USDA-NASS Cropland Data Layer
(Chesapeake Bay Watershed)

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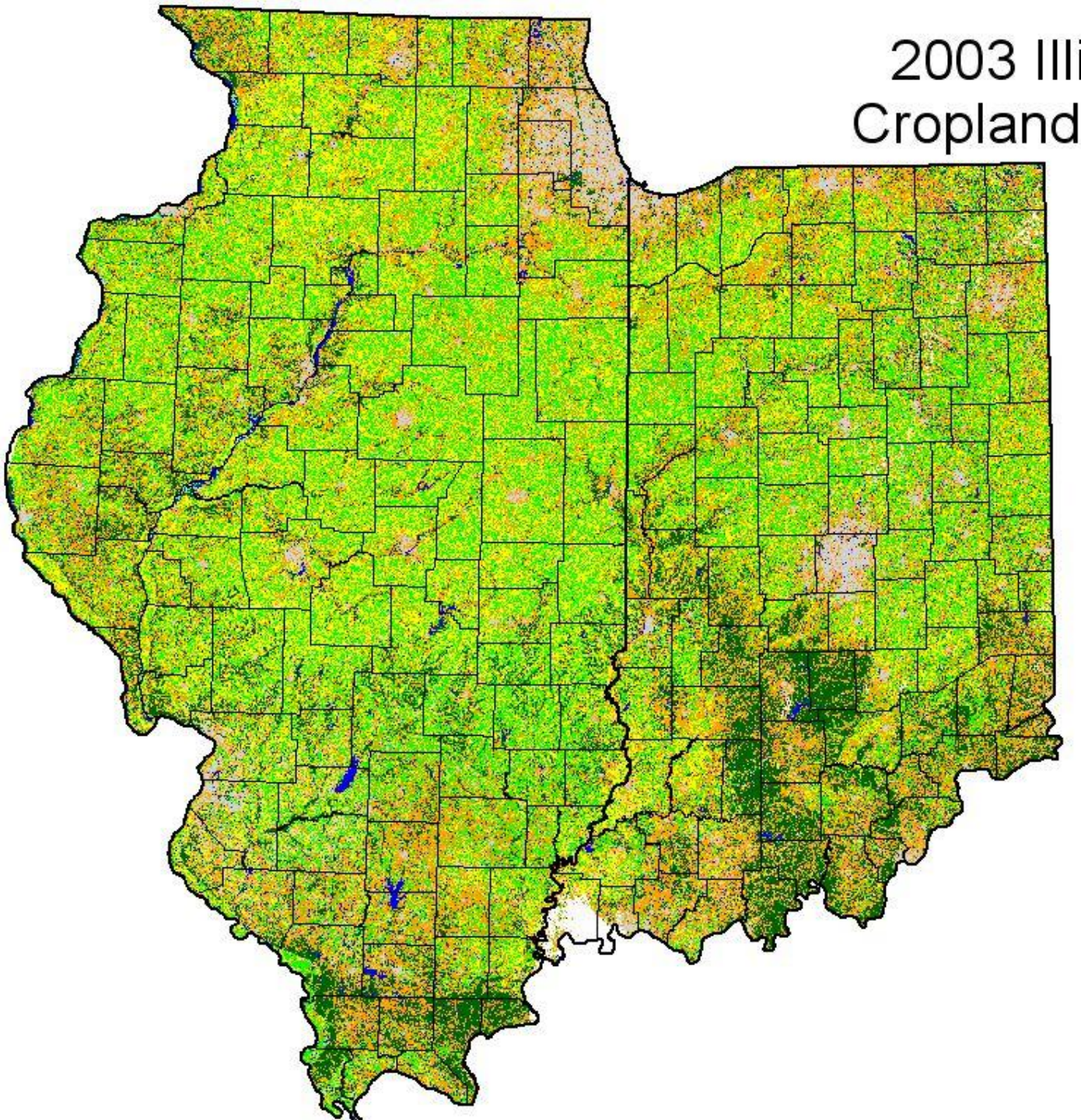
National Agricultural Statistics Service
& Towson University

Purpose of the USDA-NASS Cropland Data Layer (CDL)

- Combine remote sensing imagery and NASS survey data to produce *supplemental* acreage estimates for the state's major commodities

- Production of a crop-specific digital land cover data layer for distribution in industry standard "GIS" format

2003 Illinois/Indiana Cropland Classification



Categories

- Corn
- Soybeans
- Winter Wheat
- Other Small Grains & Hay
- Double Cropped WW/Soybean
- All Other Crops
- Fallow/Idle Cropland
- Pasture/Grassland/NonAg
- Woods
- Clouds
- Water
- Urban/Buildings/Subdivisions
- Wetlands

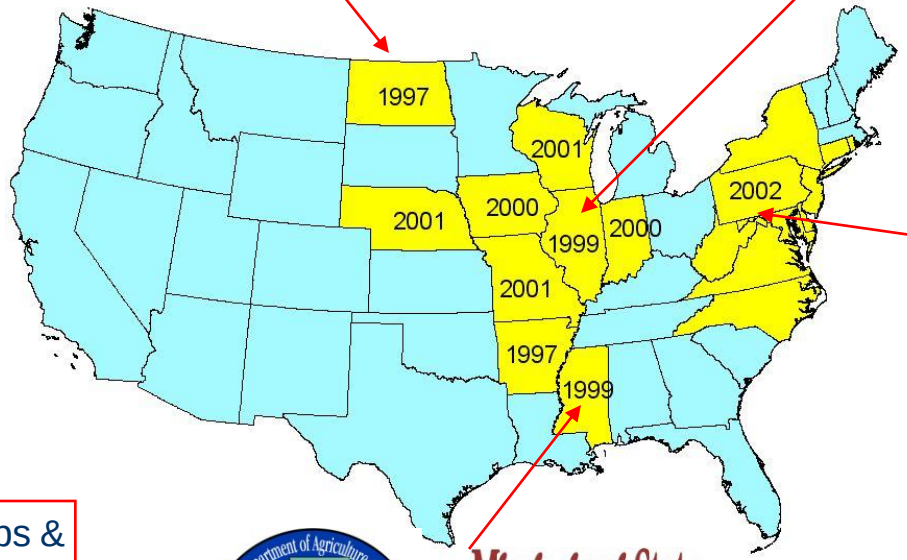
ILLINOIS DEPARTMENT OF NATURAL RESOURCES

