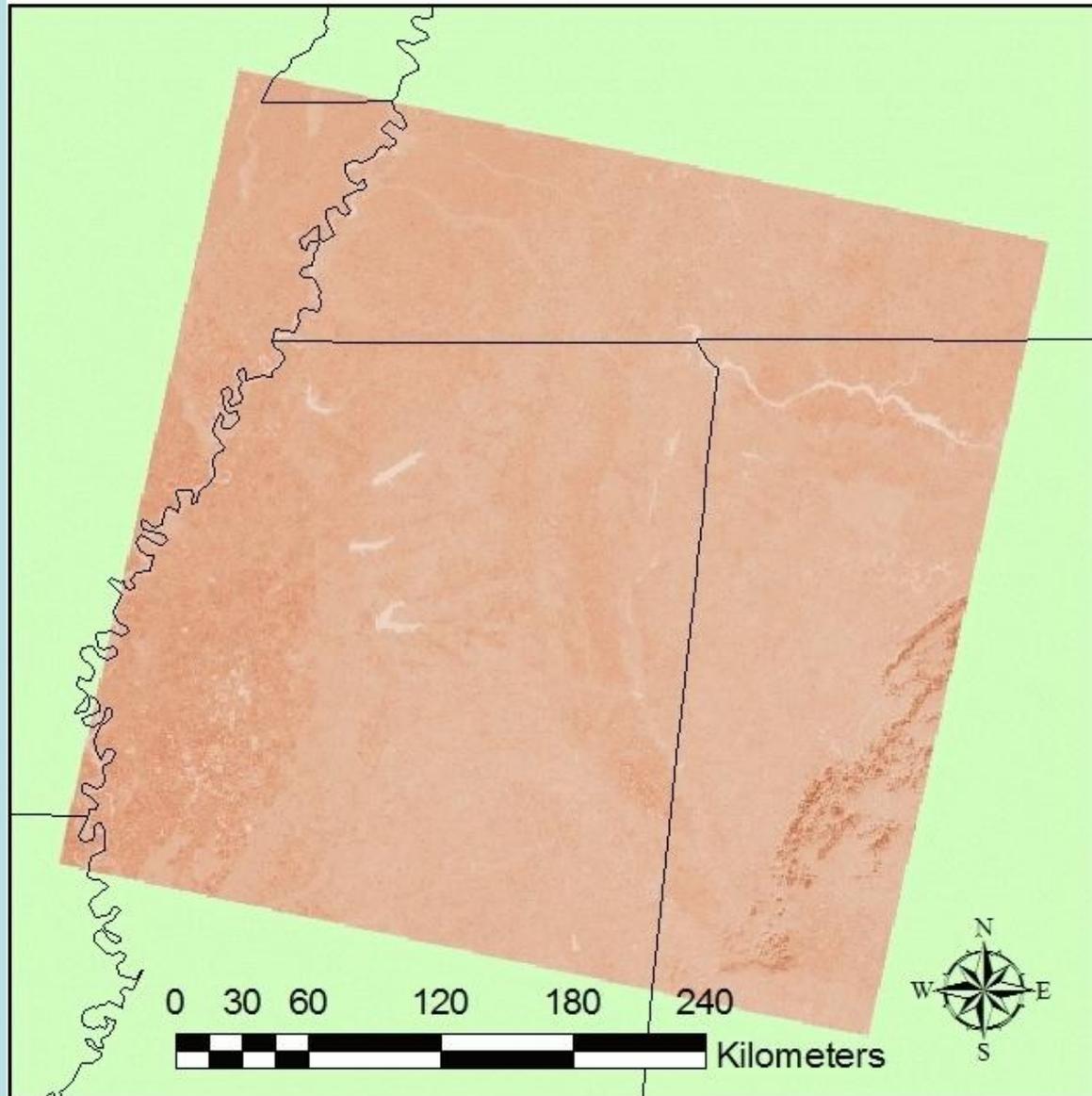
Mississippi Major Crop Planted Acres Estimates, 1999-2005
Cropland Data Layer Value as Percent of the Official Estimate
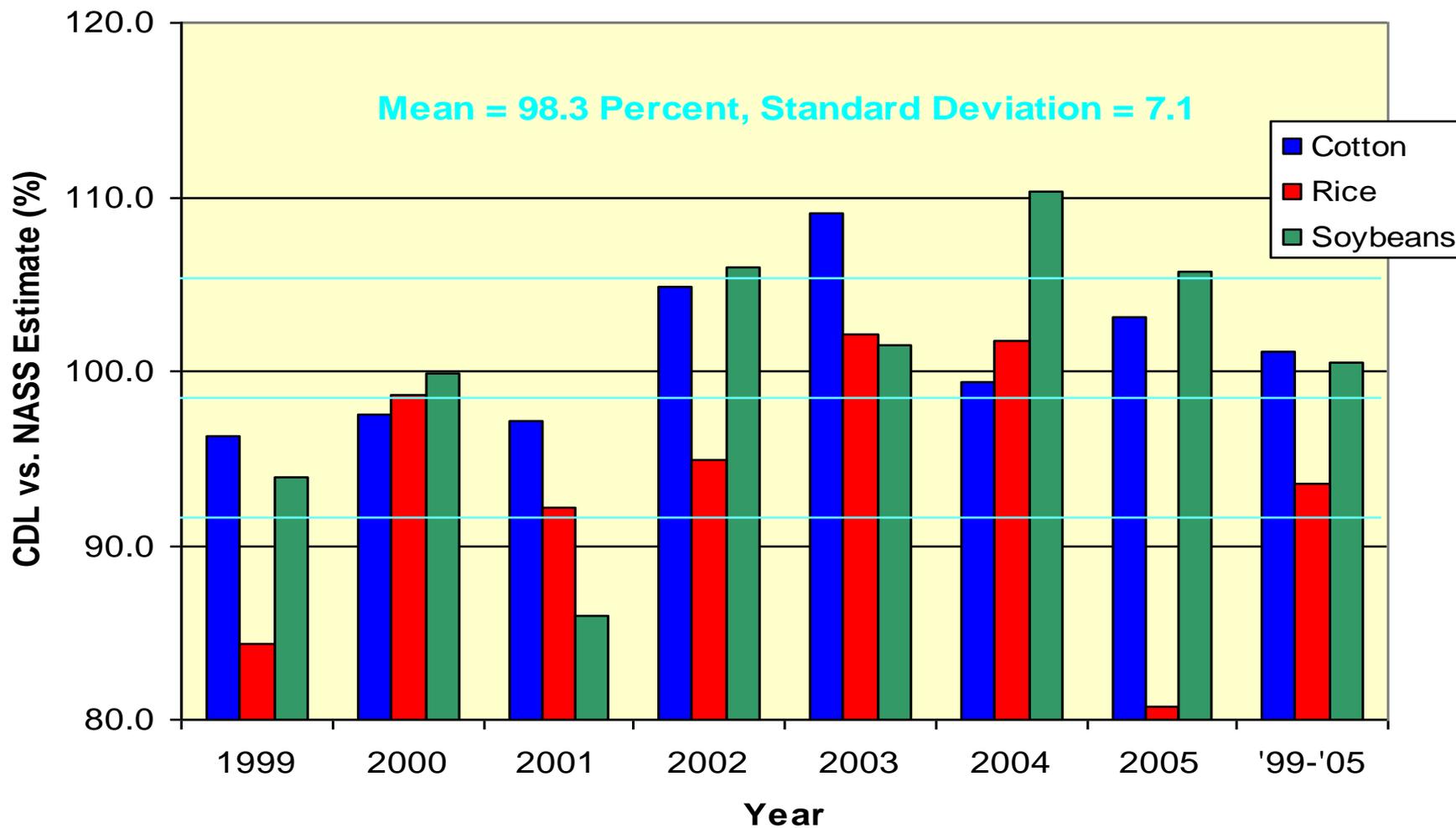
Single Year State and County Maps

