

**David M. Johnson**  
Geographer

**United States Department of Agriculture  
National Agricultural Statistics Service  
Research and Development Division  
Spatial Analysis Research Section**

# **NASS Geospatial Activities**



# Discussion Points

- National Agricultural Statistics Service (NASS)
  - Role, Mission
  - Research and Development Division
- Spatial Analysis Research Section (SARS)
  - Florida Citrus GIS
  - Extreme event monitoring
  - Crop Condition / Progress
  - Crop Yield
  - Map products
  - Regression-based Acreage Estimates
- Cropland Data Layer (CDL)
  - Resourcesat-1 AWiFS Imagery
  - Ground Truth
  - Methods
  - Kentucky

# NASS Overview

Provider of timely, accurate, and useful statistics in service to U.S. agriculture

NASS - Data and Statistics - Microsoft Internet Explorer

Address: http://www.nass.usda.gov/Data\_and\_Statistics/index.asp

USDA National Agricultural Statistics Service

The 2002 Census of Agriculture is the most comprehensive source of statistics portraying our nation's agriculture

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You are here: Home / Data and Statistics

**Data and Statistics**

Quick Stats (Agricultural Statistics Data Base)

NASS publishes U.S., state, and county level agricultural statistics for many commodities and data series. Quick Stats offers the ability to query by commodity, state(s) and year(s), providing the most up-to-date statistics including all revisions. The query dataset can be downloaded for easy use in your database or spreadsheet.

I Want To...

- Query NASS Data from a Data Base
- Search for Data by Commodity
- Request a Special Tabulation
- Contact a Specialist
- View Data in Charts and Maps

About NASS Estimates

- Importance of Ag Estimates
- Understanding Crop Forecasts
- Foundation of Estimates
- Estimating Programs
- Citation Request

Also See

- NASS Publications
- Statistical Bulletins
- Pest Management
- Price Reactions
- State Ag Overview
- Track Records

Interactive Data

NASS provides a variety of tools for interacting with our Census datasets.

Interactive Statistical Maps for 2002 Census Highlights

Table Lens Application for 1997 Census Data

Last modified: 12/30/05

NASS Home | USDA.gov | FEDSTATS | Economics Statistics System (ESS) | Site Map  
FOIA | Accessibility Statement | Privacy Policy | Non-Discrimination Statement | Information Quality | FirstGov | White House

2001 Wildlife Damage Survey

7.7 Percent of Crop Value Lost to Deer and Geese

Maryland farmers lost \$17.2 million of corn, soybeans and wheat to deer or geese during 2001, translates to Maryland farmers losing 7.7 percent of the crop value to deer and geese. Soybean acres for the greatest economic loss, totaling \$9.1 million, 11 percent. Corn losses were \$6.6 million, 5.8 percent and wheat \$1.5 million, 5.6 percent. Deer damage resulted in losses of \$13.6 million, 6.1 percent, while geese losses were \$3.6 million, 1.6 percent.

Production losses totaled 6.0 million bushels. Corn losses were 3.2 million bushels, soybean losses are 2.2 million bushels and wheat accounted for 0.6 million bushels. Production losses to deer were 4.7 million bushels and geese 1.3 million bushels.

In terms of yield, losses to deer were most severe in Central and Western Maryland, while geese damage greater on the Eastern Shore. Corn yield losses of 9.6 bushels per acre and 7.4 bushels per acre were reported in Central and Western Maryland, respectively. The Lower Eastern Shore reported the highest soybean loss of 6.1 bushels per acre.

Sixty-two percent of farms reported deer or geese damage to one or more crops. Damage was reported on percent of farms raising corn, 58 percent of farms growing soybeans and 27 percent of farms with wheat.

Maryland 2001 Crop Loss from Deer

Region	Crop	Acres Harvested	Harvested Yield (bushels)	Average Yield Loss (bushels)	Production Loss (bu)	Economic Loss (\$)
Western Maryland	Corn	9,500	124,4	7.4	40,100	83
	Soybeans	300	36.7	6.1	1,800	3.6
	Wheat	200	45.2	2.3	460	1
Central Maryland	Corn	114,200	984	9.9	1,101,200	2,473
	Soybeans	92,800	34.2	3.9	360,780	1,479
	Wheat	38,300	63.3	3.3	126,290	319
Southern Maryland	Corn	29,800	132.9	4.9	146,200	299
	Soybeans	43,200	39.0	3.3	142,260	334
	Wheat	16,000	57.0	0.9	14,400	36
Upper Shore	Corn	197,000	139.2	5.1	800,700	1,611
	Soybeans	232,000	39.8	2.4	896,000	2,262
	Wheat	84,800	64.0	1.1	99,280	213

USDA NEWS RELEASE

NATIONAL AGRICULTURAL STATISTICS SERVICE  
United States Department of Agriculture - Washington, DC 20250  
Ag Statistics Hotline: (800) 727-9540 • www.nass.usda.gov

Contact: Ellen Dougherty, (202) 690-8122  
Jeff Geuder, (202) 720-2127

USDA FORECASTS RECORD-SETTING CORN CROP FOR 2007

Washington, Aug. 10, 2007 – U.S. history in 2007, according to the Agriculture's National Agricultural Statistics Service, is 13.1 billion bushels, 10.6 percent above the 2006 record. Based on conditions as of August 10, 2007, the crop is expected to reach 13.1 billion bushels, up 3.7 bushels from last year. The 2007 crop is expected to be behind the 160.4 bushels per acre record set in 1996. Yield forecasts are higher than in 2006. Delta. Meanwhile, hot, dry conditions in the Eastern Corn Belt, Ohio Valley and the Southeast are expected to reduce yields in those areas.

WISCONSIN AGRICULTURAL STATISTICS SERVICE

P.O. Box 8034 Madison, WI 53708-8034

2002 Dairy Producer Opinion Survey

November 2002

Wisconsin Milk Production to Recover

Milk production is expected to increase in Wisconsin during the next few years according to a survey conducted by the Wisconsin Agriculture Statistics Service. This statewide survey of producers asked for their plans with the assumption that milk prices for the next five years will be at the same level as the past five years. The survey was conducted during May and June.

Based on the survey, 60 percent of producers expect to keep the same herd size, 20 percent plan to increase herd size, and 20 percent intend to discontinue milking by 2007. Actual results will depend on future milk prices, input prices, financing availability, crop yields, and other factors.

The number of herds projected for 2007 shows that the diversity of small to large herds will continue. The most prevalent herd size will remain at 50 to 99 cows.

http://www.nass.usda.gov:8080 - 2002 Census of Agriculture - SVG Interactive Mapping - United States - Microsoft Internet Explorer

National Agricultural Statistics Service 2002 Census of Agriculture

United States | All data items are from Chapter 2 - Table 1. Area Summary Highlights: 2002 Selected crops harvested - Land in orchards (acres)

State: United States - County Level | Data Item: Selected crops harvested - Land in orchards (acres)

United States Total: 5,330,439

State Total:

County Total:

Download data as CSV | XML | PDF

Help | Print | Return to

Legend

Scale: National | Zero or Data Withheld

(Changes the data range based on National or State level)

Comparisons: 6 | 20,000 | 40,000 | 60,001 to 80,000 | 80,001 to 100,000 | 100,001 +

Color: Green

Source: USDA-NASS 2002 Census of Agriculture © USDA-NASS 2005-2006

Navigate: Mouse-over a specific state/county to view the state/county level data. Right click to zoom (option-click for MAC users). Hold the Alt key and click+drag to pan. For additional assistance with this application, click here to view the support page.

All Milk Price, Wisconsin Annual Average, 1985 - 2002

Wisconsin Dairy Herds by Herd Size

Milk cow herd size	May 2002 herds	May 2007 herds (projected) %	Change 2007/2002
1 - 29	2,800	1,440	-45
30 - 49	4,700	3,440	-27
50 - 99	7,400	5,600	-24
100 - 199	1,900	2,080	+10
200 - 499	700	600	-29
500+	200	440	+120
Total	17,500	15,900	-20

1/7 The May 2007 projection is based on farmers' opinions May-June 2002, with the assumption that milk prices for the next five years will be at the same level as the past five years.

Percent of Herds by Size Group 2007 Projection

Legend: 1-29, 30-49, 50-99, 100-199, 200-499, 500+

Wisconsin Dairy Farmer Plans for May 2007 / by Herd Size

Herds	Keep same herd size	Increase herd size	Discontinue milking
2,800	47	17	36
4,700	71	9	20
7,400	63	19	18
1,900	53	37	10
700	33	59	8
200	22	78	0
17,500	62	29	20

1/7 The May 2007 projection is based on farmers' opinions May-June 2002, with the assumption that milk prices for the next five years will be at the same level as the past five years.

# Research and Development Division

## Geospatial Information Branch

NASS - Research and Science - Windows Internet Explorer

http://www.nass.usda.gov/Research\_and\_Science/index.asp

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NASS - Research and Science

USDA United States Department of Agriculture  
National Agricultural Statistics Service

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- Research and Science
- Education and Outreach

Statistics by State

Select a State

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### Research and Science

**Spatial Data**

Vegetation Condition Images

Cropland Data Layer

Image Gallery (2003) available for these states: Arkansas, Illinois, Indiana, Iowa, N. Dakota, Mississippi, Missouri, Nebraska, Wisconsin

Land Use Strata for Selected States

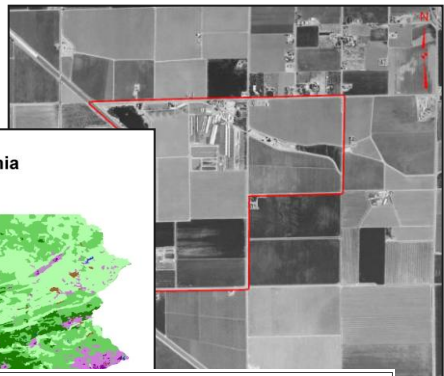
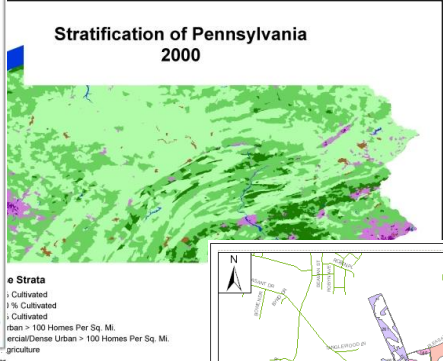
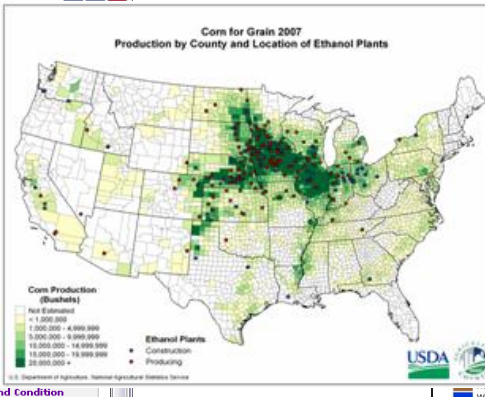
**Census of Agriculture**

2002 Census Map Gallery

2002 Maps: Gallery | Star Tree | List

Interact with Data (1997)

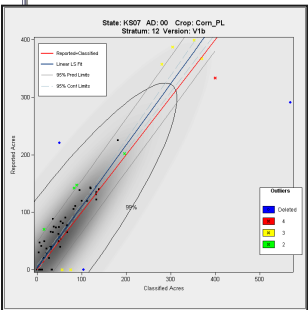
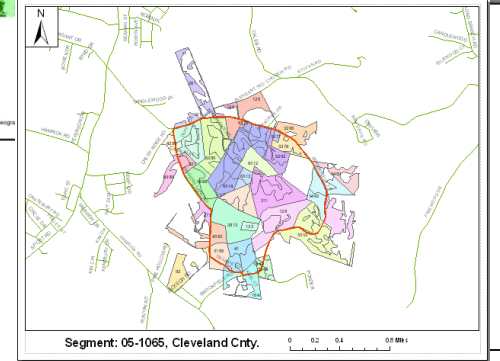
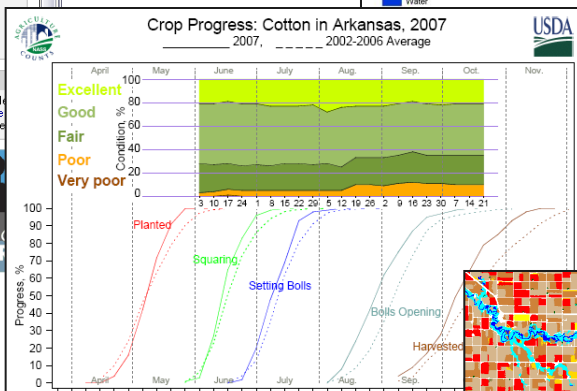
"Linked Micromap" Plots (1997):  
Corn | Cotton | Hay | Soybeans | Wheat



- Also See
- Research Associate F
  - Seasonal S
  - Progress and Condition
  - Remotely Sensed Data
  - Crop Acreage
  - Crop Yield
  - Future Vision

Media Help

To view animated map files you must have Quicktime installed on your computer.



ers and Presentations

733 archived reports available in the area: GIS | Survey | Yield

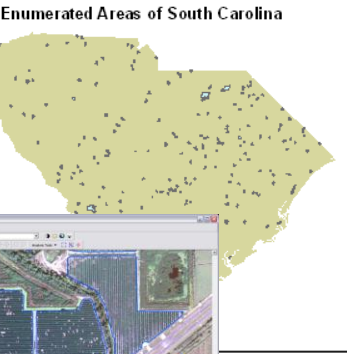
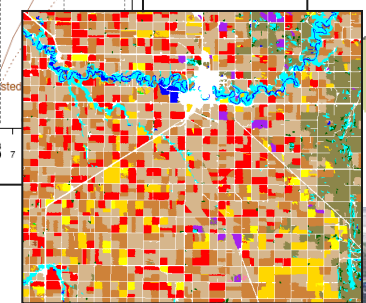
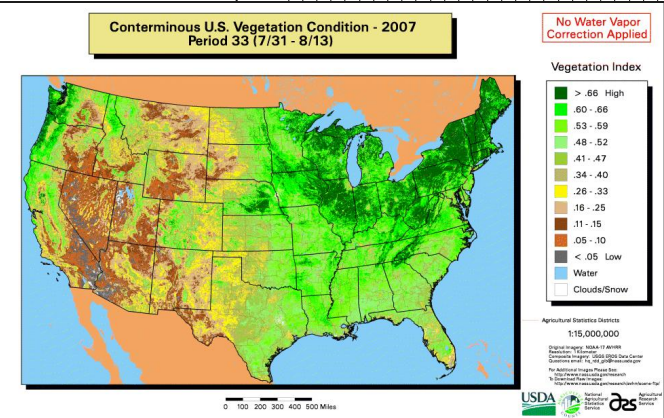
"Star Tree" Diagram

