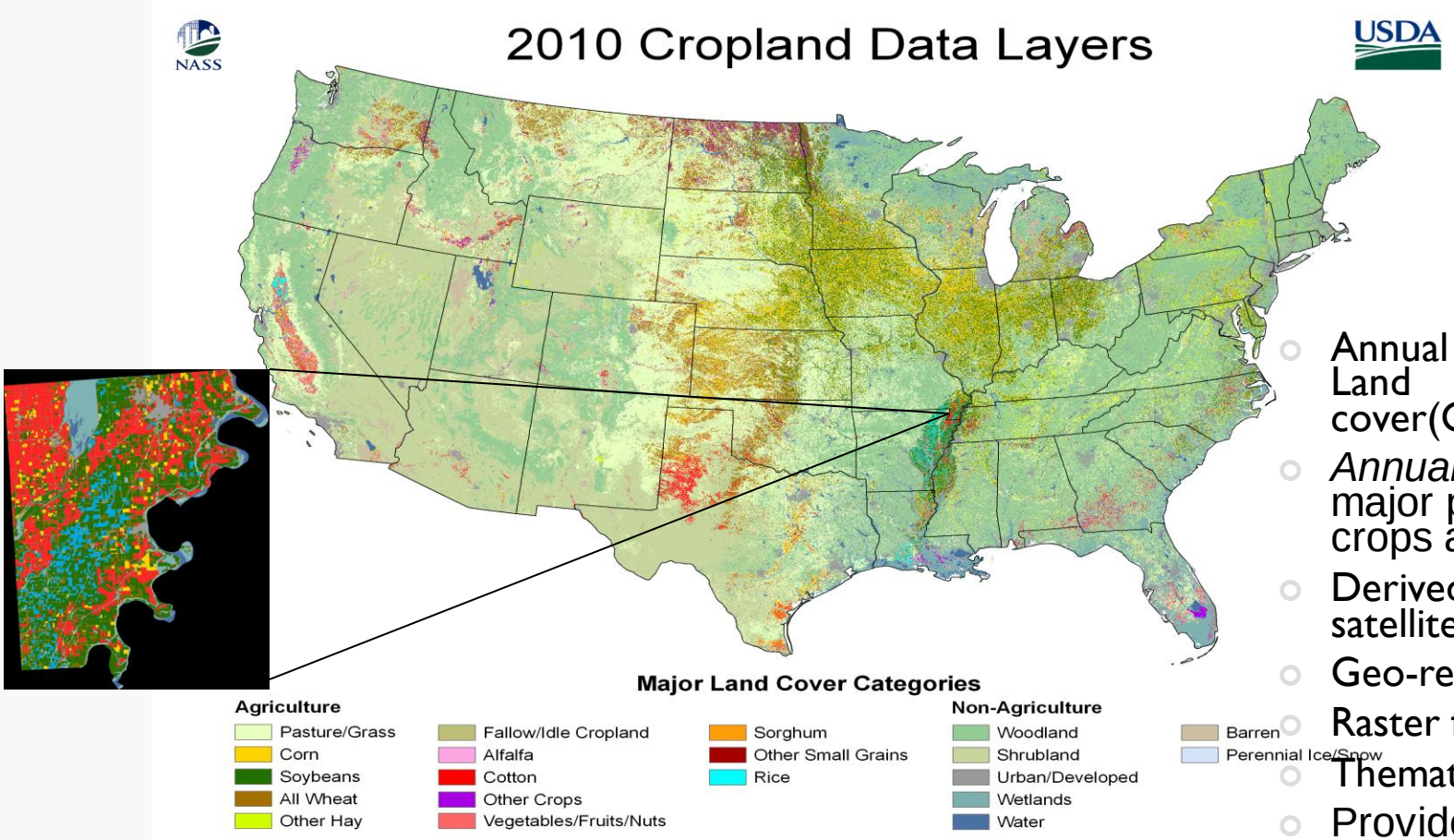
USDA CropScape Data Resources

Zhengwei Yang, Claire Boryan, Rick Mueller
USDA National Agricultural Statistics Service, Washington, DC 20250, USA
Collaborators: Liping Di, Weiguo Han
Center for Spatial Information Science and Systems, George Mason University
Zhengwei.Yang@nass.usda.gov

What Is CropScape?

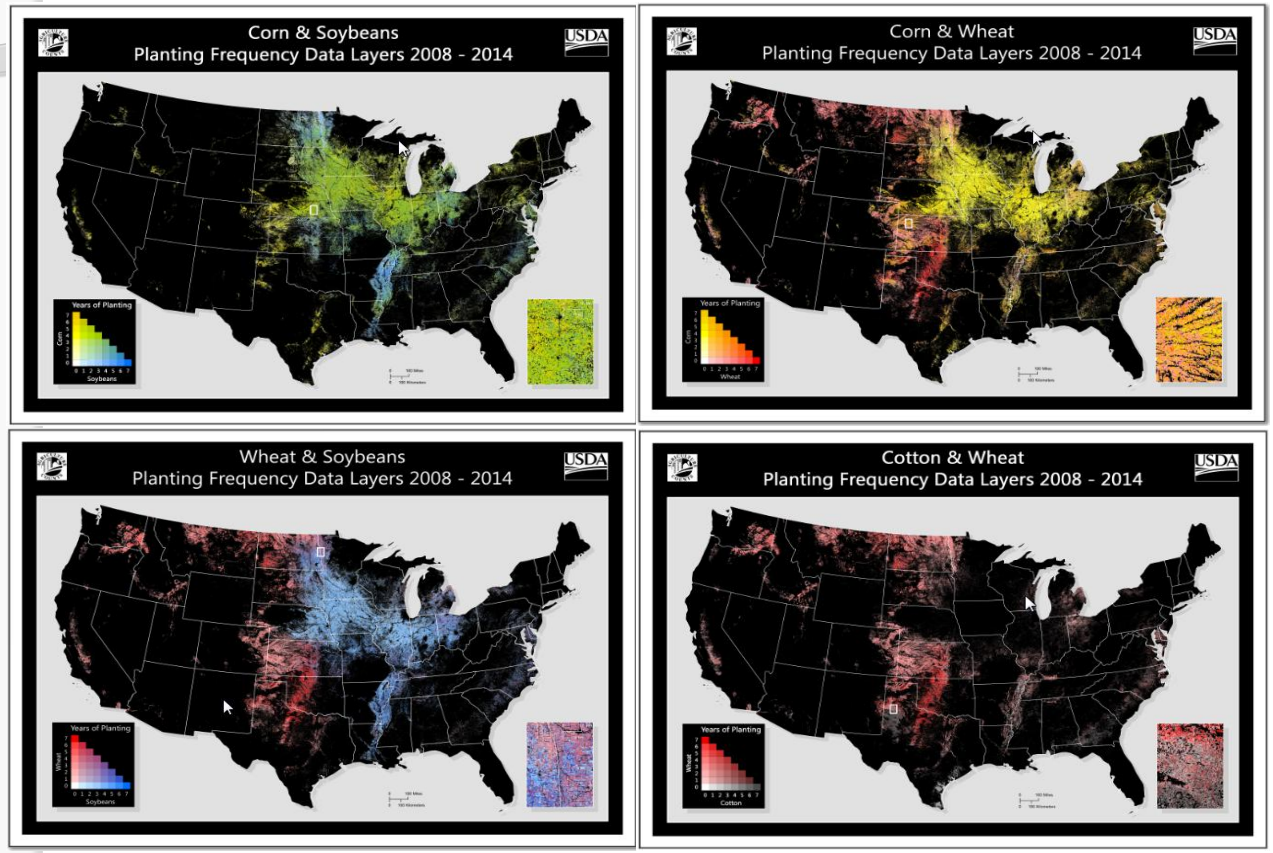
- An online GIS application for agricultural geospatial data visualization, analytics and dissemination
- Serves the NASS Cropland Data Layers (CDL), CropMask, and Crop Planting Frequency Data Layers (Crop-Specific)
- Web based interactive maps to provide capabilities of on-line geospatial crop information access, geospatial query, retrieval and analytics
- OGC standards-compliant geospatial web services for disseminating all data to the decision makers and users via real time retrieval, processing and publishing over the web
- **http://www.nassgeodata.gmu/CropScape**

What Are the Cropland Data Layers?



