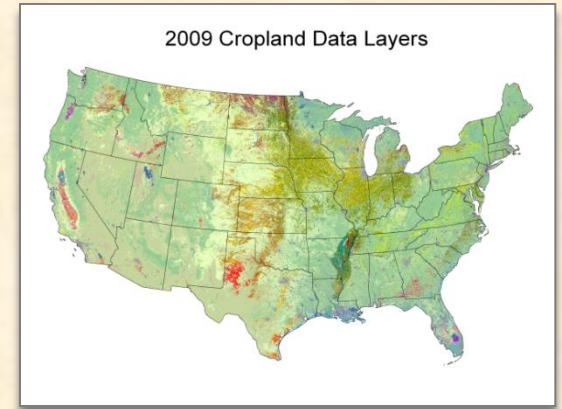
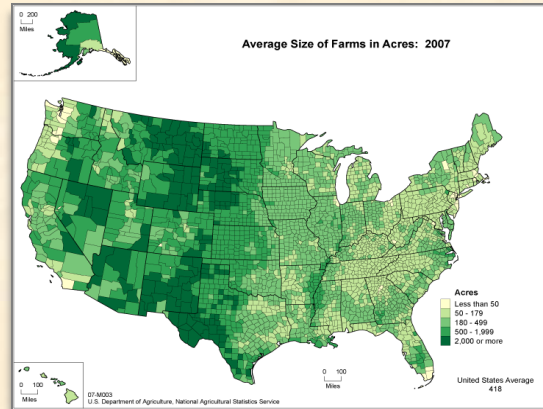
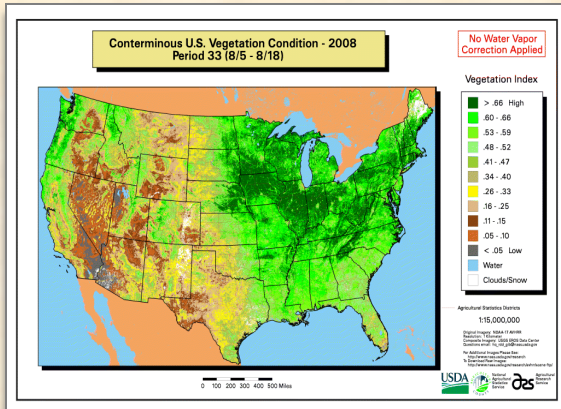
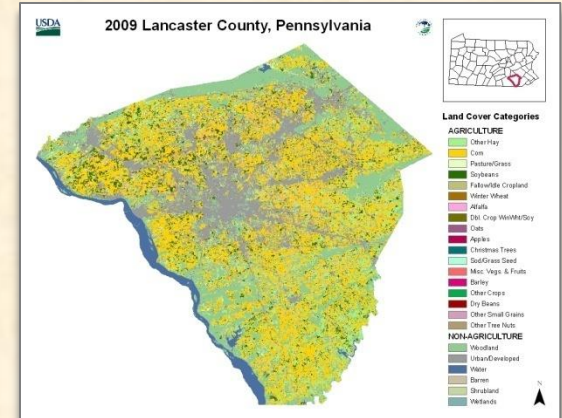
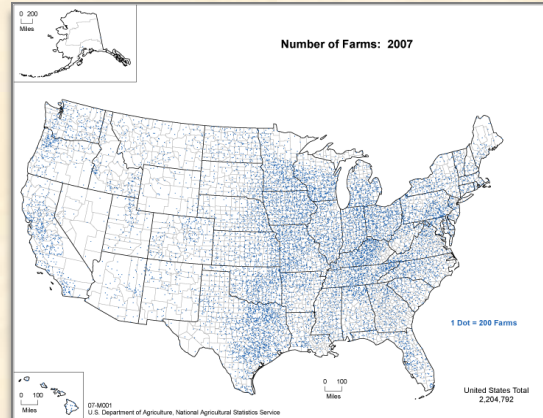
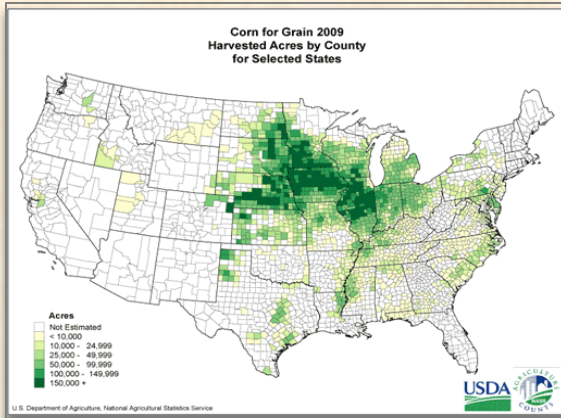


USDA NASS Geospatial Products



National Agricultural Statistics Service

Zhengwei Yang

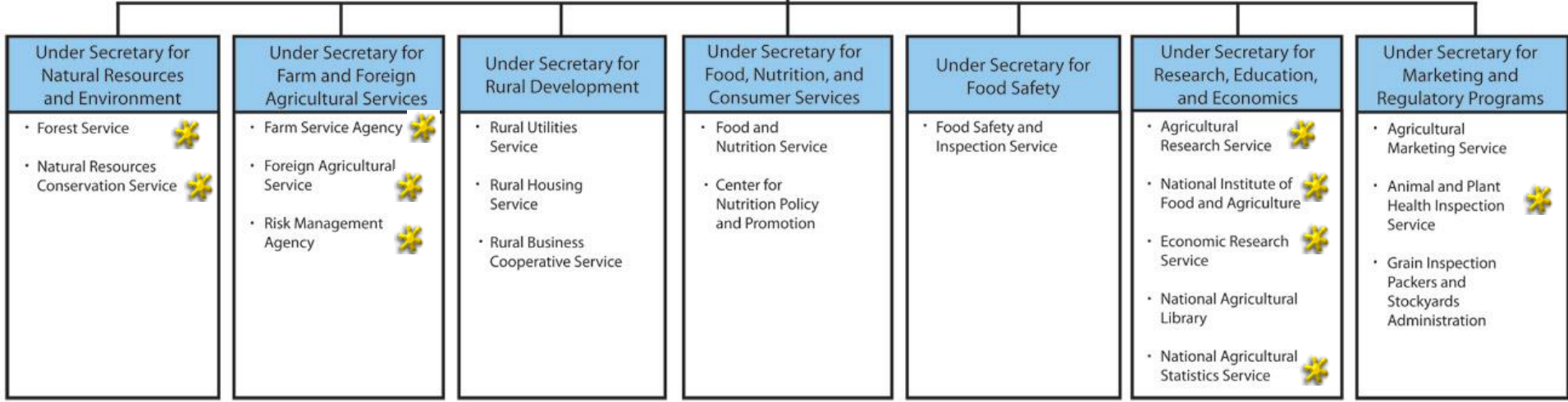
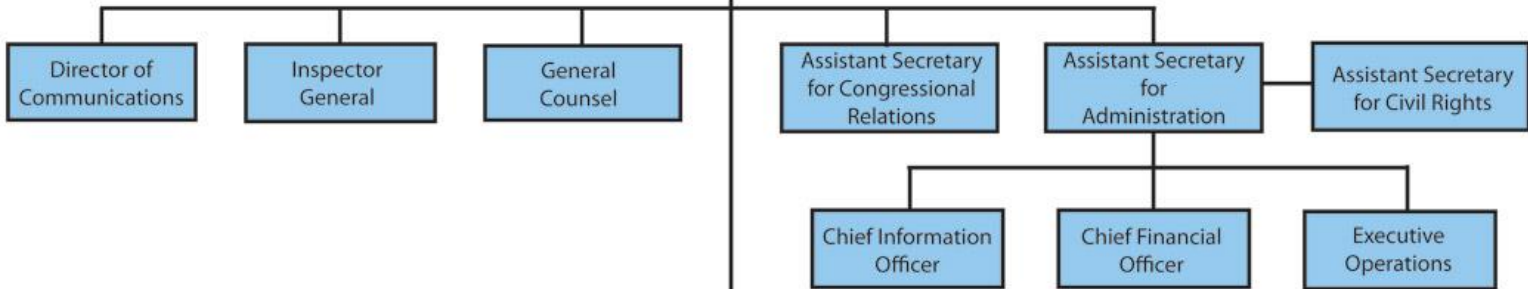
Zhengwei.yang@nass.usda.gov

September 12, 2013

SECRETARY

Deputy Secretary

* = USDA Remote Sensing Agencies
10 of 19 Agencies



USDA has over 65,000 ESRI desktop licenses



Research, Education and Economics (REE) Mission Area

Agricultural
Research
Service

Economic
Research
Service

**National
Agricultural
Statistics
Service**

National
Institute of
Food and
Agriculture



NASS MISSION:

To provide timely, accurate, and useful statistics in service to U.S. agriculture



<http://www.nass.usda.gov/>



National Agricultural Statistics Service

- ▶ Agency in U.S. Department of Agriculture
 - Non-policymaking
 - Non-political -- career staff
 - Independent, objective, unbiased appraisers of Nation's agriculture

NASS Regional Offices





What does NASS do?

- Administer USDA's Statistical Estimating Program
- Conduct the 5-year Census of Agriculture
- Coordinate Federal/State agricultural statistical needs
- Provide statistical consulting for Federal/State governments, universities, and other countries
- Collect and summarize agricultural data under reimbursable agreements
- Conduct statistical research



NASS issues about 500 statistical reports each year and about 9,000 reports and news releases

Newsroom

NASS to Release Agricultural Safety Reports

Issued July 29, 2010 by the Agricultural Statistics Board of the U.S. Department of Agriculture, National Agricultural Statistics Service. For more information, contact NASS at (202) 690-2389.

USDA's National Agricultural Statistics Service will release four agricultural safety reports at 3 p.m. EDT. The four reports cover farm accidents, injuries to farm adults, injuries to farm children, and injuries to farm animals.

The screenshot shows the NASS website interface with various navigation and search options. Key elements include:

- Search NASS:** A search bar with a 'Go' button and a dropdown menu for 'All NASS'.
- Advanced Search:** Options for 'Search Tips', 'Browse NASS by Subject', 'Crops and Plants', 'Demographics', 'Economics', 'Environmental', 'Livestock and Animals', 'Charts and Maps', 'Education and Outreach', and 'Statistics by State'.
- Quick Stats (Agricultural Statistics Data Base):** A section for querying data by commodity, state, and year.
- Additional Crops County Resources:** Information on maps and data files.
- Census of Agriculture:** A section for querying census data by year and by crop.
- Interactive Data:** Tools for interacting with census datasets, including 'Interactive Census Maps for 2002 Census Highlights' and 'Table Lens Application for 1997 Census Data'.
- Footer:** Links to NASS Home, USDA.gov, FDSSTATS, Economics Statistics System (ESS), Site Map, FOIA, Accessibility Statement, Privacy Policy, Non-Discrimination Statement, Information Quality, and FirstGov.



2001 Wildlife Damage Survey

7.7 Percent of Crop Value Lost to Deer and Geese

7.7 percent of the value of crops was lost to deer and geese during 2001. This translates to Maryland farmers losing 7.7 percent of the crop value to deer and geese. Soybeans accounted for the greatest economic loss, totaling \$0.1 billion, 11 percent. Corn losses were \$6.6 million, 5.8 percent and wheat \$1.5 million, 5.4 percent. Deer damage resulted in losses of \$13.6 million, 6.1 percent, while geese losses were \$1.6 million, 1.6 percent.

Production losses totaled 6.0 million bushels. Corn losses were 3.2 million bushels, soybean losses totaled 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.

Yield losses to deer were most severe in Central and Western Maryland, while geese damage was the heaviest in the Eastern Shore. Corn yield losses of 9.6 bushels per acre and 7.4 bushels per acre were reported in Western Maryland, respectively. The Lower Eastern Shore reported the highest soybean losses per acre.

Percent of farms reported deer or geese damage to one or more crops. Damage was reported on 61 farms raising corn, 58 percent of farms growing soybeans and 27 percent of farms with wheat.

Maryland 2001 Crop Loss from Deer

Area	Harvested	Average Yield	Production Loss	Economic Loss

The screenshot shows a USDA News Release page with the following content:

- USDA FORECASTS RECORD-SETTING CORN CROP FOR 2007**
- Washington, Aug. 10, 2007** – U.S. farmers are expected to produce the largest corn crop in history in 2007, according to the *Crop Production* report released today by the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS). Corn production is forecast at 13.1 billion bushels, 10.6 percent above the previous record of 11.8 billion bushels set in 2004.
- Based on conditions as of August 1, corn yields are expected to average 152.8 bushels per acre, up 3.7 bushels from last year. This would be second highest corn yield on record, behind the 160.4 bushels per acre produced in 2004. Growers are expected to harvest 85.4 million acres of corn for grain, the most since 1933 and 14.8 million more acres than last year.
- Yield forecasts are higher than last year across the Great Plains, central Corn Belt and Delta. Meanwhile, hot, dry conditions led to lower expected yields across much of the northern and eastern Corn Belt, Ohio Valley, Tennessee Valley, Southeast and Atlantic Coast.
- NASS forecasts 2007 soybean production at 2.63 billion bushels, down 18 percent from last year's record high of 3.19 billion bushels. Yields are expected to average 41.5 bushels per acre, down 1.2 bushels from last year.
- All cotton production is estimated at 17.3 million 480-pound bales, down 20 percent from last year's 21.6 million bales. Yield is expected to average 783 pounds per harvested acre, down 31 pounds from 2006.
- All wheat production, at 2.11 billion bushels, is up 17 percent from 2006, with yield forecast at 40.6 bushels per acre, up 1.9 bushels from last year.
- NASS's crop production forecasts are based on both farm operator surveys and actual field counts conducted among a statistically selected sample between July 23 and August 6. *Crop Production* and all other NASS reports are available online at www.nass.usda.gov.
- ###

Newsroom

Printable E-mail Bookmark Translate AAA

Contact: Alex Minchenkov, (202) 690-8121
Richard Barton, (202) 690-1502

Farm Production Expenses Fall for First Time Since 1986

WASHINGTON, August 3, 2010 – After setting a record high in 2008, U.S. farm production expenditures decreased by nearly \$20 billion in 2009 – the first major decline in nearly a quarter century, according to the *Farm Production*

The screenshot shows a Wisconsin Agricultural Statistics Service News Release page with the following content:

- 2002 Dairy Producer Opinion Survey**
- 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.

Milk cow herd size	May 2002 herds	May 2007 herds projected 1/	Change 2007/2002
1-29	2,800	4,440	+65
30-49	4,700	3,440	-27
50-99	7,400	5,800	-24
100-199	1,900	2,080	+9
200-499	700	900	+20
500+	200	440	+150
Total	17,500	13,000	-20

Milk cow herd size	Herds	Keep same herd size	Increase herd size	Discontinue milking
1-29	2,800	47	17	36
30-49	4,700	71	9	20
50-99	7,400	63	19	18
100-199	1,900	53	37	10
200-499	700	33	59	8
500+	200	22	78	0
Total	17,500	80	20	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

Reports Are Scheduled

- A release schedule provides the dates for when the data is available

County Data Release Schedule

When Does NASS Publish Annual County Data?

NASS begins preparing year-end county crop production estimates immediately after publishing the annual *Crop Production Summary* in January. State totals for some commodities are published in the monthly *Crop Production* report (April, May and June) and other reports. NASS expects data to be available in the [Quick Stats database](#) at 3 p.m. ET on the dates listed below. However, circumstances may sometimes prevent this. Therefore, final dates will be added to the "All States Available" column when all data are available.

2009 Release Schedule for Preliminary 2008 County Crop Estimates

Commodity	Anticipated Release	All States Available
Barley	February 20	February 20
Oats	February 20	February 20
Rye	February 20	February 20
All Wheat	February 25	February 27
Durum Wheat	February 25	February 27
Other Spring Wheat	February 25	February 27
Winter Wheat	February 25	February 27
Sorghum	March 2	March 2
Sunflower, All, Non-Oil & Oil	March 2	March 2
Corn for Grain & Silage	March 2	March 9
Soybeans	March 2	March 9
Canola	March 4	March 4
Dry Edible Peas	April 8	April 13
Lentils	April 8	April 13
All Hay, Alfalfa & Other	April 17	April 20
Forage - All, Alfalfa	April 17	April 17

Major Geospatial Products and Programs

- ▶ Survey Based State/County Estimates
- ▶ Census of Agriculture
- ▶ Vegetation Condition
- ▶ Cropland Data Layer
- ▶ Area Sampling Frame

Survey based estimates

Data Available Publically

- Both estimates and census data can be accessed using *Quick Stats* interactive statistical database.
- Survey and census statistical tabulate data were represented in county level charts and maps.
- Data & Maps accessible at: www.nass.usda.gov

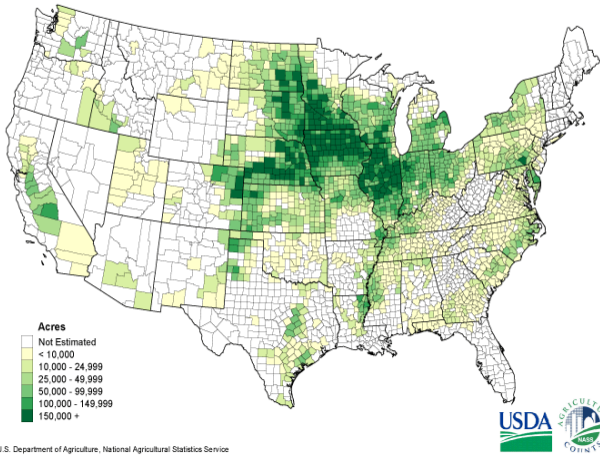
The screenshot shows the 'Quick Stats' page of the USDA National Agricultural Statistics Service. At the top, there is a navigation bar with 'Home', 'Recent Statistics', 'Feedback', and 'Help' links. Below this is a 'Keyword Search' field with a 'Search' button. A status box on the right indicates '42 records' and provides instructions to filter items and press the 'Get Data' button. The main section is titled 'Select Commodity' and features three columns of dropdown menus: 'Sector' (with 'CROPS' selected), 'Group' (with 'FIELD CROPS' selected), and 'Commodity' (with 'CORN' selected). A 'Category' dropdown is also visible, currently set to 'AREA PLANTED'.

The screenshot shows the 'Charts and Maps' page of the USDA National Agricultural Statistics Service. The page features a navigation bar with 'Home', 'About NASS', 'Newsroom', 'Publications', 'Data and Statistics', 'Census', 'Surveys', 'Help', and 'Contact Us' links. A search bar is located on the left side. The main content area is titled 'Charts and Maps' and includes a 'County Maps' section with a list of crops such as Barley, Beans, Dry Edible, Canola, Corn, and Rice. There is also an 'Also See' section with links to 'Frequently Asked Questions', 'NASS Contacts', 'Estimating Programs', and 'Query NASS Data from a Data Base'. A 'Geo Spatial Data' section is visible at the bottom right, listing 'Vegetation Condition Images' and 'Cropland Data Layer'.

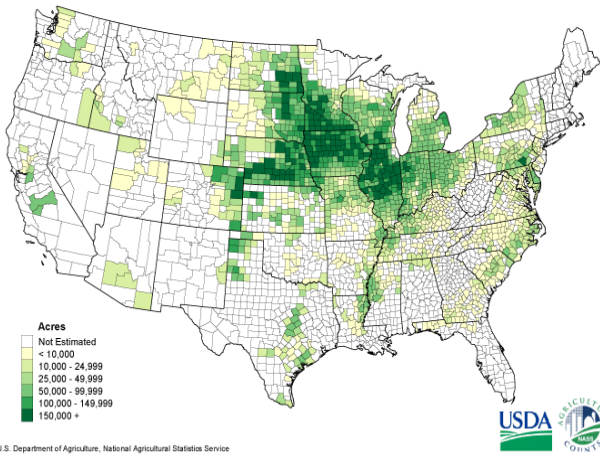
Planted Acres



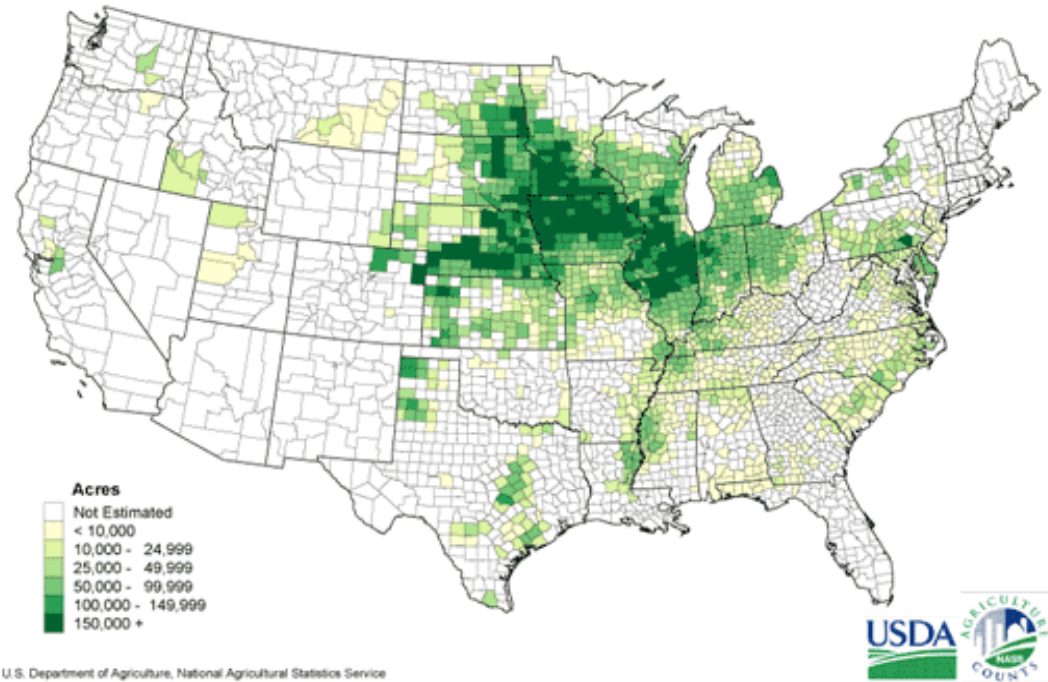
Corn for All Purposes 2007
Planted Acres by County



