Multiyear Data from the Mississippi Cropland Data Layer Classifications

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Mississippi Agricultural Production

Mississippi Agricultural Statistics Service

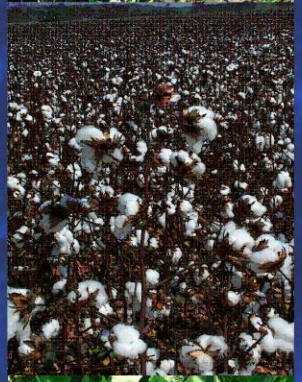
Mississippi's Rank Among States In Agricultural Commodities, 2004

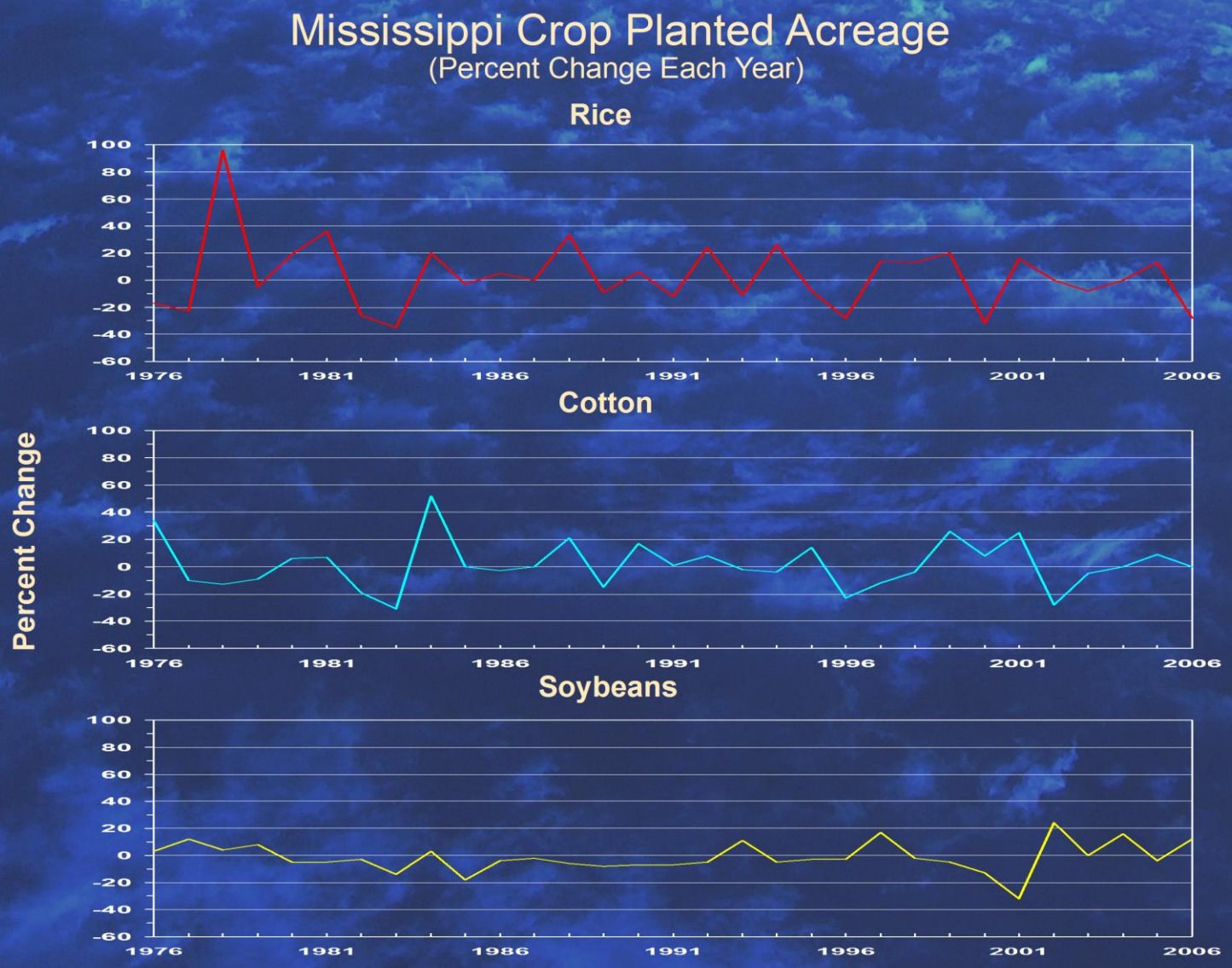
Commodity	Production or Number	Unit	Rank
Crop			
All Cotton	2,346,000	bales	3
All Rice	16,146,000	cwt	4
Sorghum for Grain	1,422,000	bu	13
Sorghum for Silage	13,000	tons	20
Sweetpotatoes	2,601,000	cwt	3
Soybeans	61,500,000	bu	13
Winter Wheat	7,155,000	bu	29
All Hay	1,656,000	tons	32
Corn for Grain	59,840,000	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