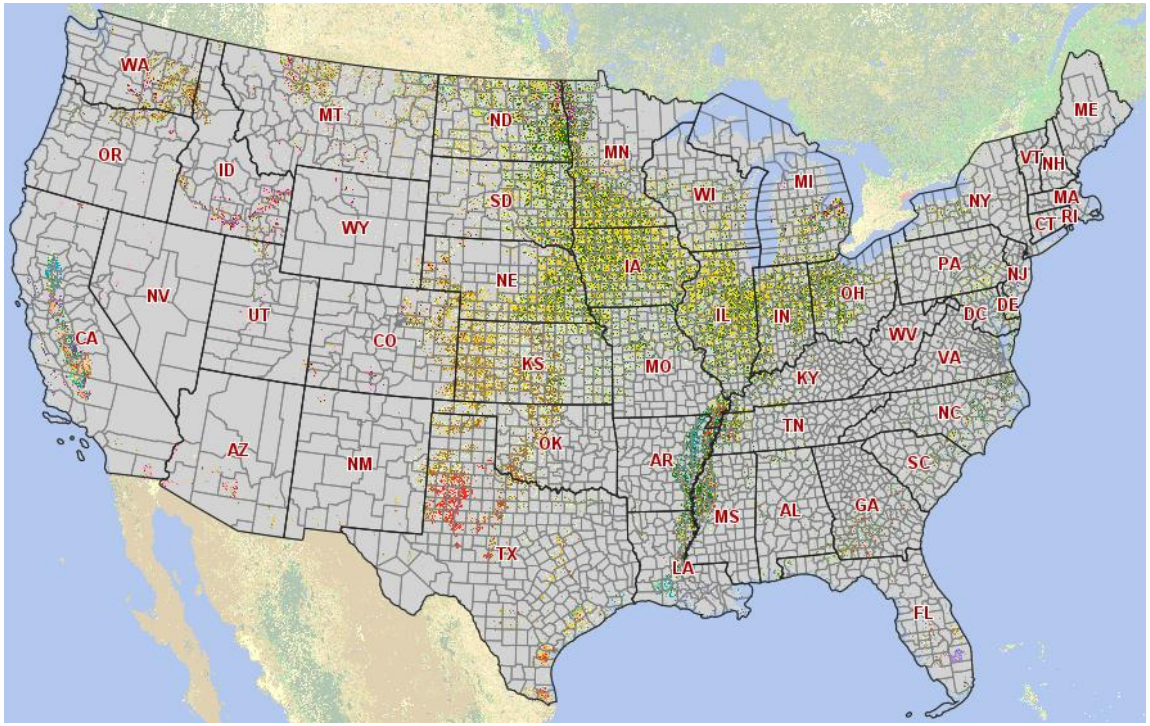
- Annual geospatial Land cover(CONUS)
- *Annually* cover major program crops and regions
- Derived from satellite images
- Geo-referenced
- Raster formatted
- Thematic maps
- Provide timely, accurate, useful estimates

Crop Planting Frequency Data Layers



- Derived from CDL
- Crop specific, 30m resolution, geo-referenced
- computed from 2008-2014 CDLs.

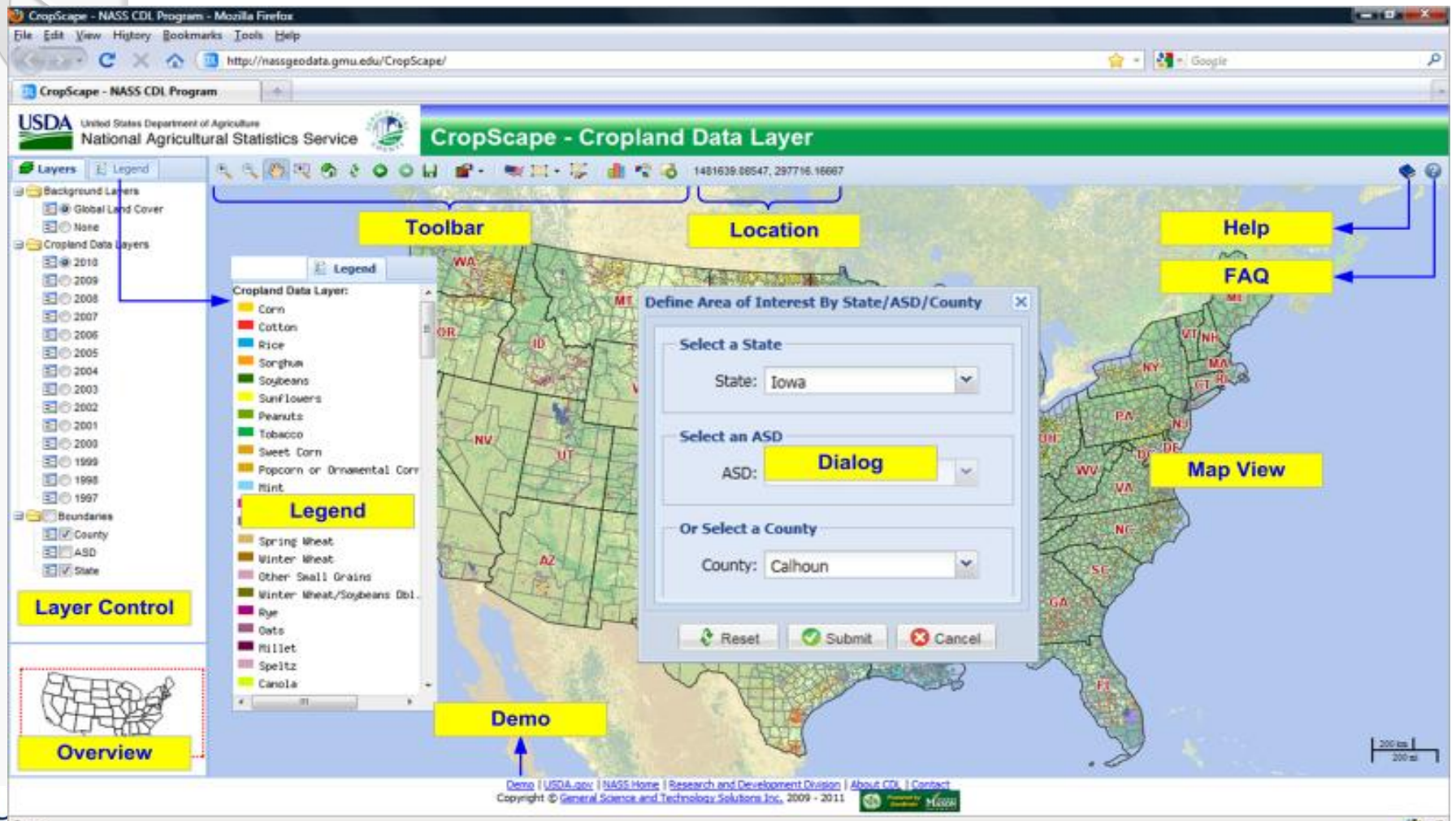
CropMask



- A CDL derivative product
- A map of national cultivated crop land cover.
- 30m resolution, geo-referenced