Corn for All Purposes 2008
Planted Acres by County

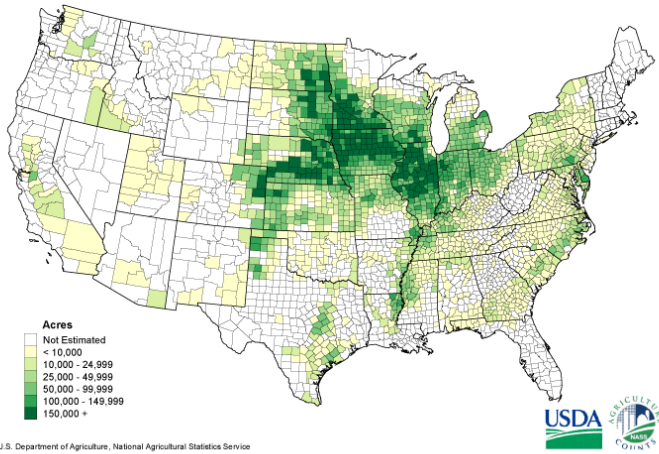


Corn for All Purposes 2009
Planted Acres by County
for Selected States

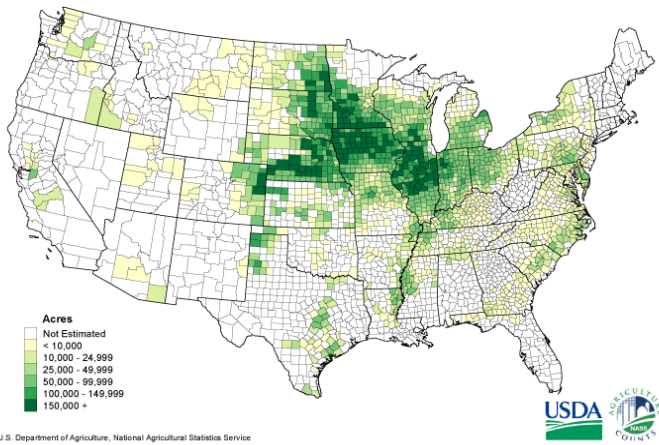


Harvested Acres

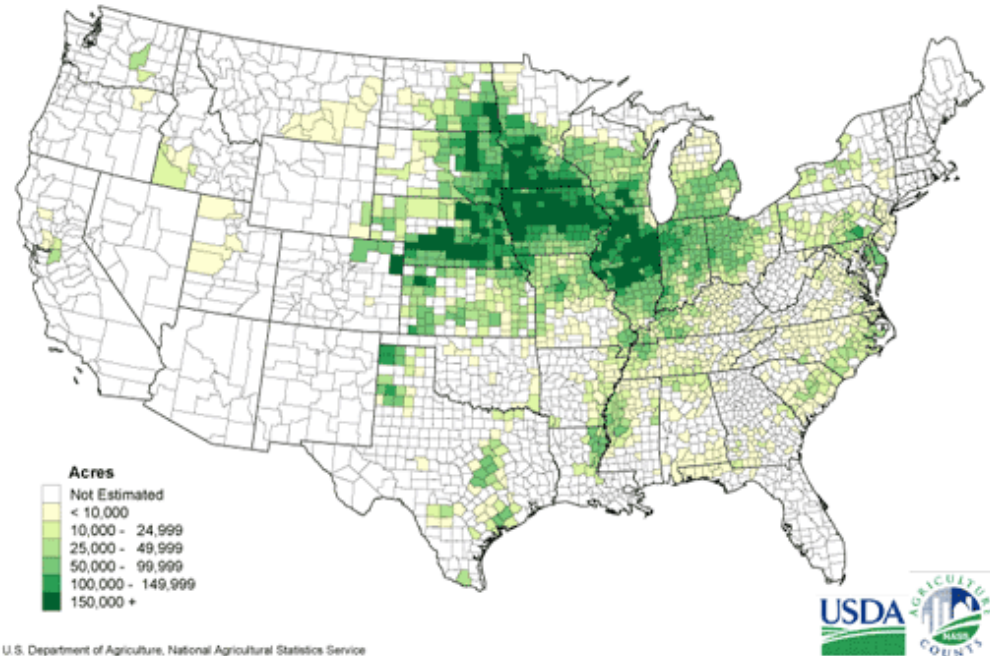
Corn for Grain 2007
Harvested Acres by County



Corn for Grain 2008
Harvested Acres by County



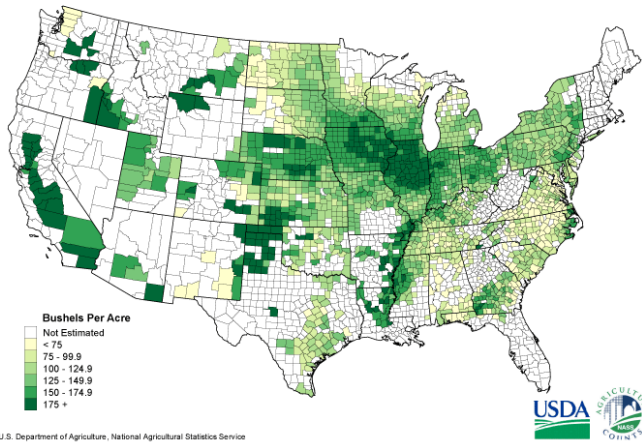
Corn for Grain 2009
Harvested Acres by County
for Selected States



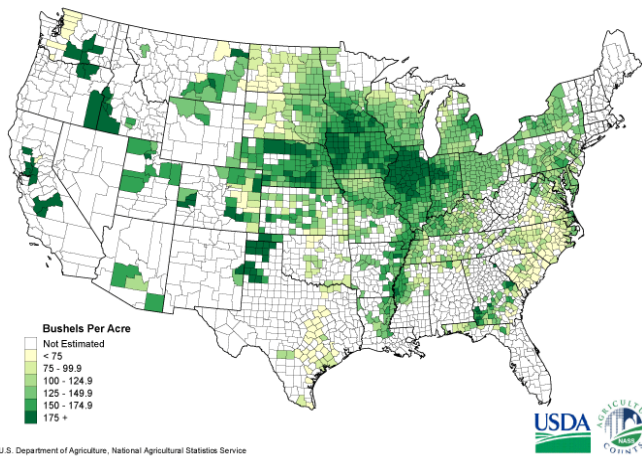
Yield Per Harvested Acre



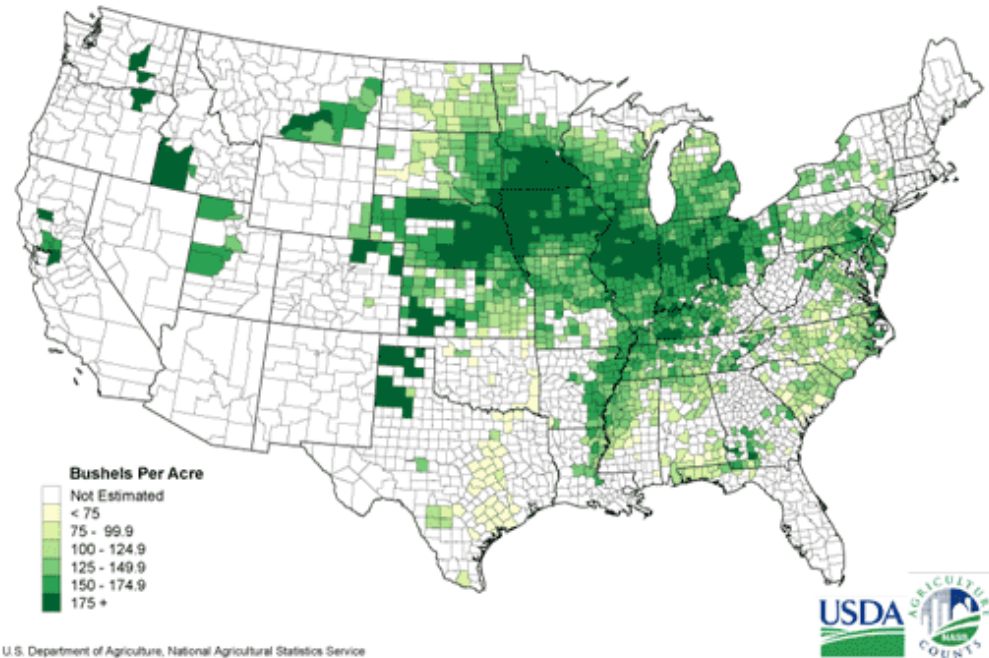
Corn for Grain 2007
Yield Per Harvested Acre by County



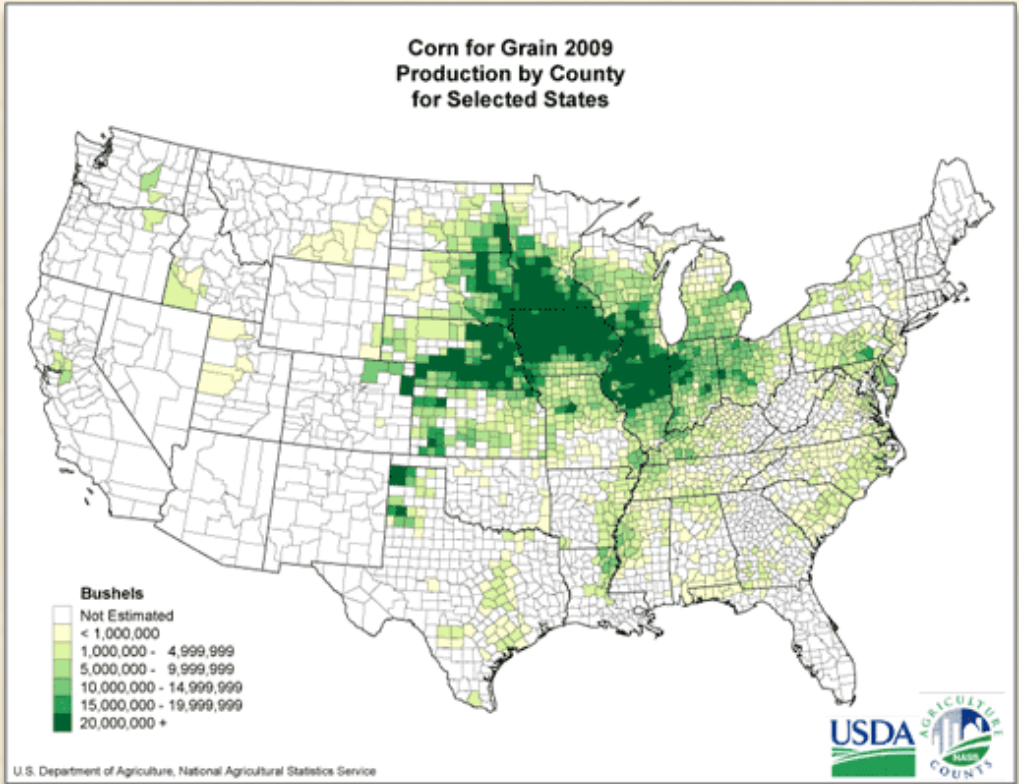
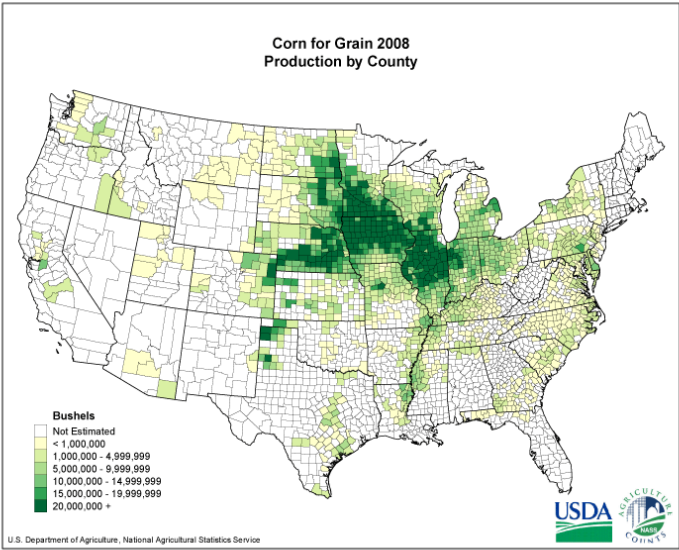
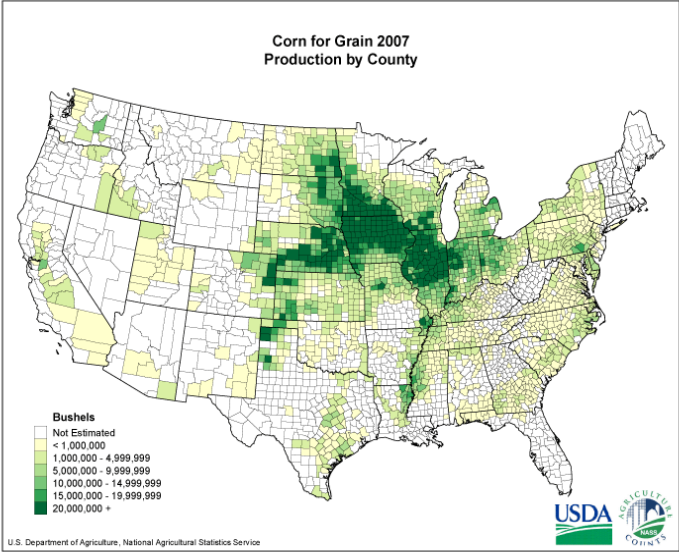
Corn for Grain 2008
Yield Per Harvested Acre by County



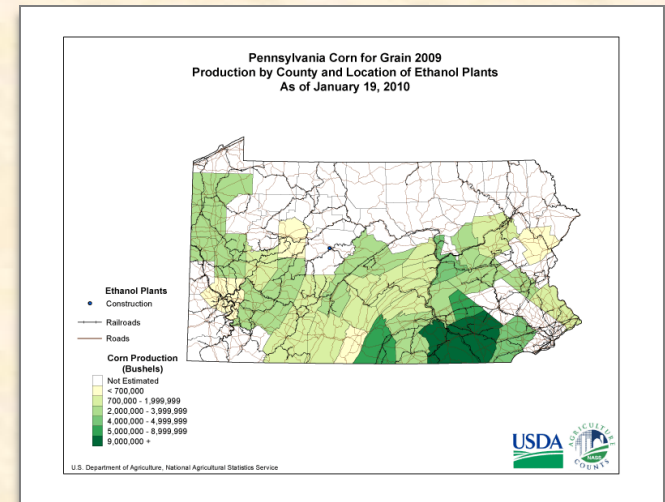
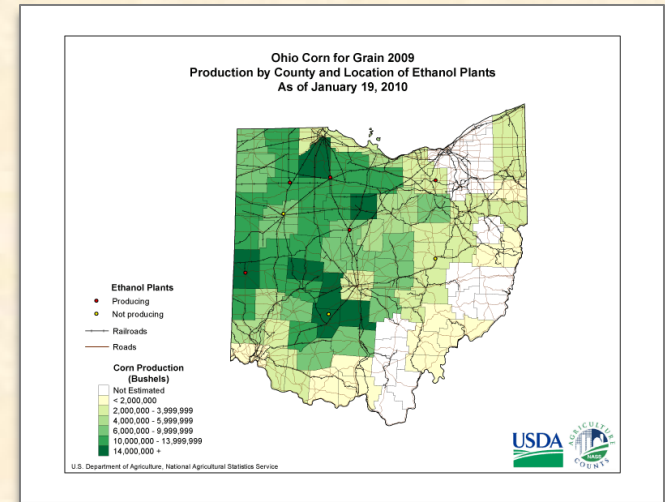
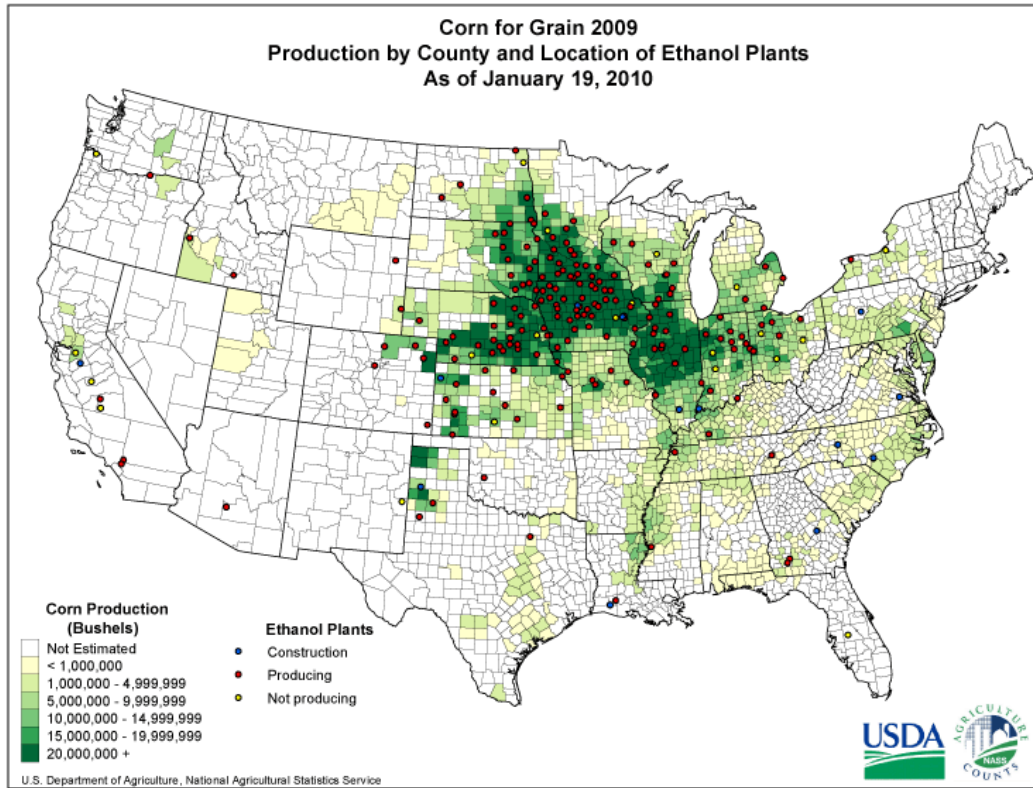
Corn for Grain 2009
Yield Per Harvested Acre by County
for Selected States



Production



Ethanol Plants and Corn Production by County





Census of Agriculture

- ❑ Census of Agriculture is conducted every 5 years
 - ❑ A complete accounting of crops and livestock on all farms
 - ❑ Collects information on operator characteristics, demographics, income and expenses
- ❑ The 2007 Census of Agriculture Guide to Census Products can be accessed by selecting 2007 Census from www.agcensus.usda.gov
 - ❑ The 2012 Census of Agriculture is in processing and will be available soon.
- ▶ Users can view, query, print or download Census tablea and *static maps*.
- ▶ Data can be downloaded as csv files for use in a spreadsheet or in a GIS

250 Static Atlas Maps for each census are available in the following areas

- Crops and Plants
- Economics
- Farms
- Livestock and Animals
- Operators

Ag Atlas Maps, Livestock and Animals

Note: These documents are in Adobe Acrobat's Portable Document Format (PDF). If you need the Acrobat Reader, it is available for free from the [Adobe web site](#).
[Click here for more information on how these maps were created.](#)

Map Number	Livestock, Poultry, and Other Animals	Format
07-M134	Cattle and Calves - Inventory: 2007	PDF
07-M135	Swine - Inventory: 2007	PDF
07-M136	Poultry - Inventory: 2007	PDF
07-M137	Other Animals - Inventory: 2007	PDF
07-M138	Percent of Farms with Livestock: 2007	PDF
07-M139	Percent of Farms with Poultry: 2007	PDF
07-M140	Percent of Farms with Swine: 2007	PDF
07-M141	Percent of Farms with Cattle: 2007	PDF
07-M142	Percent of Farms with Other Animals: 2007	PDF

Ag Atlas Maps, Economics

Note: These documents are in Adobe Acrobat's Portable Document Format (PDF). If you need the Acrobat Reader, it is available for free from the [Adobe web site](#).
[Click here for more information on how these maps were created.](#)

Map Number	Farms by Size	Format
07-M001	Number of Farms: 2007	PDF
07-M002	Change in Number of Farms: 2002 to 2007	PDF
07-M251	Percent of Farms with Internet Access: 2007	PDF
07-M252	Percent of Farms with High-Speed Internet Access: 2007	PDF

Ag Atlas Maps, Farms

Note: These documents are in Adobe Acrobat's Portable Document Format (PDF). If you need the Acrobat Reader, it is available for free from the [Adobe web site](#).
[Click here for more information on how these maps were created.](#)

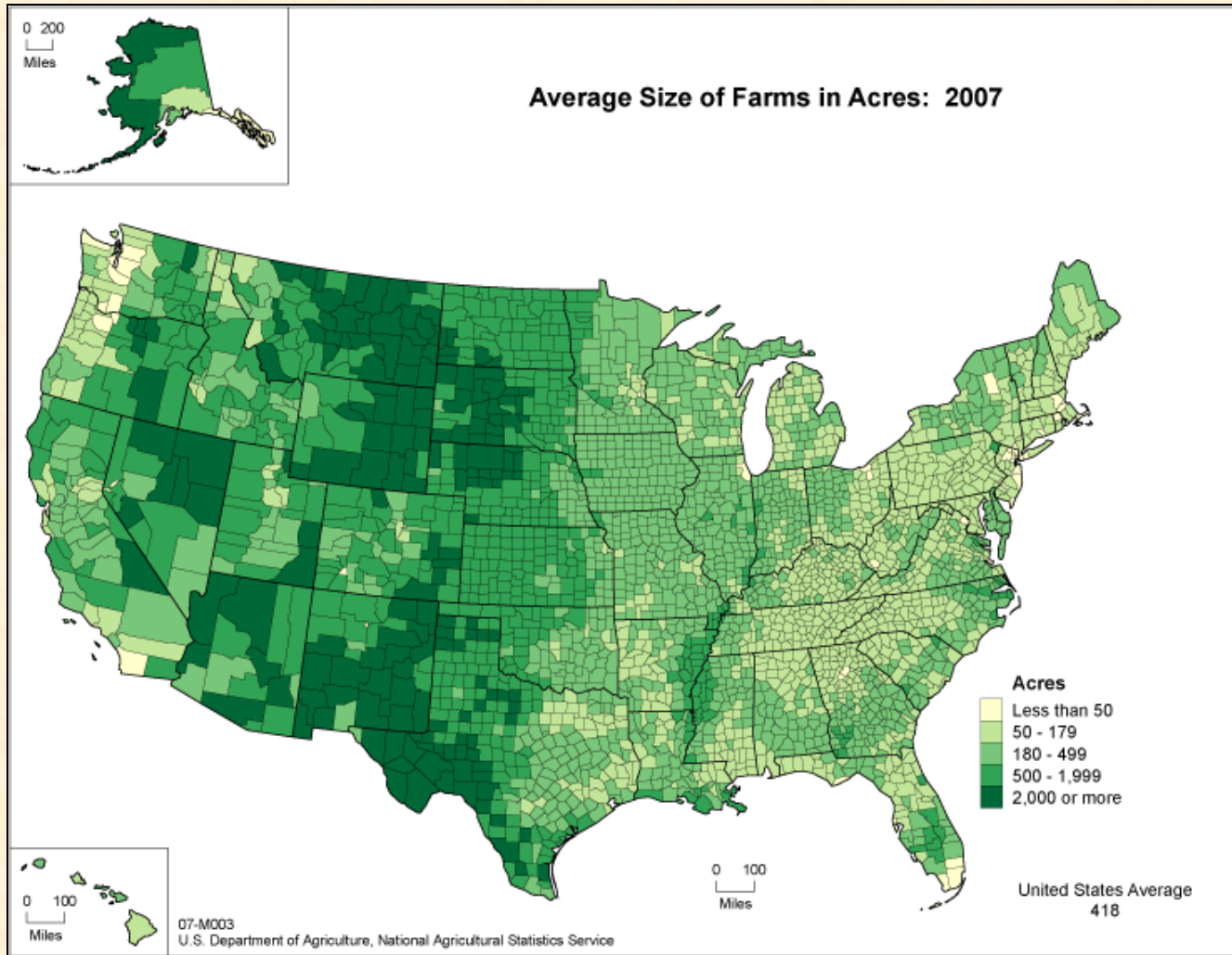
Map Number	Farms	Format
07-M001	Number of Farms: 2007	PDF
07-M002	Change in Number of Farms: 2002 to 2007	PDF
07-M251	Percent of Farms with Internet Access: 2007	PDF
07-M252	Percent of Farms with High-Speed Internet Access: 2007	PDF
Map Number	Farms by Size	Format
07-M003	Average Size of Farms in Acres: 2007	PDF
07-M004	Change in Number of Farms with Less Than 50 Acres: 2007	PDF
07-M005	Change in Number of Farms with 50 to 179 Acres: 2007	PDF
07-M006	Change in Number of Farms with 180 to 499 Acres: 2007	PDF
07-M007	Change in Number of Farms with 500 to 1,999 Acres: 2007	PDF
07-M008	Change in Number of Farms with 2,000 Acres or More: 2007	PDF
Map Number	Land in Farms and Land Use	Format
07-M077	Acres of Land in Farms: 2007	PDF
07-M078	Land in Farms - Change in Acreage: 2002 to 2007	PDF
07-M079	Acres of Land in Farms as Percent of Land Area in Acres: 2007	PDF