Mississippi Cropland Data Layer, 2005

Bolivar County, Mississippi Cropland Data Layer, 2005

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

N W E S

Mississippi Cropland Data Layer

Mississippi farmers select crops to plant each year depending on the weather and the market. Each year the USDA-NASS uses field personnel and satellite imaging to help provide the best possible estimate of crop production. This statistical information is important in predicting the US economy.
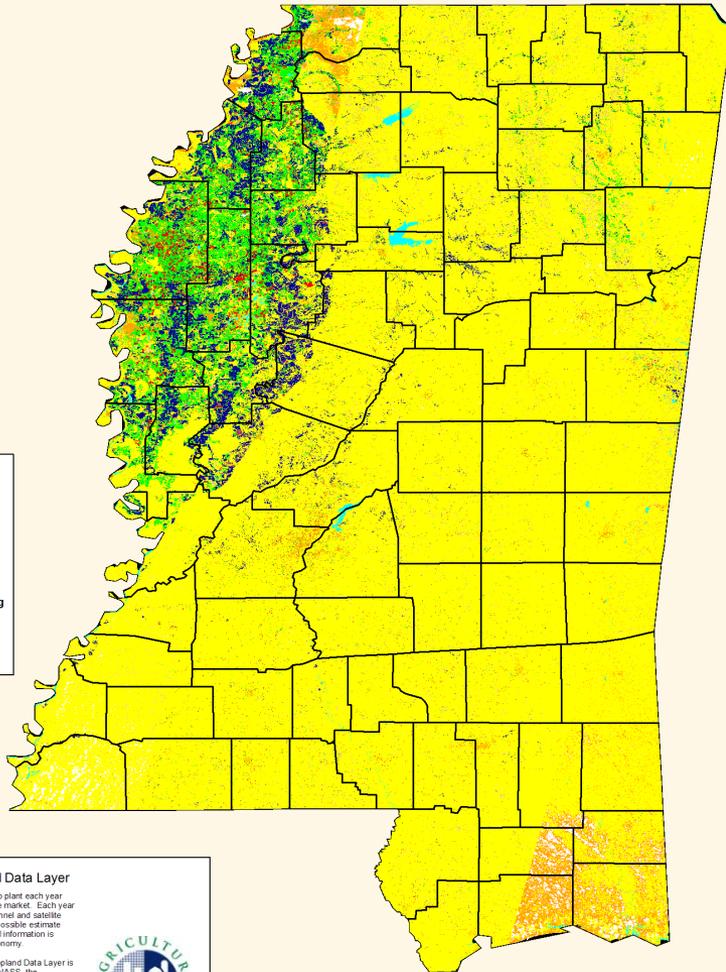
Compilation of the Mississippi Cropland Data Layer is a cooperative effort of the USDA-NASS, the Mississippi Department of Agriculture and Commerce, and the Mississippi State University Cooperative Extension Program.

Landsat imagery was processed and enhanced for this map. The official result is available on disk from USDA-NASS at (800) 727-9540.

0 10 20 40 60 80 Miles

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

Bolivar County Area Map

0 2.5 5 10 15 20 Miles

Mississippi Cropland Data Layer

Mississippi farmers select crops to plant each year depending on the weather and the market. Each year the USDA-NASS uses field personnel and satellite imaging to help provide the best possible estimate of crop production. This statistical information is important in predicting the US economy.
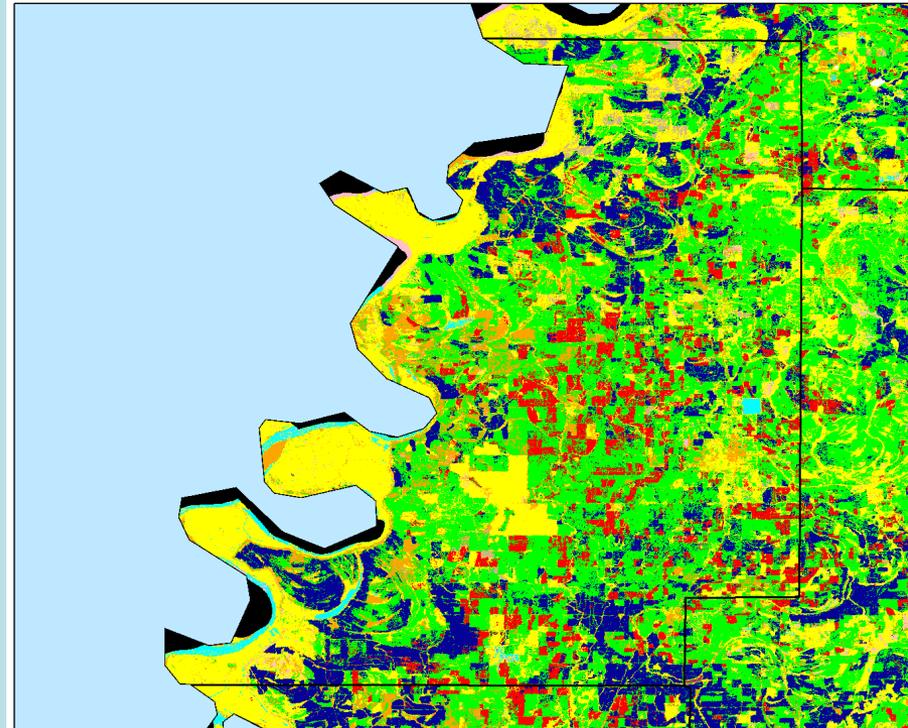
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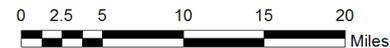
CROPS
- Corn
- Cotton
- Rice
- Sorghum
- Soybeans
- Hay/Other Crops
- Fallow/Idle Cropland
- Trees/Pasture/Non-Ag
- Clouds
- Urban
- Water

N W E S

USDA-NASS/MDAC/MSU

Map by Dr. Fred Shore

Locator Map

0 15 30 60 90 120 Miles
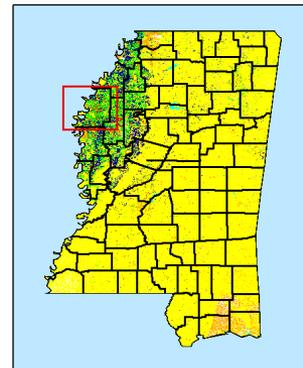
The Basic Cropland Data Layer Presentation

The Mississippi Delta showing the Cropland Data Layer classifications obtained using satellite images, and the June Agricultural Survey.

