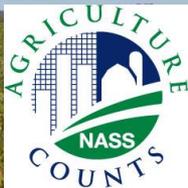


A New Land Cover Classification Based Stratification Method for Area Sampling Frame Construction

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Background

- NASS agricultural surveys use Area Sampling Frames

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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Browse NASS by Subject

- Crops and Plants
- Demographics
- Economics
- Environmental
- Livestock and Animals
- Charts and Maps
- Education and Outreach

Statistics by State

Select a State

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 crop 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 Application for 1997 Census Data

Last modified: 12/30/05

2001 Wildlife Damage Survey

7.7 Percent of Crop Value Lost to Deer and Geese

lost \$17.2 million of corn, soybeans and wheat to deer or geese during 2001 and farmers losing 7.7 percent of the crop value to deer and geese. Soybean economic loss, totaling \$9.1 million, 11 percent. Corn losses were \$6.6 million, 5.6 percent. Deer damage resulted in losses of \$13.6 million, 6.1 percent, while geese accounted for 0.6 million bushels. Production losses to deer were 4.3 million bushels. Corn losses were 3.2 million bushels, soybean losses and wheat accounted for 0.6 million bushels. Production losses to deer were 4.3 million bushels. Corn losses were 3.2 million bushels, soybean losses and wheat accounted for 0.6 million bushels. Production losses to deer were 4.3 million bushels. Corn losses were 3.2 million bushels, soybean losses and wheat accounted for 0.6 million bushels. Production losses to deer were 4.3 million bushels.

USDA **NEWS RELEASE**
NATIONAL AGRICULTURAL STATISTICS SERVICE
United States Department of Agriculture • Washington, DC 20250
Ag Statistics Hotline: (800) 853-8767

USDA FORECASTS RECORD

Washington, Aug. 10, 2007 – U.S. farmers' history in 2007, according to the *Crop Production of Agriculture's National Agricultural Statistics Service*, 13.1 billion bushels, 10.6 percent above the previous year. Based on conditions as of August 1, 2007.

WISCONSIN AGRICULTURAL STATISTICS SERVICE
P.O. Box 8034 Madison, WI 53708-8034
In cooperation with WI Department of Agriculture, Trade and Consumer Protection

2002 Dairy Producer Opinion Survey

November 2002

http://www.nass.usda.gov:8080 - 2002 Census of Agriculture - SVG 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

- <= 20,000
- 20,001 to 40,000
- 40,001 to 60,000
- 60,001 to 80,000
- 80,001 to 100,000
- 100,001 >=

Comparisons: 6 | 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.

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.

All Milk Price, Wisconsin Annual Average, 1985 - 2002 1/

Wisconsin Dairy Herds by Herd Size

| Milk cow herd size | May 2002 herds | May 2007 herds (projected) 1/ | 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 | +6 |
| 200 - 499 | 700 | 600 | +29 |
| 500+ | 200 | 440 | +120 |
| Total | 17,500 | 15,900 | -20 |

1/ 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 Herds by Herd Size

| Number | Percent |
|--------|---------|
| 2,600 | 47 |
| 4,700 | 71 |
| 7,400 | 85 |
| 1,900 | 53 |
| 700 | 33 |
| 200 | 22 |
| 17,500 | 92 |

1/ 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.

NASS Background

- NASS
 - is the statistical arm of the USDA - essentially a survey agency
 - provides timely, accurate, and useful statistics in service to U.S. agriculture
 - collects and disseminates data on all facets of agriculture.
 - performs the Census of Agriculture every 5 years, and various surveys annually or even multiple times annually.
 - gathers demographic, environmental, and economic data related to agriculture as well.
 - collects data by a variety of methods including mail, phone, Internet, or personal interview.
- However, Ag surveys use Area Sampling Frames(ASF) to select samples, to collect sample information and to make estimate.

Why Area Sampling Frames

- The NASS sampling frames (ASF) are based on a **stratification of land cover** in the U.S. defined by percent cultivated cropland.
 - They have been used as the primary tool for agricultural surveys to gather crop acreage and other agricultural information since 1954. They are considered the backbone to the agricultural statistics programs of the NASS and agencies and countries.
 - They are multipurpose and can be used for comprehensive surveys.

What is the stratification

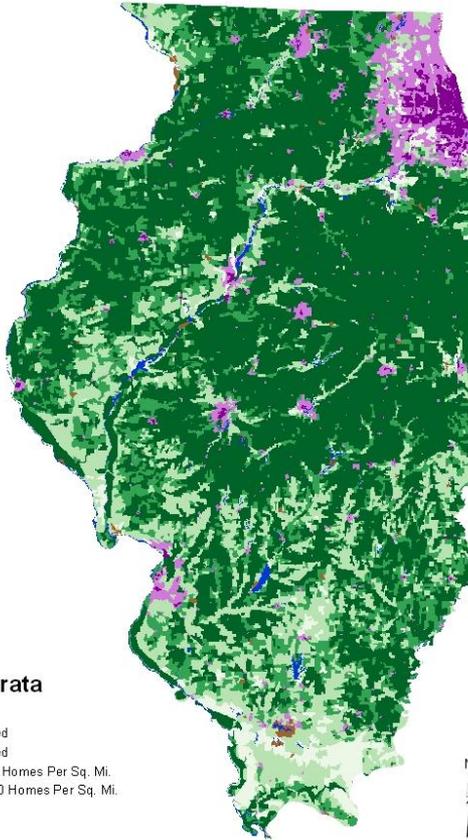
- A stratification is a process that
 - Segments and groups land based on land cover types and percent of a cover type within a segment.
- It's a manual, labor-intensive process;
- It's subjective – not very accurate, nor reliable!

How Is the Stratification Performed at NASS?

- It has been conducted by Area Frame staff since 1954 using visual interpretation of initially aerial photography, and later moderate resolution Landsat TM data.
- Crop Data Layer products are used recently in the visual interpretation process. It's not used directly for stratification!

