

**NASA Earth Observation System helps restore the threatened Plumleaf Azalea
NASA Marshall Space Flight Center
Earthzine/DEVELOP Virtual Poster Session, Summer 2011
Video Transcript**

Slide 1: Introduction/Title Slide

“Greetings, this is the Marshall Space Flight Center DEVELOP team. The project this summer used NASA’s Earth Observation Systems to Map and Monitor the Habitat of the Threatened Plumleaf Azalea at Providence Canyon State Conservation Park, Georgia.”

“DEVELOP is a NASA Science Mission Directorate Applied Sciences training and development program in which students and young professionals conduct Earth science applications projects and are mentored by science advisers from NASA and partner agencies.”

Slide 2: Community Concern and Potential Partners

“Each DEVELOP project is created with a specific goal of addressing some type community concern through the use NASA satellite observations to enhance decision support to help solve issues important to local communities. Providence Canyon State Park, located in Stewart County, Georgia, is home to the largest population of Plumleaf Azaleas in the world- making it the ideal location to study the ecology of the plant. The current distribution and abundance of the plumleaf azalea is unknown, hindering conservation efforts.”

“Our main project partner was Providence Canyon State Park which is part of the Georgia Department of Natural Resources. Additional project partners included Thomas University, the Azalea chapter of the American Rhododendron Society, and the American Azalea Society.”

Slide 3: Decision Support Tools

“The main goal of this project was to use remote sensing along with other geospatial technologies to identify the habitat characteristics of the Plumleaf Azalea and to identify new potential sites to aid in restoration efforts.”

“NASA Earth Observation Systems can be used to enhance restoration efforts of the Plumleaf Azalea by identifying what environmental parameters favor Plumleaf Azalea growth. Results can help identify new areas outside the park that are suitable for restoration efforts.”

Slide 4: *Rhododendron prunifolium* (Plumleaf Azalea)

“*Rhododendron prunifolium* is commonly known as the Plumleaf Azalea. The genus *Rhododendron* is a taxonomic classification of woody shrubs. They are a coveted ornamental plant with over 1,000 known species worldwide. Some Plumleafs have been known to mature between 10-15 feet and are often mistaken for small tree. Georgia is home to 12 native azalea species, more than any other state or providence in the world. The Azalea is the Georgia state wildflower. Among these native species, the Plumleaf Azalea is the most rare and is currently listed as threatened.”

Slide 5: Study Area

“Providence Canyon Conservation Park is home to 17 canyons all known to be human induced. They began forming around 150 years ago from erosion caused by deforestation, aggressive cotton agriculture, and poor soil management. These massive 60-120 meter canyons have earned the park the title of Georgia’s little Grand Canyon. The deep erosion of these canyons has exposed 3 distinct sedimentary layers: the clayton formation, the providence formation, and the ripley formation.”

“Members of the American rhododendron society believe there are approximately 1,000 plumleaf azaleas in the state park. Five days of collecting ground truth data in the end of July 2011 revealed 540 blooming azaleas.”

Slide 6: Methodology

“We utilized satellite imagery obtained from Terra’s ASTER sensors to analyze the park grounds and surrounding areas. The satellite imagery was obtained from the USGS GloVis website. The ASTER scene was processed and analyzed in ER Mapper 7.1 and ArcGIS 10. Field data was collected through the use of a Trimble JunoSB data logger to plot the coordinates of the blooming azaleas within the park. Spatial analysis in the form of Ordinary Kriging was performed using ArcGIS 10.”

Slide 7: Results- DEM With Field Data

“An elevation map with 5 meter contour lines was created from Digital Elevation Model (DEM) data. Plumleaf Azaleas, shown in red, were found predominantly around the canyons, located on the northeast quadrant of the park.”

Slide 8: Results- Ordinary Kriging

“Relationships between *in-situ* data points were analyzed with Ordinary Kriging. Ordinary Kriging, a type of spatial analysis, is a spatial auto-correlation model. It uses a linear combination of weights at known points to estimate the value at unknown points, using a semivariogram to measure spatial correlation between the known points. Most of the plumleaf azaleas were found in close proximity of the canyons.”

Slide 9: Results- Spectral Signature Extraction

“This map shows a remote sensing algorithm that was developed using the short wave infrared, infrared, and red bands from Terra’s ASTER sensor to successfully extraplate the Providence Sand and Ripley formations, shown in blue. These locations also correspond with the canyon.”

Slide 10: Results- Identifying New Sites

“The same remote sensing algorithm has been applied to the entire county. This map shows the surrounding areas of the park and highlights additional canyons in blue. Due to this study, these areas are now of interest to the Georgia Department of Natural Resources for establishing new plumleaf azaleas populations.”

Slide 11: Conclusion and Transition to Partner

“This project has successfully shown the potential of NASA EOS for restoration efforts of the threatened Plumleaf Azalea. ASTER imagery shows great potential in identifying environmental factors of locations that promote the growth of the plumleaf azalea. The algorithm developed by the project has identified areas within the county that may support plumleaf azaleas.”

“If plumleaf azaleas exist in the new areas of interest, they can be protected by the Georgia Department of Natural Resources. If no plumleaf azaleas are found within the new areas of interest, plum leaf azaleas can be planted to help expand geographic distribution of the plant.”

“The methodology developed by this project has facilitated Providence Canyon State Conservation Park in fulfilling the goals defined by their resource management plan. The project has also introduced Providence Canyon State Conservation Park and the Georgia Department of Natural Resources to NASA EOS products and how it can be implemented into their resource management plan.”

Slide 12: Team Members

“This Summer’s team was assisted by Dr. Jeff Luvall, science advisor, Dr. Donna Burnett, research advisor, and Steve Padgett-Vasquez, center lead. The team members were Kevin Cowart, Semiha Caliskan, Katherine Campbell, Michelle Foreman, and Danielle Keyes. This concludes our presentation. Thank you for your attention.”