Ag Atlas Maps, Operators

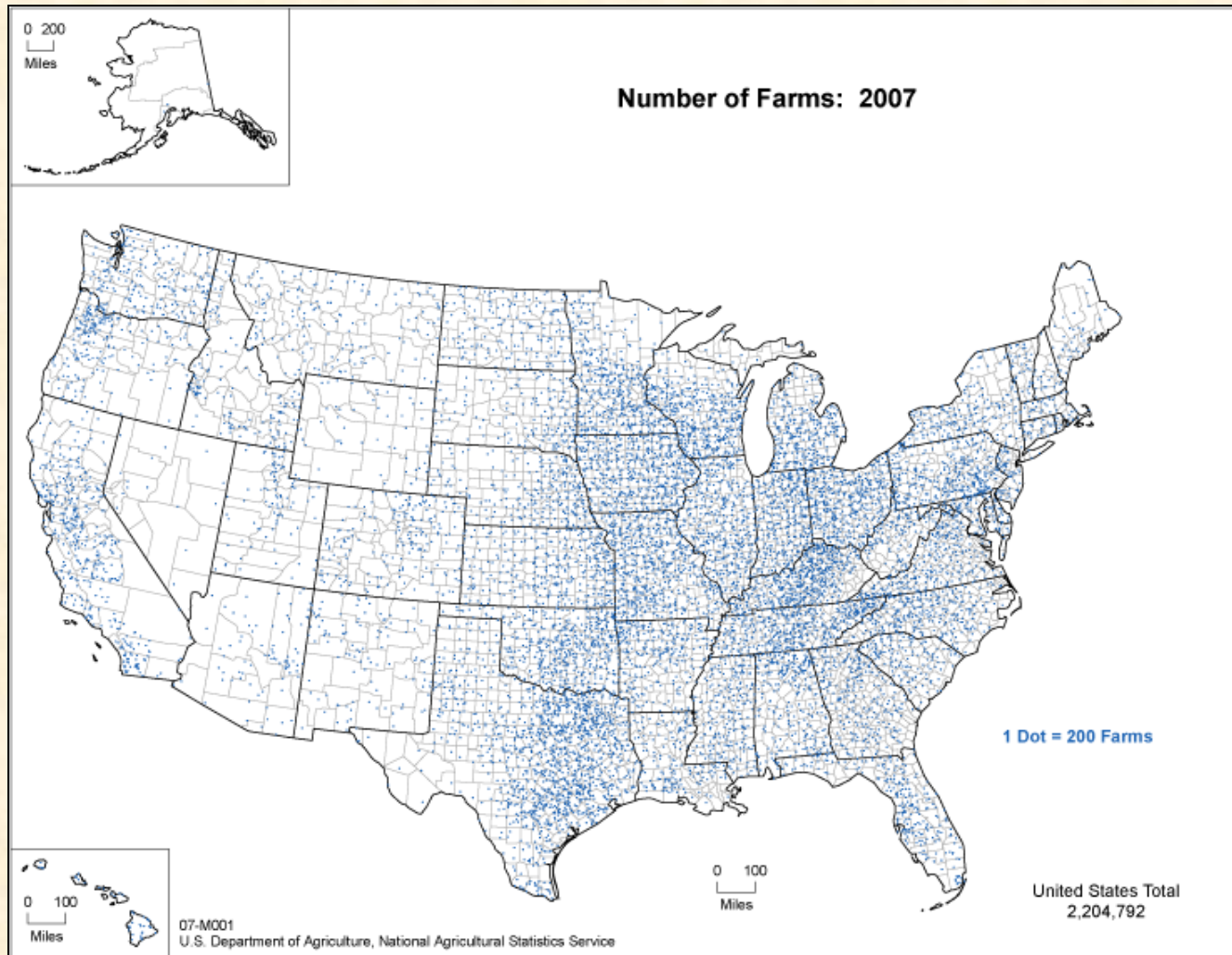
Note: These documents are in Adobe Acrobat's Portable Document Format (PDF). If you need the Acrobat Reader, it is available for free from the [Adobe web site](#).
[Click here for more information on how these maps were created.](#)

Map Number	Hired Farm Labor	Format
07-M075	Hired Farm Workers Working Less Than 150 Days: 2007	PDF
07-M076	Hired Farm Workers Working 150 Days or More: 2007	PDF
Map Number	Tenure of Farm Operators and Farm Operations	Format
07-M111	Percent of Farms Operated by Full Owners: 2007	PDF
07-M112	Percent of Land in Farms Operated by Full Owners: 2007	PDF
07-M113	Percent of Farms Operated by Part Owners: 2007	PDF
07-M114	Percent of Land in Farms Operated by Part Owners: 2007	PDF
07-M115	Percent of Farms Operated by Tenants: 2007	PDF
07-M116	Percent of Land in Farms Operated by Tenants: 2007	PDF
07-M117	Percent of Land in Farms Rented or Leased: 2007	PDF
Map Number	Farms by Type of Organization	Format
07-M118	Percent of Farms Operated by Family or Individual: 2007	PDF
07-M119	Percent of Farms Operated by Partnership: 2007	PDF
07-M120	Percent of Farms Operated by Corporation: 2007	PDF
Map Number	Principal Occupation of Operator	Format
07-M121	Percent of Principal Farm Operators Reporting Primary Occupation	PDF

