

Remote Sensing of Agriculture

NASS' Cropland Data Layer Program

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USDA/NASS



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 United States Department of Agriculture
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.

- Query our Quick Stats Data Base

Additional Crops County Resources

Maps of crops county estimates for acreage and yield are available from NASS as both CSV data files and maps.

County data from Quick Stats data is also available in pre-extracted data sets by year and by crop.

Census of Agriculture

To query Census of Agriculture data, choose from the Census years below. To view the Census publications, click here:

- Data Queries for 2002, select below:

Select a Census Query

- Data Queries for 1997, 1992, 1987

Interactive Data

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

Interactive Statistical Maps Interactive Census Maps for 2002 Census Highlights

Table Lens 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 losses were 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 27 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	124,919	7.4	40,100	83
	Soybeans	300	36.7	9.9	1,201,250	2,473
	Wheat	200	45.2	2.0	460	2
Central Maryland	Corn	114,200	984	3.9	360,750	1,479
	Soybeans	92,800	34.0	3.3	126,250	319
	Wheat	38,300	63.3	3.3	126,250	319
Southern Maryland	Corn	29,800	132.9	4.9	146,200	299
	Soybeans	43,200	39.0	3.3	142,250	314
	Wheat	16,900	57.0	0.9	14,400	16
Upper Shore	Corn	197,200	159.2	5.1	800,700	1,211
	Soybeans	232,000	39.8	2.4	186,000	2,232
	Wheat	88,800	64.0	1.1	99,150	213

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. corn production in 2007, according to the U.S. Department of Agriculture's National Agricultural Statistics Service, is projected to reach 13.1 billion bushels, 10.6 percent above the 2006 record of 11.8 billion bushels. Based on conditions as of August 10, 2007, the average yield per acre, up 3.7 bushels from last year, will produce 13.1 billion bushels from the 160.4 bushels per acre of corn for grain. Yield forecasts are higher than those for the Delta. Meanwhile, hot, dry conditions in the Southeast and eastern Corn Belt, Ohio Valley and

WISCONSIN AGRICULTURAL STATISTICS SERVICE

P.O. Box 8934 Madison, WI 53708-8934
In cooperation with WI Department of Agriculture, Trails and Consumer Protection

2002 Dairy Producer Opinion Survey

November 2002

Wisconsin Milk Production to Recover

Milk production is expected to increase in Wisconsin during the next five years according to a survey conducted by the Wisconsin Agricultural 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 2002.

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/0800> - 2002 Census of Agriculture - NVG Interactive Mapping - United S - 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:

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 to 100,000

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 \$/cwt

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	+9
200 - 499	700	600	-29
500+	200	440	+120
Total	17,500	19,900	+20

1/7/03 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

Wisconsin Dairy Farmer Plans for May 2007 1/ 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

1/7/03 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

Spatial Analysis Research

NASS - Research and Science - Windows Internet Explorer

http://www.nass.usda.gov/Research_and_Science/index.asp

USDA United States Department of Agriculture
National Agricultural Statistics Service

Search NASS

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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

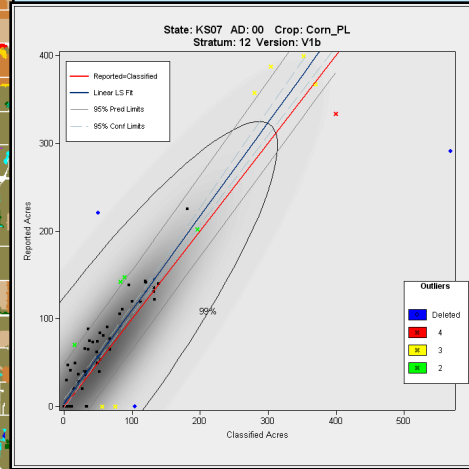
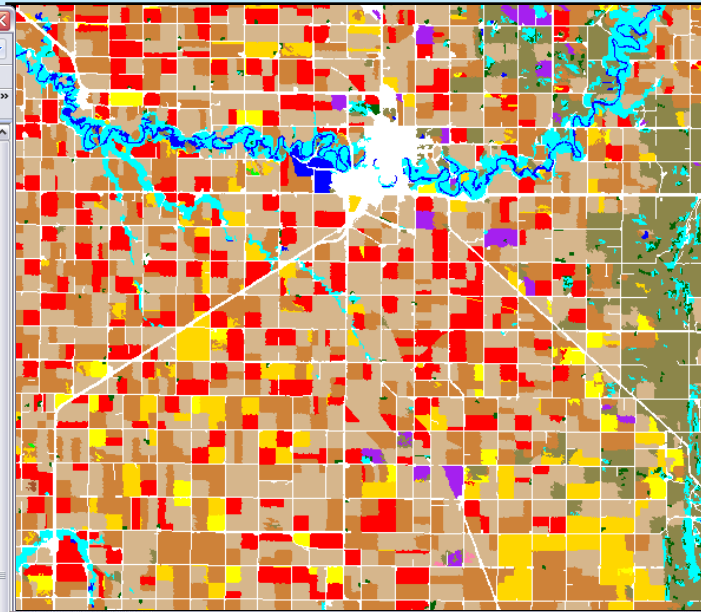
Interact with Data (1997)

Also See

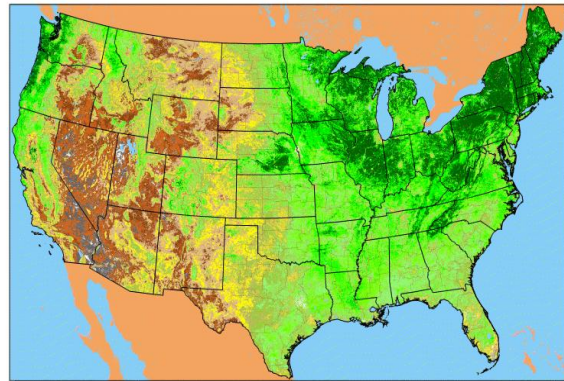
- Research Fellow and Associate Program
- Seasonal Summary of Crop Progress and Condition
- Remotely Sensed Data
 - Crop Acreage
 - Crop Yield
 - Future Vision

Media Help

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

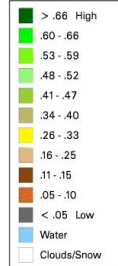


Conterminous U.S. Vegetation Condition - 2007
Period 33 (7/31 - 8/13)



No Water Vapor Correction Applied

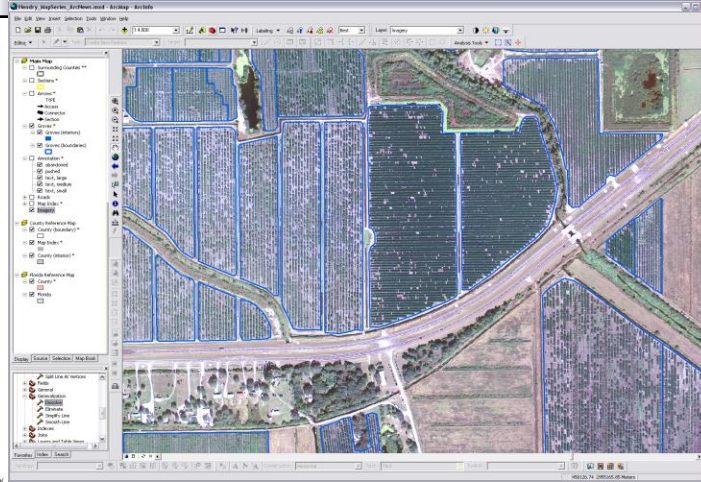
Vegetation Index



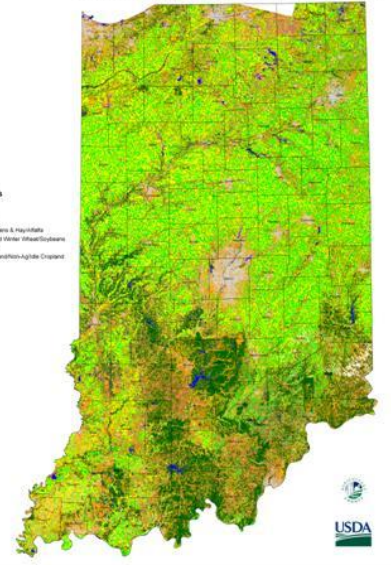
Agricultural Statistics Districts

1:15,000,000

Prepared by NASS, NASS-11000, 11/00/07
 Copyright 2007, National Agricultural Statistics Service
 Questions email: rs_rdg@nass.usda.gov



2006 Indiana Cropland Data Layer



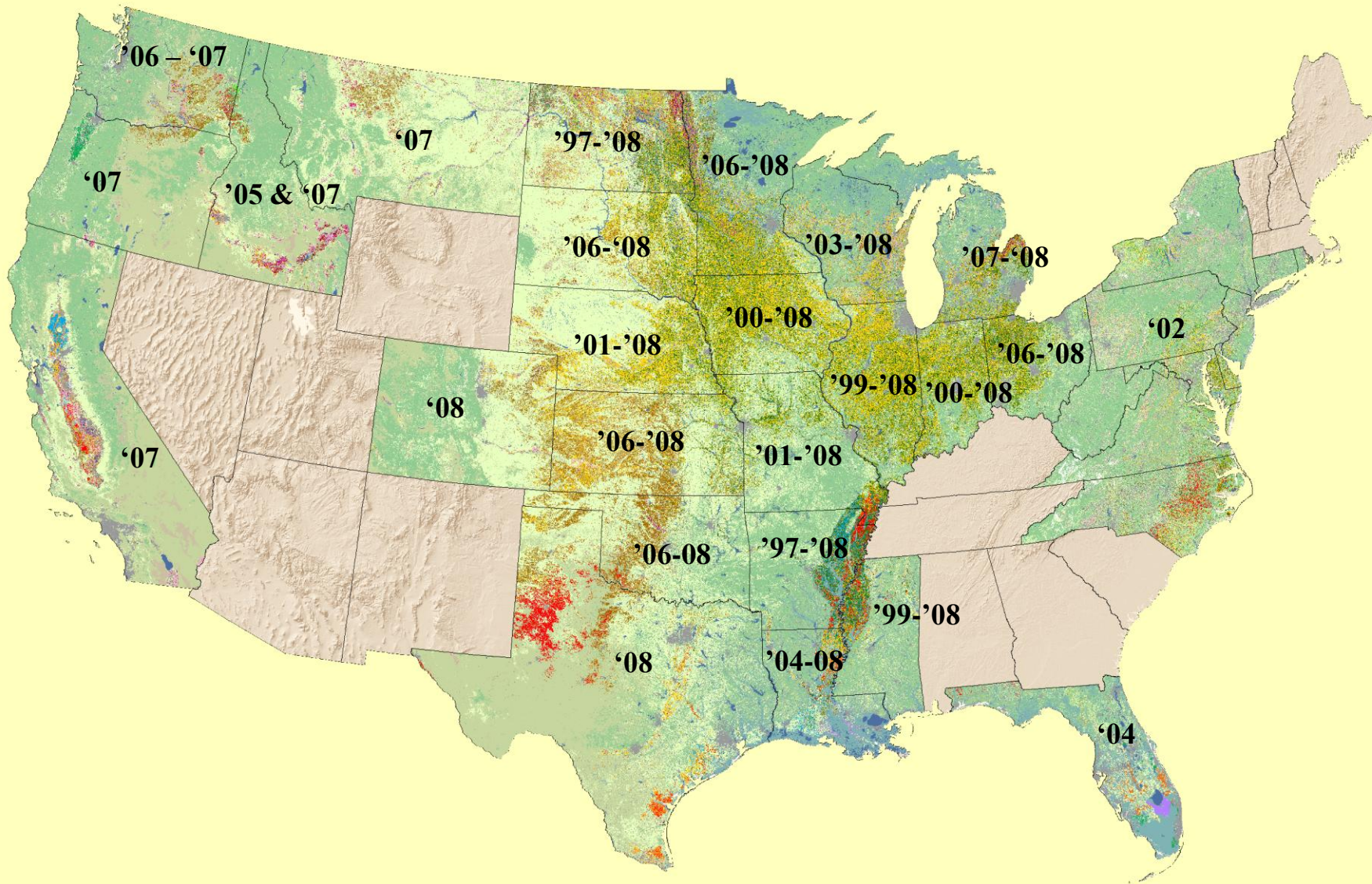
Remote Sensing Acreage Estimation Program Objectives

- “Census by Satellite”
 - Without area duplication
 - Major corn and soybean regions

- Provide timely, accurate, useful independent estimates
 - Measurable error
 - County and state level