Presenter

Last modified

Statistics System (ESS) | Site Map

Non-Discrimination Statement | In





# Flood impacts on NASS June Acreage Survey “Segments”

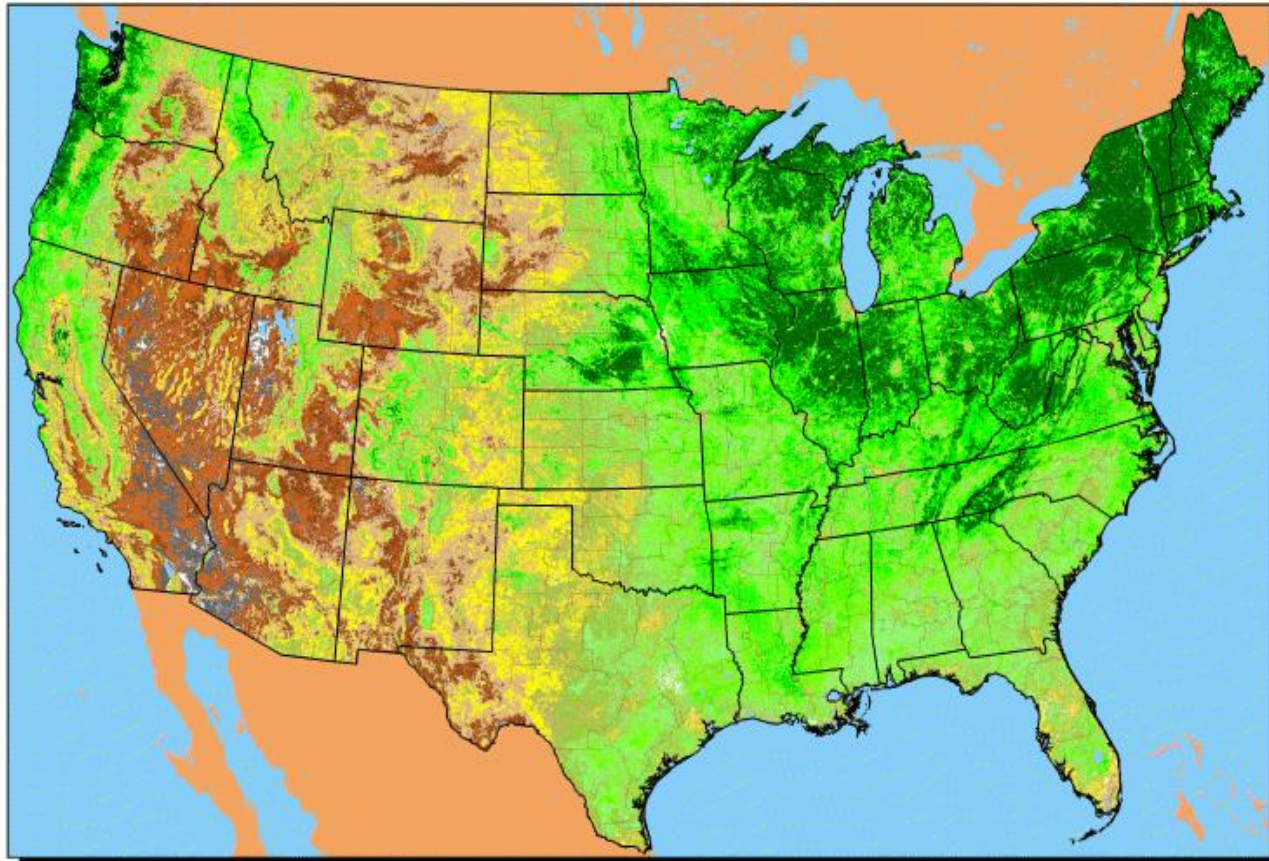


IRS-P6 AWiFS

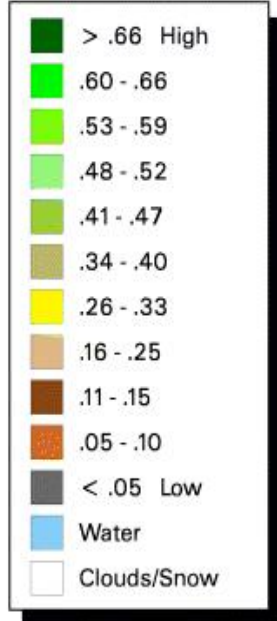
# Vegetation Condition

**Conterminous U.S. Vegetation Condition - 2007  
Period 33 (7/31 - 8/13)**

**No Water Vapor  
Correction Applied**



## Vegetation Index



Agricultural Statistics Districts

1:15,000,000

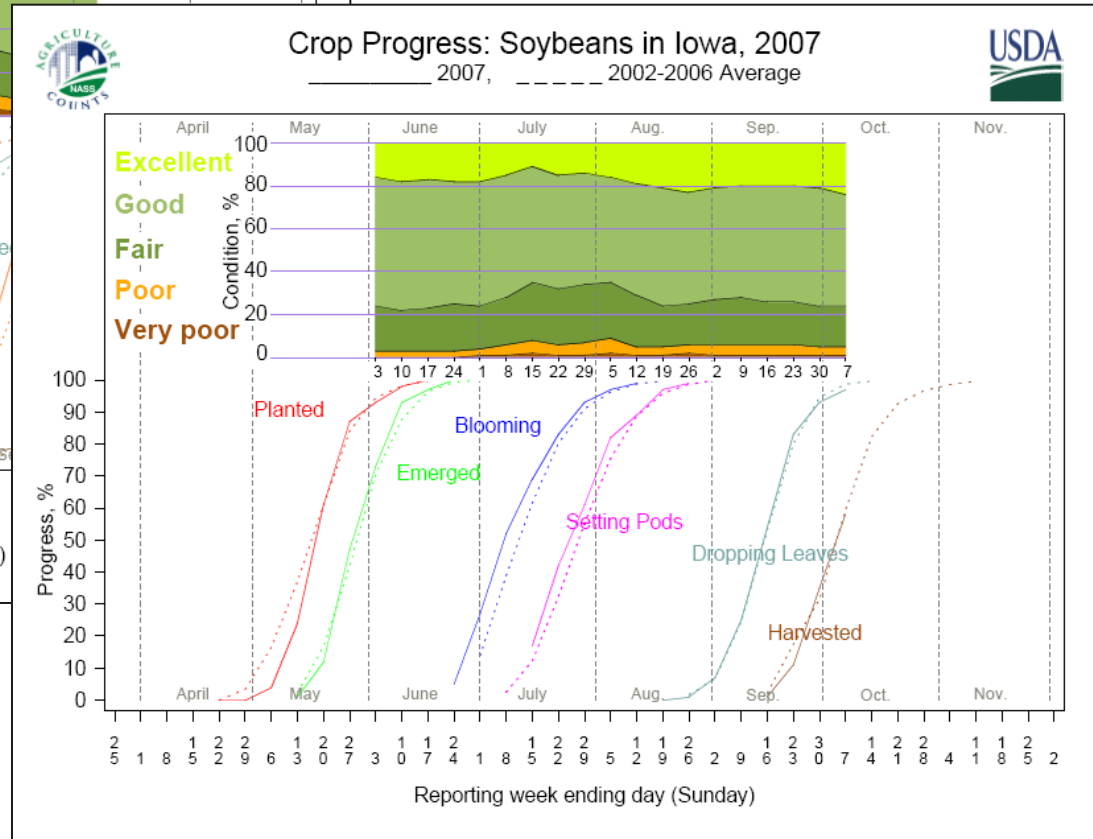
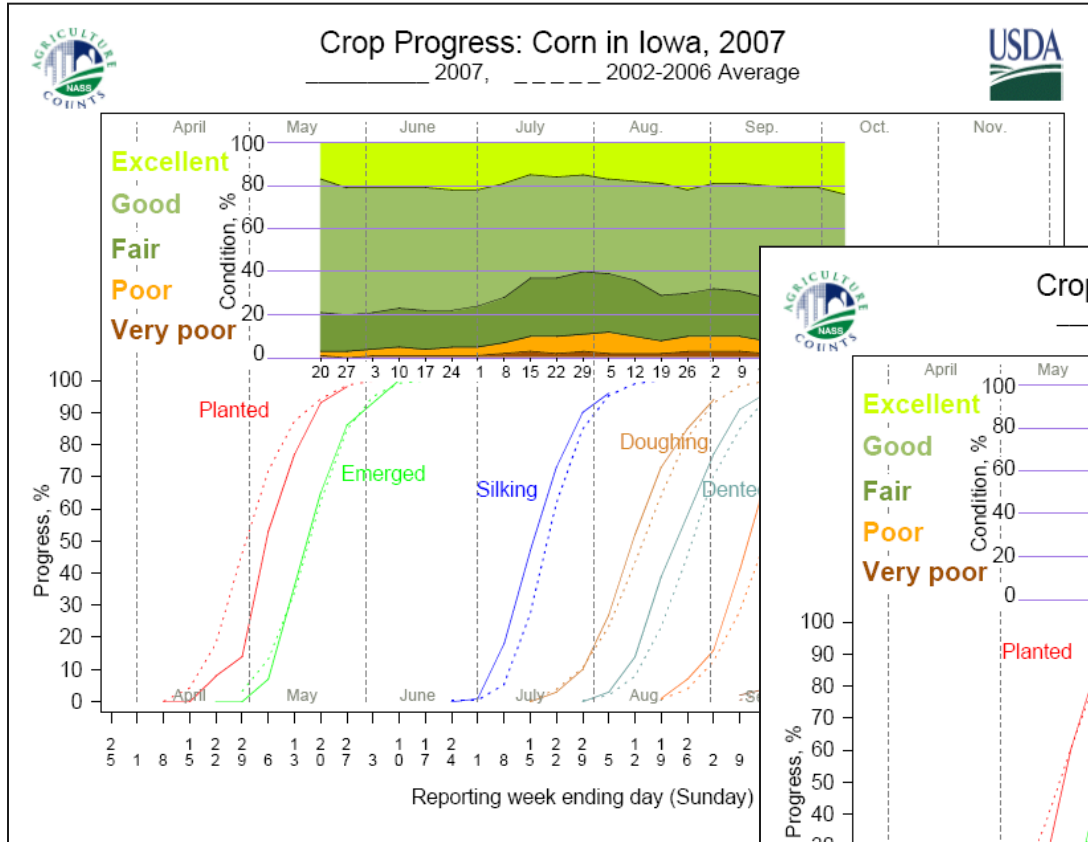
Original Imagery: NOAA-17 AVHRR  
Resolution: 1 Kilometer  
Composite Imagery: USGS EROS Data Center  
Questions email: [hq\\_rdd\\_gib@nass.usda.gov](mailto:hq_rdd_gib@nass.usda.gov)

For Additional Images Please See:  
<http://www.nass.usda.gov/research>  
To Download Raw Images:  
<http://www.nass.usda.gov/research/avhrr/scene-ftp/>