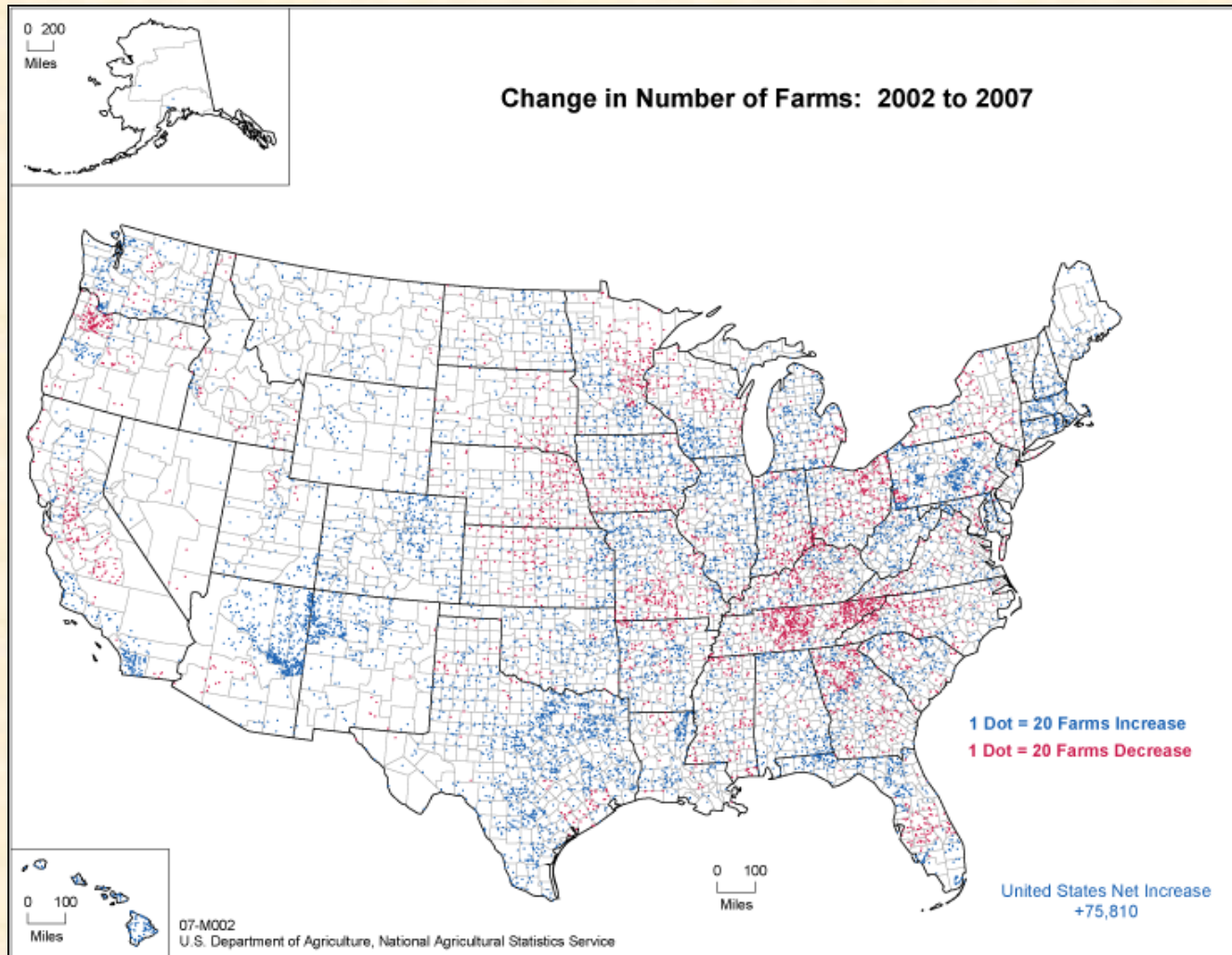
Choropleth (shaded) Maps



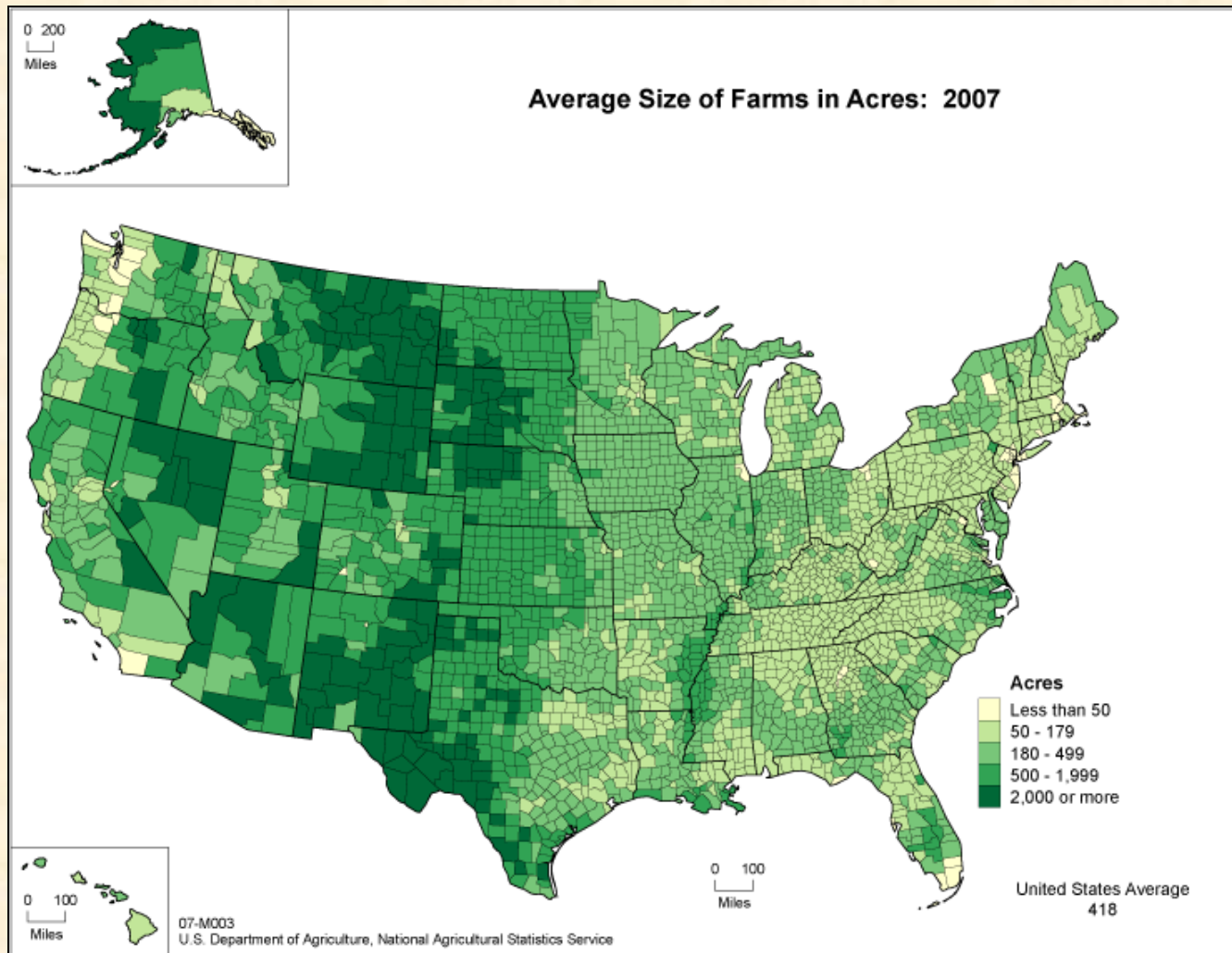
Dot Density Maps



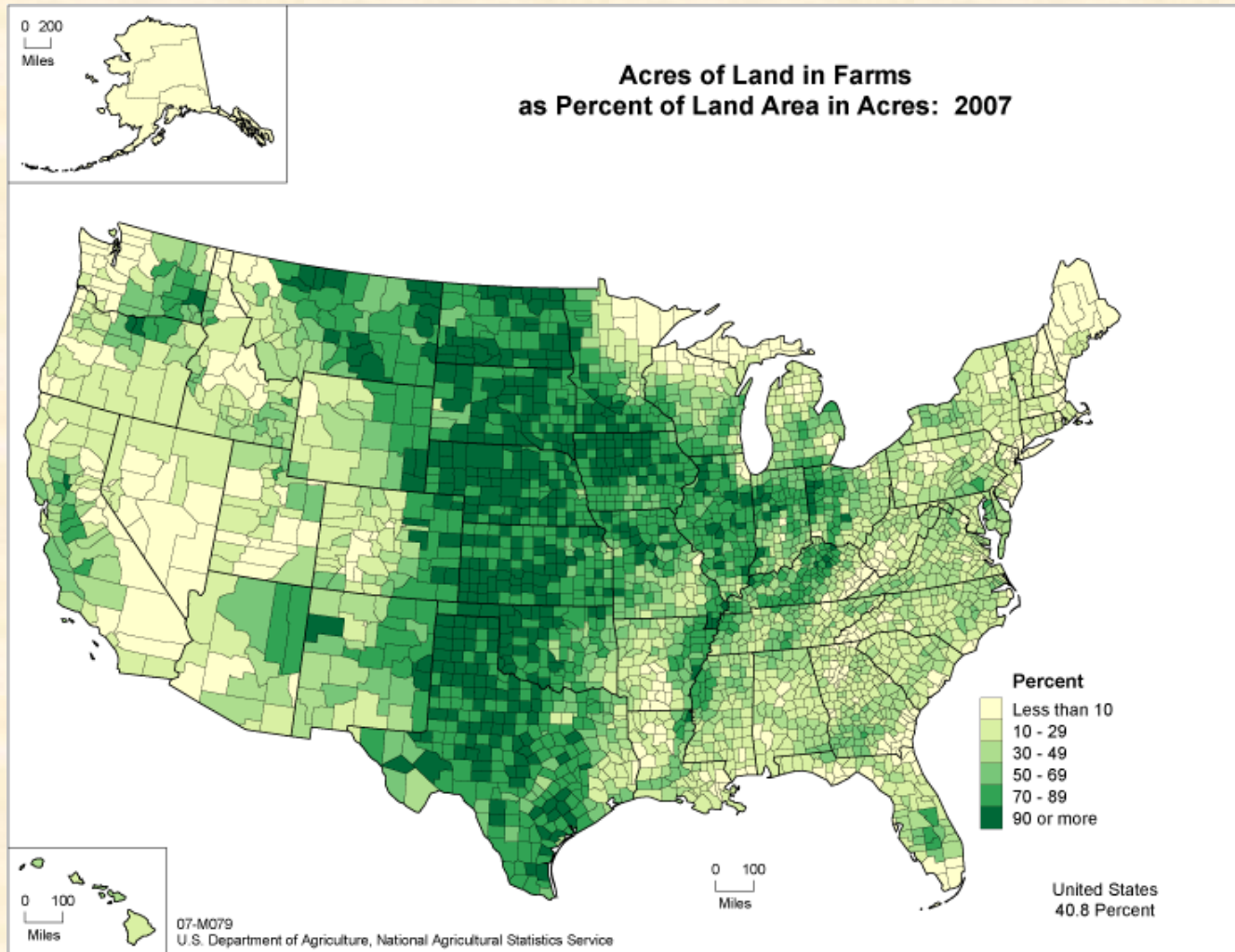
Dot Density Change Maps



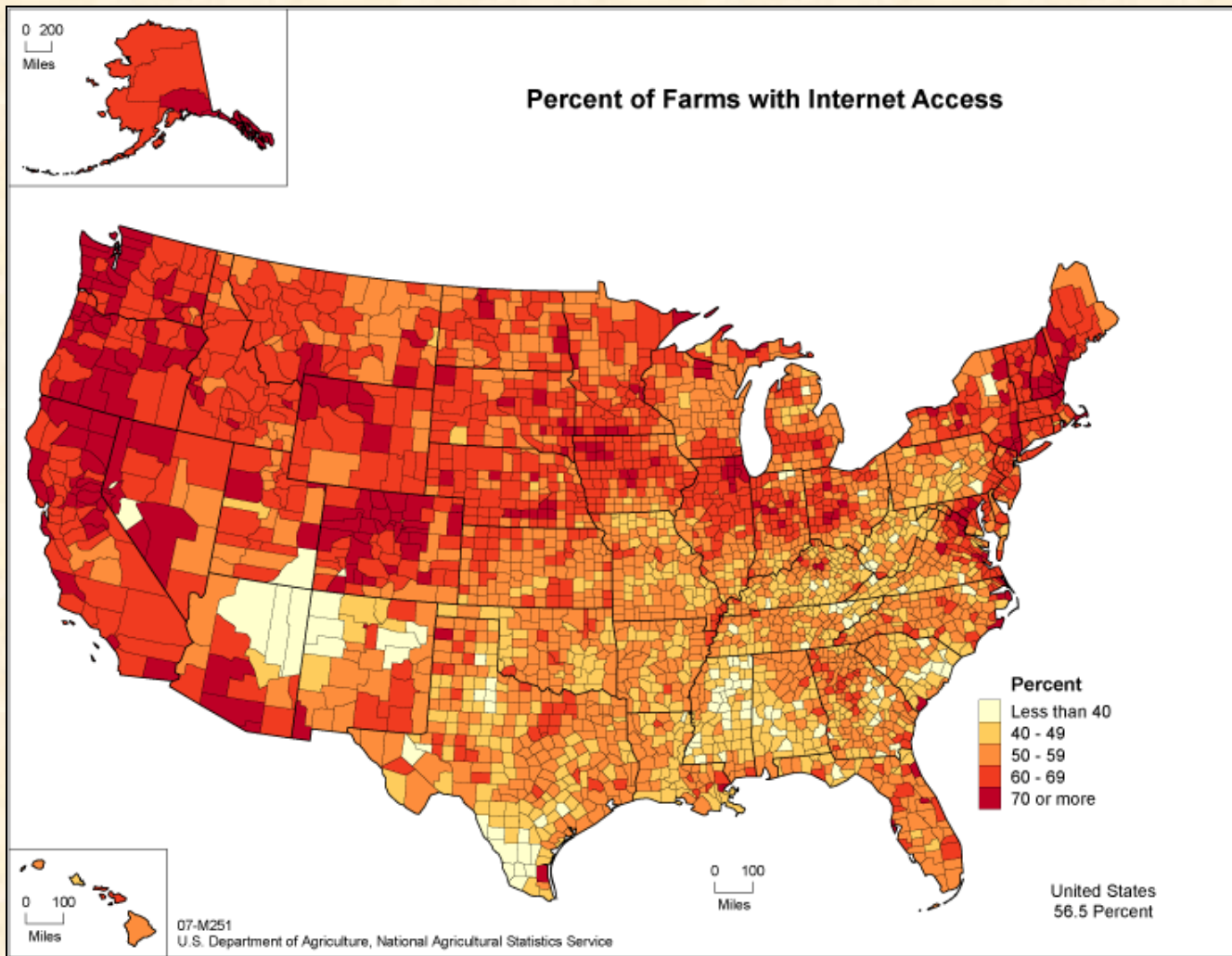
Farms



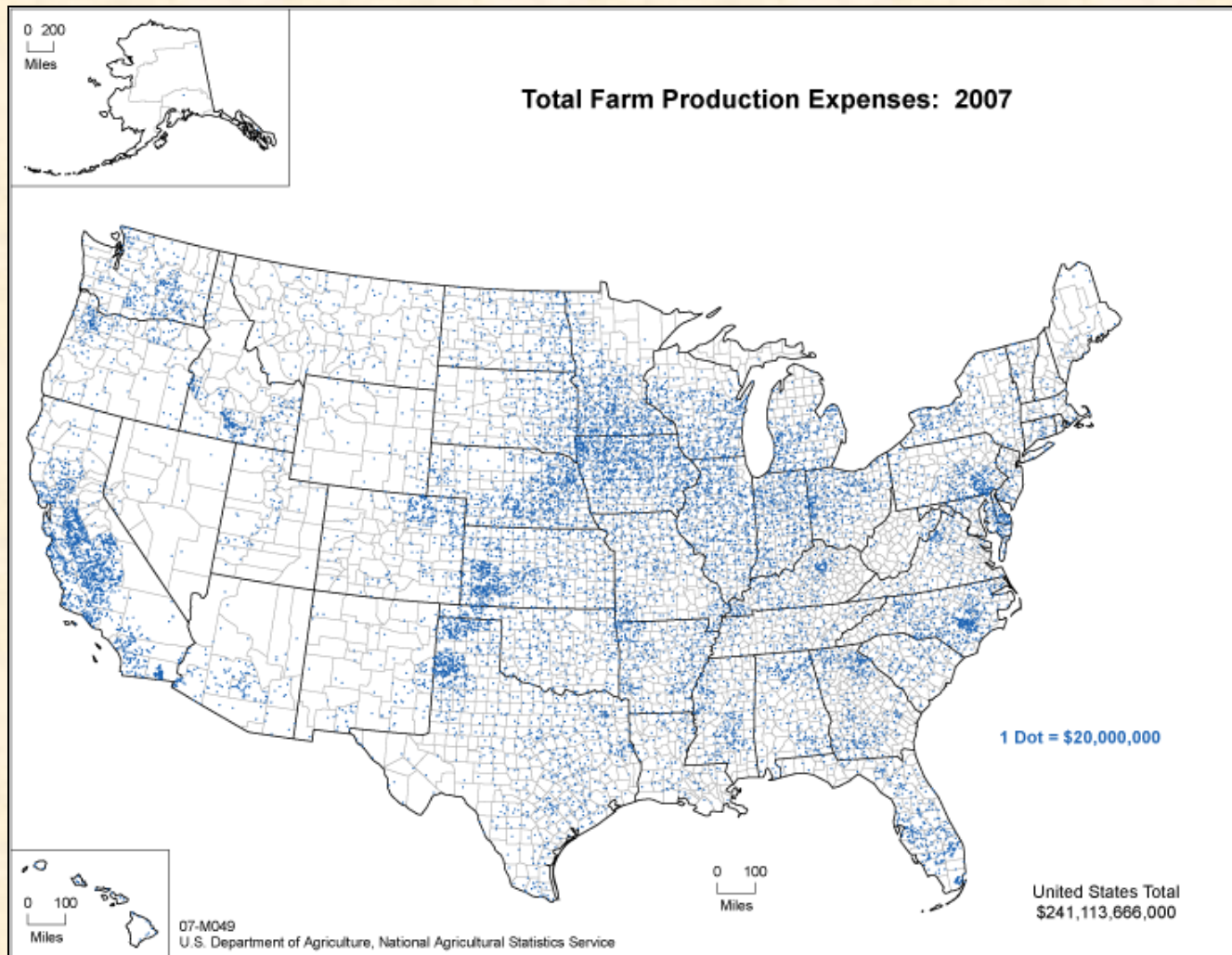
Farms



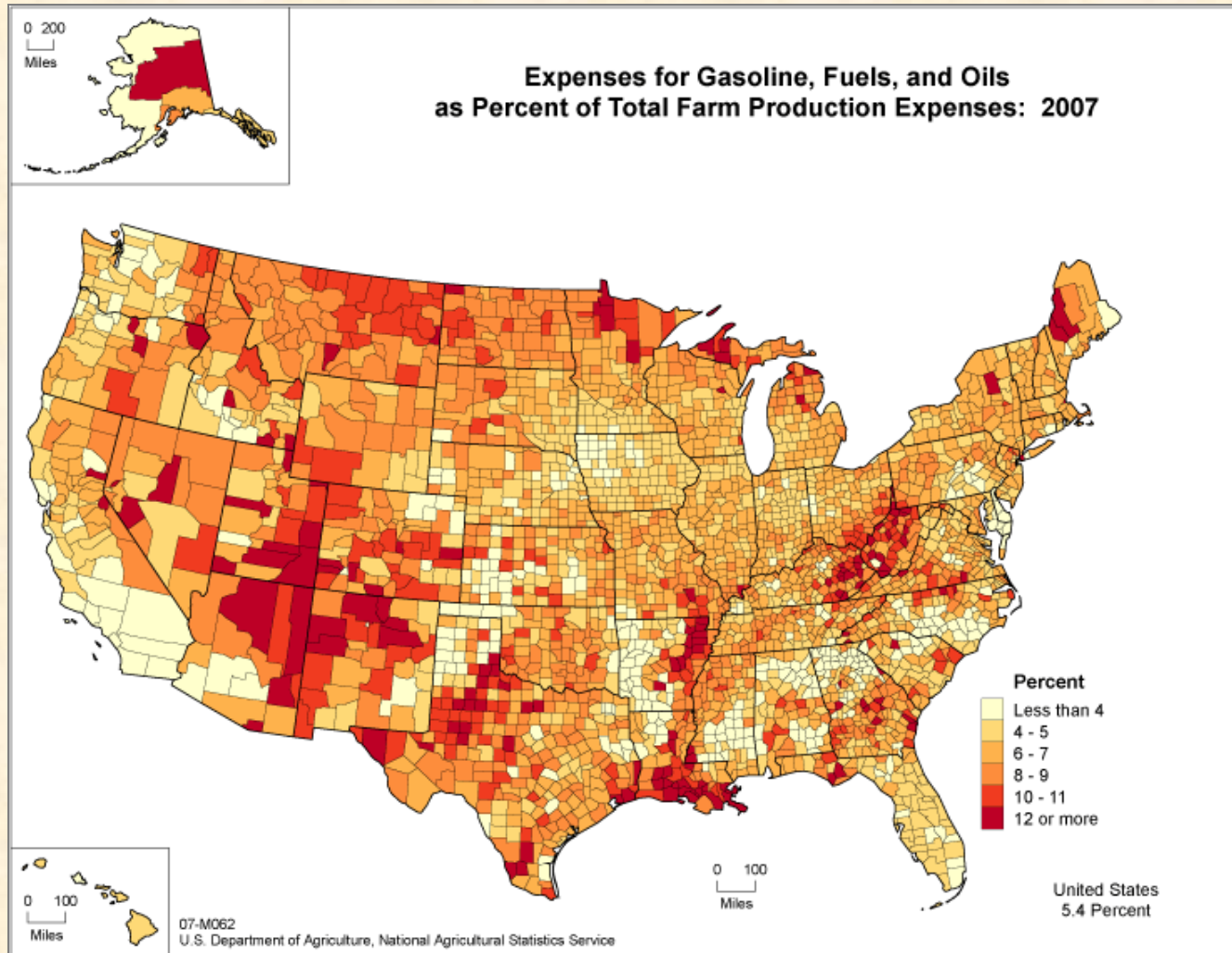
Farms



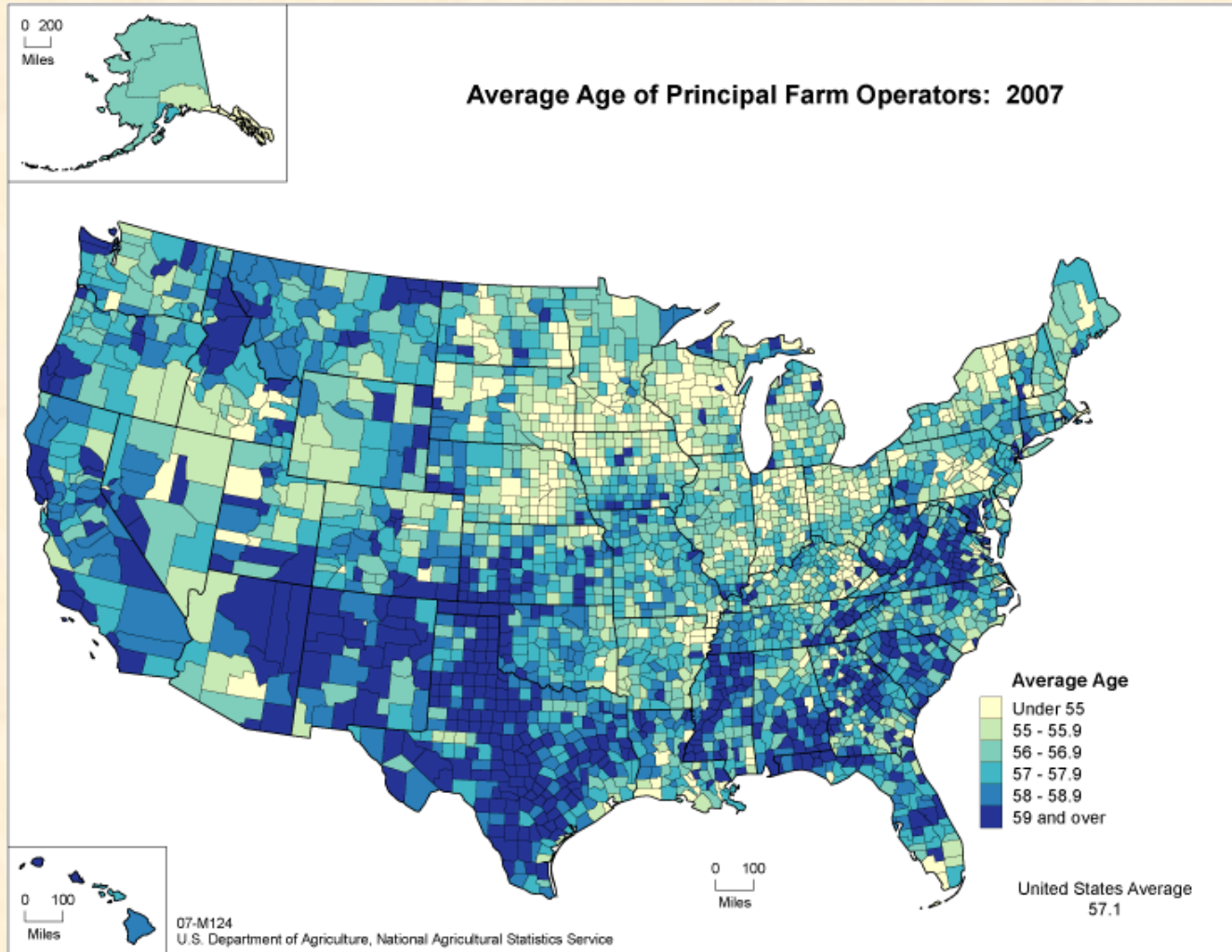
Economics



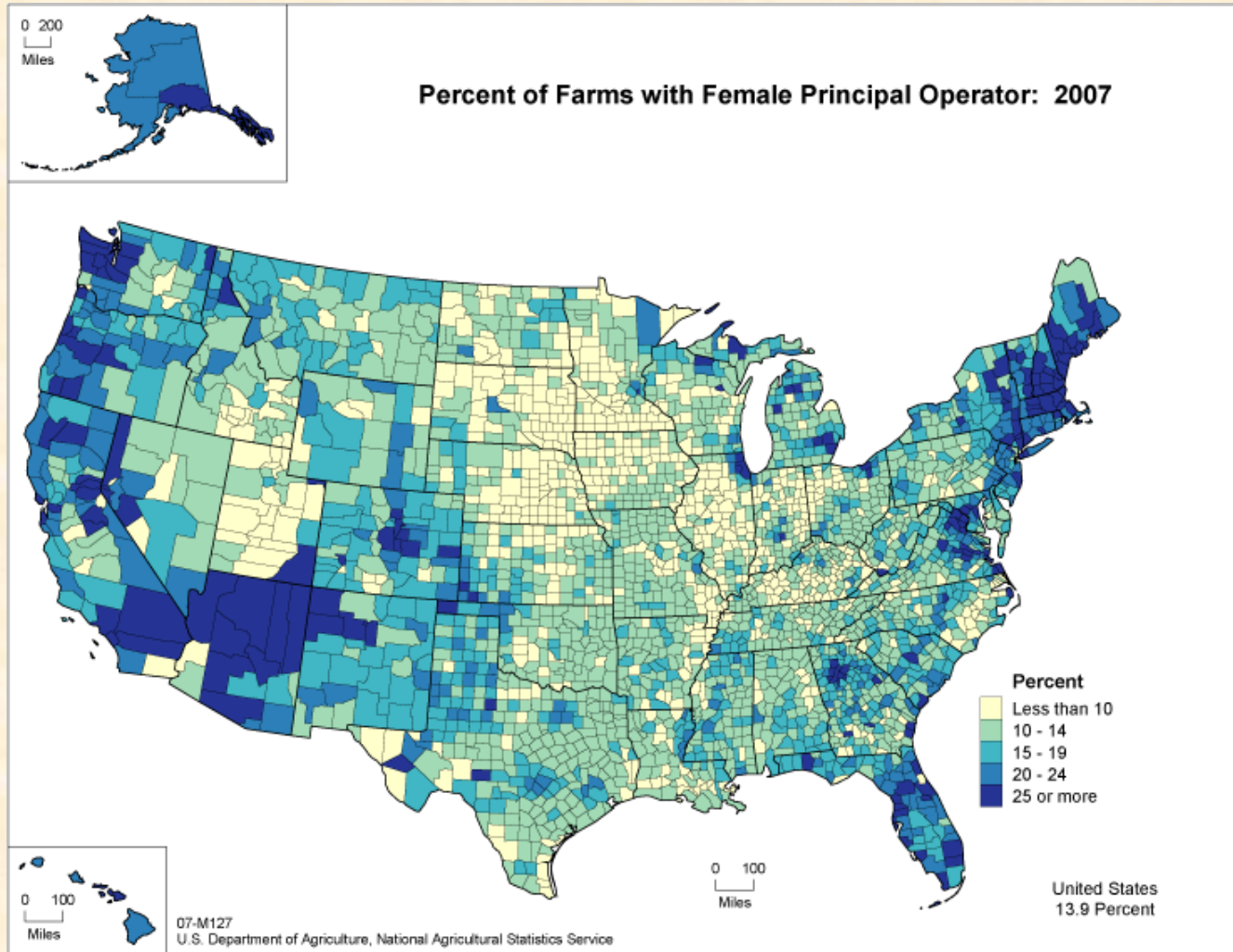
Economics



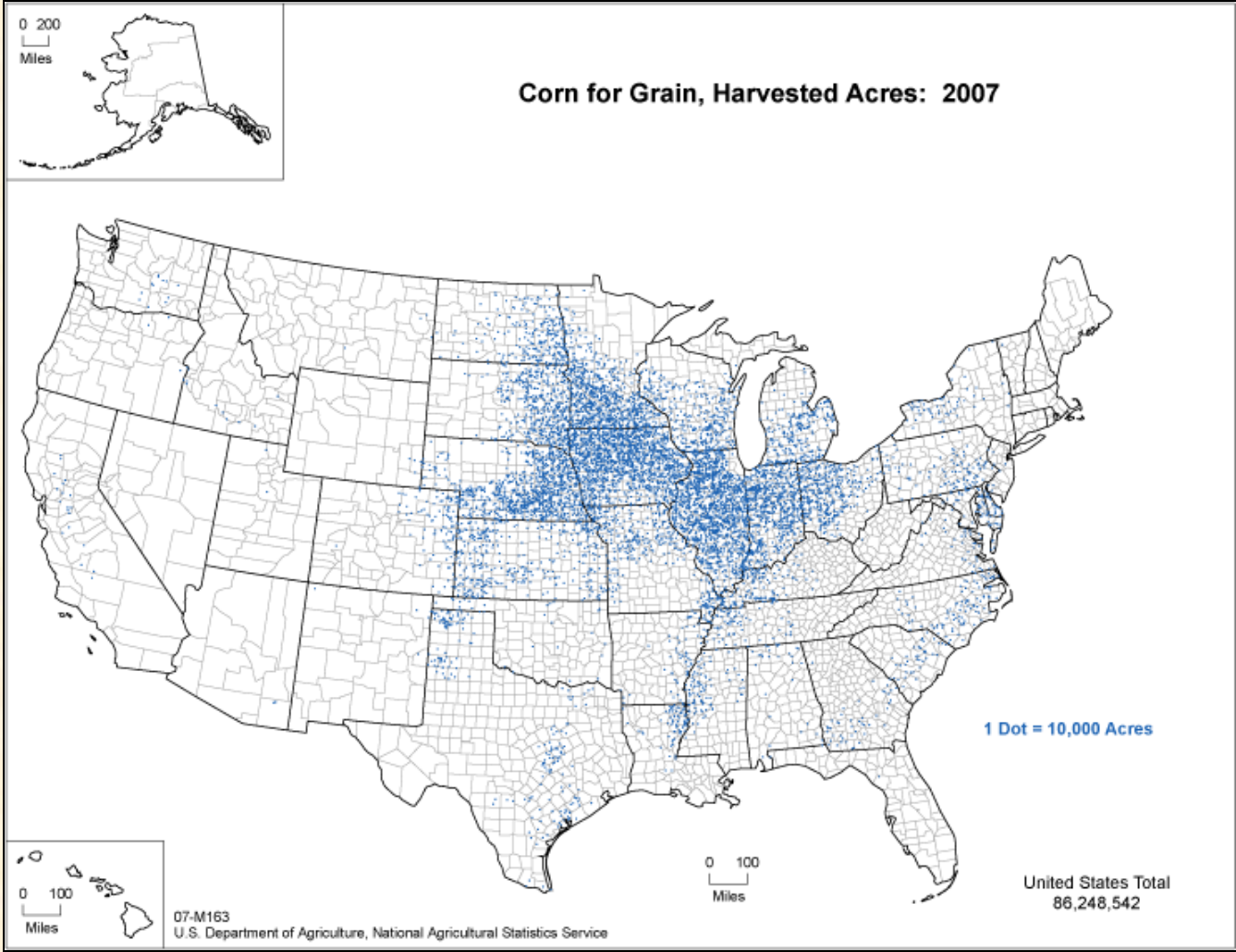
Operators



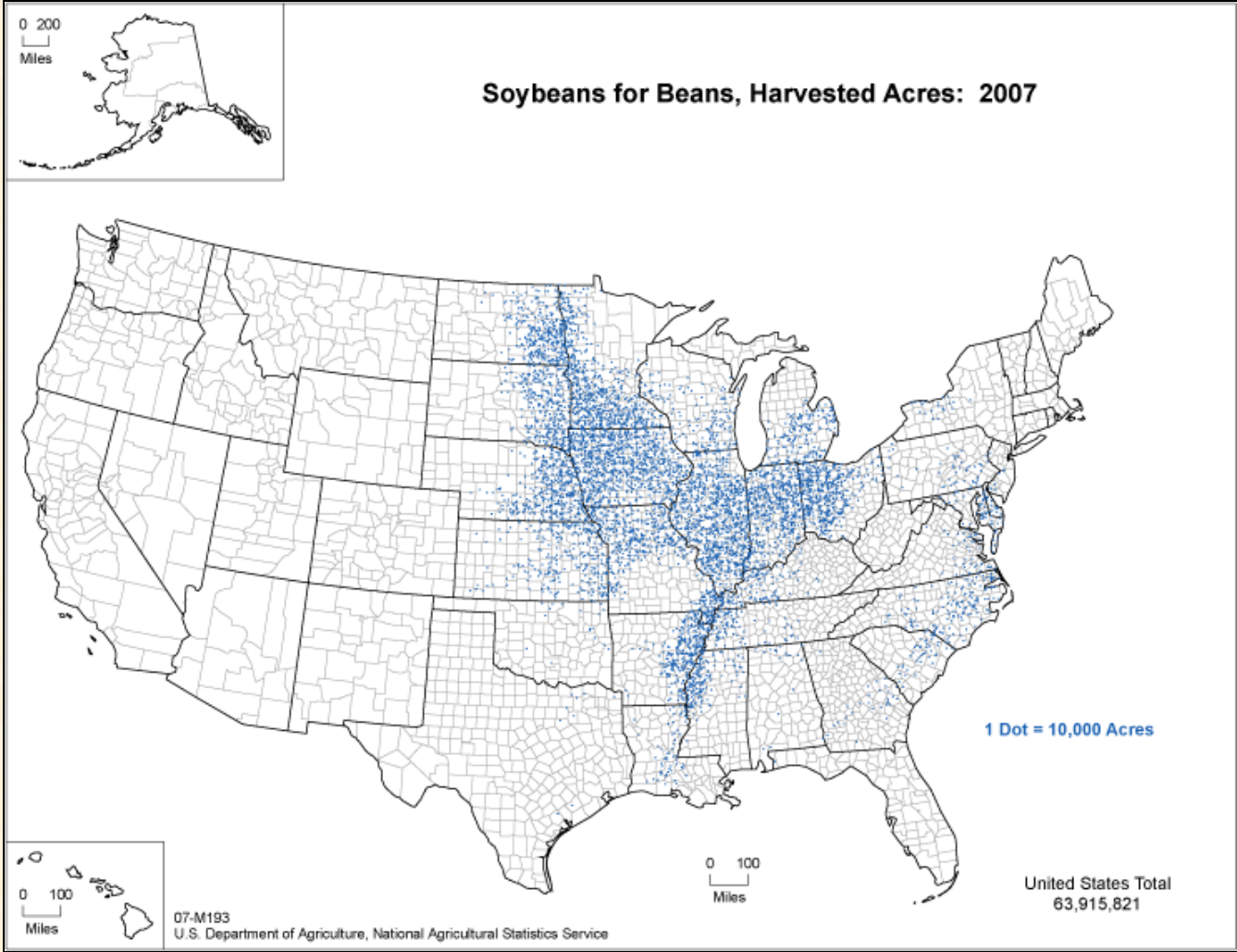
Operators



Crops



Crops



▶ County profiles

Profiles and Rankings

Summary reports that combine narrative and data from the 2007 Census of Agriculture. These reports give an insight into State, County, and Congressional District agricultural information, as well as the agriculture products ranking reports sorted by market value.

Regional Studies

- State & County Profiles
- Race, Ethnicity and Gender Profiles (updated 10/30/09) PDF | CSV
- 2007 Congressional Districts
- ZIP Code Tabulations

Rankings

- Ranking: Market Value Ag Products
- Congressional District Rankings

2007 Census Publications

State and County Profiles

Pennsylvania

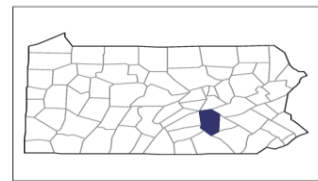


Statewide Summary

Adams	Clinton	Lackawanna	Pike
Allegheny	Columbia	Lancaster	Potter
Armstrong	Crawford	Lawrence	Schuylkill
Beaver	Cumberland	Lebanon	Snyder
Bedford	Dauphin	Lehigh	Somerset
Berks	Delaware	Luzerne	Sullivan
Blair	Erie	Lycoming	Susquehanna
Bradford	Fayette	McKean	Tioga
Bucks	Forest	Mercer	Union
Butler	Franklin	Mifflin	Venango
Cambria	Fulton	Monroe	Warren
Cameron	Greene	Montgomery	Washington
Carbon	Huntingdon	Montour	Wayne
Centre	Indiana	Northampton	Westmoreland
Chester	Jefferson	Northumberland	Wyoming
Clarion	Luniata	Perry	York
Clearfield		Philadelphia	

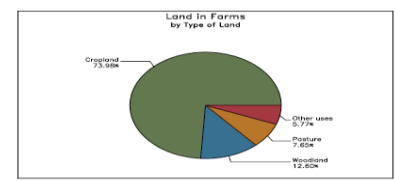
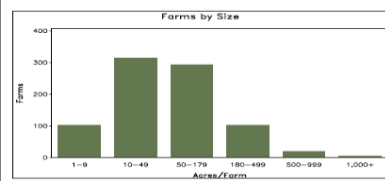
2007 CENSUS OF AGRICULTURE

County Profile



Dauphin County Pennsylvania

	2007	2002	% change
Number of Farms	836	852	- 2
Land in Farms	89,533 acres	94,983 acres	- 6
Average Size of Farm	107 acres	111 acres	- 4
Market Value of Products Sold	\$82,887,000	\$46,487,000	+ 78
Crop Sales \$16,348,000 (20 percent)			
Livestock Sales \$66,539,000 (80 percent)			
Average Per Farm	\$99,148	\$54,562	+ 82
Government Payments	\$857,000	\$948,000	- 10
Average Per Farm Receiving Payments	\$2,985	\$4,493	- 34



Dauphin County – Pennsylvania

Ranked items among the 67 state counties and 3,079 U.S. counties, 2007

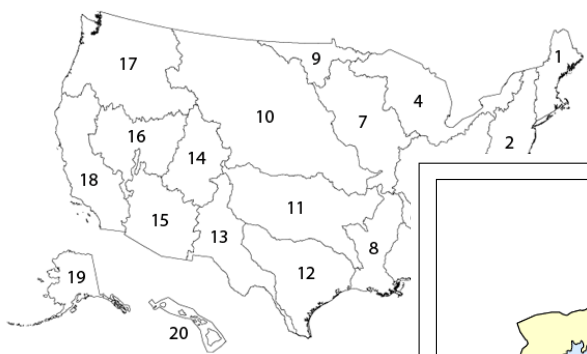
Item	Quantity	State Rank	Universe ¹	U.S. Rank	Universe ¹
MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD (\$1,000)					
Total value of agricultural products sold	82,887	21	67	1,070	3,076
Value of crops including nursery and greenhouse	16,348	27	67	1,581	3,072
Value of livestock, poultry, and their products	66,539	21	67	618	3,069
VALUE OF SALES BY COMMODITY GROUP (\$1,000)					
Grains, oilseeds, dry beans, and dry peas	10,109	16	67	1,223	2,933
Tobacco	(0)	15	19	(0)	437
Cotton and cottonseed	-	-	-	-	626
Vegetables, melons, potatoes, and sweet potatoes	1,206	33	67	749	2,796
Fruits, tree nuts, and berries	1,257	18	66	409	2,659
Nursery, greenhouse, floriculture, and sod	753	50	65	1,213	2,703
Cut Christmas trees and short rotation woody crops	(0)	15	66	(0)	1,710
Other crops and hay	2,977	15	66	565	3,054
Poultry and eggs	30,925	11	67	318	3,020
Cattle and calves	7,042	25	67	1,474	3,054
Milk and other dairy products from cows	21,118	25	65	287	2,493
Hogs and pigs	6,252	15	66	484	2,922
Sheep, goats, and their products	384	6	66	331	2,968
Horses, ponies, mules, burros, and donkeys	459	14	67	527	3,024
Aquaculture	220	39	59	526	1,498
Other animals and other animal products	139	39	67	844	2,875
TOP CROP ITEMS (acres)					
Forage - land used for all hay and hayslage, grass silage, and greenhouse	19,611	33	67	1,069	3,060
Corn for grain	17,599	22	66	975	2,634
Soybeans for beans	10,539	14	61	1,012	2,627
Corn for silage	3,919	31	64	403	2,263
Wheat for grain, all	3,759	13	60	1,106	2,481
TOP LIVESTOCK INVENTORY ITEMS (number)					
Layers	788,324	8	67	122	3,024
Broilers and other meat-type chickens	669,744	10	62	355	2,476
Pullets for laying flock replacement	225,273	8	65	140	2,627
Turkeys	127,231	8	63	151	2,371
Hogs and pigs	21,604	13	66	504	2,956

▶ Watershed data published at the 6 digit hydrologic unit code for 38 selected land use characteristics

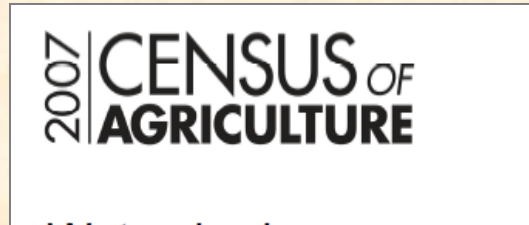
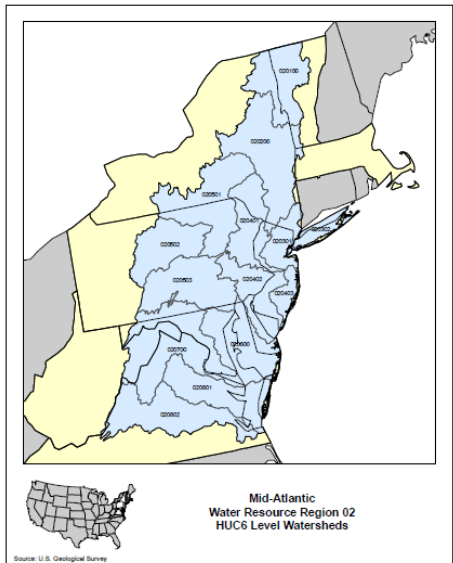
2007 Census Publications

2007 Census by Watershed

Select the watershed region from the map or from the text below the map.