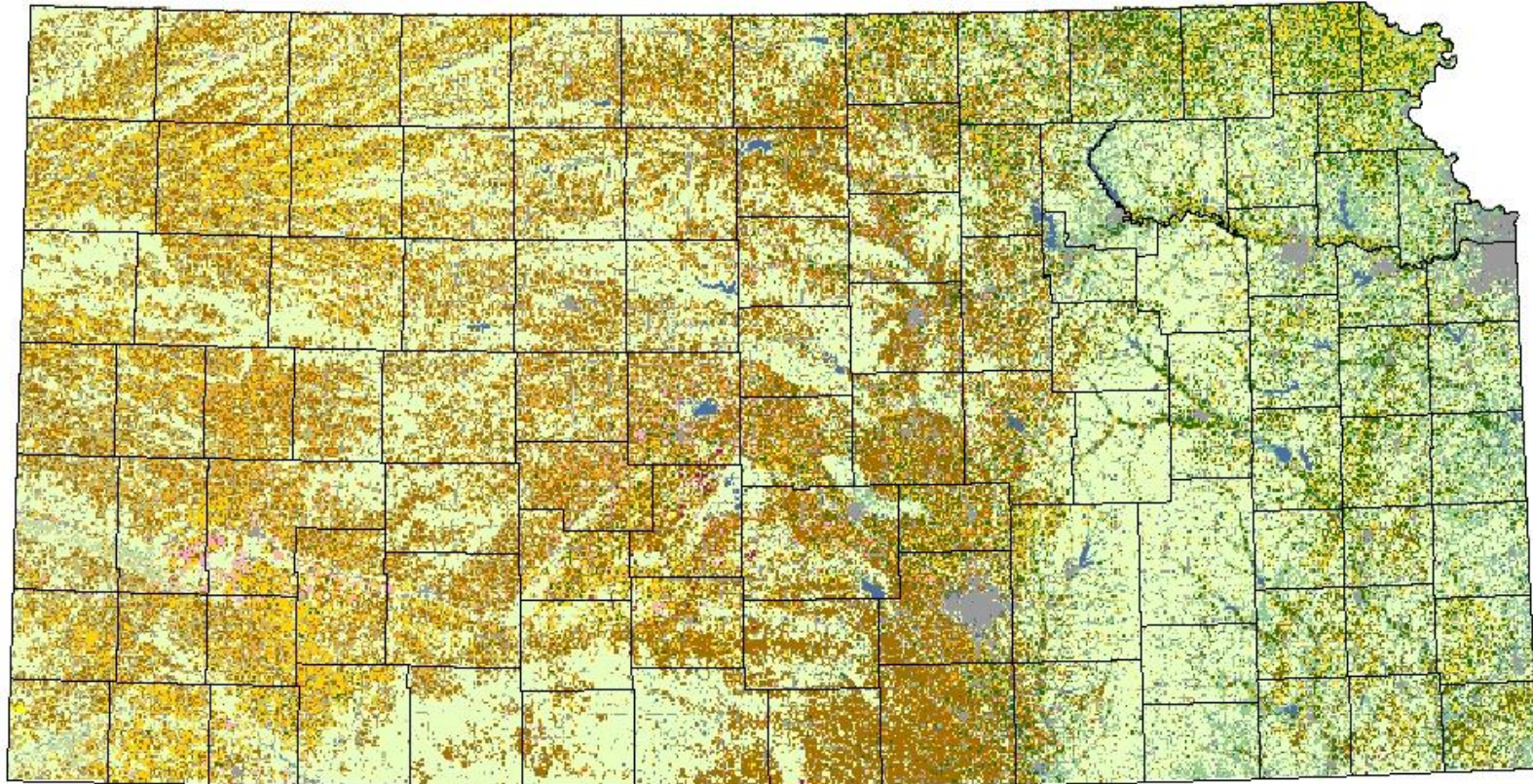
- Output crop specific Cropland Data Layer
 - Distribute free to public [NRCS Geospatial Data Gateway](http://www.nrcs.usda.gov/research/Cropland/SARS1a.htm) or <http://www.nass.usda.gov/research/Cropland/SARS1a.htm>
 - Publish accuracy statistics/metadata
 - County and state level

Cropland Data Layers 1997 - 2008





Kansas 2008 Cropland Data Layer



Land Cover Categories

(Ordered by Decreasing Acreage)

Agriculture

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

- W. Wht./Soy. Dbl. Crop.
- Sunflowers
- Rye
- Cotton
- Other Small Grains
- Clover/Wildflowers
- Oats

- Potatoes
- Seed/Sod Grass
- Canola
- Millet
- Other Crops
- Barley
- Other Tree Nuts & Fruits

Non-Agriculture

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

Cropland Data Layer Program Components



- Advanced Wide Field Sensor (AWiFS) data
- Ground truth: FSA/CLU + 578 & NLCD
- Ancillary data sets
- Commercial Software Suite
- See5 Decision Tree Methodology
- Estimation
- Research

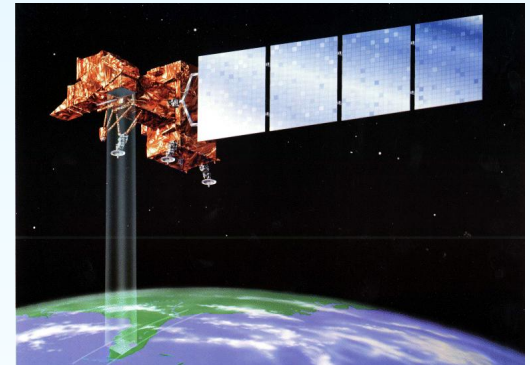
Landsat Imagery

1997-2005

Landsat 5 launched 1984 (3 yr design life!)

- Thematic Mapper (TM) Sensor

Landsat 7 launched 1999 Thematic Mapper (ETM+) Sensor



The Landsat Data Gap

Landsat 7 ETM+



Landsat 5 TM



News Release

November 30, 2005 Ron Beck

Landsat 5 Experiencing Technical Difficulties

On November 26, 2005, the back-up solar array drive on Landsat 5 began exhibiting unusual behavior. The solar array drive maintains the proper pointing angle between the solar array and the sun. The rotation of the solar array drive became sporadic and the solar array was not able to provide the power needed to charge the batteries. Maintaining power to the batteries is critical to sustain proper operation of the spacecraft. The primary solar array drive failed under similar circumstances last January. As a result of this current situation, imaging operations will be suspended for at least the next two weeks or until attempts to solve the problem have been resolved.

Source: USGS, Landsat Project:

http://landsat.usgs.gov/slc_enhancements/slc_off_level1_standard.php

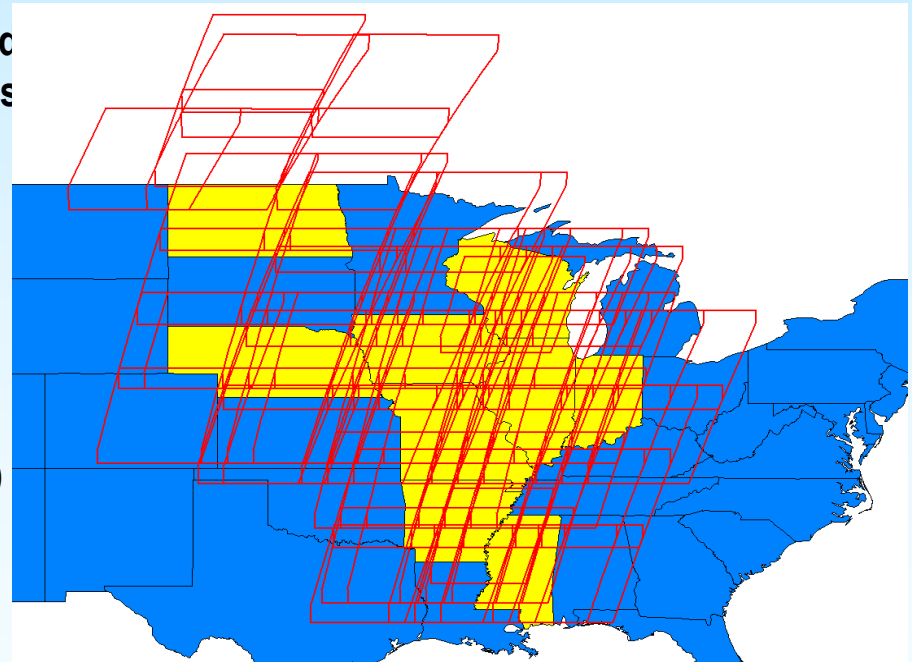
Indian Remote Sensing Satellite: RESOURCESAT-1

Advanced Wide Field Sensor (AWiFS)

States Targeted for Data Collection in August 2004

- **AWiFS:** Swath: 370 km each head, 740 km combined
56 m resolution at nadir, 70 m resolution at field edges
- **Spectral Bands**
- **B2: 0.52-0.59 (Visible Green)**
- **B3: 0.62-0.68 (Visible Red)**
- **B4: 0.77-0.86 (Near Infrared)**
- **B5: 1.55-1.70 (Shortwave Infrared)**

- **Temporal Resolution (5 Days)**

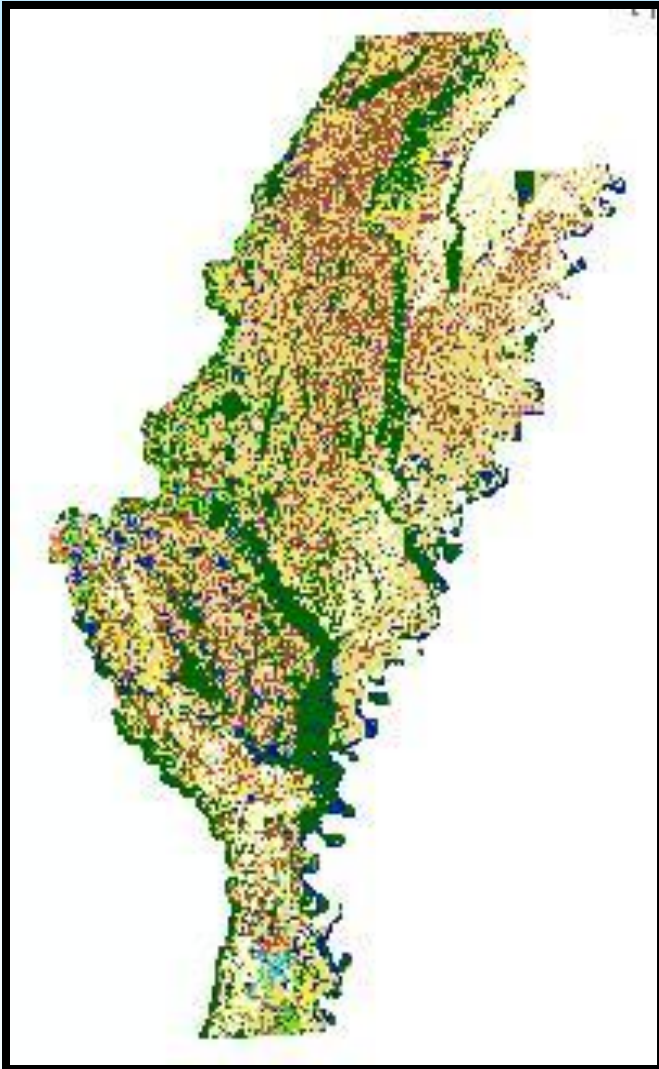


Sensor Specifications Compared

	<u>TM</u>	<u>AWiFS</u>
Altitude	705 km	817 km
Equatorial crossing time	9:45 ± 15 minutes	10:30 ± 5 minutes
Temporal Resolution	16 days	5 days
Spatial Resolution	30 x 30 m (reflective) 120 x 120 m (thermal)	56 x 56 m
Radiometric Resolution	8 bit (256)	10 bit (1024)
Spectral Resolution	6 (B, G, R, NIR, SWIR, MIR) + Thermal IR	4 (G, R, NIR, SWIR)
Swath wide	185 km	737 km
Scene size	184 x 152 km	370 x 370 km

Crop Acreage Estimation:

Landsat TM and AWiFS Assessments 2004-2005



- Nebraska, 2004
- Arkansas (Delta Region), 2005
- Nebraska, 2005
- Coincident studies (AR, IL, IA) 2005

Need for Coincident Imagery

The best classification comparison would use not only data from the **same area** but from the **same time**. Thus controlling for variables including:



Atmospherics conditions

- Clouds
- Haze
- Smoke

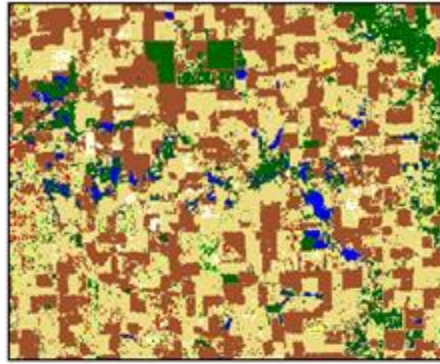
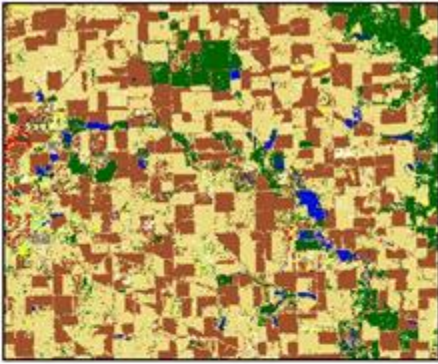
Ground conditions

- Soil moisture
- Vegetation phenology

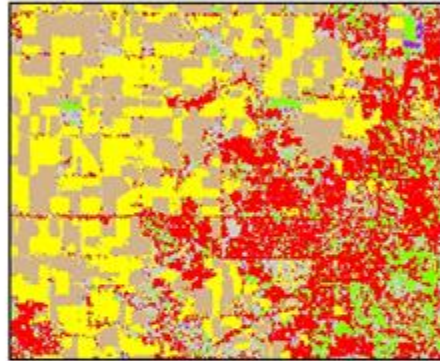
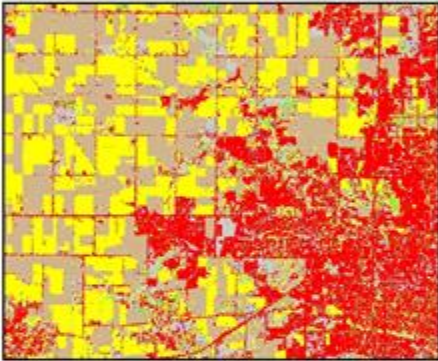
Sun angle