0 100 200 300 400 500 Miles



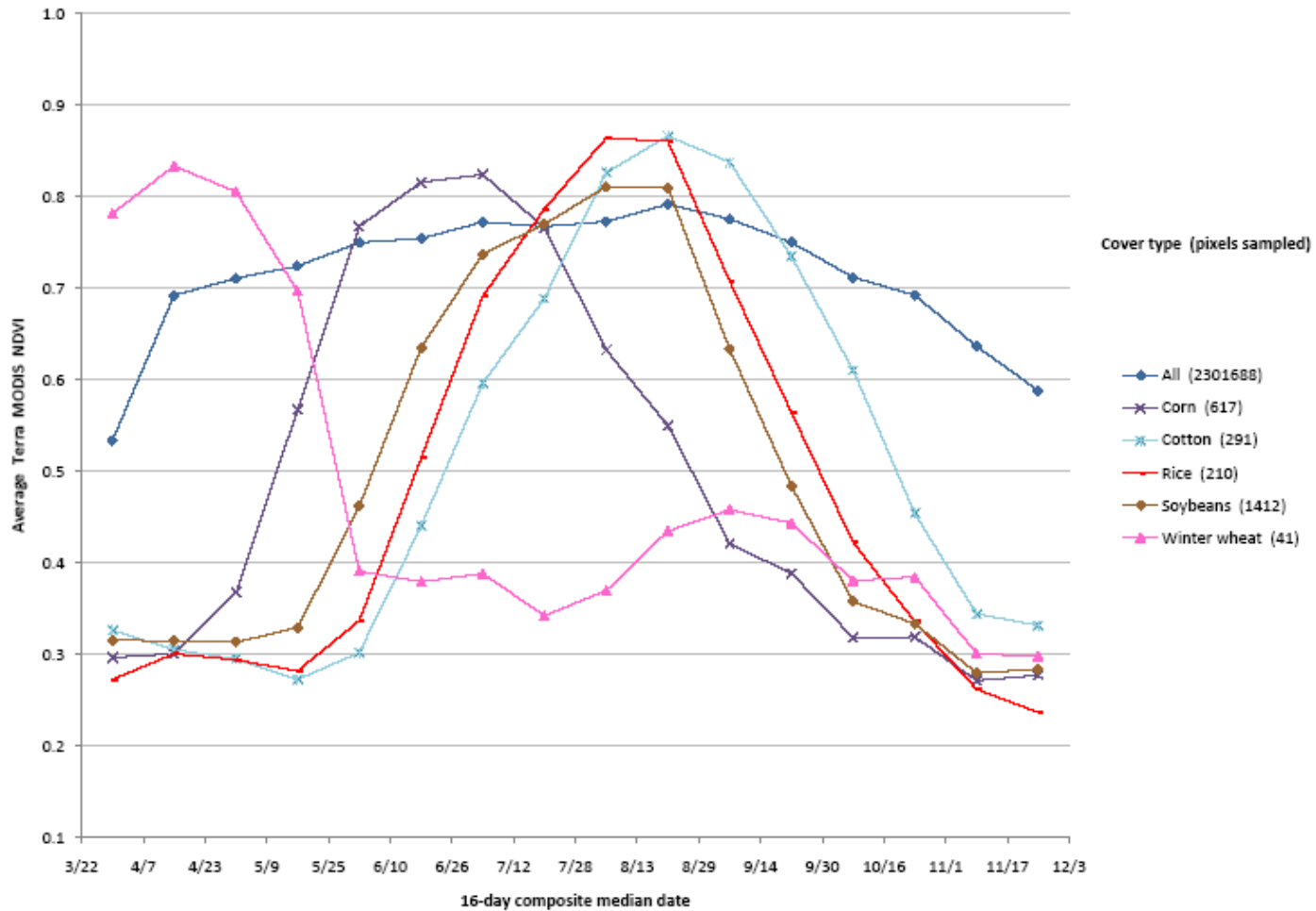
# Crop Progress



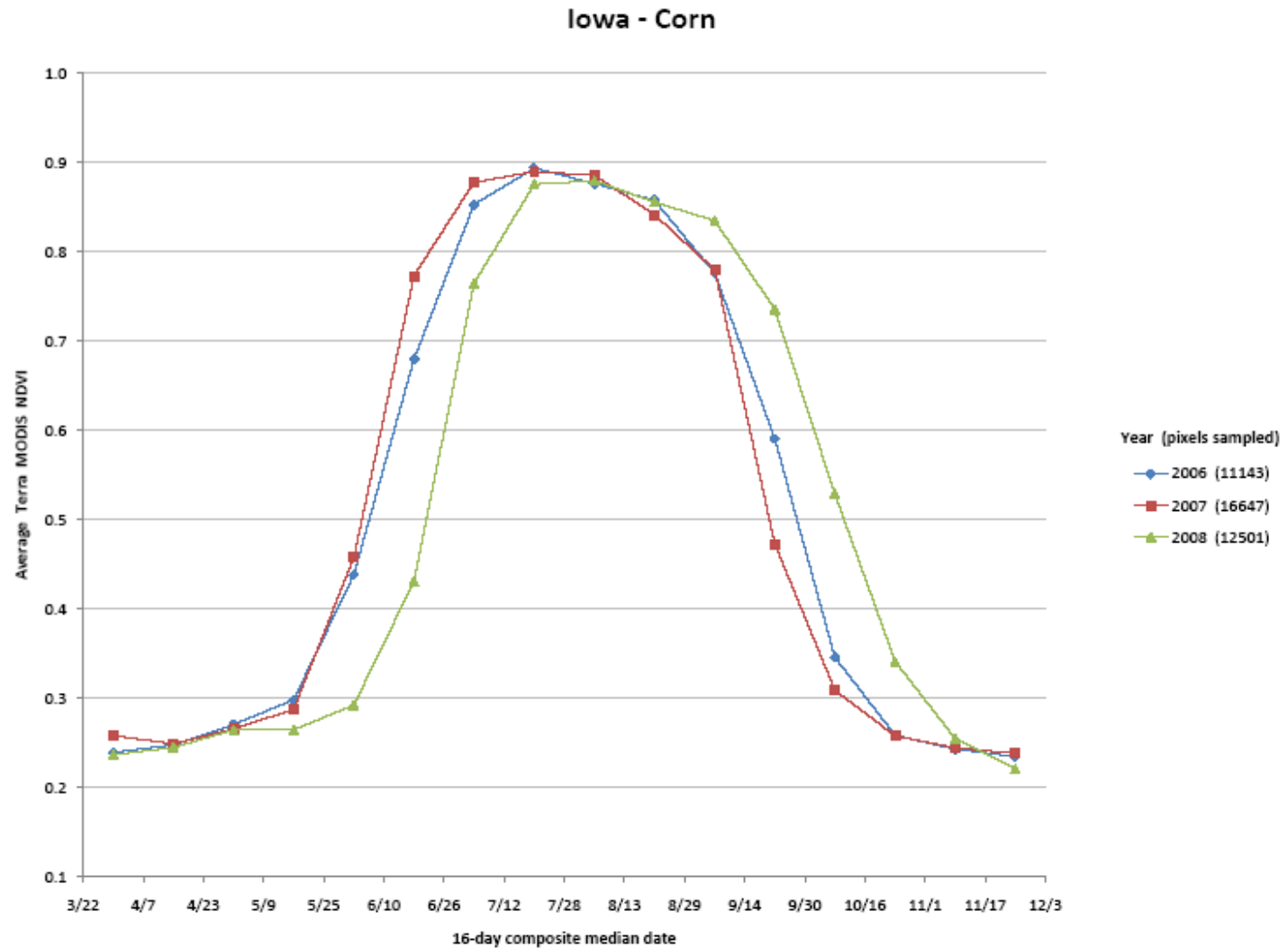


# Crop Phenology

Mississippi - 2008

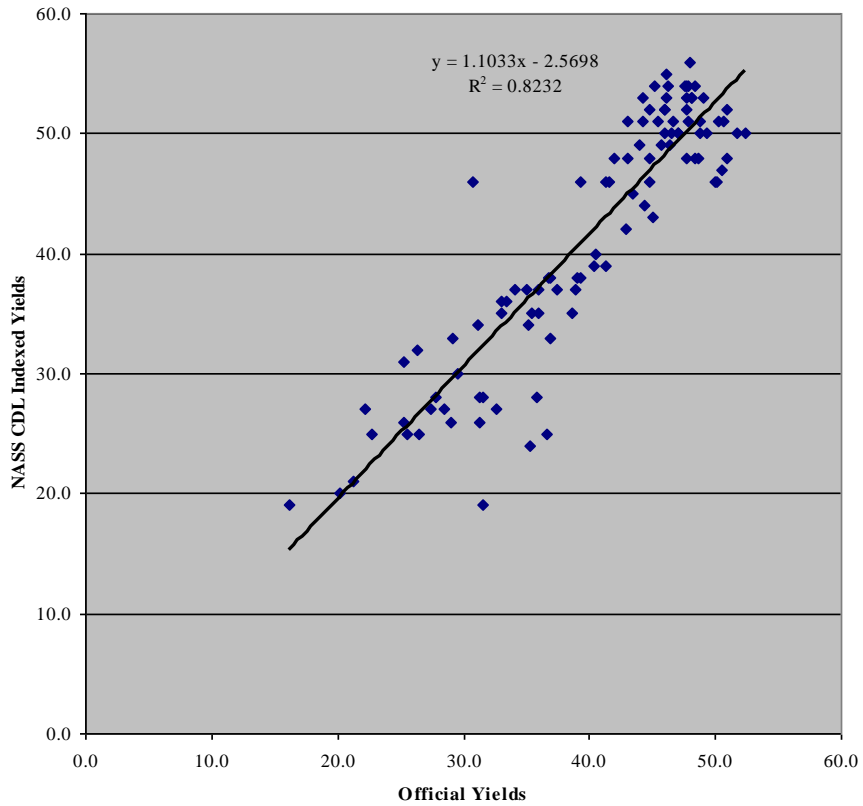


# Corn Phenology – Annual differences



# Yield

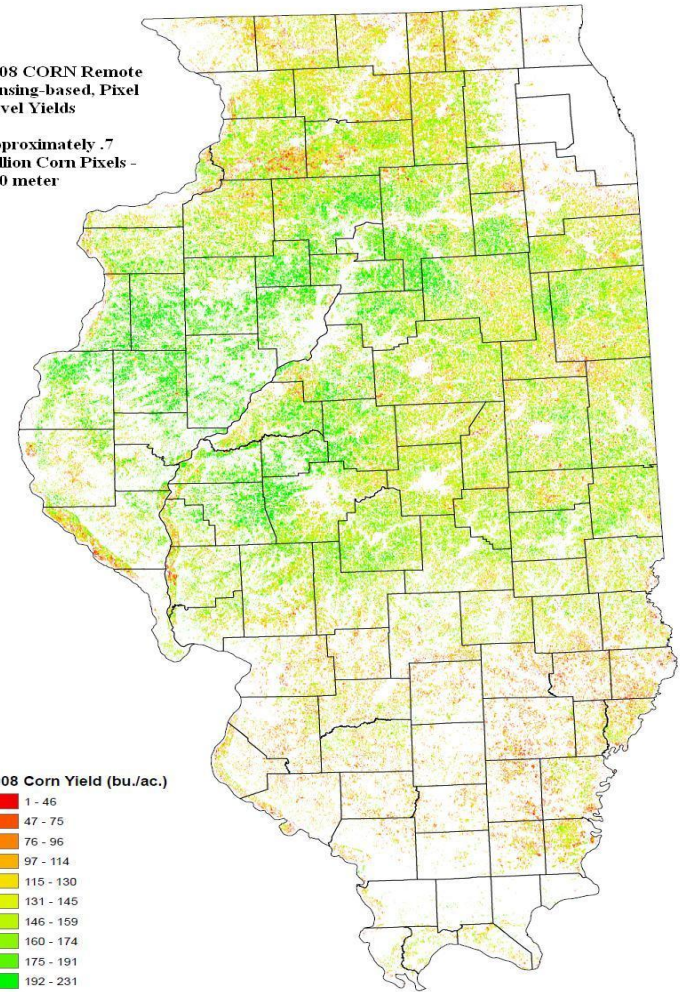
NASS CDL Indexed Yields vs. Official Yields  
Soybeans - 2007 Illinois



2008 CORN Remote Sensing-based, Pixel Level Yields

Approximately .7 million Corn Pixels - 250 meter

2008 Corn Yield (bu./ac.)



# Thematic Maps

Crop Progress and Condition Survey Data

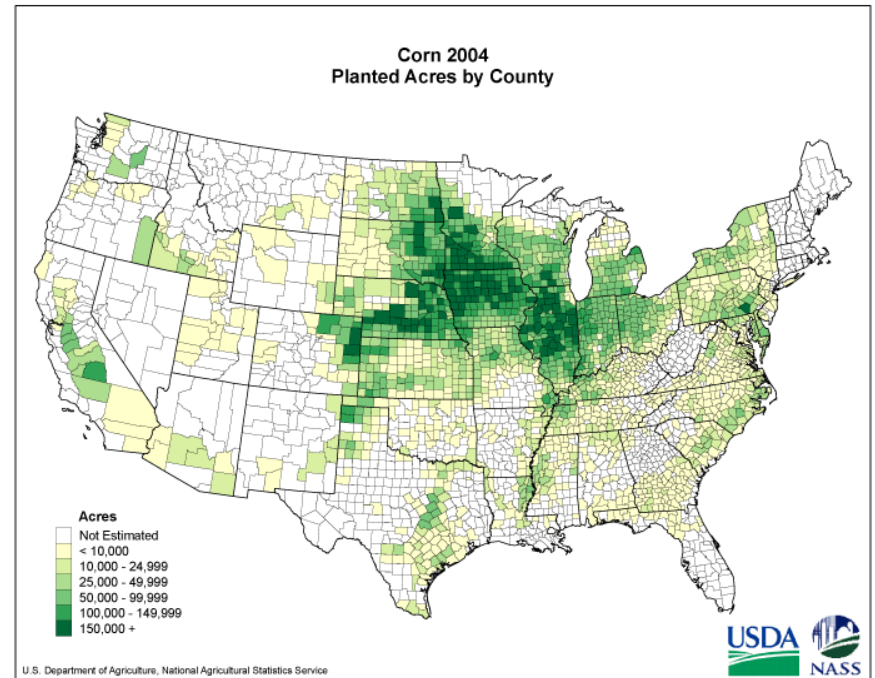
Monthly Ag Yield Survey Data

Objective Yield Survey Data

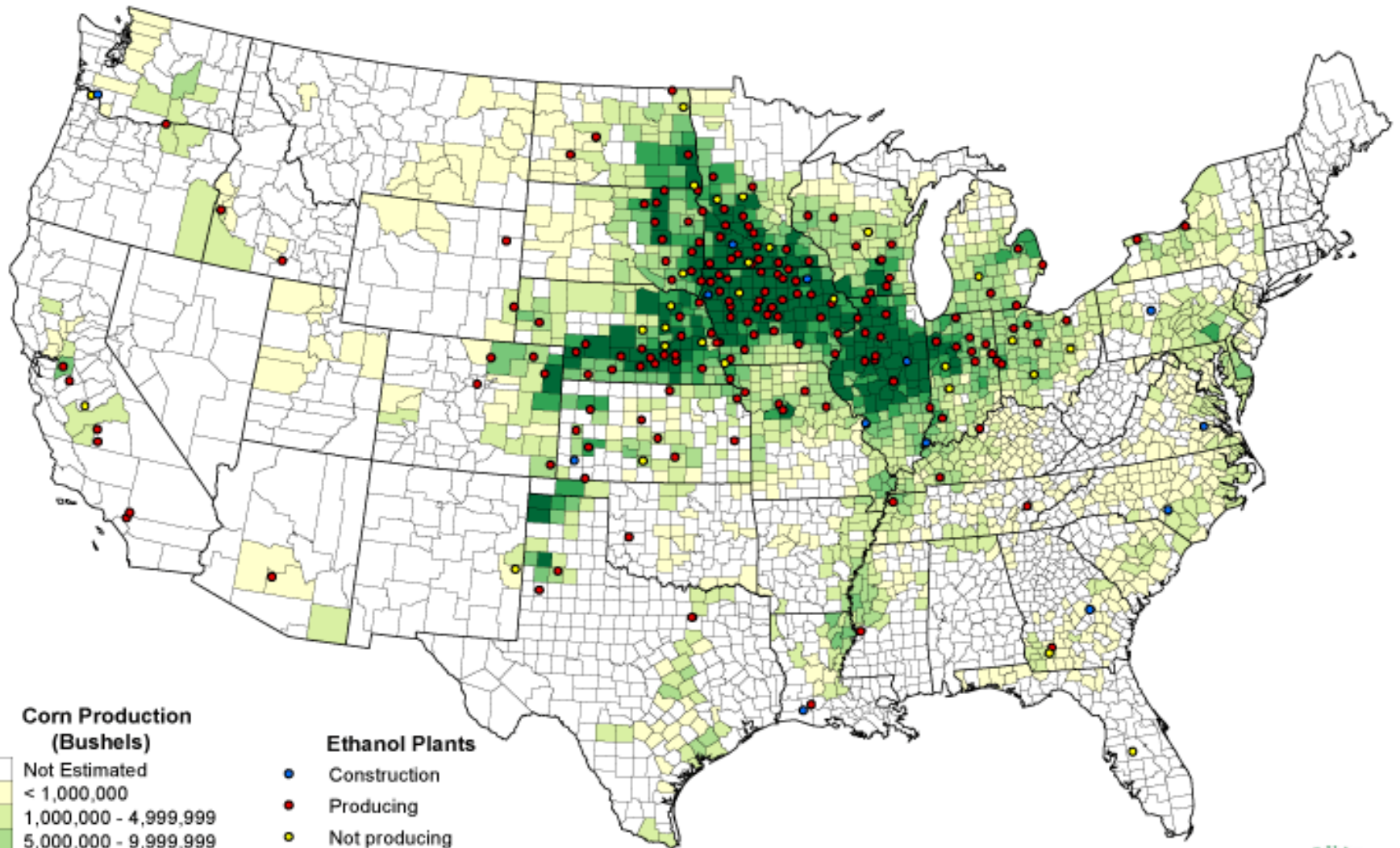
Crop Condition (AVHRR)

County Estimate Survey Data

2002/2007 Census of Agriculture



# Corn for Grain 2008 Production by County and Location of Ethanol Plants



**Corn Production  
(Bushels)**

- Not Estimated
- < 1,000,000
- 1,000,000 - 4,999,999
- 5,000,000 - 9,999,999
- 10,000,000 - 14,999,999
- 15,000,000 - 19,999,999
- 20,000,000 +

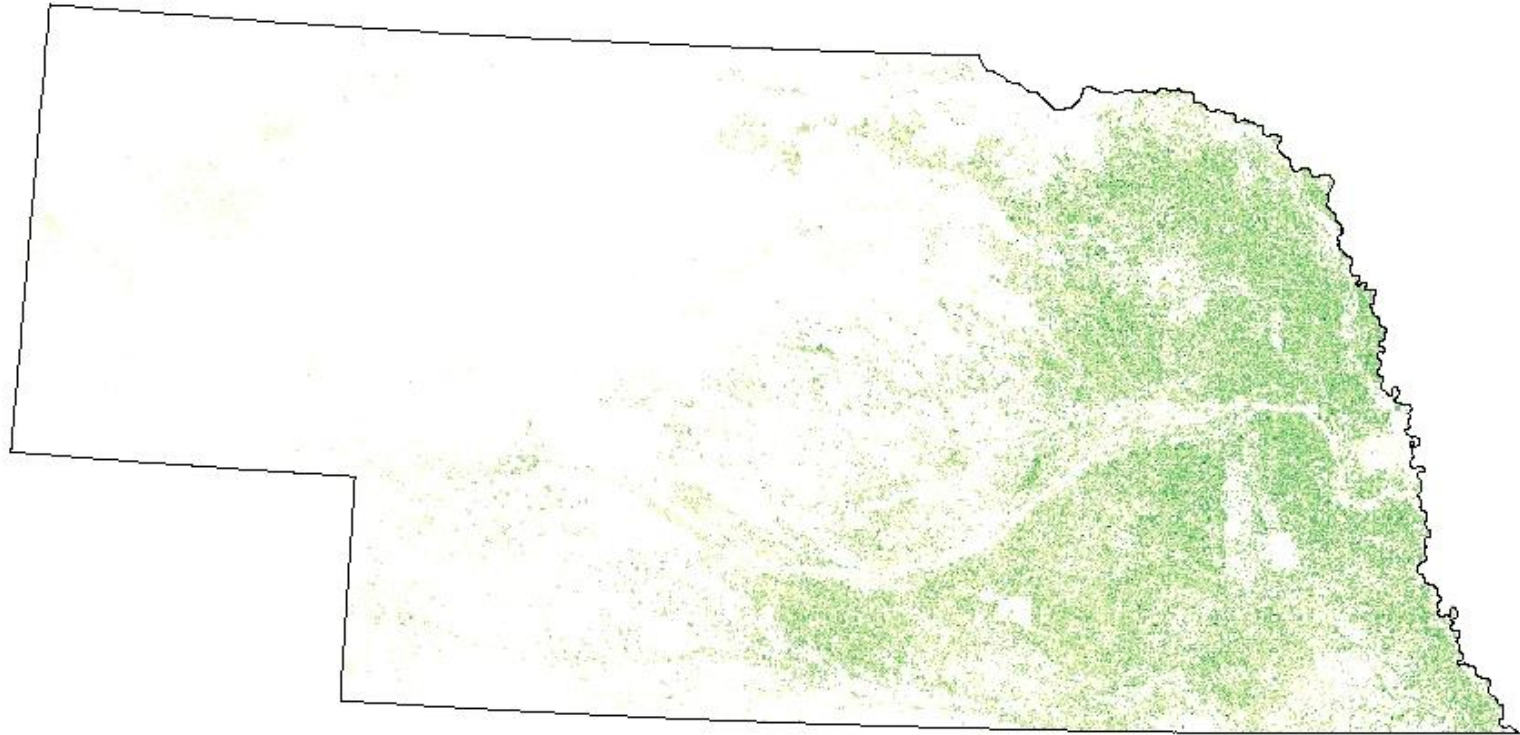
**Ethanol Plants**

- Construction
- Producing
- Not producing

# Nebraska

## Continuous Years of Soybean Planting 2003-2007

CDL  
Derivative  
Products



### Years Identified as Planted to Soybeans

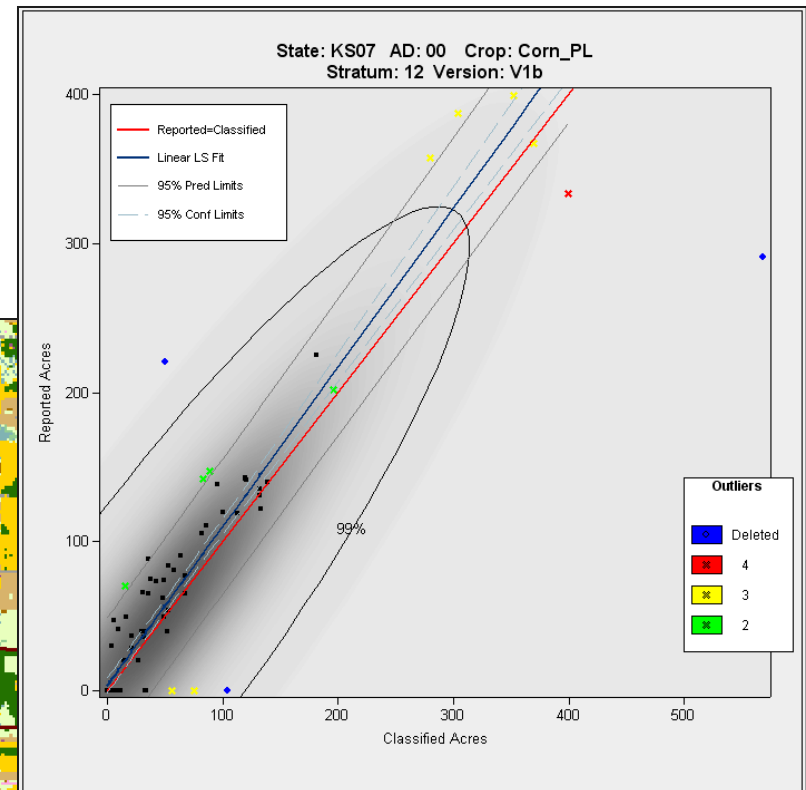
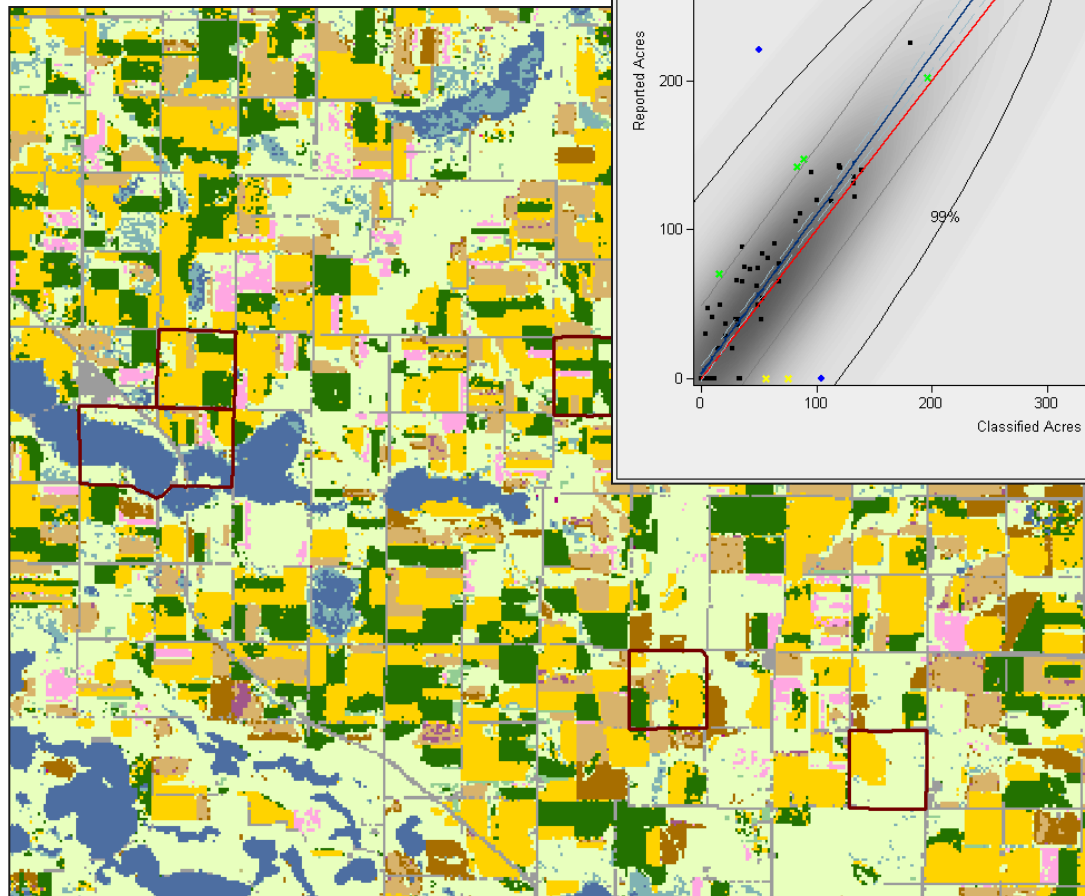