- Full Watershed Report [PDF](#) | [TXT](#) | [CSV](#)
- New England 01
 - Mid-Atlantic 02
 - South Atlantic-Gulf 03
 - Great Lakes 04
 - Ohio 05
 - Tennessee 06
 - Upper Mississippi 07
 - Lower Mississippi 08
 - Souris-Red-Rainy 09
 - Missouri 10
 - Arkansas-White-Red 11
 - Texas-Gulf 12
 - Rio Grande 13
 - Upper Colorado 14
 - Lower Colorado 15



Watershed Volume 2 • Subject

Issued May 2009

Table 1. Summary by Hydrologic Unit Code: 2007 and 2002 - Con.

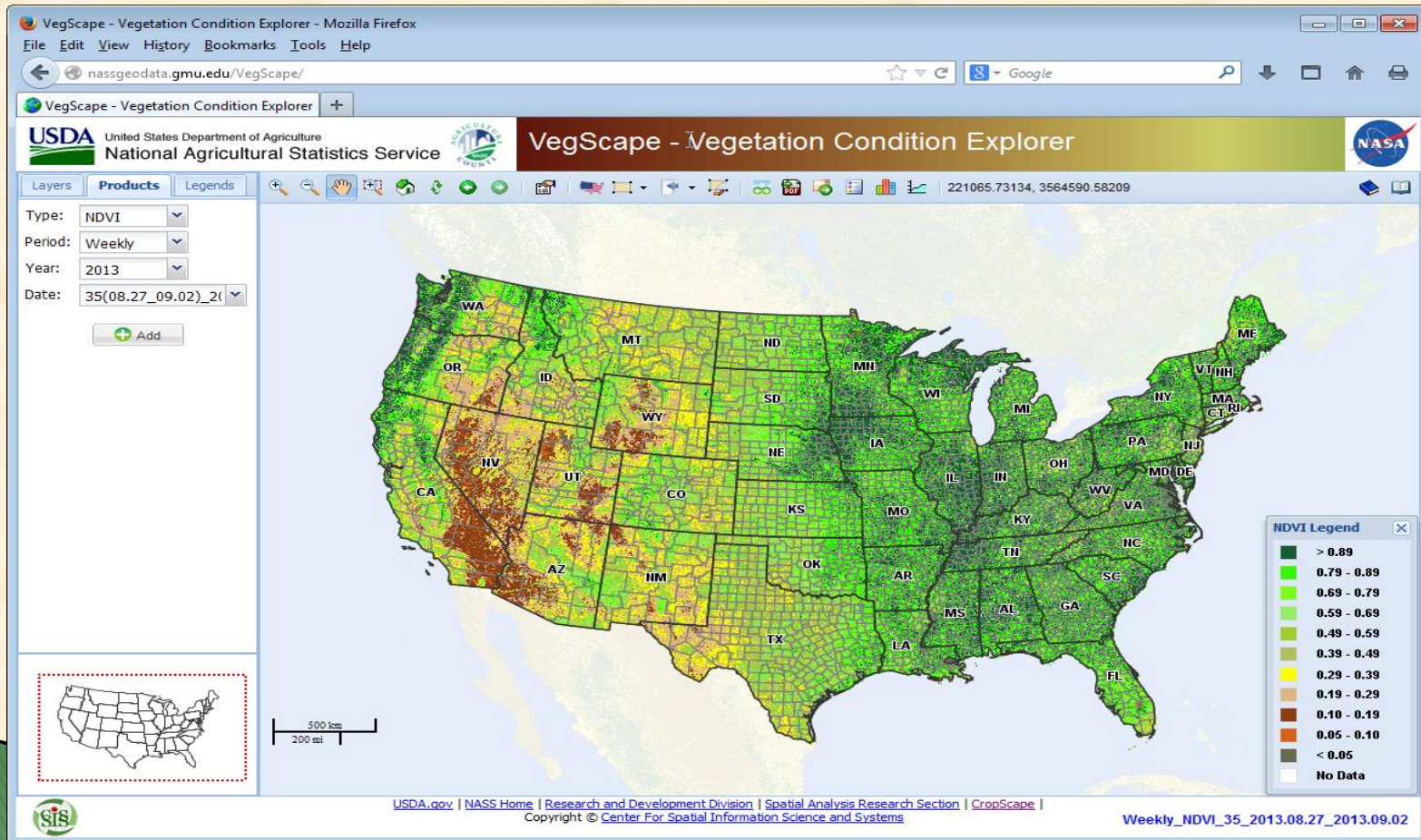
(For meaning of abbreviations and symbols, see introductory text)

Item	US		H10 Missouri		H100100	
	2007	2002	2007	2002	2007	2002
Farms.....	farms 2,294,702	farms 2,128,682	287,832	282,810	113	86
Land in farms.....	acres 922,046,640	acres 938,279,058	258,882,881	281,283,483	187,325	184,070
Land use:						
Total cropland.....	farms 1,685,339	farms 1,751,450	219,730	226,784	89	68
Harvested cropland.....	acres 408,424,909	acres 434,164,948	110,542,228	115,541,128	68,738	70,143
Cropland used only for pasture or grazing.....	farms 1,328,004	farms 1,382,838	178,765	180,259	36	46
Cropland on which all crops failed or were abandoned.....	acres 308,807,801	acres 302,897,252	81,388,773	75,808,818	25,736	31,853
Cropland idle or used for cover crops or soil improvement but not harvested and not pastured or grazed.....	farms 484,753	farms 718,232	41,850	72,189	10	20
Cropland in cultivated summer fallow.....	acres 56,771,154	acres 80,567,835	7,139,131	12,458,438	8,074	4,094
Total woodland.....	farms 89,587	farms 119,942	11,829	27,812	11	11
Woodland pastured.....	acres 7,405,868	acres 17,069,594	1,813,275	7,937,248	2,421	1,914
Woodland not pastured.....	farms 380,225	farms 380,300	59,007	58,580	37	24
Permanent pasture and rangeland, other than cropland and woodland pastured.....	acres 37,868,746	acres 37,281,095	12,032,518	10,588,882	18,884	14,300
Cropland in cultivated summer fallow.....	farms 87,680	farms 72,335	23,170	22,778	24	23
Total woodland.....	acres 15,871,507	acres 16,559,229	8,188,829	9,096,741	11,514	18,182
Woodland pastured.....	farms 843,204	farms 818,105	80,139	55,009	6	11
Woodland not pastured.....	acres 75,068,803	acres 75,878,213	5,658,042	6,028,423	191	15,609
Permanent pasture and rangeland, other than cropland and woodland pastured.....	farms 370,207	farms 378,795	31,141	31,791	3	7
Land used for organic production.....	acres 28,809,890	acres 31,128,955	3,647,009	3,819,573	151	1,880
Land used for organic production.....	farms 586,123	farms 588,898	37,334	31,457	3	5
Land used for organic production.....	acres 48,488,913	acres 44,749,258	2,309,033	2,203,860	40	13,749
Land in farmsteads, buildings, livestock facilities, ponds, roads, wasteland, etc.....	farms 1,132,808	farms 850,913	155,825	131,317	85	66
Land in farmsteads, buildings, livestock facilities, ponds, roads, wasteland, etc.....	acres 408,832,118	acres 385,278,829	134,080,804	132,931,778	88,866	74,277
Irrigated land.....	farms 1,128,272	farms 1,165,594	142,109	150,213	51	56
Irrigated land.....	acres 31,740,212	acres 32,957,088	6,414,009	6,787,168	1,700	4,041
Harvested cropland.....	farms 301,028	farms 299,583	40,139	39,940	18	18
Harvested cropland.....	acres 88,599,305	acres 55,311,238	14,158,958	13,158,207	4,421	2,480
Harvested cropland.....	farms 256,105	farms 258,030	38,615	38,827	14	18
Pastureland and other land.....	acres 51,537,104	acres 50,334,022	13,215,761	12,183,818	4,021	(D)
Pastureland and other land.....	farms 72,885	farms 68,588	7,847	7,528	6	1
Pastureland and other land.....	acres 5,082,201	acres 4,977,214	942,566	956,881	400	(D)
Land used for organic production.....	farms 20,437	farms 7,254	1,117	518	1	-
Land used for organic production.....	acres 2,577,418	acres 562,488	828,227	140,383	(D)	-
Fertilizers and chemicals.....	farms 1,022,038	farms 1,078,435	134,024	141,755	28	38
Commercial fertilizer, lime, and soil conditioners.....	acres 285,665,497	acres 248,060,283	66,834,888	58,381,228	20,881	28,829

Vegetation Condition Monitoring

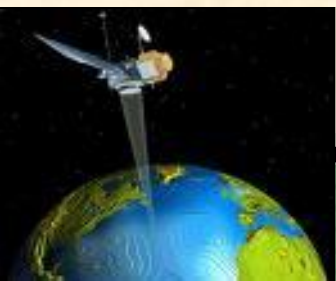
- ▶ Vegetation condition from VegScape:

<http://nassgeodata.gmu.edu/VegScape/>



Vegetation Condition Monitoring

- ▶ Daily, weekly composited from MODIS daily reflectance data
- ▶ Vegetation condition are based on NDVI, which measures **vegetation vigor** (greenness) caused by “photosynthetic activity”
 - Lower NDVI values are likely to show areas under stress due to
 - drought
 - excessive moisture
 - disease
 - Higher NDVI values represent healthy vegetation
- ▶ NDVI based indices are used to monitor changing vegetation conditions throughout the growing season



Vegetation Condition Indices

$$NDVI = (IR - R) / (IR + R)$$

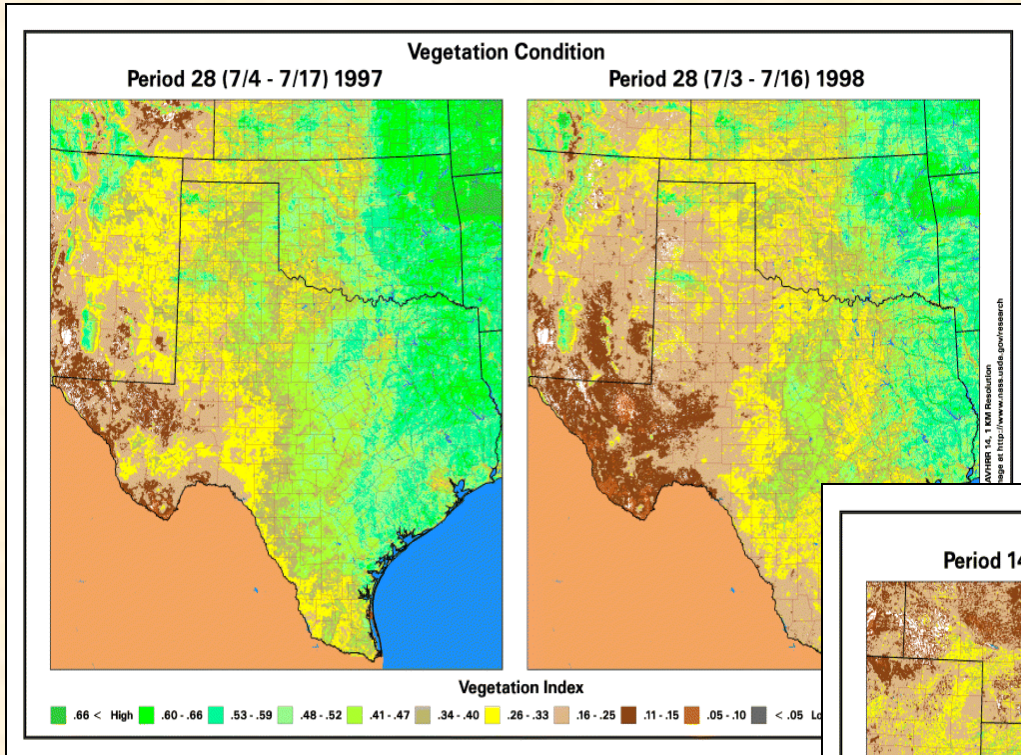
$$MVCI = \frac{NDVI(x, y) - NDVI_m(x, y)}{NDVI_m(x, y)} \times 100$$

$$RMVCI = \frac{NDVI_i(x, y) - NDVI_{med}(x, y)}{NDVI_{med}(x, y)} \times 100\%$$

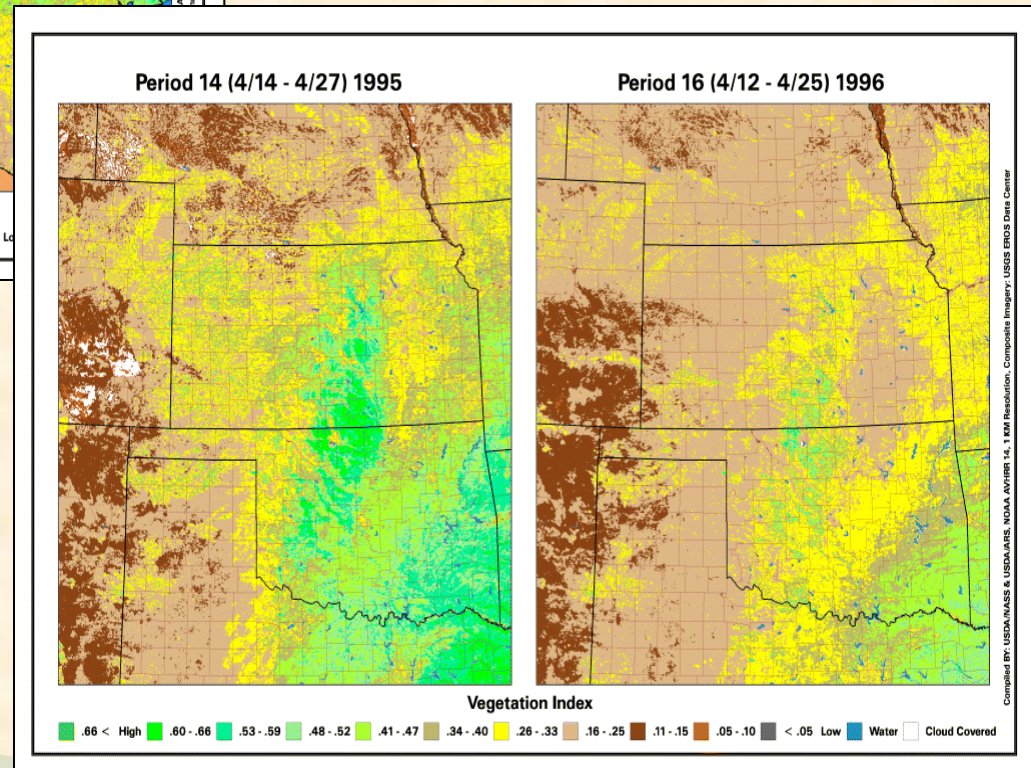
$$RVCI = \frac{NDVI_i(x, y) - NDVI_{i-1}(x, y)}{NDVI_{i-1}(x, y)} \times 100\%$$

$$VCI = \frac{NDVI(x, y) - NDVI_{min}(x, y)}{NDVI_{max}(x, y) - NDVI_{min}(x, y)} \times 100\%$$

1998 Drought in Texas



1996 Drought in Winter Wheat Areas



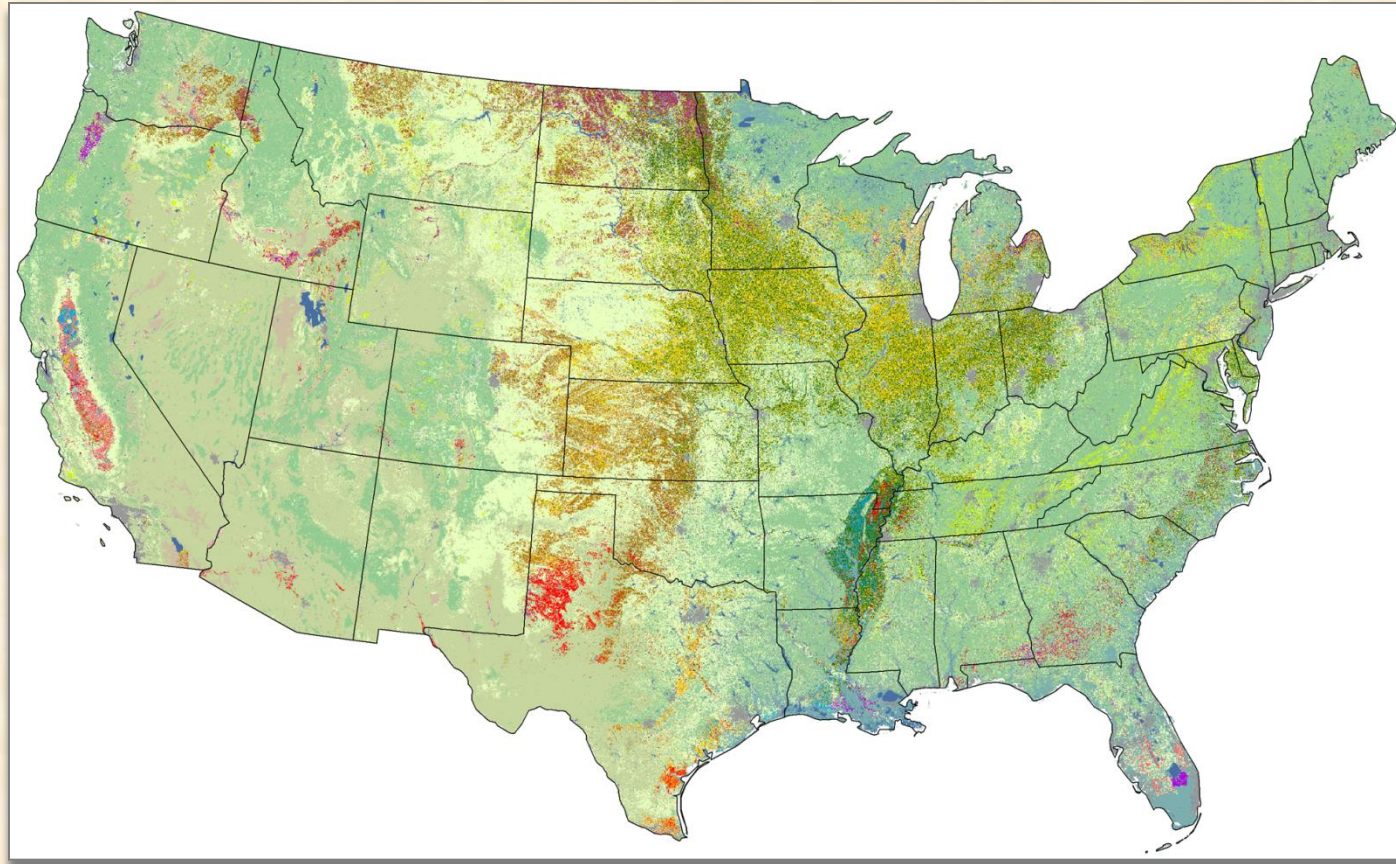
The USDA/NASS Cropland Data Layer Program

48 State Continental US Coverage

What is a Cropland Data Layer (CDL)?

Identifies agriculture type and location

Each pixel represents a type of crop or land cover



Corn



Winter Wheat



Rice



Soybeans



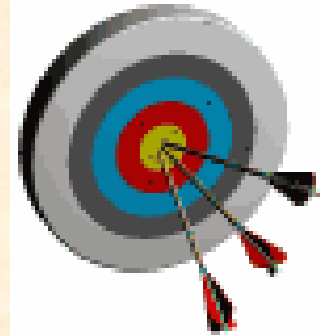
Cotton



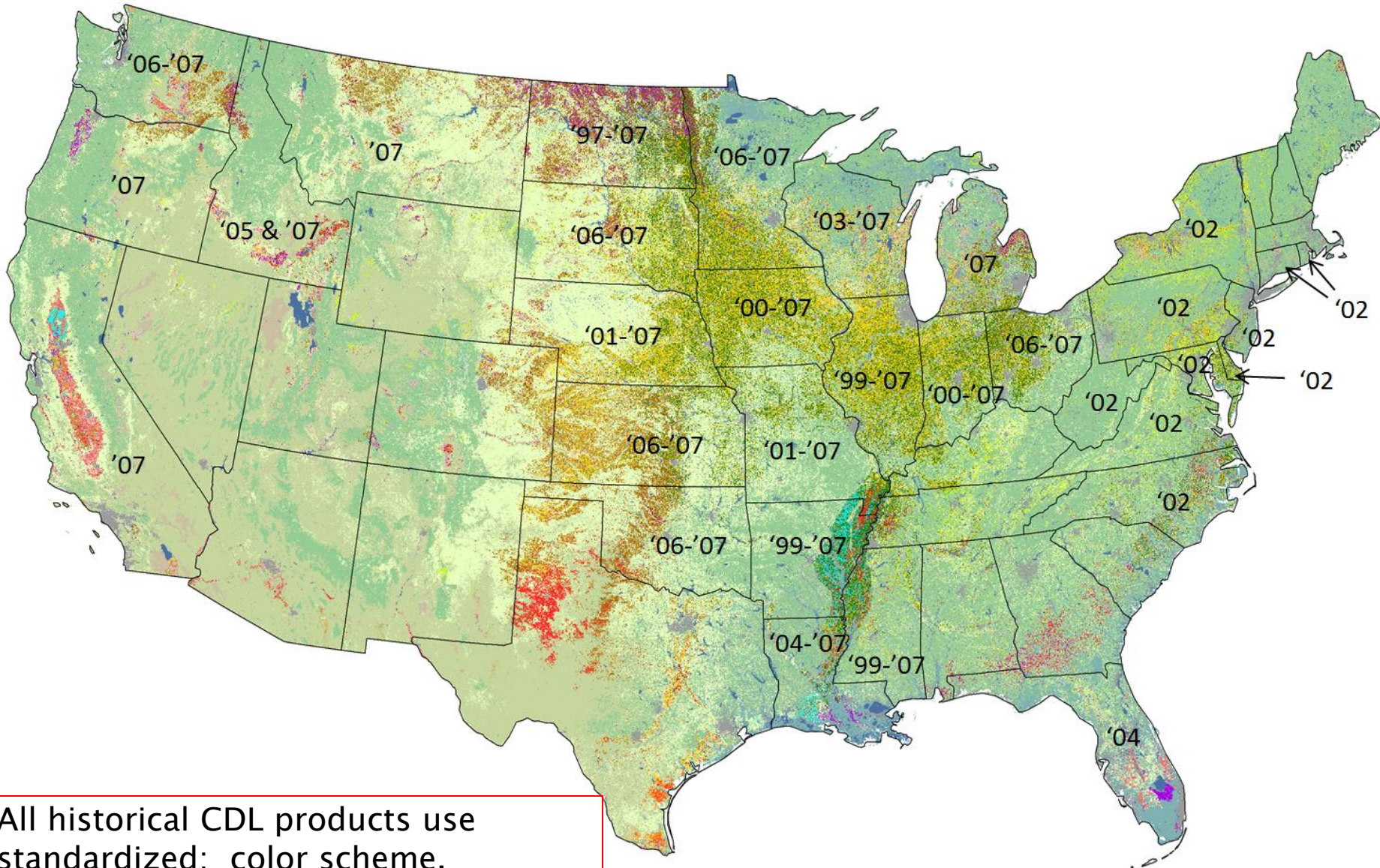
Alfalfa

Cropland Data Layer (CDL) Objectives

- “Census by Satellite”
 - *Annually* cover major program crops and regions
 - Crops accurately geo-located
- Deliver in-season remote sensing acreage estimates
 - NASS Official Reports
 - Update planted area
 - Reduce respondent burden
- Provide timely, accurate, useful estimates
 - Measurable error
 - Unbiased/independent estimator
 - State, District, County
- Public domain crop specific crop classification
 - Available @ CropScape <http://nassgeodata.gmu.edu/CropScape/> or
 - Google “Cropland Data Layer”

