Crop Sequence Boundaries:
A New Publicly Available Geospatial Dataset to Support Research and Decision Making

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What are Crop Sequence Boundaries (CSBs)?

CSBs represent **field-level boundaries** over a **set time frame** in a **homogenously** cropped area

1. Automatically delineated fields

2. Physical boundaries and boundaries between different crop types

3. Coverage is complete at the national-scale (contiguous US)

4. Each CSB polygon contains 8 years of cropping history

USDA

United States Department of Agriculture
National Agricultural Statistics Service
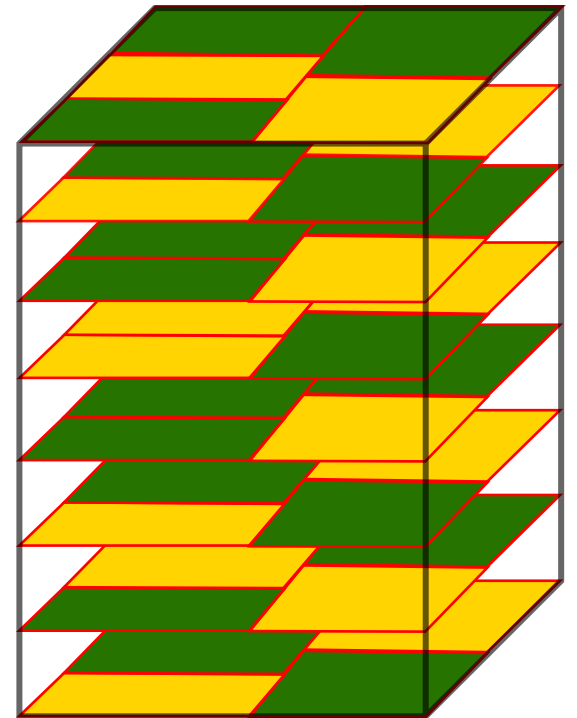
Methodology overview

Geospatial-processing steps for creating polygons from the Cropland Data Layer (CDL):

Google Earth Engine

Google Earth Engine

Filter/clean

Stack years

Process to polygons

High performance cloud computing

Esri ArcGIS Pro

Esri ArcGIS Pro

USDA

FSA Coverage Evaluation

FSA Form 578 data and Common Land Units are administrative data reported by farmers to FSA to participate in USDA programs. Data include crop types, locations, and acreages.

- Geospatial-based analysis to measure coverage of FSA data

- CSBs play significant role in automatically identifying and estimating cropland acreage that is not covered by FSA data

- Used as input to calculate level of FSA under-coverage in terms of land area
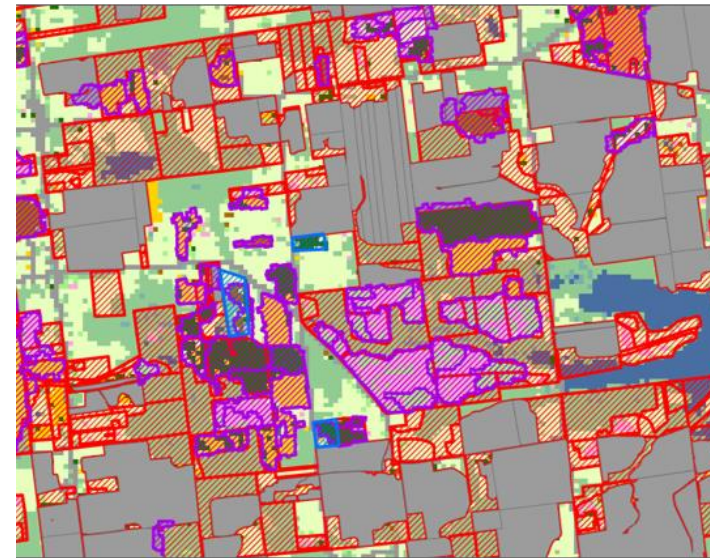
Polygon Data