USDA

NASS

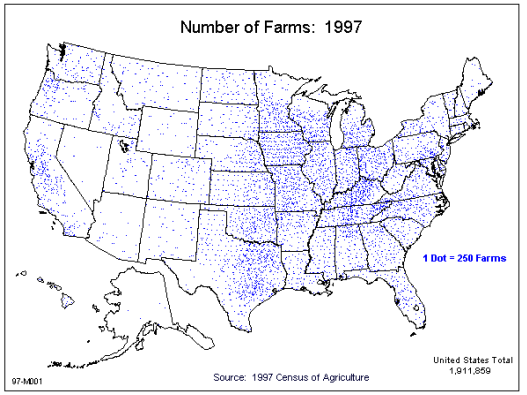
Illinois Department of Agriculture

Cropland Data Layer States



Cooperative partnerships & year implemented

Cropland Data Layer Background

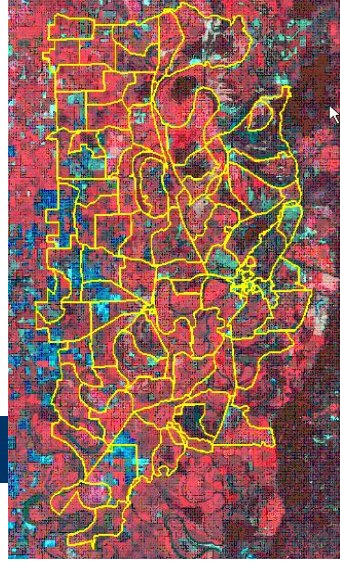


- National Agricultural Statistics Service
  - June Agricultural Survey (JAS) – National in Scope
    - 41,000 farms visited
    - 11,000 one-square mile sample area segments visited
    - Most states contain between 150 – 400 segments
    - Planted acreage estimate
  - Cropland Data Layer depends on the JAS data
    - Unbiased statistical estimator of crop area
      - State and county level estimates

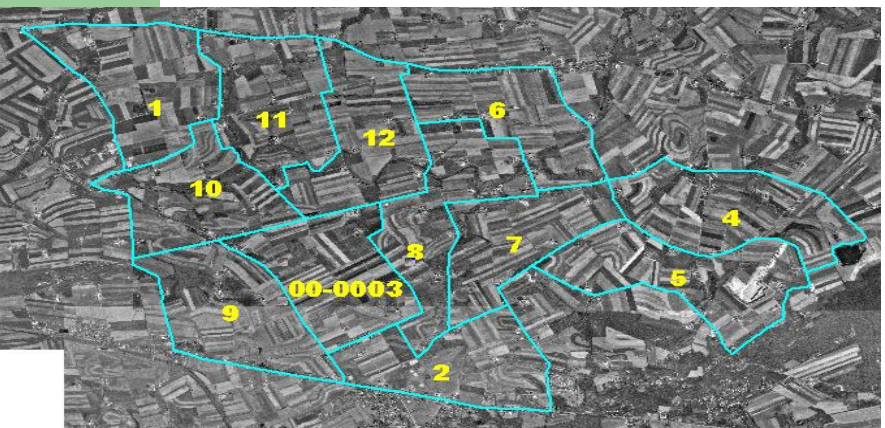
NASS Methodology

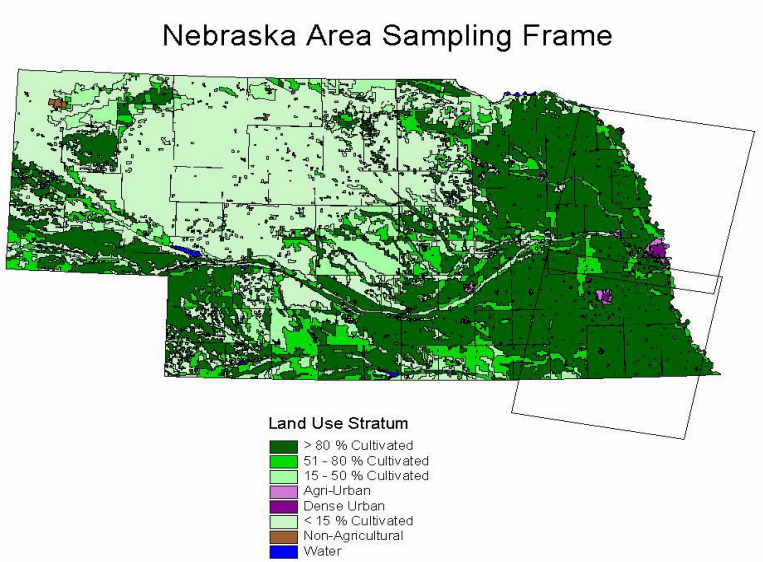
1. Hundreds of farms throughout each state are visited annually by enumerators as part of the USDA/NASS June Agricultural Survey (JAS).

