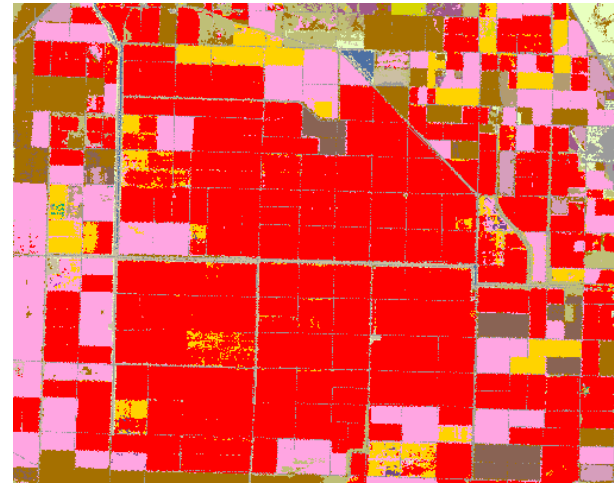


CROPLAND DATA LAYER

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

RAW



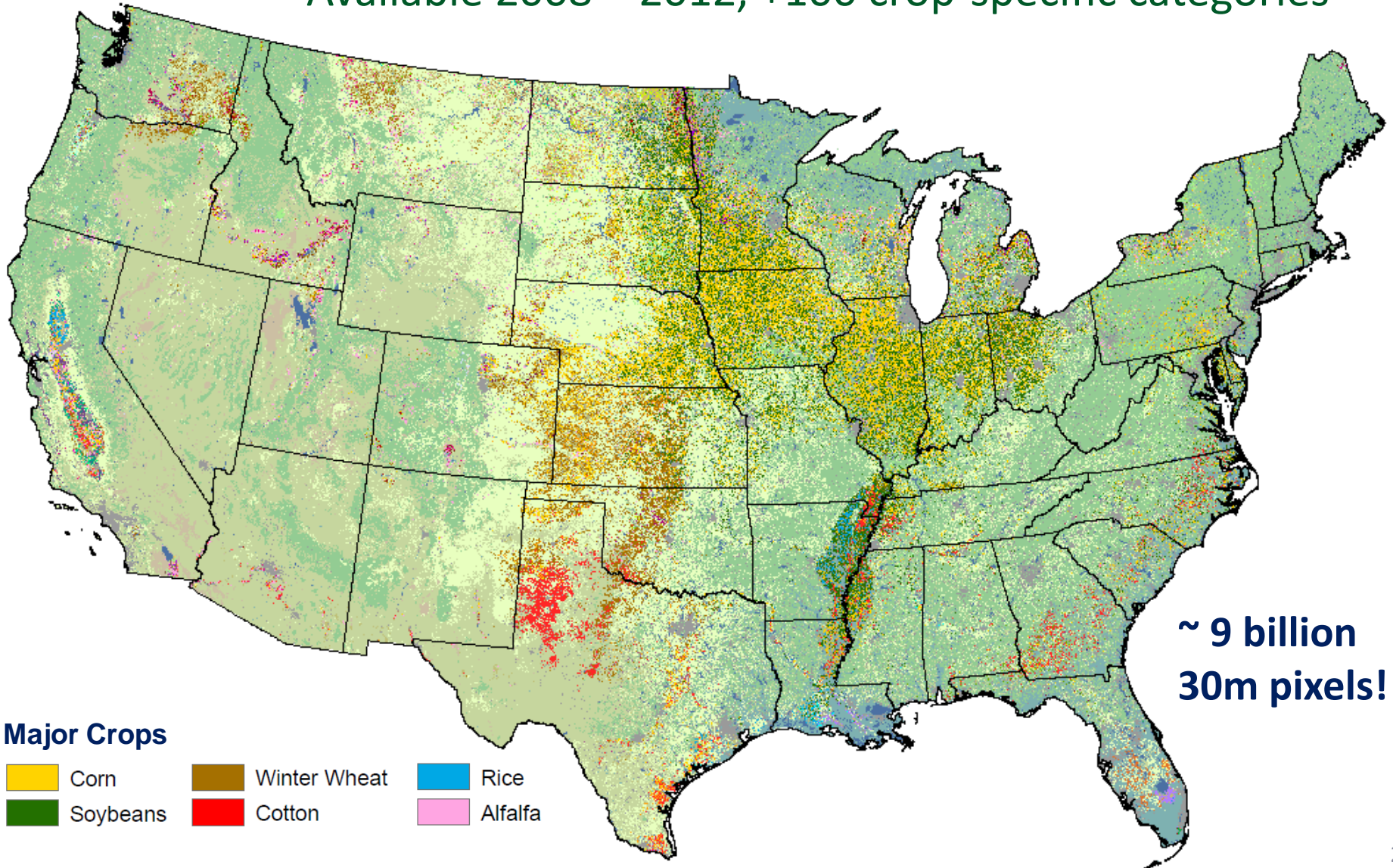
CDL

Audra Zakzeski & Lee Ebinger

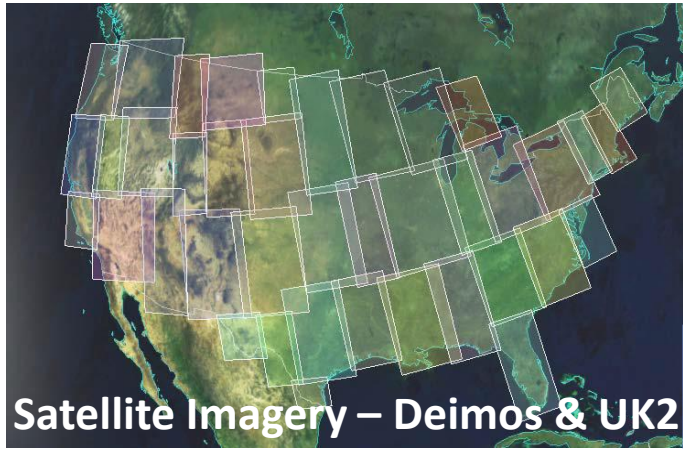
United States Department of Agriculture
National Agricultural Statistics Service

Cropland Data Layer (CDL)

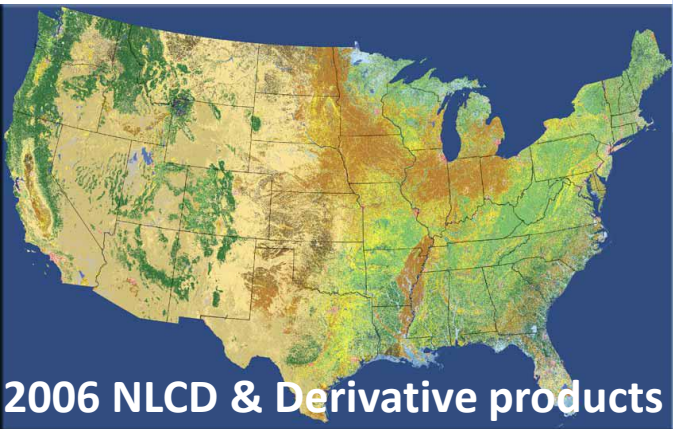
National agriculture land cover image product
Available 2008 – 2012, +100 crop-specific categories