- ▪ Dec CLUs linked with FSA Data
- ▨ Dec CLUs not linked with FSA Data
- ▨ **Non-overlapping CSB**
- ▨ Non-overlapping Digitized Polygons

Crop Categories (CDL)

- ▪ Corn
- ▪ Soybeans

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Non-FSA Field Linkage to NASS List Frame

Process to build NASS list frame in areas where FSA data is missing:

- Identify potential cropland that is not on FSA registers

- Capture their geospatial boundaries with CSBs

- Use county parcel data to get owner information

- Perform record linkage

- National Agricultural Classification Survey (NACS)

- Add to frame (dependent on NACS outcome)

June Area Survey (JAS) Automatic Imputation

NASS's JAS methods require missing tract-level data to be imputed

- CSBs and their crop planting history data are used as inputs for machine learning (ML) models to predict in-season planting before the growing season

- ML predictions are summarized at the JAS tract level using digital tract boundaries
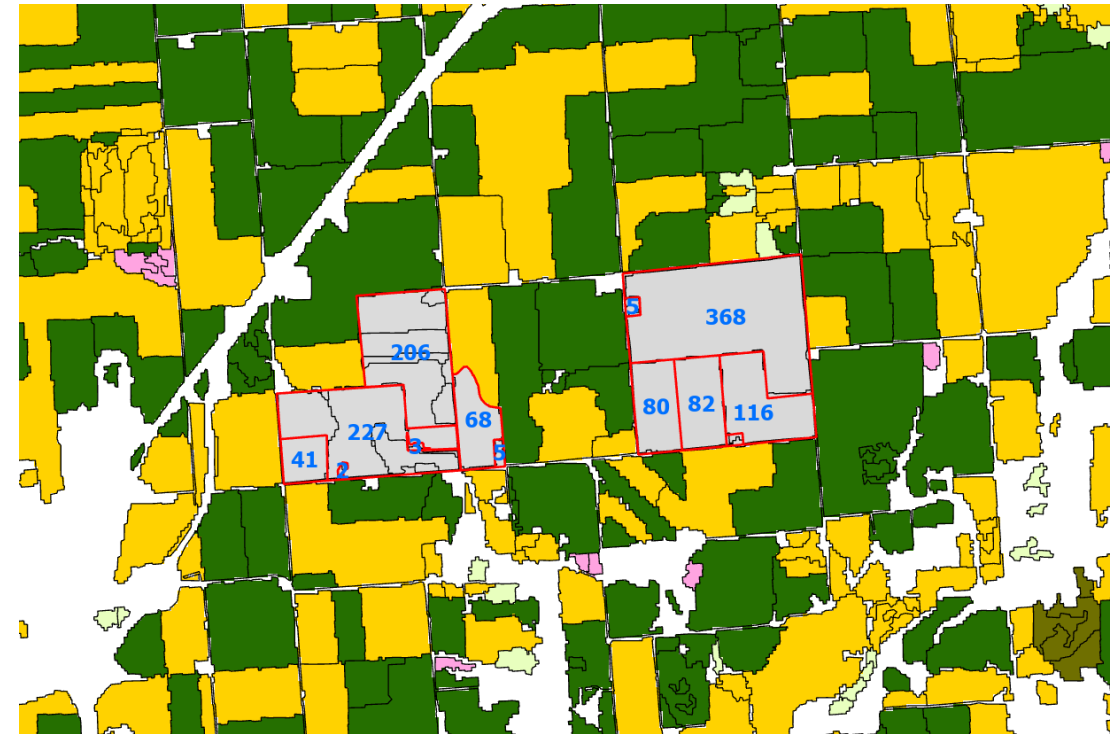
CSB Data Access