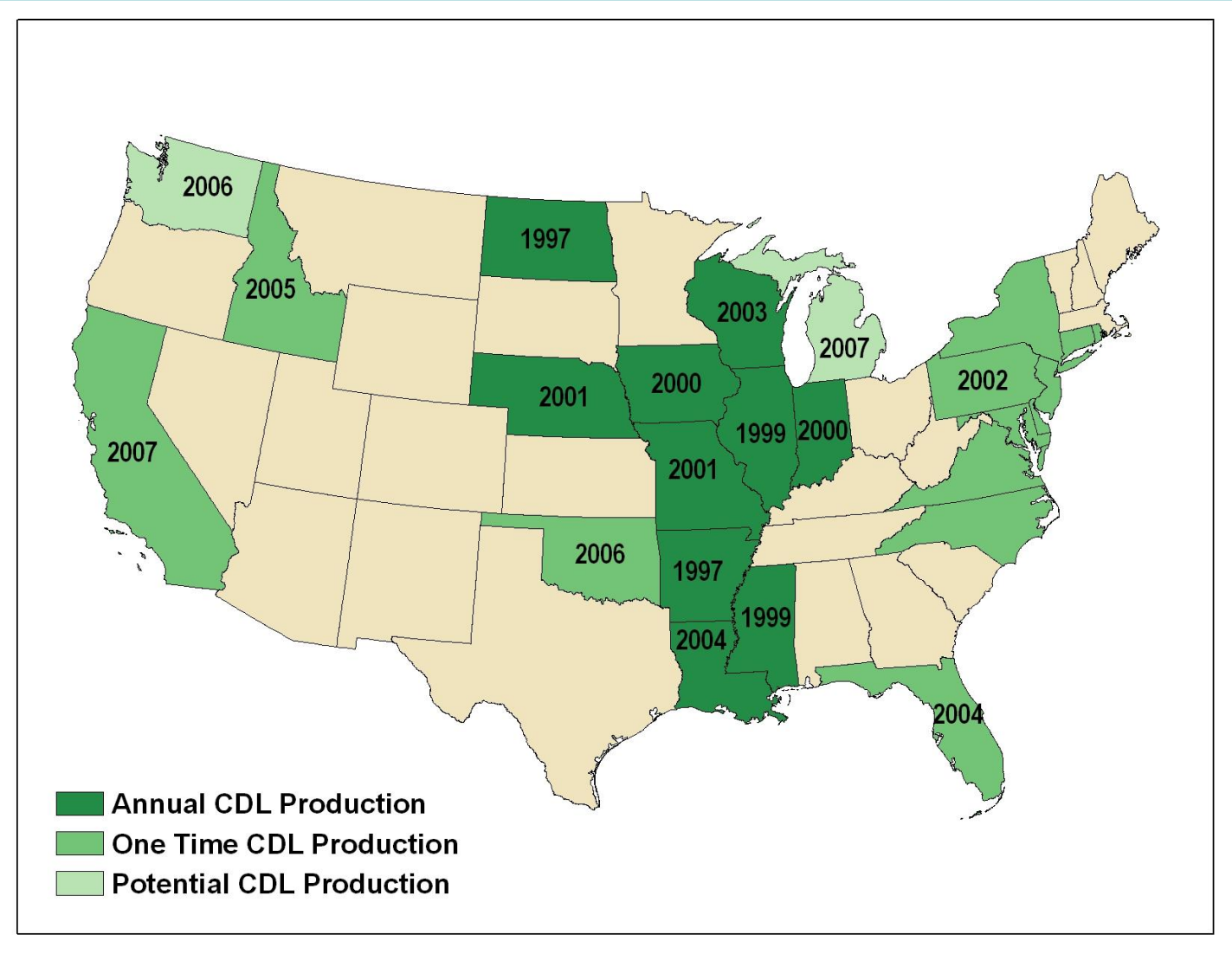
Planting Decisions





The Cropland Data Layer Project Status

Oklahoma and Washington Were Added for 2006

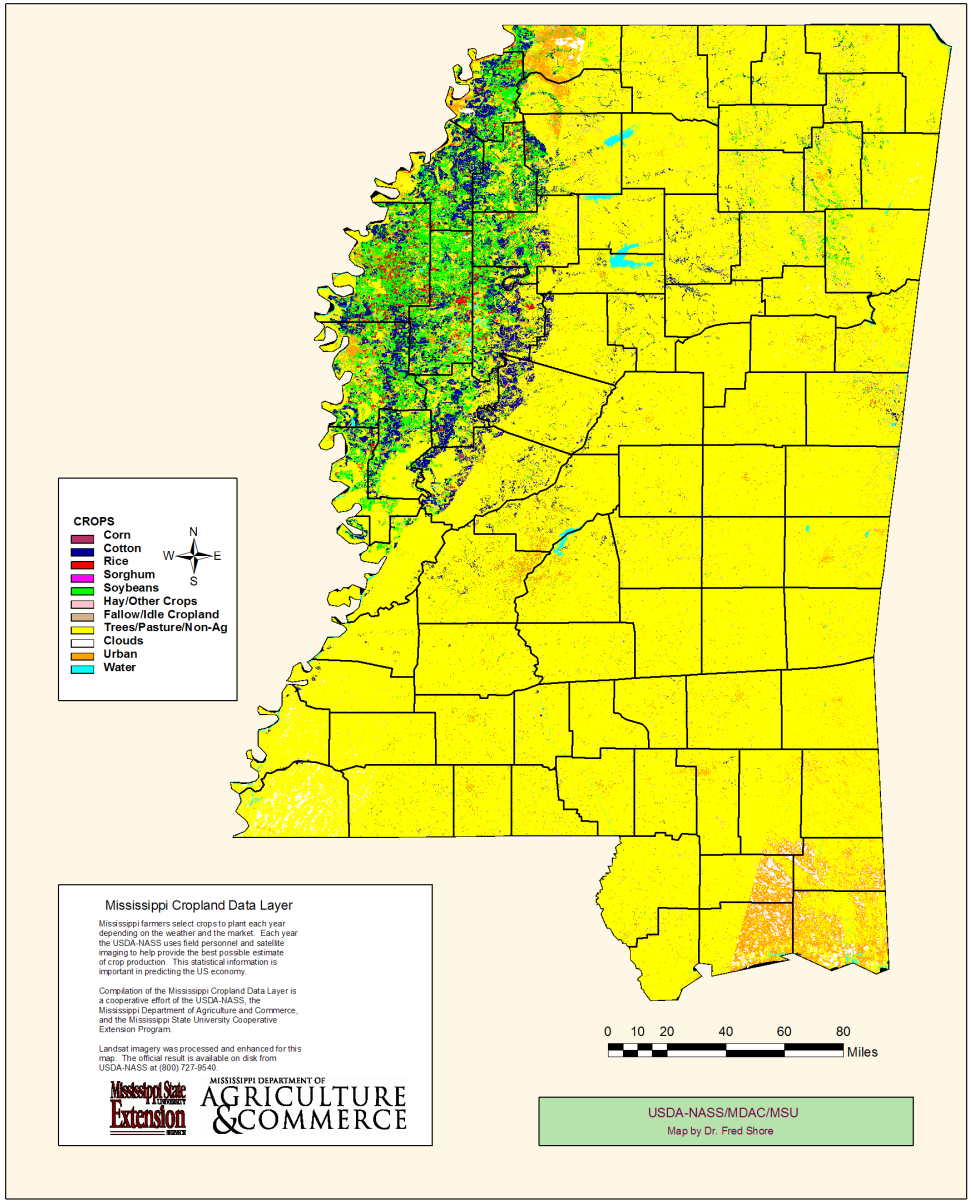


The Cropland Data Layer in Mississippi

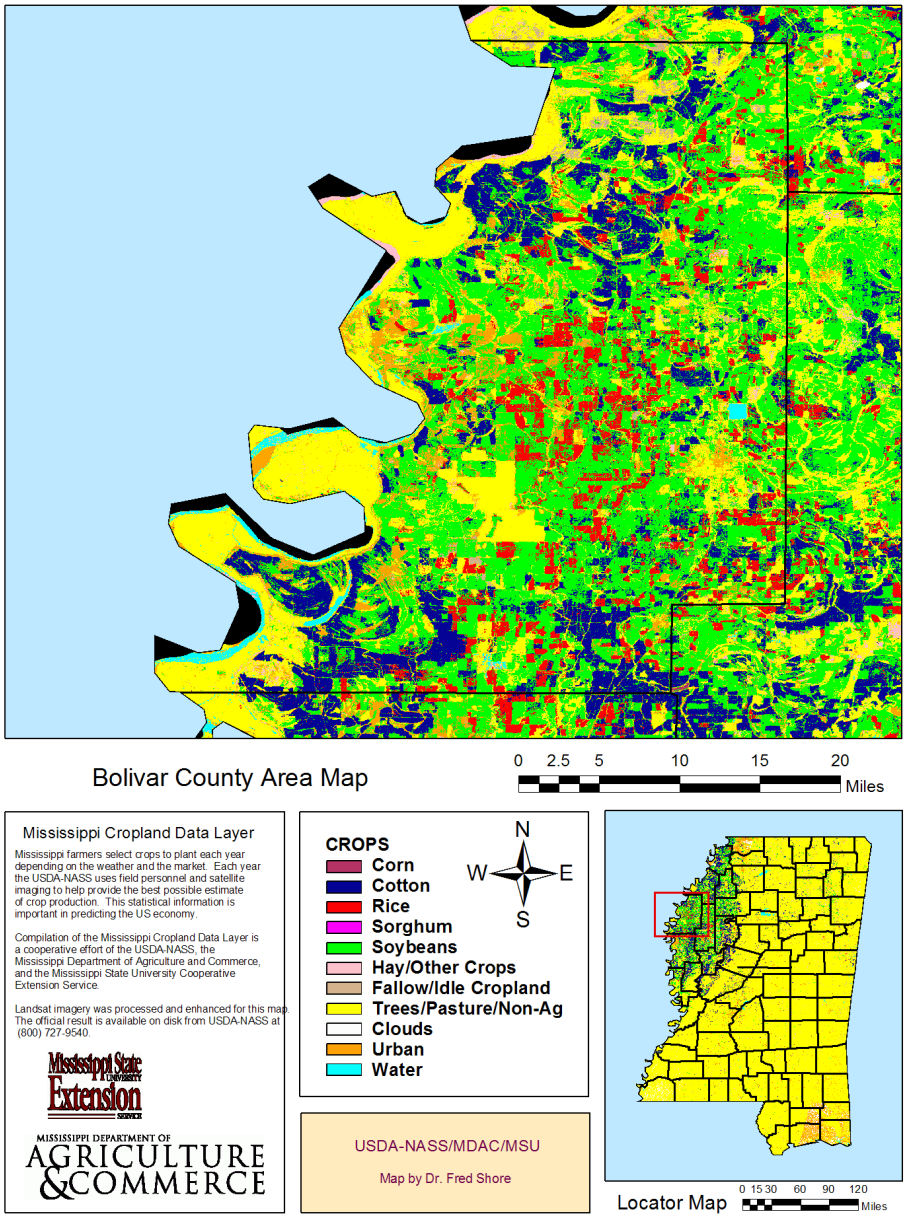
- Multi-temporal processing based on USDA-NASS programs started in the 1970s and the LARSYS software from Purdue University.
- Mississippi project started in 1999 using the Public Domain Peditor and RSP software programs of NASS.
- A cooperative project of NASS, Mississippi State University, and the Mississippi Department of Agriculture and Commerce.