Area Sampling Frame



- Stratify based on percent cultivated land
- Subdivide strata into primary sampling units or PSU's
  - Selected PSU's divided into secondary sampling units or segments



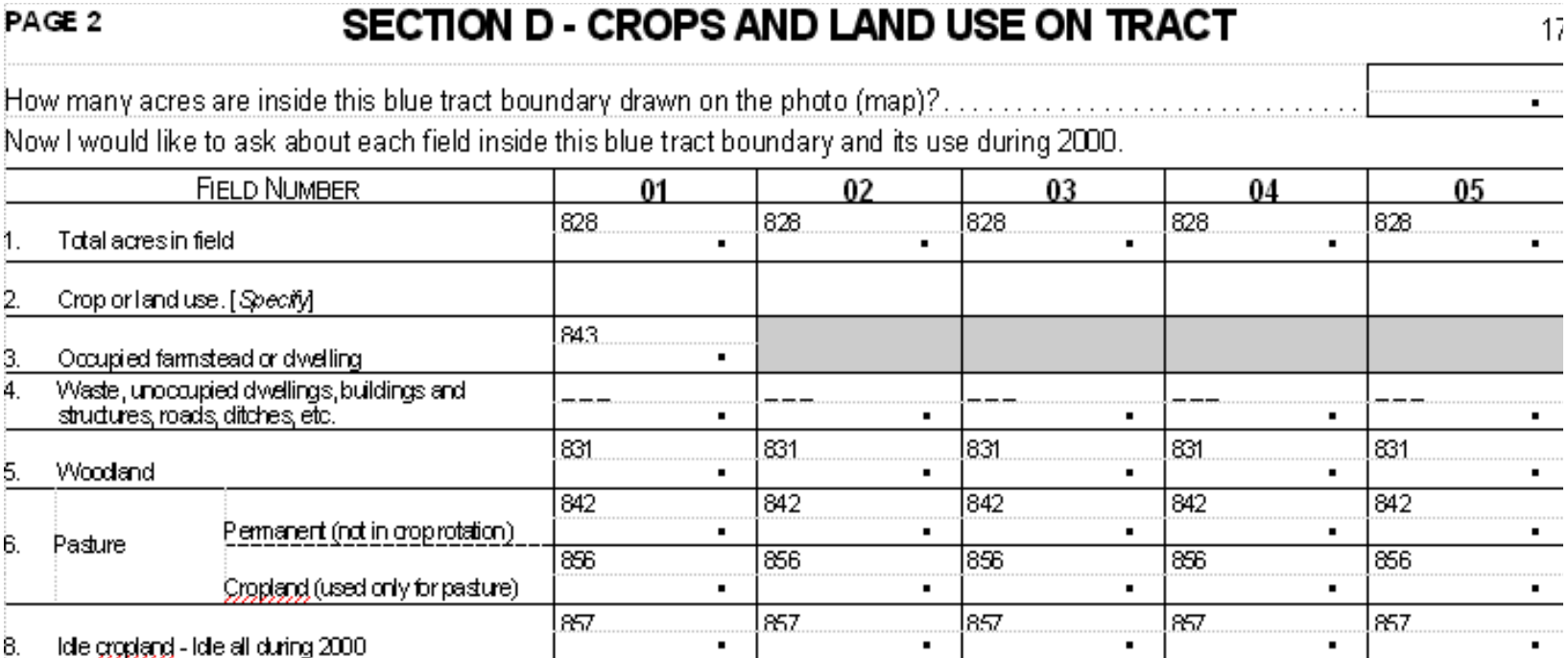


NASS Methodology

1 sq. mi. JAS segment annotated by enumerator on a 1:8,000-scale NAPP photo

JAS Questionnaire

- Enumerators account for all land usage in segment
  - Draw off field location by direct observation
  - Directly link questionnaire to segment photo



PAGE 2

SECTION D - CROPS AND LAND USE ON TRACT

17

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.

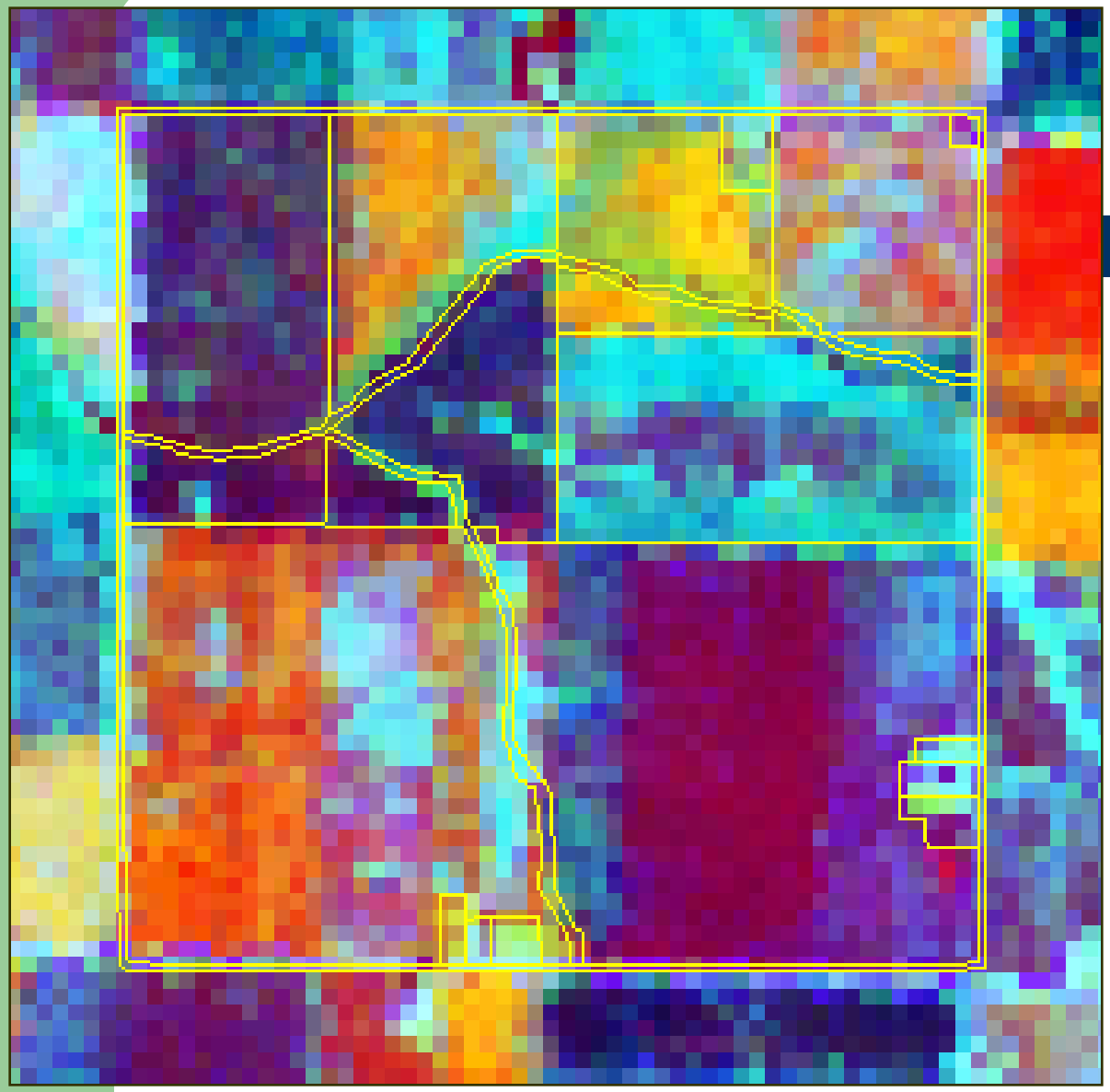
FIELD NUMBER	01	02	03	04	05
1. Total acres in field	828	828	828	828	828
2. Crop or land use. [*Specify*]					
3. Occupied farmstead or dwelling	843				
4. Waste, unoccupied dwellings, buildings and structures, roads, ditches, etc.	___	___	___	___	___
5. Woodland	831	831	831	831	831
6. Pasture — Permanent (not in crop rotation)	842	842	842	842	842
6. Pasture — Cropland (used only for pasture)	856	856	856	856	856
8. Idle cropland - Idle all during 2000	857	857	857	857	857