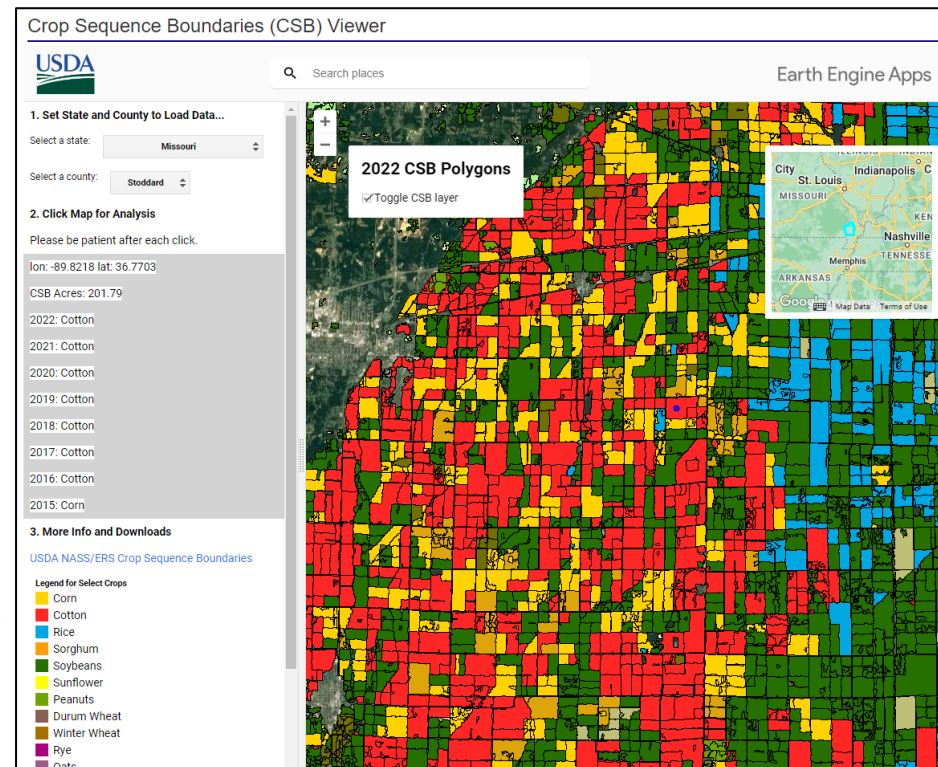**Link - https://www.nass.usda.gov/Research_and_Science/Crop-Sequence-Boundaries/**

- Interactive map to explore data
- Geodatabase files are available for download
- Algorithm available on github

Datasets:

Eight-year time frames from 2008 to present.

- Download the Crop Sequence Boundaries (CSB) 2022 dataset
- Download the Crop Sequence Boundaries (CSB) 2021 dataset
- Download the Crop Sequence Boundaries (CSB) 2020 dataset
- Download the Crop Sequence Boundaries (CSB) 2019 dataset
- Download the Crop Sequence Boundaries (CSB) 2018 dataset
- Download the Crop Sequence Boundaries (CSB) 2017 dataset
- Download the Crop Sequence Boundaries (CSB) 2016 dataset
- Download the Crop Sequence Boundaries (CSB) 2015 dataset

Example of CSB interactive map

Crop Sequence Boundaries (CSB) Viewer

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Earth Engine Apps

1. Set State and County to Load Data...

Select a state: Missouri

Select a county: Stoddard

2. Click Map for Analysis

Please be patient after each click.

lon: -89.8218 lat: 36.7703

CSB Acres: 201.79

2022: Cotton
2021: Cotton
2020: Cotton
2019: Cotton
2018: Cotton
2017: Cotton
2016: Cotton
2015: Corn

3. More Info and Downloads

USDA NASS/ERS Crop Sequence Boundaries

Legend for Select Crops
- Corn
- Cotton
- Rice
- Sorghum
- Soybeans
- Sunflower
- Peanuts
- Durum Wheat
- Winter Wheat
- Rye
- Oats

2022 CSB Polygons
☑ Toggle CSB layer

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Thank you!

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