# Regression-based Acreage Estimator

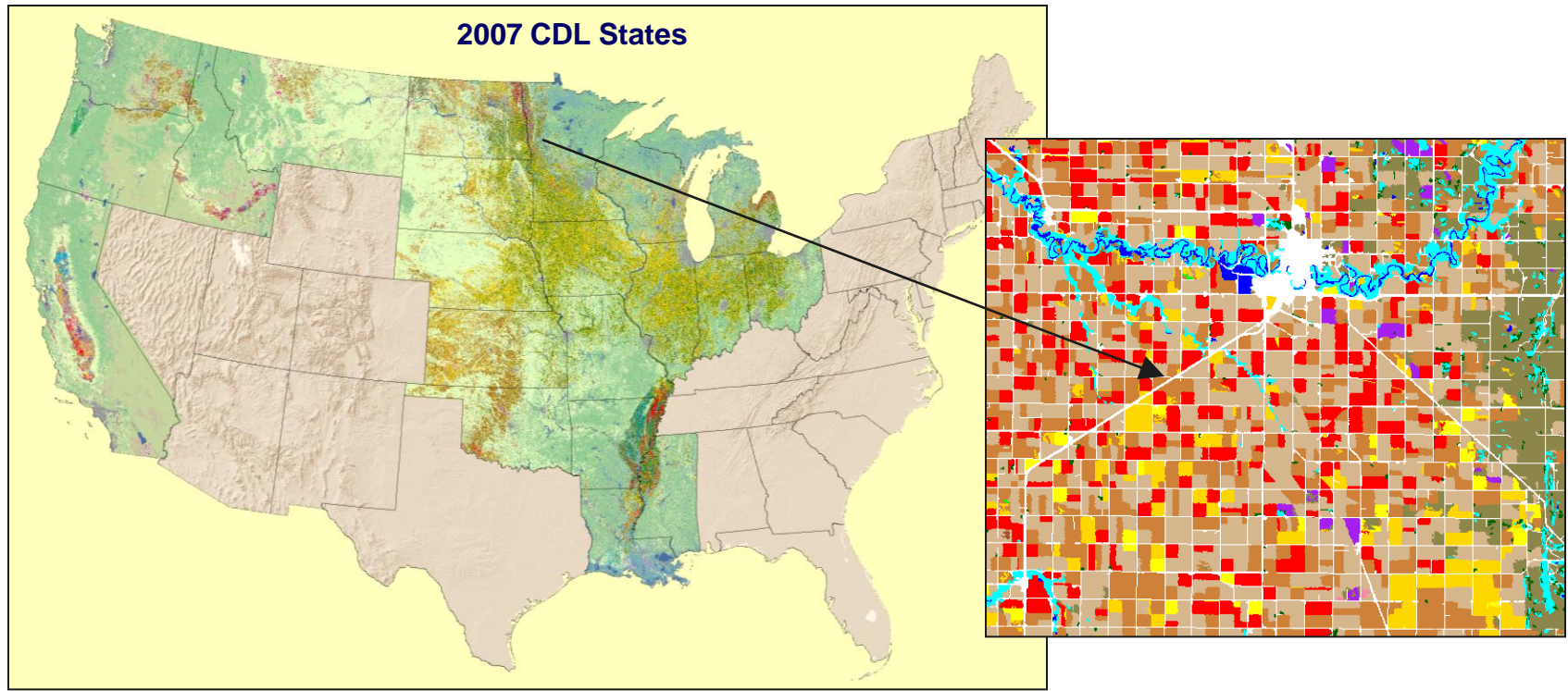
Acreage not just about counting pixels

## NASS Inputs

- June Survey summaries
- Area Sampling Frame
- CDLs



# Cropland Data Layer (CDL) Program



- State specific land cover classifications emphasizing row crop agriculture
  - Some regions done annually (Corn Belt, The Delta)
  - Others “one-and-done” (California, Northwest)
- Within NASS, CDL used to
  - Increase precision on survey derived acreage estimates
  - Improve county level acreage estimates



# Creating a Land Cover Classification

## Cropland

Corn  
Soybeans  
Winter Wheat  
Spring Wheat  
Cotton  
Sorghum  
Barley  
Oats  
Rice  
Sunflowers  
... and more

## Non-Cropland

Water  
Developed  
Barren  
Woodland  
Shrubland  
Grassland  
Wetland

# Cropland Data Layer Uses



## Within NASS

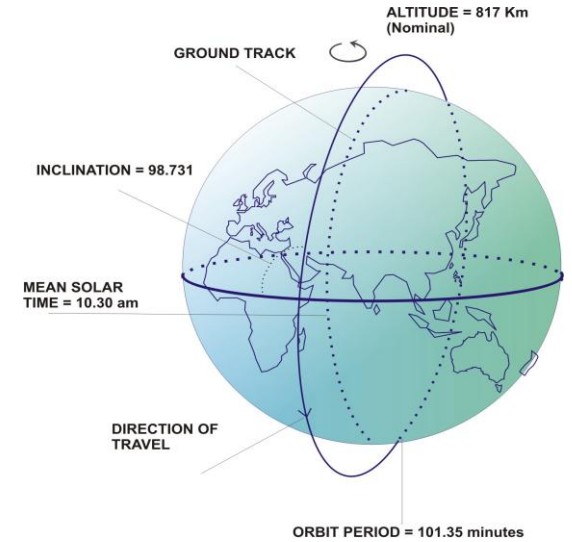
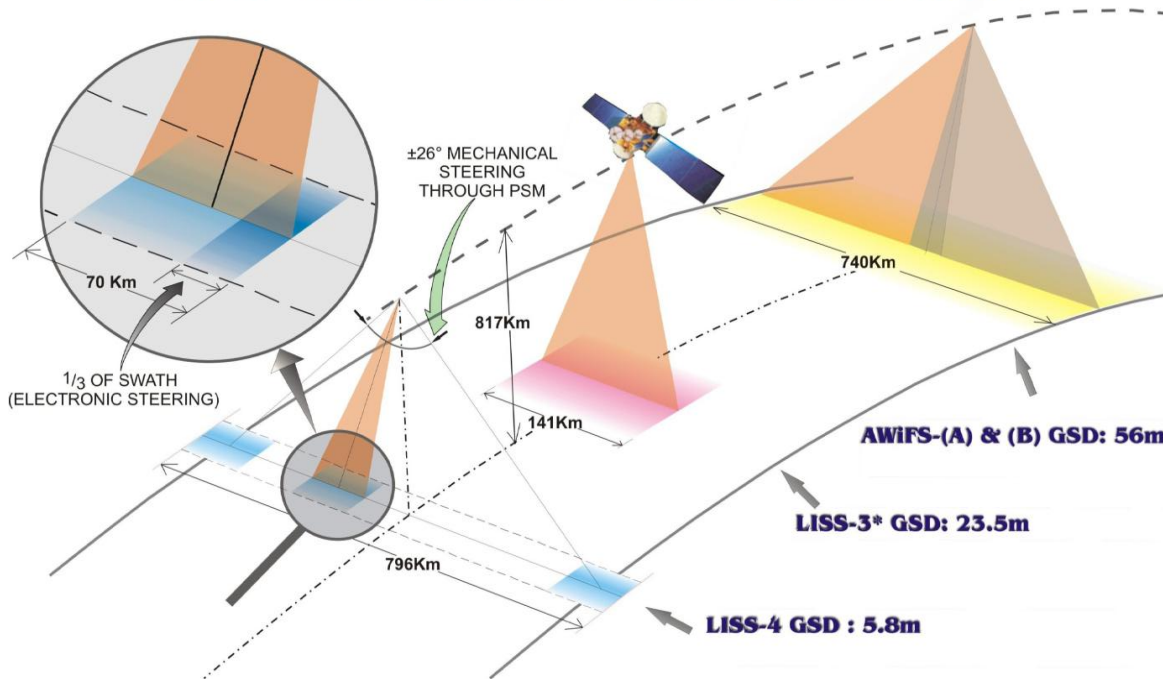
- Refined state-wide acreage estimates
- Improved county-wide acreage estimates
- Tightened confidence intervals on all survey derived acreage estimates

## Outside NASS

- Watershed runoff modeling
- Agribusiness planning
- Ground truth
- Change detection
- Water use mapping
- Epidemiological research
- Habitat monitoring
- Carbon sequestration analysis
- .....and more

# Resourcesat-1

## IRS-P6 THREE TIER IMAGING



**Department of Space**  
**Indian Space Research Organisation**



# IRS Resourcesat-1 AWiFS Imagery

Primary Imagery Source

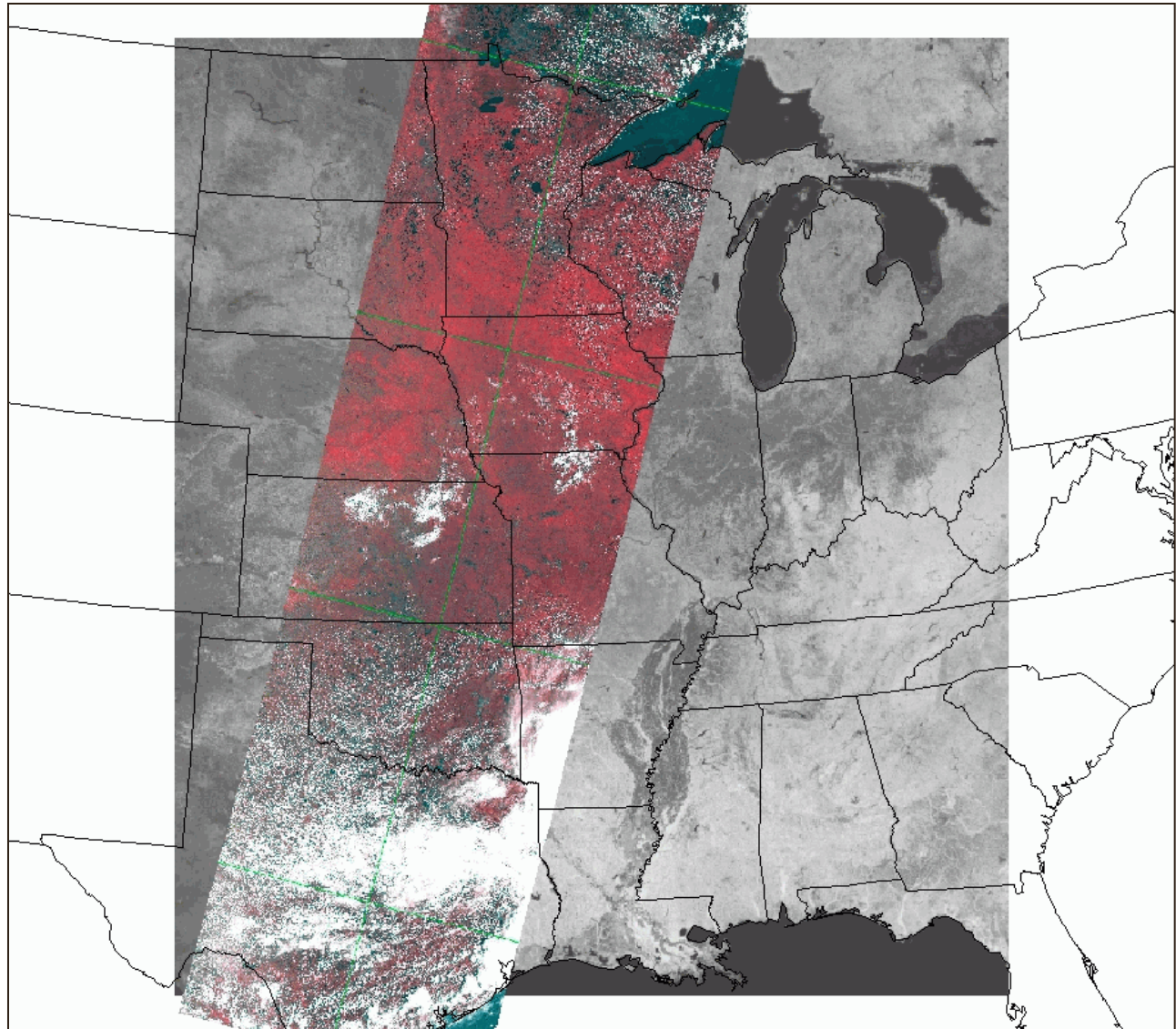
740 km swath  
width

5-day revisit

4 spectral bands

- green
- red
- near-infrared
- short-wave  
infrared

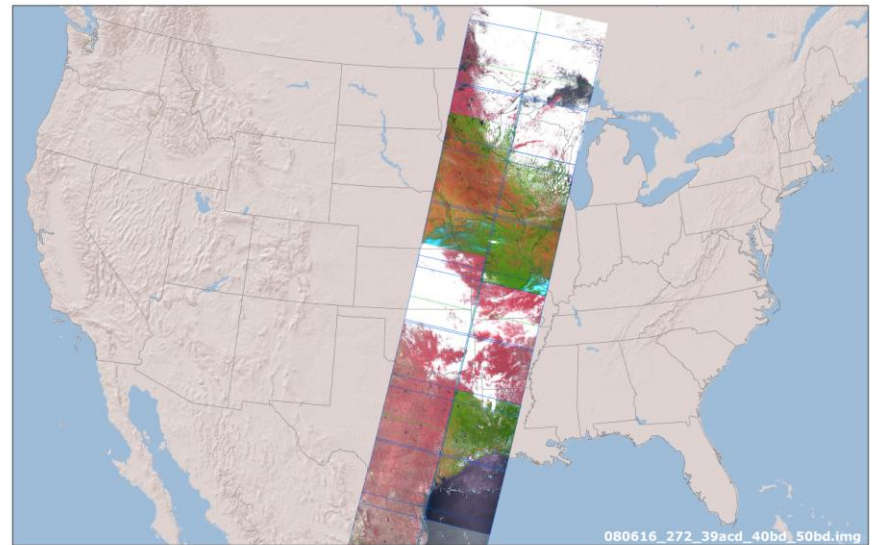
56 m ground  
sample resolution



6 July 2007

# Why NASS Likes AWiFS

- Large swath width
- Inclusion of red, NIR, SWIR spectral bands
- Tolerable spatial resolution at 56m
- Cost effectiveness
- 5-day or less revisit rate
- Operational nature
- Fast data delivery by vendor
- Healthy satellite
- Follow-on system (Resourcesat-2) already built



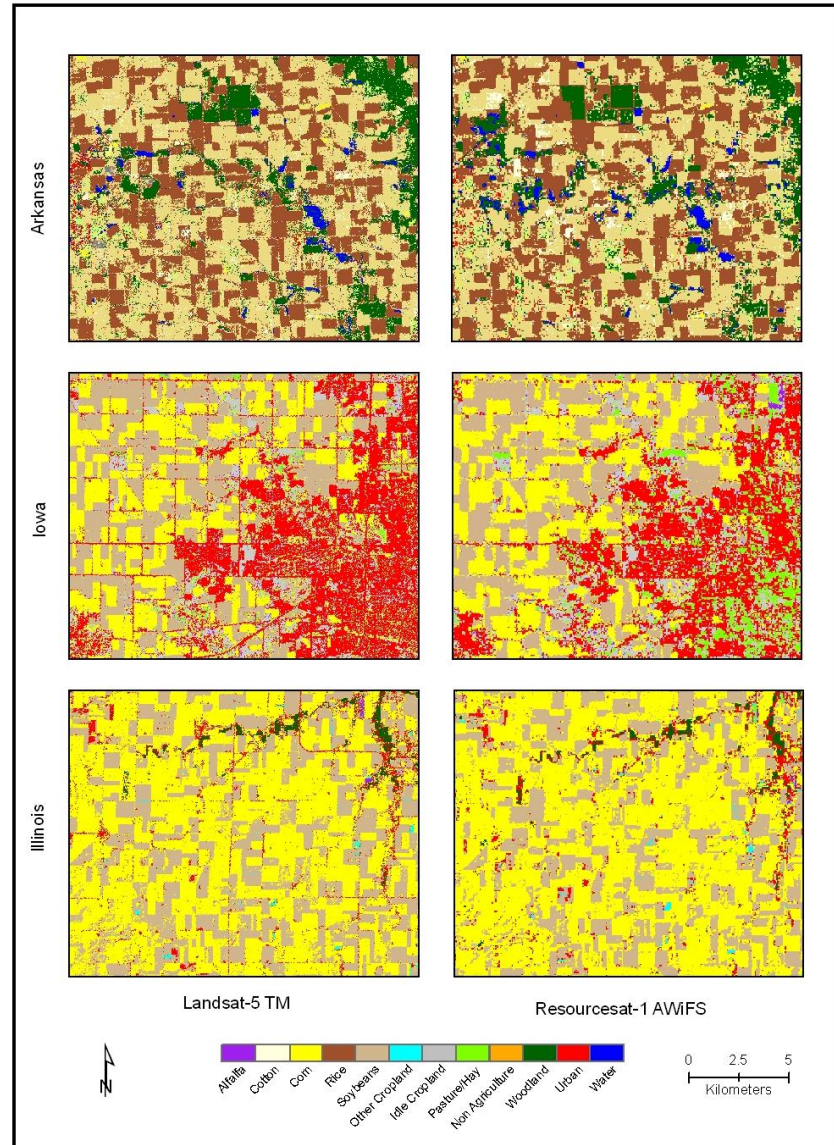
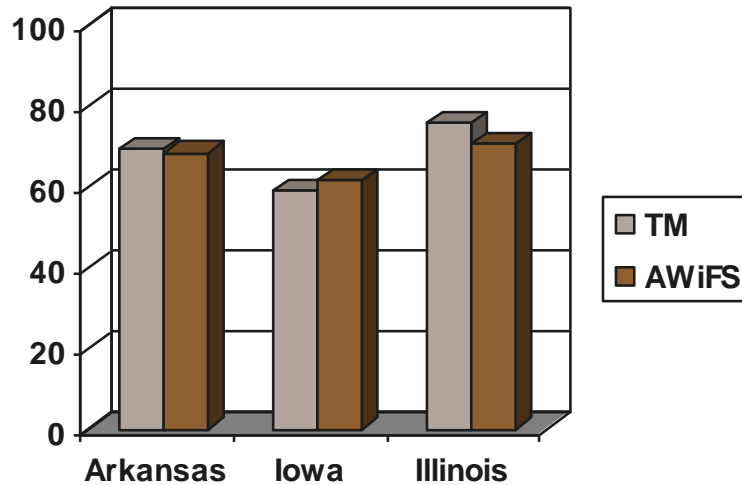
# History of NASS AWiFS Use