- Seasonal variation

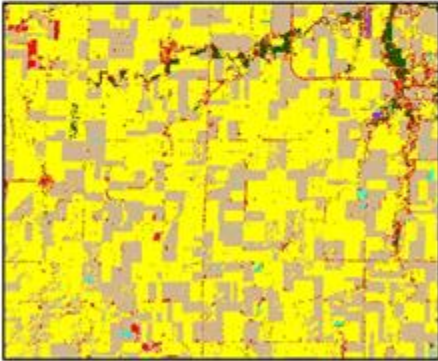
Arkansas



Iowa

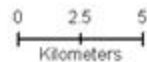
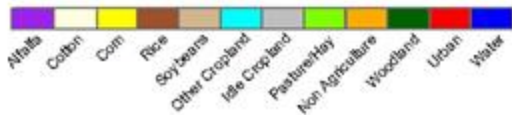


Illinois



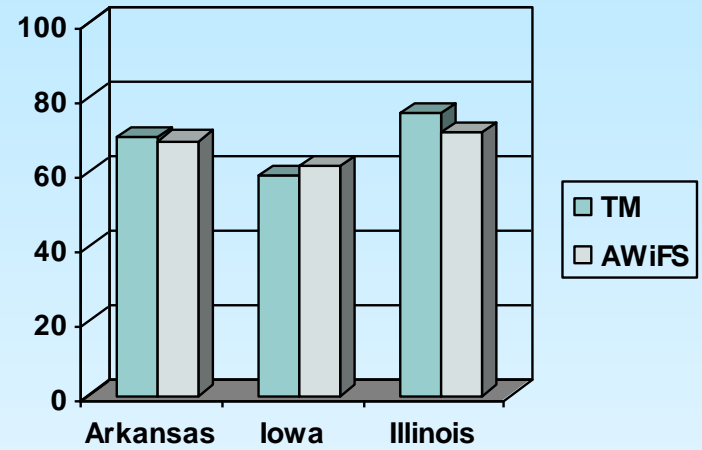
Landsat-5 TM

Resourcesat-1 AWiFS

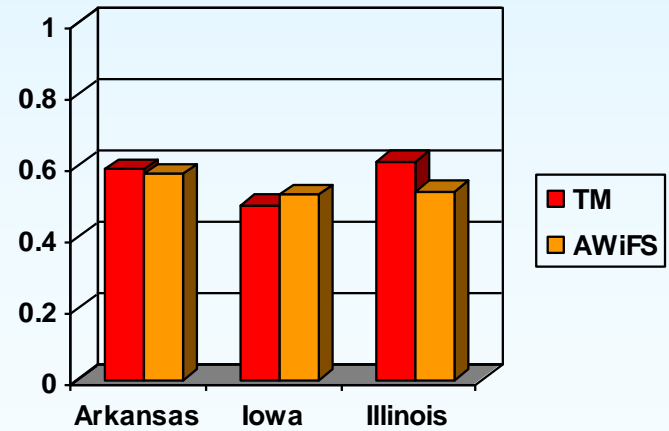


Results

Overall Accuracy



Overall Kappa



Conclusions:

AWiFS vs. TM evaluations 2004-2005

- AWiFS data are acceptable for crop acreage estimation over large crop areas such as the Midwest, the Delta and the Northern Great Plains.
- Improvements in classification accuracy are achieved due to increased temporal frequency of the AWiFS sensor (5 day) vs. the TM sensor (16 day) repeat cycle.
- The large footprint of the AWiFS sensor provides the opportunity to utilize training and ancillary data over large areas which leads to improved classification accuracies and production efficiencies.



IRS Resourcesat-1 AWiFS Imagery

340 km swath per head
740 km combined

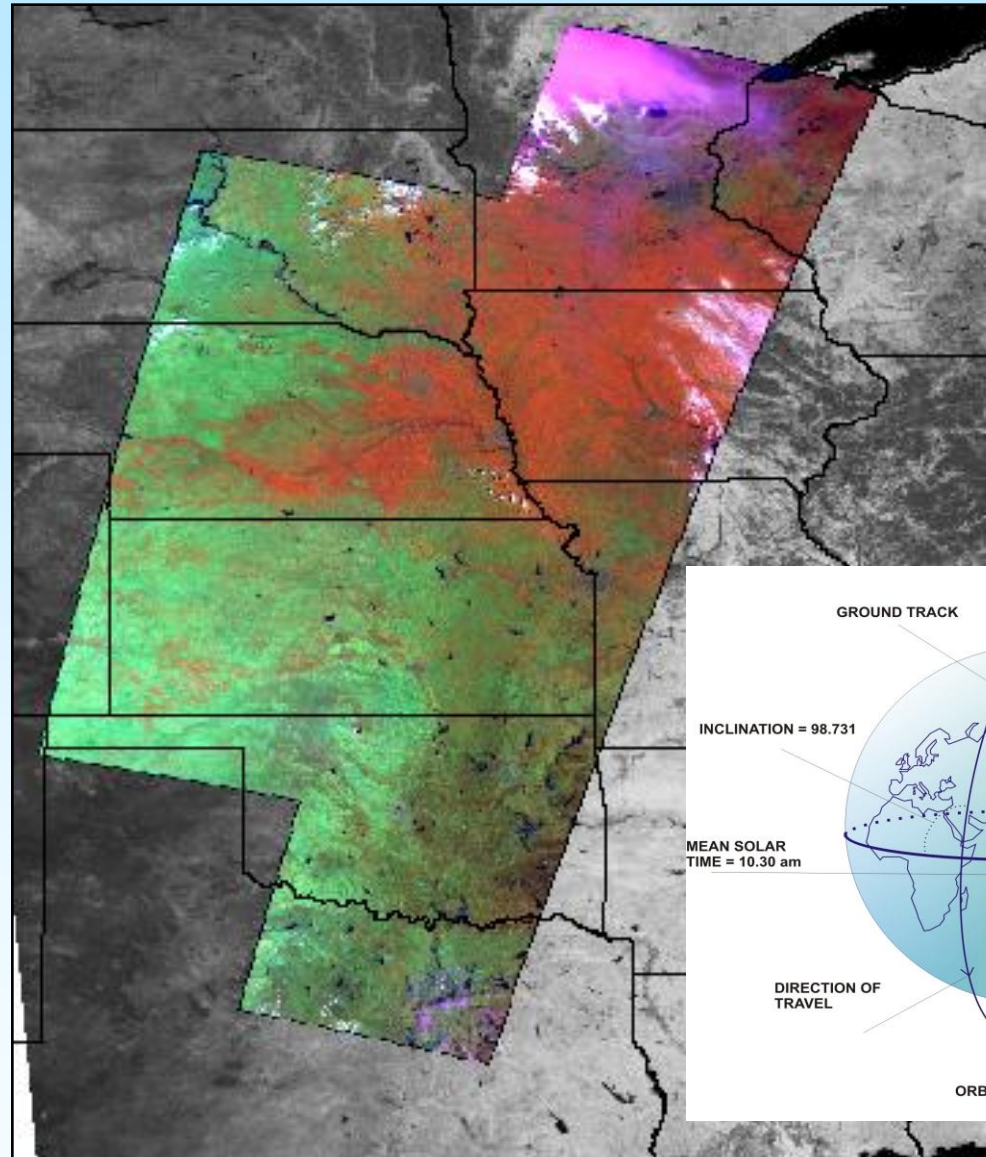
5-day revisit

4 spectral bands

- B2: 0.52 - 0.59
- B3: 0.62 - 0.68
- B4: 0.76 - 0.86
- B5: 1.55 - 1.7

56 m nadir/70 m field edges

Data provided by Arctic Slope
Regional Corporation



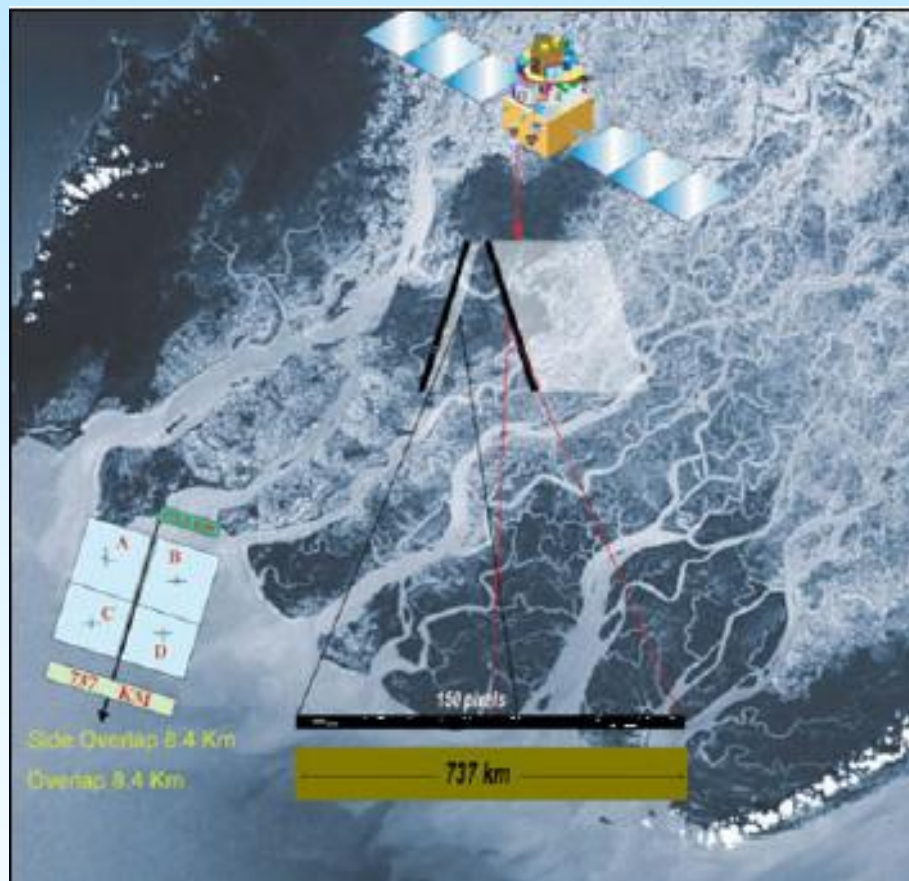
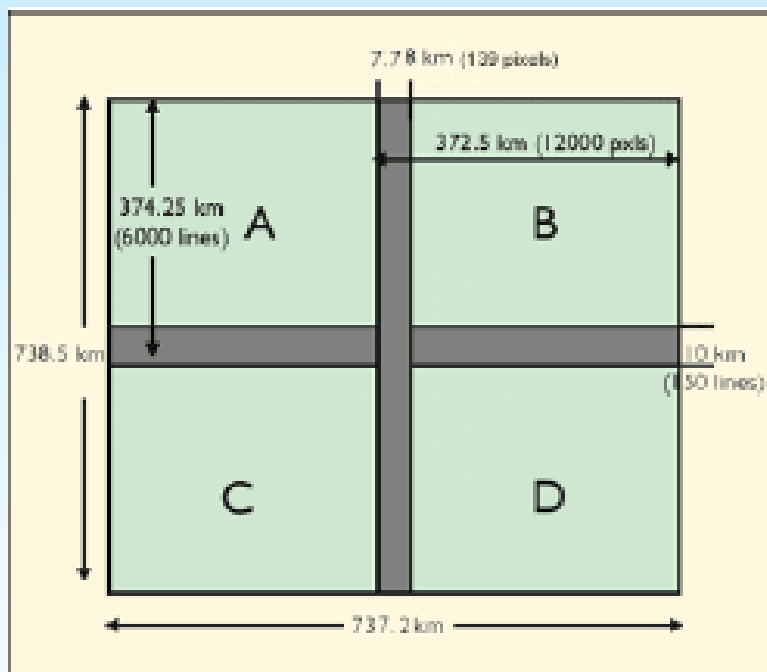
13 Aug 2007



Department of Space
Indian Space Research Organisation

IRS Resourcesat-1 AWiFS Imagery

- The AWiFS camera is split into two separate electro-optic modules (AWiFS-A and AWiFS-B) tilted by 11.94 degrees with respect to nadir