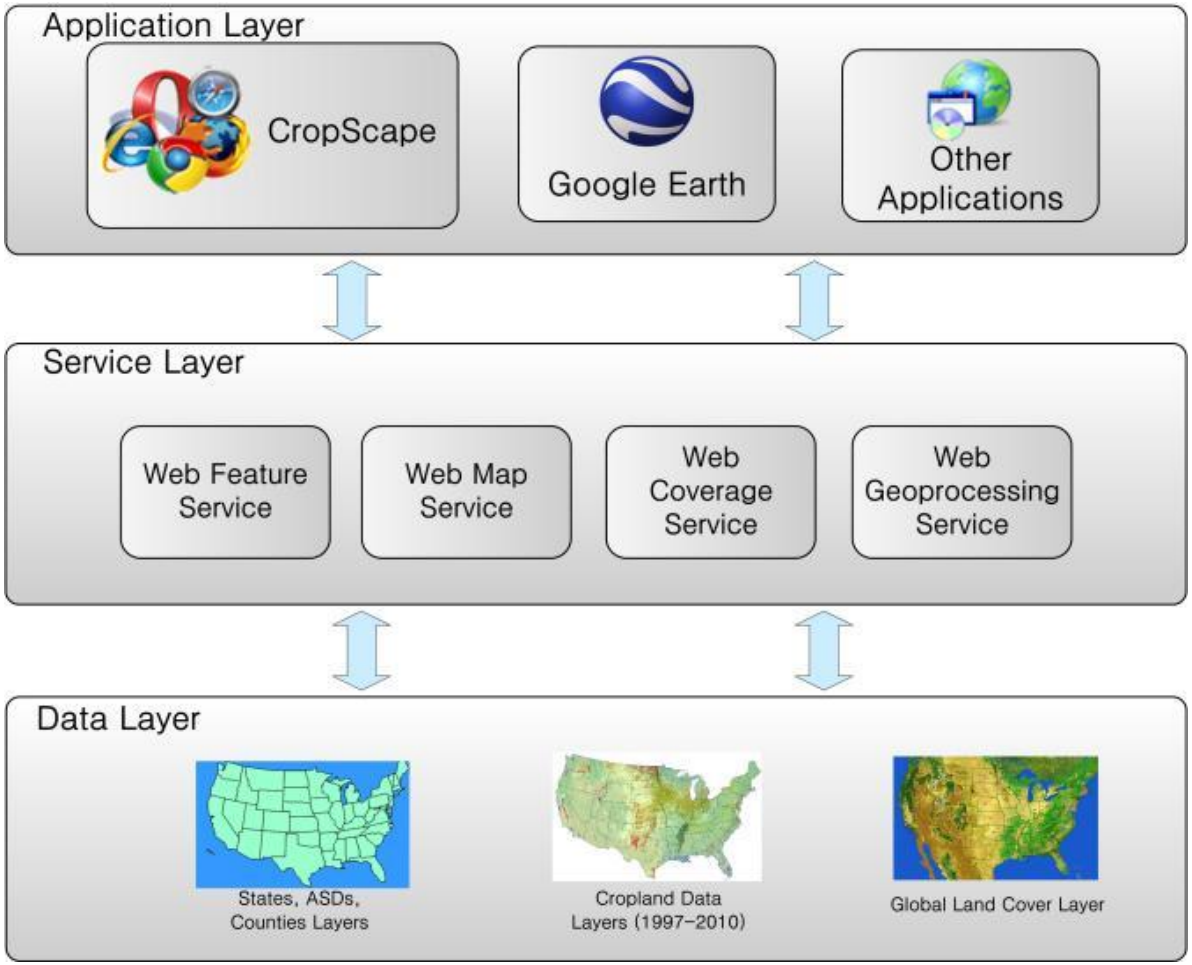
5

CropScape Browser Based Client - User Interface



www.nassgeodata.gmu/CropScape

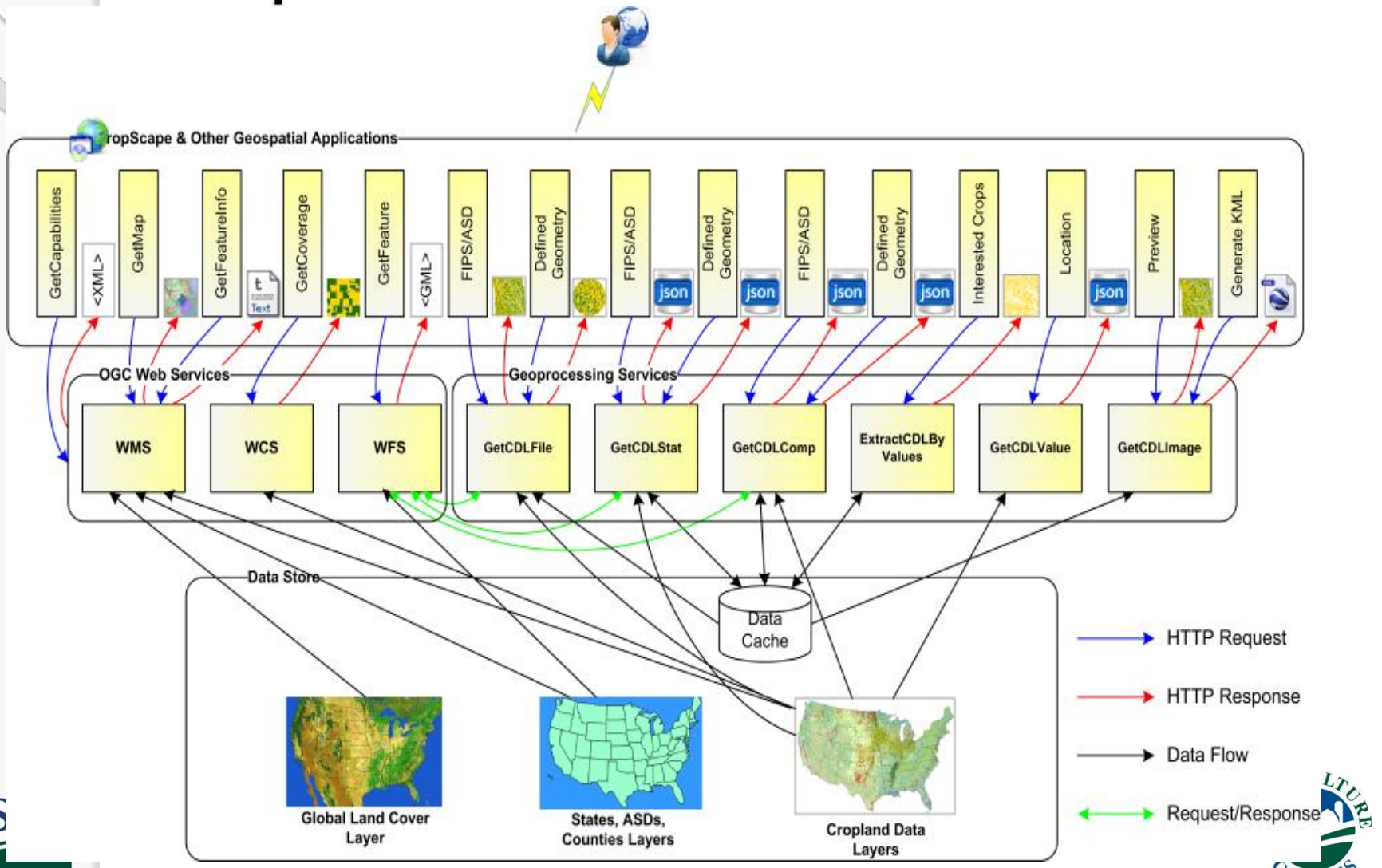
Service Oriented Architecture



- Open Architecture
- Comprehensive Standard API
- Accessible through HTTP
- Scalable, Robust, and Reusable
- Implement standard web services and geoprocessing web services