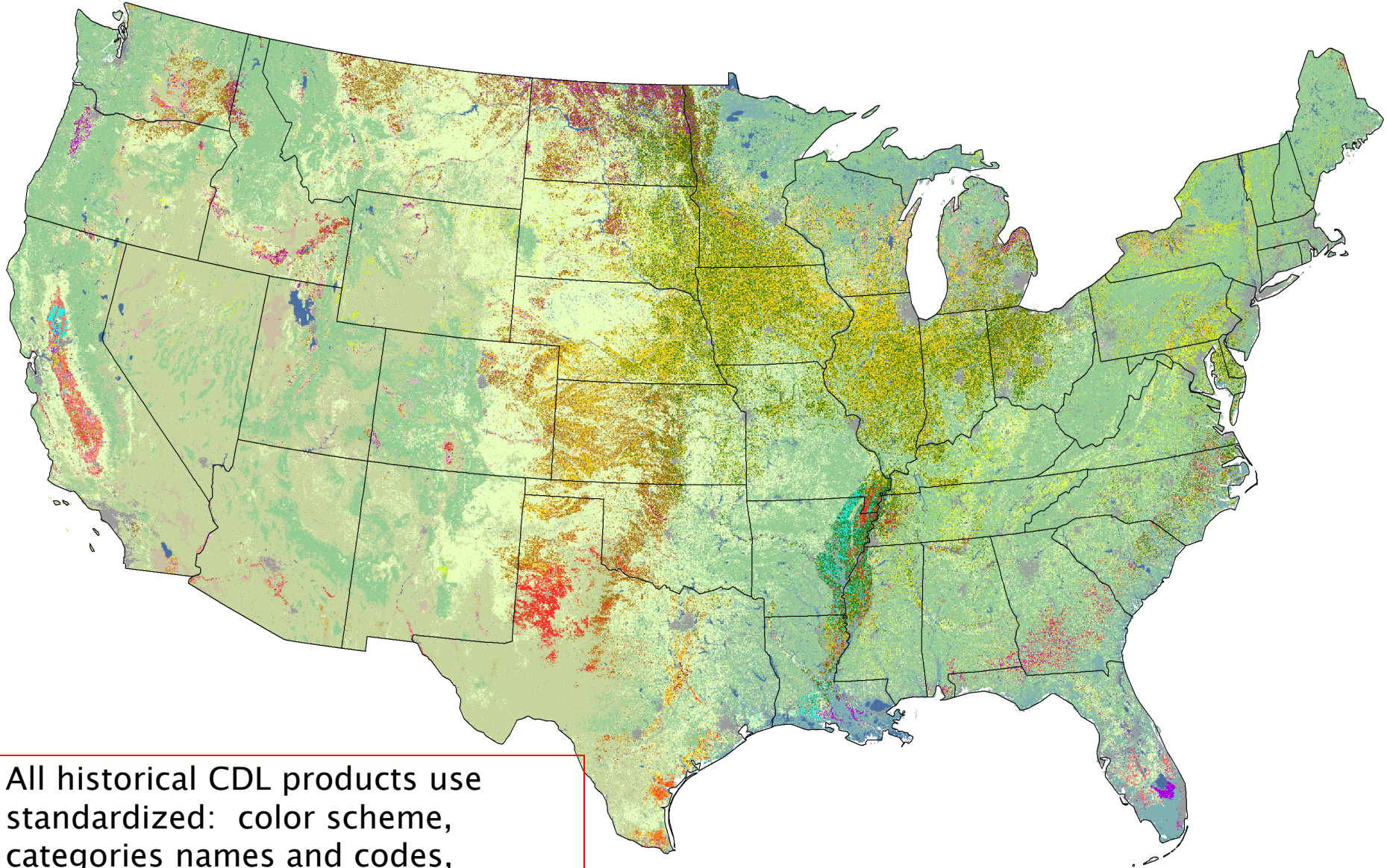


1997 - 2007 Coverage



All historical CDL products use standardized: color scheme, categories names and codes, projection, metadata.

2008 - 2012 Coverage



All historical CDL products use standardized: color scheme, categories names and codes, projection, metadata.

Cropland Data Layer Program Components



□ Inputs

- DMC Deimos-1, UK2 and Landsat imagery
- Farm Service Agency – Common Land Unit
- NASS June Ag Survey
- Ancillary data –USGS NLCD & derivative products

□ Outputs

- Acreage Estimates
- Cropland Data Layer

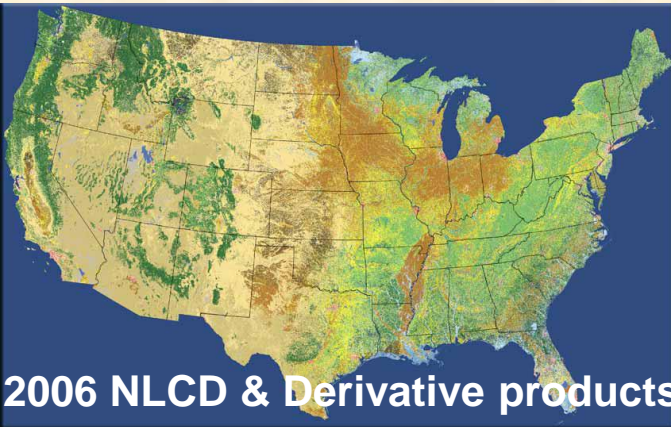
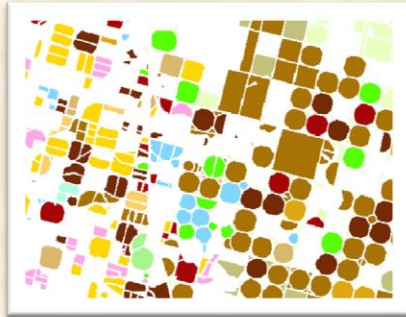
□ Process

- Supervised Classification – See 5
- Crop Acreage Estimation using Linear Regression Model
- Commercial software

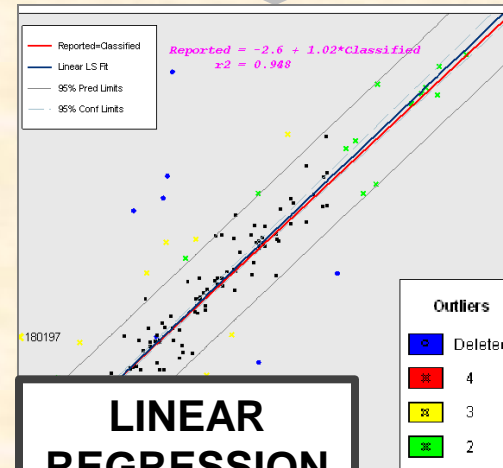
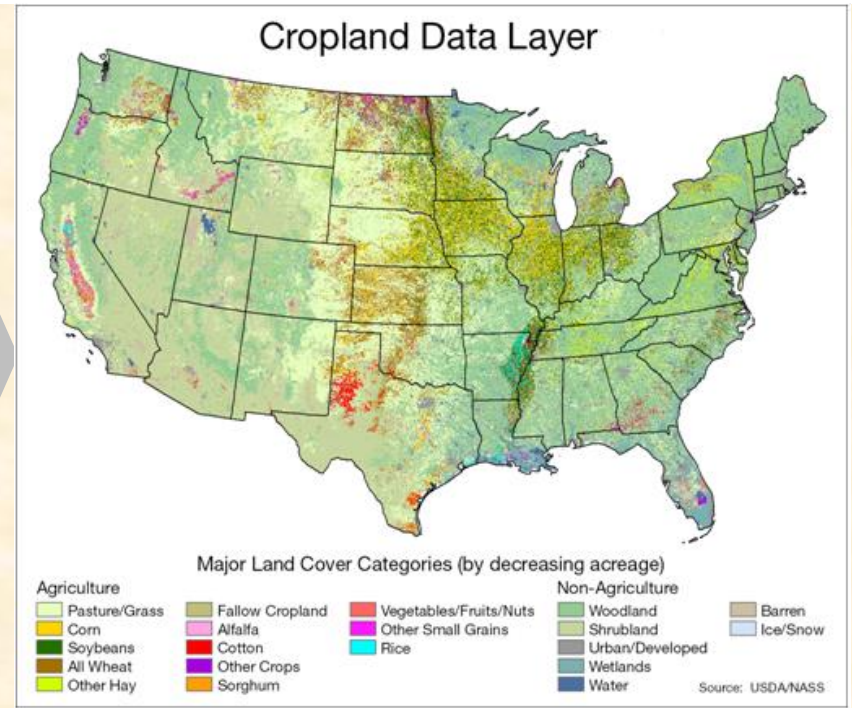
Cropland Data Layer Inputs/Processes/Outputs



Ground Truth:
Farm Service Agency
Common Land Units



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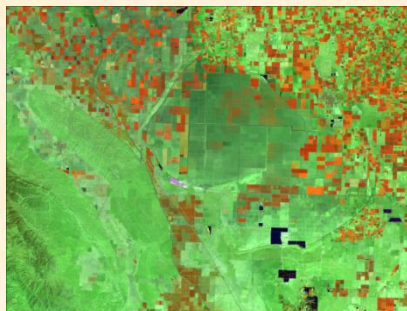


CROP
ACREAGE
ESTIMATES

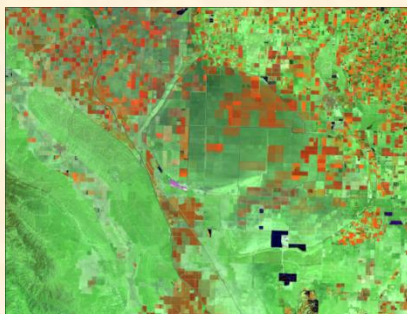
LINEAR
REGRESSION

Growing Season Satellite Images

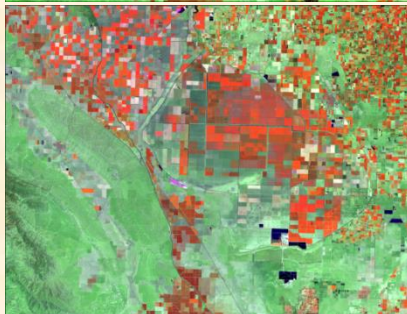
April



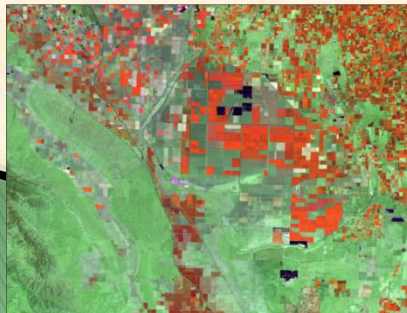
May



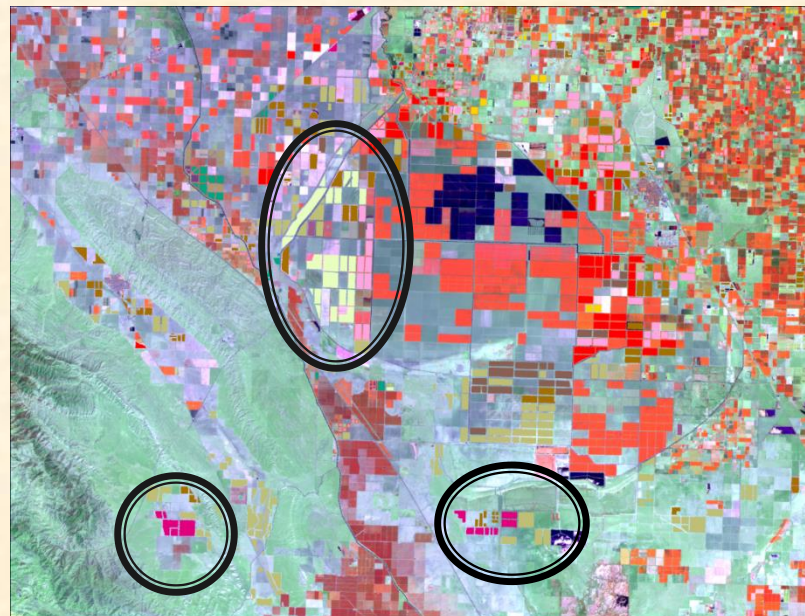
June



July



August
with farm data

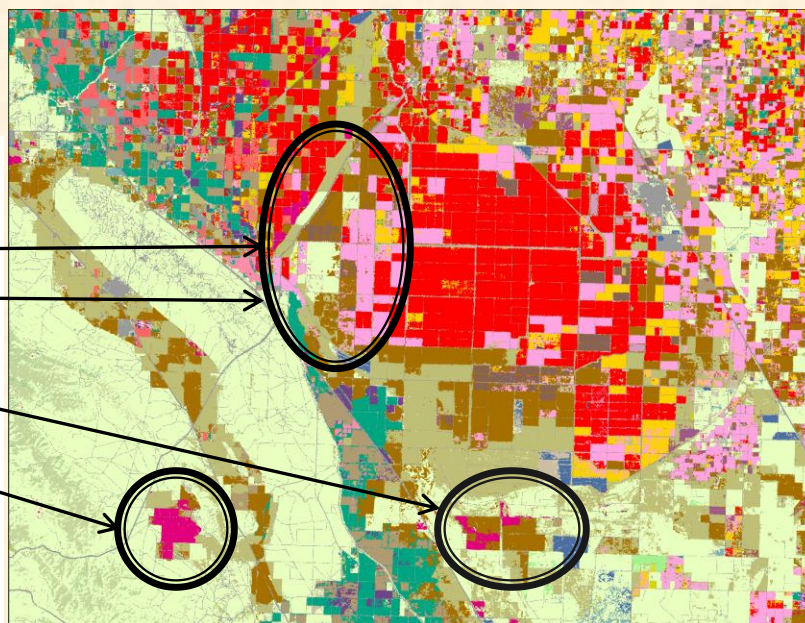


Final CDL

Land Cover Categories

Agriculture

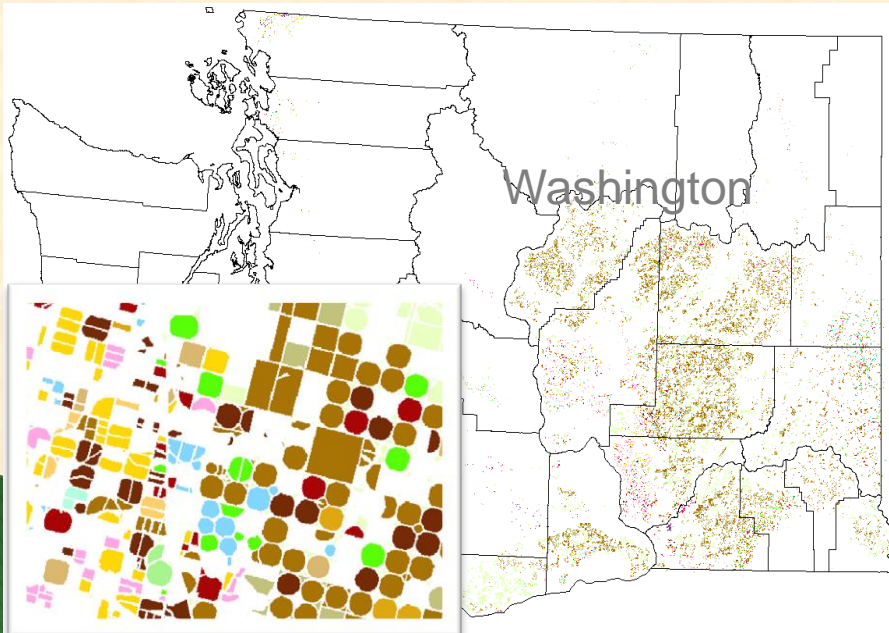
- Pasture/Grass
- Alfalfa
- Fallow/Idle Cropland
- Winter Wheat
- Barley
- Cotton
- Almonds
- Corn
- Durum Wheat



Ground Truth – Land Cover

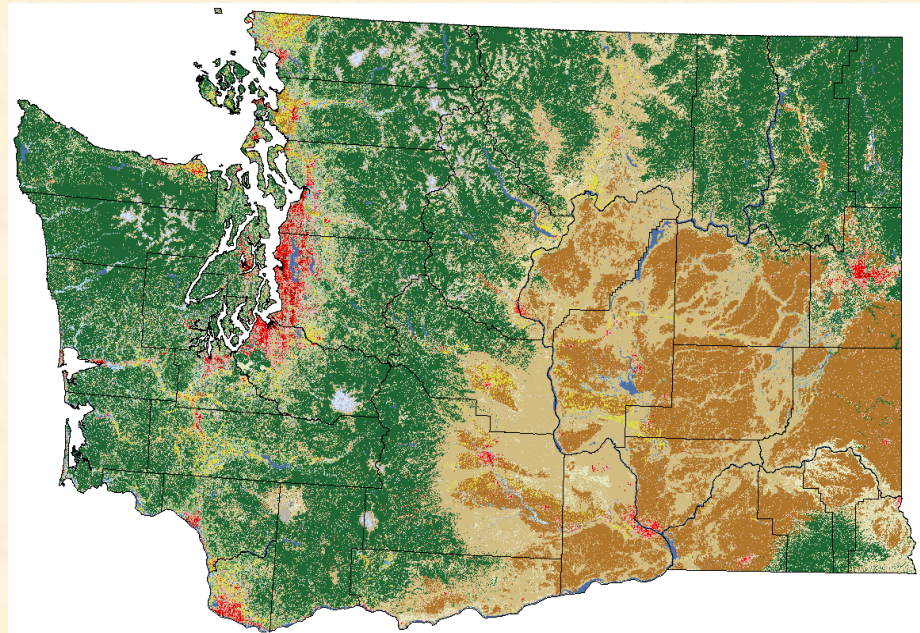
Agriculture Ground Truth

- ❑ Provided by Farm Service Agency
 - Identifies known fields and crops
- ❑ Divide known fields into 2 sets
 - 70% used for training software
 - 30% used for validating results

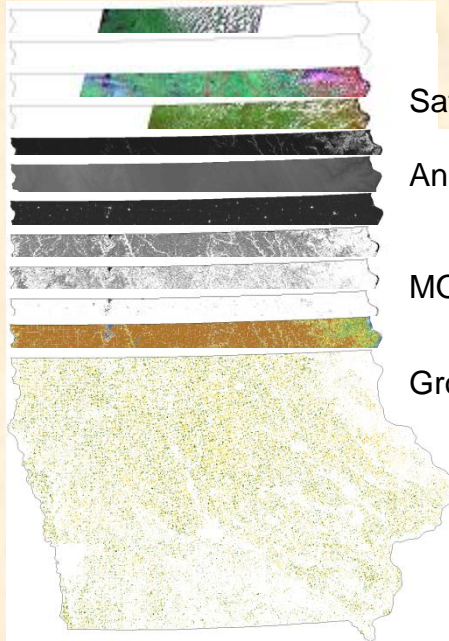


Non-Agriculture Ground Truth

- ❑ USGS National Land Cover Dataset
 - Identifies urban infrastructure and non-agriculture land cover
 - Forest, grass, water, cities



Processing a CDL



Satellite Imagery

Ancillary Data

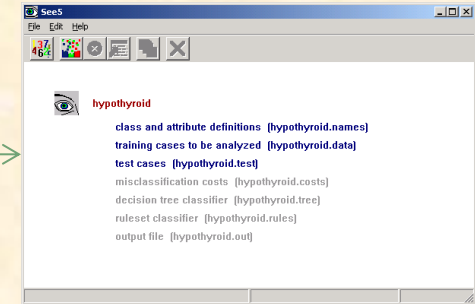
MODIS Data

Ground Truth

Sampling



See5



Decision Tree

```

nd146 > 0:
...band146 > 17:
...band146 > 48:
...band146 > 76:
...band146 > 56: 123 (1224/184)
band146 <= 36: 123 (6)
...band06 > 70: 123 (7/1)
...band06 <= 70:
...band146 <= 50:
...band42 > 4581:
...band146 <= 50: 122 (102/30)
...band146 <= 50: 123 (6)
band42 <= 4581:
...band146 > 46: 123 (93/40)
band46 <= 46:
...band28 <= 416: 122 (68/32)
band18 > 416: 123 (4/1)
band146 > 50:
...band70 <= 109:
...band111 <= 140: 123 (192/156)
band111 > 140: 123 (64/8)
band70 > 109:
...band04 <= 187: 1 (2/1)
band04 > 187:
...band08 <= 233: 123 (6/2)
band08 > 233: 122 (21/8)
band146 > 76:
...band84 > 121: 123 (4)
band84 <= 121:
...band146 <= 83:
...band20 > 591: 124 (318/333)
band20 <= 591: 123 (17/3)
band146 > 83:
...band55 > 129: 124 (149/1)
band55 <= 129:
...band27 > 307:
...band146 <= 470: 124 (22/9)
band146 > 470: 123 (4)
band27 <= 307:
...band146 <= 88:
...band09 <= 122: 124 (149/14)
band09 > 122: 123 (2)
band146 > 88:
...band12 <= 404: 124 (208/1)
band12 > 404:
...band09 <= 181: 123 (3)
band09 > 181: 124 (21)
band146 <= 48:
...band146 > 28:
...band11 > 91:
...band11 <= 92: 121 (4/2)
band11 > 92:
...band21 > 134: 122 (8/1)
band21 <= 134:
...band08 <= 661: 123 (30/12)
band08 > 661: 122 (9/1)
band11 <= 91:
...band146 <= 39: 122 (3111/376)
band146 > 39:
...band02 <= 149:
...band146 <= 44: 122 (1045/149)
band146 > 44:
...band110 > 89: 123 (10/2)
band110 <= 89:
...band110 > 44: 122 (1045/149)
    
```

Classification



Iowa Cropland Data Layer



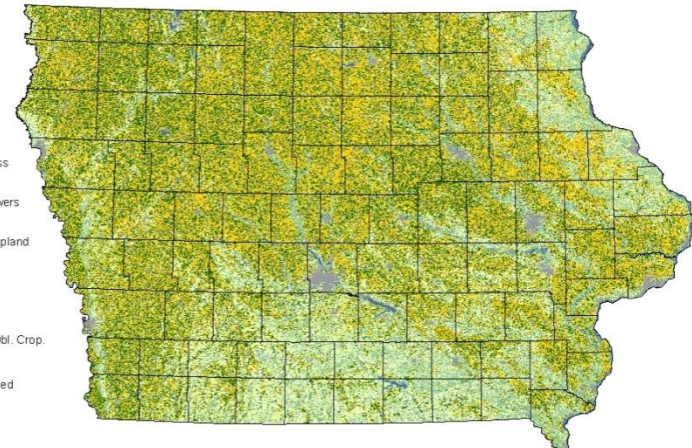
Land Cover Categories
(Ordered by Decreasing Acreage)

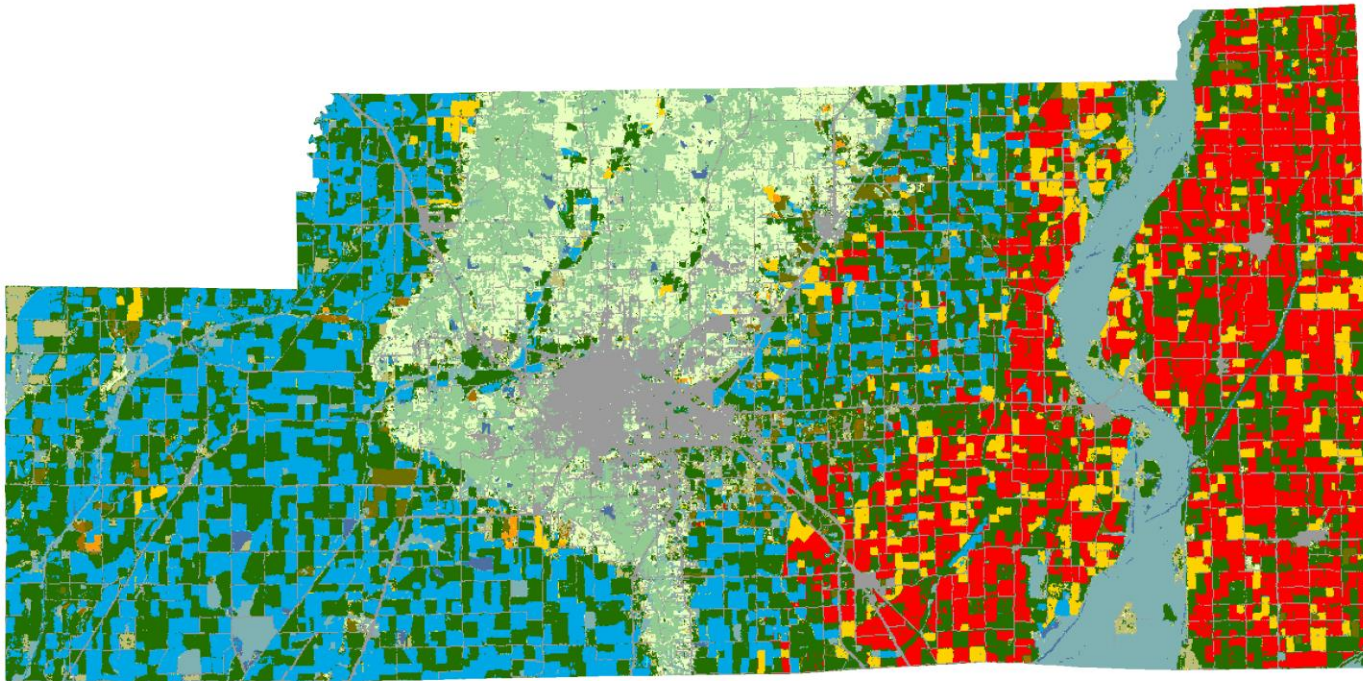
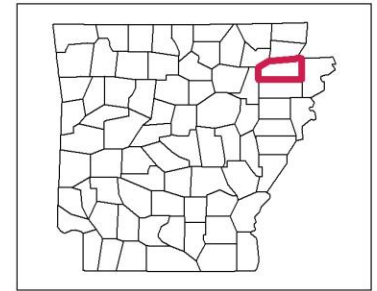
Agriculture

- Corn
- Soybeans
- Pasture/Grass
- Alfalfa
- Oats
- Winter Wheat
- Spring Wheat
- Seed/Sod Grass
- Barley
- Clover/Widflowers
- Other Crops
- Fallow/Idle Cropland
- Durum Wheat
- Sorghum
- Rye
- Dry Beans
- W. Wht./Soy. Dbl. Crop.