USDA Satellite Image Archive

Active Paths for P6-AWiFS CONUS

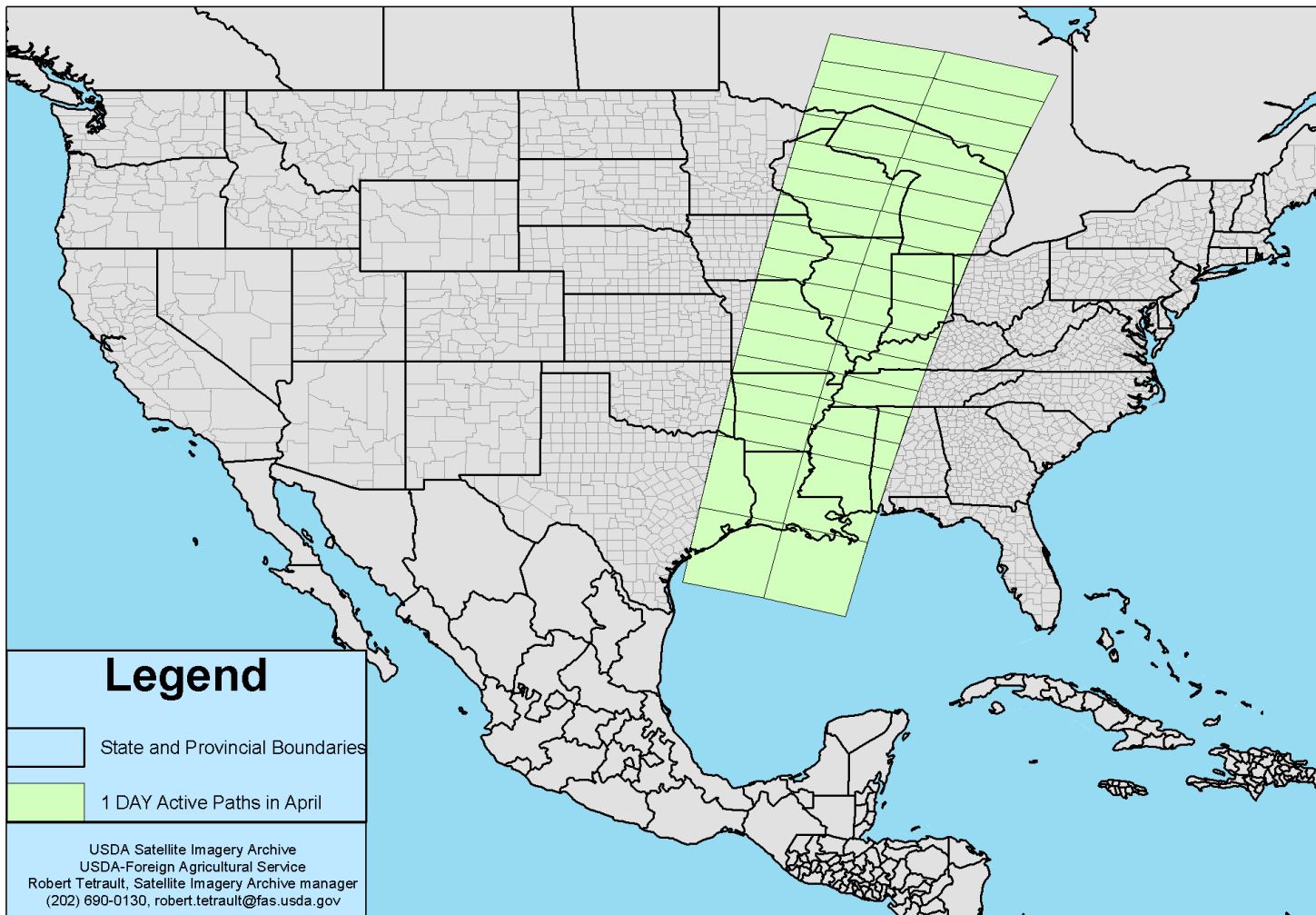
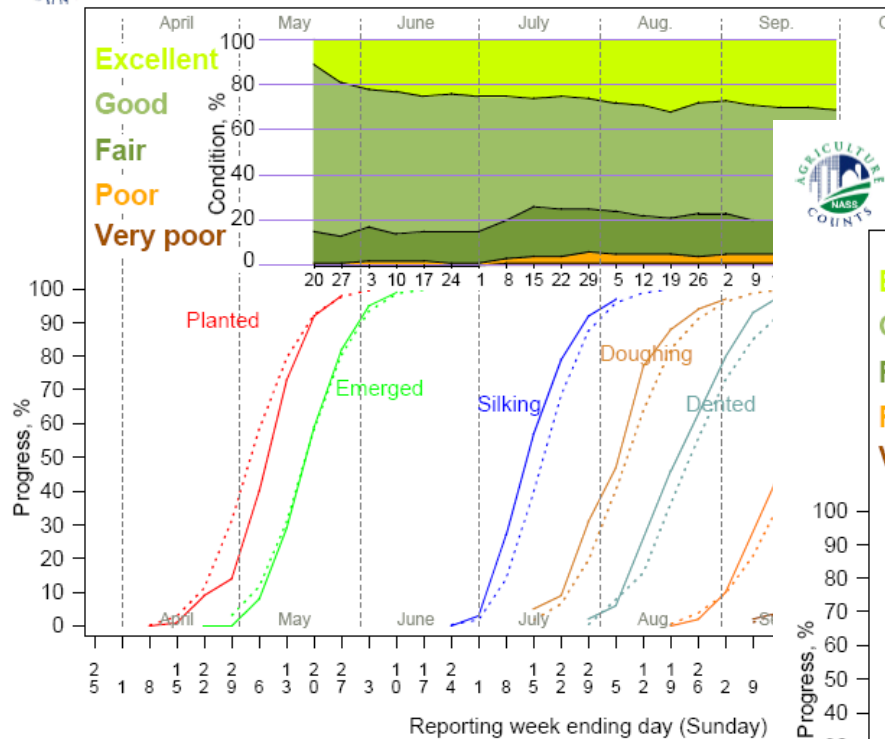


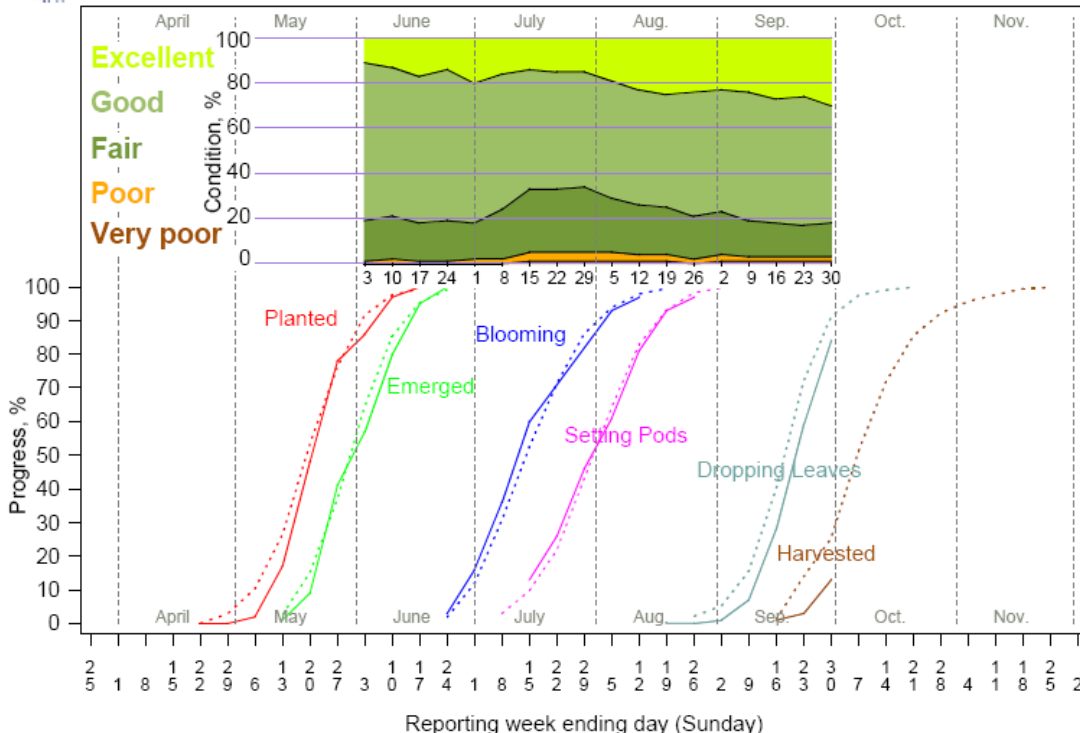
Image Timing



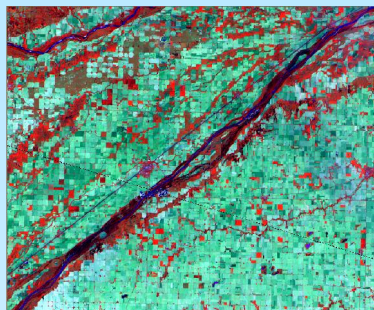
Crop Progress: Corn in Nebraska, 2007
 _____ 2007, _____ 2002-2006 Average



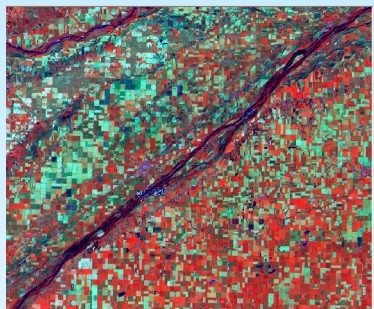
Crop Progress: Soybeans in Nebraska, 2007
 _____ 2007, _____ 2002-2006 Average



