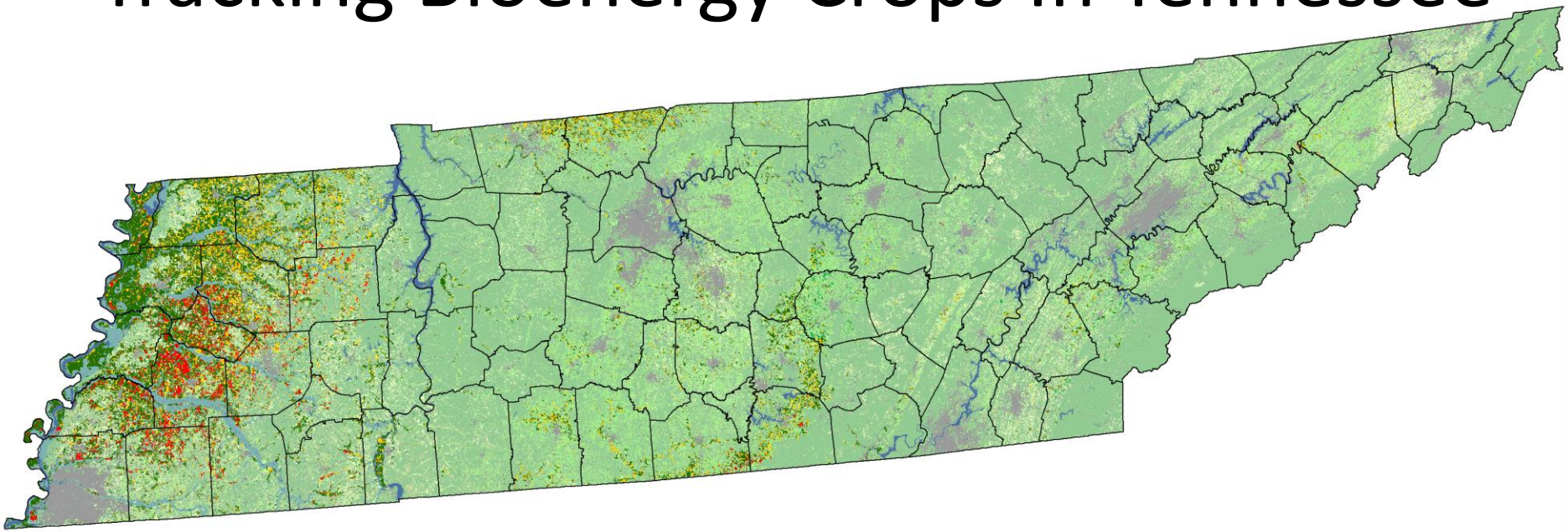
NASS Cropland Data Layer Efforts Tracking Bioenergy Crops In Tennessee