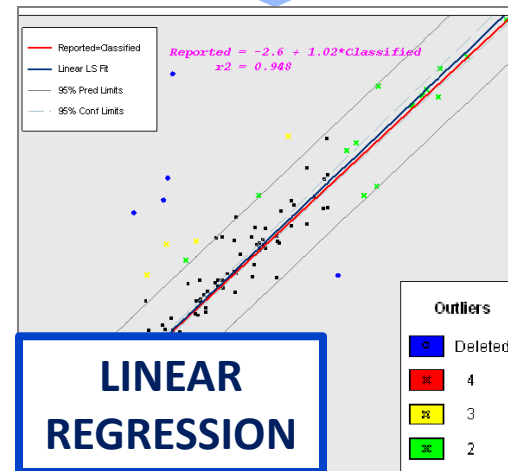
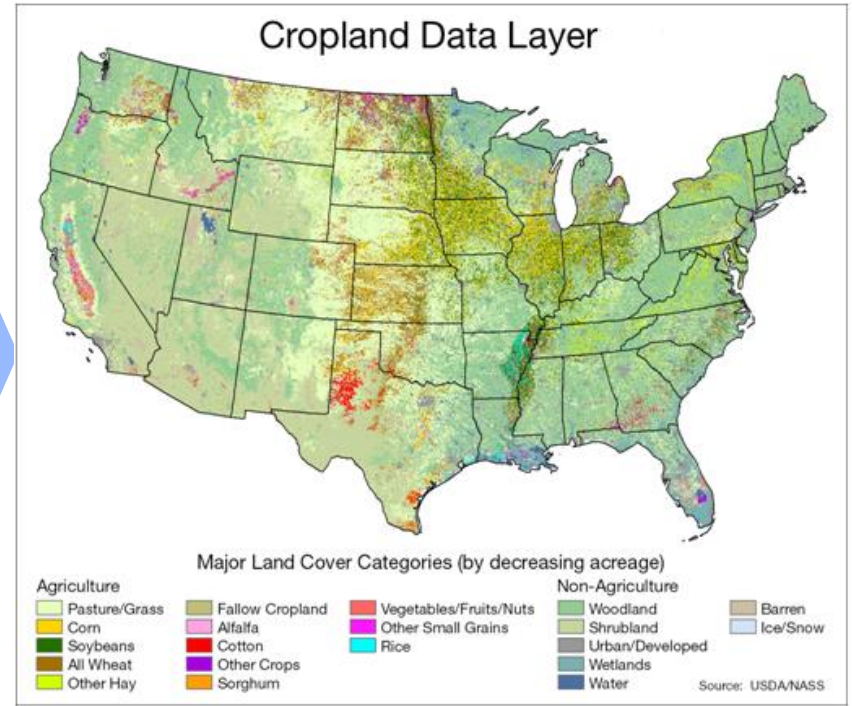
Cropland Data Layer Inputs/Processes/Outputs