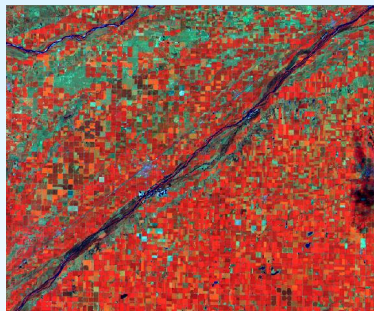
AWiFS Imagery Time Series



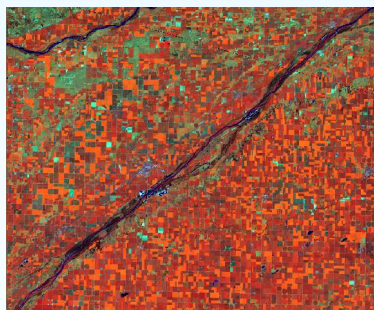
May 18



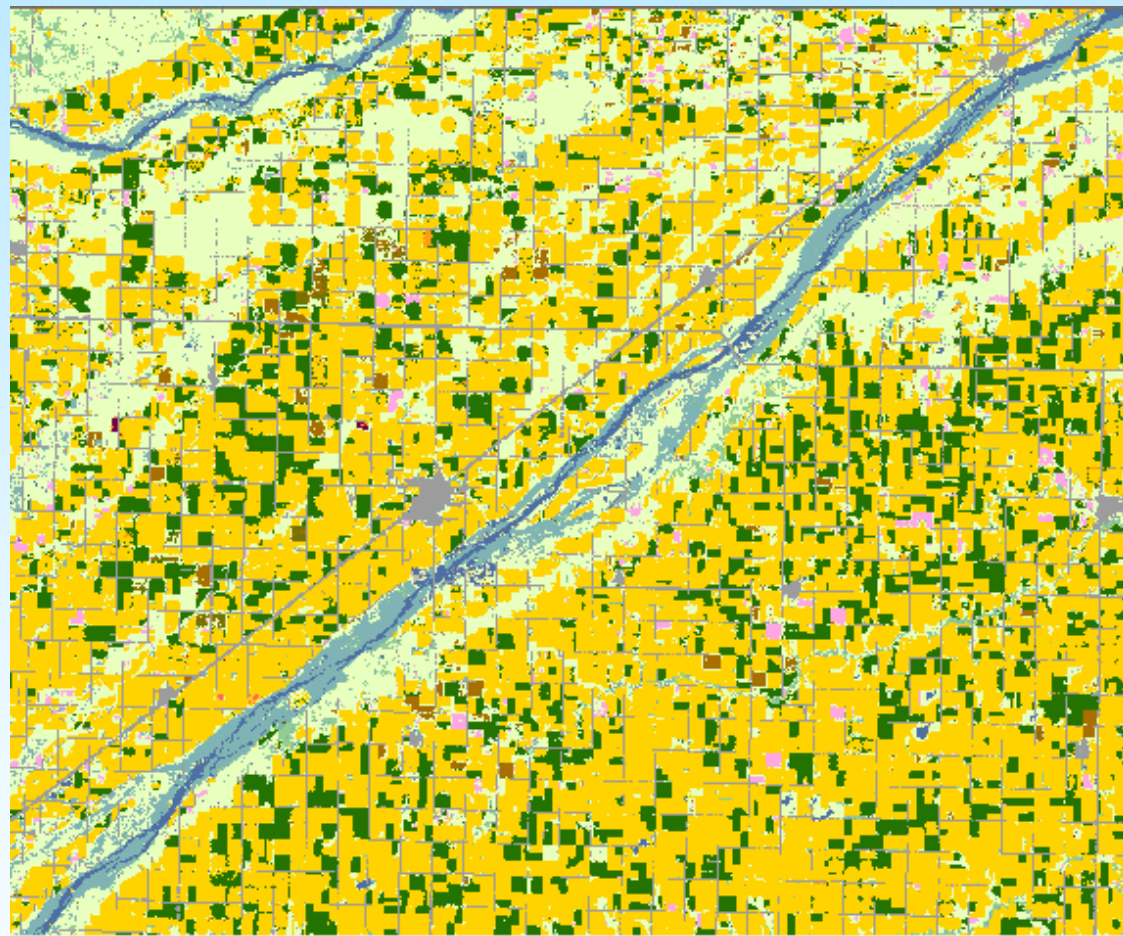
June 21



July 15



Aug 27

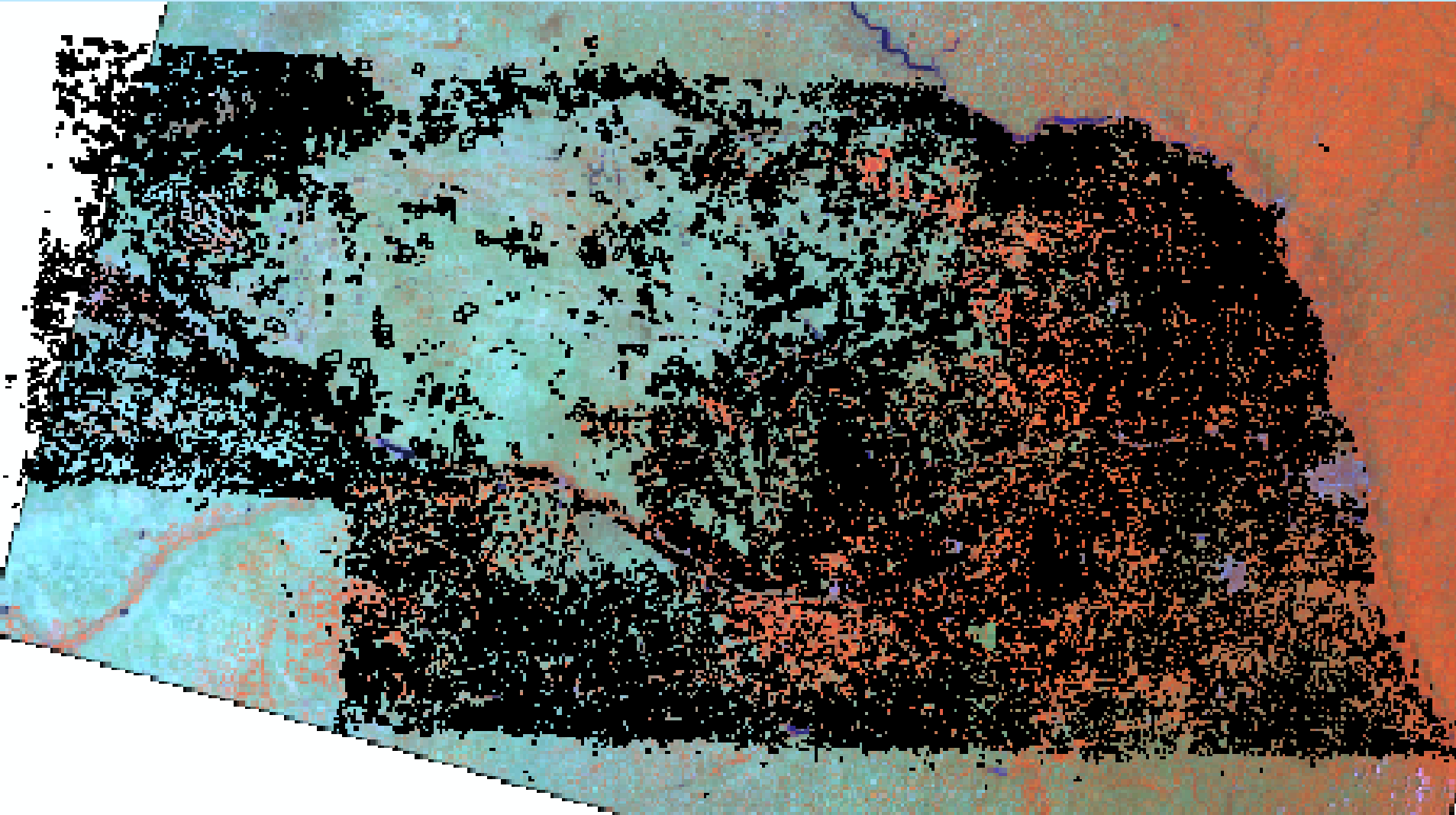


Cropland Data Layer Program Components

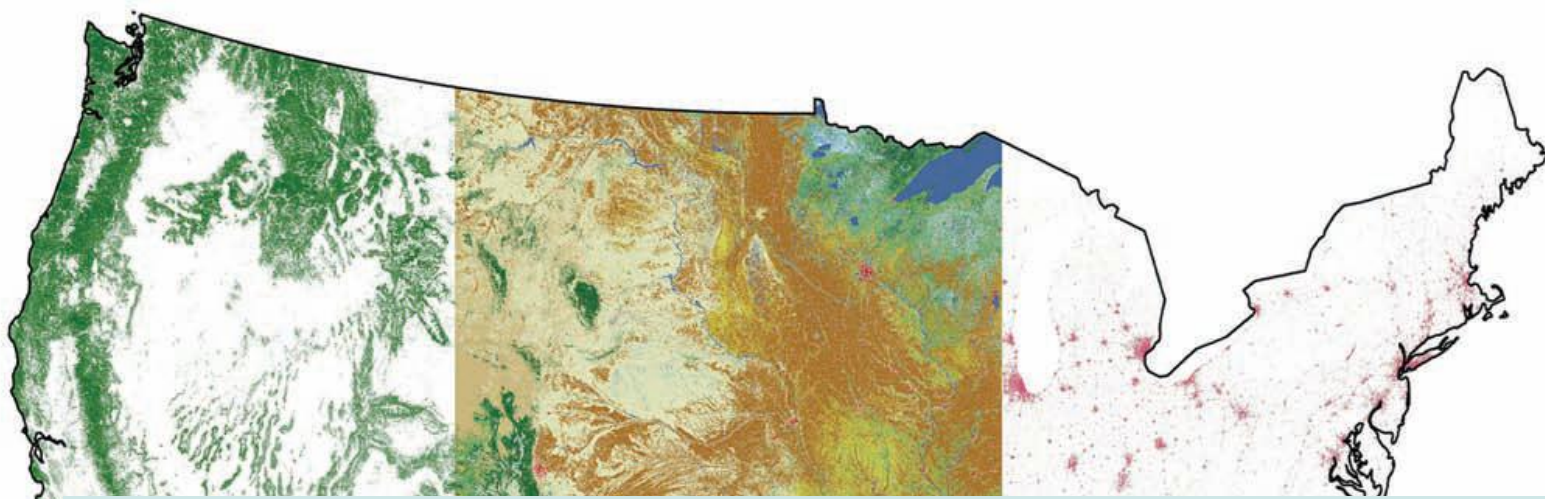


- Advanced Wide Field Sensor (AWiFS)
- Ground truth: FSA/CLU + 578 & NLCD
- Ancillary data sets
- Commercial Software Suite
- See5 Decision Tree Methodology
- Estimation
- Research

Ground Truth - Agriculture

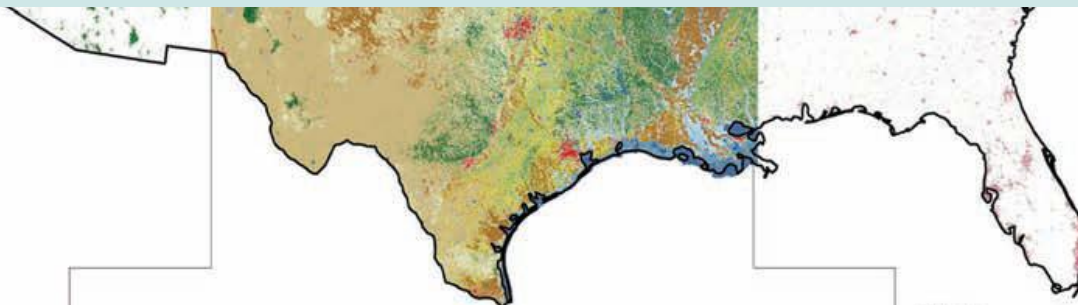


NASS June Agricultural Survey (JAS) data still
used for acreage estimation

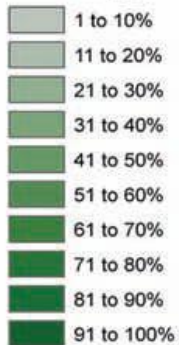


Non-Agricultural Ground Truth

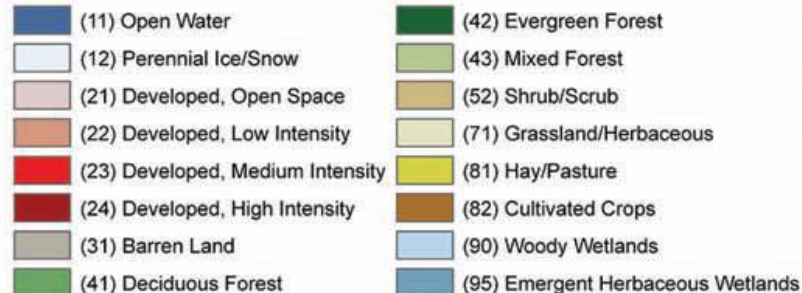
USGS, National Land Cover Dataset 2001



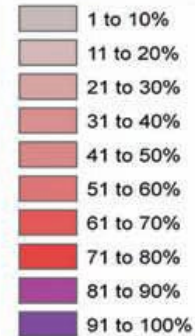
Tree canopy



Land Cover Class Value and Description



Urban Imperviousness

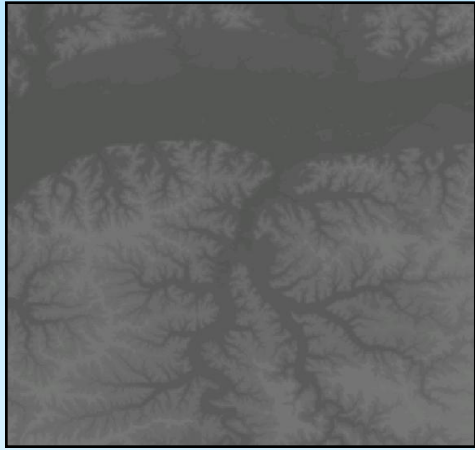


Cropland Data Layer Program Components

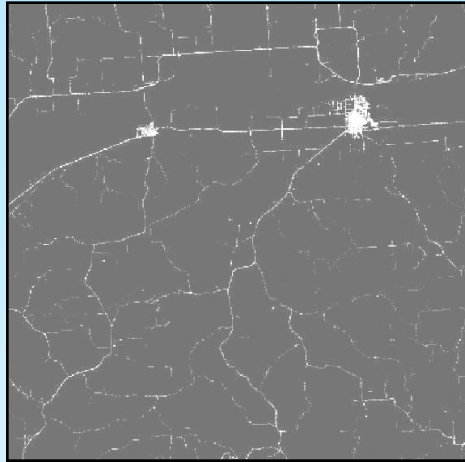


- Landsat TM and ETM+ vs. Advanced Wide Field Sensor (AWiFS)
- Ground truth: FSA/CLU + 578 & NLCD
- Ancillary data
- Commercial Software Suite
- See5 Decision Tree Methodology

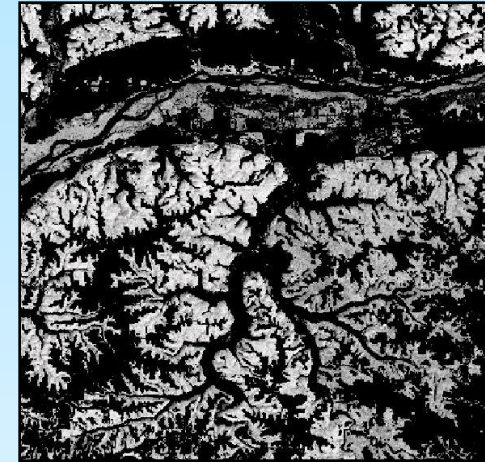
Ancillary Data – USGS/NASA Products



Elevation

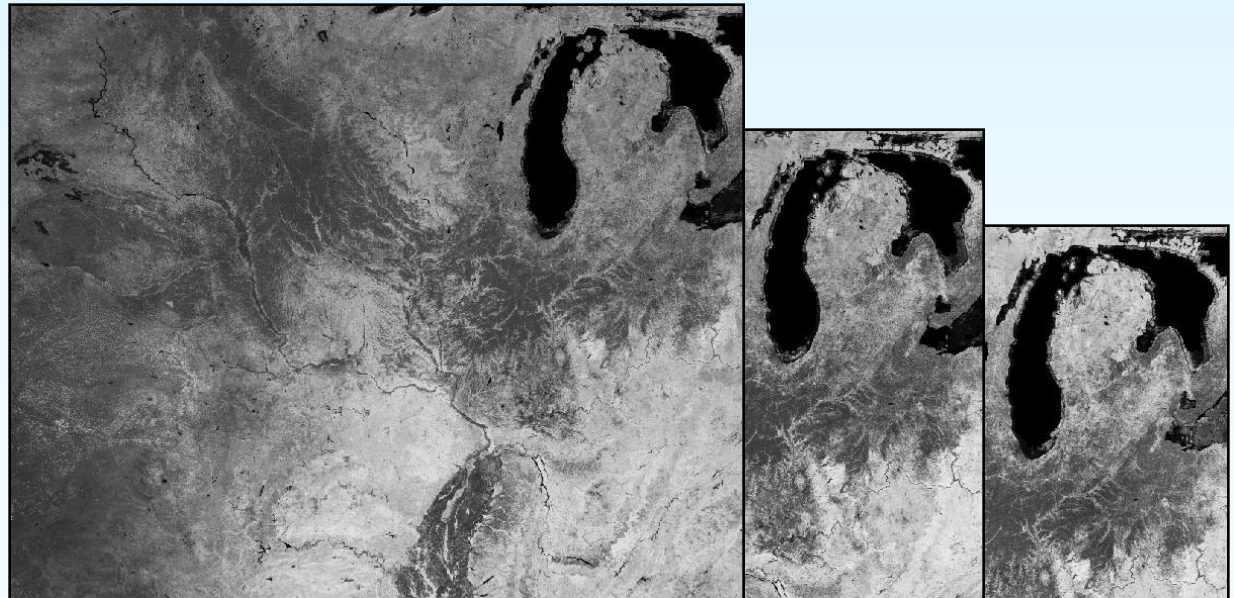


Imperviousness



Forest Canopy

NASA MODIS Terra
(16-day NDVI composite)



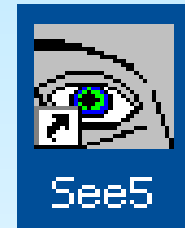
Cropland Data Layer Program Components



- Advanced Wide Field Sensor (AWiFS)
- Ground truth: FSA/CLU + 578 & NLCD
- Ancillary data sets
- Commercial Software Suite
- See5 Decision Tree Methodology
- Estimation
- Research