Single Year State and County Maps

Mississippi Cropland Data Layer, 2005

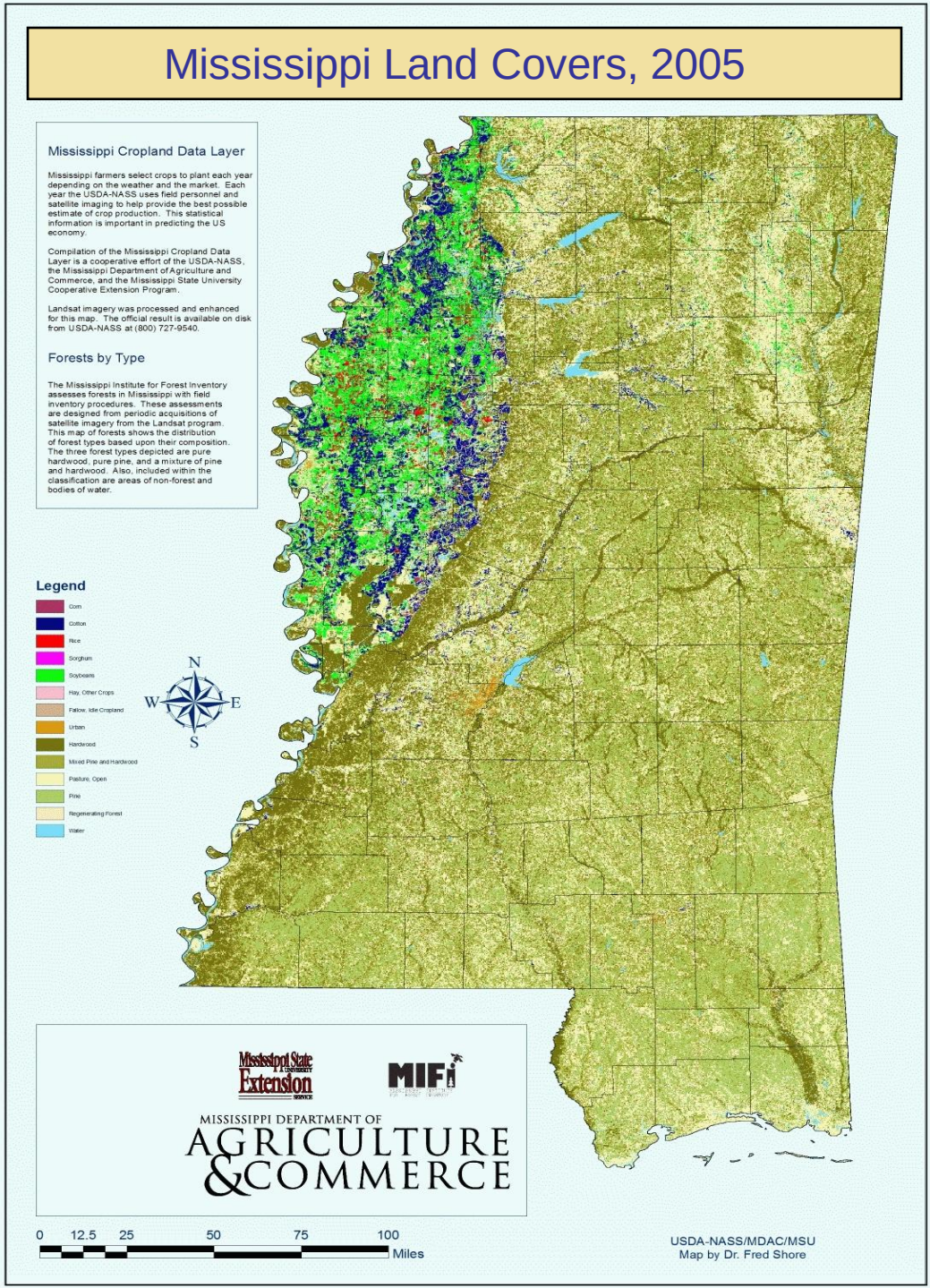


Bolivar County, Mississippi Cropland Data Layer, 2005

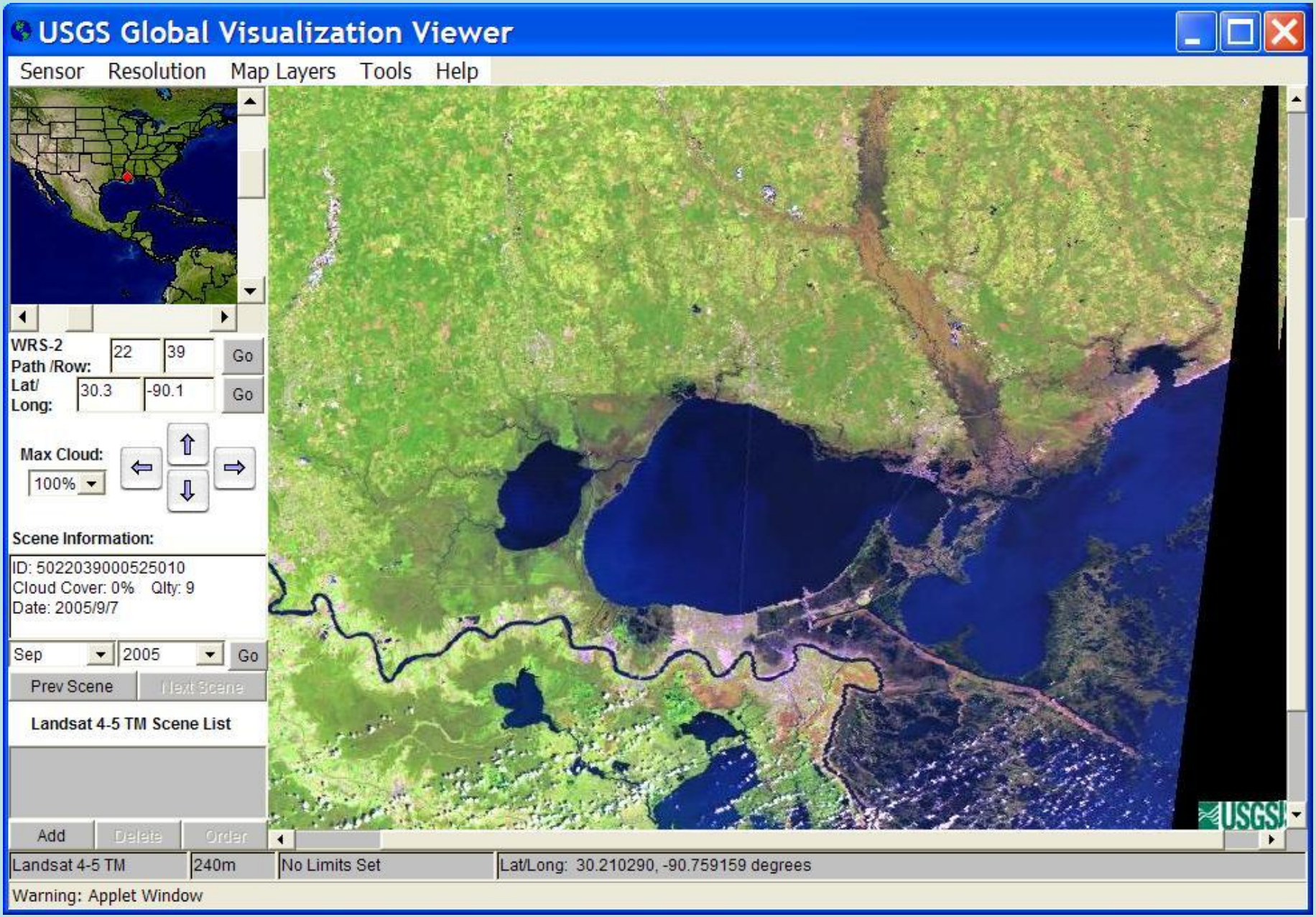


Map Uses of the Cropland Data Layer

The Cropland Data Layer as a layer over the classified forests of Mississippi



After Katrina, Landsat 5 View

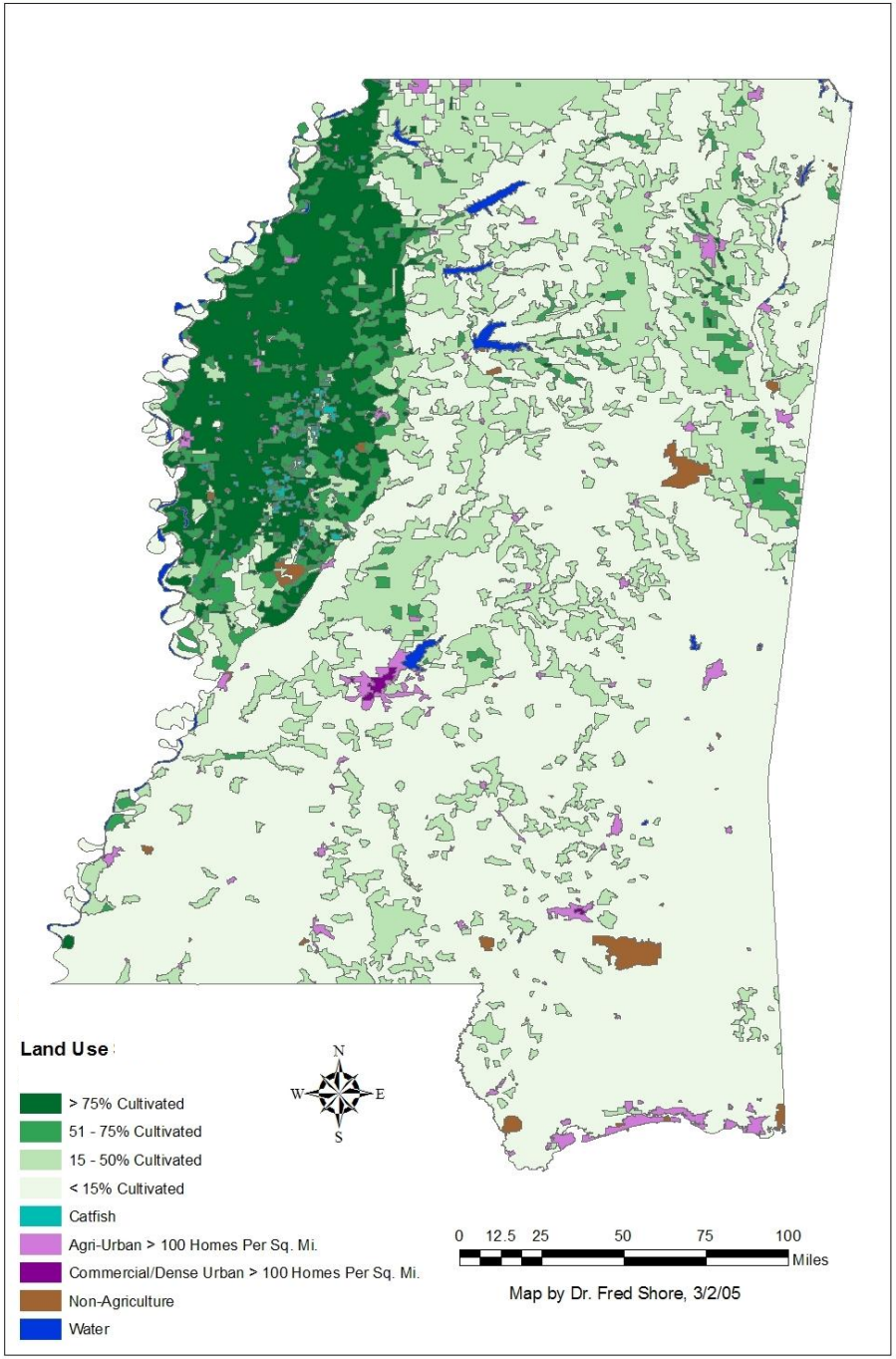


June Agricultural Survey (JAS) Segment Selection

Selection of study segments in each strata allows direct expansion of field acreages to give crop acreage estimates in the JAS.

