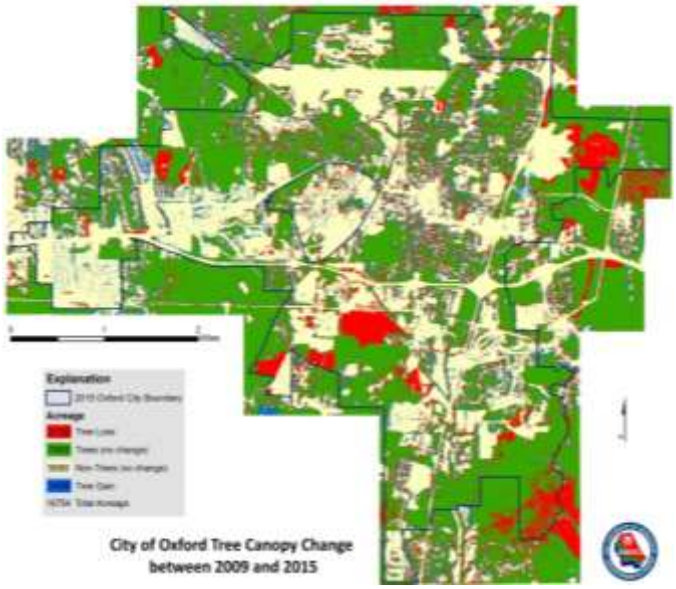
MississippiView Remote Sensing Activities 2014 - 2015

Mapping Changes in Tree Canopy within the City of Oxford, MS

The MississippiView team, in partnership with the City of Oxford's Tree Board used remote sensing to analyze and quantify the changes in tree canopy cover within the City of Oxford and portions of Lafayette County, MS. The study updated a previous mapping effort and provided the City Planner with the rate of tree loss due to development, the extent of the tree canopy cover, and the regions of most change. The Tree Board and the Planning Department will use these data and the analysis to update the Oxford comprehensive plan for the city, to understand the loss in tree canopy, and to determine if new regulations are needed.



Benefits to Mississippi

Both of these High Impact Activities demonstrate the application of remotely sensed data as tools for practical analysis of issues affecting the state of Mississippi. The land use and land cover changes found in the Oxford canopy study show that there has been a significant loss of trees which raised concern in the Mayor's office. The significance of the soil moisture study to a heavily agricultural state like Mississippi cannot be overstated.

Demonstrating the Effectiveness of Monitoring Tree Cover with Remote Sensing

Monitoring loss and gain in tree cover in an urban environment is challenging. High spatial resolution imagery is required to be able to quantify the small losses, individual lot clearing, that add up to a significant loss of trees. The City of Oxford is proud of its heritage as a 'Tree City'; a significant loss of tree cover lessens the importance of this designation.

Two sets of imagery were used for this comparison. 2009 and 2015 QuickBird imagery for the City of Oxford were classified as trees, asphalt, water, grass, and other. The classes were further simplified into two classes: trees or non-trees. A process was used to remove classified areas (polygons) that were smaller than a few pixels in size. Manipulation of the polygons was minimal due to time constraints, but obvious errors in classification were manually corrected.

2009-2015 Tree Canopy Study

	Acres	Sq. Miles
Tree Loss	2139.0	3.3
Trees (no change)	7492.6	11.7
Non-Trees (no change)	5685.8	8.9
Tree Gain	1436.2	2.2

	Trees (acres)	Non-Trees (acres)	Trees (sq. miles)	Non-Trees (sq. miles)
2009	9631.8	7120.8	15.0	11.1
2015	8929.2	7825.1	14.0	12.2

	Change (acres)		Change (sq. miles)	
2009-2015	-702.6	704.3	-1.0	1.1

negative values indicated a "loss" of reported area

	Area Sum (acres)	Area Sum (sq. miles)
2009	16752.6	26.2
2015	16754.3	26.2

	Error (acres)	Error (sq. miles)
2009-2015	1.7	0.0

	Trees %	Non-Trees %
2009	57.49	42.51
2015	53.29	46.71
Change	-4.20%	

MississippiView is a member of the AmericaView Consortium, a nationally coordinated network of academic, agency, non-profit, and industry partners and cooperators that share the vision of promoting and supporting the use of remote sensing data and technology within each state.

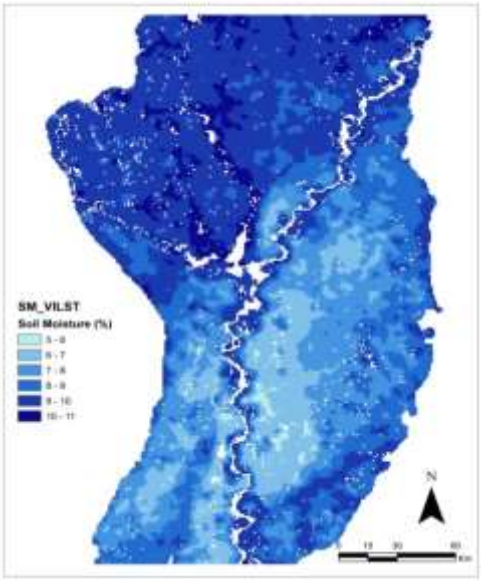
AmericaView Website:
www.AmericaView.org
Roberta Lenczowski, Executive Director:
roberta.lenczowski@sbcglobal.net
Debbie Deagen, Program Manager:
debbie.deagen@montana.edu
Russell Congalton, Board Chair:
russ.congalton@unh.edu

Soil Moisture Estimation using Optical and Microwave Remote Sensing

Soil moisture in the upper layer of the soil is an important variable in a wide range of applications. In recent years, many different studies have employed remotely sensed data to quantitatively estimate soil moisture in areas with limited vegetative cover. During the plant-growing season, agricultural fields are covered with different heights and densities of vegetation canopy. Accurate information about the soil water content can be used for effective irrigation planning which will lead to optimized water consumption. The Advanced Microwave Scanning Radiometer (AMSR-E) sensor onboard the Aqua satellite gathered global soil moisture data before the automatic shutdown in October 2011. Global soil moisture data were acquired daily but had a coarse resolution of 25-km, which is not suitable for local-scale applications.

Study Area in the Mississippi Delta

In this study, triangle scatterplots of normalized difference vegetation index (NDVI) and land surface temperature (LST) from MODIS are used to downscale AMSR-E data to the moderate resolution of 1-km over an agricultural areas in Mississippi delta. This data fusion technique has been completed using four sets of data collected from Jan 2010 to Feb 2011 to study the effectiveness of the downscaling for studying soil moisture under vegetation canopies from emergence to full growth to senescence. In-situ soil moisture data measured at 15 stations of the National Resources Conservation Service (NRCS) in the delta are used to assess the accuracy of downscaled soil moisture data.



MississippiView Vision and Goals

MSView Vision:

Build partnerships to promote the application of Geospatial Information Science and Technology (GIS&T) and remote sensing to natural resources problems of local, state and national importance.

MSView Long-Term Goals:

- Build partnerships with state and local government entities that promote the utility of remote sensing data products for practical applications
- Facilitate access to remote sensing data for Mississippi
- Expand the knowledge and utilization of remote sensing via courses, workshops and other educational opportunities for K-12 educators, university students and the existing workforce
- Support remote sensing research through access to data and, as funding becomes available, through grants and contracts

MississippiView Principal Investigator:

Greg Easson, Professor and Director
University of Mississippi
662-915-5995
geasson@olemiss.edu

MISSISSIPPI VIEW
THE UNIVERSITY OF MISSISSIPPI

http://www.msview.olemiss.edu