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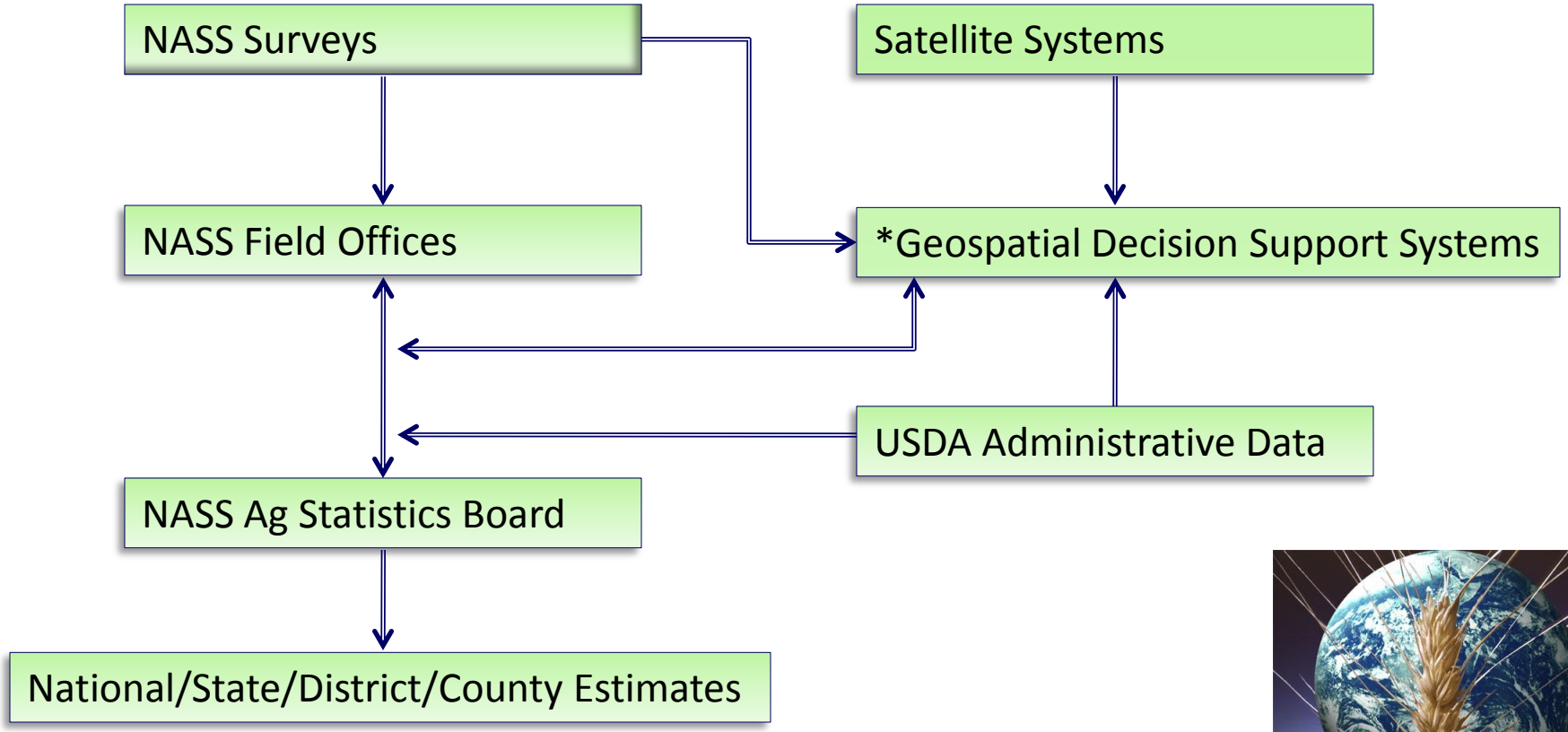
ASA-CSSA-SSSA 282-4 Meetings
11/4/09