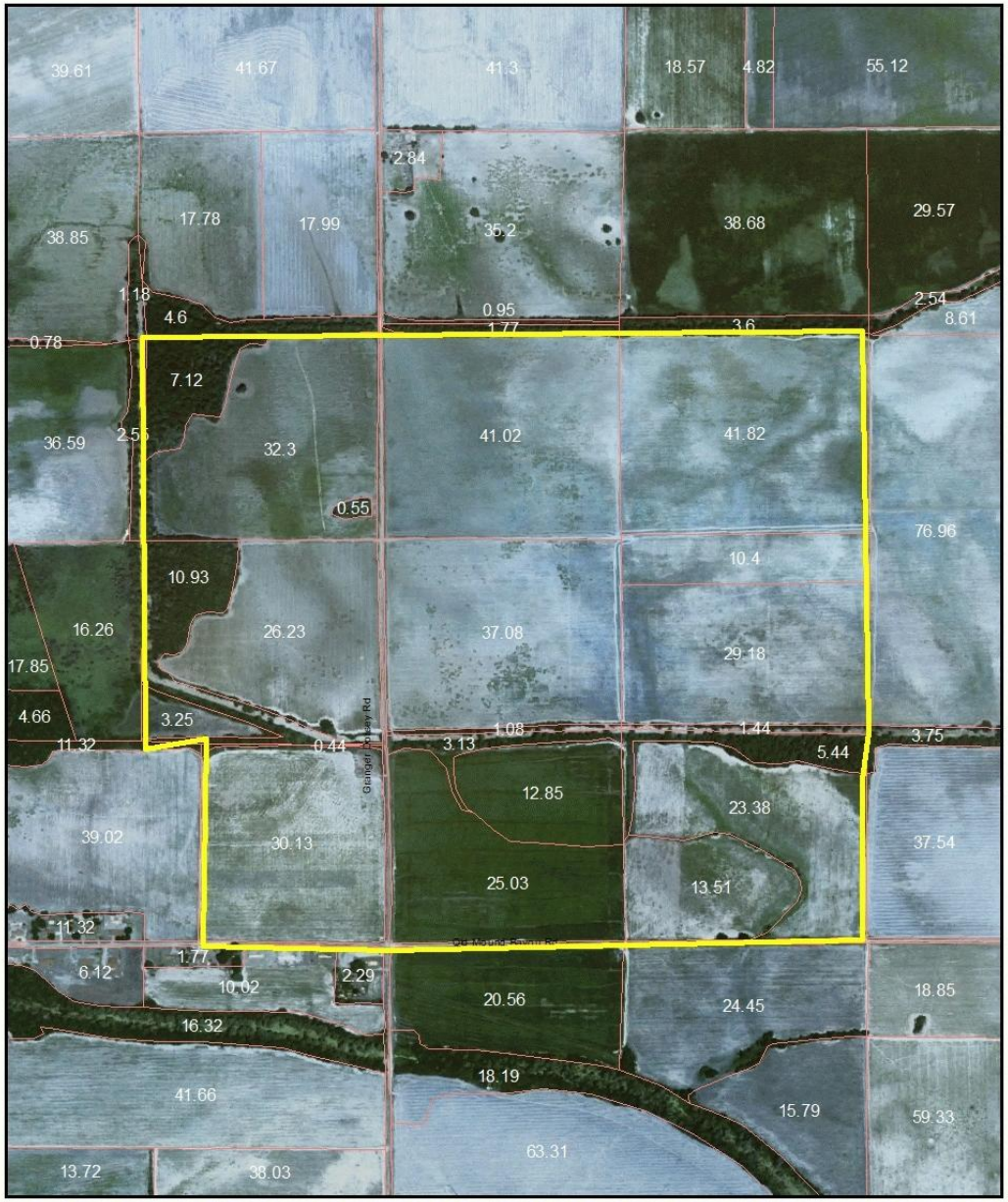
Data compliments of the NASS Area Frame Section, Fairfax, VA.

Mississippi Stratification, 2005-Present



Field/Segment Boundaries on a High Resolution Photo

The segment boundary is shown in yellow and the field boundaries in pink with acres shown for each field.

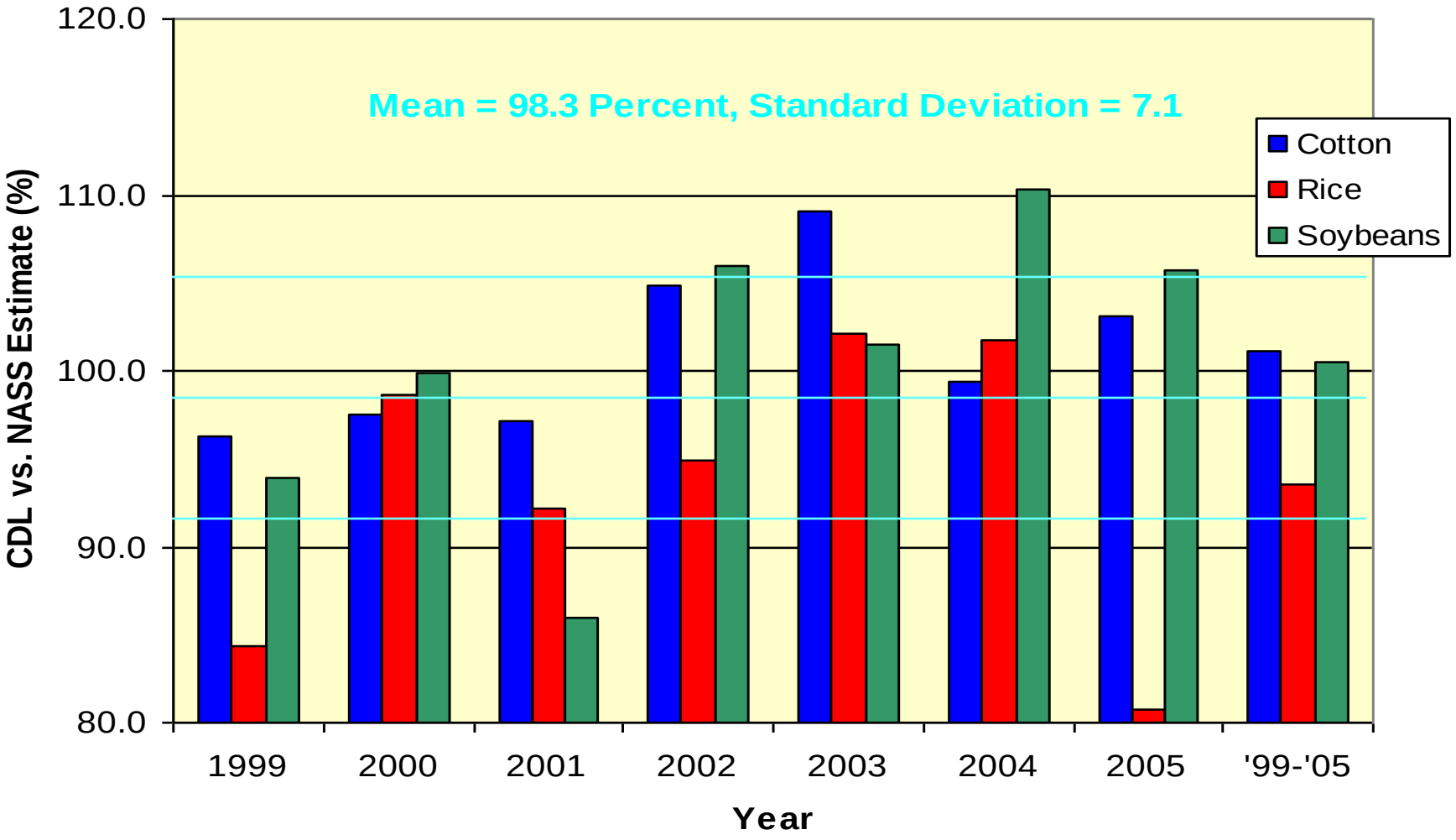


Sample Segment Map, Mississippi 2007

MSU, USDA_NASS, MDAC Map by Dr. Fred Shore, 3/7/07

Enumerator Caution: photo, acres and field lines may be inaccurate.