NASS Methodology

1. Several hundred farms throughout the state are visited annually by enumerators as part of the USDA/NASS June Agricultural Survey (JAS).

2. **The land use and acreage information is entered into a database and the field boundaries are digitized.**

NASS Methodology



- Each field is digitized by the NASS field office staff through direct interpretation of the enumerator's annotated NAPP photo of the JAS segment onto an enlarged Landsat TM image.

Satellite Specs

Landsat 5 (TM) and Landsat 7 (ETM+)

Spatial Resolution:

- One picture element (pixel) represents an area of 30 meters by 30 meters, 185 kilometer swath width
- 43 Scenes used for the 2002 Mid-Atlantic Cropland Data Layer

Temporal Resolution:

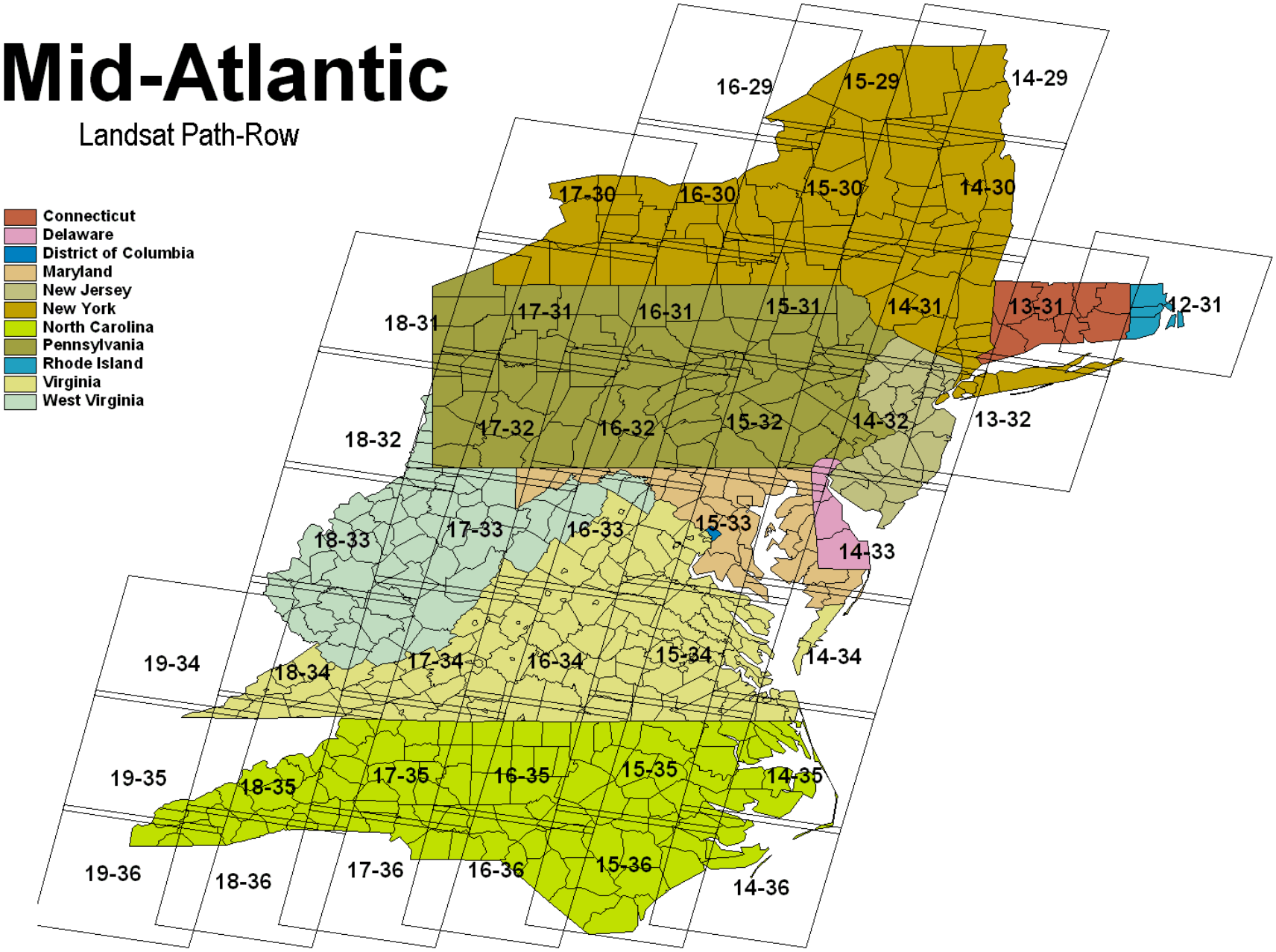
- 16 day repeat coverage (two satellites in 2002 = once every 8 days)
- NASS uses 2 dates for our classification process (Spring & Summer)