NASS Estimation Systems

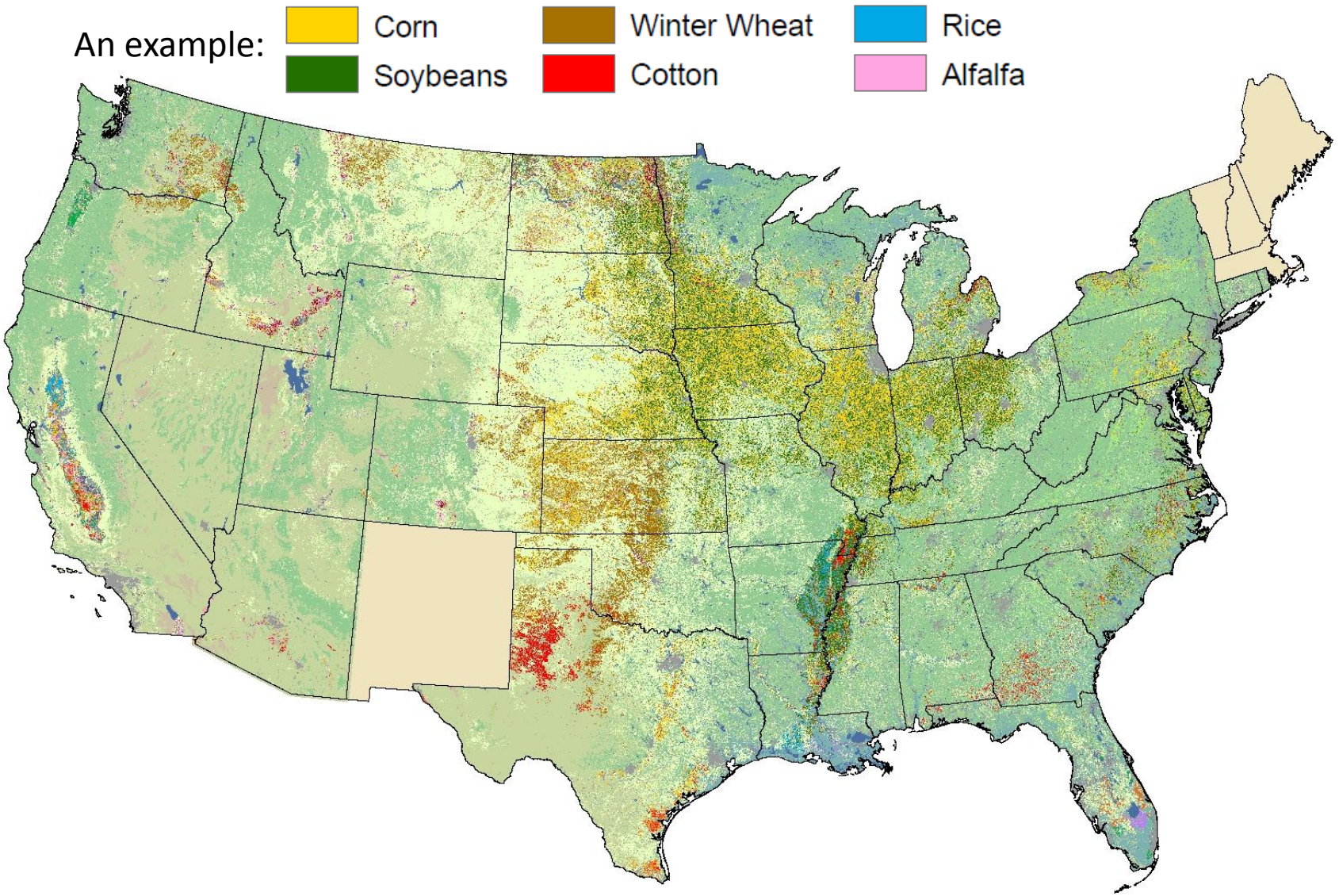


*NASS uses Geospatial Decision Support Systems to provide updated information to the Ag Statistics Board and data users.

What is the Cropland Data Layer (CDL)?

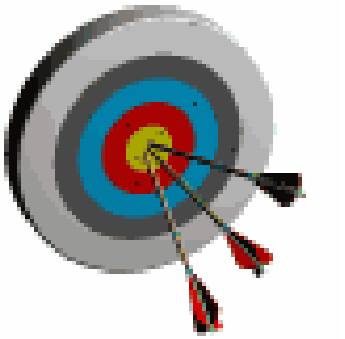
A tool to identify agriculture type and location