NASS Area Frames Examples

Stratification of Illinois 2006



Land Use Strata

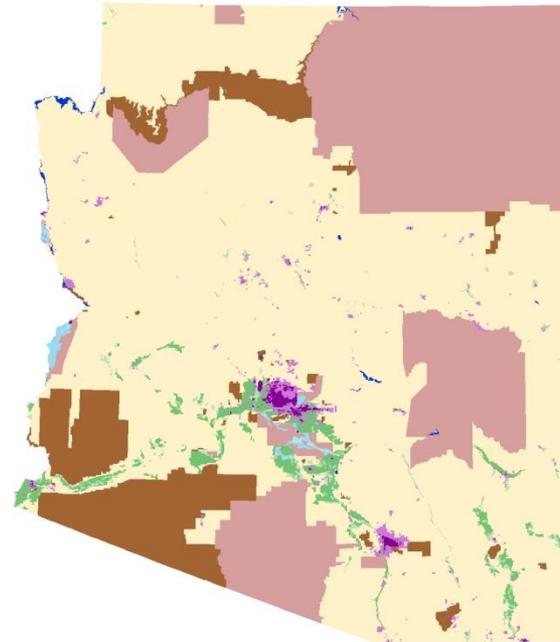
- > 75% Cultivated
- 51 - 75% Cultivated
- 25 - 50% Cultivated
- Agri-Urban: > 100 Homes Per Sq. Mi.
- Commercial: > 100 Homes Per Sq. Mi.
- < 25% Cultivated
- Non-Agriculture
- Water



Projection: NAD 1983, UTM Zone 16

Prepared by Area Frame Section, 2006

Stratification of Arizona 1984



Land Use Strata

- >50% Cultivated
- >50% Cultivated--Native American
- Commercial: >20 Homes/Sq Mi
- Agri-Urban: >20 Homes/Sq Mi
- 15-50% Cultivated
- 15-50% Cultivated--Native American
- Native American
- Public/Private Lands
- Non-Agricultural
- Water



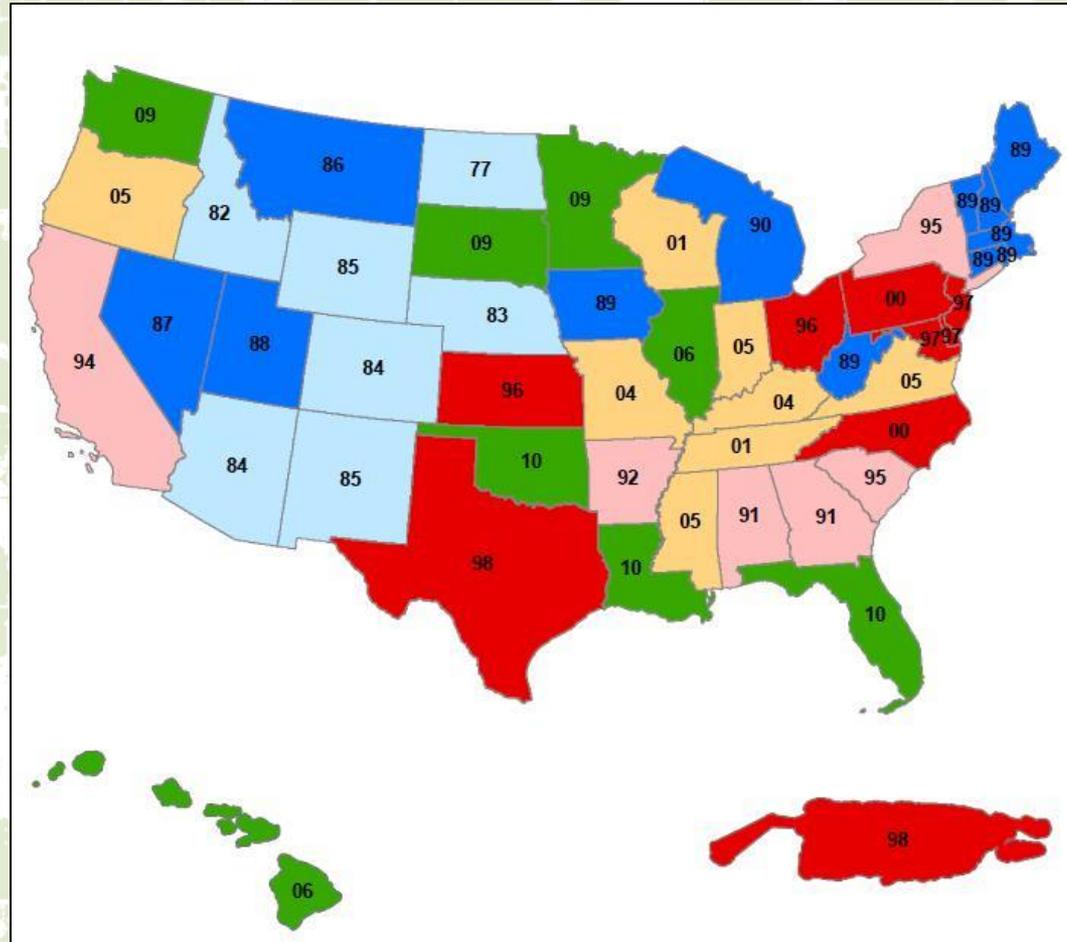
Projection: Geographic Latitude and Longitude

Prepared by Area Frame Section, 2006

General Land-Use Stratification Code Definitions Used in NASS Area Sampling Frames

| Land-Use Strata Codes and Definitions Stratum | Definition |
|--|--|
| 11 | General Cropland, greater than 75% cultivated. |
| 12 | General Cropland, 51-75% cultivated |
| 20 | General Cropland, 15-50% cultivated. |
| 31 | Ag-Urban, less than 15% cultivated, more than 100 dwellings per square mile, residential mixed with agriculture. |
| 32 | Residential/Commercial, no cultivation, more than 100 dwellings per square mile. |
| 40 | Less than 15% cultivated |
| 50 | Non-agricultural, |
| 62 | Water |

US map illustrating the implementation years of current NASS Area Sampling Frames