Ground Truth:
Farm Service
Agency
Common
Land Units



C
L
A
S
S
I
F
I
C
A
T
I
O
N



CROP
ACREAGE
ESTIMATES

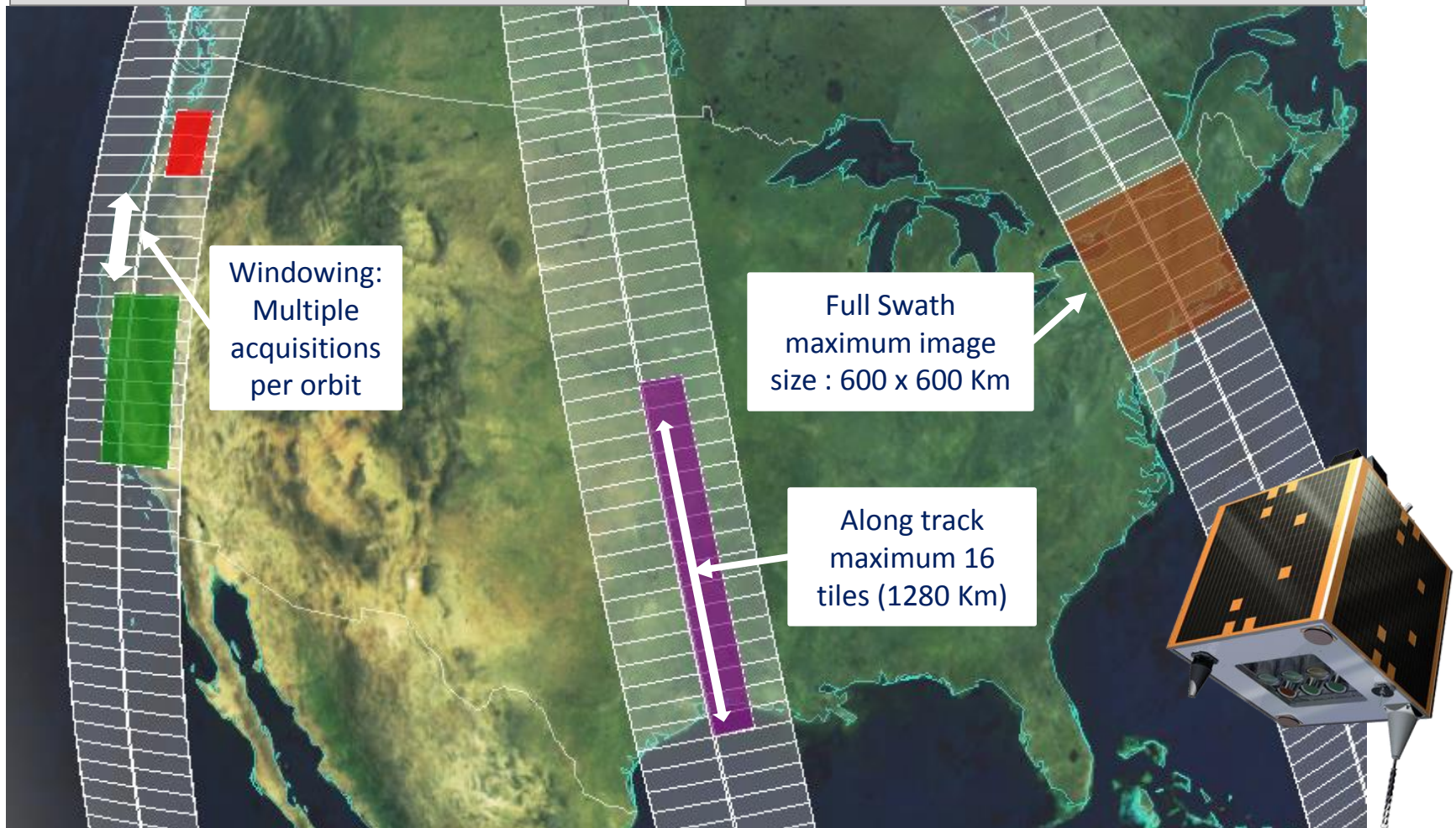
Deimos-1/UK-DMC-2 Satellite Imagery

Default

*3 Bands – Green, Red, NIR
Resolution – 22 meters
CONUS coverage every 15 days*

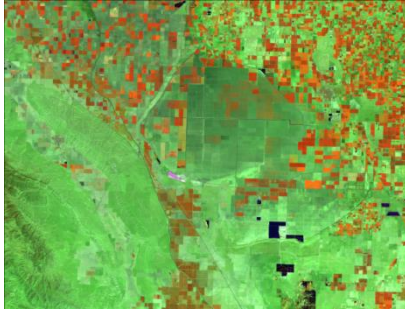
2011 - 2013

*Bands for monitoring vegetation
Upscaled to 30 meters
Multi-temporal images May – Oct.*