Spectral Resolution:

- 3 Visible Bands@ 30m
- 1 Near Infrared (IR) Band @ 30m
- 2 Shortwave IR Bands @ 30m
- 1 Thermal IR Band (TM @ 120m, ETM @ 60m)
- 1 Panchromatic Band @ 15m res. (ETM only)

Mid-Atlantic

Landsat Path-Row



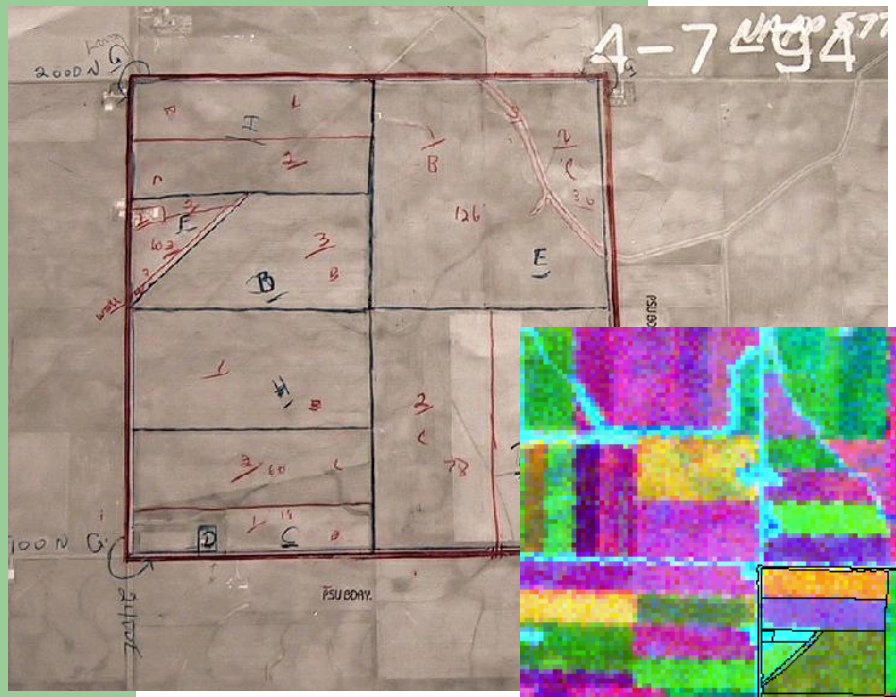
NASS Methodology

1. Several hundred farms throughout the state are visited annually by enumerators as part of the USDA/NASS June Agricultural Survey (JAS).

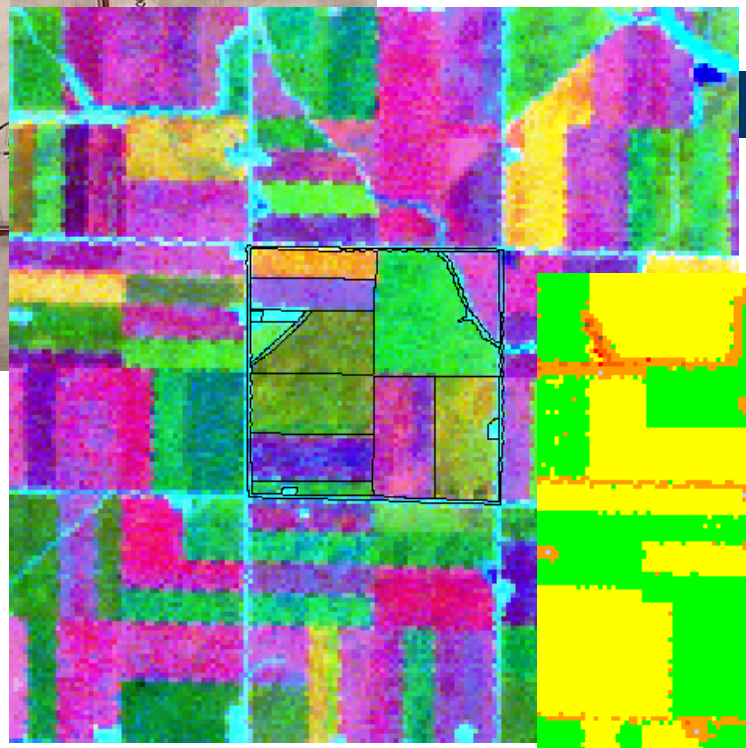
2. The land use and acreage information is entered into a database and the field boundaries are digitized.