Each pixel represents a type of crop or land cover



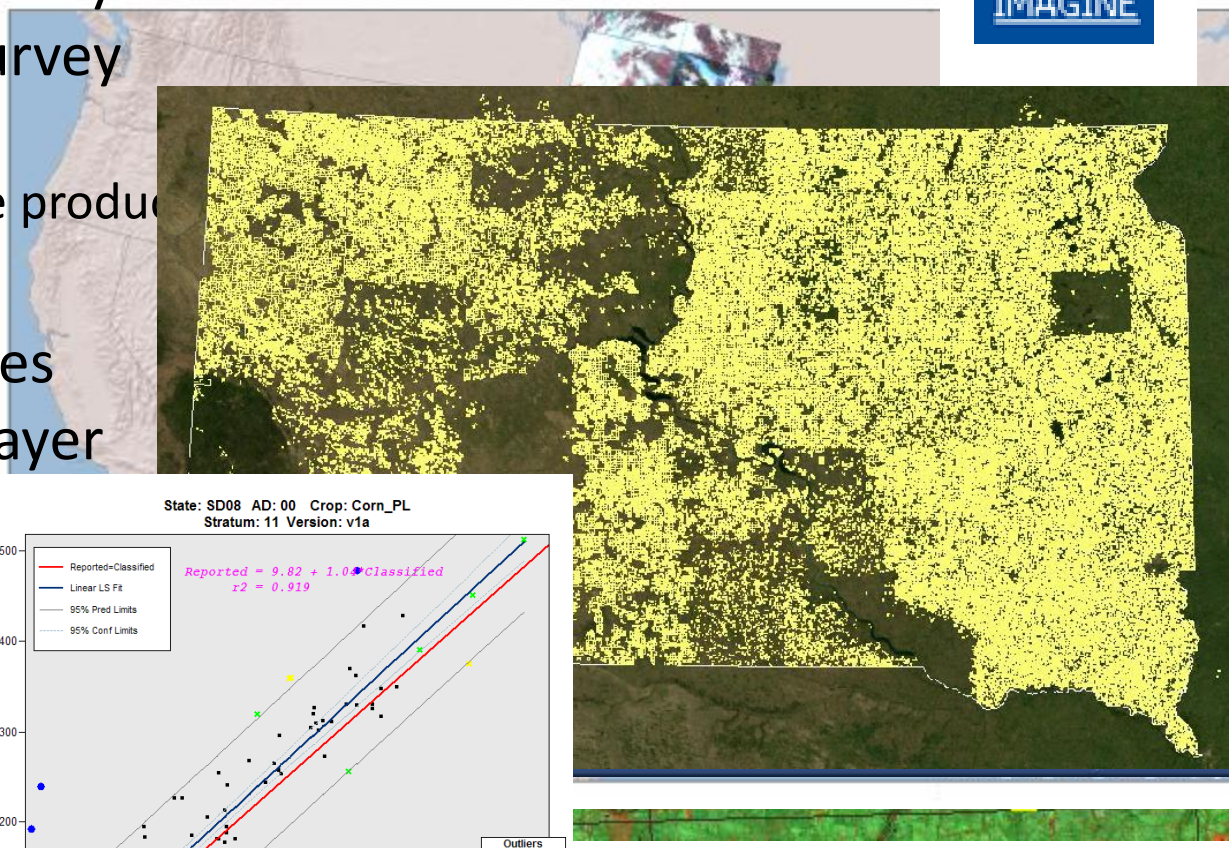
Cropland Data Layer (CDL) Objectives

- "Census by Satellite"
  - *Annually* cover major program crops and regions
  - Crops accurately geo-located
- Deliver in-season remote sensing acreage estimates
  - For June, July, August, September, and October Official Reports
  - Update planted area
  - Reduced respondent burden
- Provide timely, accurate, useful estimates
  - Measurable error
  - Unbiased/independent estimator
  - State, District, County
- Public domain crop specific crop classification
  - Hosted @ NRCS Geospatial Data Gateway & http://www.nass.usda.gov/research/Cropland/SARS1a.htm

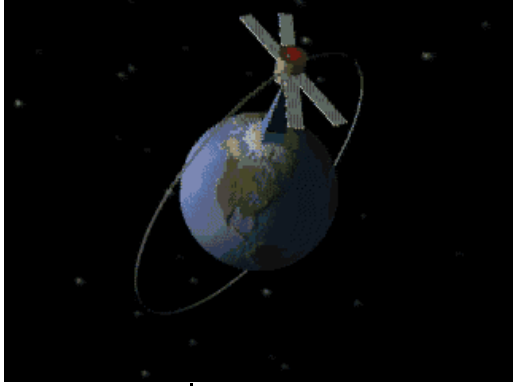


CDL Program

- Inputs
  - Resourcesat-1 AWiFS imagery
  - Farm Service Agency – Common Land Unit
  - NASS June Ag Survey
  - Ancillary data
    - NLCD & derivative produ
- Outputs
  - Acreage Estimates
  - Cropland Data Layer
- Process
  - Commercial so



Data Partnerships



- Foreign Agricultural Service
  - Resourcesat-1 AWiFS

Linking U.S. Agriculture FAS to the World

- Farm Service Agency
  - Common Land Unit “ground truth”

USDA Farm Service Agency

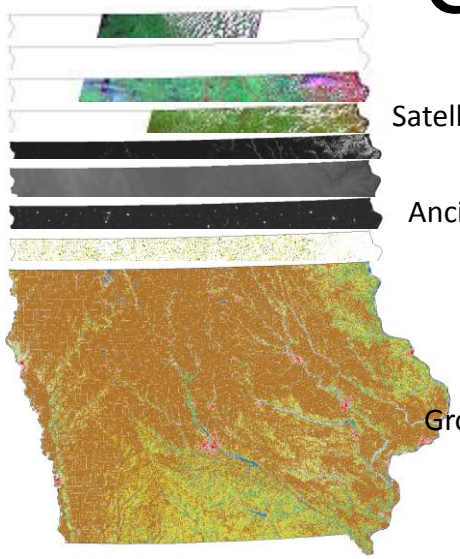
- US Geological Survey
  - National Land Cover Dataset