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



Multiyear Overlays Cotton

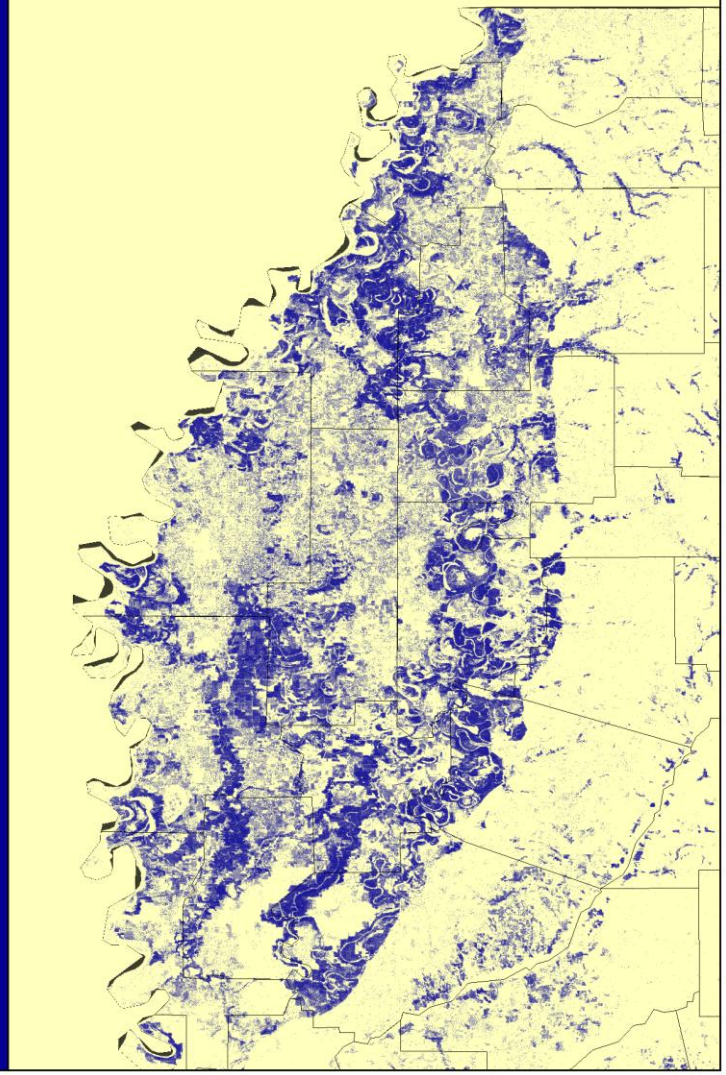
The variation of land use for cotton in the Delta over a 7 year period is shown in this map.

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

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.