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NASS

Mississippi State
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CROPS
- Corn
- Cotton
- Rice
- Sorghum
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- Fallow/Idle Cropland
- Trees/Pasture/Non-Ag
- Clouds
- Urban
- Water

N
W E
S

0 5 10 20 30 40 Miles
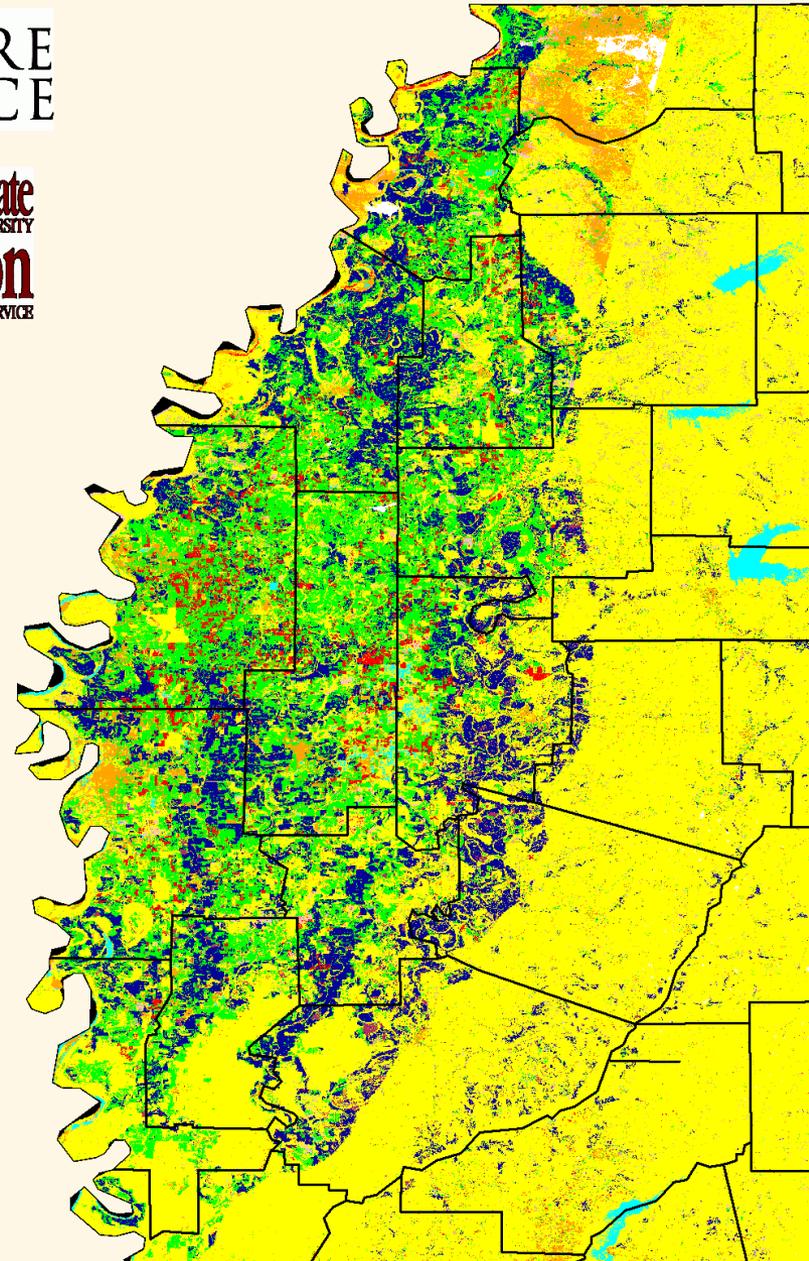
Multiyear Overlays Cotton

The variation of land use for cotton in the Delta over a 7 year period is shown in this map.

The darker the shade of blue, the more years the same land was used to grow cotton.

Frequency of Acreage Planted to Cotton, 1999-2005

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

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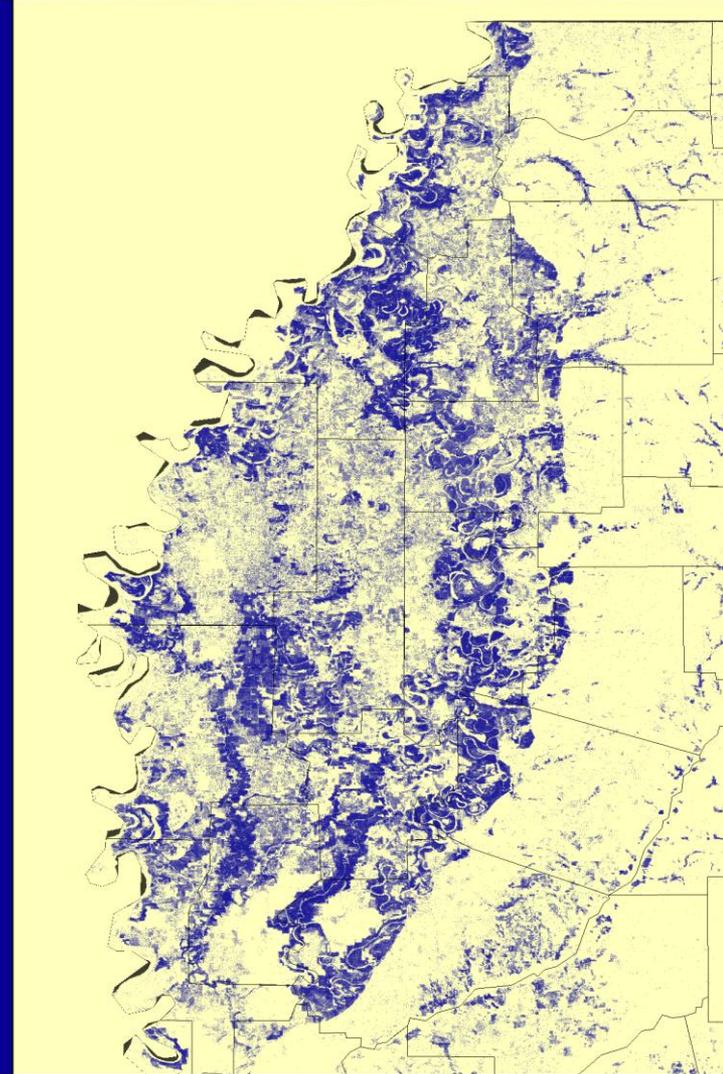