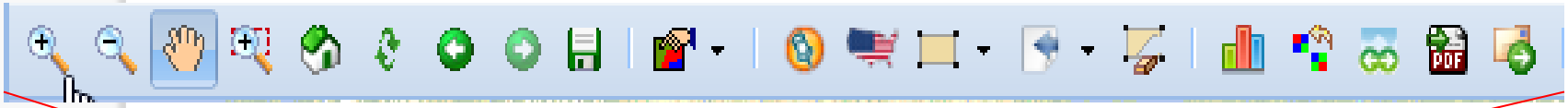
- Raster data
- Vector data
- Attribute Data

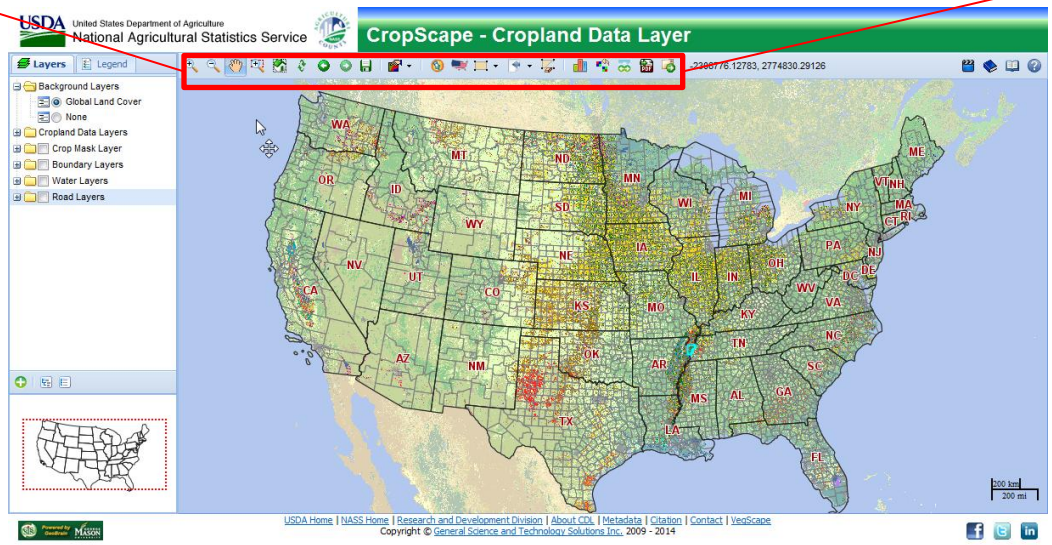
Functional Diagram Blocks Implemented in Web Services



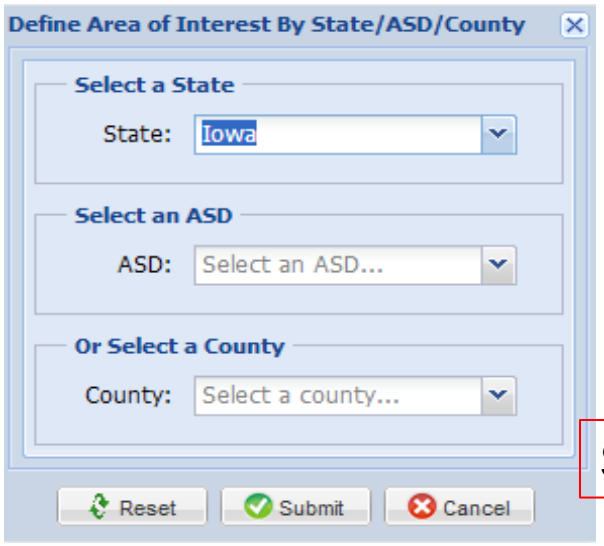
CropScape Tools

Zoom in
Zoom out
Pan
Drag zoom
Home
Refresh
Previous View
Next view
Save view
Query pixel value
Find location
Define state/county AOI
Define rectangle AOI
Import AOI
Clear AOI
Statistics analysis
Change analysis
Swipe layers
Create PDF map
Download Data

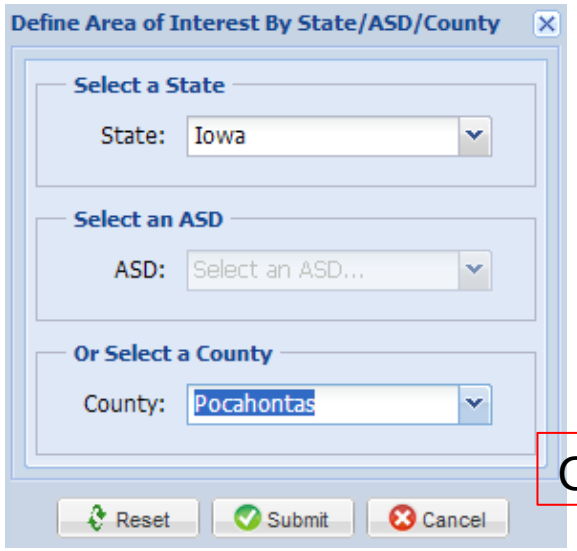




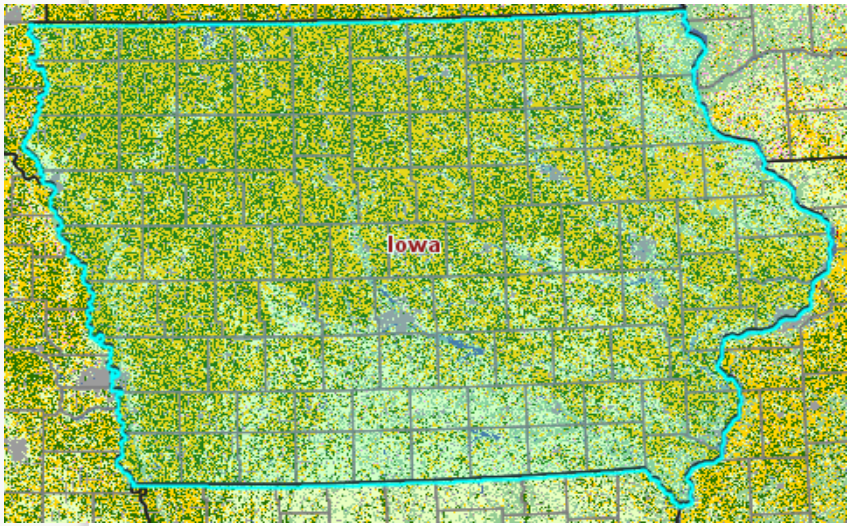
Select an Area of Interest (AOI)