Objective

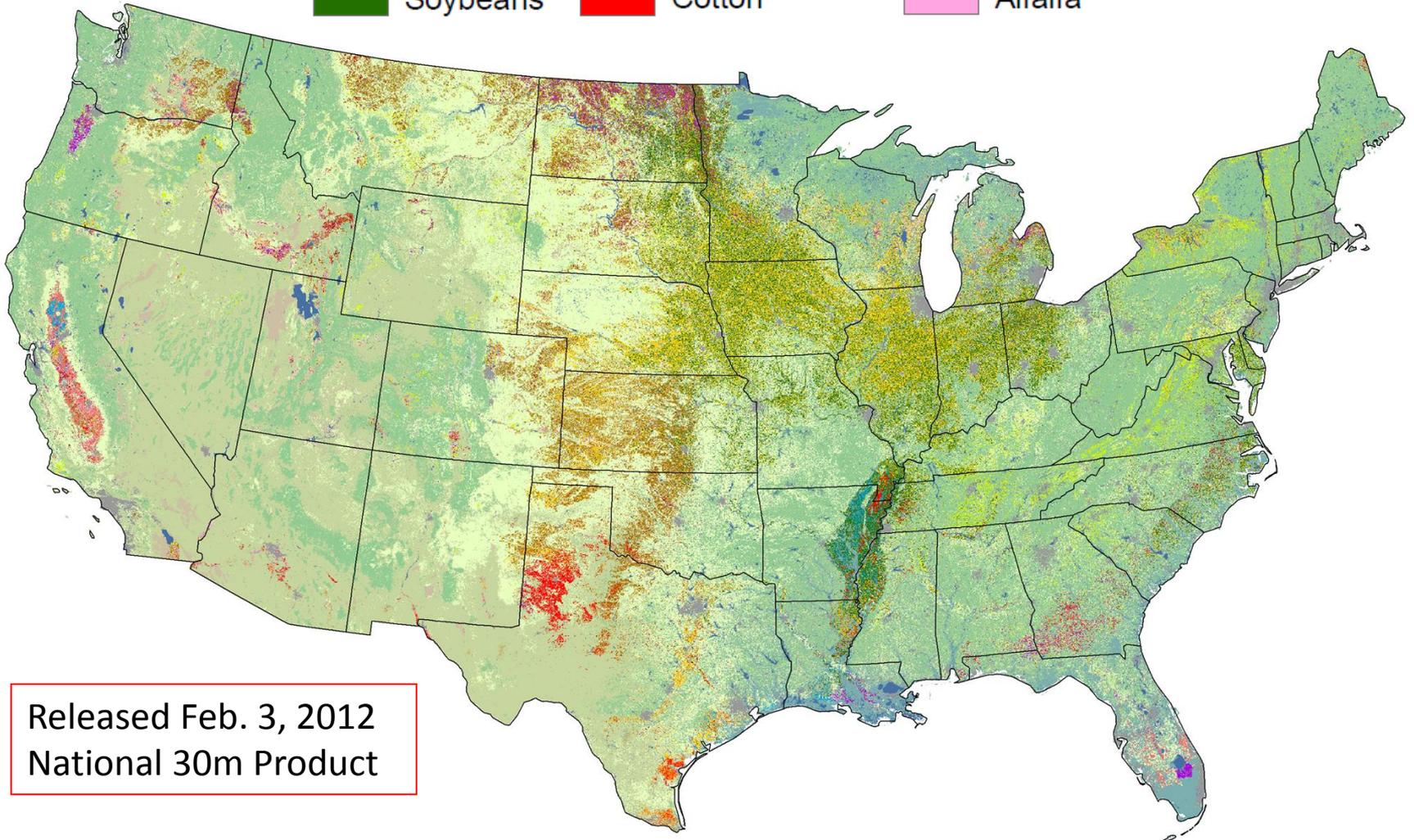
The objective of this investigation was to determine the utility of the automated Cropland Data Layer (CDL) based stratification method for use in Area Sampling Frame (ASF) construction.

Study Areas

CDL based stratification study of NASS ASF Primary Sampling Units (PSUs) was tested for Arizona, Georgia, Ohio, Oklahoma, Virginia.

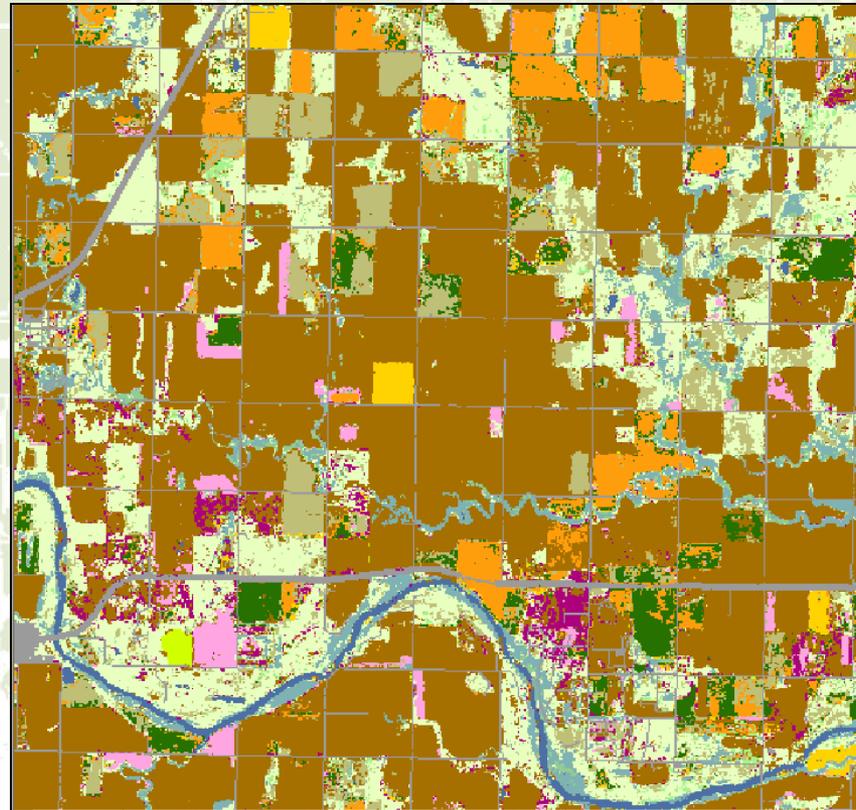
What is the Cropland Data Layer (CDL)?

The Cropland Data Layer product is a raster-formatted, geo-referenced, crop specific, land cover product.



Released Feb. 3, 2012
National 30m Product

Total crop mapping accuracies for historic CDLs range from 85% to 95% for the major crops