Land Use for Major Crops in the Mississippi Delta, 1999-2005

Legend

Overlay Priority
Rice>Cotton>Soybeans

Rice
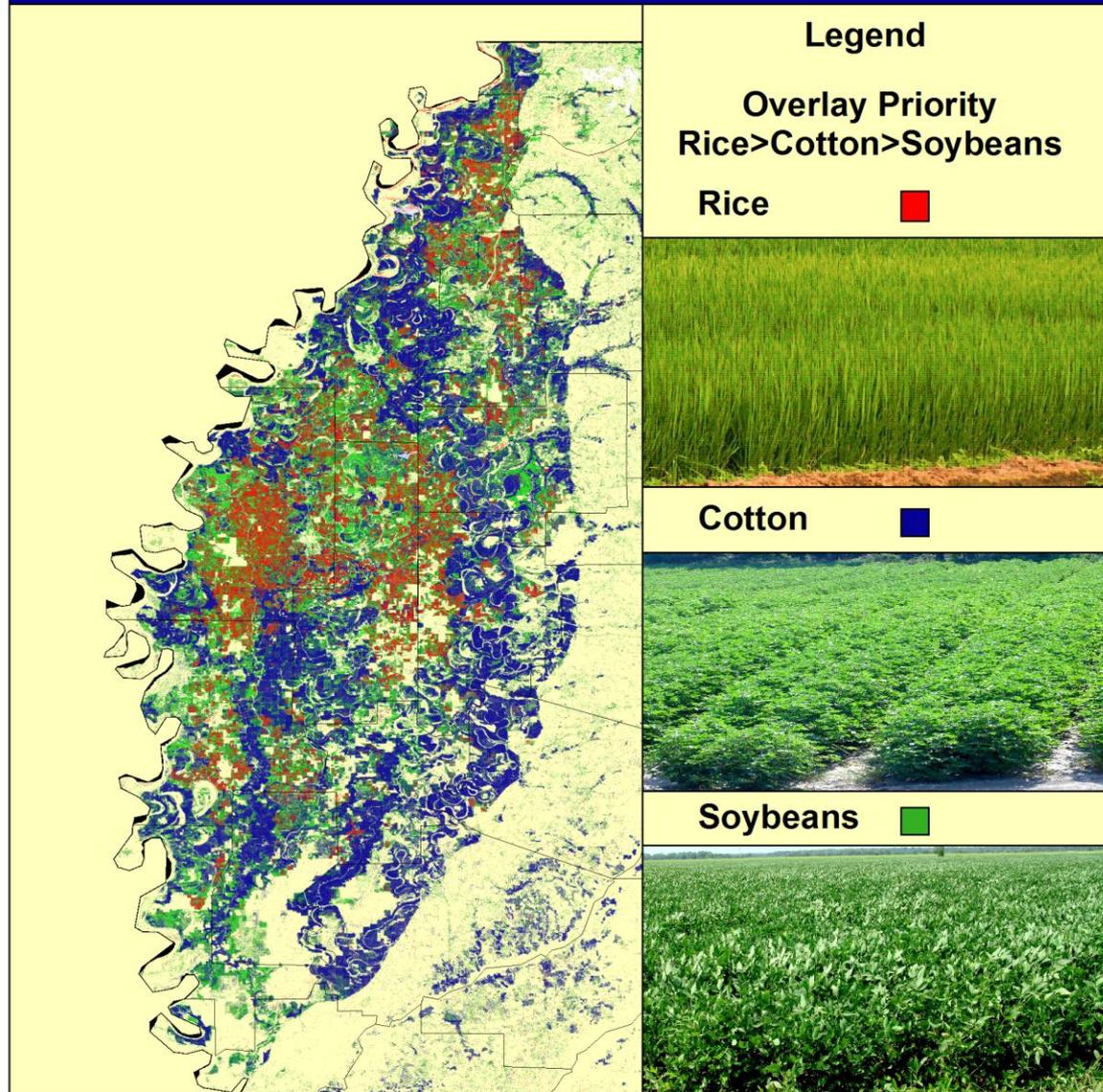
Cotton

Soybeans

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.