Non-Agriculture













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





Land Cover Categories

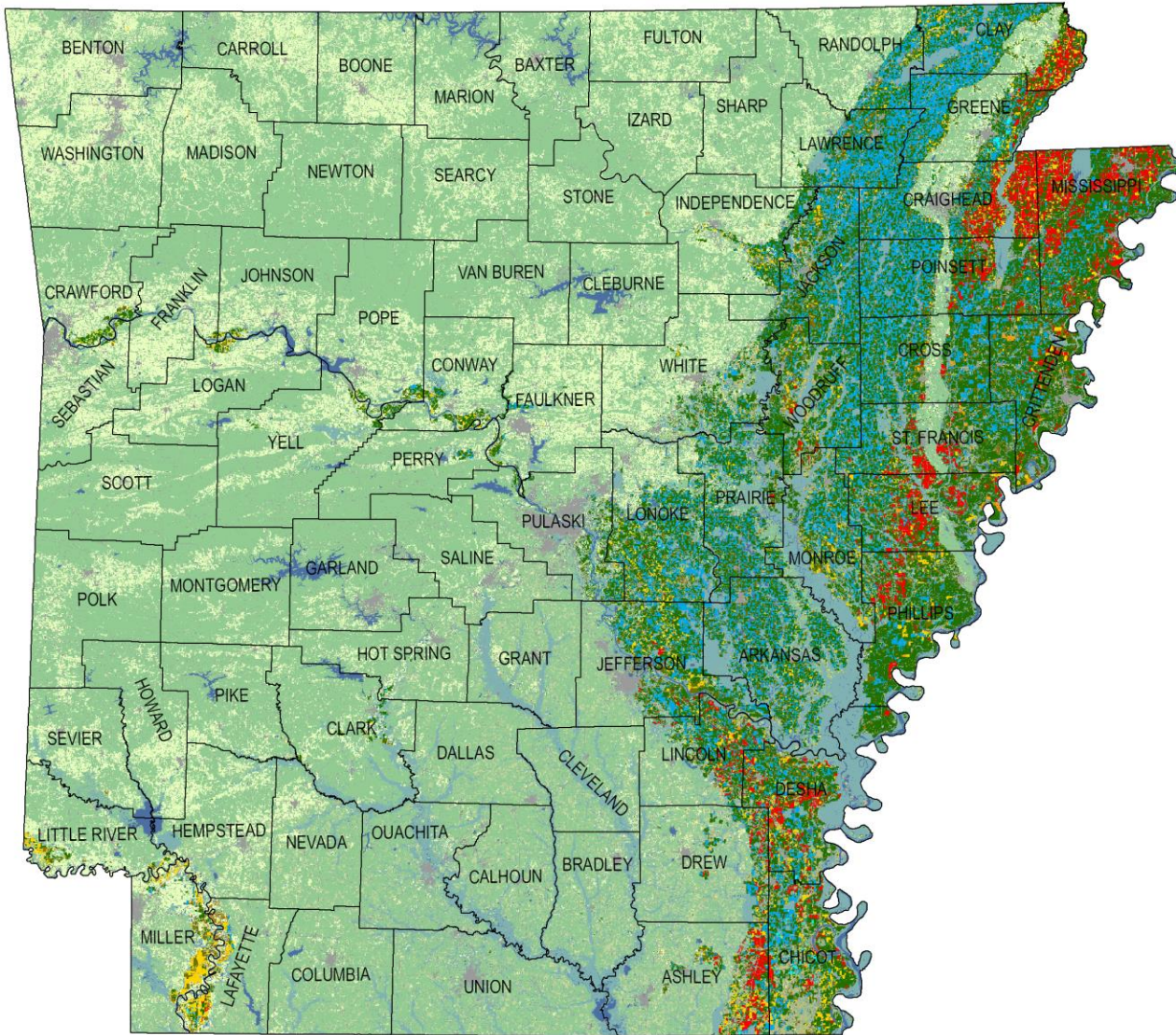
AGRICULTURE

-  Pasture/Grass
-  Soybeans
-  Rice
-  Cotton
-  Fallow/Idle Cropland
-  Corn
-  W. Wht./Soy. Dbl. Crop
-  Winter Wheat
-  Sorghum
-  Aquaculture
-  Other Crops/Vegs. & Fruits
-  Other Tree Nuts

NON-AGRICULTURE

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





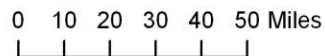
Land Cover Categories (by decreasing acreage)

AGRICULTURE

- Pasture/Grass
- Soybeans
- Rice
- Cotton
- Fallow/Idle Cropland
- Corn
- W. Wht./Soy. Dbl. Crop
- Winter Wheat
- Sorghum
- Aquaculture
- Other Crops/Vegetables & Fruits
- Other Tree Nuts

NON-AGRICULTURE

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



2009 California Cropland Data Layer



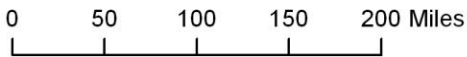
Land Cover Categories (by decreasing acreage)

AGRICULTURE

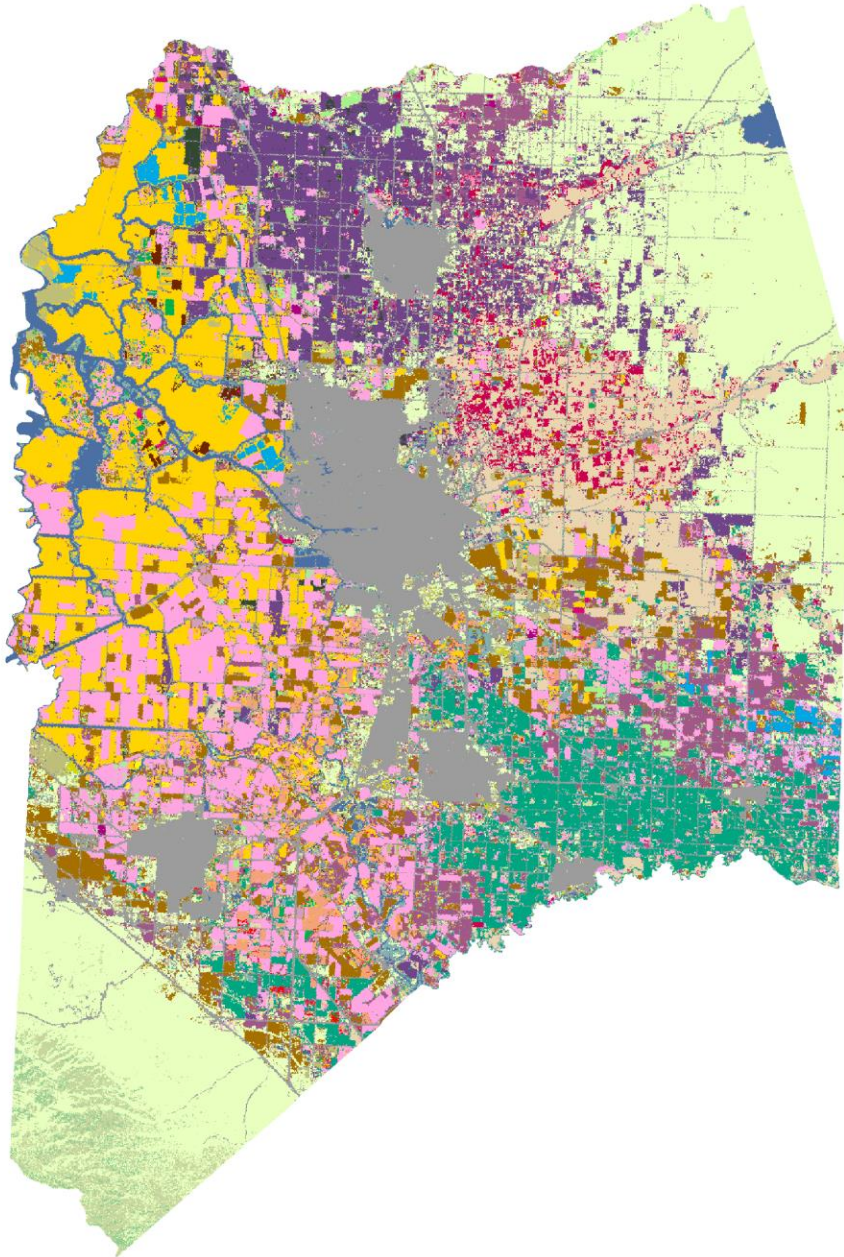
- Pasture/Grass
- Alfalfa
- Fallow/Idle Cropland
- Almonds
- Winter Wheat
- Rice
- Other Hays
- Corn
- Grapes
- Walnuts
- Oats
- Cotton
- Durum Wheat
- Oranges
- Tomatoes
- Other Tree Nuts & Fruits
- Olives
- Peaches/Plums/Apricots
- Barley
- Clover/Wildflowers
- Misc. Veggies. & Fruits
- Other Crops/Seed/Sod Grass
- Sunflowers
- Safflower
- Triticale
- Spring Wheat
- Cherry/Apple Orchard
- Melons
- Potatoes/Sweet Potatoes
- Rye

NON-AGRICULTURE

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



2009 San Joaquin County, California



Land Cover Categories

AGRICULTURE

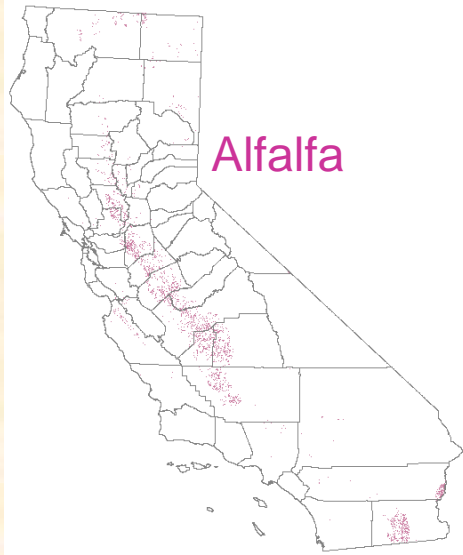
- Pasture/Grass
- Alfalfa
- Fallow/Idle Cropland
- Almonds
- Winter Wheat
- Rice
- Other Hays
- Corn
- Grapes
- Walnuts
- Oats
- Cotton
- Durum Wheat
- Oranges
- Tomatoes
- Other Tree Nuts & Fruits
- Olives
- Peaches/Plums/Apricots
- Barley
- Clover/Wildflowers
- Misc. Veggies. & Fruits
- Other Crops/Seed/Sod Grass
- Sunflowers
- Safflower
- Triticale
- Spring Wheat
- Cherry/Apple Orchard
- Melons
- Potatoes/Sweet Potatoes
- Rye

NON-AGRICULTURE

- Shrubland
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- Water
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California Individual Crop Maps



CDL Access, Visualization, Analysis and Dissemination Platform - CropScape

CropScape - NASS CDL Program - Mozilla Firefox
File Edit View History Bookmarks Tools Help
nassgeodata.gmu.edu/CropScape/
VegScape - Vegetation Condition Exp... x CropScape - NASS CDL Program x +
USDA United States Department of Agriculture National Agricultural Statistics Service
CropScape - Cropland Data Layer
Layers Legend
Background Layers
Cropland Data Layers
2012
2011
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001
2000
1999
1998
1997
Crop Mask Layer
Boundary Layers
Water Layers
Road Layers
USDA Home | NASS Home | Research and Development Division | About CDL | Metadata | Citation | Contact | VegScape
Copyright © General Science and Technology Solutions Inc. 2009 - 2014
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<http://nassgeodata.gmu.edu/CropScape/>

CDL Colors & Categories

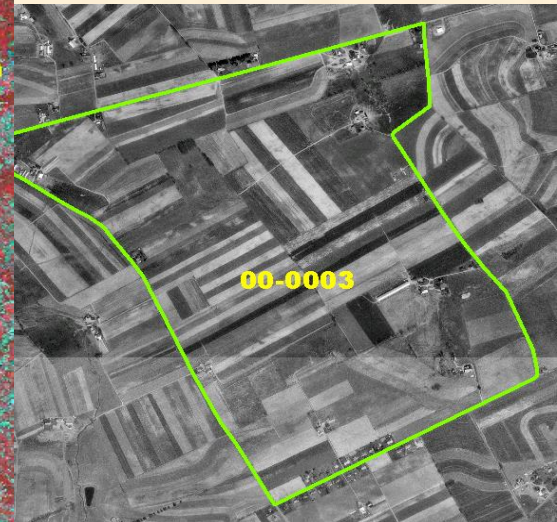
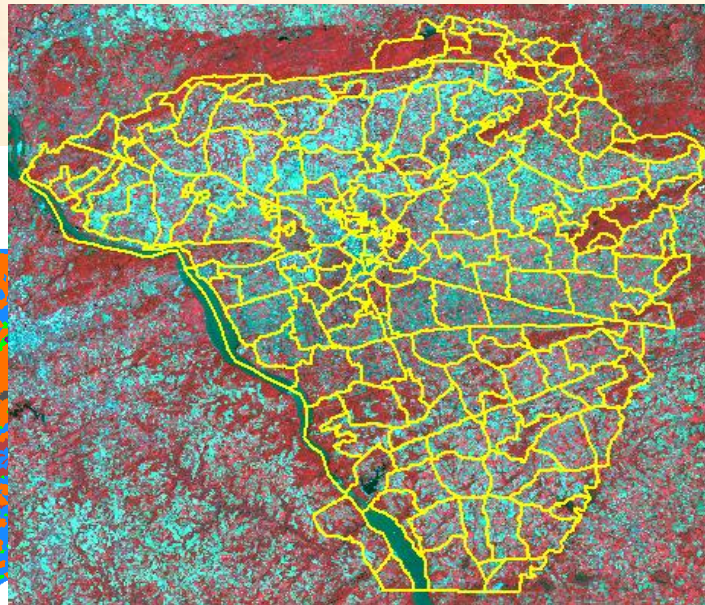
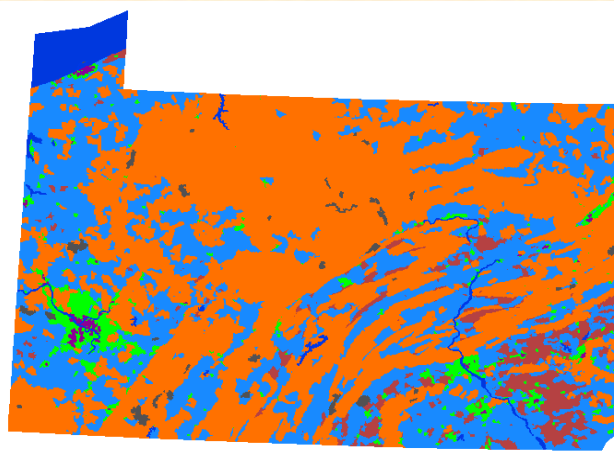
- National scope
- Capture all major crops
- Unique categories & colors

Land Cover Categories (by decreasing acreage)

Agriculture

 Other Hays	 Carrots
 Fallow/Idle Cropland	 DbI. Crop WinWht/Corn
 Corn	 Peas
 Soybeans	 Herbs
 Winter Wheat	 Barley
 W. Wht./Soy. DbI. Crop	 Pumpkin
 Pasture/Grass	 Sorghum
 Seed/Sod Grass	 Eggplant
 Rye	 Watermelon
 Blueberry	 DbI. Crop Barley/Corn
 Other Crops	 Turnip
 Alfalfa	 Christmas Trees
 Tomatoes	 Clover/Wildflowers
 Peaches	 DbI. Crop Oats/Corn
 Potatoes	 Sunflowers
 Squash	 Mint
 Sweet Corn	 Grapes
 Misc. Veggies. & Fruits	 DbI. Crop WinWht/Sorghum
 Peppers	 DbI. Crop Soybeans/Oats
 DbI. Crop Barley/Soybeans	 Triticale
 Dry Beans	 Cantaloupe
 Oats	Non-Agriculture
 Sweet Potatoes	 Woodland
 Apples	 Urban/Developed
 Cranberry	 Wetlands
 Asparagus	 Water
 Cabbage	 Barren
	 Shrubland

NASS Area Sampling Frame Program



How Does Agricultural Statistics Collected at NASS?

- ▶ Agriculture Census every five years
- ▶ Estimates from Remote Sensing
- ▶ **Agricultural surveys**
 - Estimates from samples based on NASS **area sampling frames(ASFs)** and list frames



providing timely, accurate, and useful statistics in service to U.S. agriculture.”



What Is An Area Sampling Frames?

- An area sampling frame is a collection of segmented land parcels for the area of interest, such as a state. A land parcel can be defined by its attributes, such as ownership, land usage, land cover, etc.
- NASS ASFs are based on a **stratification of land cover** in the U.S. defined by percent cultivated cropland, i.e. all land parcels are classified different land cover categories!
- NASS Area Sampling Frames have been used as the primary tool to conduct agricultural surveys since 1954.
- The NASS Area Sampling Frames are the basis for the annual June Area Survey in which approximately 11,000 segments are enumerated in early June to collect crop acreage and other agricultural information.



Why Area Sampling Frames

Pro:

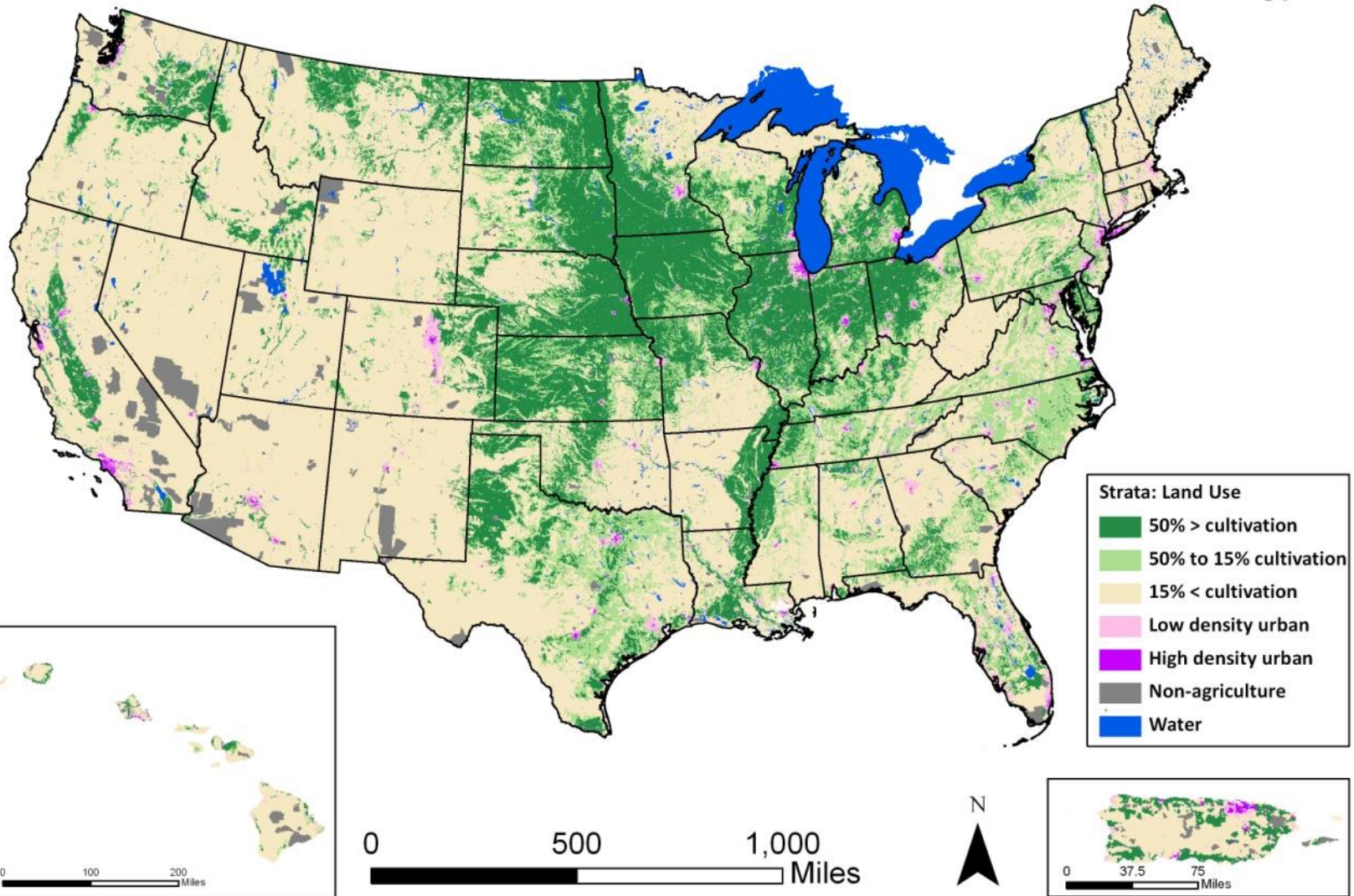
- ▶ Multiple uses for sampling units
- ▶ Frame longevity for coverage
- ▶ Robust for crop acreage
- ▶ Better performance