Corn



Winter Wheat



Rice



Soybeans

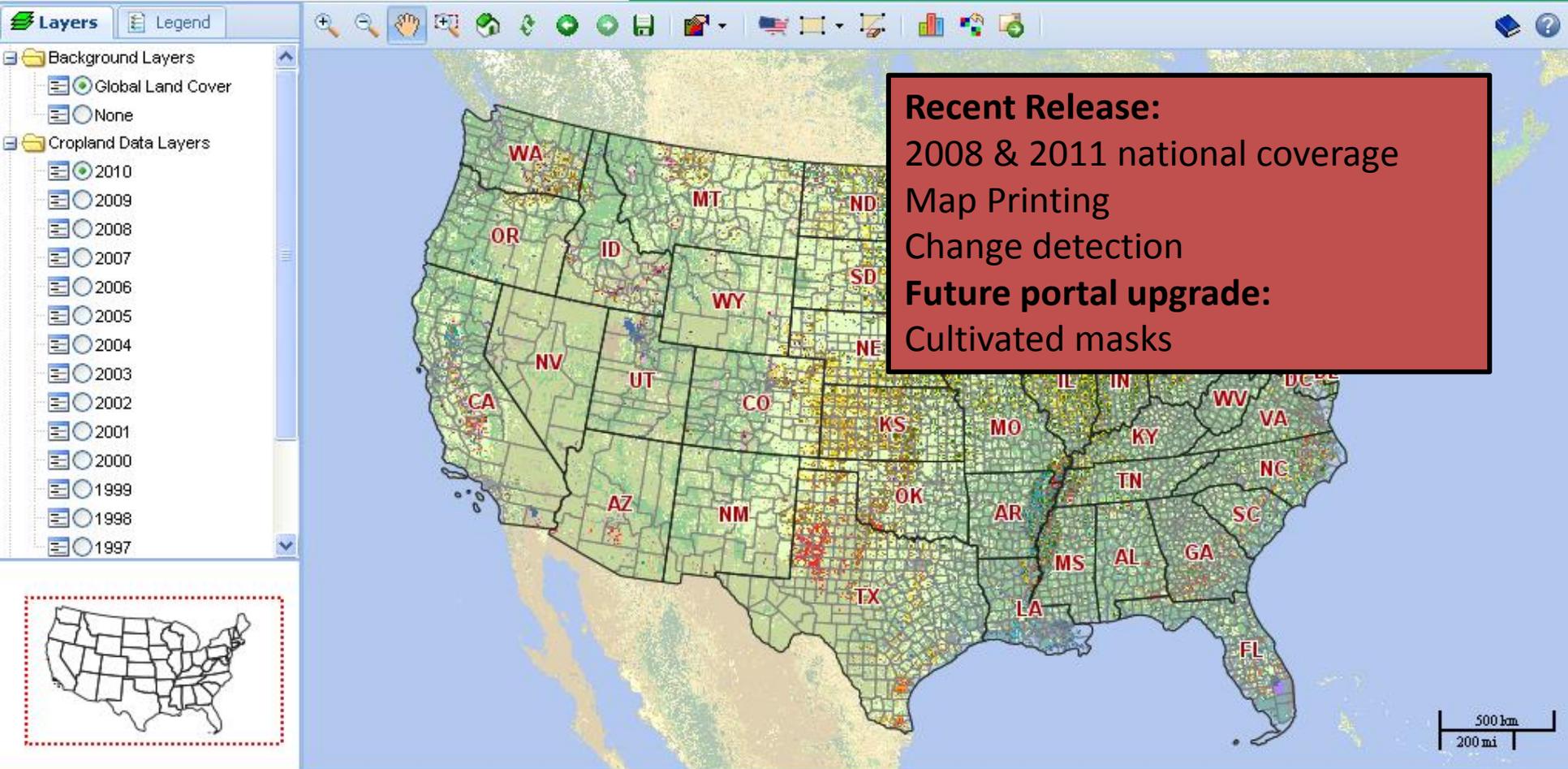


Cotton

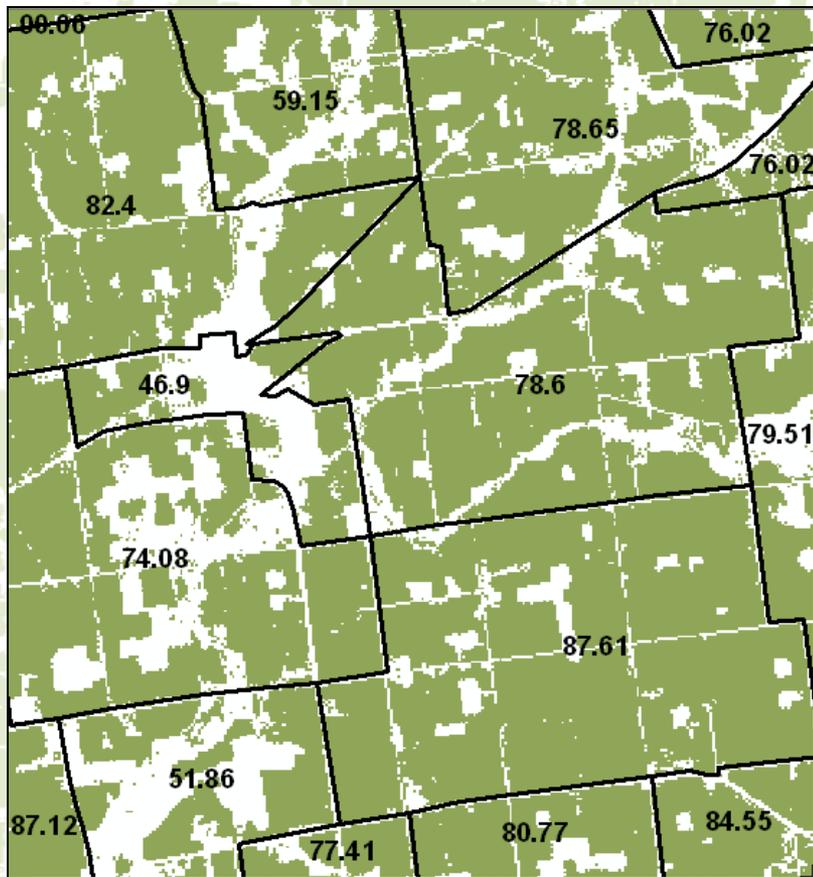


Alfalfa

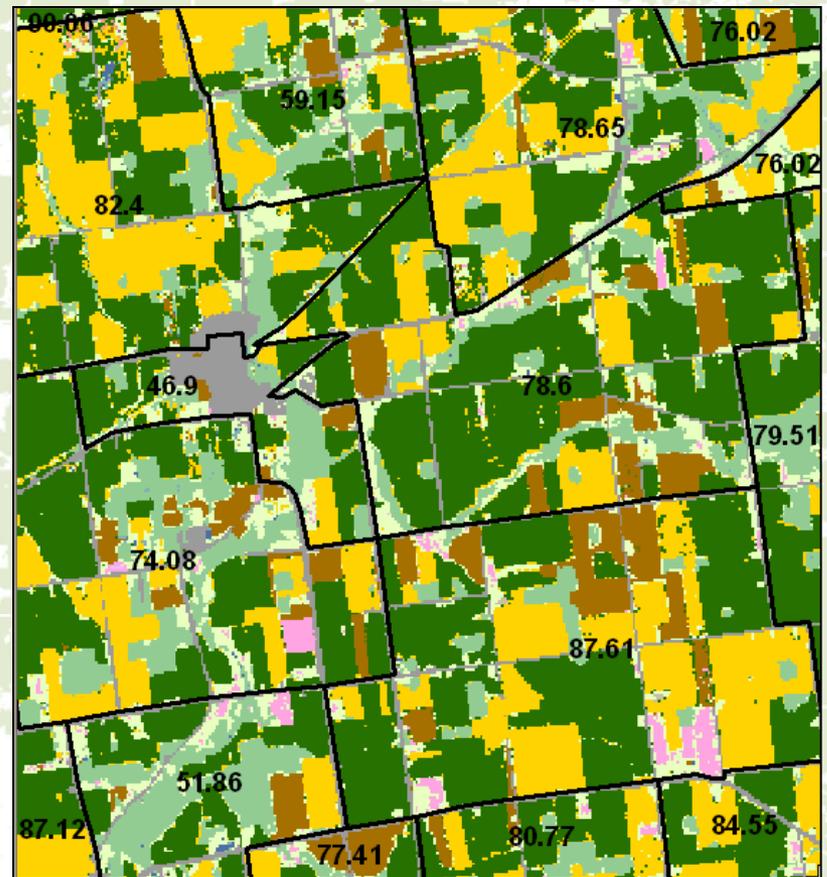
CropScape Portal



A new automated stratification method has been developed to utilize the NASS Cropland Data Layer in the construction of the NASS Area Sampling Frame