Bolivar County CDL 2005 Field Polygon Overlay in White
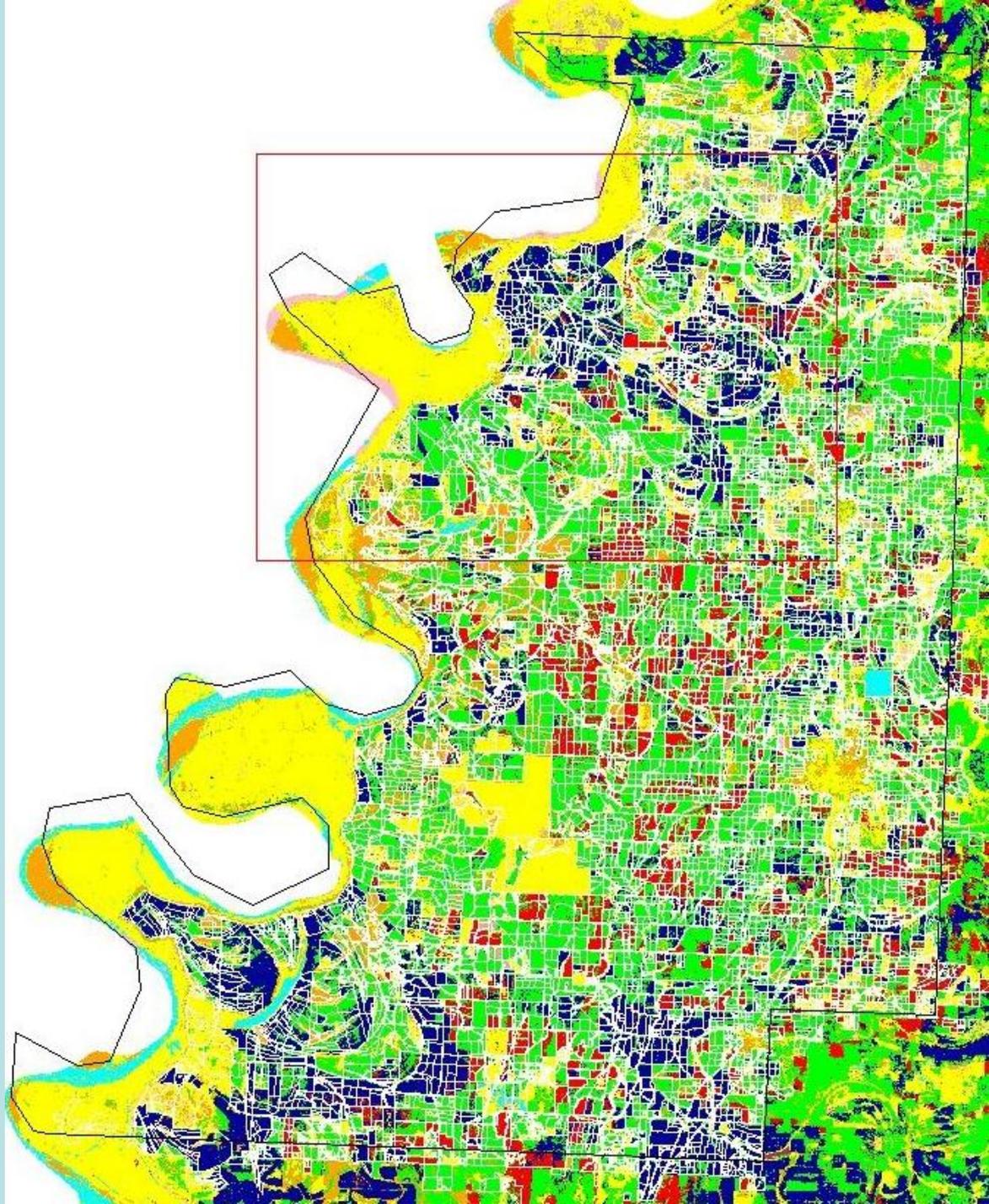
Field Level Overlay of MS CDL05 Bolivar County
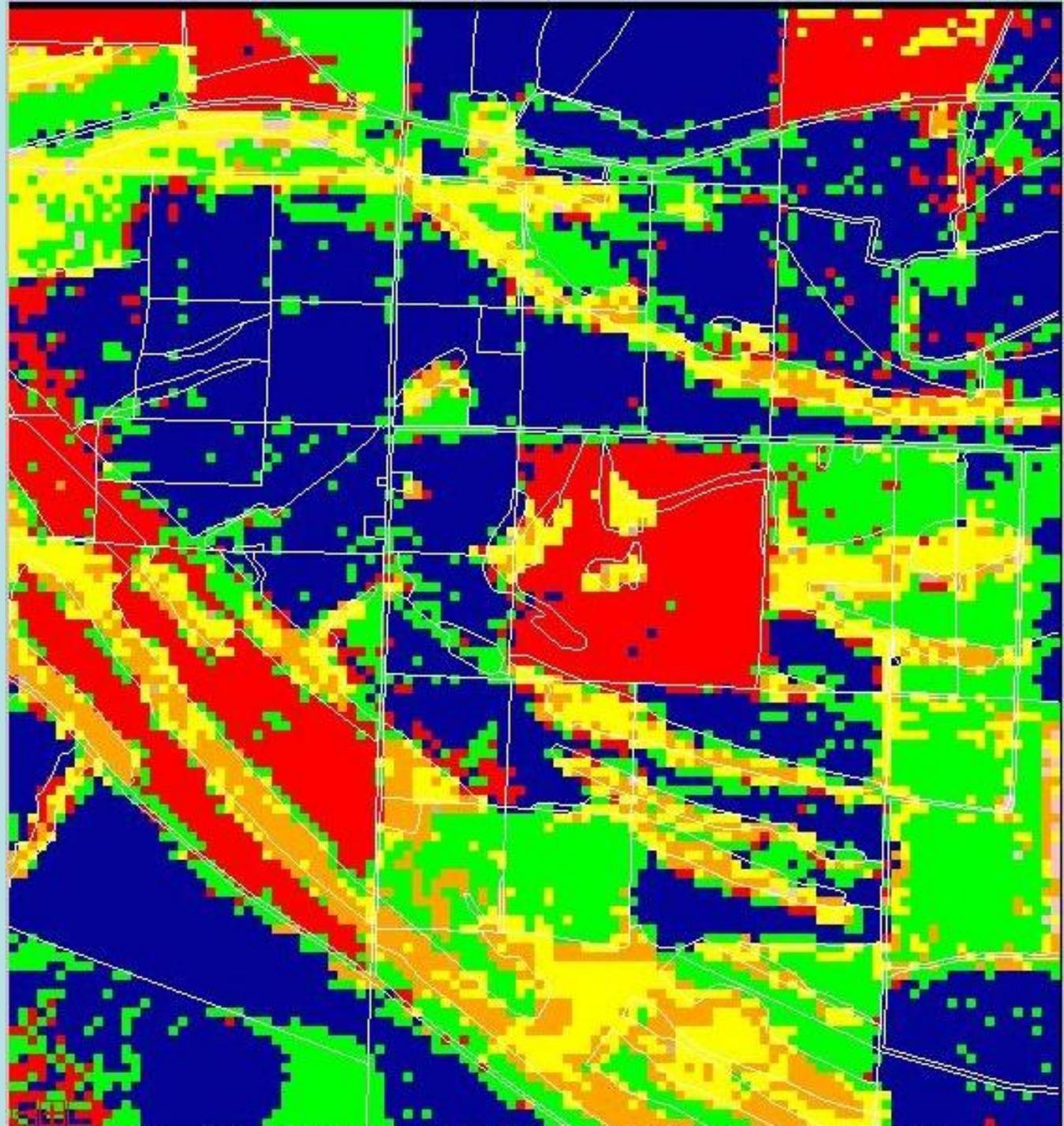
Bolivar County Field 1 Cotton
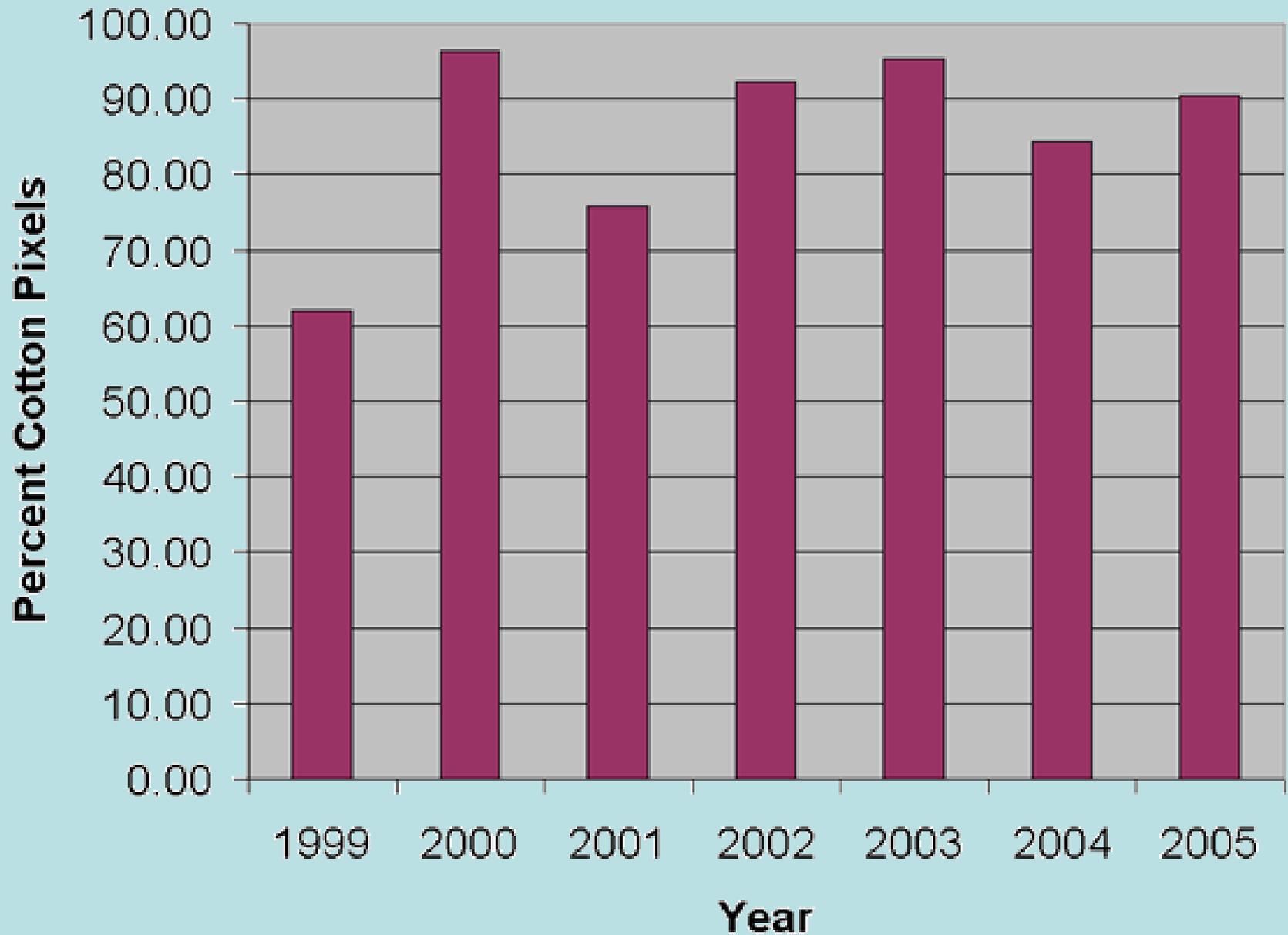
Field 1 by Year