MRLC Consortium

- US Geological Survey/ NASA
  - Landsat TM 5 & 7

USGS science for a changing world NASA

CDL Processing Method



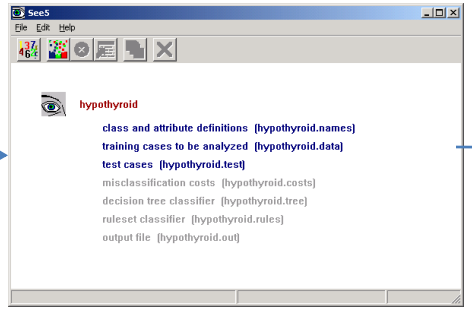
Satellite Imagery

Ancillary Data

Ground Truth

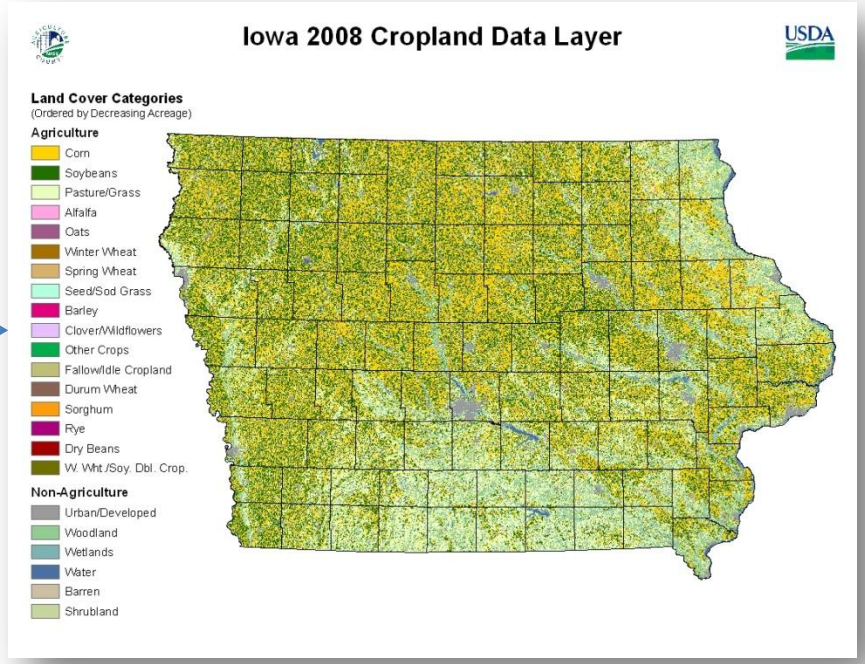
Sampling Done by

See5

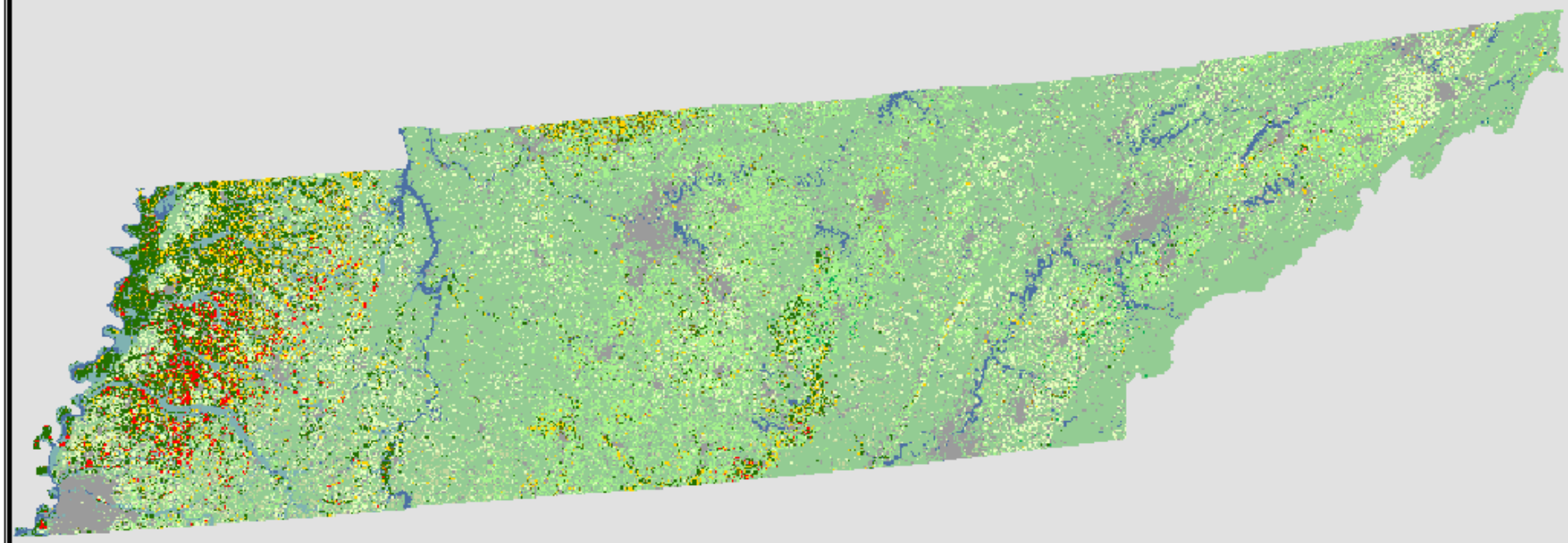


Decision Tree

Classification



Tennessee 2009 Cropland Data Layer

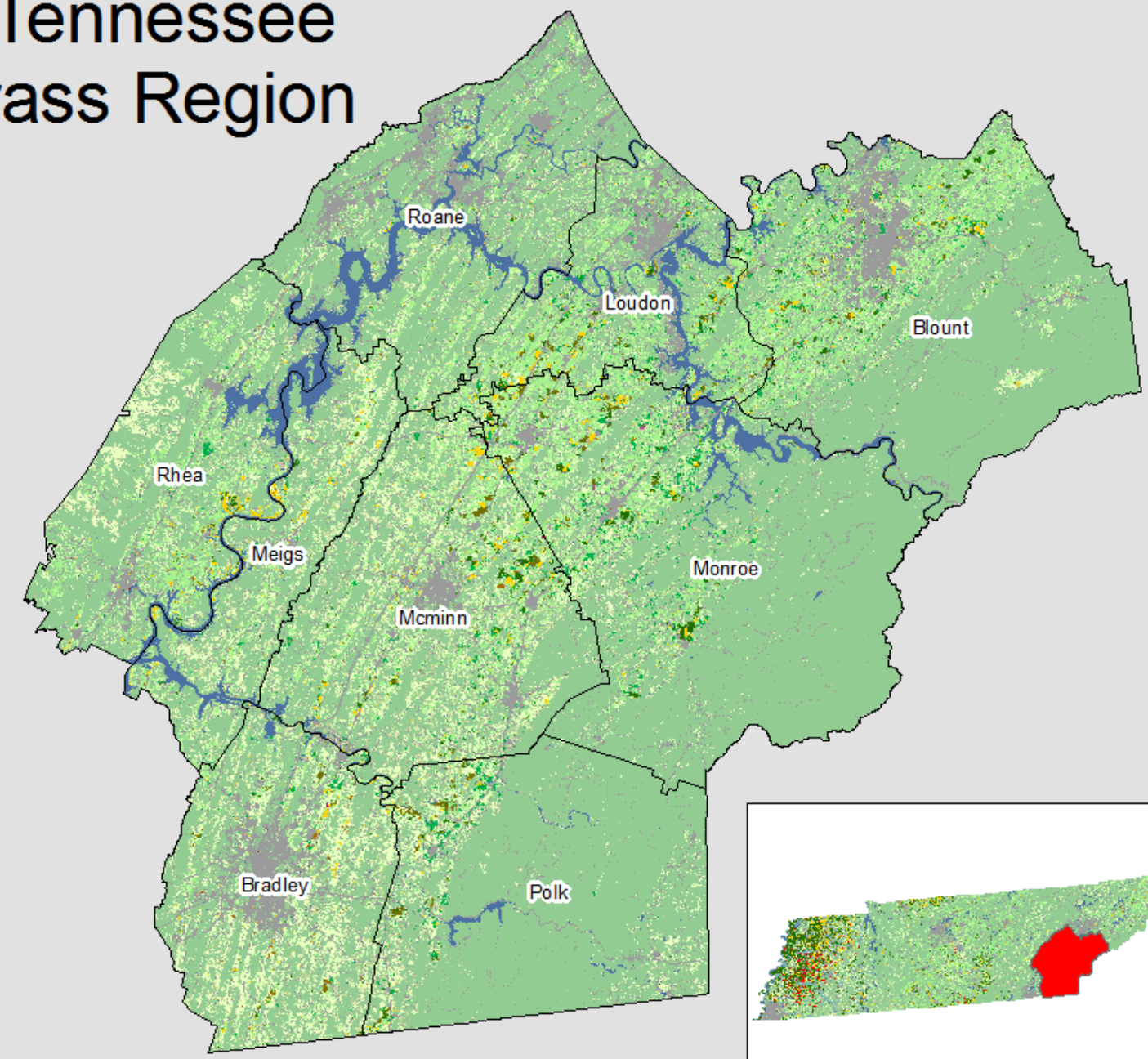


Landcover Categories

Alfalfa	Dry Beans	Developed	Oats	Rice	Sweet Corn
