

Assignment #1:

2019 Seasonal Land Cover Changes in Kent Island, Maryland

Kent Island is the largest island in the Chesapeake Bay consisting of an eastern shore community that thrives on agriculture and fishing. Figure 1 shows a side by side comparison of true color Landsat 8 imagery during the spring, summer and fall seasons. The spring image was obtained on April 4th, 2019, the summer on July 27th, 2019, and the fall on September 29th, 2019. These true color images were created in ENVI Classic by layer stacking the Landsat file and loading bands 4, 3, and 2 in as a RGB image.

Figure 2 displays a comparison of the same Landsat 8 imagery on the exact same dates, but as false-color images. False-color images can be used to better observe different aspects or events by allowing visualization of wavelengths that humans cannot normally see. These images were created in ENVI Classic by selecting the Near Infrared, Red and Green bands to display as a RGB image.

Using these false color images, an unsupervised classification map of differing land cover types can be created with a tool called Isodata. A minimum of 5 classes, and a maximum of 20 classes will be created with the minimum number of pixels per class as 1. These 20 classes were then renamed and recolored based on land cover type. Figure 3 has a landcover map for the spring, summer, and fall seasons with water, wetlands, forests, agriculture, plowed agriculture, and other vegetation all classified. By looking at the class statistics for all classes it is apparent that several classes have consistently very low reflectance values. These classes are water because water has a high absorption rate and a low reflectance rate. This method was used to assign a name to all 20 classes, as well as references to google Earth to ensure proper assignment. Once all 20 classes were properly assigned, the data was combined and clumped using ENVI 5.5 providing the final map displayed in figure 3.

Figure 4 has a histogram of the reflectance values for each class that is displayed in the figure 3 maps while Figure 5 shows pie graphs of the class percentages. This allows us to better visualize the changes that Kent Island land cover undergoes from season to season. The pie charts show us that from spring to summer, the amount of plowed agriculture increased, possibly alluding to a dry season or agricultural patterns. It also shows that the forest land cover class increased from spring to summer, and decreased from summer to fall- this could be explained by the loss of leaves by deciduous trees. This could also explain the increase in visible urban area in the fall, since thick canopies are no longer blocking buildings and roads.



Figure 1: Landsat 8 true color aerial imagery of the Kent Island area displayed respectfully in the spring, summer, and fall seasons.

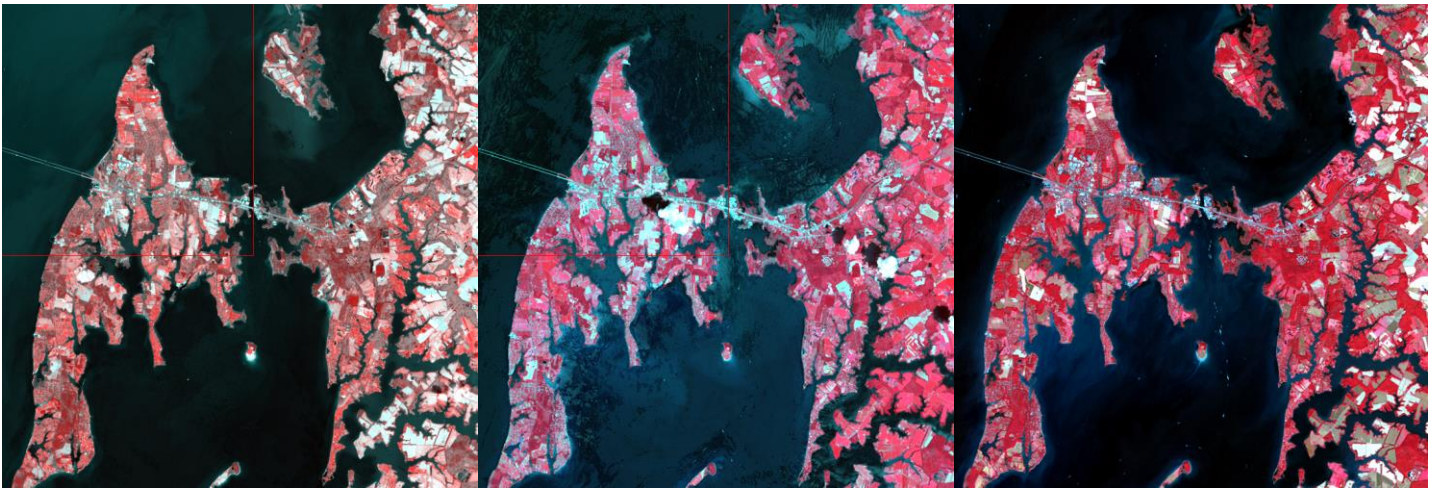


Figure 2: Landsat 8 false color aerial imagery of the Kent Island area displayed respectfully in the spring, summer, and fall seasons.