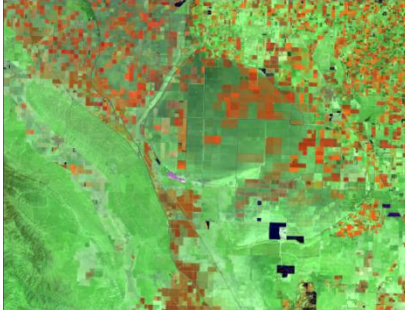


Growing Season Satellite Images

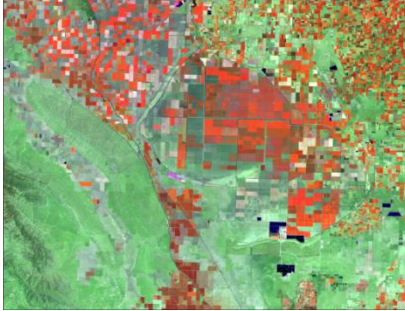
April



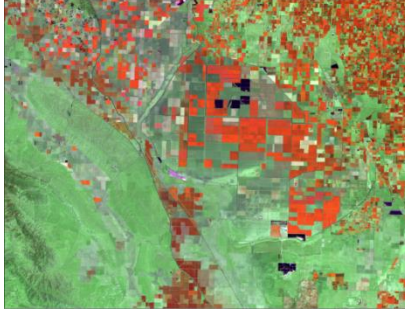
May



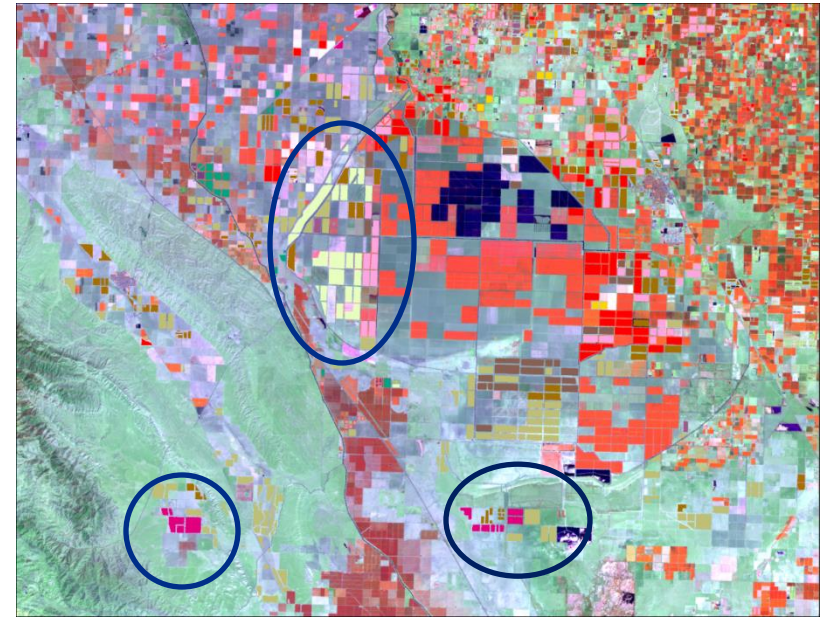
June



July



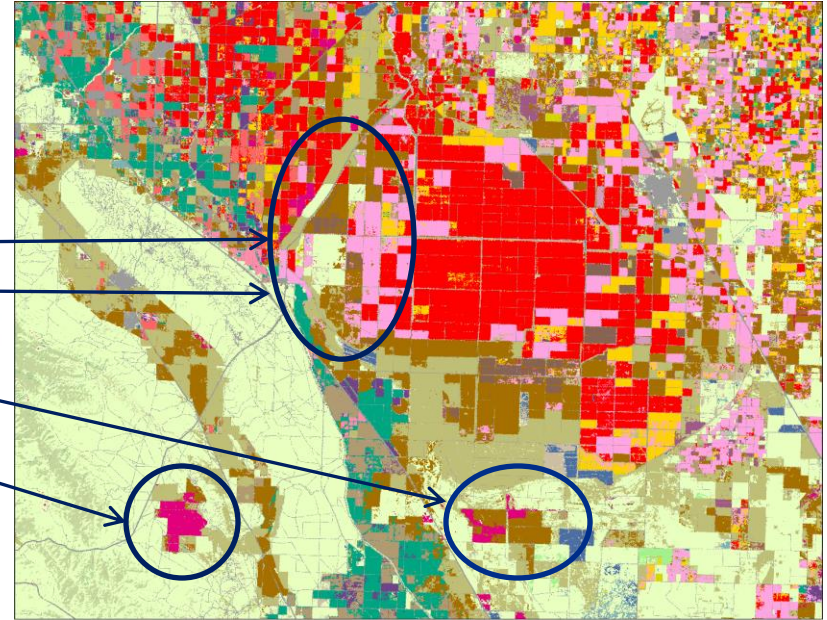
August
with farm data



