CROPLAND DATA LAYER
Mapping US Agriculture using Multi-temporal DMCii Satellite Imagery & Farm Survey Data

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United States Department of Agriculture
National Agricultural Statistics Service
United States Department of Agriculture

Cropland Data Layer (CDL)

National agriculture land cover image product
Available 2008 – 2012, +100 crop-specific categories

~ 9 billion 30m pixels!

Major Crops
- Corn
- Winter Wheat
- Soybeans
- Rice
- Cotton
- Alfalfa
Cropland Data Layer Inputs/Processes/Outputs

Satellite Imagery – Deimos & UK2

Ground Truth: Farm Service Agency Common Land Units

2006 NLCD & Derivative products

CLASSIFICATION

CROP ACREAGE ESTIMATES

LINEAR REGRESSION

United States Department of Agriculture

Cropland Data Layer Inputs/Processes/Outputs

2006 NLCD & Derivative products

Ground Truth: Farm Service Agency Common Land Units

Satellite Imagery – Deimos & UK2

Major Land Cover Categories (by decreasing acreage)

Agriculture
- Pasture/Grass
- Corn
- Soybeans
- All Wheat
- Other Hay
- Fallow Cropland
- Vegetable/Fruits/Nuts
- Other Small Grains
- Rice

Non-Agriculture
- Woodland
- Shrubland
- Urban/Developed
- Wetlands
- Water

Source: US DNASS

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Deimos-1/UK-DMC-2 Satellite Imagery

**Default**

*3 Bands – Green, Red, NIR*

*Resolution – 22 meters*

*CONUS coverage every 15 days*

**2011 - 2013**

*Bands for monitoring vegetation*

*Upscaled to 30 meters*

*Multi-temporal images May – Oct.*

**Windowing:**

*Multiple acquisitions per orbit*

**Full Swath**

*maximum image size: 600 x 600 Km*

**Along track**

*maximum 16 tiles (1280 Km)*
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
ArcGIS/SAS Geoprocessing Steps: Models & Scripts

1. Buffer CLU polygons inwards to avoid mixed pixels
2. Use SAS to join CLUs shapefile to FSA 578 Ag Data
3. Remove CLUs with no crop or multiple crop data
4. Assign CLUs to training and validation data sets
5. Convert both CLU data sets from vector to raster

**CA FSA CLUs & 578 Data**
Processing a Cropland Data Layer

Satellite Imagery
Ancillary Data
MODIS Data
Ground Truth

Sampling

ERDAS IMAGINE 2011

See5

Decision Tree
Classification

Iowa Cropland Data Layer

Land Cover Categories

- Agriculture
  - Corn
  - Soybeans
  - Pasture/Grass
  - Alfalfa
  - Oats
  - Winter Wheat
  - Spring Wheat
  - Drip/Irrigated Grass
  - Barley
  - Clover/White Flowers
  - Other Crops
  - Fall and Winter Cropland
  - Durum Wheat
  - Sugarcane
  - Ryef
  - Dry Beans
  - Winter Wheat/soy, etc.
- Non-Agriculture
  - Urban/Covered
  - Woodland
  - Wetlands
  - Water
  - Barren
  - Shrubland
Linear Regression for Acreage Estimates
Comparing June Agricultural Survey to Cropland Data Layer

June Ag Survey – Interview

Crop acreage estimates are sent to the Agricultural Statistics Board as an indication for USDA official acreage totals.

Regression Variables:

<table>
<thead>
<tr>
<th>Dependent (Y)</th>
<th>Independent (X)</th>
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</thead>
<tbody>
<tr>
<td>Enumerated JAS Segments</td>
<td>CDL Classified Acres</td>
</tr>
<tr>
<td>Soybeans</td>
<td>227 acres</td>
</tr>
<tr>
<td>Wheat</td>
<td>337 acres</td>
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</tbody>
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\[ R^2 \text{ for regression} \]
- Aug – 0.948
- Sep – 0.950
- Oct – 0.957
CropScape – CDL Website
http://nassgeodata.gmu.edu/CropScape