3. **A modified supervised classification is performed using the digitized segments as training samples. NASS uses software developed and maintained in-house.**

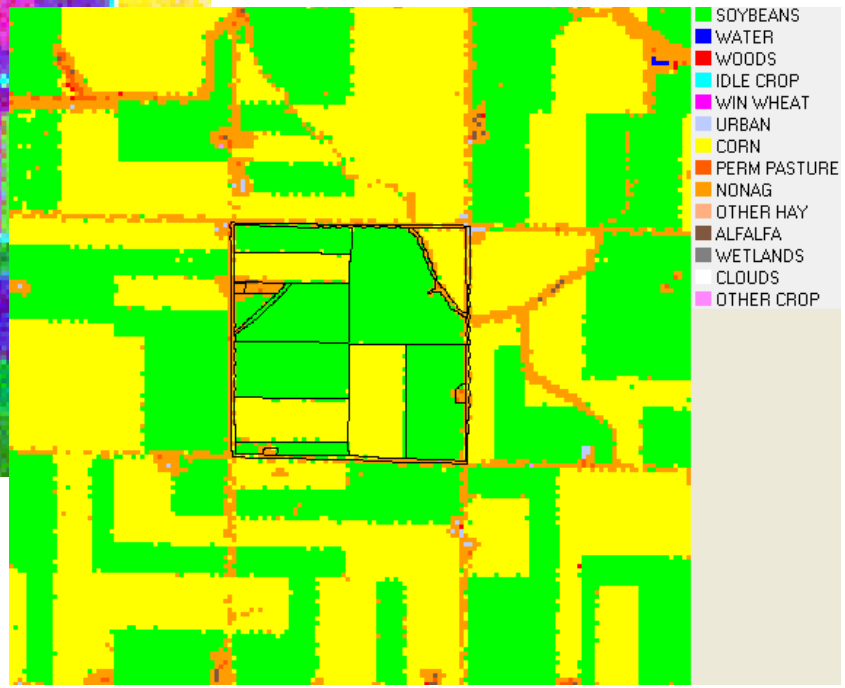
Segment Processing



Field Enumeration



Digitizing & Labeling



Classification

Program Resources

Hardware

- Computational intensive jobs (i.e. cluster/classify)
  - Windows XP
- Digitizing/editing
  - Windows XP

Software

- Image processing PEDITOR
  - Developed internally
- Digitizing/editing
  - Remote Sensing Project
    - Developed internally
- Batch job processing
  - XLNT – Commercial software

NASS Methodology

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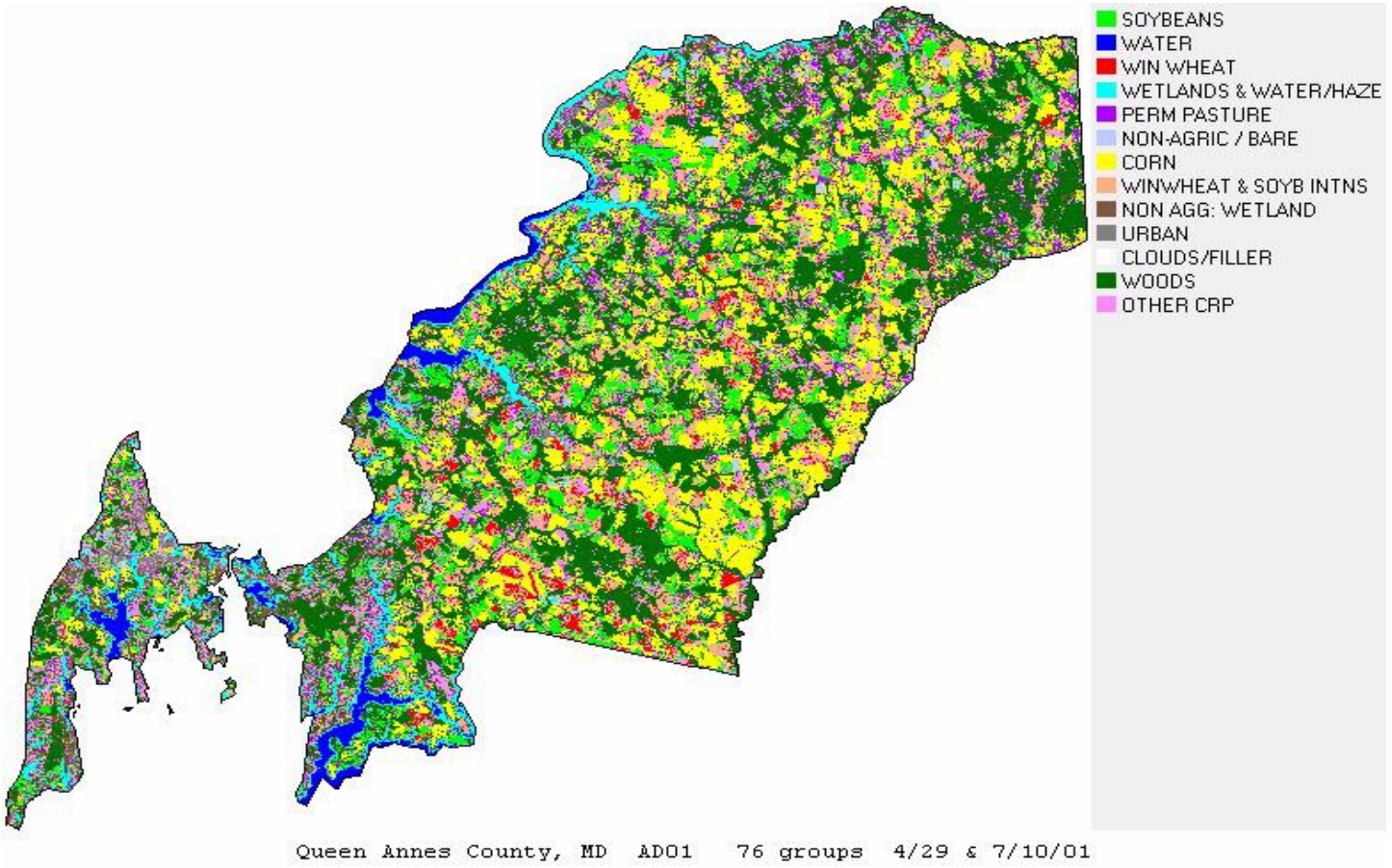
4. **All the categorized scenes comprising a state are stitched together to produce a statewide land cover classification map (GIS layer).**

2001 Maryland Cropland Data Layer
(Pilot Project) Queen Anne's County



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2. The land use and acreage information is entered into a database and the field boundaries are digitized.