Final CDL

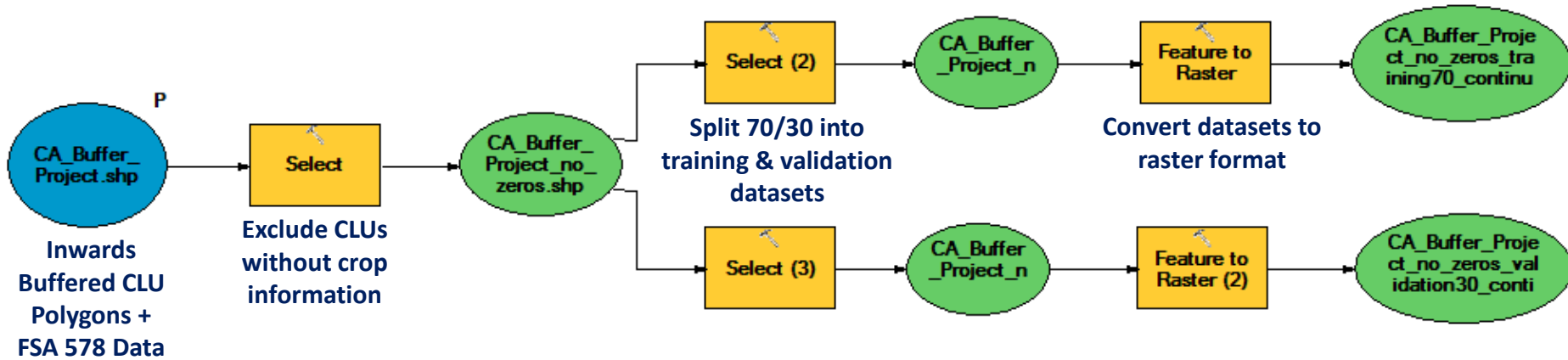
Land Cover Categories

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



Geoprocessing Ground Truth

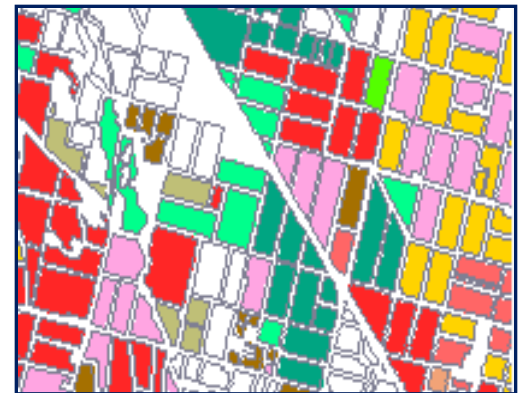
Farm Service Agency (FSA) 578 Ag Survey Data Linked to Common Land Unit (CLU) Polygons