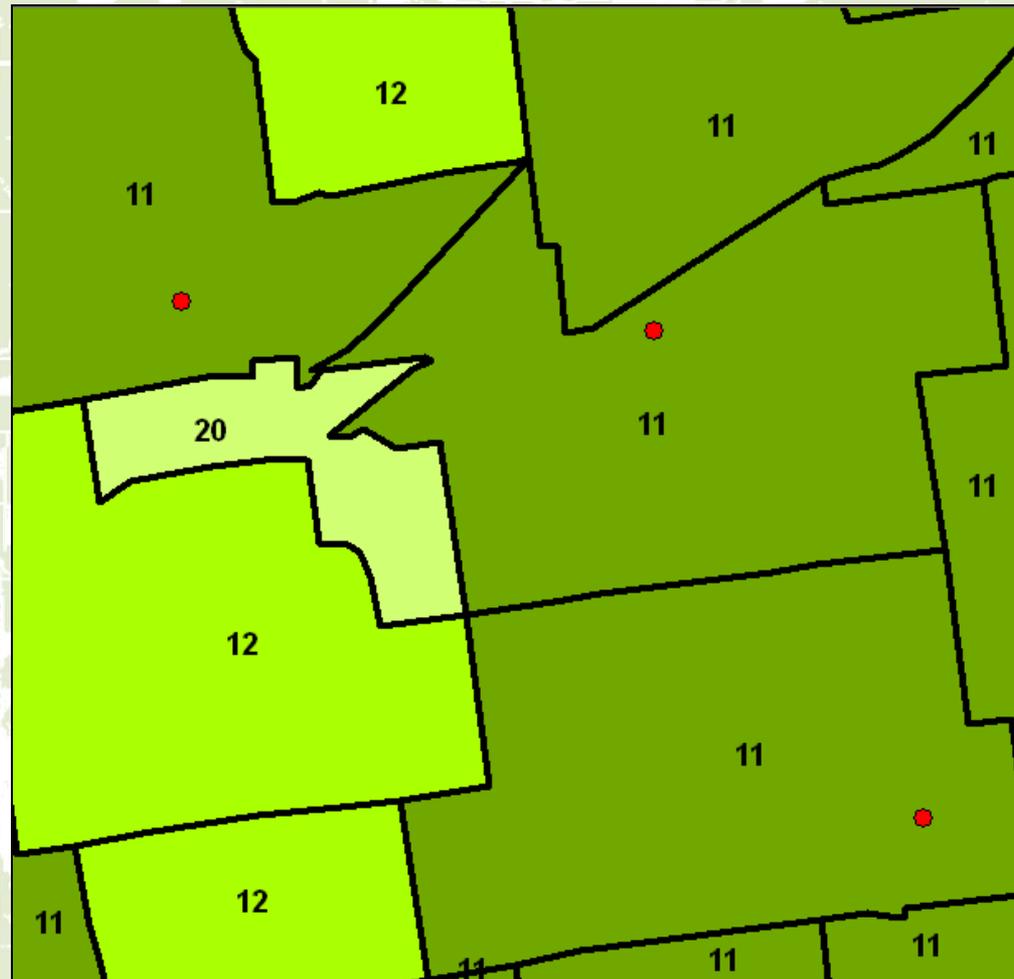


Area Frame: Primary Sampling Units with CDL percent cultivation



Primary Sampling Units with CDL percent cultivation, overlaying a 2010 CDL image product

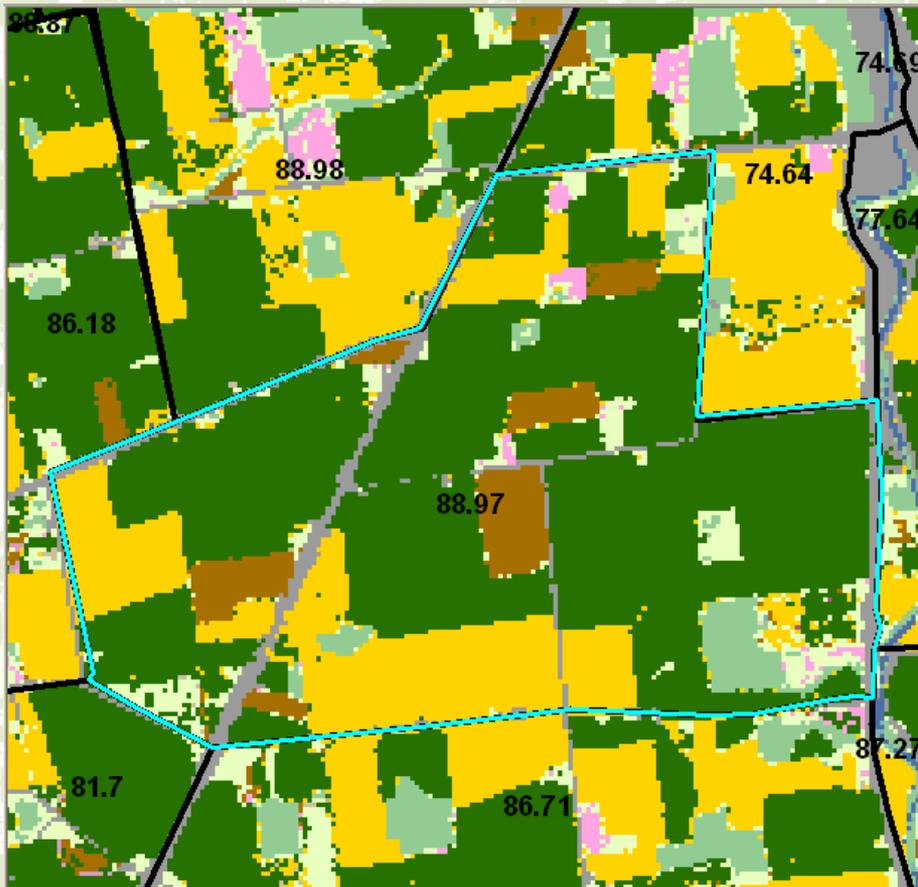
Cropland Data Layer (CDL) based stratification of a NASS Area Sampling Frame (ASF)