Barley	Millet	Grassland Herbaceous	Other Crops	Rye	Switchgrass
Christmas Trees	Misc. Vegs. & Fruits	Open Water	Other Hays	Seed/Sod Grass	Tobacco
Corn	Barren	Shrubland	Pasture/Grass	Sorghum	W. Wht./Soy. Dbl. Crop
Cotton	Forest	Woody Wetlands	Peaches	Soybeans	Winter Wheat

OAK RIDGE National Laboratory
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

Eastern Tennessee Switchgrass Region



TN Accuracy Assessments

Crop categories only	Correct	Accuracy	Error	Kappa
Overall Accuracy 2009	223010	86.44%	13.56%	0.8179
Overall Accuracy 2008	219563	88.16%	11.84%	0.8374

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Individual Categories 2008

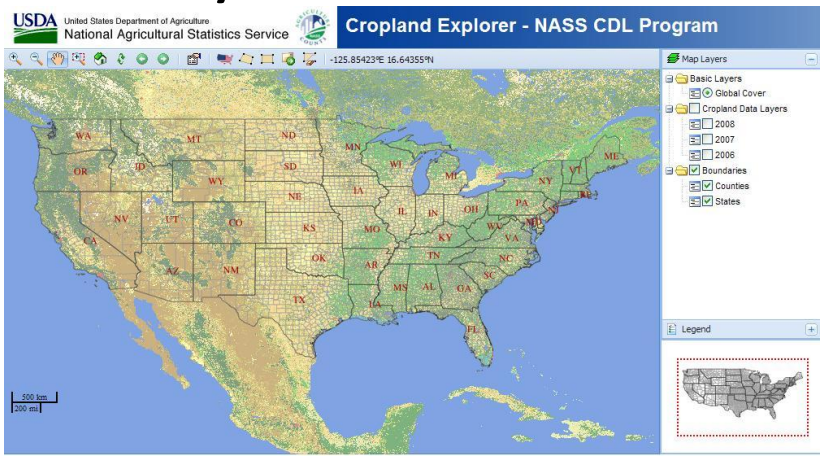
Cover Type	Attribute Code	Correct Pixels	Producer's Accuracy	Omission Error	Kappa	User's Accuracy	Commission Error	Kappa
Corn	1	58257	92.62%	7.38%	0.9205	91.64%	8.36%	0.9101
Cotton	2	23065	87.40%	12.60%	0.8704	92.44%	7.56%	0.9222
Soybeans	5	91449	90.97%	9.03%	0.8978	87.49%	12.51%	0.8591
WW / Soybeans	26	43890	91.68%	8.32%	0.9118	87.51%	12.49%	0.8681
Switchgrass	60	124	29.25%	70.75%	0.2923	57.67%	42.33%	0.5765