ArcGIS/SAS Geoprocessing Steps: Models & Scripts

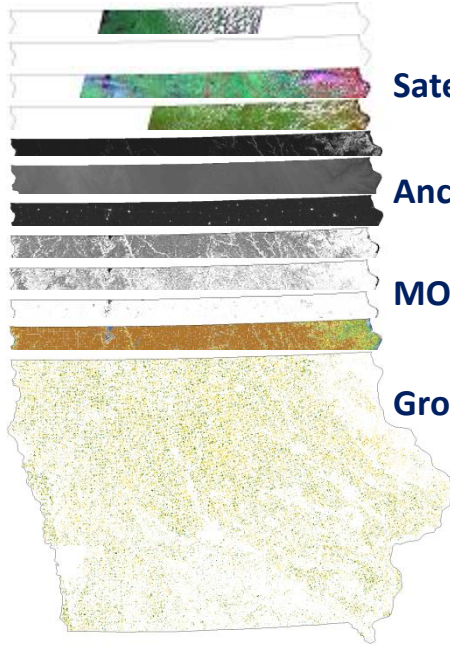
1. Buffer CLU polygons inwards to avoid mixed pixels
2. Use SAS to join CLUs shapefile to FSA 578 Ag Data
3. Remove CLUs with no crop or multiple crop data
4. Assign CLUs to training and validation data sets
5. Convert both CLU data sets from vector to raster

CA FSA CLUs & 578 Data



Cotton
 Pistachio
 Corn
 Almonds

Processing a Cropland Data Layer



Satellite Imagery

Ancillary Data

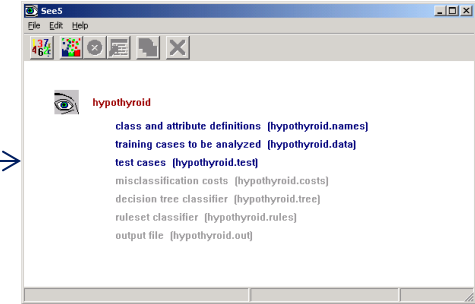
MODIS Data

Ground Truth

Sampling



See5



Decision Tree

```

nd46 > 01
...band46 > 171
...band46 > 481
...band46 > 791
...band46 > 561 123 (1224/104)
band46 > 561
...band46 > 702 123 (7/2)
band46 > 702
...band46 > 101
...band46 > 4581
...band46 > 91 122 (102/30)
band46 > 4581
...band46 > 481 123 (93/40)
band46 > 481
...band46 > 416 122 (68/32)
band46 > 416 123 (8/2)
band46 > 101
...band46 > 140 123 (182/156)
band46 > 140 122 (24/8)
band46 > 101
...band46 > 187 1 (2/1)
band46 > 187
...band46 > 211 123 (6/2)
band46 > 211 122 (2/8)
band46 > 761
band46 > 121 123 (4)
band46 > 121
...band46 > 81
...band46 > 191 124 (318/133)
band46 > 191 123 (2/5)
band46 > 81
...band46 > 131 124 (149/1)
band46 > 131
...band46 > 107
...band46 > 4701 124 (22/3)
band46 > 4701 123 (4)
...band46 > 81
...band46 > 121 124 (149/14)
band46 > 121 123 (3)
band46 > 81
...band46 > 404 124 (208/2)
band46 > 404
...band46 > 181 123 (1)
band46 > 181 124 (12)
band46 > 81
...band46 > 91
...band46 > 92 123 (4/2)
band46 > 91
...band46 > 134 122 (8/3)
band46 > 134
...band46 > 665 123 (10/22)
band46 > 665 122 (5/5)
band46 > 91
...band46 > 81 123 (331/396)
band46 > 81
...band46 > 140
...band46 > 44 122 (1045/149)
band46 > 44
...band46 > 81 123 (10/2)
band46 > 81
band46 > 81

```

Classification



Iowa Cropland Data Layer

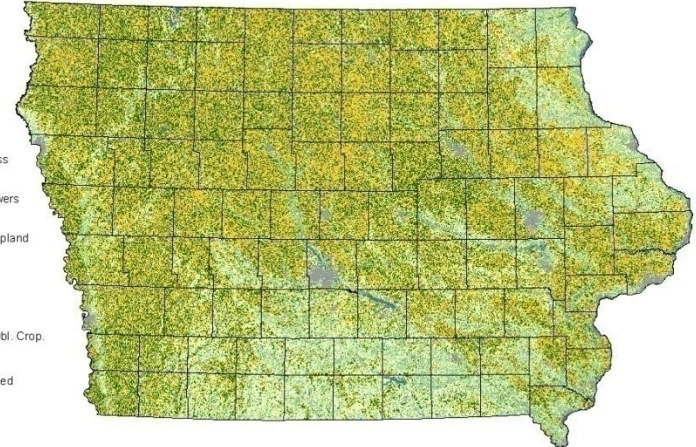
Land Cover Categories
(Ordered by Decreasing Acreage)