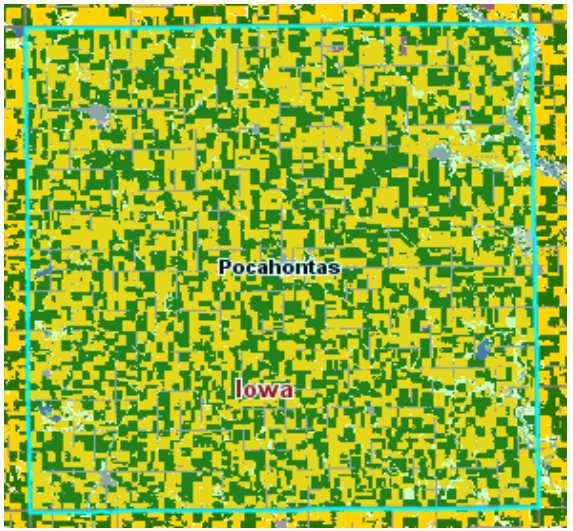


State



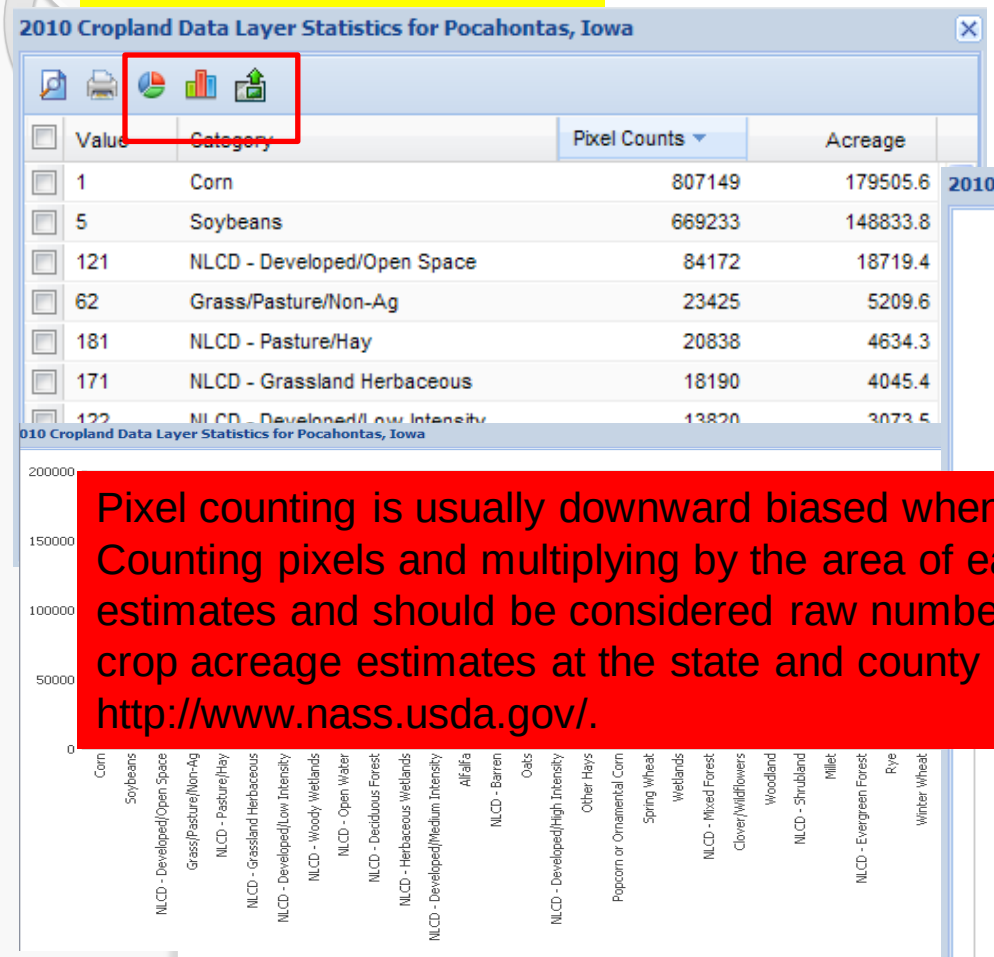
County

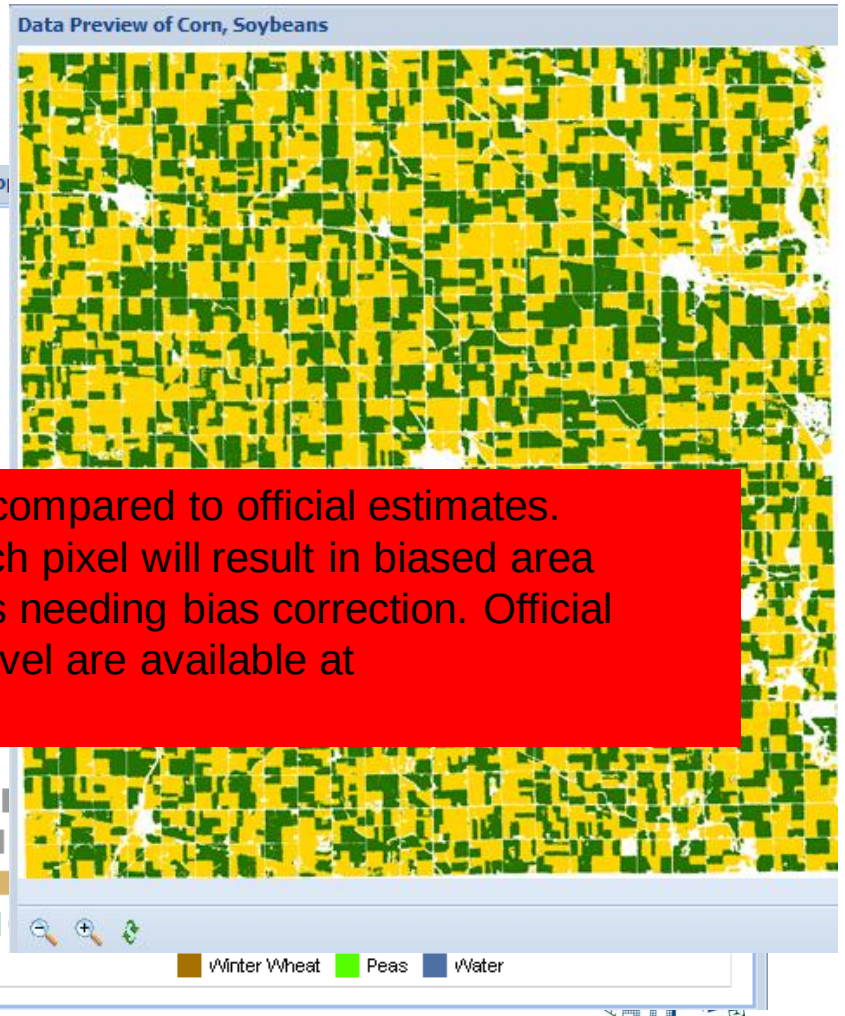




CropScape Statistics

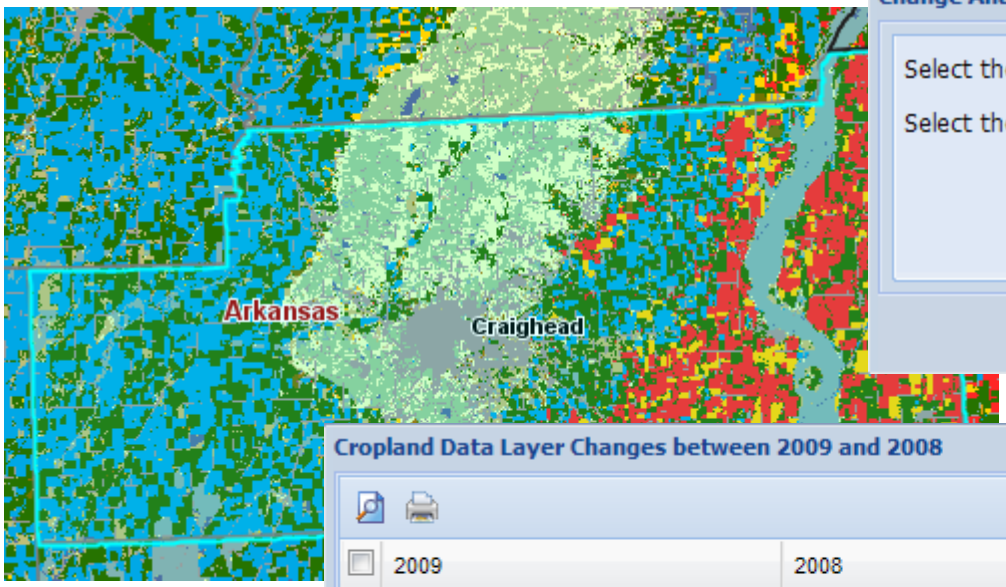
Pie/Histogram/Graphic

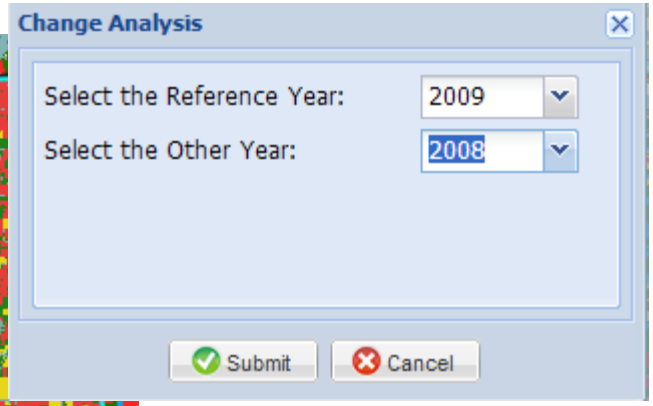




Pixel counting is usually downward biased when compared to official estimates. Counting pixels and multiplying by the area of each pixel will result in biased area estimates and should be considered raw numbers needing bias correction. Official crop acreage estimates at the state and county level are available at http://www.nass.usda.gov/.