- 2004
  - Obtained AWiFS August imagery
  - Used to augment TM images collected during entire summer
- 2005
  - Obtained AWiFS June and August imagery
  - Used to augment or replace TM
  - Assessed quantitative differences
- 2006
  - Switched from Landsat to Resourcesat at a USDA-wide level
  - Obtained AWiFS during entire summer growing season
- 2007
  - Obtained even more AWiFS during entire summer growing season
- 2008
  - Utilized broader coverage of AWiFS to expand to more of US
- 2009
  - Expecting to use more
  - Now with winter collects as well



# Results of TM versus AWiFS

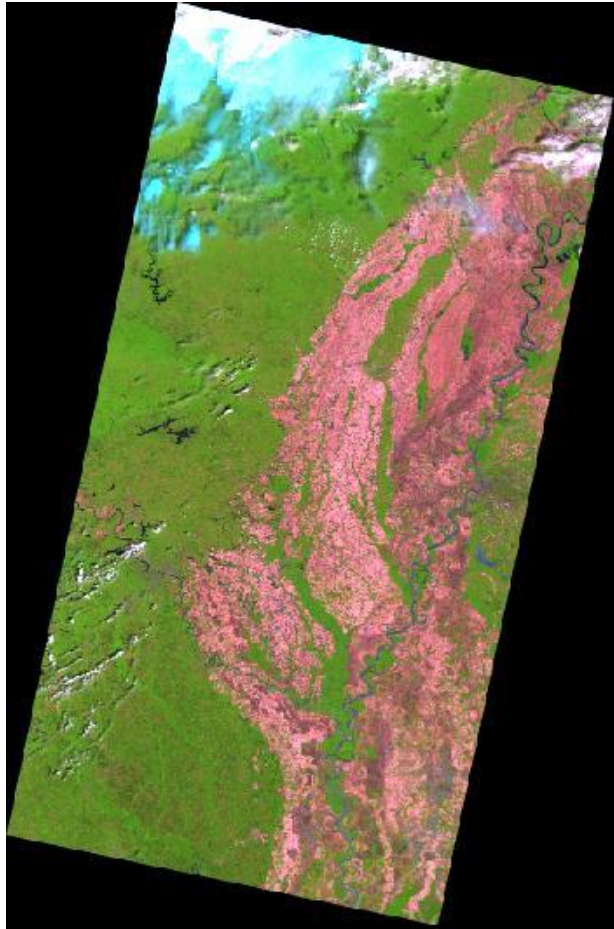
Overall Accuracy



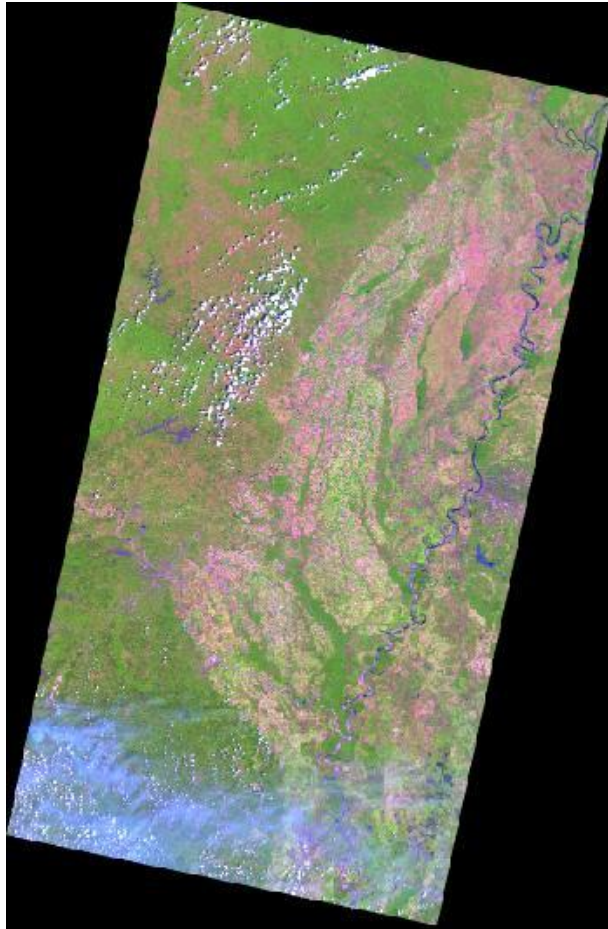
TM usually outperforms AWiFS.

Spatial resolution somewhat more important than loss of blue and mid-infrared bands.

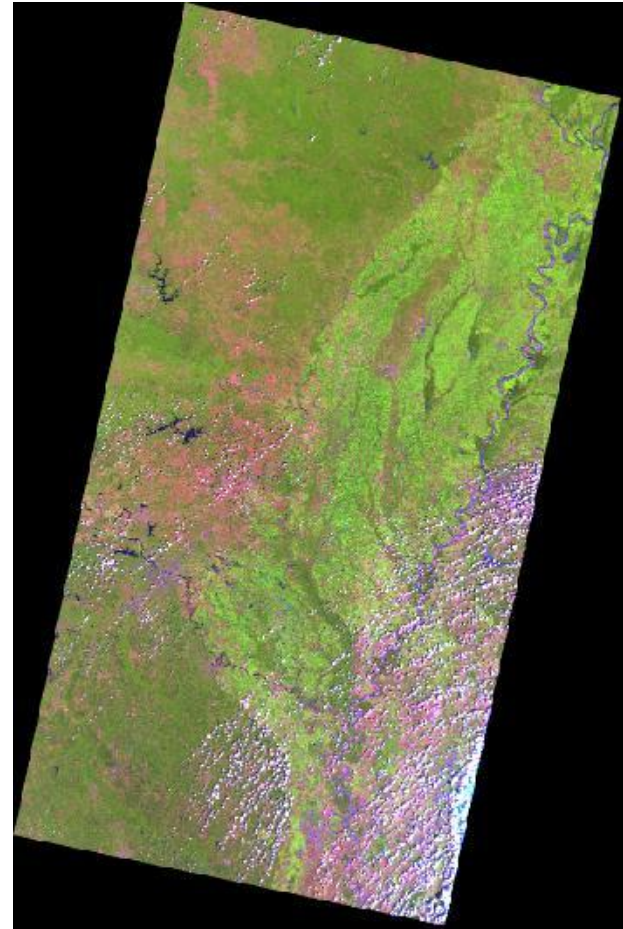
# AWiFS Imagery Time Series



May 20



July 2



July 31



# AWiFS



April



June



August

# June 16<sup>th</sup> data collects

IRS-P6 AWiFS

Landsat

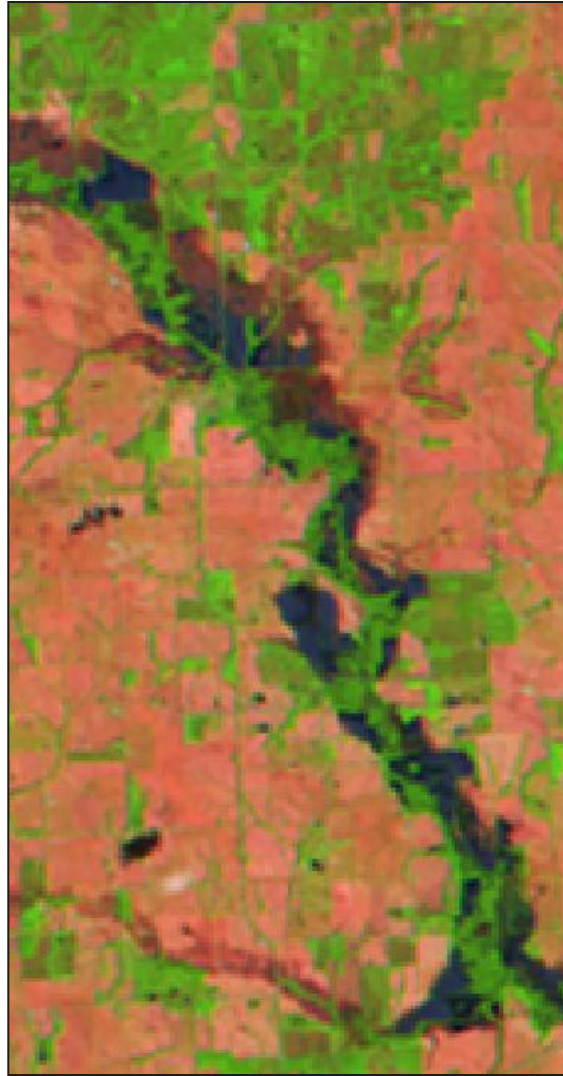
Terra MODIS

# Imagery Comparison – June 16th

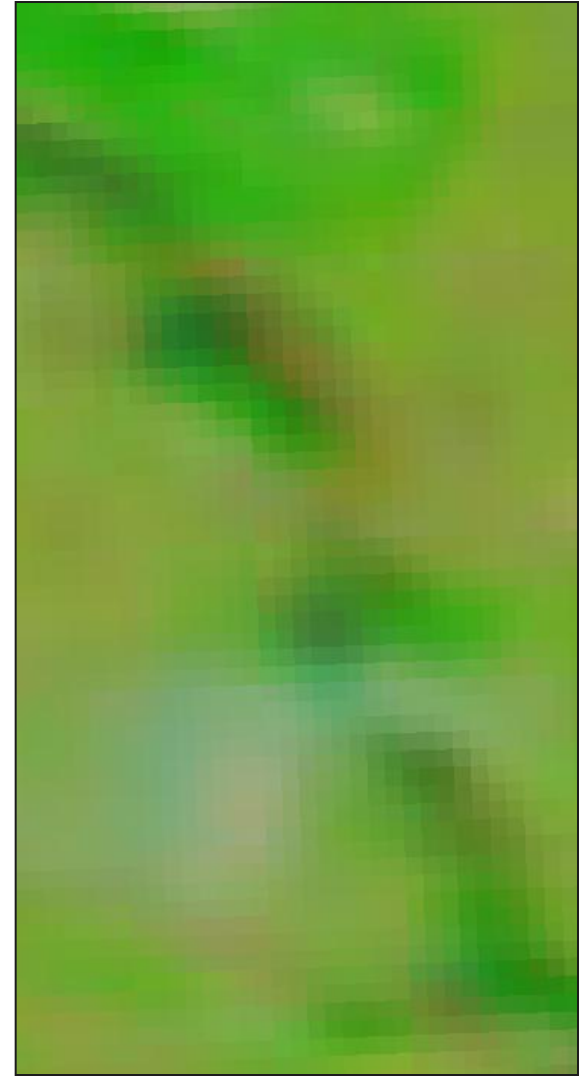


Landsat 5 TM

United States Department of Agriculture  
National Agricultural Statistics Service  
Research and Development Division  
Spatial Analysis Research Section



IRS P6 AWiFS

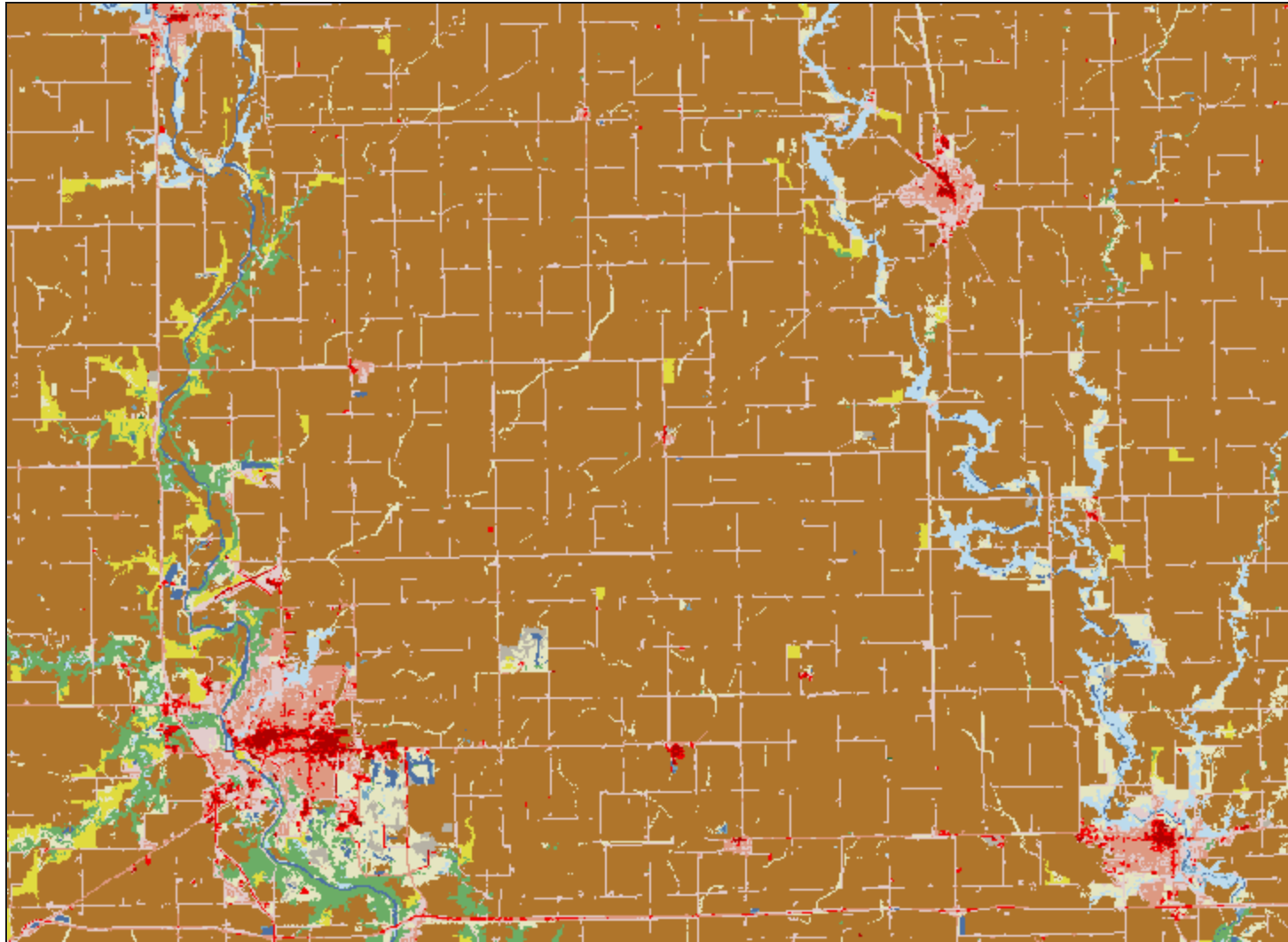


Terra MODIS  
(Rapid Response)