Legend

CROPS
- Corn
- Cotton
- Rice
- Sorghum
- Soybeans
- Hay/Other Crops
- Fallow/Idle Cropland
- Trees/Pasture/Non-Ag
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1999

2000

2001

2002
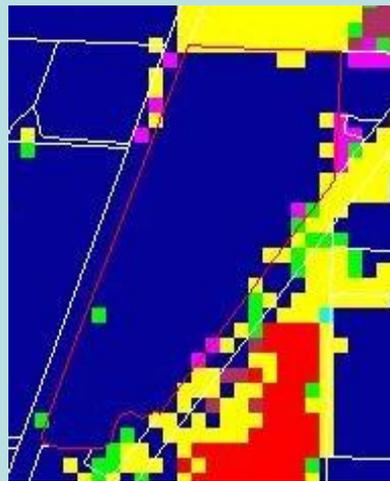
2003
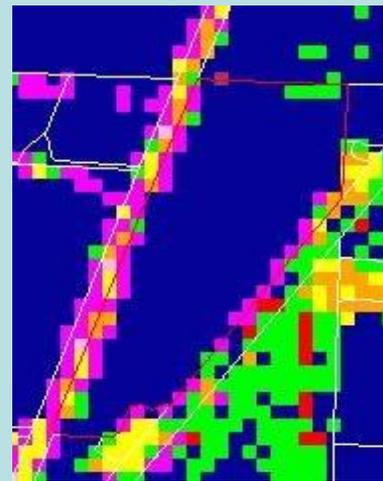
2004
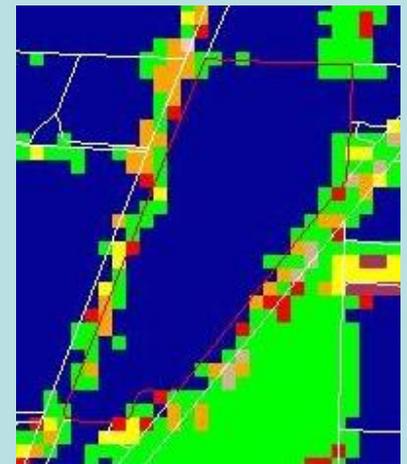
2005