Commercial Software Suite

- Imagery Preparation
 - Leica Geosystems ERDAS Imagine
- Image classification
 - Decision tree software
 - See5.0 www.rulequest.com
- Ground Truth Preparation
 - ESRI ArcGIS
- Acreage Estimation
 - SAS/IML workshop



```

5dates.out - WordPad
File Edit View Insert Format Help

See5 [Release 2.03] Tue Dec 26 09:20:26 2006
-----

Options:
  10 boosting trials

Class specified by attribute `dep'

Read 62526 cases (23 attributes) from 5dates.data

----- Trial 0: -----

Decision tree:

band15 > 59:
...band14 <= 34:
:   ...band01 > 33:
:   :   ...band04 > 113: 8 (76)
:   :   :   band04 <= 113:
:   :   :   :   ...band07 > 105:
:   :   :   :   :   ...band05 <= 21: 3 (5/1)
:   :   :   :   :   :   band05 > 21:
:   :   :   :   :   :   :   ...band18 > 25: 1 (24)
:   :   :   :   :   :   :   :   band18 <= 25:
:   :   :   :   :   :   :   :   :   ...band08 > 66: 1
:   :   :   :   :   :   :   :   :   :   band08 <= 66:
:   :   :   :   :   :   :   :   :   :   :   ...band08 <=
:   :   :   :   :   :   :   :   :   :   :   :   band08 > 6
:   :   :   :   :   :   :   :   :   :   :   :   :   band07 <= 105:
:   :   :   :   :   :   :   :   :   :   :   :   :   :   ...band14 > 27:
:   :   :   :   :   :   :   :   :   :   :   :   :   :   :   ...band06 <= 21: 3 (2
:   :   :   :   :   :   :   :   :   :   :   :   :   :   :   :   band06 > 21:

```

Classifier Construction Options

Winnow attributes

Rulesets

Sort by utility bands

Boost trials

Subsets of values

Use sample of %

Lock sample

Cross-validate folds

Ignore costs file

Advanced options

Fuzzy thresholds

Global pruning

Pruning CF %


Minimum cases

OK Defaults Cancel

```

See5
File Edit Help

```

 **hypothyroid**

[class and attribute definitions \(hypothyroid.names\)](#)

[training cases to be analyzed \(hypothyroid.data\)](#)

[test cases \(hypothyroid.test\)](#)

[misclassification costs \(hypothyroid.costs\)](#)

[decision tree classifier \(hypothyroid.tree\)](#)

[ruleset classifier \(hypothyroid.rules\)](#)

[output file \(hypothyroid.out\)](#)

See5 Decision Tree Classifier

State-of-the-art technique for image classification

- Relatively cheap (\$750)

Incorporates a powerful ensemble method known as “boosting”

The “NLCD Mapping Tool” was integrated into ERDAS Imagine

- Provided gratis by USGS

NLCD Mapping Tool

Percent Calculation ...

NLCD Sampling Tool ...

Cubist Classifier...

See5 Classifier...

Accuracy Assessment...

Smart Eliminate...

Cubist Info See5 Info

Close



See5 Decision Tree Classifier

Advantages

- Efficient to construct and capable of handling large and complex data sets
- Ingests up to 83 bands of data and three million sampling points
- Incorporates missing and non-continuous data
- Tolerant of outliers (i.e., clouds and errors in ground truth)
- Names files can be altered and different inputs run through classifier (Great for Testing!!)

```
File Edit Format View Help
|| Generated with cubstinput v2.0 by MDA Federal
|| Sampling option      : Percentage
|| Training percent requested : 100.00
|| Validation percent requested: 0.00
|| Minimum samples requested : 0
|| Ignored values       : 0, 181, 182, 200, 204, 215, 217, 255
|| Training samples present : 542802
|| Validation samples present : 0
|| Sample method        : Stratified Random
|| Output Format         : See5

dep.      |y:/nebraska/groundtruth/fsa_c1u_training_ne_mrg_irrig.img(:Layer_1)

xcoord: ignore.
ycoord: ignore.
band01: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_1)
band02: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_2)
band03: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_3)
band04: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_4)
band05: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_1)
band06: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_2)
band07: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_3)
band08: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_4)
band09: continuous. |y:/nebraska/scene/awifs_070706_270_35c-40abcd_ne_test_extent.img(:Layer_1)
band10: continuous. |y:/nebraska/scene/awifs_070706_270_35c-40abcd_ne_test_extent.img(:Layer_2)
band11: continuous. |y:/nebraska/scene/awifs_070706_270_35c-40abcd_ne_test_extent.img(:Layer_3)
band12: continuous. |y:/nebraska/scene/awifs_070706_270_35c-40abcd_ne_test_extent.img(:Layer_4)
band13: continuous. |y:/nebraska/scene/awifs_070827_266_40bcd-45ab.img_ne_test_extent.img(:Layer_1)
band14: continuous. |y:/nebraska/scene/awifs_070827_266_40bcd-45ab.img_ne_test_extent.img(:Layer_2)
band15: continuous. |y:/nebraska/scene/awifs_070827_266_40bcd-45ab.img_ne_test_extent.img(:Layer_3)
band16: continuous. |y:/nebraska/scene/awifs_070827_266_40bcd-45ab.img_ne_test_extent.img(:Layer_4)
band17: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070509-1129_ne_test_extent.img(:Layer_1)
band18: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070525-1145_ne_test_extent.img(:Layer_1)
band19: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070610-1161_ne_test_extent.img(:Layer_1)
band20: ignore.
band21: ignore.
band22: ignore.
band23: ignore.
band24: ignore.
band25: ignore.
band26: ignore.
band27: ignore.

File Edit Format View Help
|| Generated with cubstinput v2.0 by MDA Federal
|| Sampling option      : Percentage
|| Training percent requested : 100.00
|| Validation percent requested: 0.00
|| Minimum samples requested : 0
|| Ignored values       : 0, 181, 182, 200, 204, 215, 217, 255
|| Training samples present : 542802
|| Validation samples present : 0
|| Sample method        : Stratified Random
|| Output Format         : See5

dep.      |y:/nebraska/groundtruth/fsa_c1u_training_ne_mrg_irrig.img(:Layer_1)

xcoord: ignore.
ycoord: ignore.
band01: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_1)
band02: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_2)
band03: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_3)
band04: continuous. |y:/nebraska/scene/awifs_070518_265_35cd-40abcd_ne_test_extent.img(:Layer_4)
band05: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_1)
band06: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_2)
band07: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_3)
band08: continuous. |y:/nebraska/scene/awifs_070607_269_40bc-45a_ne_test_extent.img(:Layer_4)
band09: ignore.
band10: ignore.
band11: ignore.
band12: ignore.
band13: ignore.
band14: ignore.
band15: ignore.
band16: ignore.
band17: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070509-1129_ne_test_extent.img(:Layer_1)
band18: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070525-1145_ne_test_extent.img(:Layer_1)
band19: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070610-1161_ne_test_extent.img(:Layer_1)
band20: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070712-1193_ne_test_extent.img(:Layer_1)
band21: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070728-1209_ne_test_extent.img(:Layer_1)
band22: continuous. |y:/nebraska/modis/modis_16-day-ndvi_070813-1225_ne_test_extent.img(:Layer_1)
band23: continuous. |y:/nebraska/nlcd_dem_ancillary/ned_aspect_nebraska_test_cnty.img(:Layer_1)
band24: continuous. |y:/nebraska/nlcd_dem_ancillary/ned_elevation_nebraska_test_cnty.img(:Layer_1)
band25: continuous. |y:/nebraska/nlcd_dem_ancillary/ned_slope_nebraska_test_cnty.img(:Layer_1)
band26: continuous. |y:/nebraska/nlcd_dem_ancillary/nlcd_canopy_nebraska_test_cnty.img(:Layer_1)
band27: continuous. |y:/nebraska/nlcd_dem_ancillary/nlcd_impervious_nebraska_test_cnty.img(:Layer_1)
```


Accuracy Measures



User's Accuracy:

indicates the probability that a pixel from the classification actually matches the ground truth data and measures errors of commission

Errors of Commission:

occur when a pixel is included in an incorrect category

Producer's Accuracy:

relates to the probability that a ground truth pixel will be correctly mapped and measures errors of omission.

Errors of Omission:

occur when a pixel is excluded from the correct category

Accuracy Assessment

```

Crop-specific covers only *Correct Accuracy Error Kappa
-----
OVERALL ACCURACY          740009  93.56%  6.44%  0.8488
  
```

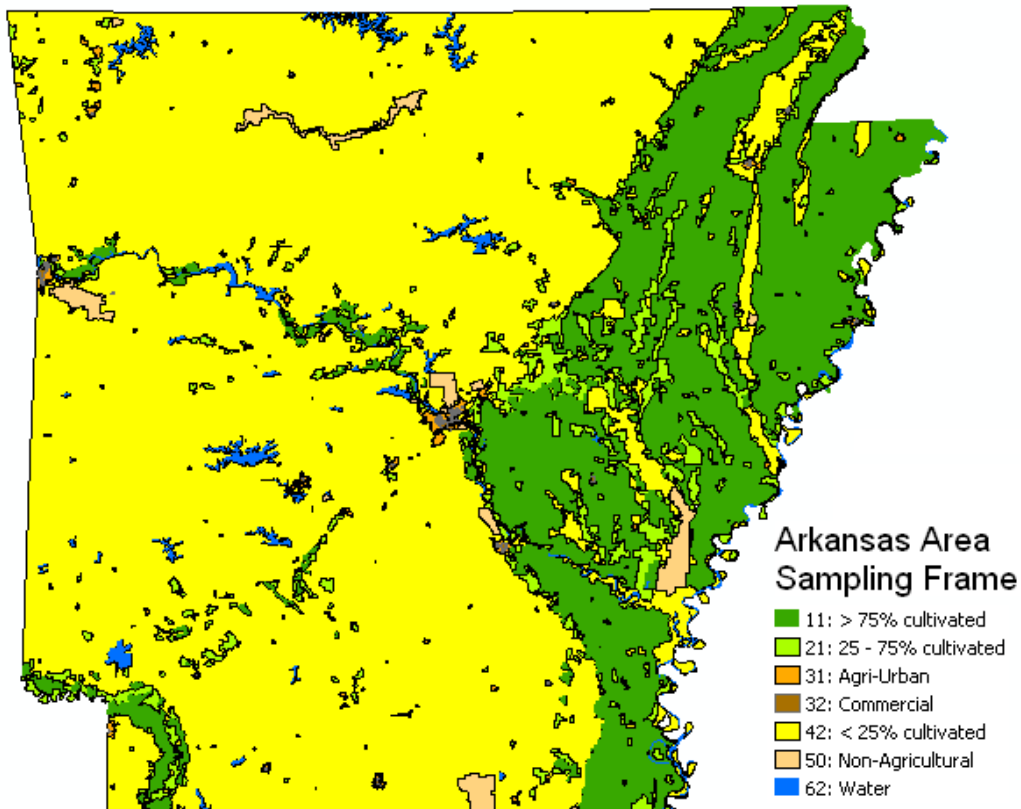
Cover Type	Attribute Code	*Correct Pixels	Producer's Accuracy	Omission Error	Kappa	User's Accuracy	Commission Error	Cond'1 Kappa
Corn	1	28358	95.36%	4.64%	0.9528	93.08%	6.92%	0.9297
Cotton	2	11757	95.08%	4.92%	0.9505	94.59%	5.41%	0.9456
Rice	3	2	28.57%	71.43%	0.2857	66.67%	33.33%	0.6667
Sorghum	4	21251	89.85%	10.15%	0.8972	92.46%	7.54%	0.9236
Soybeans	5	12885	86.15%	13.85%	0.8604	88.61%	11.39%	0.8851
Sunflowers	6	102	89.47%	10.53%	0.8947	99.03%	0.97%	0.9903
Peanuts	10	512	90.14%	9.86%	0.9014	92.09%	7.91%	0.9208
Barley	21	785	71.95%	28.05%	0.7194	97.39%	2.61%	0.9739
Durum Wheat	22	48	42.86%	57.14%	0.4286	100.00%	0.00%	1.0000
Spring Wheat	23	205	56.47%	43.53%	0.5647	99.03%	0.97%	0.9903
Winter Wheat	24	580437	97.54%	2.46%	0.9631	94.00%	6.00%	0.9117
Other Small Grains	25	1120	56.97%	43.03%	0.5694	93.57%	6.43%	0.9356
Win Wht /Soyb Dbl Crop	26	14758	79.51%	20.49%	0.7932	90.06%	9.94%	0.8996
Rye	27	13249	66.90%	33.10%	0.6664	91.39%	8.61%	0.9129
Oats	28	2941	64.85%	35.15%	0.6479	95.18%	4.82%	0.9517
Millet	29	439	77.02%	22.98%	0.7701	96.48%	3.52%	0.9648
Canola	31	337	75.90%	24.10%	0.7590	98.83%	1.17%	0.9883
Alfalfa	36	19653	88.21%	11.79%	0.8807	91.78%	8.22%	0.9168
Dry Beans	42	115	88.46%	11.54%	0.8846	93.50%	6.50%	0.9350
Potatoes	43	49	96.08%	3.92%	0.9608	100.00%	0.00%	1.0000
Other Crops	44	50	45.87%	54.13%	0.4587	80.65%	19.35%	0.8064
Misc Veggies & Fruits	47	33	54.10%	45.90%	0.5410	86.84%	13.16%	0.8684
Watermelon	48	24	77.42%	22.58%	0.7742	85.71%	14.29%	0.8571
Peas	53	188	72.59%	27.41%	0.7258	96.91%	3.09%	0.9691
Clover/Wildflowers	58	21	36.21%	63.79%	0.3621	75.00%	25.00%	0.7500
Fallow/Idle Cropland	61	30612	69.78%	30.22%	0.6922	90.48%	9.52%	0.9025
Peaches	67	9	36.00%	64.00%	0.3600	100.00%	0.00%	1.0000
Other Tree Nuts & Fruit	71	69	33.82%	66.18%	0.3382	83.13%	16.87%	0.8313

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

Cropland Data Layer Program Components



- Advanced Wide Field Sensor (AWiFS)
- Ground truth: FSA/CLU + 578 & NLCD
- Ancillary data sets
- Commercial Software Suite
- See5 Decision Tree Methodology
- Estimation
- Research



SECTION D - CROPS AND LAND USE ON TRACT

How many acres are inside this blue tract boundary drawn on the photo (map)?