Con:

- ▶ Expensive

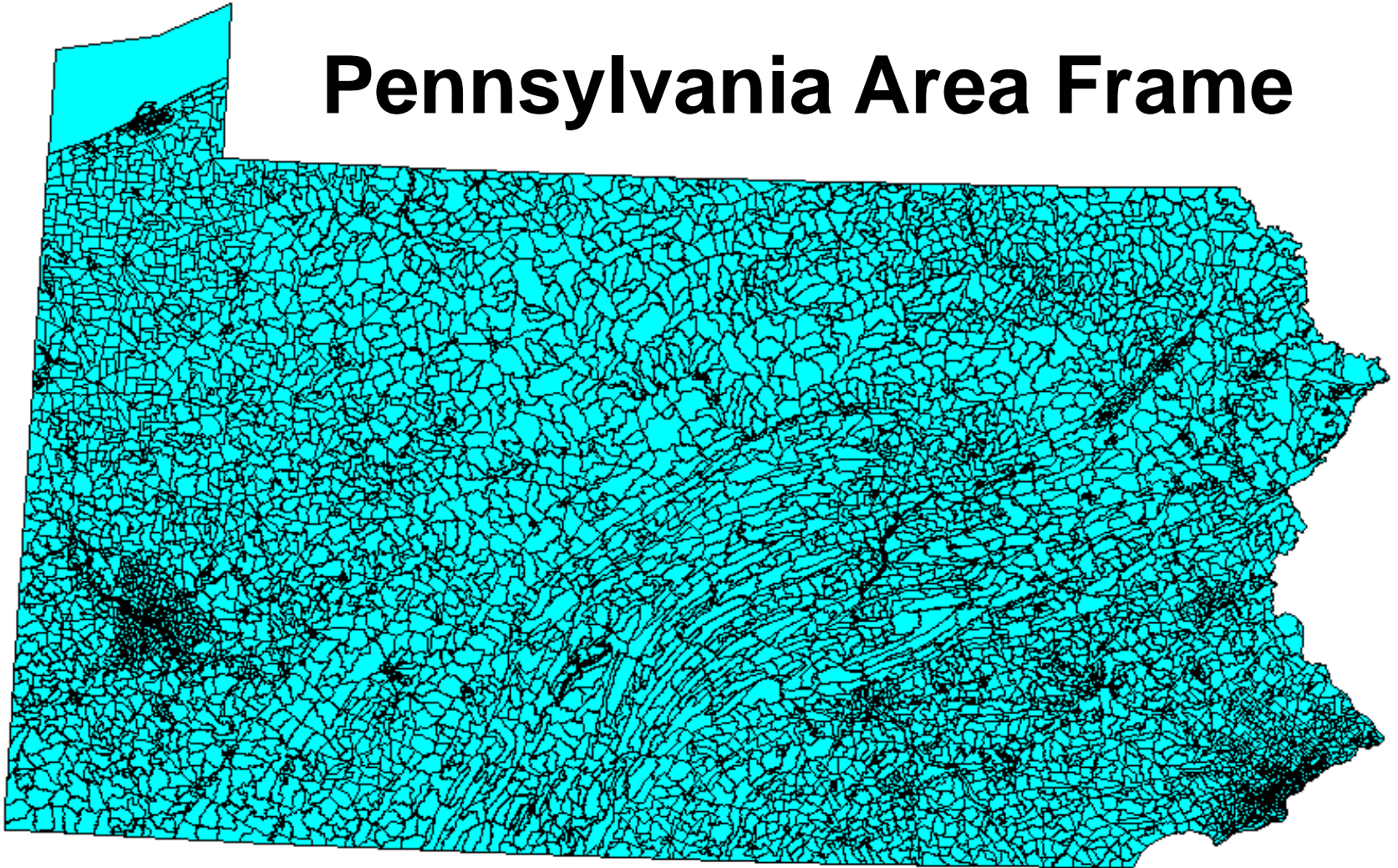


National Agricultural Statistics Service Land Use Area Frame



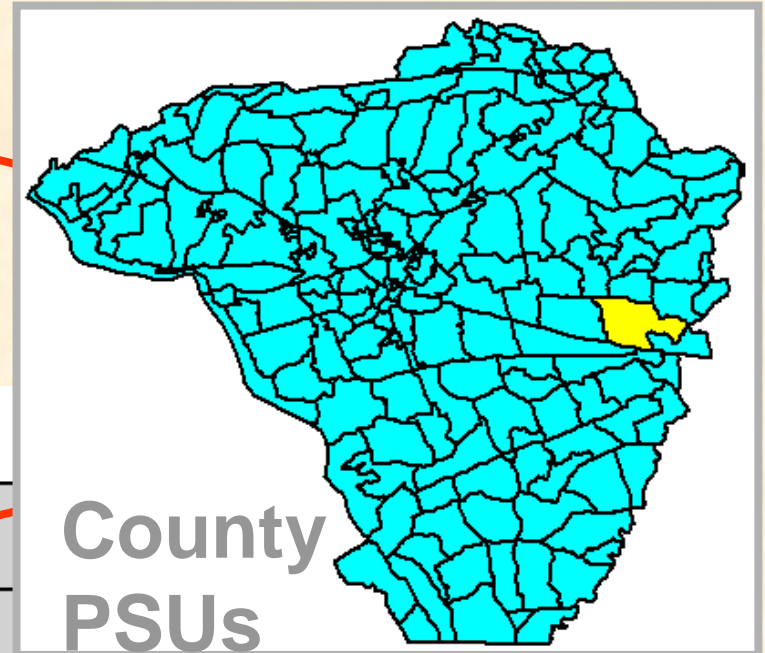
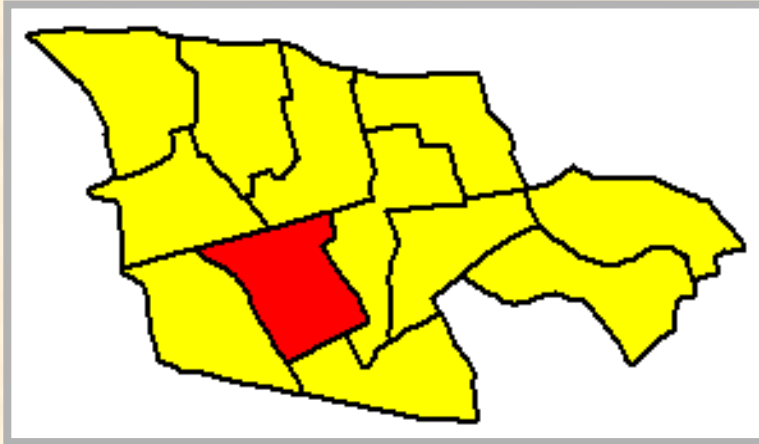
What is an Area Frame?

Pennsylvania Area Frame

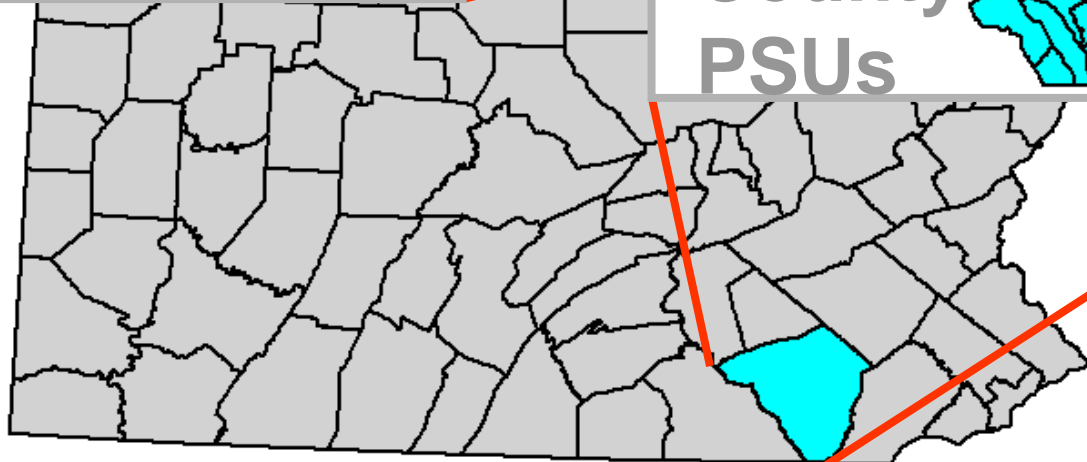


What is an Area Frame?

PSU Segments



County
PSUs



Counties

Area Frame Construction Steps

Land Use Stratification

```
graph TD; A[Land Use Stratification] --> B[Sample Allocation]; B --> C[Sample Selection]; C --> D[Sample Preparation];
```

Sample Allocation

Sample Selection

Sample Preparation

Stratification

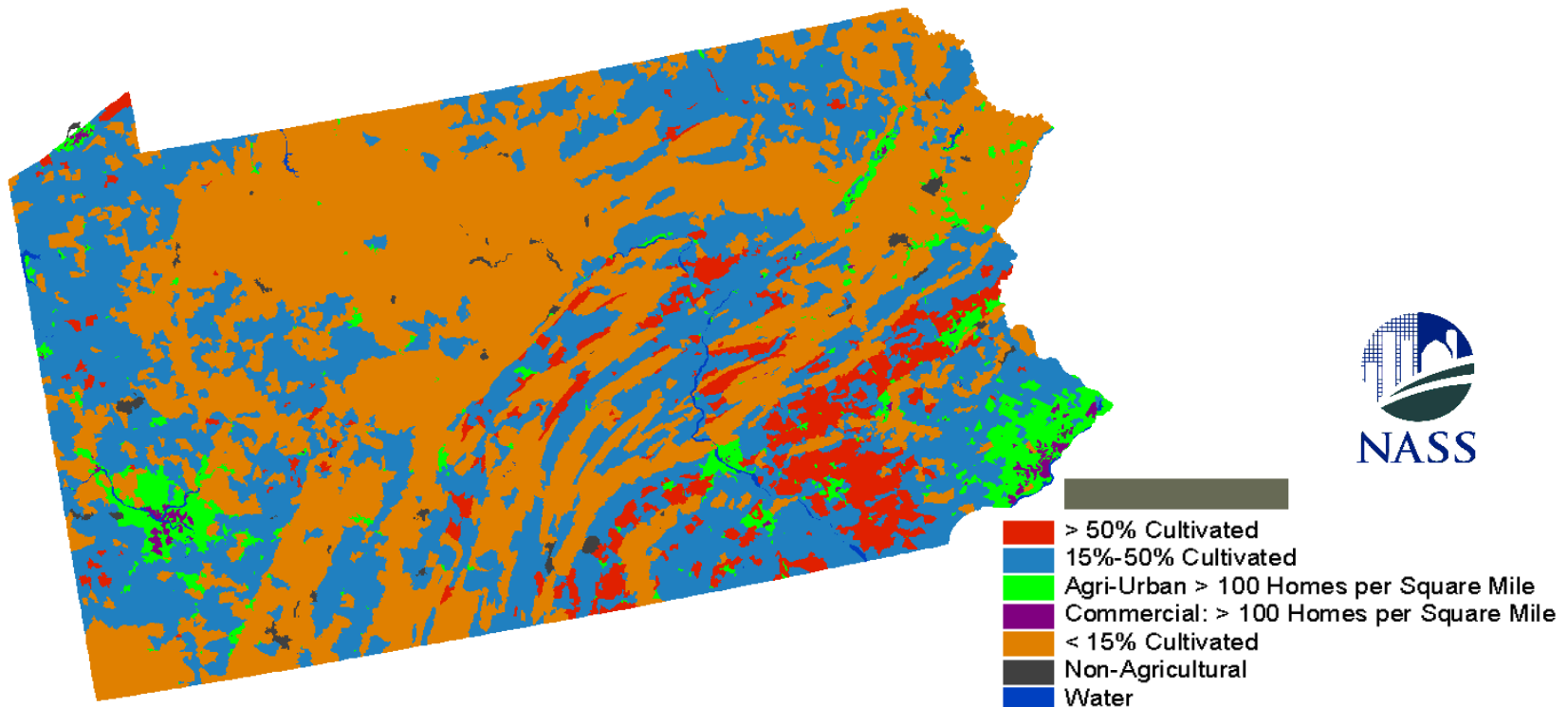
is the division of a land area into broad land use categories:

- Cultivation
- Agri-urban
- Intensive Urban
- Non-Agricultural
- Large water bodies

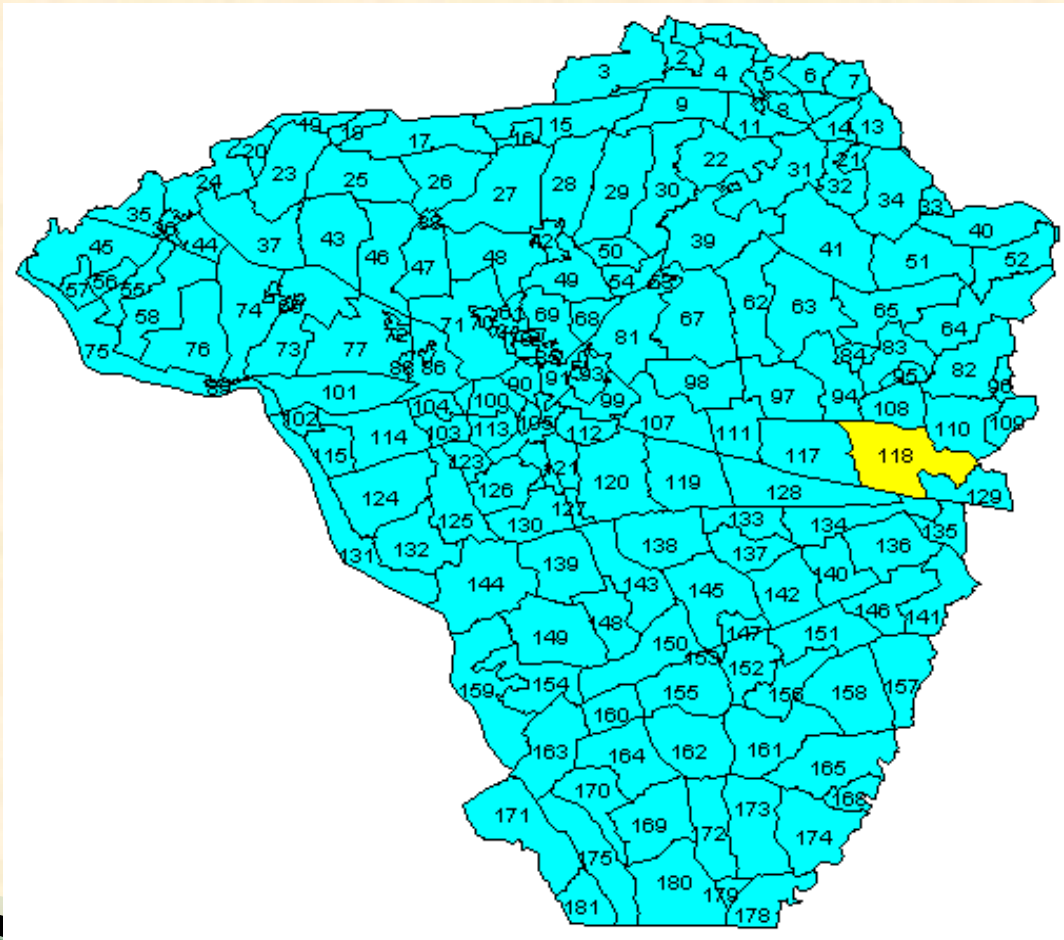
<u>PA</u>	<u>Stratum</u>	<u>Definition</u>
13		> 50% Cultivated
20		15% – 50% Cultivated
31		Agri-Urban
32		Intensive Urban
40		< 15% Cultivated
50		Non-Agricultural

Product: Land Use Stratification Map of Statewide Merged Strata Values

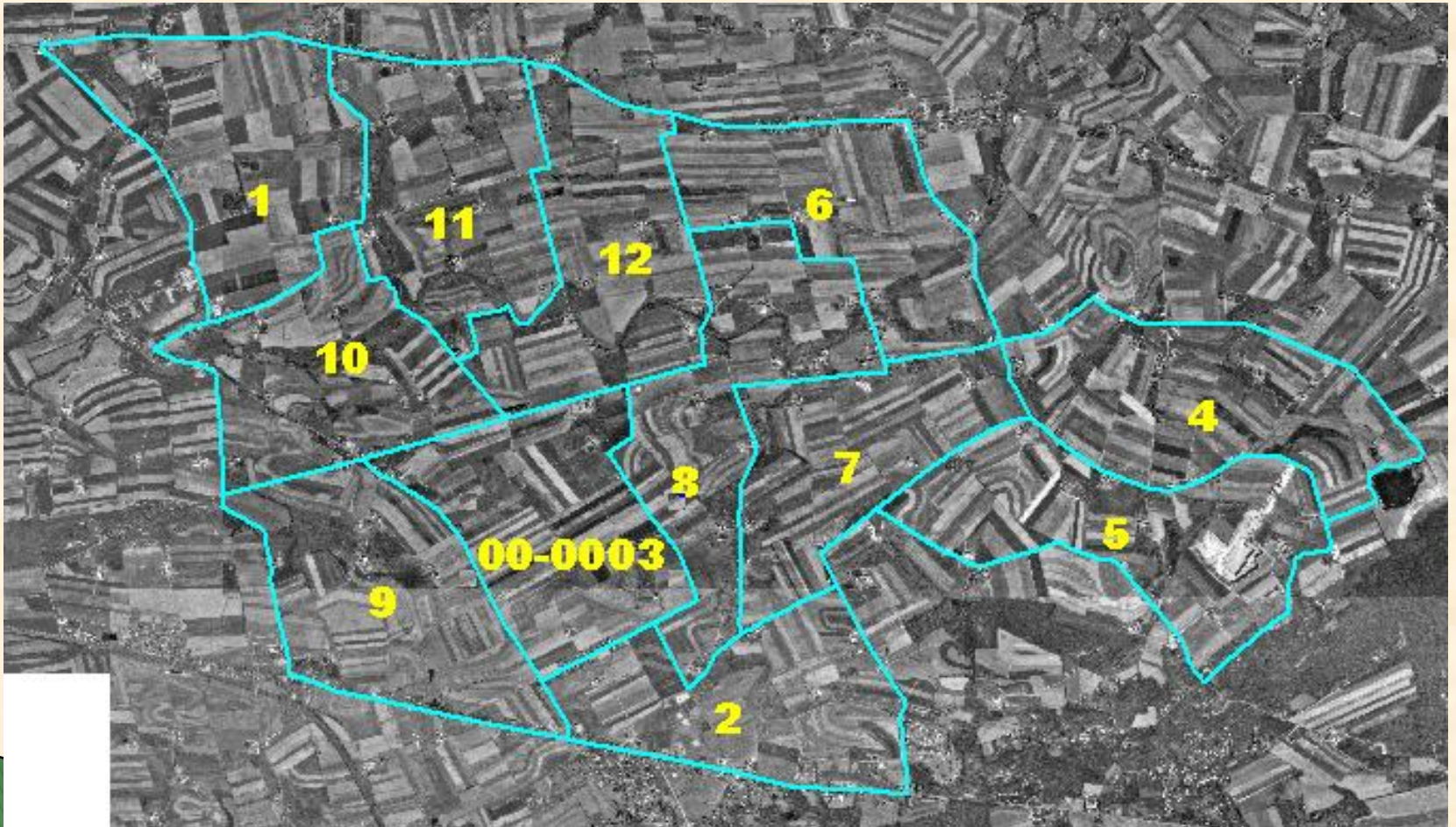
Stratification of Pennsylvania 1999



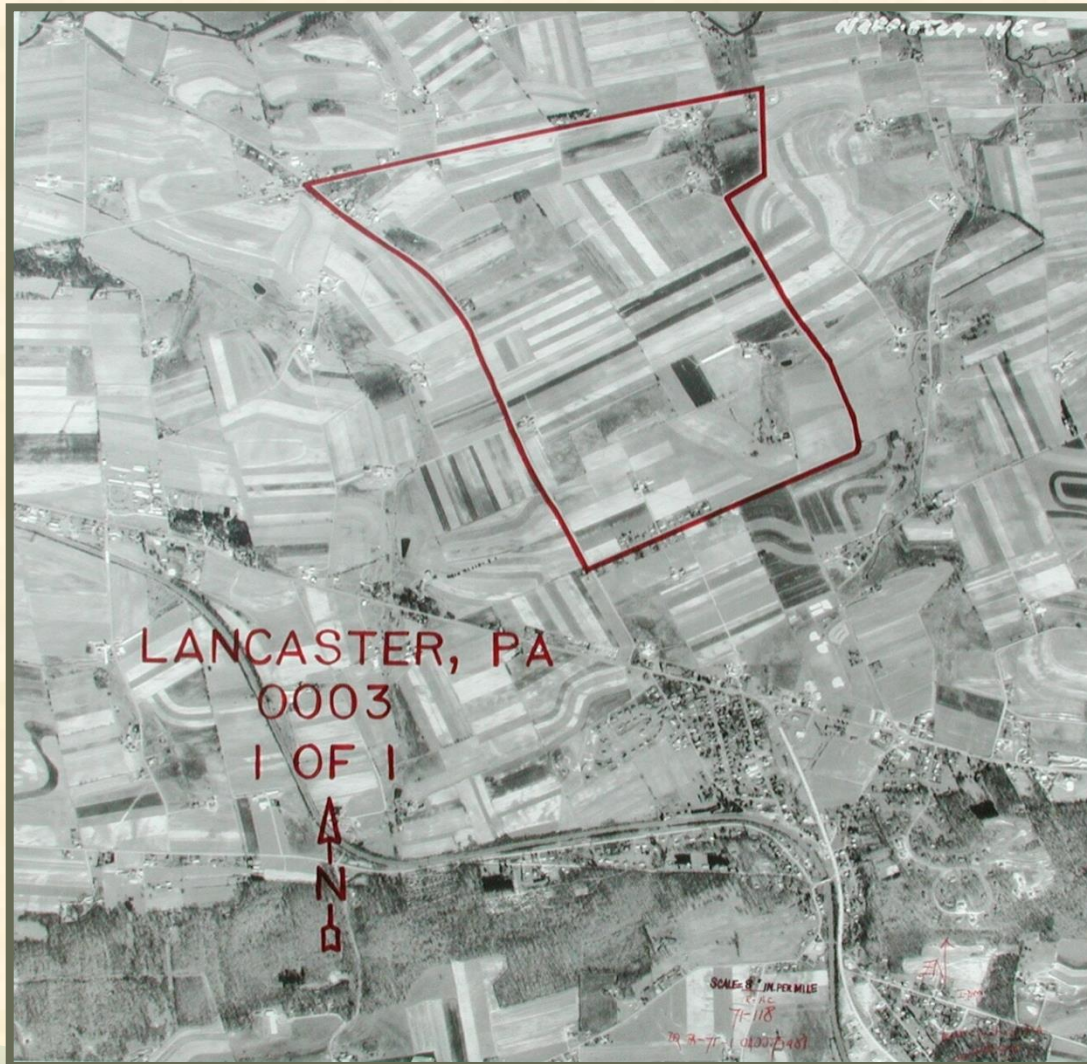
Area Frame File of Lancaster County PSUs



Workfile of PSU 118 and Segments



Prepared Photo Enlargement



Program Summary

- ▶ **Survey based State/County Estimates**
 - Accessing NASS County maps and County data
- ▶ **Census of Agriculture**
 - Accessing AgAtlas maps and Census data
- ▶ **Vegetation Condition**
 - Accessing vegetation condition maps
- ▶ **Cropland Data Layer**
 - Accessing the CDL from CropScape
- ▶ **Area Sampling Frame**

Thank You

- ▶ For further questions or comments:
- ▶ Contact: zhengwei_yang@nass.usda.gov