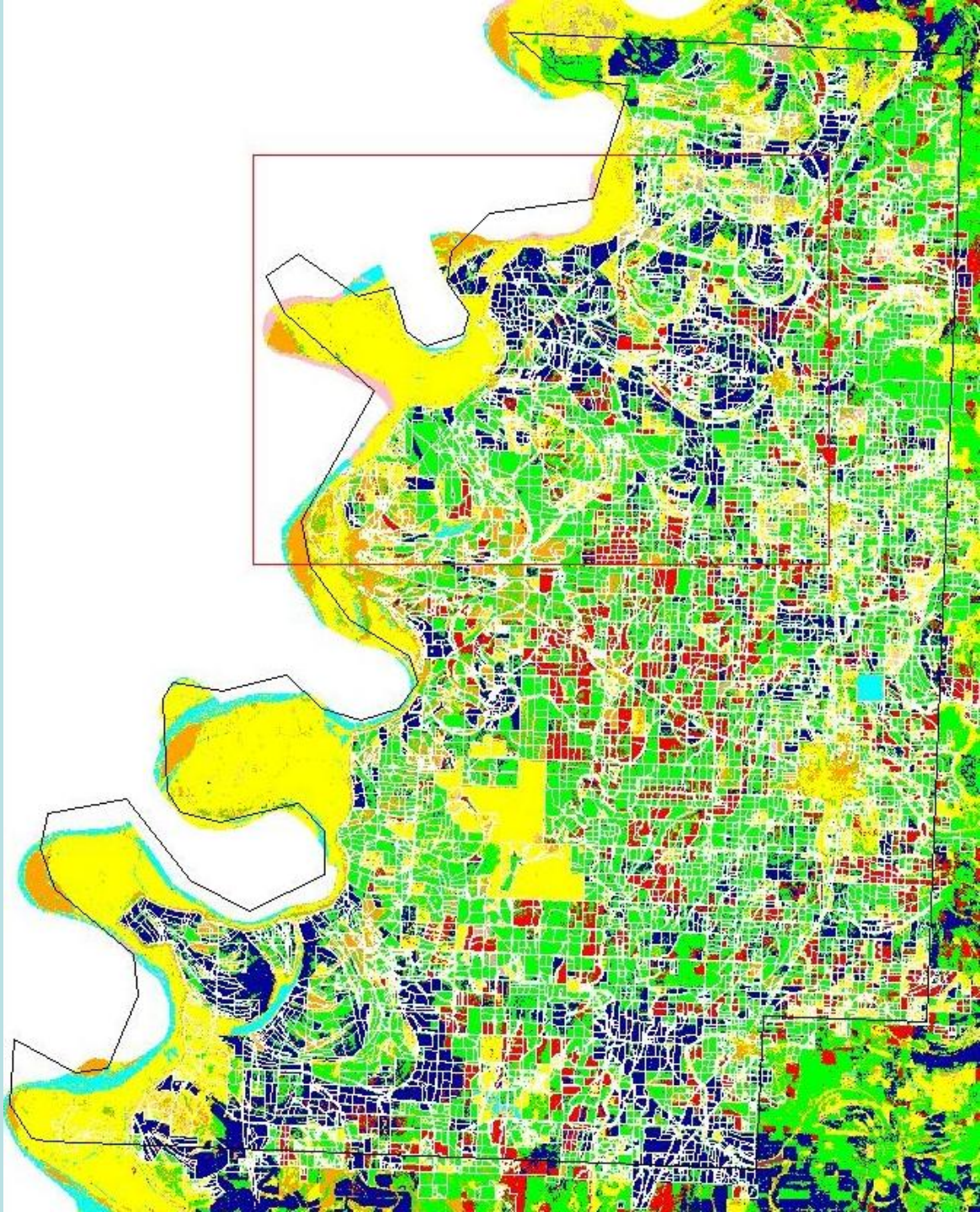


Multiyear Data from the Mississippi Cropland Data Layer Classifications

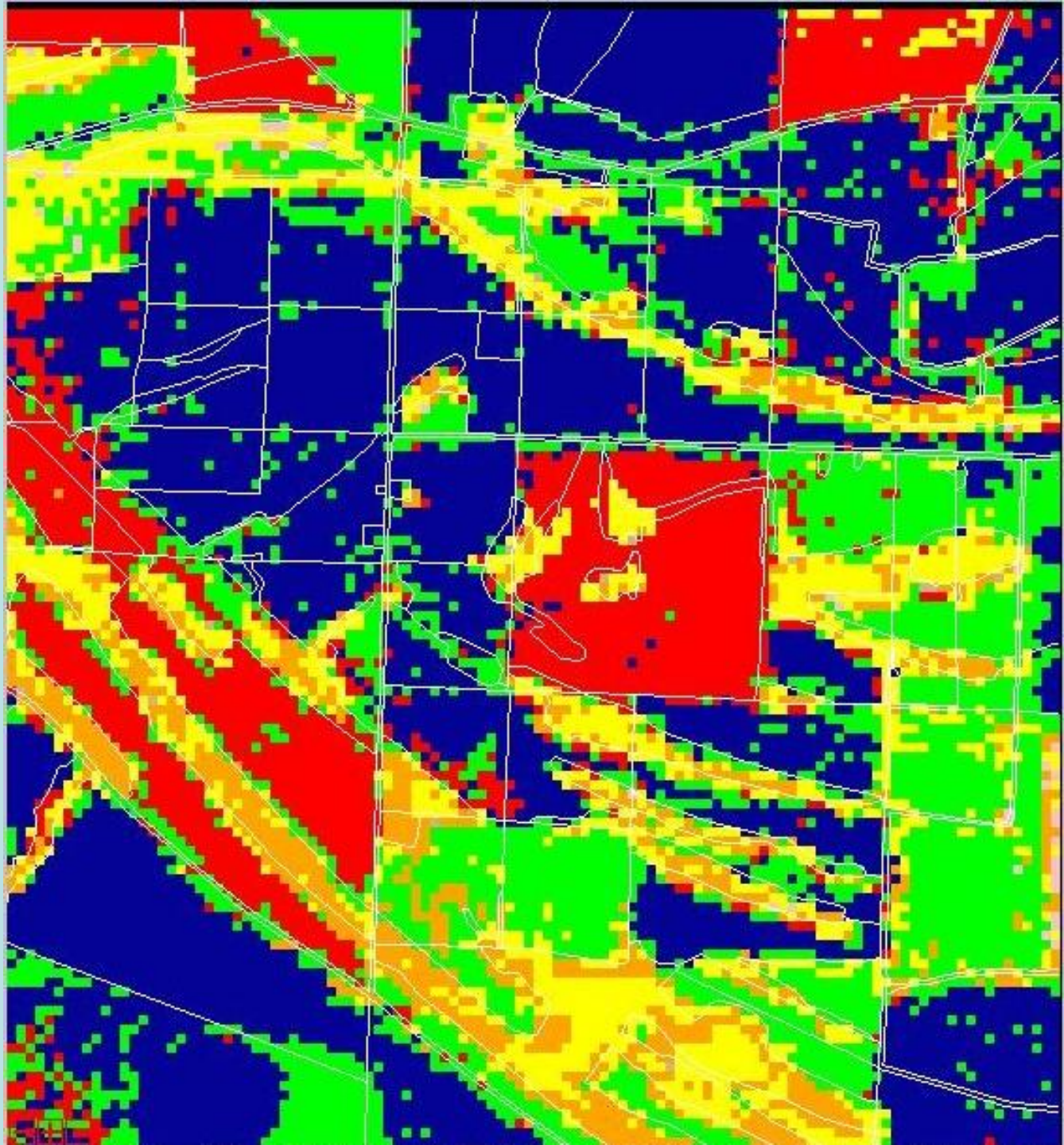
Methods

- RSP/Peditor, the USDA-NASS public domain software, is used to produce acreage estimates and classified images for the Cropland Data Layer program.
- ENVI 4.2/IDL® is used to capture field-level classification data.
- SAS ® is used to convert the ENVI output to a database and run queries on the data.