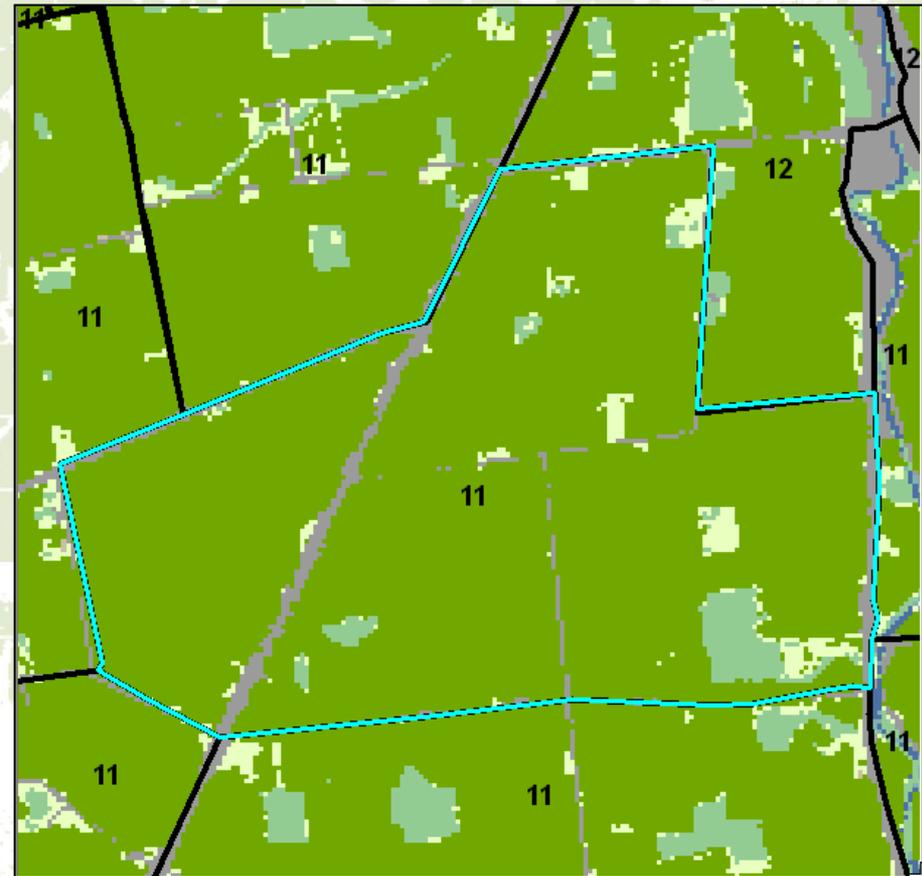
Red dots are location points of in situ validation collected during the 2010 June Area Survey

