**NASA DEVELOP National Program**

****Wise County Clerk of Court’s Office

**Fall 2014**

**Virginia Agriculture I**

*Utilizing NASA Earth Observations to Monitor Vineyards in Virginia*

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**Applied Sciences National Application Addressed:**

Agriculture

**Study Area:**

Virginia

**Study Period:**

January 2013 – September 2014

**Partners/Collaborators**

Virginia Wine Board: Amy Ciarametaro

**80-100 Word Blurb**

Virginia is one of the largest wine producing states in the United States. However, the extent of each individual vineyard is not available. By using NASA Earth observations and high resolution imagery from ArcGIS online, the team digitized all the vineyards throughout the commonwealth. The results can help the Virginia Department of Agriculture to continuously monitor around 200 vineyards in the region. The project will also facilitate the Virginia Wine Board in their efforts to explore the possibilities of extension and economic development.

**Community Concerns**

* Vineyards are identified by their street address and not by their area, meaning that the state has no idea how much of a property is dedicated to grape-growing.
* Current monitoring of vineyards requires land surveys and reports from owners which are usually problematic and time consuming.

**Current Management Practices & Policies**

The Virginia Wine Board uses land surveys, self-reports from owners, and reports from the counties to monitor the expansion and foliage of vineyards. Continuous monitoring of vineyards through NASA Earth observations can help farmers, wineries, financial leaders and land-use planners to determine grape production as well as to show the correlation between the land area and the economic output of the vineyards.

**Abstract**

The Virginia Wine Board was created by Virginia General Assembly in 1984 as part of Virginia's Department of Agriculture and Consumer Services. The Virginia Wine Board has promoted the interests of vineyards and wineries in the Commonwealth through research, education and marketing. In that spirit, the Wine Board partnered with Wise DEVELOP to map the extension of Virginia vineyards.

Vineyard extent was measured using data from Landsat 8 Operational Land Imager (OLI). Boosted Regression Analysis was utilized to classify the surface reflectance data. Accuracy assessment was conducted using aerial images obtained from local and state government. This project also utilized cropland data from United States Department of Agriculture. Cropland data from 2008 to 2013 were stacked to identify the dominant type. The results of this project informed the Virginia Wine Board of the extent of the vineyards in their efforts to explore the possibilities of extension.

**Decision Support Tools**

* Vineyard extent map- A detailed shapefile showing all the vineyards in the Commonwealth of Virginia

**Benefit to End-User:**

* Continuous monitoring of vineyards in Virginia will allow the Virginia Wine Board to accurately track the expansion and foliage of vineyards.

**Earth Observations & Parameters**

Landsat 8, Operational Land Imager (OLI) – Vegetation analysis

**Ancillary Datasets Utilized**

Virginia Wine Board - Virginia Wineries Addresses 2014

National Agricultural Statistics Service, United States Department of Agriculture (USDA) - Cropland data layer 2013

**Software Utilized**

ArcGIS – Raster manipulation/analysis, image enhancement & map creation

ERDAS Imagine – Land classification of Landsat imagery