Bolivar County CDL 2005 with Field Polygon Overlay in White

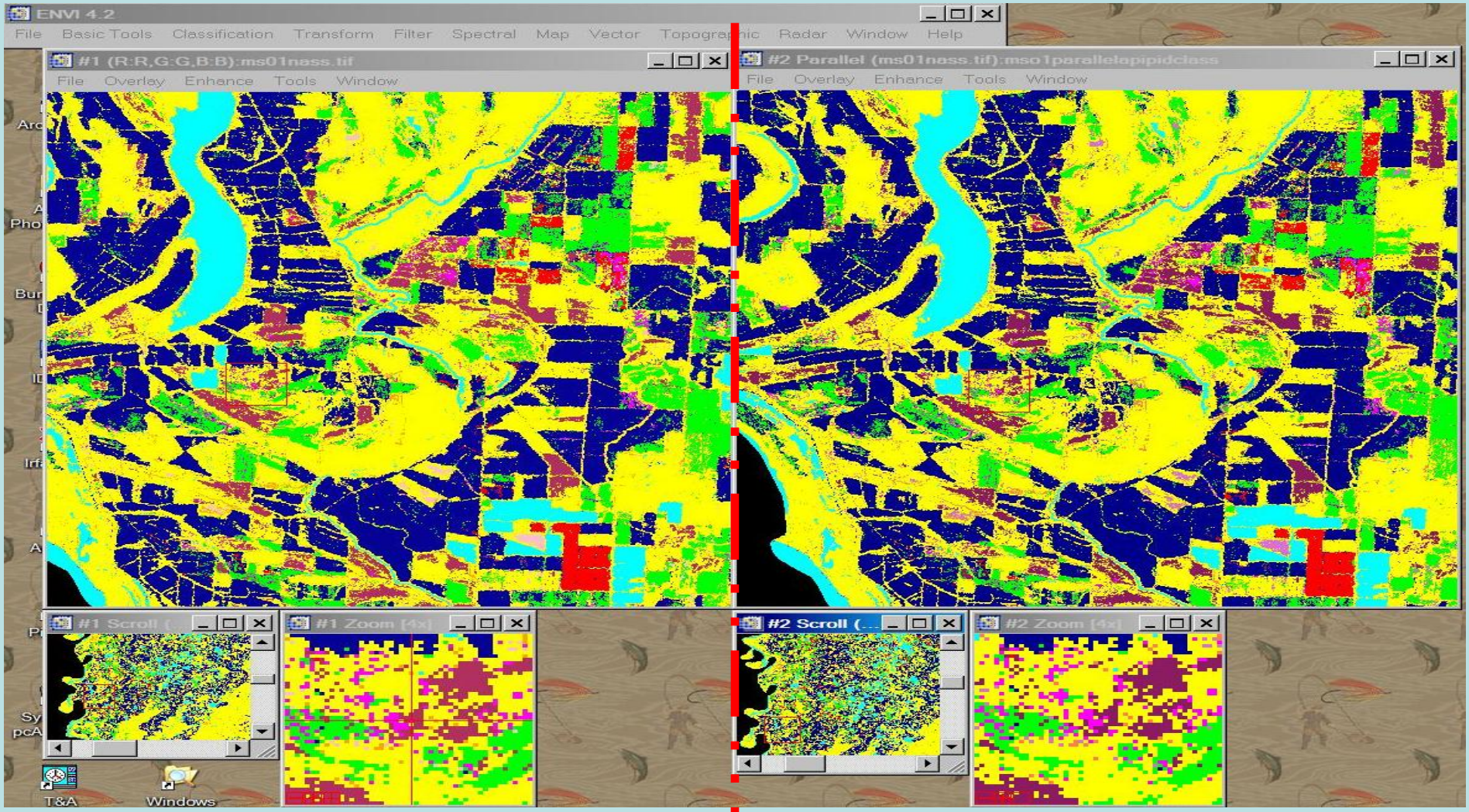


Field Level Overlay of MS CDL05 Bolivar County



CDL Reclassification Using ENVI

CDL Mosaic | ENVI Result



Field Level CDL ENVI Data Extraction

Bolivar County had 15,203 fields in 2005

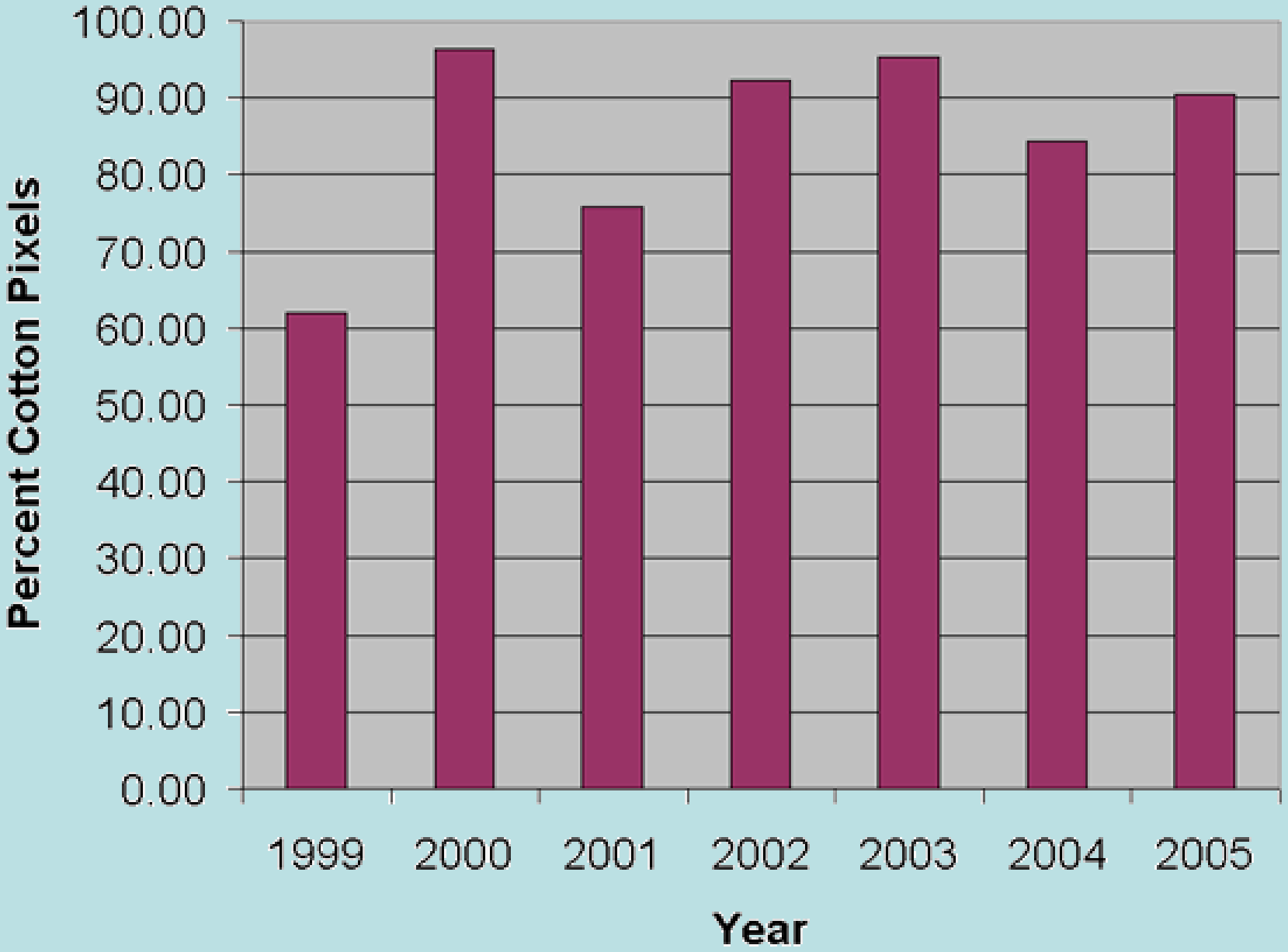
MS05 Output Stats, 8/21/06

ImageFile Name: C:\RSI\CLASSSTATS\MS05ENVIClass

ShapeFile Name:C:\RSI\CLASSSTATS\Bolivar05\clu_a_MS011.shp

Field:			1	282TPixels
Class	Pixels	AccPixels	Percent	Acc Percent
Uncl	0	0	0.000000	0.000000
Corn	0	0	0.000000	0.000000
Cott	255	255	90.425529	90.425529
Rice	0	255	0.000000	90.425529
Sorg	0	255	0.000000	90.425529
Soyb	24	279	8.510638	98.936165
Hay/	0	279	0.000000	98.936165
Fall	0	279	0.000000	98.936165
Tree	1	280	0.354610	99.290771
Clou	0	280	0.000000	99.290771
Urba	2	282	0.709220	99.999992
Wate	0	282	0.000000	99.999992

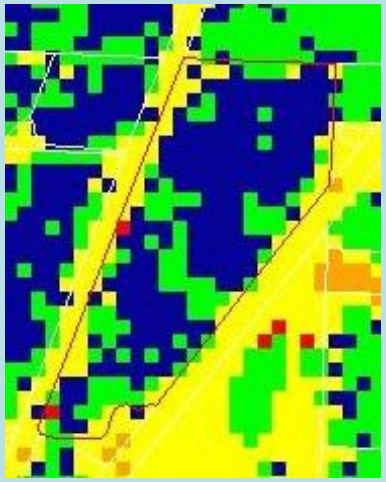
Bolivar County Field 1 Cotton



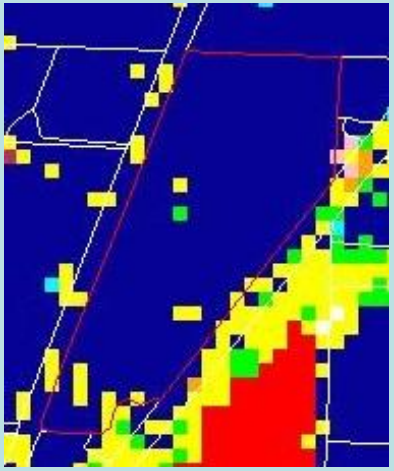
Field 1 by Year

Legend

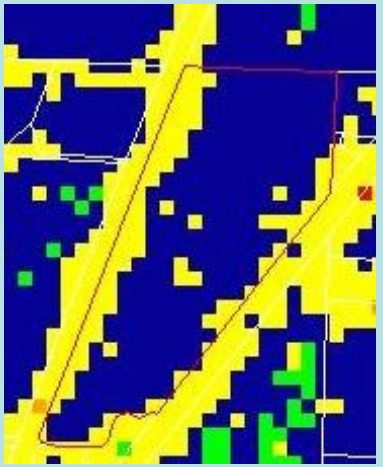
CROPS
- Corn
- Cotton
- Rice
- Sorghum
- Soybeans
- Hay/Other Crops
- Fallow/Idle Cropland
- Trees/Pasture/Non-Ag
- Clouds
- Urban
- Water



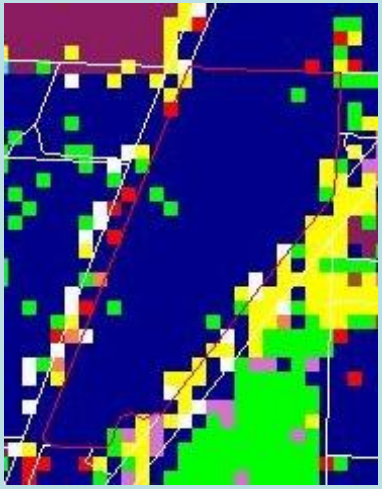
1999



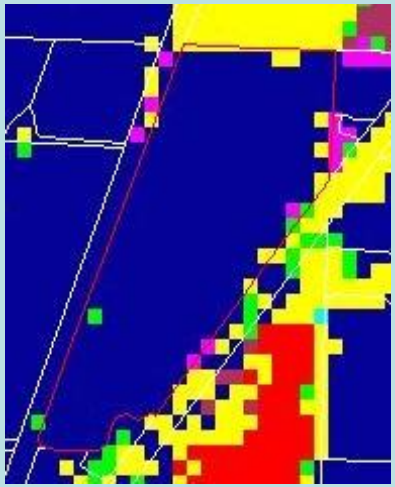
2000



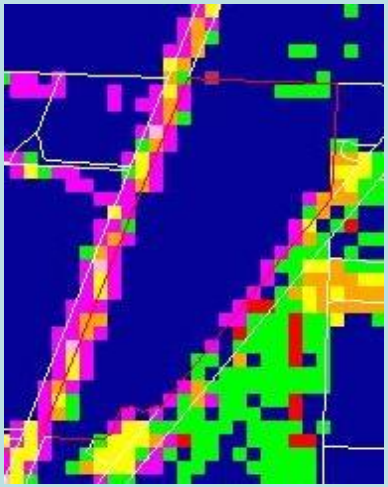
2001



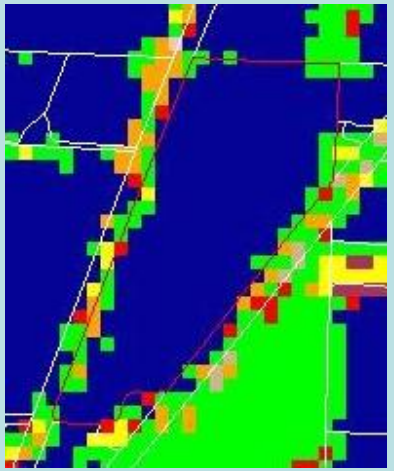
2002



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	cotton_percent1999	cotton_percent2000	cotton_percent2001	cotton_percent2002	cotton_percent2003	cotton_percent2004	cotton_percent2005	cotton_use1999	cotton_use2000	cotton_use2001	cotton_use2002	cotton_use2003	cotton_use2004	cotton_use2005
363	946	31.73	92.65	80.32	13.25	88.35	97.99	93.57	.	c	c	.	c	c	c
373	956	57.04	93.92	88.17	3.74	94.40	93.77	94.27	c	c	c	.	c	c	c
375	958	56.26	98.27	90.59	2.48	95.97	96.11	95.82	c	c	c	.	c	c	c
376	959	53.85	100.00	53.85	0.00	84.62	76.92	76.92	c	c	c	.	c	c	c
384	970	50.78	95.38	85.94	11.52	99.41	2.15	4.69	c	c	c	.	c	.	.
385	971	2.20	66.67	75.82	9.89	6.59	0.00	0.00	.	c	c	.	.	.	.
405	999	41.92	94.01	6.59	6.59	98.20	1.80	0.60	.	c	.	.	c	.	.
406	1000	1.69	98.37	40.68	5.93	98.31	0.00	5.09	.	c	.	.	c	.	.
420	1020	0.00	0.00	78.17	88.33	93.40	88.33	86.29	.	.	c	c	c	c	c
422	1022	0.00	1.28	55.70	5.06	41.77	22.79	45.57	.	.	c	.	.	.	.
435	1036	38.24	5.58	68.07	96.22	97.06	91.18	91.60	.	.	c	c	c	c	c
436	1037	17.39	4.35	78.26	100.00	100.00	60.87	82.61	.	.	c	c	c	c	c
447	1048	57.55	0.00	61.32	93.87	99.06	92.45	98.11	c	.	c	c	c	c	c
450	1051	0.00	1.35	84.53	91.72	96.73	84.53	94.77	.	.	c	c	c	c	c