Area Frame manual stratification *matches*

CDL based automated stratification



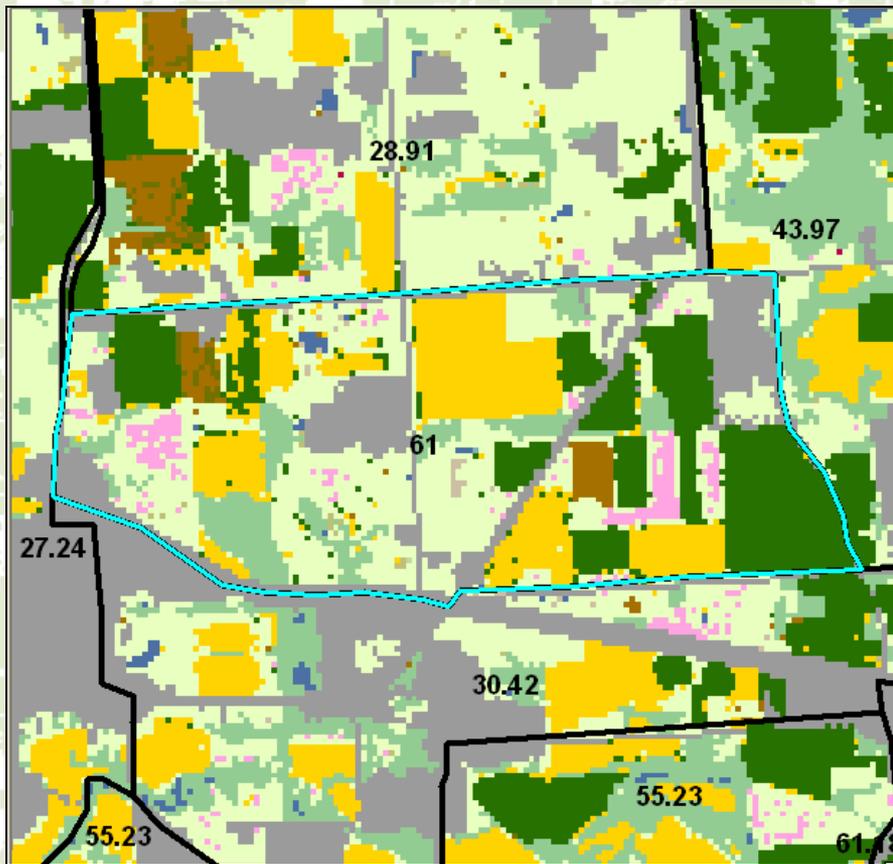
CDL percent cultivation – 88.97%



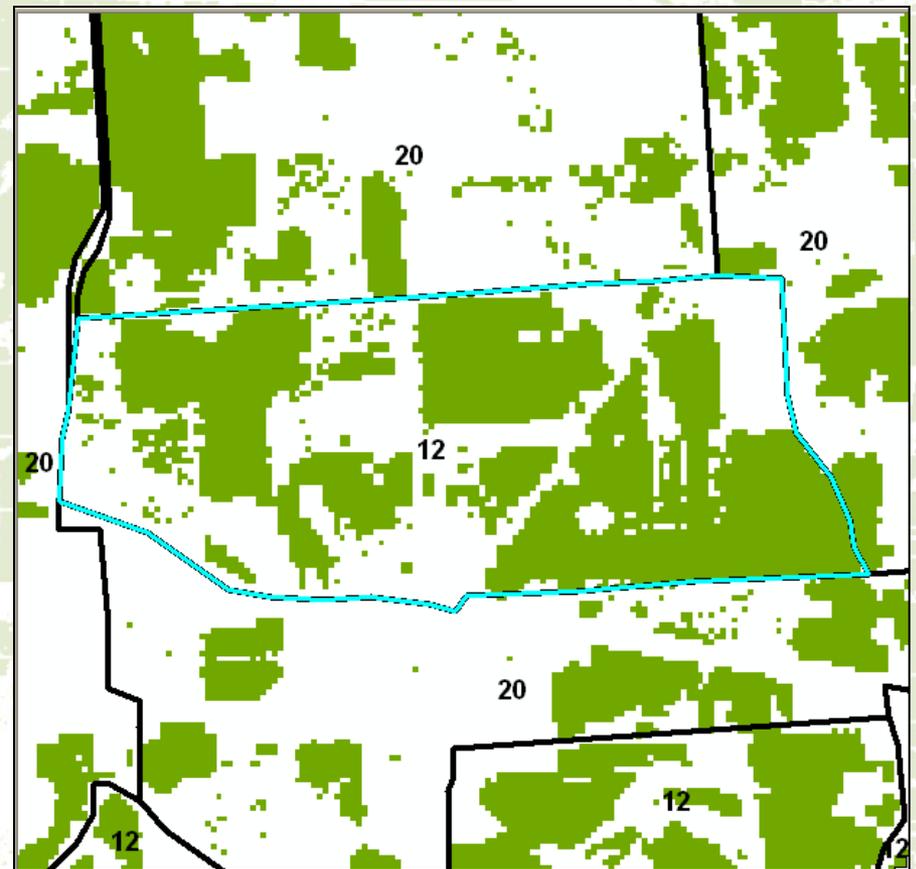
AF stratification – 11 (manual)
CDL stratification – 11 (automated)

Area Frame manual stratification *does not match*

Cropland Data Layer based automated stratification



CDL percent cultivation – 61%



AF stratification – 11 (manual)
CDL stratification – 12 (automated)

Evaluation

Stratification accuracy was measured using in-situ data collected by enumerators during the 2010 June Area Survey (JAS) in the five states evaluated.

Accuracy measures were derived by comparing the strata definitions reported by JAS enumerators with the original ASF manual stratification and the CDL based automated stratification.

Evaluation

To determine if the percentage differences between the original Area Frame stratification method and the CDL based stratification method were statistically significant at a 95% confidence level, a two-tailed proportion test was used.

These tests were performed with Chi-Square and Fisher's Exact tests when the sample sizes were less than five

Evaluation

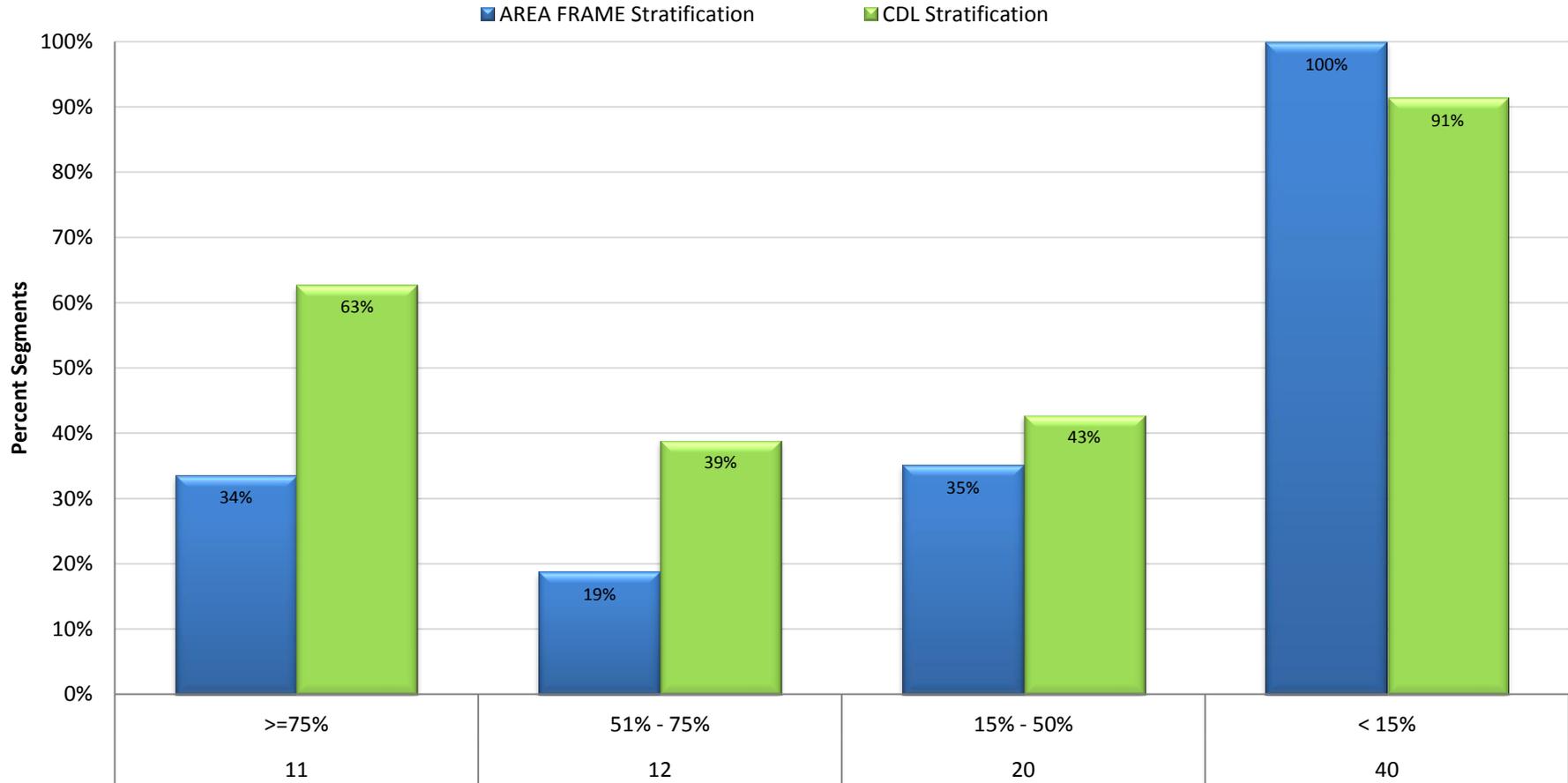
The hypotheses of the significance tests were $H_0: p_1 = p_2$ and $H_a: p_1 \neq p_2$. The null hypothesis stated that there was no difference in the results of the two stratification methods while the alternative hypothesis stated that the results of the two stratification methods were significantly different.

The tests were performed and p values were calculated for each state and each stratum with a confidential level of 95%.

