A Sneak Peak at Conservation Farming Practices

Identifying Cover Crops From Space

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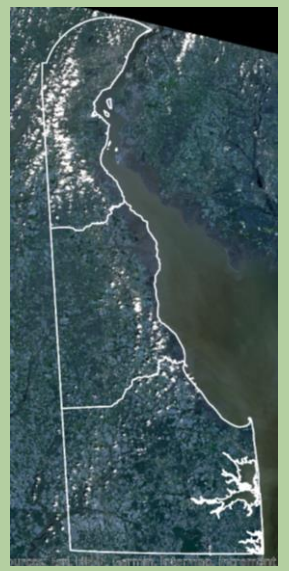
Objectives

Develop a method to identify cover crops using satellite imagery over the past decade, and then determine the persistence of this farming practice after initial adoption. Cover crops are short-term vegetation which are grown when the field would otherwise be bare and protect soil from erosion and nutrient loss.

Data

- DNREC Dashboard Survey (ground truth, training data)
- Cloud free Landsat 8 Operational Land Imager imagery (Nov-Dec, Mar-Apr)

Survey route with cover crop locations

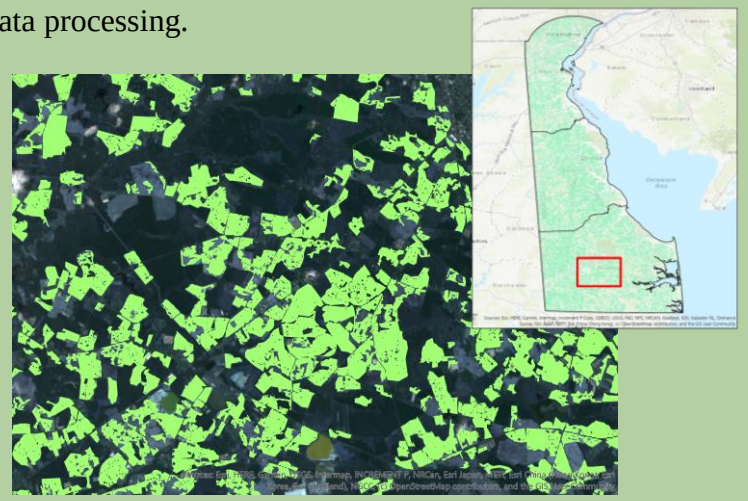


Landsat 8 Apr 28, 2018

Methods

1. Process survey data to identify only those farm fields with cover crops
2. Determine most appropriate Landsat OLI bands and time period to detect cover crops
    a. Create spectral signature graphs of survey locations
    b. Create time series NDVI graphs of survey locations
3. Run classification
4. Conduct accuracy assessment

Google Earth Engine and ArcGIS Pro were both used for data processing.



Identified cover crop locations in 2018 from classification

Analysis & Conclusions

- Survey data was collected by driving by and observing the presence of cover crops on DE farms in 2014-2018.
- Survey data served as the training and validation for the classification of the Landsat 8 OLI imagery to detect cover crops.
- Imagery for Nov to Dec 2017 and Mar to Apr 2018 and individual Landsat bands 3 (green), 4 (red), 5 (near infrared), and 6 (mid infrared) and normalized difference vegetation index (NDVI) were selected as input to the classification method.
- The validation using the survey data results in 84.8% overall accuracy. This high accuracy gives us confidence in the classification method and our next steps to classify previous years where survey data exist.
- The success of this classification provides us the ability to also determine the persistence of usage over the years and let us know if farmers continue utilization after initial adoption.

Acknowledgements

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