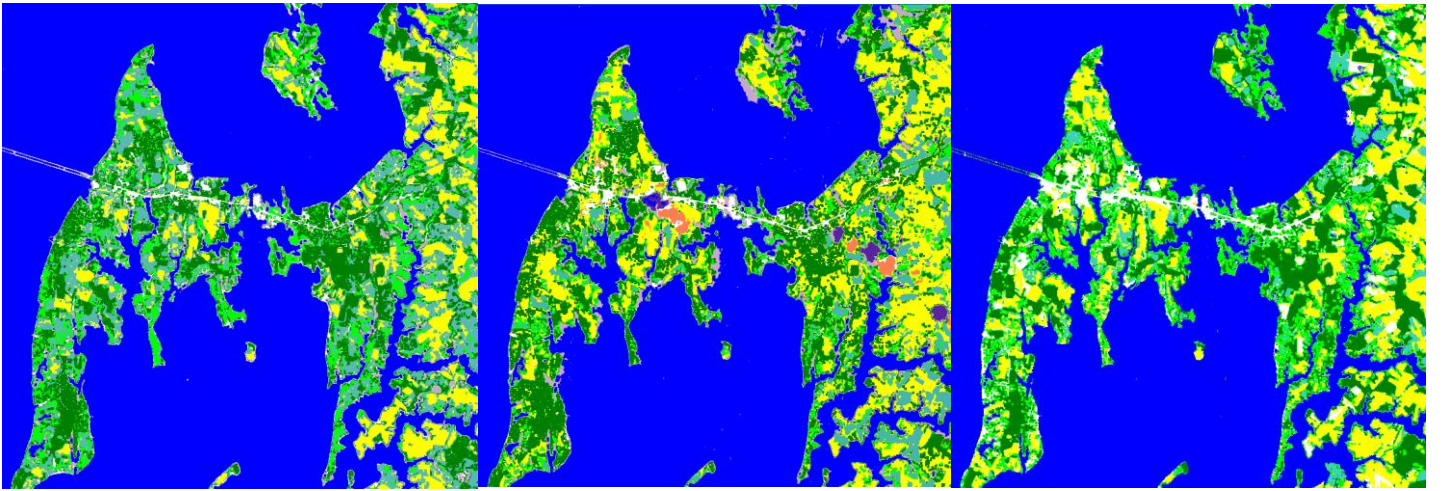


Figure 3: Land cover map of Kent Island area displayed respectfully in the spring, summer and fall seasons. Legend displayed below.



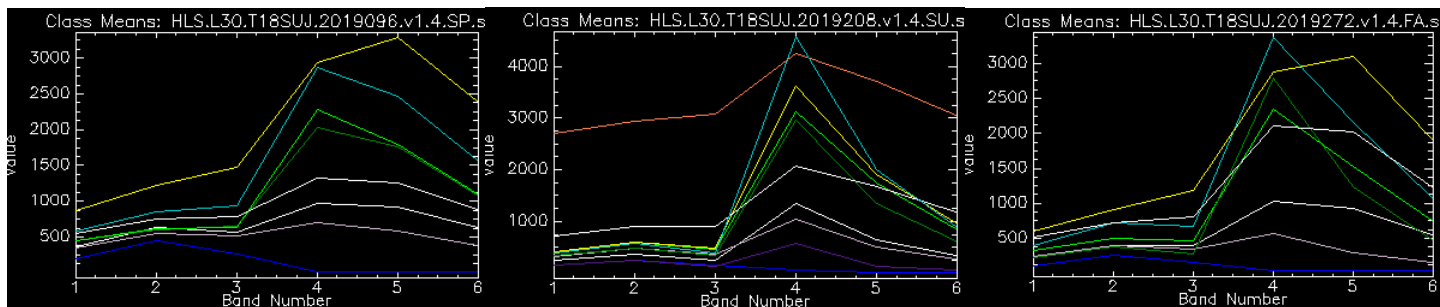


Figure 4: Histogram for all classes displaying reflectance values and band numbers in spring, summer, and fall, respectively.