3. A modified supervised classification is performed using the digitized segments as training samples. NASS uses software developed and maintained in-house.

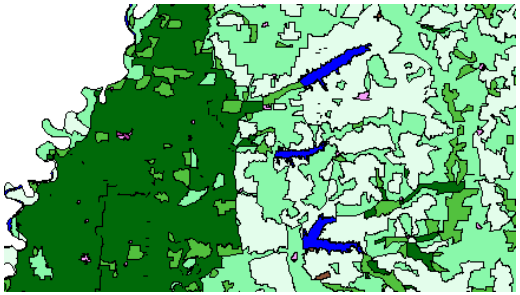
4. All the categorized scenes comprising a state are stitched together to produce a statewide land cover classification map (GIS layer).

5. **This land cover data layer is then used to produce state and county-level crop estimates using a regression estimator and/or raw pixel counts.**

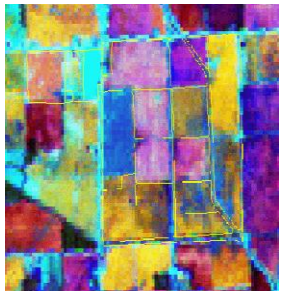
Program Summary

Raw Satellite Image

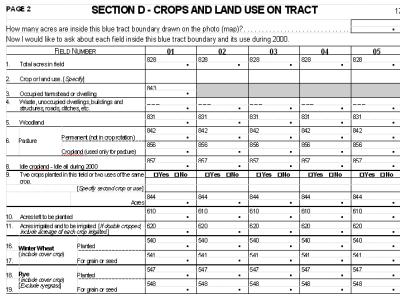
Area Sampling Frame



Segment Boundaries



JAS Questionnaire

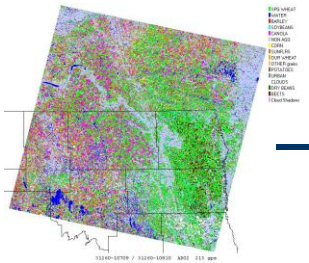


PAGE 2 **SECTION D - CROPS AND LAND USE ON TRACT**

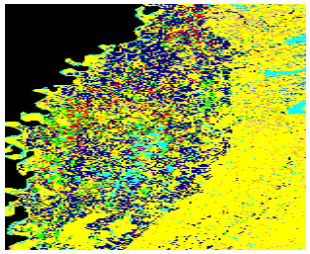
How many acres are inside this blue tract boundary drawn on the photo (map)?

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

FIELD NUMBER		01	02	03	04	05
1. Total acres in field		828	828	828	828	828
2. Crop or land use. [Specify]						
3. Occupied farmstead or dwelling		841				
4. Waste, unoccupied dwellings, buildings and structures, roads, ditches, etc.		---	---	---	---	---
5. Woodland		831	831	831	831	831
6. Pasture	Permanent (not in crop rotation)	842	842	842	842	842
	Cropland (used only for pasture)	856	856	856	856	856
8. Idle cropland - Idle all during 2000		857	857	857	857	857
9. Two crops planted in this field on two uses of the same acre.		☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
	[Specify second crop or use]					
	Acres	844	844	844	844	844
10. Acres left to be planted		610	610	610	610	610
11. Acres irrigated and to be irrigated (If double cropped, indicate acreage of each crop irrigated)		620	620	620	620	620
16. Winter Wheat (include cover crop)	Planted	540	540	540	540	540
17.	For grain or seed	541	541	541	541	541
18. Rice (include cover crop) (Exclude overseed)	Planted	547	547	547	547	547
19.	For grain or seed	548	548	548	548	548



Categorized Images



Mosaicked CDL

soybeans	2001	AR	Clay	21	129000	127000
soybeans	2001	AR	Conway	29	21000	20000
soybeans	2001	AR	Craighead	31	87000	85500
soybeans	2001	AR	Crawford	33	13000	12500
soybeans	2001	AR	Crittenden	35	166000	162500
soybeans	2001	AR	Cross	37	150000	149000
soybeans	2001	AR	Desha	41	87000	86000
soybeans	2001	AR	Drew	43	21000	20500
soybeans	2001	AR	Faulkner	45	7000	7000
soybeans	2001	AR	Franklin	47	2000	2000