Area Frame vs. CDL Stratification Oklahoma 2010

| | | AREA FRAME Stratification | | | CDL Stratification | | | P-value |
|--------------|-----------------------------|---------------------------|----------------|------------------------------|--------------------|----------------|------------------------------|-------------------------------------|
| Stratum | Survey Ratio (% Cultivated) | Total Segments | Total Reported | Percentage (p ₁) | Total Segments | Total Reported | Percentage (p ₂) | Ha: p ₁ ≠ p ₂ |
| 11 | ≥75% | 140 | 47 | 34% | 43 | 27 | 63% | 0.001 |
| 12 | 51% - 75% | 48 | 9 | 19% | 77 | 30 | 39% | 0.024 |
| 20 | 15% - 50% | 74 | 26 | 35% | 98 | 42 | 43% | 0.305 |
| 40 | < 15% | 61 | 61 | 100% | 105 | 96 | 91% | 0.027 |
| Total | | 323 | | | 323 | | | |

Area Frame vs. CDL Stratification Oklahoma 2010



Stratum & Percent Cultivation

Area Frame vs. CDL Stratification

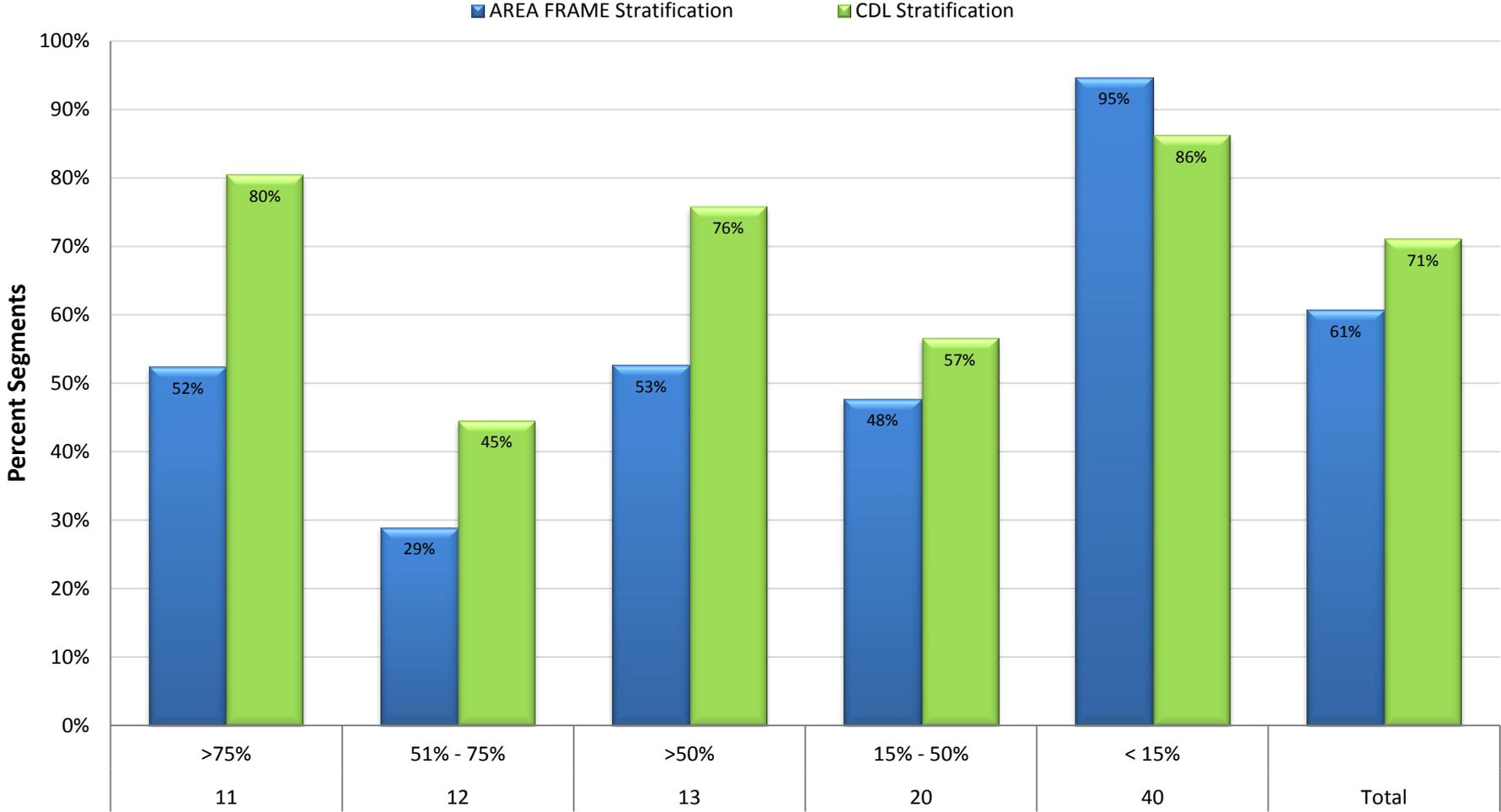
Five State - Strata Summary, 2010

| Stratum | Survey Ratio (% Cultivated) | AREA FRAME Stratification | | | CDL Stratification | | | P-value |
|--------------|-----------------------------|---------------------------|----------------|------------------------------|--------------------|----------------|------------------------------|-------------------------------------|
| | | Total Segments | Total Reported | Percentage (p ₁) | Total Segments | Total Reported | Percentage (p ₂) | Ha: p ₁ ≠ p ₂ |
| 11 | >75% | 250 | 131 | 52% | 128 | 103 | 80% | 0.000 |
| 12 | 51% - 75% | 83 | 24 | 29% | 119 | 53 | 45% | 0.025 |
| 13 | >50% | 171 | 90 | 53% | 91 | 69 | 76% | 0.000 |
| 20 | 15% - 50% | 371 | 177 | 48% | 387 | 219 | 57% | 0.000 |
| 40 | < 15% | 322 | 305 | 95% | 472 | 407 | 86% | 0.000 |
| Total | | 1197 | 727 | 61% | 1197 | 851 | 71% | 0.000 |

Five State Analysis - Arizona, Georgia, Ohio, Oklahoma, Virginia.

Area Frame vs. CDL Stratification

Five State - Strata Summary 2010



Stratum & Percent Cultivation

Conclusion

Results of the five state analyses indicated that the new automated Cropland Data Layer (CDL) stratification method performed well in determining U.S. percent cultivation **in moderate to highly intensive cropped areas** and weaker in non agricultural areas.

The strength of the CDL product and the CDL based stratification method is the **objective and consistent identification of cultivated cropland.**

Conclusion – Cont.

The Cropland Data Layer based stratification method can be used for

- *review of current Area Sampling Frames*
- *as a change detection technique*
- *as the primary method of stratification*

The Cropland Data Layer based automated stratification method should improve the efficiency, reduce the cost and improve the precision of the June Agricultural Survey estimates.

Thank you!
Questions?

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Fairfax VA
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