CropScape Change Analysis



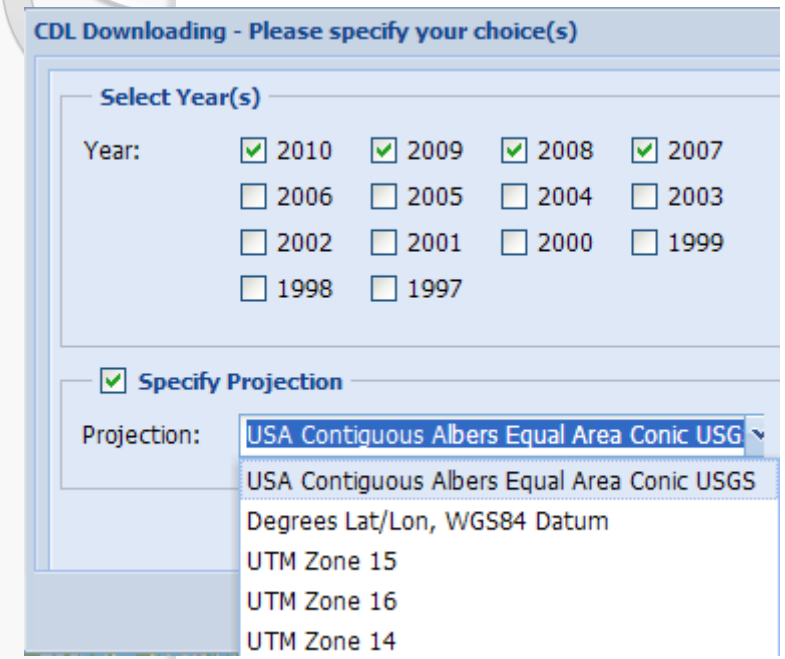


Cropland Data Layer Changes between 2009 and 2008

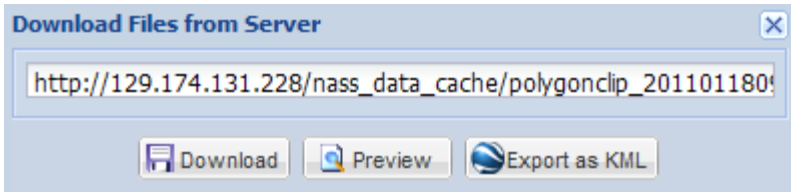
2009	2008	Pixel Counts	Acreage
Rice	Soybeans	133502	103453.6
Soybeans	Rice	129916	100674.7
Cotton	Cotton	120872	93666.3
Soybeans	Soybeans	106428	82473.4
NLCD - Developed/Open Space	NLCD - Developed/Open Space	85414	66189.2
NLCD - Woody Wetlands	NLCD - Woody Wetlands	83660	64830
NLCD - Deciduous Forest	NLCD - Deciduous Forest	73312	56811.1
Other Hays	Other Hays	61496	47654.6
Rice	Rice	39116	30311.8
		1177212	**912239.6**