Now I would like to ask about each field inside this blue tract boundary and its use during 2000

FIELD NUMBER		01	02	
1.	Total acres in field	828	828	828
2.	Crop or land use. [Specify]			
3.	Occupied farmstead or dwelling	843		
4.	Waste, unoccupied dwellings, buildings and structures, roads, ditches, etc.			
5.	Woodland	831	831	831
6.	Pasture	Permanent (not in crop rotation)	842	842
			856	856

**Estimation Components:
Area Sampling Frame+
June Ag Survey+
Questionnaire**

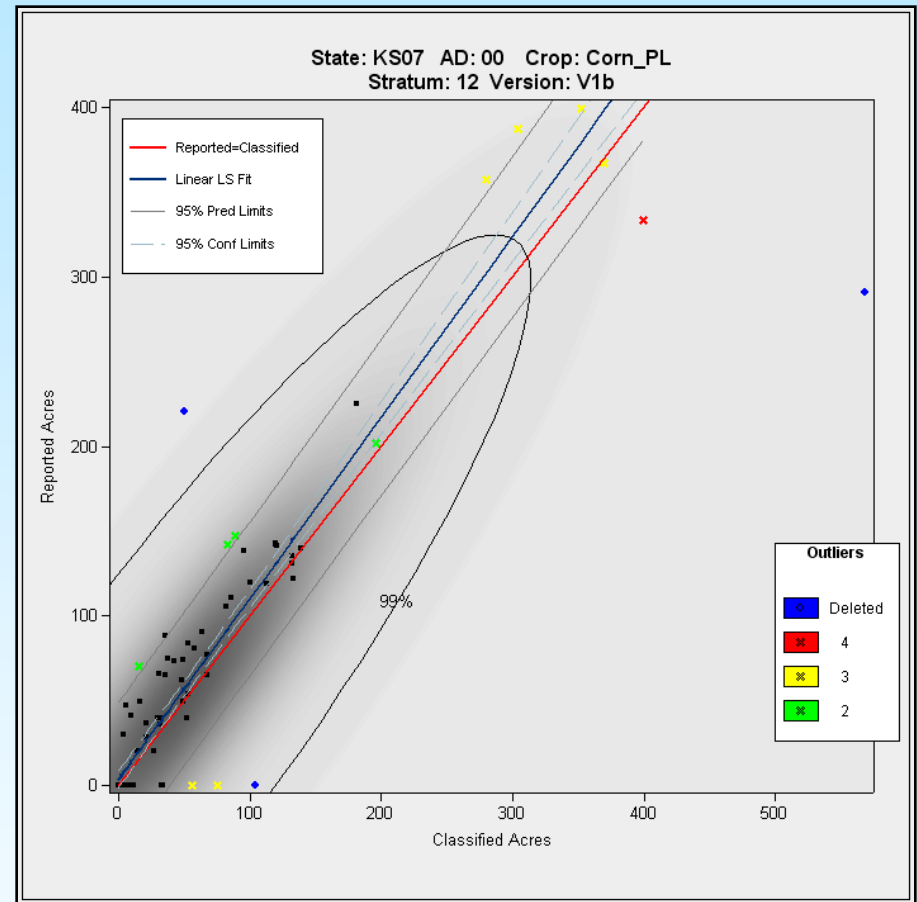
Regression-based Acreage Estimator

Regression used to relate categorized pixel counts to the ground reference data

- **(X) – Cropland Data Layer (CDL) classified acres**
- **(Y) – June Agricultural Survey (JAS) reported acres**

Using both CDL and JAS acreage results in estimates with reduced error rates over JAS alone

Outlier segment detection - correction or removal from regression analysis



Acreage not just about counting pixels

Cropland Data Layer Summary

Operational Program, 2007

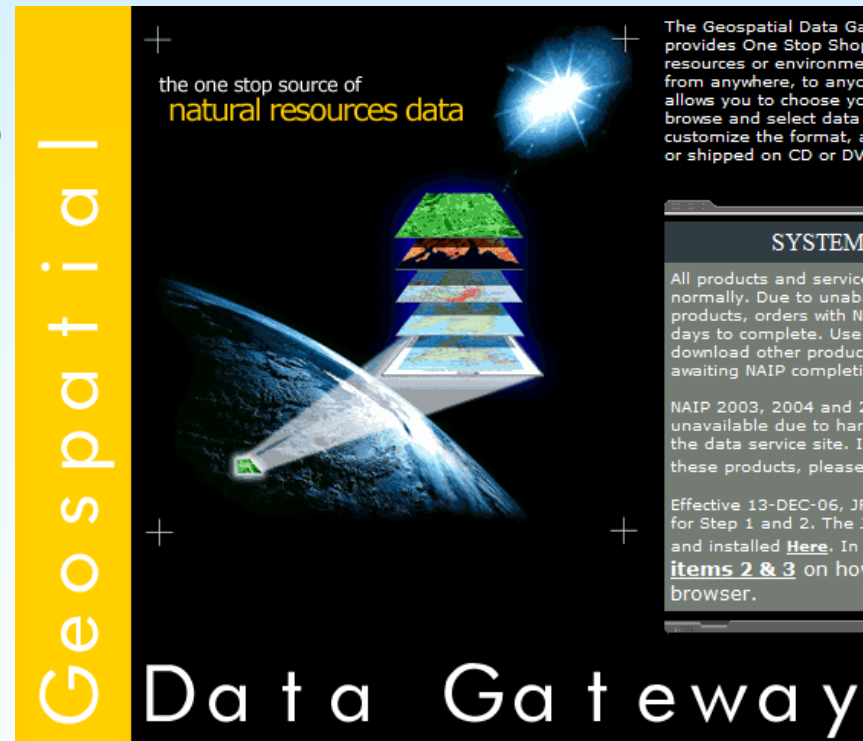
- Early delivery of estimates, 2008
 - Winter Wheat – June
 - Corn and Soybeans – August & October
- Provides measureable statistical error
- Results considered for setting national acreage estimate

Components

- AWiFS/MODIS
- Farm Service Agency
 - Common Land Unit (training/testing)
- Commercial Software
- June Agricultural Survey
 - Regression estimator

Distribution

- datagateway.nrcs.usda.gov



The Geospatial Data Gateway provides One Stop Shopping for natural resources or environmental data from anywhere, to anyone. It allows you to choose your data, browse and select data, customize the format, and download or shipped on CD or DVD.

the one stop source of
natural resources data

Geospatial
Data Gateway

SYSTEM

All products and services are available normally. Due to unavailability of products, orders with NAIP data may take 30 days to complete. Use the NAIP data service site to download other products. For more information, please contact the NAIP team.

NAIP 2003, 2004 and 2005 data is currently unavailable due to hardware issues. Please check the data service site for updates. For these products, please contact the NAIP team.

Effective 13-DEC-06, JP... for Step 1 and 2. The... and installed [Here](#). In **items 2 & 3** on how to use the browser.

Cropland Data Layer Program Components

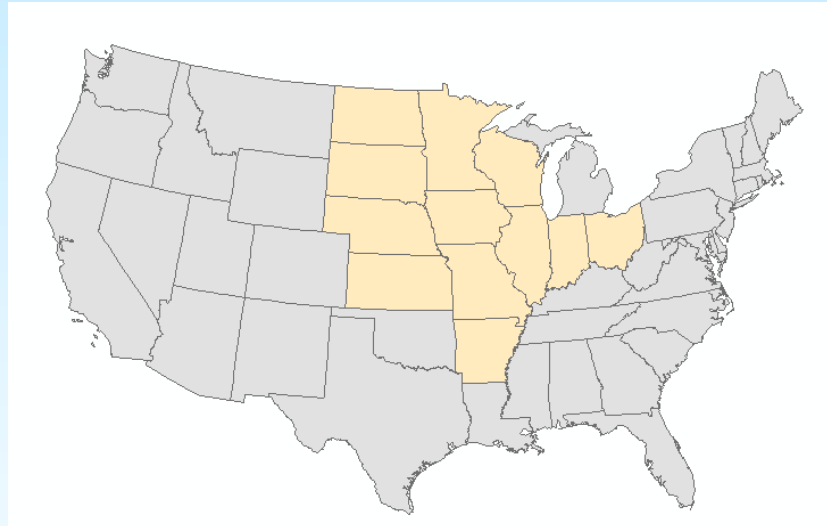


- Advanced Wide Field Sensor (AWiFS)
- Ground truth: FSA/CLU + 578 & NLCD
- Ancillary data sets
- Commercial Software Suite
- See5 Decision Tree Methodology
- Estimation
- Research

Research 2007-2008

AWiFS Essential Dates Assessment

Goal: To determine the necessary dates of AWiFS data for the identification of corn and soybean fields in the U.S. Heartland.

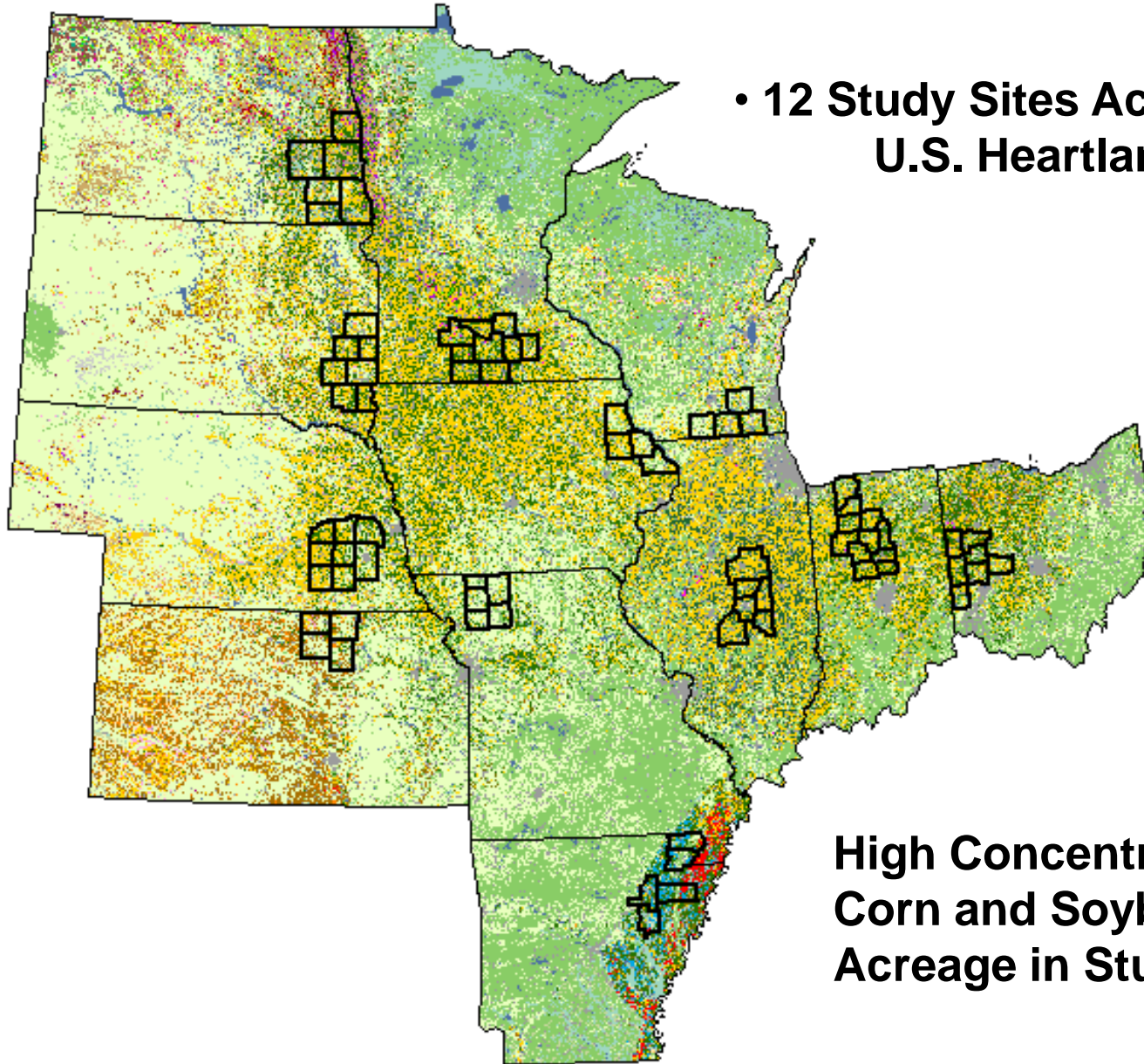


Corn



Soybeans

Methodology



- **12 Study Sites Across the U.S. Heartland**

High Concentration of Corn and Soybean Acreage in Study Sites

Methodology

**Identical Methodologies using ERDAS Imagine and See5
Decision Tree Software**

**Seven Classifications (per study site) vary only by the dates of
AWiFS data used**

4 dates- May, June, July, August

3 dates- May, June, July

2 dates- May, June

1 date - May

1 date - June

1 date - July

1 date - August

Average Corn and Soybean Accuracy U.S. Heartland

Percentage loss in accuracy highlighted
from 4 date (May – Aug) classification

May - Aug		May - July		May - June		May Only	
C.P	C.U.	C.P	C.U.	C.P	C.U.	C.P	C.U.
94.55%	94.48%	92.61%	93.07%	82.58%	82.10%	74.34%	66.48%
		(1.94%)	(1.41%)	(11.97%)	(12.38%)	(20.21%)	(28.00%)