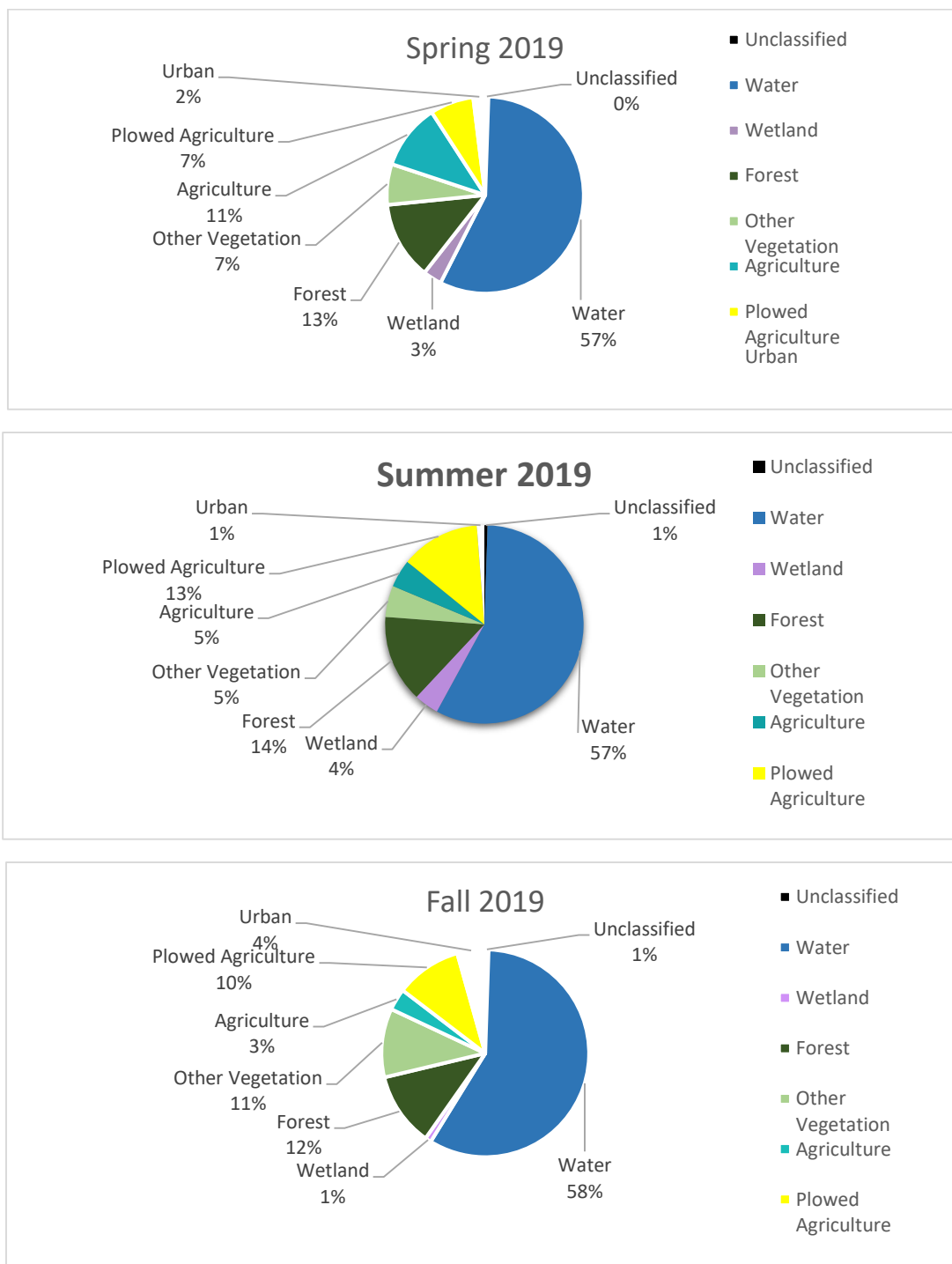


Figure 5: Land cover Percentage pie graphs derived from the clumped land cover maps.