SAS Query Cotton and Corn Rotation

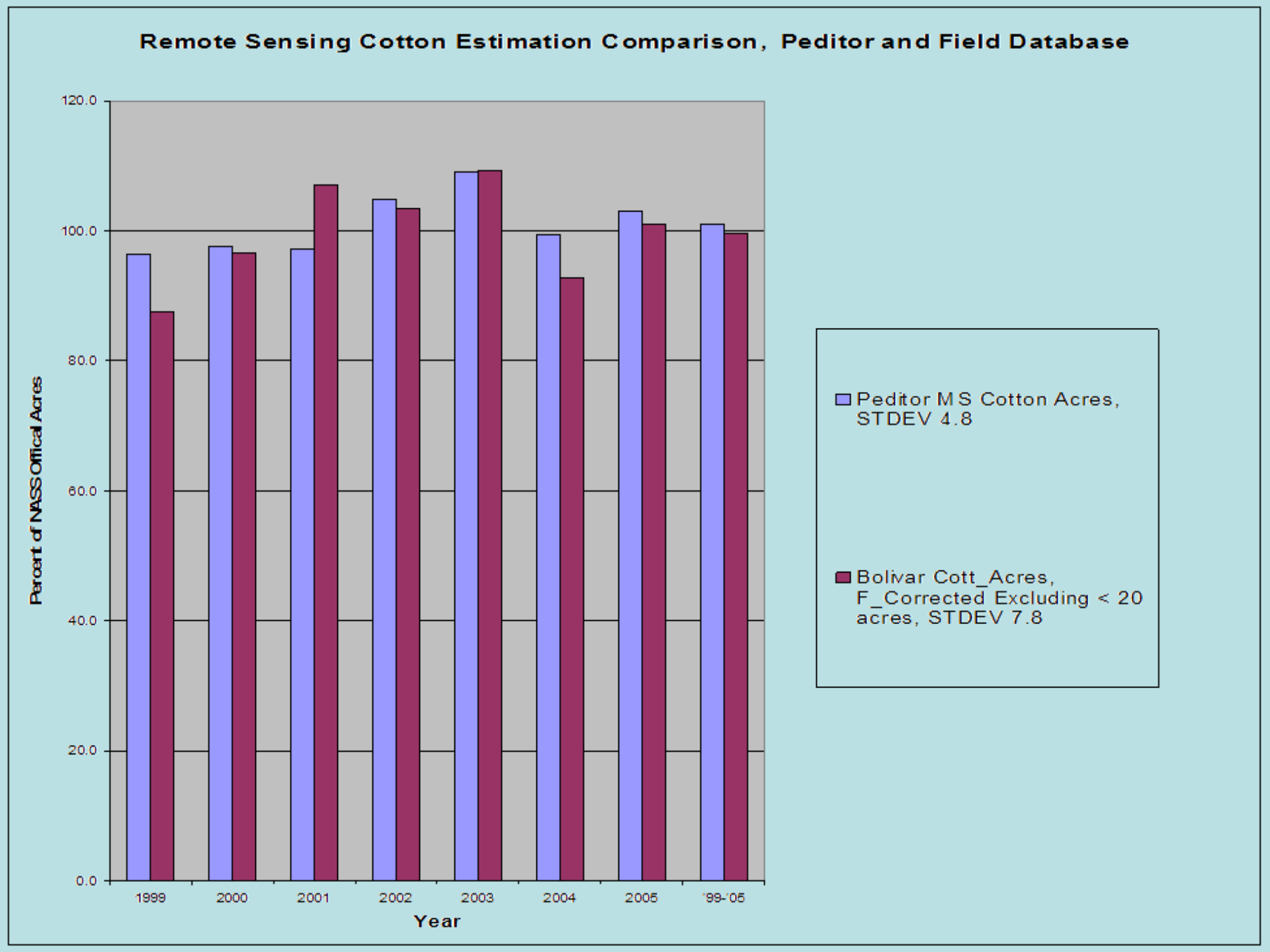
count_1990	count_1991	count_1992	count_1993	count_1994	count_1995
c	c	c	c	c	c
c	c	c	c	c	c
c	c	c	c	c	c
c	c	c	c	c	c
c	c	c	c	.	.
.	c	c	.	.	.
.	c	.	.	c	.
.	c	.	.	c	.
.	.	c	c	c	c
.	.	c	.	.	.
.	.	c	c	c	c
.	.	c	c	c	c
c	.	c	c	c	c
.	.	c	c	c	c

count_1990	count_1991	count_1992	count_1993	count_1994	count_1995
.	.	.	C	.	.
.	.	.	C	.	.
.	.	.	C	.	.
.	.	.	C	.	.
.	.	.	.	C	.
.	.	.	C	.	.
.	.	.	C	.	.
.	.	.	C	.	.
.	C	.	.	.	.
.	C	.	.	.	.
.	C	.	.	.	.
.	C	.	.	.	.
.	C	.	.	.	.
.	C	.	.	.	.

Output - (Untitled)

Cotton Acres By Field Classification 1
Clou A, Corn C, Cott c, Fall F, Hay H, Rice R
Sorg S, Soyb s, Tree T, Uncl u, Urba U, Wate W
An underscore '_' indicates no category was >= 50 Percent
This Listing Includes ONLY Fields with at least one Year of Cotton >= 50 Percent
Bolivar: First 40 Observations in the Data Set
INCLUDES EVERY SIZE Cotton Fields
13:34 Friday, March 23, 2007

Obs	year	_FREQ_	freq_var	CALCACRES	Cott_Acres
1	1999	5382	-Total-	195,832.89	45,922.52
2	1999	263	ccccccc	14,357.35	9,963.06
3	1999	218	scccccc	11,763.43	3,376.18
4	1999	89	sscssss	4,752.95	317.13
5	1999	47	_cccccc	2,332.59	880.46
6	1999	47	ccccccs	1,443.80	1,031.02
7	1999	44	ssc_sss	3,339.83	321.81
8	1999	41	cccccsc	1,625.86	1,116.87
9	1999	30	ccTcccc	786.65	536.64
10	1999	28	scccccs	1,044.65	261.31
11	1999	27	sscccccc	1,945.63	259.98
12	1999	24	scTcccc	371.78	115.65
13	1999	23	sRcRsss	1,133.04	105.42
14	1999	20	scccccsc	1,695.07	463.25
15	1999	19	scccccss	327.22	81.40
16	1999	19	sscscss	813.23	60.05
17	1999	17	cccccss	491.22	317.36
18	1999	17	sscRsss	1,139.06	79.62
19	1999	16	ssc_css	632.48	60.27
20	1999	14	Rscssss	793.44	4.23
21	1999	14	_cTcccc	307.48	119.43
22	1999	14	csTssss	530.57	322.92
23	1999	14	sCcccccc	870.96	153.67
24	1999	14	sRcsRss	907.97	59.16
25	1999	14	sscRssR	939.77	141.22
26	1999	14	sscs_ss	852.99	27.58
27	1999	14	sscssHs	871.35	40.92
28	1999	13	Tsccccc	834.42	2.00
29	1999	13	sRsRssc	729.22	72.95
30	1999	13	ucuuuuu	5.04	0.00
31	1999	12	cc_cccc	542.36	359.17
32	1999	12	sRcssss	336.04	19.35
33	1999	12	sRsRcss	666.79	103.86
34	1999	12	ssccsss	825.09	24.02
35	1999	12	sscss_s	439.93	14.23
36	1999	11	s_cssss	379.61	12.23
37	1999	11	ss_scss	291.15	67.16
38	1999	11	ssc__ss	303.99	43.37
39	1999	11	sscccss	513.05	55.15
40	1999	11	ssccsss	377.86	42.92


Remote Sensing Cotton Estimation Comparison, Peditor and Field Database
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Percent of NASS Offical Acres
1999
2000
2001
2002
2003
2004
2005
'99-'05
Year
Peditor MS Cotton Acres, STDEV 4.8
Bolivar Cott_Acres, F_Corrected Excluding < 20 acres, STDEV 7.8

Multiyear Data from the Mississippi Cropland Data Layer Classifications

Results

- A field database of pixel count extractions of the Cropland Data Layer per year for 7 years was obtained.
- For Bolivar County, 1999-2005:
  - The frequency of single year land use for cotton was greatest in 2001 (56.06% of the fields with >50% cotton). This unusual planting of cotton coincides with the 1996 Farm Bill ending in 2001.
  - About 16% of the cotton acres per year are from the same fields.
  - A total of about twice the acres of the annual acreage estimate has cotton history.
  - Cotton acreage estimates per year from the database agree well with previous estimates.

Multiyear Data from the Mississippi Cropland Data Layer Classifications

Discussion

- This conversion of the spatial remote sensing classified values per field allows examination of multiyear data and reveals single year exceptions and multiyear trends that were not available through the traditional single year result .
- The published Cropland Data Layers for Mississippi and other states can be obtained from USDA-NASS by calling (800) 727-9540 and on-line from www.mdac.state.ms.us and from http://www.nass.usda.gov/research/Cropland/SARS1a.htm.

Acknowledgements

Commissioner Lester Spell, Jr., D.V.M., Mississippi Department of Agriculture and Commerce, Dr. Vance H. Watson, Interim Director, Mississippi Cooperative Extension Service, and the USDA Field Enumerators in Mississippi were critical to the success of this project. Also, thank you to Andy Pursch of ITT for IDL programs and ENVI training.