Bolivar County Field 1
2005 Aerial Image, 2006 Flag/Field Picture

SAS Output Selected Fields Where cott Pixels Exceeded 50 Percent

09:08 Tuesday, August 29, 2006

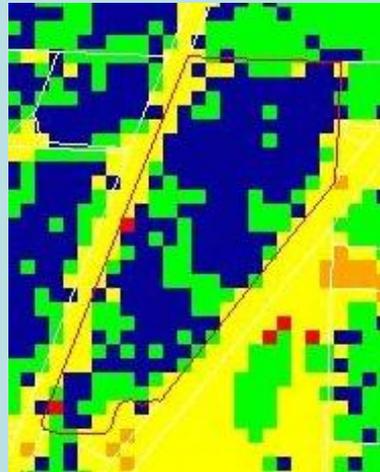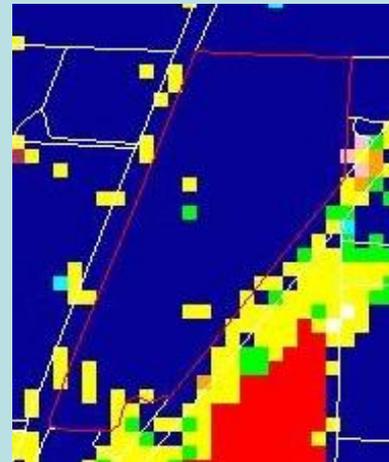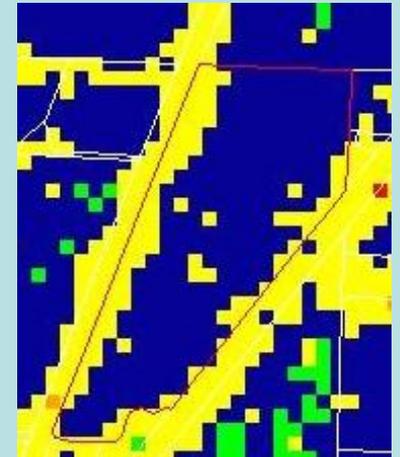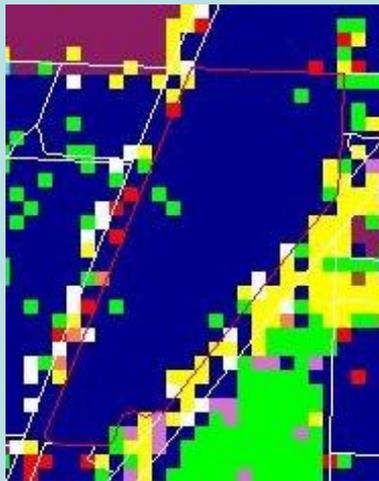| Obs	field	cott_pcent_1999	cott_pcent_2000	cott_pcent_2001	cott_pcent_2002	cott_pcent_2003	cott_pcent_2004	cott_pcent_2005	count_1999	count_2000	count_2001	count_2002	count_2003	count_2004	count_2005
363	946	31.73	92.65	80.32	13.25	88.35	97.99	93.57	.	1	1	.	1	1	1
373	956	57.04	93.92	88.17	3.74	94.40	93.77	94.27	1	1	1	.	1	1	1
375	958	56.26	98.27	90.59	2.48	95.97	96.11	95.82	1	1	1	.	1	1	1
376	959	53.85	100.00	53.85	0.00	84.62	76.92	76.92	1	1	1	.	1	1	1
384	970	50.78	95.38	85.94	11.52	99.41	2.15	4.69	1	1	1	.	1	.	.
385	971	2.20	66.67	75.82	9.89	6.59	0.00	0.00	.	1	1	.	.	.	.
405	999	41.92	94.01	6.59	6.59	98.20	1.80	0.60	.	1	.	.	1	.	.
406	1000	1.69	98.37	40.68	5.93	98.31	0.00	5.09	.	1	.	.	1	.	.
420	1020	0.00	0.00	78.17	88.33	93.40	88.33	86.29	.	.	1	1	1	1	1
422	1022	0.00	1.28	55.70	5.06	41.77	22.79	45.57	.	.	1	.	.	.	.
435	1036	38.24	5.58	68.07	96.22	97.06	91.18	91.60	.	.	1	1	1	1	1
436	1037	17.39	4.35	78.26	100.00	100.00	60.87	82.61	.	.	1	1	1	1	1
447	1048	57.55	0.00	61.32	93.87	99.06	92.45	98.11	1	.	1	1	1	1	1
450	1051	0.00	1.35	84.53	91.72	96.73	84.53	94.77	.	.	1	1	1	1	1

SAS Output Selected Fields Where corn Pixels Exceeded 50 Percent

Obs	filed	corn_percent_199	corn_percent_200	corn_percent_201	corn_percent_202	corn_percent_203	corn_percent_204	corn_percent_205	corn_count_199	corn_count_200	corn_count_201	corn_count_202	corn_count_203	corn_count_204	corn_count_205
64	946	0.00	0.00	0.00	71.49	0.00	0.00	0.00	.	.	.	1	.	.	.
65	956	0.00	0.00	0.00	87.17	0.00	0.00	0.00	.	.	.	1	.	.	.
66	958	0.00	0.00	0.00	89.46	0.00	0.00	0.00	.	.	.	1	.	.	.
67	959	0.00	0.00	0.00	73.08	0.00	0.00	0.00	.	.	.	1	.	.	.
68	970	0.00	0.00	0.00	15.23	0.00	82.81	0.20	.	.	.	.	.	1	.
69	971	0.00	0.00	0.00	51.65	0.00	3.30	0.00	.	.	.	1	.	.	.
70	999	0.00	0.00	0.00	67.07	0.00	4.19	0.00	.	.	.	1	.	.	.
71	1000	0.00	0.00	0.00	55.08	0.00	25.42	0.00	.	.	.	1	.	.	.
72	1020	0.00	75.68	0.00	0.00	0.51	0.00	0.00	.	1	.	.	.	.	.
73	1022	0.00	57.69	0.00	1.27	0.00	0.00	0.00	.	1	.	.	.	.	.
74	1036	0.00	80.26	0.00	0.00	0.00	0.00	0.00	.	1	.	.	.	.	.
75	1037	0.00	52.17	0.00	0.00	0.00	0.00	0.00	.	1	.	.	.	.	.
76	1048	0.00	79.25	0.00	0.00	0.00	0.00	0.00	.	1	.	.	.	.	.
77	1051	0.00	80.67	0.00	0.00	0.00	0.00	0.00	.	1	.	.	.	.	.

SAS Query Cotton and Corn Rotation

count_1999	count_2000	count_2001	count_2002	count_2003	count_2004	count_2005
.	1	1	.	1	1	1
1	1	1	.	1	1	1
1	1	1	.	1	1	1
1	1	1	.	1	1	1
1	1	1	.	1	.	.
.	1	1	.	.	.	.
.	1	.	.	1	.	.
.	1	.	.	1	.	.
.	.	1	1	1	1	1
.	.	1	.	.	.	.
.	.	1	1	1	1	1
.	.	1	1	1	1	1
1	.	1	1	1	1	1
.	.	1	1	1	1	1

count_1999	count_2000	count_2001	count_2002	count_2003	count_2004	count_2005
.	.	.	1	.	.	.
.	.	.	1	.	.	.
.	.	.	1	.	.	.
.	.	.	1	.	.	.
.	.	.	.	.	1	.
.	.	.	1	.	.	.
.	.	.	1	.	.	.
.	.	.	1	.	.	.
.	1	.	.	.	.	.
.	1	.	.	.	.	.
.	1	.	.	.	.	.
.	1	.	.	.	.	.
.	1	.	.	.	.	.
.	1	.	.	.	.	.