# Ground truth – non agriculture



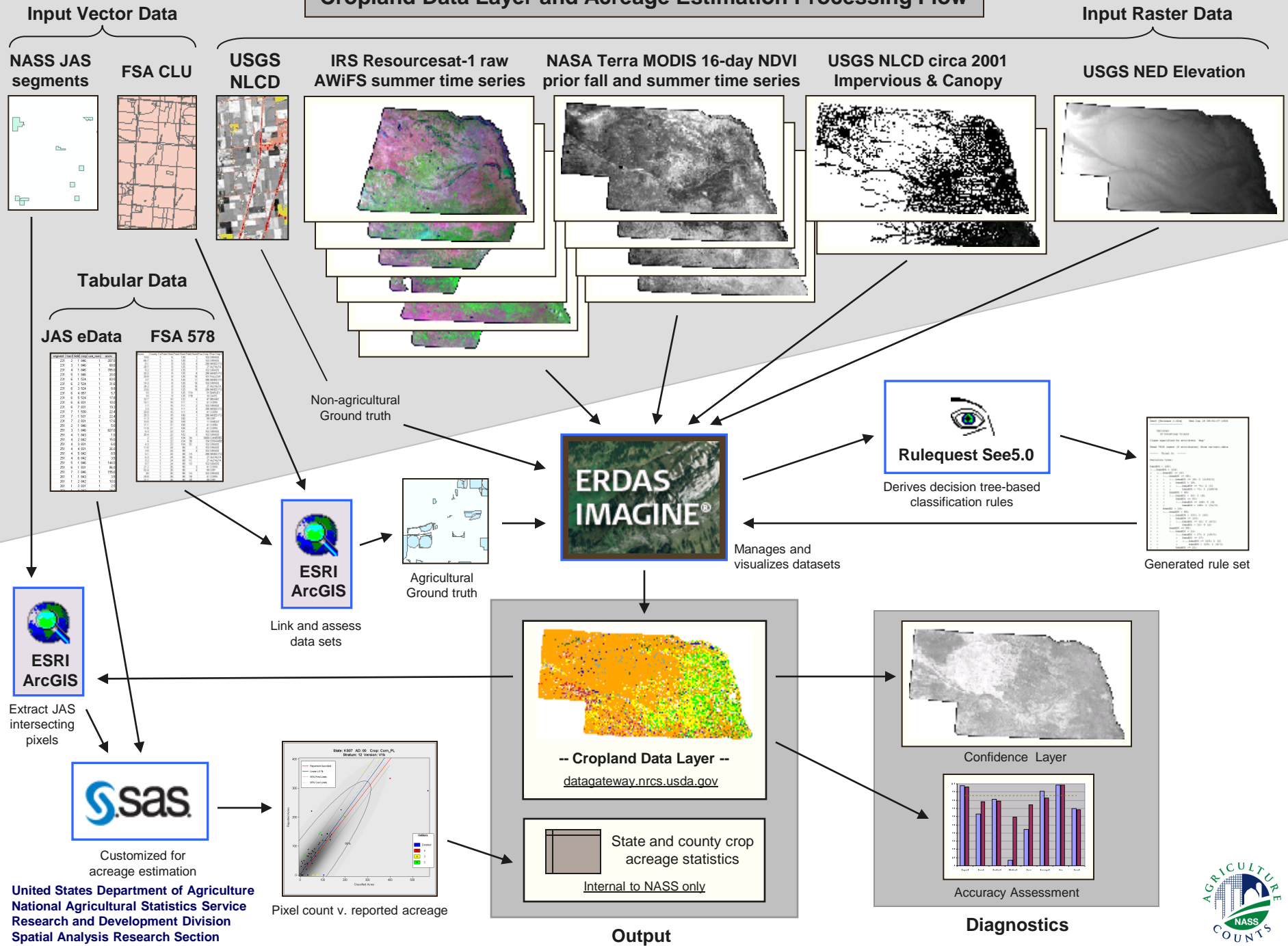
2001 National Land Cover Dataset  
(brown = agriculture)

# Classification Methodology

- Analyze areas by state
- “Stack” AWiFS, MODIS, and ancillary data layers within a raster GIS
  - 56 m grid cells, Albers Conic Equal Area projection
- Sample spatially from stack within known ground truth from FSA (for ag. categories) and NLCD (for non ag. categories)
- Data-mine samples using Boosted Classification Tree Analysis to derive best fitting decision rules
  - implemented with Rulequest See5.0
- Apply derived decision rules back to input data stack
- Create land cover map
- Create probability map
- Assess map accuracy
- Derive acreage estimates
  - utilizing customized SAS routines



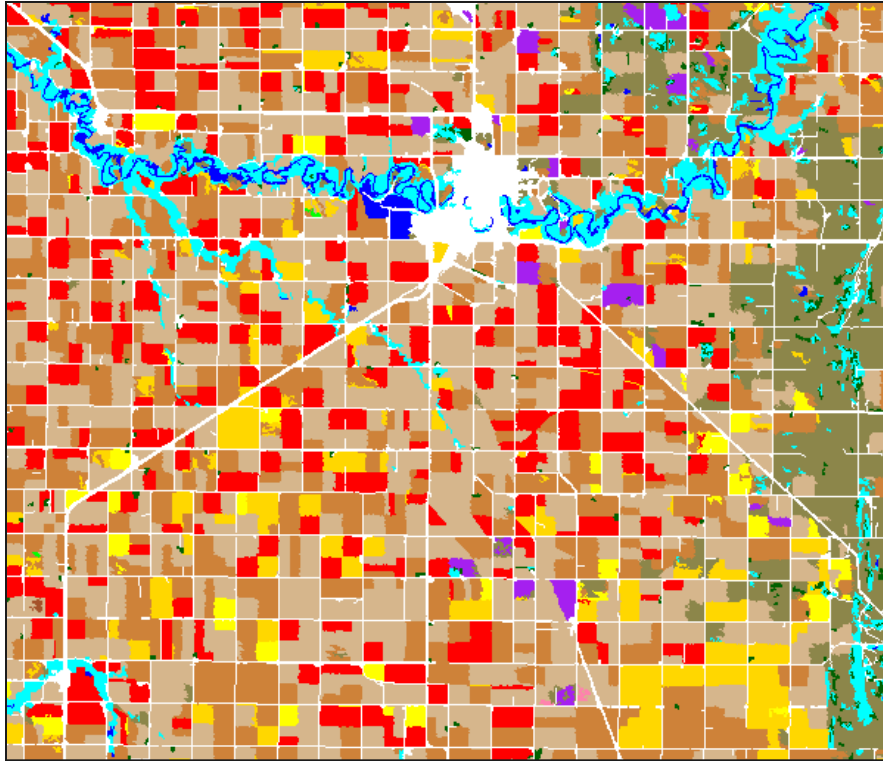
# Cropland Data Layer and Acreage Estimation Processing Flow



**United States Department of Agriculture  
National Agricultural Statistics Service  
Research and Development Division  
Spatial Analysis Research Section**



# Example Classification Subset



CDL Classification

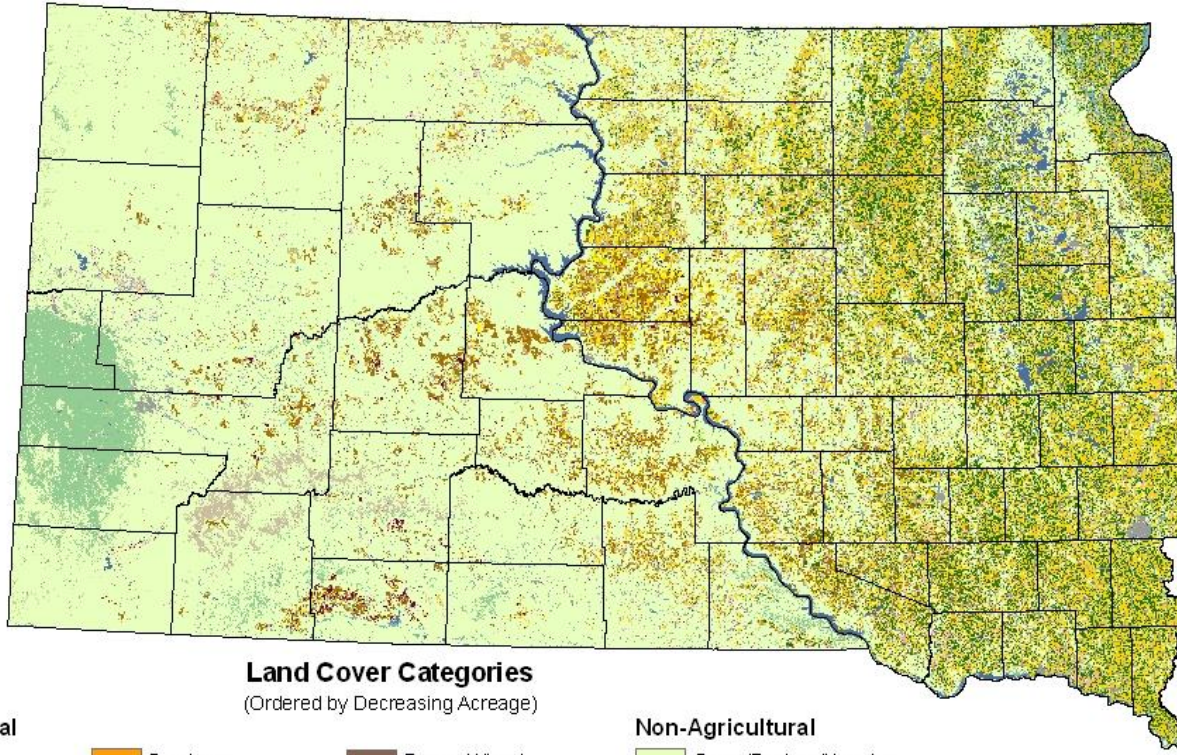


Resourcesat-1 AWiFS, 6 July 2007



# Example State CDL

## South Dakota 2007 Cropland Data Layer



### Land Cover Categories

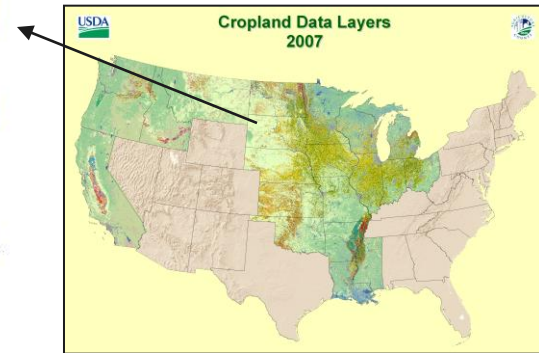
(Ordered by Decreasing Acreage)

#### Agricultural

- |              |                         |                         |
|--------------|-------------------------|-------------------------|
| Corn         | Sorghum                 | Durum Wheat             |
| Soybeans     | Peas                    | Flaxseed                |
| Winter Wheat | Barley                  | Clover/Wildflowers      |
| Spring Wheat | Safflower               | W. Wht./Soy. Dbl. Crop. |
| Alfalfa      | Dry Beans               | Other Crops             |
| Sunflowers   | Misc. Veggies. & Fruits | Sugarbeets              |
| Millet       | Rye                     |                         |
| Oats         | Other Small Grains      |                         |

#### Non-Agricultural

- |                      |
|----------------------|
| Grass/Pasture/Non-Ag |
| Urban/Developed      |
| Woodland             |
| Water                |
| Wetlands             |
| Barren               |
| Fallow/Idle Cropland |
| Shrubland            |



# Example County CDL



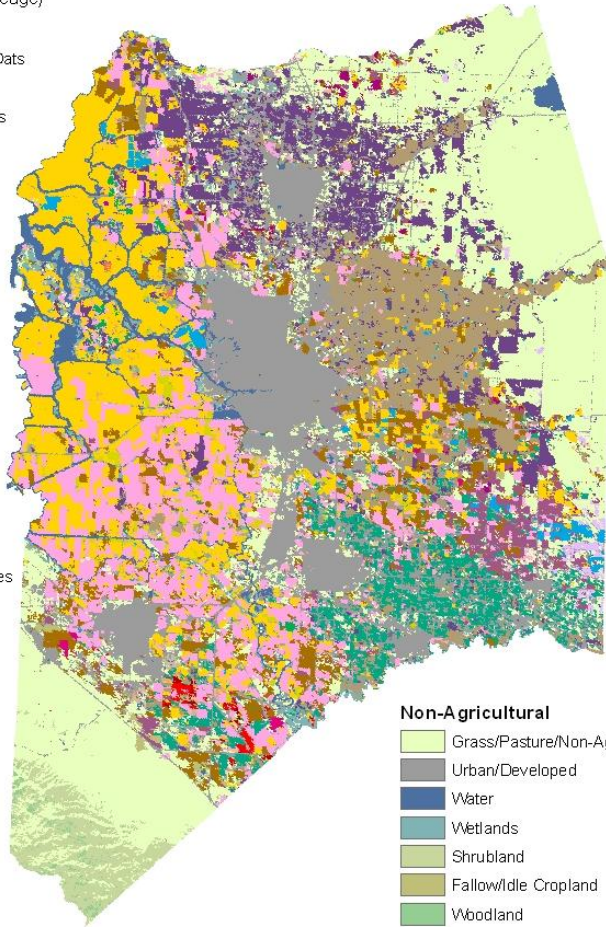
## San Joaquin County, California 2007 AWiFS Cropland Data Layer



### Land Cover Categories (Ordered by Decreasing Acreage)

#### Agricultural

- Corn/Db. Crp. w/ WW/Oats
- Alfalfa
- Other Tree Nuts & Fruits
- Grapes
- Winter Wheat
- Almonds
- Oats
- Safflower
- Rice
- Clover/Wildflowers
- Tomatoes
- Rye
- Grass Seed/Sod
- Cotton
- Barley
- Dry Beans
- Misc. Vegs. & Fruits
- Sugarbeets
- Peaches/Apricots/Prunes
- Other Hays
- Cantaloupe
- Sweet Potatoes
- Apples
- Christmas Trees
- Triticale
- Peas



#### Non-Agricultural

- Grass/Pasture/Non-Ag
- Urban/Developed
- Water
- Wetlands
- Shrubland
- Fallow/Idle Cropland
- Woodland
- Barren



## 2007 California AWiFS Cropland Data Layer



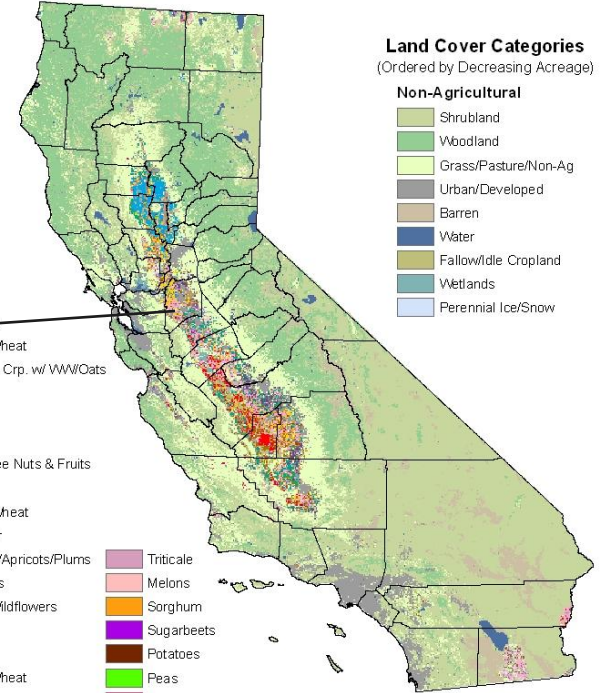
### Land Cover Categories (Ordered by Decreasing Acreage)

#### Non-Agricultural

- Shrubland
- Woodland
- Grass/Pasture/Non-Ag
- Urban/Developed
- Barren
- Water
- Fallow/Idle Cropland
- Wetlands
- Perennial Ice/Snow

#### Agricultural

- Alfalfa
- Almonds
- Winter Wheat
- Corn/Db. Crp. w/ WW/Oats
- Rice
- Cotton
- Grapes
- Other Tree Nuts & Fruits
- Oats
- Durum Wheat
- Safflower
- Peaches/Apricots/Plums
- Tomatoes
- Clover/Wildflowers
- Barley
- Citrus
- Spring Wheat
- Misc. Vegs. & Fruits
- Grass Seed/Sod/Herbs
- Other Hays
- Dry Beans
- Rye
- Sunflowers
- Triticale
- Melons
- Sorghum
- Sugarbeets
- Potatoes
- Peas
- Apples
- Vetch
- Sweet Potatoes
- Christmas Trees
- Sugarcane
- Aquaculture



# Land Cover Categories

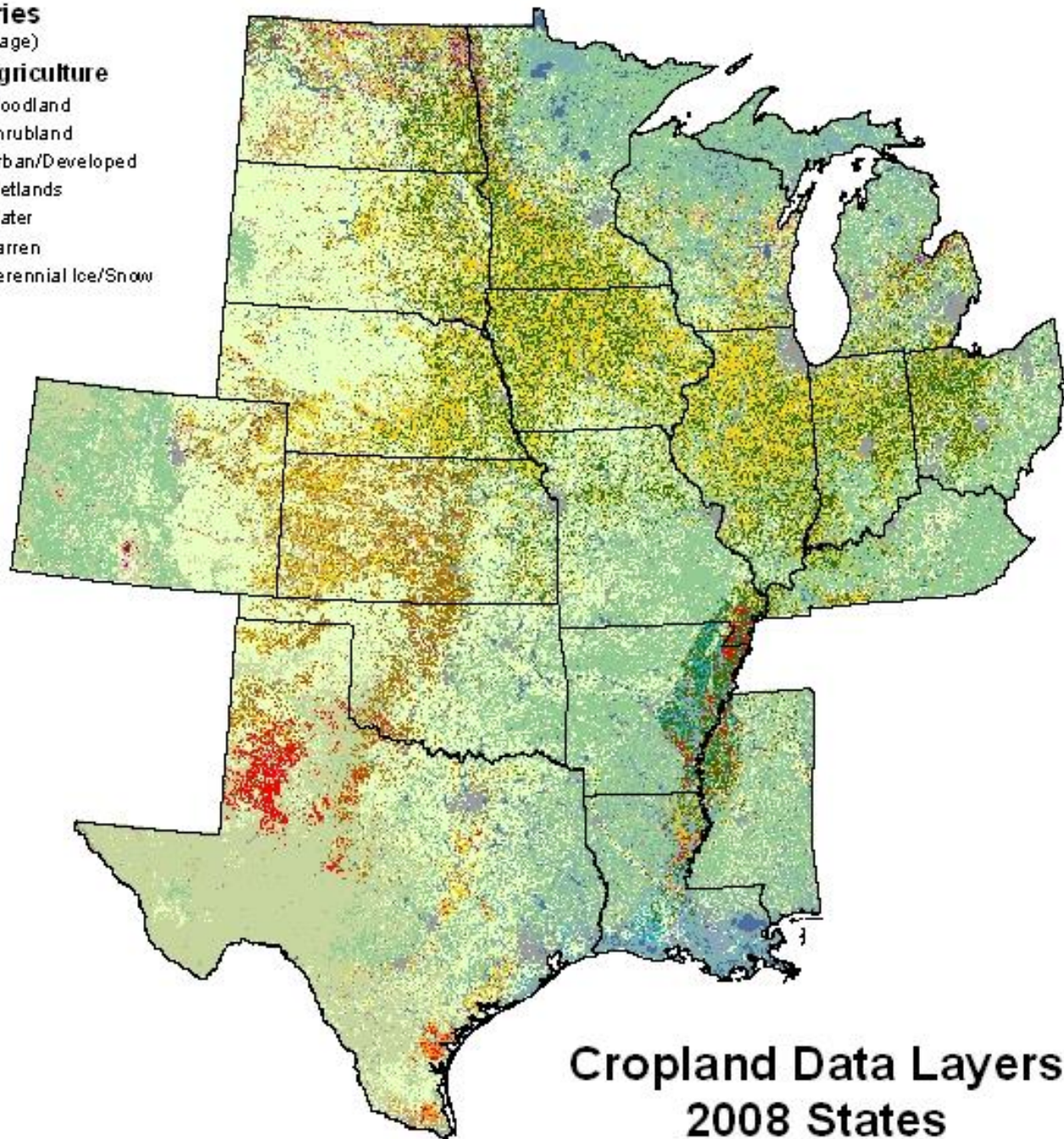
(Ordered by Decreasing Acreage)