May - Aug		May - July		May - June		May Only	
S.P	S.U.	S.P	S.U.	S.P	S.U.	S.P	S.U.
93.90%	92.81%	89.88%	88.88%	72.25%	74.51%	47.39%	62.04%
		(4.02%)	(3.93%)	(21.65%)	(18.30%)	(46.51%)	(30.77%)

Accuracy Measures

C.P. - Corn Producer

S.P. - Soybean Producer

C.U. - Corn User

S.U. - Soybean User



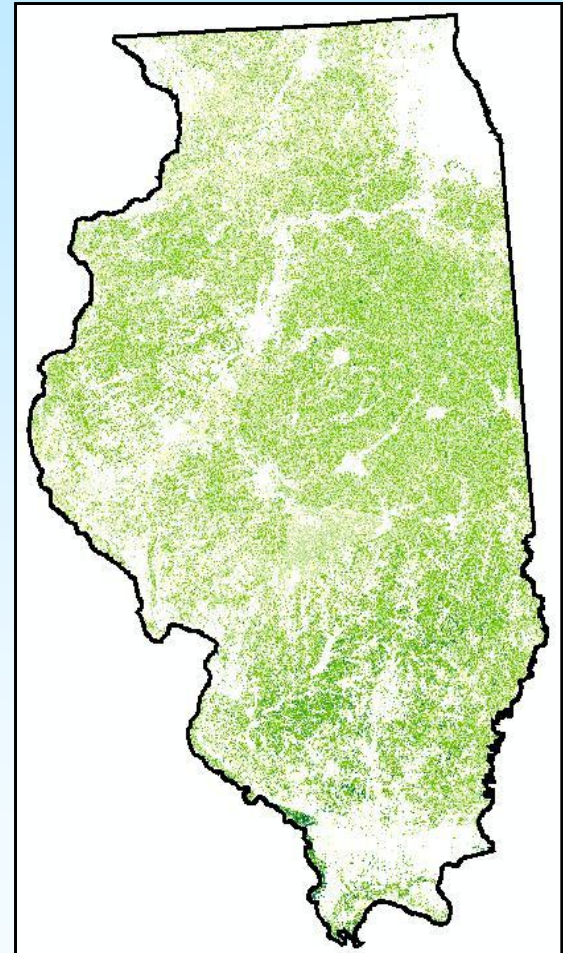
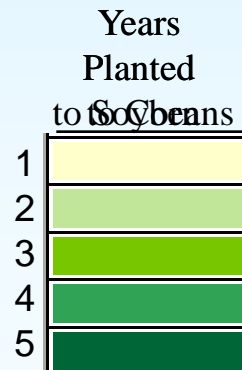
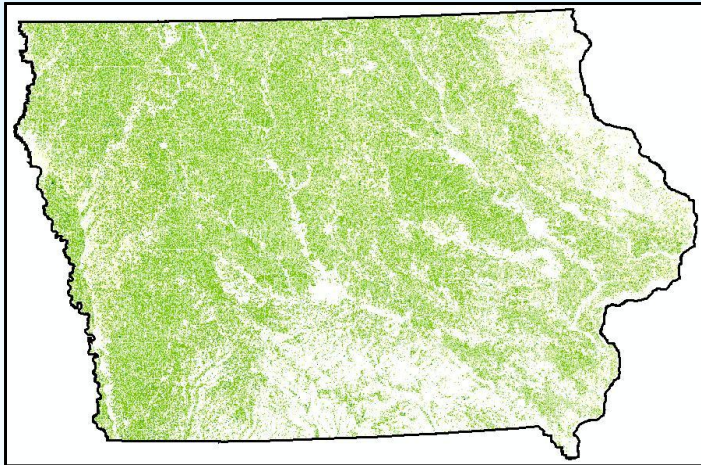
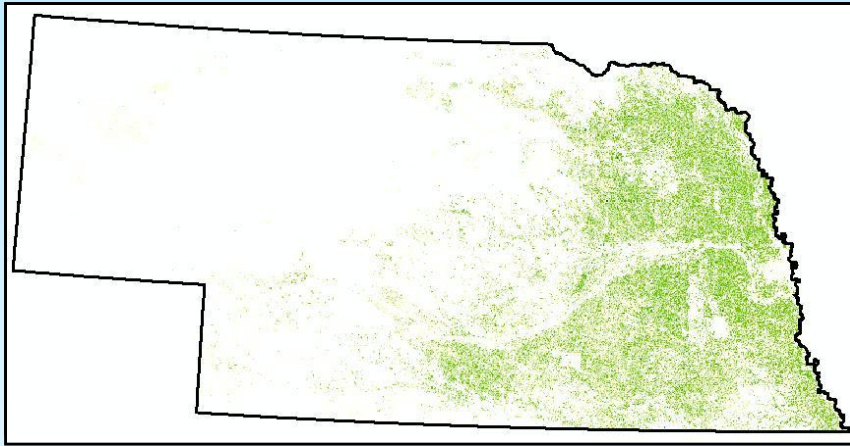
Conclusions

- 1 **Without August AWiFS Data- Reductions in Accuracy**
 - **Corn: 1.41% - 1.94%**
 - **Soybeans: 3.93% – 4.02%**
- 1 **Without July and August AWiFS Data- Reductions in Accuracy**
 - **Corn: 11.97% - 12.38%**
 - **Soybeans: 18.30% - 21.65%**
- 1 **AWiFS collects through July are essential to produce highly accurate corn and soybean classifications.**

Research 2008-2009

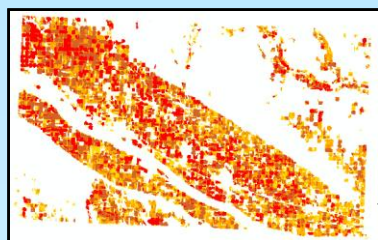
Single Crop Planting Intensity, 2004 - 2008

Nebraska, Iowa and Illinois

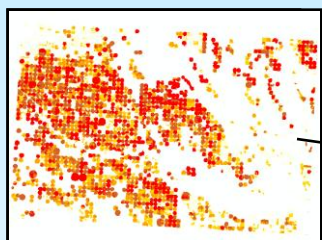


Cropland Data Layers (CDLs) utilized in assessment: 2004 - 2008

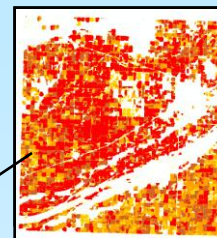
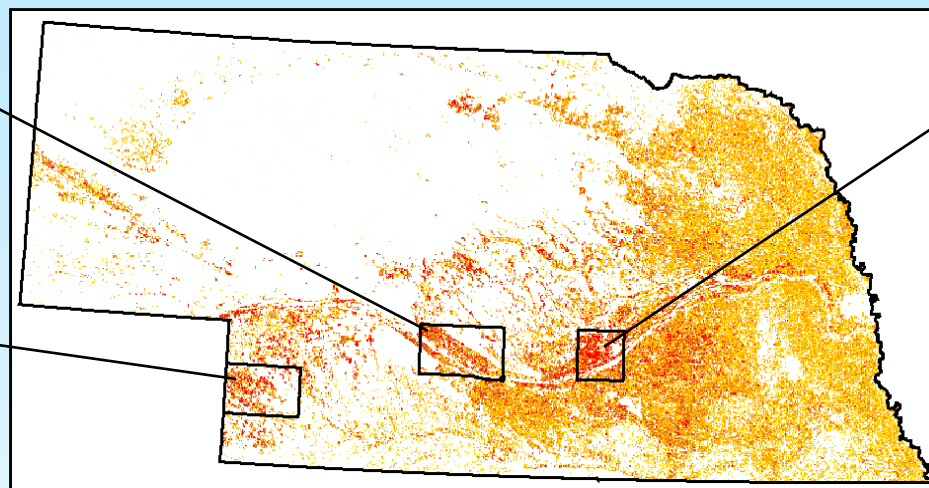
Corn Planting Intensity in Nebraska 2004 - 2008



Dawson, NE

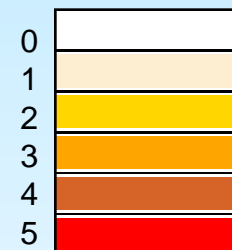


Chase, NE



Hall, NE

Years
Planted
to Corn



Hall County	Chase County	Dawson County	State Total
5 years in a row planted to corn: 43%	5 years in a row planted to corn: 28%	5 years in a row planted to corn: 21%	5 years in a row planted to corn: 7%
4 out of 5 years planted to corn: 22%	4 out of 5 years planted to corn: 21%	4 out of 5 years planted to corn: 29%	4 out of 5 years planted to corn: 13%

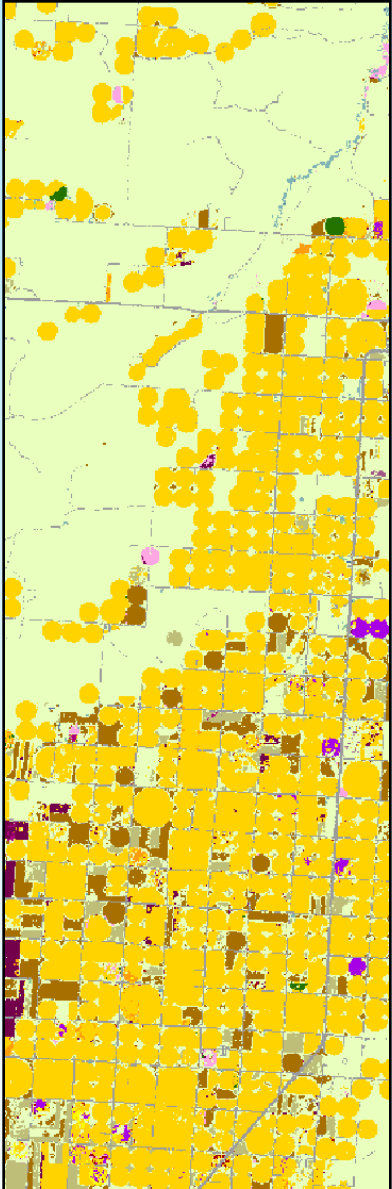
Crop Rotation Methodology



1. Inputs include: Cropland Data Layers (CDLs) for 2004 - 2008
2. CDLs are recoded to
2008: Corn: 1, Soy: 2, Other: 3
2007: Corn: 10, Soy: 20, Other: 30
2006: Corn: 100, Soy: 200, Other: 300
2005: Corn: 1,000, Soy: 2,000, Other: 3,000
2004: Corn: 10,000, Soybeans: 20,000, Other: 30,000
3. The recoded CDLs are added together using the ERDAS Imagine Modeler
4. The output is the Crop Rotation Image which is ready for evaluation

Crop Rotation Results Nebraska

Crop Rotation Patterns (Corn and Soybean) 04- 08 As Percentage of Total Cultivated Cropland



Corn (04), Soy (05), Corn (06), Soy (07), Corn (08)	10.1%
Soy (04), Corn (05), Soy (06), Corn (07), Soy (08)	9.3%
Corn (04), Corn (05), Corn (06), Corn (07), Corn (08) (.3% < than 2003-2007)	7.5%
Additional acreage into corn production (07):	309,688 acres
Additional acreage into corn production (08):	503,221 acres

Total Cultivated Cropland derived from NASS' Nebraska 2008 CDL

Bureau Of The Census

Department: **Department Of Commerce**
Agency: **Bureau of the Census**
Job Announcement Number:
ASF-09-312

USAJOBS
"WORKING FOR AMERICA"



Cartographer

SALARY RANGE: 43,521.00 - 95,026.00 USD per year **OPEN PERIOD:** Thursday, April 02, 2009 to Thursday, April 23, 2009

SERIES & GRADE: GS-1370-07/12 **POSITION INFORMATION:** Full-Time

Type of Appointment: Competitive Service: Appointment may be permanent (career/career-conditional) or term (appointment not to exceed 2 years; may be extended an additional 2 years)

PROMOTION POTENTIAL: 12 **DUTY LOCATIONS:** vacancy(s) in one of the following locations: FEW vacancies - Washington, DC (Suitland, MD)

WHO MAY BE CONSIDERED:

Applications will be accepted from United States citizens.

Department of Commerce employees eligible for the Career Transition Assistance Program (CTAP).

Applicants eligible for the Interagency Career Transition Assistance Program (ICTAP).

JOB SUMMARY:

POSITION AND SALARY: Cartographer

GS-1370-07 (\$43,521-\$53,574)

GS-1370-09 (\$50,408-\$65,531 per year)

GS-1370-11 (\$60,080-\$70,780 per year)

GS-1370-

Duty Loc

Federal Agencies Currently Hiring in the Geospatial Field

Economic Research Service



National Oceanic And Atmospheric Administration



Thank You

Claire Boryan, Rick Mueller, Mike Craig, Dave Johnson, Bob Seffrin, Patrick Willis, Larry Beard, Zhengwei Yang and Lee Ebinger



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