North Carolina's Outer Coastal Plain Change Detection Study

Department of Geography and Geology

Remote Sensing in Environmental Analysis

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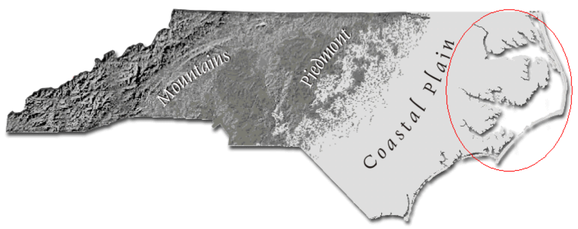
PURPOSE AND BACKGROUND

The purpose of this research project is to show the change of North Carolina's coast and its' land uses from January of 1985 to January of 2011. North Carolina is located midway down the Atlantic coast between New York and Florida.

The state as a whole is well known for its' farming industry. The variable material of the Coastal Plain came from the higher elevation of the Atlantic slope and deposited in different layers, which vary in texture from fine-grained silts and clays to coarse sands and gravel. The mixture of the soil gives this region the ability to produce different characteristic types of farms including: cash grain, tobacco, peanuts, cotton, and other various cash crops. In turn the region consists mostly of farm-land, and very little urban areas. Although urbanization of the coastline has been slowly and steadily increasing, agriculture still remains to be one of the prominent forms of commerce.

STUDY AREA



METHODS

- Downloaded Landsat 4-5 TM images from USGS Glovis database.
- Mosaicked 2 adjacent images from Jan. 1985 and 2 from Feb. 2011.
- Clipped the study area from the images by creating a subset data via ROI and masked the area outside of the subset to only include North Carolina's Outer Coastal Plain.
- Performed a Supervised Classification by creating ROI polygons to classify the different land uses into water, vegetation, non-vegetation, and sand. Then used the Maximum Likelihood method to calculate the probability that each given pixel belongs to a specific class.
- Post Classification using a Majority Analysis; a post classification algorithm used to smooth the classified images by weeding out the isolated pixels that were initially given labels that were dissimilar labels assigned to the surrounding pixels.
- Change Detection Report to calculate statistics of loss and gain per each individual classification

ACKNOWLEDGEMENTS

We would like to acknowledge Dr. Ghoneim and Sam Woolard for their continuous time, effort, and assistance.

Figure 1. Landsat TM 4-5 , 1985 True Color Composite

Figure 2. Landsat TM 4-5 , 2011 True Color Composite

Figure 3. Landsat TM 4-5, 1985 False Color Composite

Figure 4. Landsat TM 4-5, 2011 False Color Composite

Figure 5. 1985 Supervised Classification using Majority Analysis

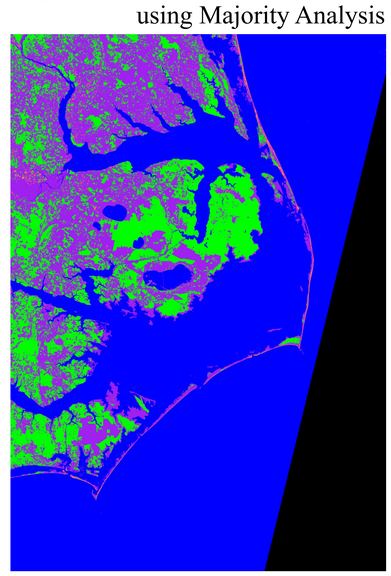
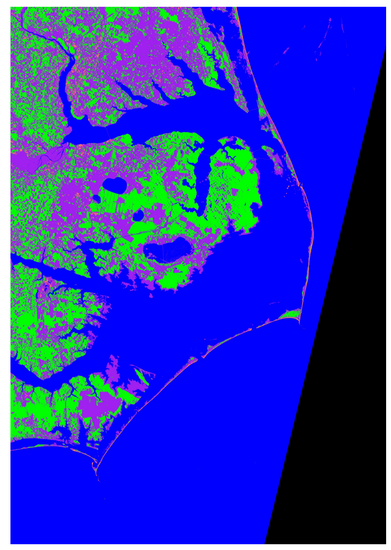


Figure 6. 2011 Supervised Classification using Majority Analysis



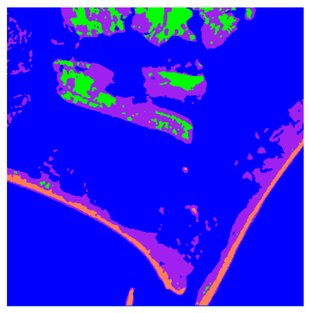


Figure 7. 1985 Clipped Area

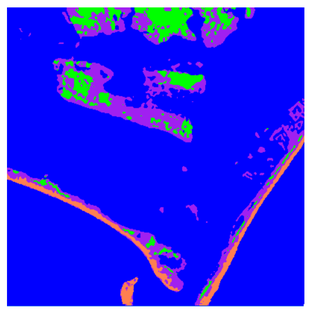


Figure 8. 2011 Clipped Area

RESULTS

The Change Detection Report reveals that the subject area experienced an overall decrease of non vegetated areas by 250 square miles. In concurrence there has been an increase of water by 50 square miles. This data is relative to the rising sea levels along the Atlantic Coast over the past 26 years. The report also shows that there has been an increase in vegetated areas by 180 square miles as opposed to the decrease of non vegetated areas. This is explained because the use of farmland changed from 1985 to 2011. In the 1985 image, there is more fallow land than in the 2011 image. This could be because there has been a greater amount of farming, due to advances in agricultural education and technologies.

- Water
- Non-Vegetation
- Vegetation
- Sand

REFERENCES

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