## Agriculture

- Pasture/Grass
- Corn
- Soybeans
- Winter Wheat
- Spring Wheat
- Fallow/Idle Cropland
- Cotton
- Sorghum
- Alfalfa
- W. Wht./Soy. D bl. Crop.
- Rice
- Sunflowers
- Durum Wheat
- Barley
- Dry Beans
- Canola
- Sugarbeets
- Peas
- Oats
- Millet
- Sugarcane
- Rye
- Flaxseed
- Potatoes
- Seed/Sod Grass
- Aquaculture
- Lentils
- Peanuts
- Other Small Grains
- Other Crops
- Misc. Veggies. & Fruits
- Other Tree Nuts & Fruits
- Clover/Wildflowers
- Safflower
- Sweet Potatoes
- Apples/Cherries
- Christmas Trees

## Non-Agriculture

- Woodland
- Shrubland
- Urban/Developed
- Wetlands
- Water
- Barren
- Perennial Ice/Snow

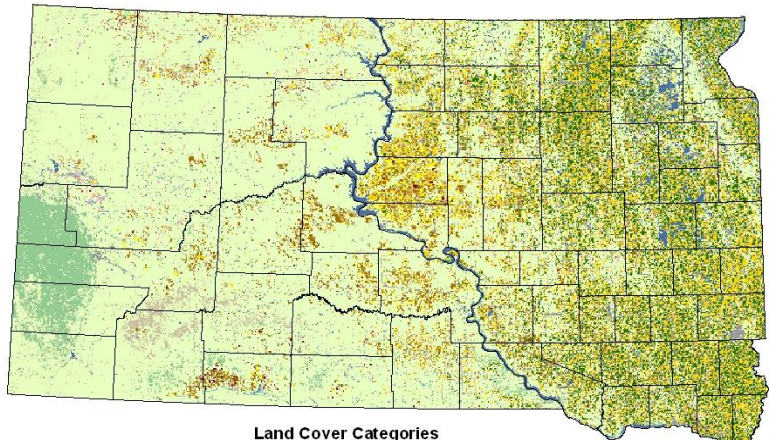


# 2008 CDL Coverage

Commodity	CDL States	US Total Acres (mill)	% US Total
Corn	18	78,177	92
Soybeans	18	74,374	91
Rice	5	2,924	82
Wheat	13	40,252	70
Cotton	4	7,755	66
Potatoes	11	1,058	34



# South Dakota 2008 Cropland Data Layer



**Land Cover Categories**  
(Ordered by Decreasing Acreage)

- |                    |                      |                         |                 |
|--------------------|----------------------|-------------------------|-----------------|
| <b>Agriculture</b> |                      | <b>Non-Agriculture</b>  |                 |
| Pasture/Grass      | Fallow/Idle Cropland | Woodland                | Urban/Developed |
| Corn               | Millet               | Water                   | Wetlands        |
| Soybeans           | Sorghum              | Wetlands                | Barren          |
| Winter Wheat       | Oats                 | Wetlands                | Shrubland       |
| Spring Wheat       | Barley               | W. Wht./Soy. Dbl. Crop. |                 |
| Alfalfa            | Peas                 | Other Small Grains      |                 |
| Sunflowers         | Safflower            | Rye                     |                 |
|                    |                      | Flaxseed                |                 |

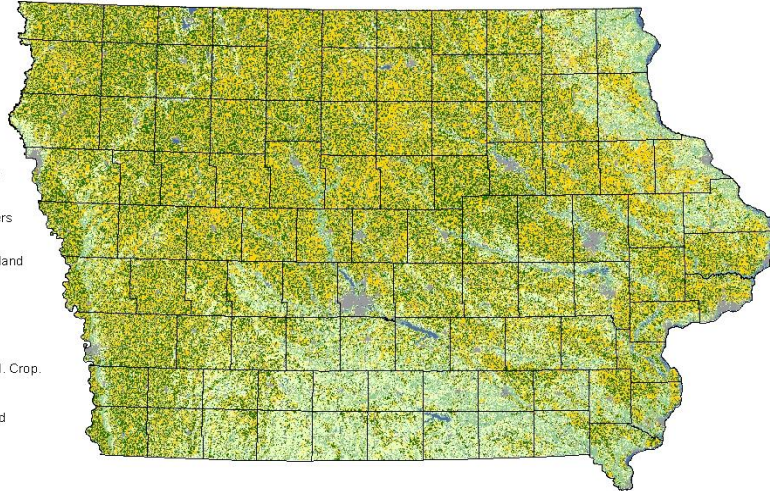


# Iowa 2008 Cropland Data Layer

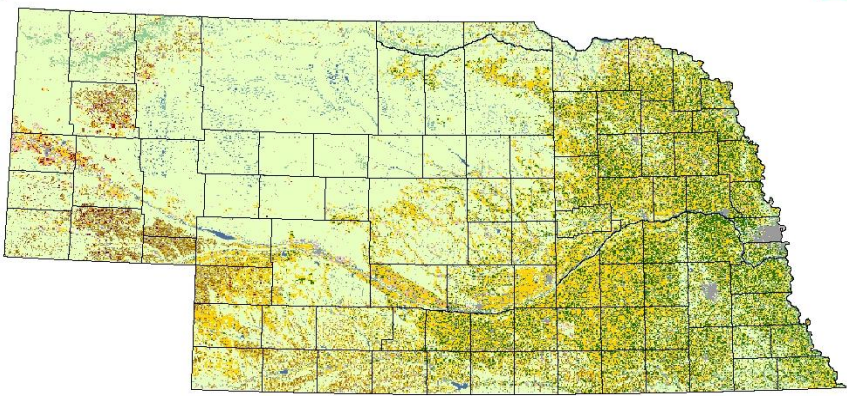


**Land Cover Categories**  
(Ordered by Decreasing Acreage)

- |                         |                         |                        |           |
|-------------------------|-------------------------|------------------------|-----------|
| <b>Agriculture</b>      |                         | <b>Non-Agriculture</b> |           |
| Corn                    | Soybeans                | Urban/Developed        | Woodland  |
| Pasture/Grass           | Alfalfa                 | Water                  | Wetlands  |
| Oats                    | Winter Wheat            | Wetlands               | Barren    |
| Spring Wheat            | Seed/Sod Grass          | Wetlands               | Shrubland |
| Barley                  | Clover/Wildflowers      |                        |           |
| Other Crops             | Other Crops             |                        |           |
| Fallow/Idle Cropland    | Durum Wheat             |                        |           |
| Sorghum                 | Sorghum                 |                        |           |
| Rye                     | Rye                     |                        |           |
| Dry Beans               | Dry Beans               |                        |           |
| W. Wht./Soy. Dbl. Crop. | W. Wht./Soy. Dbl. Crop. |                        |           |



# Nebraska 2008 Cropland Data Layer



**Land Cover Categories**  
(Ordered by Decreasing Acreage)

- |                      |            |                         |           |
|----------------------|------------|-------------------------|-----------|
| <b>Agriculture</b>   |            | <b>Non-Agriculture</b>  |           |
| Pasture/Grass        | Millet     | Urban/Developed         | Woodland  |
| Corn                 | Dry Beans  | Water                   | Wetlands  |
| Soybeans             | Oats       | Wetlands                | Barren    |
| Winter Wheat         | Sunflowers | W. Wht./Soy. Dbl. Crop. | Shrubland |
| Fallow/Idle Cropland | Sugarbeets | Other Small Grains      |           |
| Alfalfa              | Potatoes   | Seed/Sod Grass          |           |
| Sorghum              | Rye        | Other Crops             |           |
|                      |            | Barley                  |           |
|                      |            | Canola                  |           |

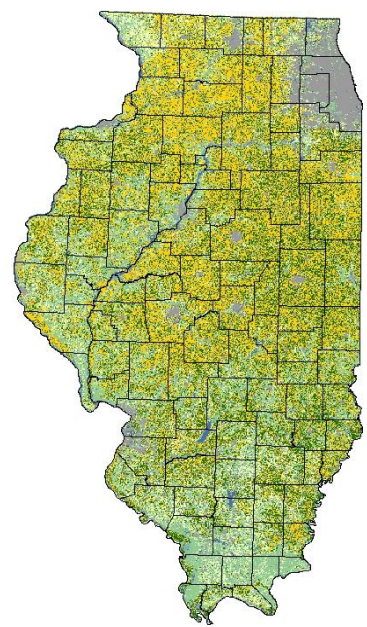


# 2008 Illinois Cropland Data Layer

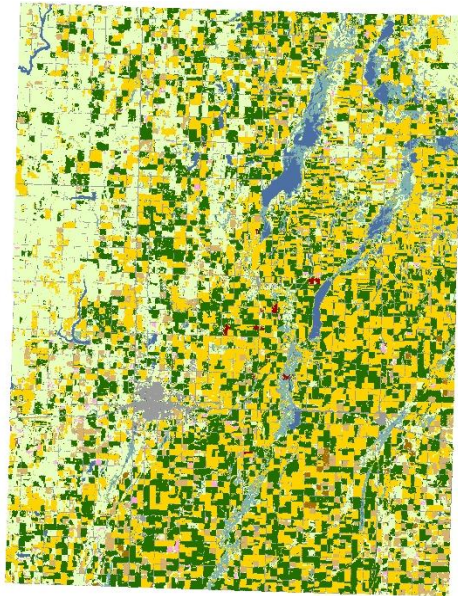


**Land Cover Categories**  
(Ordered by Decreasing Acreage)

- |                         |                    |                        |           |
|-------------------------|--------------------|------------------------|-----------|
| <b>Agriculture</b>      |                    | <b>Non-Agriculture</b> |           |
| Corn                    | Potatoes           | Urban/Developed        | Woodland  |
| Soybeans                | Rice               | Water                  | Wetlands  |
| Pasture/Grass           | Sunflowers         | Wetlands               | Barren    |
| W. Wht./Soy. Dbl. Crop. | Rye                | Wetlands               | Shrubland |
| Winter Wheat            | Other Small Grains |                        |           |
| Fallow/Idle Cropland    | Peas               |                        |           |
| Alfalfa                 |                    |                        |           |
| Sorghum                 |                    |                        |           |
| Misc. Veggies. & Fruits |                    |                        |           |
| Seed/Sod Grass          |                    |                        |           |
| Dry Beans               |                    |                        |           |
| Other Crops             |                    |                        |           |
| Oats                    |                    |                        |           |
| Clover/Wildflowers      |                    |                        |           |



# Brown County, South Dakota 2008 Cropland Data Layer



## Land Cover Categories (Ordered by Decreasing Acreage)

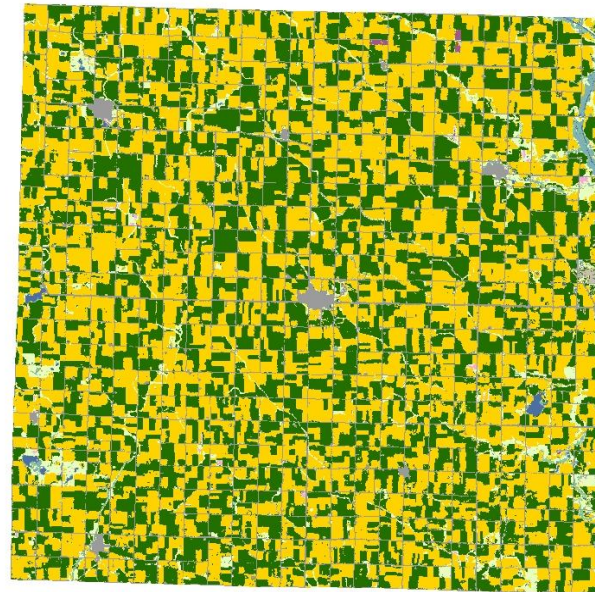
### Agriculture

- Corn
- Soybeans
- Spring Wheat
- Alfalfa
- Winter Wheat
- Dry Beans
- Sunflowers
- Oats
- Millet
- Sorghum
- Barley
- Rye
- Other Crops

### Non-Agriculture

- Grass/Pasture/Non-Ag
- Urban/Developed
- Wetlands
- Water
- Woodland
- Fallow/Idle Cropland
- Barren
- Shrubland

# Pocahontas County, Iowa 2008 Cropland Data Layer



## Land Cover Categories (Ordered by Decreasing Acreage)

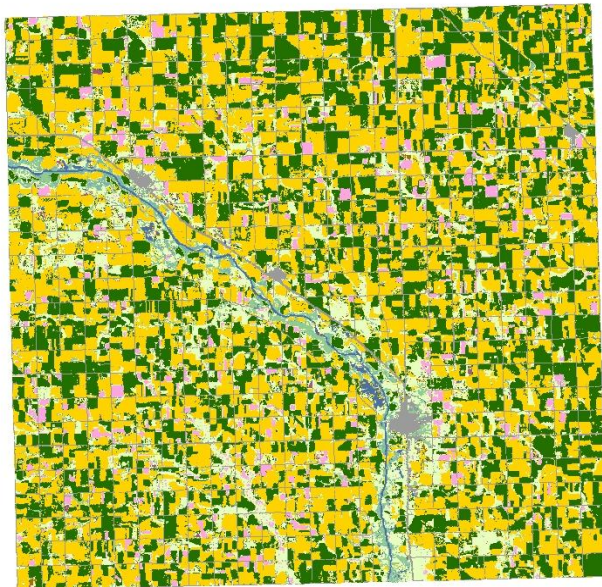
### Agriculture

- Corn
- Soybeans
- Pasture/Grass
- Alfalfa
- Oats
- Winter Wheat
- Spring Wheat
- Clover/Wildflowers

### Non-Agriculture

- Urban/Developed
- Wetlands
- Woodland
- Water
- Barren

# Cuming County, Nebraska 2008 Cropland Data Layer



## Land Cover Categories (Ordered By Decreasing Acreage)

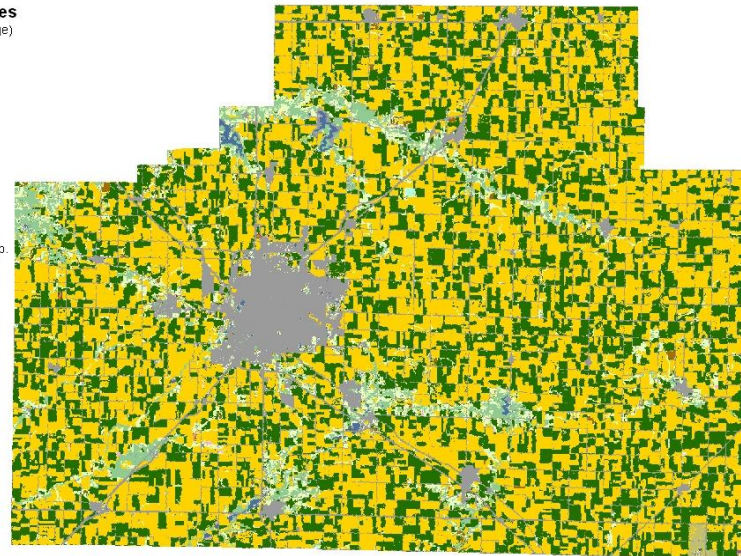
### Agriculture

- Corn
- Soybeans
- Pasture/Grass
- Alfalfa
- Oats
- Winter Wheat
- Fallow/Idle Cropland
- Sorghum
- Rye
- W. Wht./Soy. Dbl. Crop.
- Seed/Sod Grass

### Non-Agriculture

- Urban/Developed
- Woodland
- Wetlands
- Water
- Barren
- Shrubland

# McLean County, Illinois 2008 Cropland Data Layer



## Land Cover Categories (Ordered by Decreasing Acreage)

### Agriculture

- Corn
- Soybeans
- Pasture/Grass
- Winter Wheat
- Fallow/Idle Cropland
- Alfalfa
- Misc. Veggies. & Fruits
- Seed/Sod Grass
- W. Wht./Soy. Dbl. Crop.
- Oats
- Dry Beans
- Sorghum
- Clover/Wildflowers
- Sunflowers
- Rye
- Other Crops
- Peas

### Non-Agriculture

- Urban/Developed
- Woodland
- Wetlands
- Water
- Barren
- Shrubland

# Accuracy Assessments

	Cover Type	Attribute Code	*Correct Pixels	Producer's Accuracy	Omission Error	Kappa	User's Accuracy	Commission Error	Cond'l Kappa
IA	Corn	1	2197719	96.58%	3.42%	0.9226	97.86%	2.14%	0.9509
	Soybeans	5	1471094	96.24%	3.76%	0.9392	95.78%	4.22%	0.9320
IL	Corn	1	2258219	98.06%	1.94%	0.9527	98.58%	1.42%	0.9650
	Soybeans	5	1339089	96.36%	3.64%	0.9438	97.96%	2.04%	0.9681
NE	Corn	1	1856422	97.29%	2.71%	0.9605	97.32%	2.68%	0.9608
	Soybeans	5	849249	95.83%	4.17%	0.9513	96.95%	3.05%	0.9643
SD	Corn	1	803251	94.29%	5.71%	0.9342	95.78%	4.22%	0.9513
	Soybeans	5	707383	95.03%	4.97%	0.9439	97.72%	2.28%	0.9741

	Crop-specific covers only	*Correct	Accuracy	Error	Kappa
IA	OVERALL ACCURACY	3688803	95.74%	4.26%	0.9145
IL	OVERALL ACCURACY	3730093	97.05%	2.95%	0.9426
NE	OVERALL ACCURACY	3071960	94.05%	5.95%	0.8981
SD	OVERALL ACCURACY	2306428	87.51%	12.49%	0.8416

**Producer's Accuracy:** relates to the probability that a ground truth pixel will be correctly mapped and measures errors of omission.