Agriculture

- Corn
- Soybeans
- Pasture/Grass
- Alfalfa
- Oats
- Winter Wheat
- Spring Wheat
- Seed/Sod Grass
- Barley
- Clover/Mildflowers
- 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



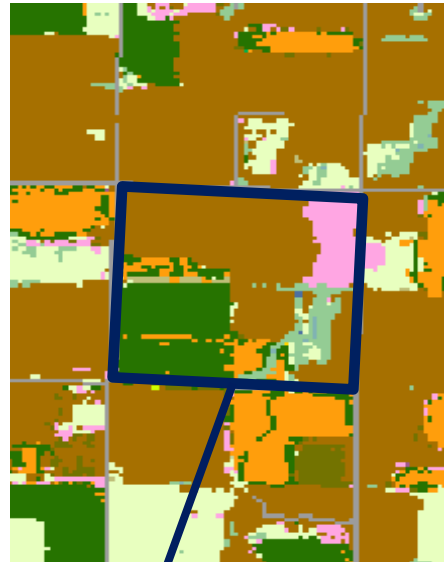
Linear Regression for Acreage Estimates

Comparing June Agricultural Survey to Cropland Data Layer

June Ag Survey – Interview

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
1. Total acres in field	020	020	020	020
2. Crop or land use. [Specify]				
3. Occupied tenement or dwelling	R43			
4. Waste, unoccupied dwellings, buildings and structures, roads, ditches, etc.	---	---	---	---
5. Woodland	031	031	031	031
6. Pasture	Permanent (not in operation)	042	042	042
	Cropland (used only for pasture)	056	056	056
7. Idle cropland - idle all during 2000	067	067	067	067
8. Two crops planted in this field or two uses of the same crop. [Specify second crop or use]	Yes No	Yes No	Yes No	Yes No
	Acres	044	044	044
10. Acres left to be planted	010	010	010	010
11. Acres irrigated and to be irrigated [If double-cropped, include acreage of each crop irrigated]	020	020	020	020
16. Winter Wheat (include cover crop)	Planted	540	540	540
	For grain or seed	541	541	541

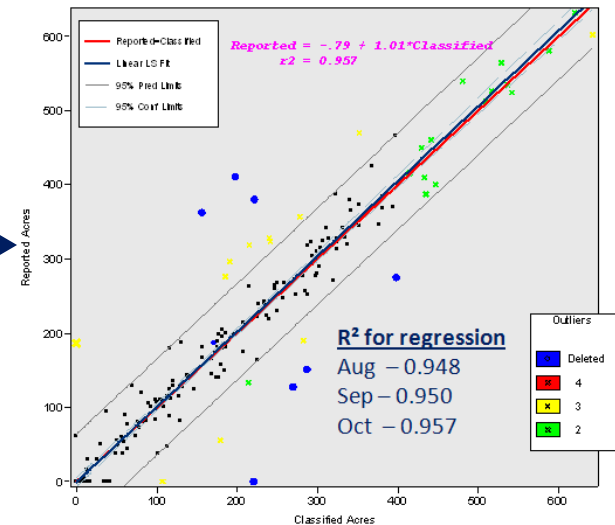
Cropland Data Layer



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

Dependent (Y) Independent(X)

Regression Variables:	Enumerated JAS Segments	CDL Classified Acres
Soybeans	227 acres	273 acres
Wheat	337 acres	541 acres



CropScape – CDL Website

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

