

MAPPING INLAND WETLANDS USING LANDSAT 8 IMAGERY AND TERRAIN DATA

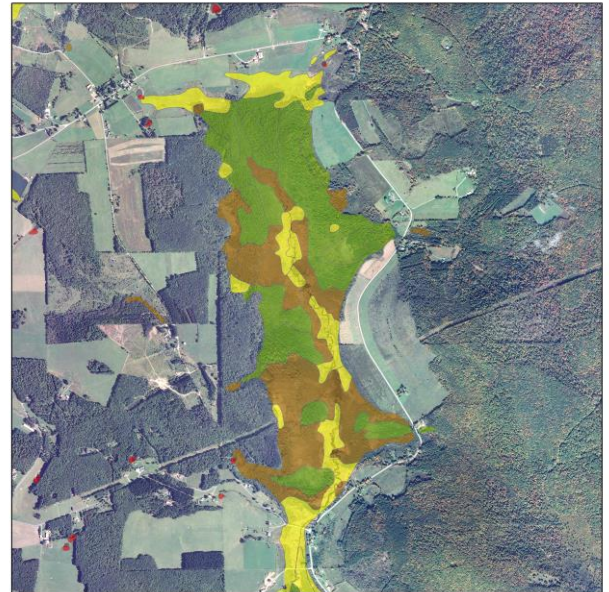
Purpose: To produce maps of inland wetlands of West Virginia using satellite imagery, terrain information, and random forest classification in the R statistical software. This work was conducted by West Virginia View and researchers at Alderson Broaddus University in Philippi, WV.

Input data

1. Two Landsat 8 Operational Land Imager (OLI) scenes.
2. Terrain derivatives from 1/9th arc second digital elevation model (DEM) data.
3. National Wetland Inventory (NWI) data.
4. West Virginia Division of Natural Resources (WVDNR) supplemental wetland data.

Results

1. An accuracy of 78.2% was obtained for mapping three wetland categories based on comparison to data points within the NWI and also additional field sites provided by the WVDNR.
2. Overall accuracy of the classification was improved by incorporating multiple Landsat 8 images, emphasizing the value of multi-temporal Landsat data.
3. Landsat 8 OLI shortwave near infrared bands were shown to be of particular importance. Landsat is one of the few moderate resolution sensors that images in the shortwave near infrared.
4. Terrain derivatives from the DEM were also key for mapping wetlands, indicating that information on the physical terrain is important for mapping wetlands. This finding highlights the value of USGS DEM products.
5. To date, we have finished initial analyses and are working toward improving the methodology for potential publication.



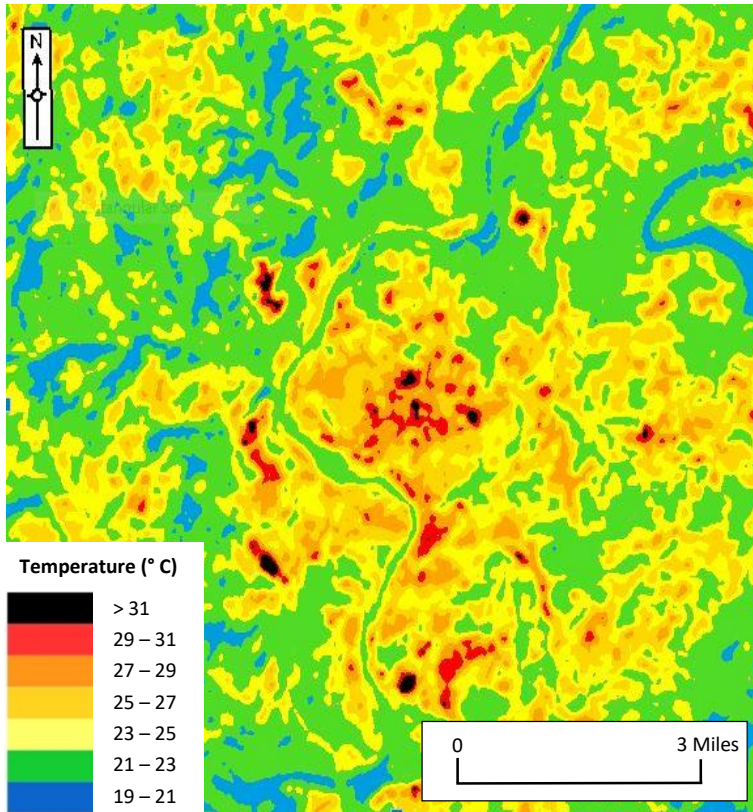
Example West Virginia wetlands classification map from NWI

BENEFITS TO WEST VIRGINIA

This project is of high importance in West Virginia as current wetland data tend to have high omission error rates (i.e., not all wetlands are mapped). Landsat and DEM data offer the potential to predict where unmapped wetlands may occur.

Mapping the location of these features is of great importance as wetlands provide key ecological services. Finding additional unmapped wetlands could help conserve wetland species, protect ground water quality and recharge areas, as well as support outdoor recreational opportunities, such as bird watching and hunting.

MAPPING URBAN HEAT ISLANDS AND THERMAL COMFORT



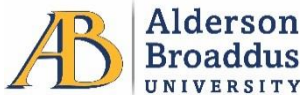
The aim of this project was to map the urban heat island phenomenon in Morgantown, West Virginia, and evaluate the consequences for human comfort in the city. Morgantown has undergone rapidly increasing urbanization in recent years, and local civic and non-profit groups are advocating for the greening of the city.

The land surface temperature map shown on the left highlights the broad range of temperatures, from 19 °C to 38 °C, and allows the identification of “hot spots” within the city. This is of significant importance in terms of thermal comfort evaluation, as well as for use in energy efficiency and demand studies. The map could be used for future planning purposes and also to assist in efforts related to environmental quality issues, such as the promotion of green roofs in the city.

The project was undertaken by West Virginia University under the direction of Dr. Nektaria Adaktilou.

Landsat 8 OLI surface temperature map of Morgantown, WV, for 15 September 2016

WEST VIRGINIA VIEW CONSORTIUM MEMBERSHIP



Federal consortium members identified above do not receive funding from AmericaView.

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