www.nassgeodata.gmu/CropScape

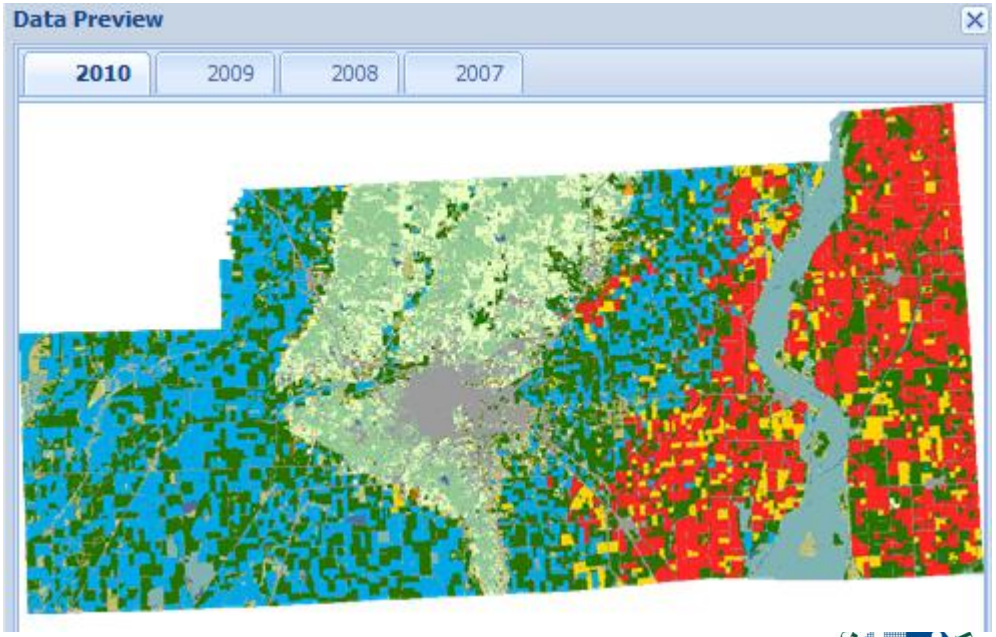
CropScape Download & Export



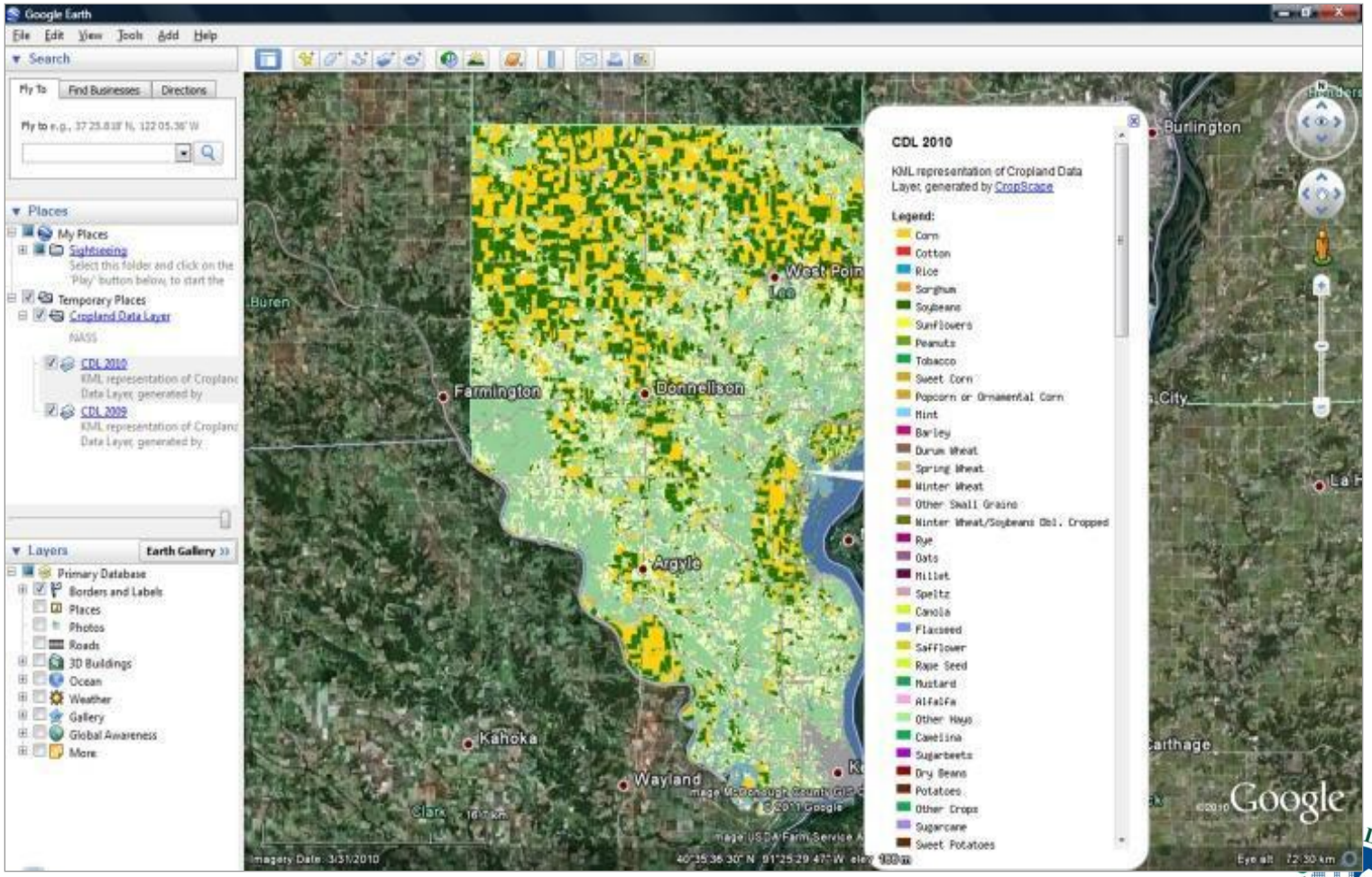
Specify Years and Projection



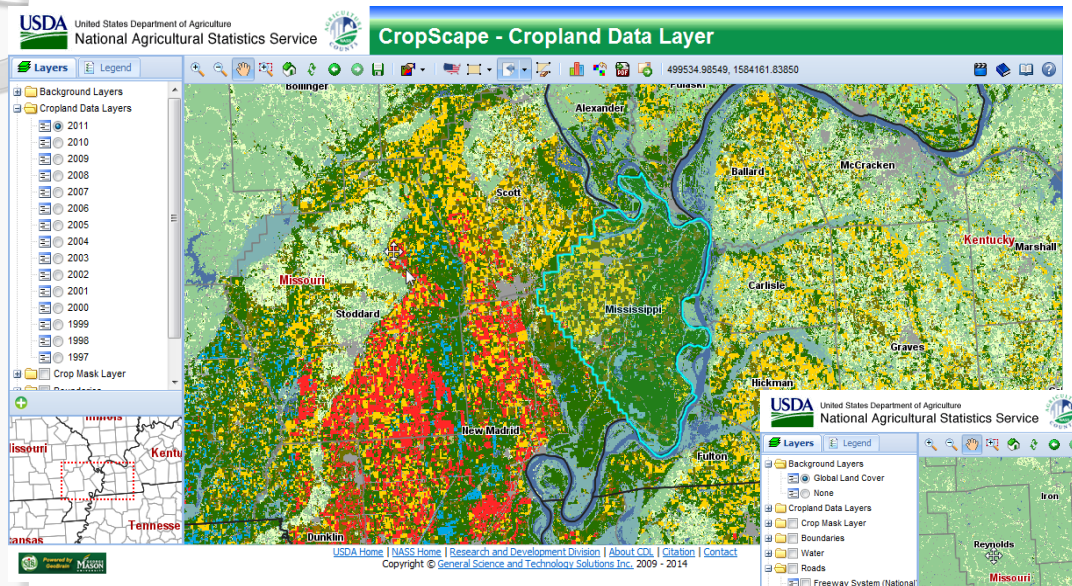
Preview and Download

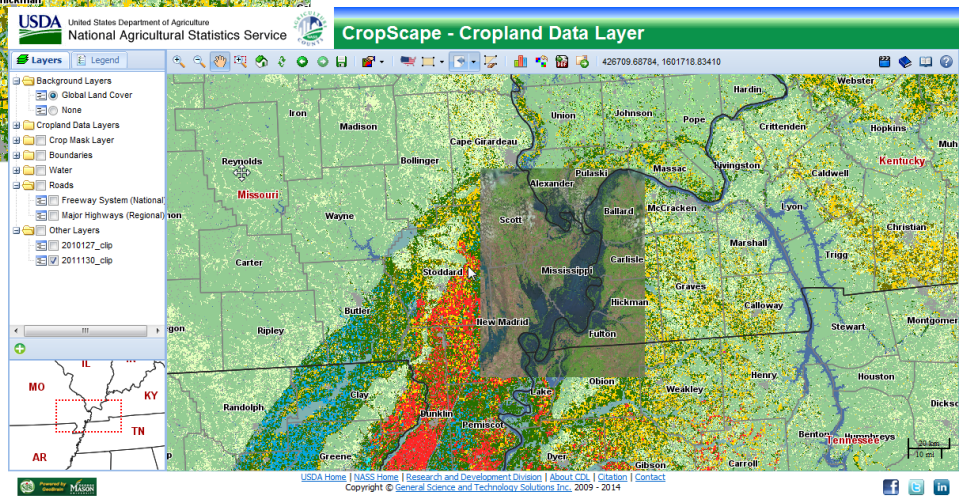


Export CDL Area of Interest to Google Earth

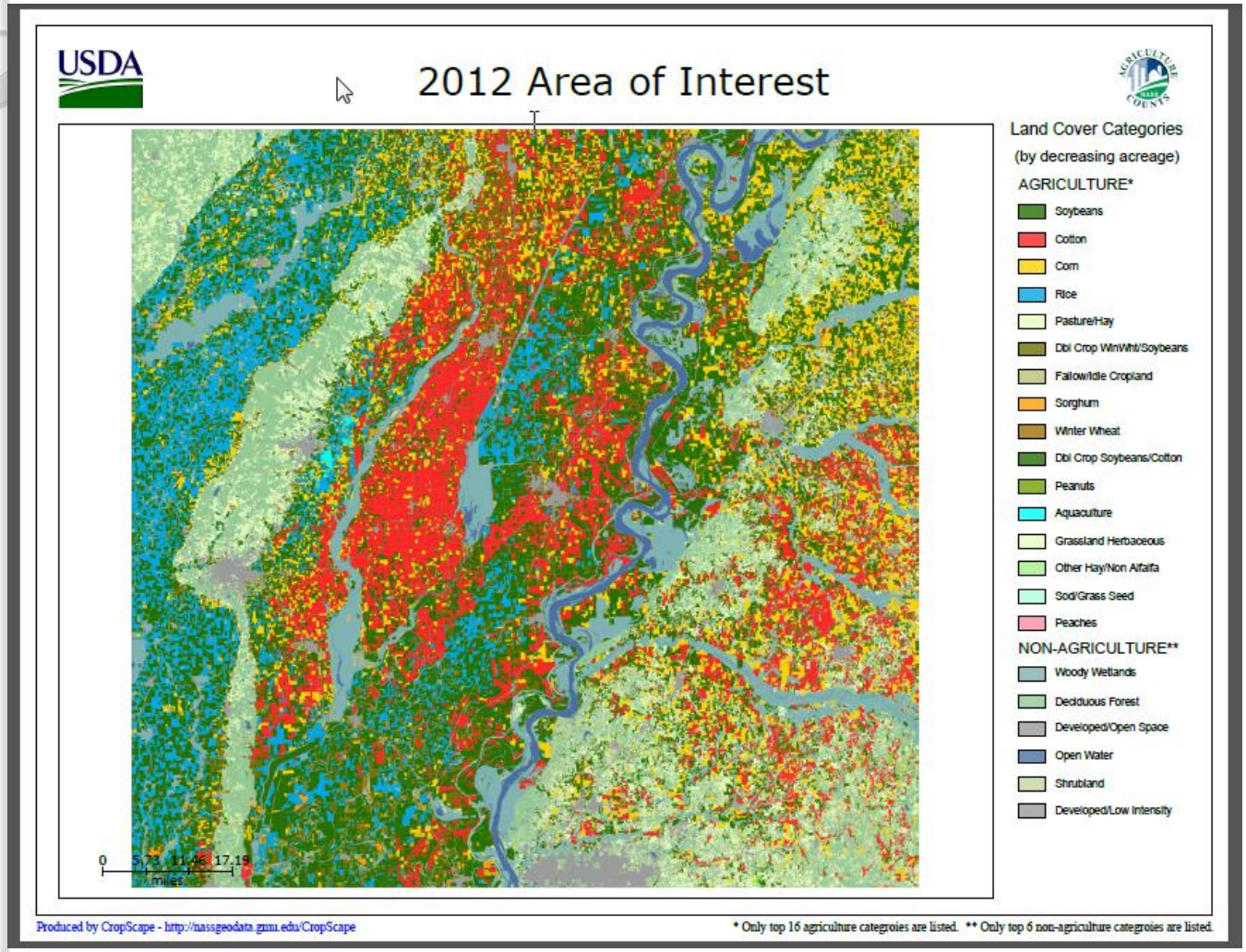


Import Area of Interest Boundary and Customer Data Layer





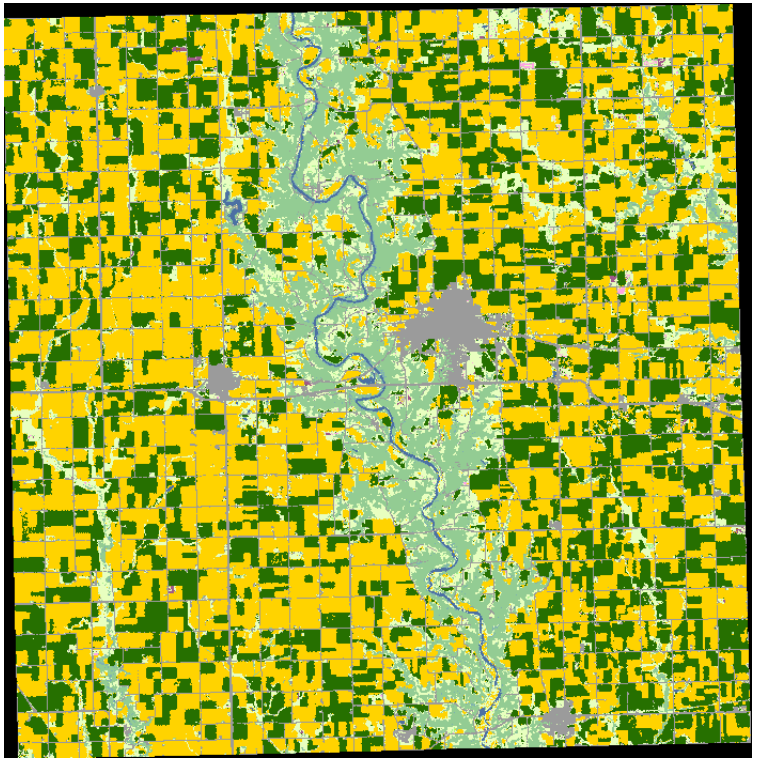
Automatically Created On-the-Fly Map in PDF



CROPSCAPE WEB SERVICE EXAMPLES

a) http://nassgeodata.gmu.edu/CropScape/GetCDL?year=2009&fips=19015 (Get CDL County data)

a) http://nassgeodata.gmu.edu/CropScape/GetCDLStatData?year=2009&fips=19015 (Get CDL County Statistics Data)



a)

Value	Category	Acreage
1	Corn	156661.3
5	Soybeans	100869.2
12	Sweet Corn	1.5
24	Winter Wheat	13.2
28	Oats	389.8
36	Alfalfa	327.8
37	Other Hays	486.7
59	Seed/Sod Grass	2.3
61	Fallow/Idle Cropland	0.8
62	Grass/Pasture/Non-Ag	3313.6
63	Woodland	13.9
87	Wetlands	41.8
111	NLCD - Open Water	2064.4
121	NCLD - Developed/Open Space	29350.2
122	NCLD - Developed/Low Intensity	3873.8
123	NCLD - Developed/Medium Intensity	708.3
124	NLCD - Developed/High Intensity	206.1
131	NLCD - Barren	93.0
141	NLCD - Deciduous Forest	34563.8
142	NLCD - Evergreen Forest	7.0
143	NLCD - Mixed Forest	0.8
152	NLCD - Shrubland	19.4
171	NLCD - Grassland Herbaceous	10842.7
181	NLCD - Pasture/Hay	21097.2
190	NLCD - Woody Wetlands	1896.2
195	NLCD - Herbaceous Wetlands	285.9

b)

CropScape Usage Statistics
(From July 1, 2014 to Oct. 14, 2015)