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

CDL Future

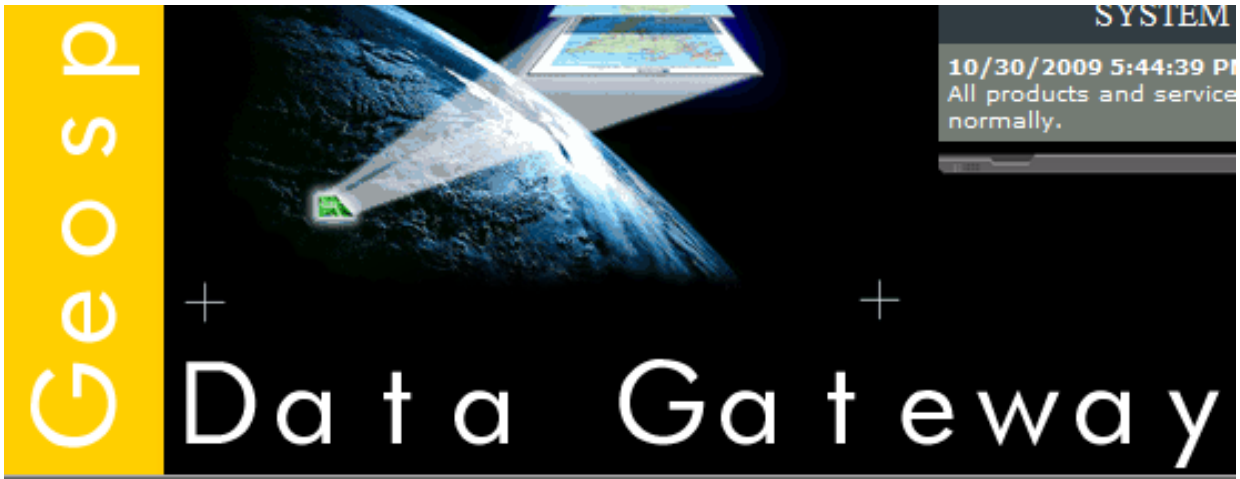
- Seek opportunities to collection bioenergy crop data
  - Need for other “non-program” farm crops

- National CDL crop year 2009
  - Funded in part by EPA/target release Jan/Jun ‘10
- Fund Geospatial CDL portal
  - George Mason Univ/Center for Spatial Information Science and Systems
- National Commodity Crop Productivity Index
  - NRCS dynamic soils layer



CDL Freely Available from the NRCS Geospatial Data Gateway

Thank You!



Ag Market Segmentation	Agribusiness planning	Analyses of Co2 fluxes
Analyzing watersheds, soil utilizations, & crop rotations	Assist with water use estimates	Assisting in education, research & outreach
Background data for research development	Background information for land use categories	Business analysis
Carbon cycle research	Comparison with our Climate Atlas	Crop rotation analysis
Data for students to practice on in Advanced Cartography class	Demographic Research	Determine acres of crop type within conservation projects
Distribution of land among forest, urban, crops & water.	Doing a theoretical radioactive plume impact assessment for crops	Environ lanscape analysis
Epidemiological research	Fertilizer Company looking at where the acres are	Fertilizer usage/potential
For archival purposes	GIS analysis of Mallard nesting sites/targeting restoration activities	GIS Reference layer
Globle irrigated area mapping	Habitat project planning	Incorporate these data sets into other landcover studies
Land cover analysis	Land use and conservation issues along the rural-urban interface	Landcover to calibrate/validate in house classifications
Mapping crop areas, using MODIS images in global scale	Market data analysis for land sales and appraisals	Market research
Modeling of environmental impacts from agriculture	Modelling support	Nutrient load in watershed modeling
Overlay with health statistics to estimate pesticide exposures	Post-stratification of forest inventory estimates	Precision farming, land classification
Research on future crop loss	Scientific research	Soil erosion prediction
Study for transportation project	study hurrican damage	Study of climate effects on vegetation
Teaching	To be used for Eco System modeling	To compare changes in cropping patterns overtime for Nebraska
To understand heterogeneity within AVHRR pixels	To use for analysis of deer habitat	Trend analysis of cropping patterns and verification of other data sources
Undergraduate teaching	Understand crop density distribution for selecting research locations	Use in spatial analysis by GIS consultants to crop protection industry
Use for agro-ecological zones for crop classification algorithm	Use to develop land management/rotation data files	Used for a project involving the tillage adoption by crop for counties
Used for risk assessment for pesticides/gene flow project	Used to constrain an ecosystem process model for estimating crop productivity	Validate landuse forecast model based on prior landuse classification
Will be used by our Water Use Program Manager	Will be used to aid in emergency operations, planning and recovery efforts for the State of Mississippi	Wish to test as input into area crop production estimation & watershed models