Estimates

Importance of Land Cover Data

Agricultural Business Planning

Land Use Summary by Unit Area

Farmland Conversion

Resource Management

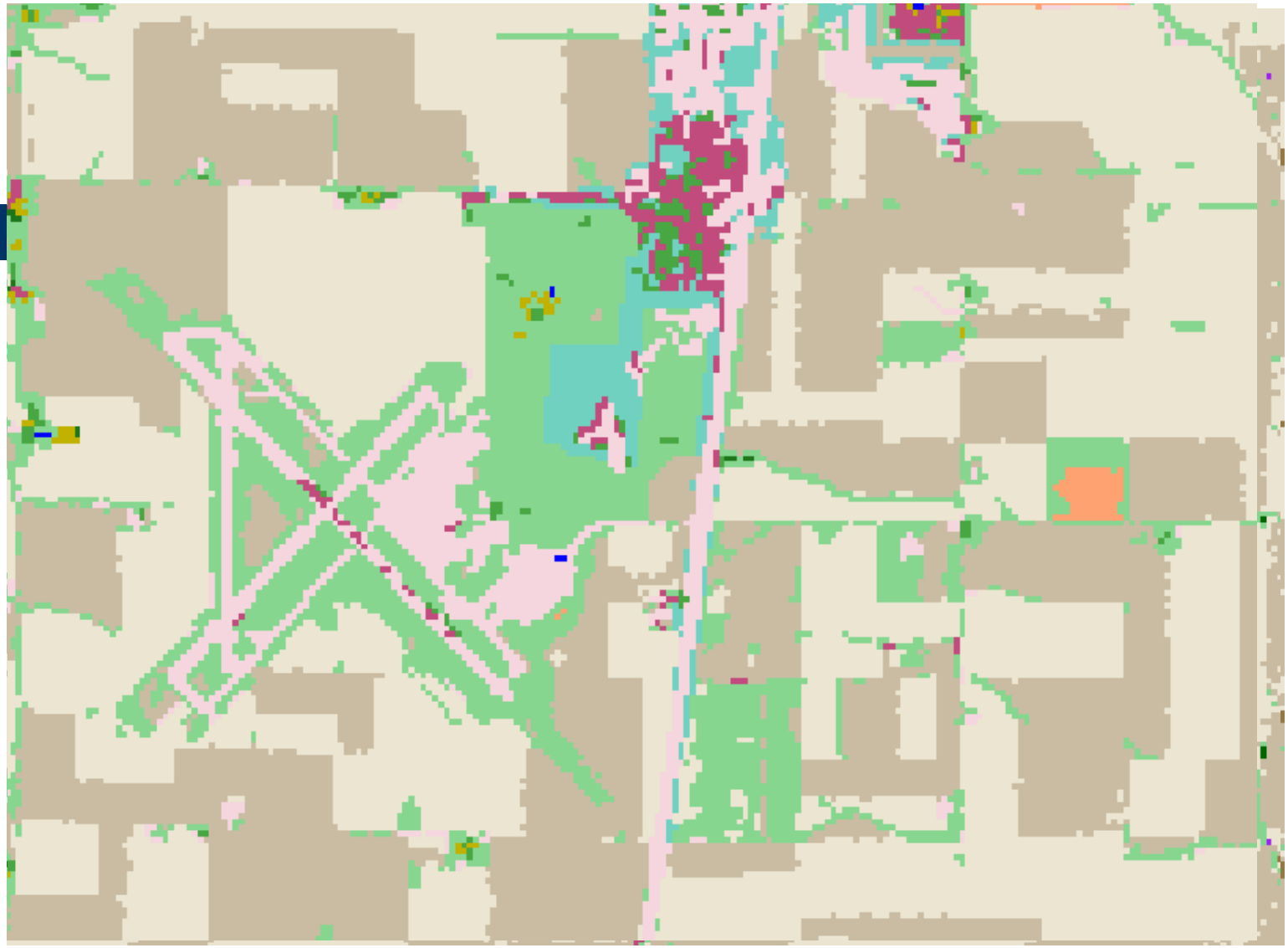
- **Soil Erosion Rates**
- **Acres of Crops in Prime Farmland**
- **Woodland Management**

Hydrologic Modeling Input

CDL Customers

Farmers, farm org, seed companies, fertilizer & pesticide companies, farm equipment dealers, grain transit/storage companies, farm real estate, global change, water quality, soils, & environmental assessment, crop insurance, universities, federal, state, & county gov, value added RS/GIS resellers, agribusinesses

1999 CDL 2000 CDL 2001 CDL Interagency



Champaign, Illinois - Willard Airport

Limitations of NASS Land Cover Data

- 30 m x 30 m ground resolution
- Emphasis on agricultural land cover
- Classification limitations
- Potential cloud cover
- Dependent upon continued health of the Landsat 5 satellite
  - USDA stopped purchasing Landsat 7 ETM in 2004

Benefits of NASS Land Cover Data

- **Low Cost for CD-Rom**
- **Spatially Referenced**
- **Attributed**
- **Updated Annually**
- **Statewide Coverage**
- **Quality Control for Other Data**
- **Generate Summary Analysis Quickly**

Cropland Data Layer CD-ROM Order Form

PLEASE NOTE: If you experience any difficulties submitting this form call 1-800-727-9540. For technical questions about this product call the Spatial Analysis Research Section, USDA NASS (703)235-5218 .

Mosaicked Precision Registered Final

Arkansas ☐ **2000 and 2001 ($35)** available 6/02 ☐ **1999 and 2000 ($25)** ☐ **1997 and 1998 ($25)** *Note: Mosaicked but not precision registered*	**Mississippi** ☐ **2000 and 2001 ($35)** available 6/02 ☐ **1999 and 2000 ($25)**
Illinois ☐ **2000 and 2001 ($35)** ☐ **1999 and 2000 ($25)**	**Missouri** - boot heel only **NEW** ☐ **2001 ($25)** available 6/02
Indiana ☐ **2000 and 2001 ($35)**	**Nebraska** - southeast only **NEW** ☐ **2001 ($25)** only available for 2001
Iowa ☐ **2000 and 2001 ($35)**	**North Dakota** ☐ **2000 and 2001 ($35)** ☐ **1999 and 2000 ($25)** ☐ **1997 and 1998 ($25)**

To order a CD-ROM (see prices as noted above) please fill out this order form and submit it either electronically (invoice will follow with the CD(s)) or mail the completed form with your check to: USDA/NASS Customer Service, 1400 Independence Avenue, SW, Room 5829-S, Washington DC 20250-9410. Please note "Cropland Data Layer - (State)" in the "Memo" part of your check. **Checks should be made out to "USDA-NASS".** Allow 1 week for delivery.

Enter the mailing address information below.
Please be sure to include your phone number or E-mail address, in case we have any questions.

http://www.nass.usda.gov/research/Cropland/cdorderform.htm

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State:

Questions?