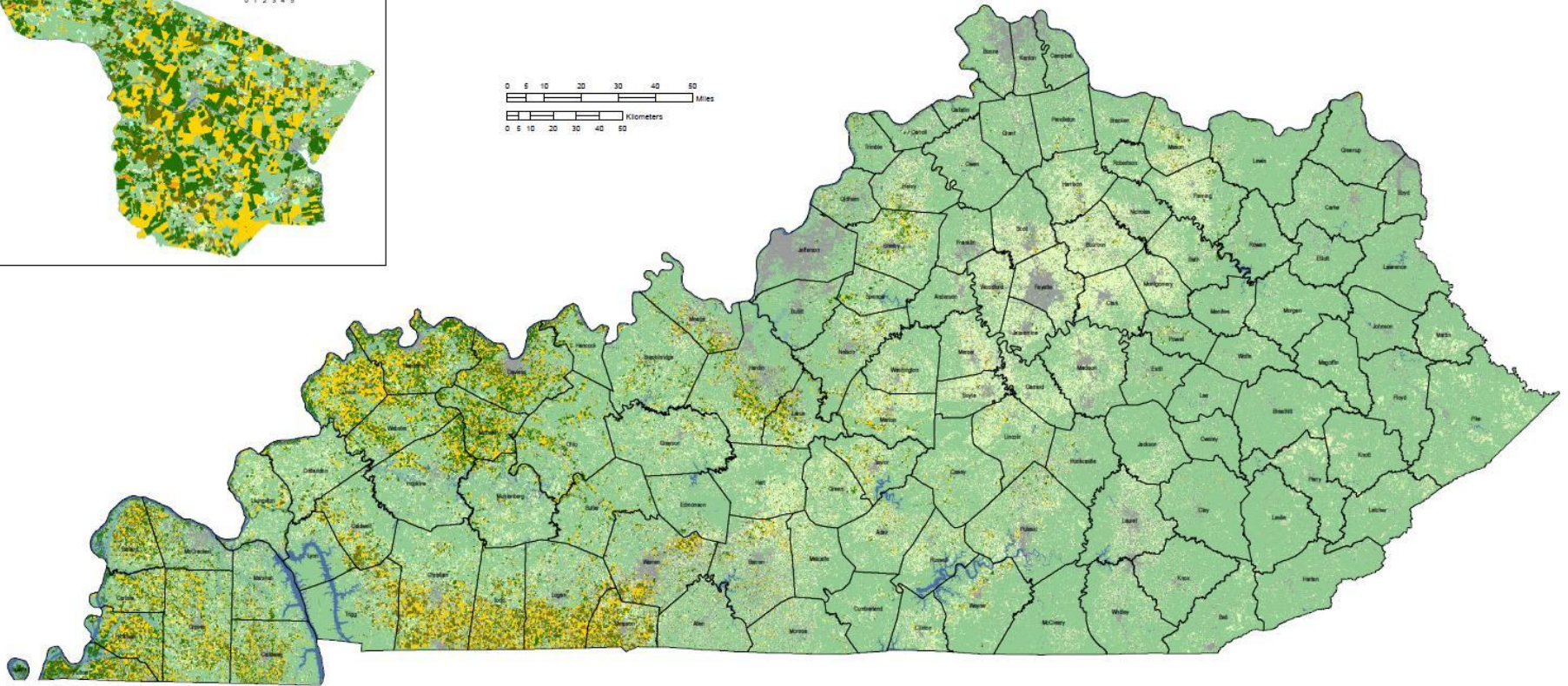
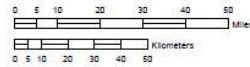
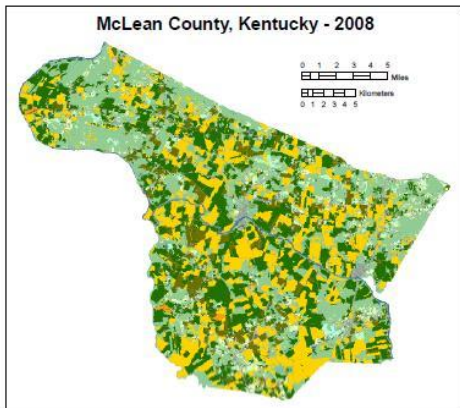
**Error of Omission:** occur when a pixel is excluded from the correct category.

**User's Accuracy:** indicates the probability that a pixel from the classification actually matches the ground truth data and measures errors of commission.

**Error of Commission:** occur when a pixel is included in an incorrect category.

**Kappa Coefficient:** A statistics measure of agreement, beyond chance, between two maps.

# 2008 Kentucky Cropland Data Layer



Data Source:  
Resourcesat-1 AWIFS courtesy of USDA Foreign Agricultural Service.

Image Processing:  
Rulequest See5 and ERDAS Imagine.

Ground Truth:  
The Farm Service Agency Common Land Unit for crops classes, and  
2001 National Land Cover Dataset (NLCD) for non-agricultural classes.

Ancillary Data: NLCD Impervious Surface, NLCD Forest Canopy,  
National Elevation Dataset, and Moderate Resolution Imagery  
Spectroradiometer (MODIS) 16 day Normalized Difference Vegetation  
Index (NDVI) composite.

Projection: UTM zone 16, WGS84 datum.

Map Production: ArcGIS 9.2.

## Land Cover Categories

(Ordered by Decreasing Acreage)

### Agriculture

- Pasture/Grass
- Corn
- Soybeans
- Winter Wheat
- Fallow/Idle Cropland
- Alfalfa
- Sorghum

- Millet
- Dry Beans
- Oats
- Sunflowers
- Sugarbeets
- Potatoes
- Rye

- Spring Wheat
- Other Small Grains
- W. Wht./Soy. Dbl. Crop.
- Seed/Sod Grass
- Other Crops
- Barley
- Canola

### Non-Agriculture

- Urban/Developed
- Woodland
- Wetlands
- Water
- Barren
- Shrubland





# Louisville Area



# Kentucky CDL Accuracy

USDA, National Agricultural Statistics Service, 2008 Kentucky Cropland Data Layer  
STATEWIDE AGRICULTURAL ACCURACY REPORT

Crop-specific covers only	*Correct	Accuracy	Error	Kappa
OVERALL ACCURACY	383666	89.82%	10.18%	0.8638

Cover Type	Attribute Code	*Correct Pixels	Producer's Accuracy	Omission Error	Kappa	User's Accuracy	Commission Error	Cond'l Kappa
Corn	1	141976	95.43%	4.57%	0.9472	95.21%	4.79%	0.9448
Sorghum	4	651	38.82%	61.18%	0.3878	97.02%	2.98%	0.9701
Soybeans	5	107429	92.28%	7.72%	0.9137	91.51%	8.49%	0.9052
Sunflowers	6	0	0.00%	100.00%	0.0000	n/a	n/a	n/a
Tobacco	11	8	3.29%	96.71%	0.0329	21.62%	78.38%	0.2160
Pop or Orn Corn	13	379	49.54%	50.46%	0.4952	95.47%	4.53%	0.9546
Winter wheat	24	442	16.03%	83.97%	0.1598	73.54%	26.46%	0.7348
WW / Soybeans	26	55664	95.44%	4.56%	0.9518	89.76%	10.24%	0.8920
Rye	27	6	8.70%	91.30%	0.0870	85.71%	14.29%	0.8571
Oats	28	10	9.90%	90.10%	0.0990	66.67%	33.33%	0.6666
Millet	29	0	0.00%	100.00%	0.0000	n/a	n/a	n/a
Alfalfa	36	945	23.80%	76.20%	0.2371	72.64%	27.36%	0.7254
Other crops	44	1	4.55%	95.45%	0.0454	12.50%	87.50%	0.1250
Misc. vegetables	47	0	0.00%	100.00%	0.0000	n/a	n/a	n/a
Clover / Wildflowers	58	5	1.93%	98.07%	0.0193	62.50%	37.50%	0.6249
Seed/Sod Grass	59	177	16.36%	83.64%	0.1634	71.37%	28.63%	0.7134
Idle / Fallow	61	9	4.84%	95.16%	0.0484	69.23%	30.77%	0.6923
Peaches	67	0	0.00%	100.00%	0.0000	n/a	n/a	n/a
Apples	68	0	n/a	n/a	n/a	0.00%	100.00%	0.0000
Other tree nuts	71	0	n/a	n/a	n/a	0.00%	100.00%	0.0000
Aquaculture	92	0	0.00%	100.00%	0.0000	n/a	n/a	n/a

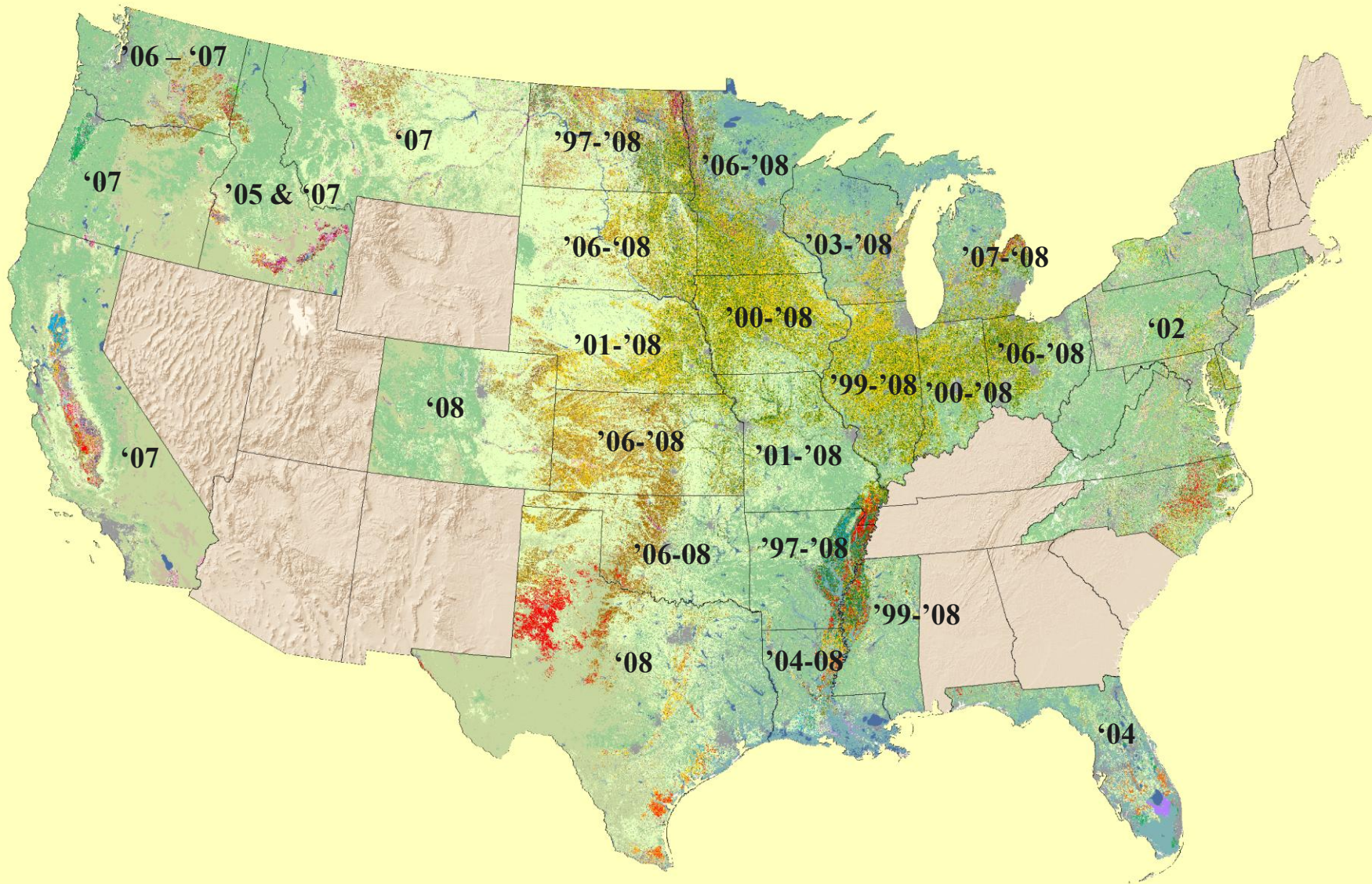
\*Correct Pixels represents the total number of independent validation pixels correctly identified in the error matrix.

# Obtaining Kentucky 2008 CDL

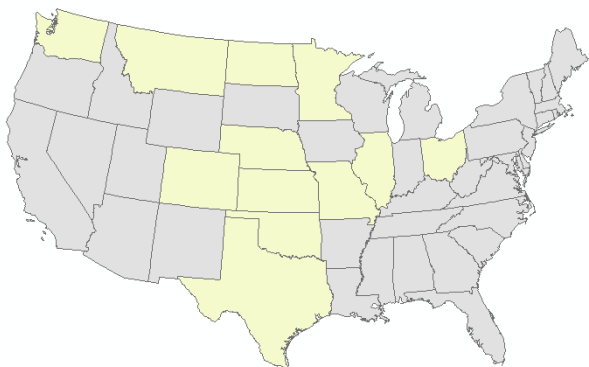
The screenshot shows a web browser window displaying the USDA-NASS RDD Spatial Analysis Research Section website. The page features the U.S. Department of Agriculture logo and the National Agricultural Statistics Service Research and Development Division. It includes navigation links for the Census and Survey Research Branch and the Geospatial Information Branch. A central section highlights the Cropland Data Layer (CDL) with two maps labeled 'Proposed '08' and '09 Proposed'. Below this, an announcement states that the Spatial Analysis Research Section has released ALL 2008 Cropland Data Layer Products. The text explains that these products are downloadable from the website or the Geospatial Data Gateway. It also provides information about the availability of CDL data prior to 2007. Further down, the page details the release of the 2008 Cropland Data Layer (CDL) for various states, including AR, CO, IA, IL, IN, KS, KY, LA, MI, MN, MO, MS, ND, NE, OH, OK, SD, TX, and WI. It also mentions the re-release of the 2006 CDL for states AR, IA, KS, LA, MN, MO, MS, ND, OH, SD, and WI. Additionally, it describes the 2007 Cropland Data Layer (CDL) DVD products for the Lower Mississippi Valley and Pacific Northwest, and provides links to download the newest Lower Mississippi Valley and Pacific Northwest CDL (354 MB) and the Midwestern 2007 CDL (363 MB). The page concludes with a note to visit the Geospatial Data Gateway to download the NASS CDL for free and a brief description of the CDL's purpose in GIS applications.

<http://www.nass.usda.gov/research/Cropland/SARS1a.htm>

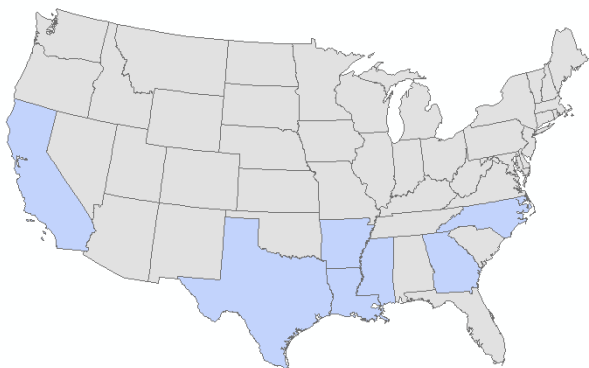
# Cropland Data Layers 1997 - 2008



# Future CDLs, 2009 and beyond....



Primary Wheat States



Primary Cotton States

- Expand geographic scope?
  - Wheat states next priority
  - Mid-Atlantic region (often asked about)
  - “Manifest Destiny”
- Improved categories?
  - Grassland
    - Pasture (chewed grass)
    - Hay (cut grass)
    - Natural (quasi-native)
- Imagery?
  - More frugal use of
  - Future sensors
  - Finer resolution
- Other ancillary data?
  - Soils
  - Climate
- Derivatives?
  - Change detection
  - Crop rotation patterns

# Thank You

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703-877-8000 x169

[www.nass.usda.gov](http://www.nass.usda.gov)  
[www.nass.usda.gov/research/Cropland/SARS1a.htm](http://www.nass.usda.gov/research/Cropland/SARS1a.htm)  
[datagateway.nrcs.usda.gov](http://datagateway.nrcs.usda.gov)