- Total Visits: 55,188
  - 59.1% New Visitor, 40.1% Returning Visitor
- Total users visited: 33,492 (92% from US)
- Total user countries: 113

CropScape – An Award Winning Application

- CropScape won 2014 URISA Exemplary Systems in Government (ESIG™) Award
- CropScape Application & CDL won 2011 USDA Secretary's honor awards.
- CropScape was listed as only USDA achievement in "highlights of Agency Open Government IT Accomplishments that improve citizen engagement" in the FY 2011 Report to Congress on the Implementation of The E-Government Act of 2002 (U. S. Office of Management and Budget, 2012).

Publications

- W. Han, Z. Yang, L. Di, B. Zhang, C. Peng, " Enhancing Agricultural Geospatial Data Dissemination and Applications Using Geospatial Web Services," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing,* 05/2014; 11(7).
- W. Han, Z. Yang and L. Di, "A Web Geoprocessing Service Approach for Generating On-demand Thematic Map", *Trans of American Society of Agricultural and Biological Engineers (ASABE),* 02/2014; 57(1):239-247.
- W. Han, Z. Yang, L. Di, A. L. Yagci, "CropScape: Making Cropland Data Layer data accessible and actionable in GIS education," *Journal of Geography*, 01/2014.
- W. Han, Z. Yang, L. Di, R. Mueller, "CropScape: AWebservicebased application for exploring and disseminating US conterminous geospatial cropland data products for decision support," *Computers and Electronics in Agriculture,* Volume 84, June 2012, Pages 111–123

Question?

THANK YOU!

CONTACT: ZHENGWEI.YANG@NASS.USDA.GOV

http://www.nassgeodata.gmu/CropScape