Comparing Crop Overlays Cotton and Corn

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

**Frequency of Acreage Planted to Cotton vs. Corn, 1999-2005**
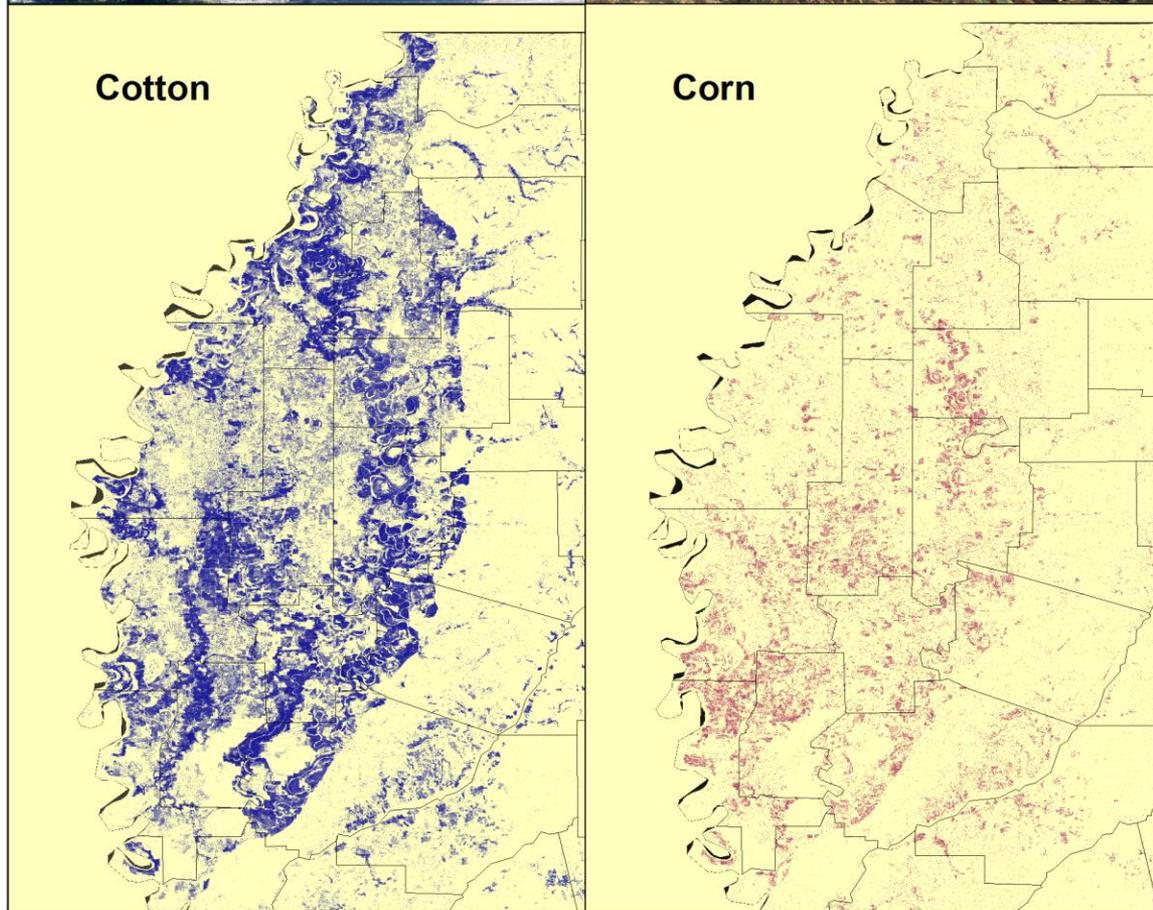
Cotton

Corn

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.

New interest in corn

Not just a great rotation crop for cotton, the corn to energy concept is becoming more cost effective. Winona was a proposed location, but the Vicksburg location now seems more likely.
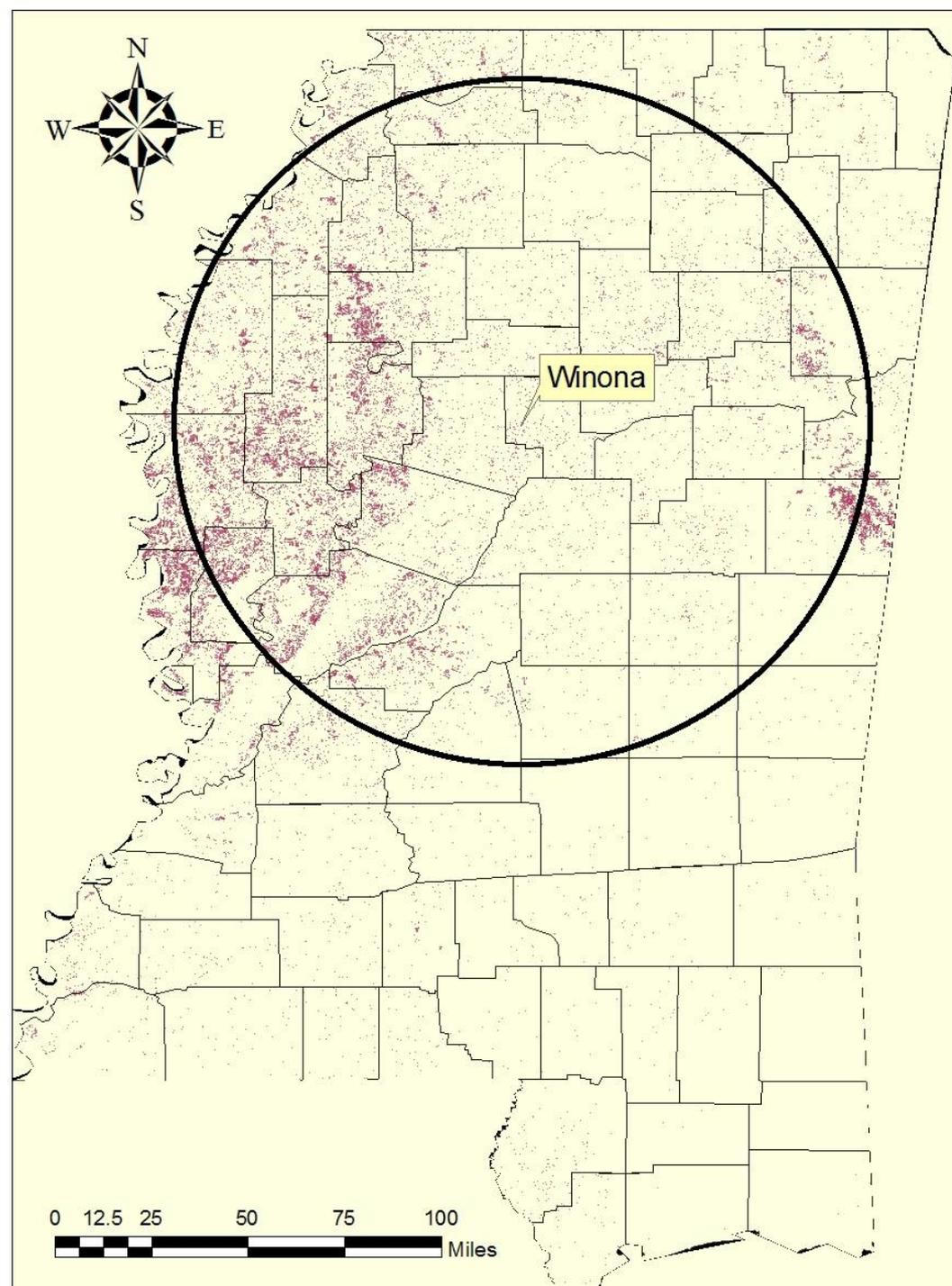
The Mississippi Cropland Data Layer and Cotton *Results*

•Information and 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.

•The Cropland Data Layer is useful for crop acreage estimates and for visual presentations of cropland coverage.

•Field level data for cotton and other crops can be extracted for the 1999-2005 years.

•Multi-layer ArcGIS maps allow land use patterns and crop rotations with cotton to be observed.

•Statistics on posters are useful for spotting trends and for display of cotton facts such as yield.