

Mobile County Health Department
Mobile County Water Resources and Urban Growth
Fall 2012 Earthzine script

>>[Walt cLARK]: Hey, I'm Walt, A Meteorology Major at the University of South Alabama
>>[jAMES pICKETT]: and my name is James-I am a Mathematics Major at the University of South Alabama
>>[dEBBIE mIMS]: I'm Debbie I am a Geography Major at the University of South Alabama.
>>[cOURTNEY rICHARDS]: and I'm Courtney I am a Geography Major at the University of West Florida.
>>[Walt]: And together, we represent the fall 2012 Mobile County Health Department NASA DEVELOP team.

>>[Courtney]: Until the 1950's, the modest Three Mile Creek served as the drinking water supply for Mobile, Alabama. However, rapid expansion of industrial and urban development in the 1950's outgrew the current water supply from Three Mile Creek, and plans were made to dam Big Creek in rural West Mobile. A dam and pumping station was built across Big Creek yielding the 3600 acre JB Converse Reservoir. Since the damming, Mobile's residential and commercial districts have continued to expand rapidly westward. To serve this new suburban area, and to reinforce the connection of Mobile to Hattiesburg, Mississippi, plans were enacted to rebuild US Hwy 98 north of Big Creek Lake, through the reservoir's watershed.

>>[Walt]: This upgrade to the transportation corridor is projected to harbor a new spurt of urban and suburban growth through the Converse Watershed. The impact of this future growth is predicted to be greater than the initial construction of highway 98. Already, there have been impacts on longleaf pine habitats, the protected gopher tortoise, and feeder wetlands. It is, however, the anticipation of successive urban construction within the JB Converse Watershed that has our project partners, the Mobile Area Water and Sewer Systems (MAWSS) and the Mobile County Health Department concerned.

>>[Walt]: Dr. Eichold, what concerns you most about the new highway 98 corridor through the JB Converse watershed?

>>[Dr. Bert Eichold] (Release on File): If we do not build the road properly. If we do not have absolute safeguards in place, the water supply of our community will be jeopardized. One we open up an area that has limited access to transportation, development will ensue if there are not controls in place.

>>[James]: In response to these community concerns, the Mobile County Health Department team, with assistance from a team at Langley Research Center in VA is analyzing present and future impacts from the new highway. Through the use of NASA's Landsat and MODIS earth observing systems, classification maps of the watershed were created and paired with water quality data to show sediment loading of the reservoir based on derived total suspended sediment measurements. By analyzing classification maps and suspended sediment in and around the reservoir, future monitoring and prediction models can be established, and utilized by partners and management.

>>[Walt]: We are joined via telephone by Allison Bowman and Taylor Beard. Allison and Taylor, could you explain what your aspect of the project entailed?

>>[Allison]: We were tasked to determine if runoff resulting from precipitation events, wind, and the reconstruction of Hwy 98 induced sedimentation in Big Creek Reservoir. Suspended sediments can be stirred in the lake by factors like currents, wind, and rainfall.

>>[Walt]: Why are suspended sediments a concern for the lake?

>>[Allison]: Well, the small watershed responds quickly to rainfall and runoff events, which cause the introduction of sediments into feeder streams and ultimately the lake. Other land disturbances such as urbanization and construction can also introduce sediment. In severe cases, these sediments have appeared as large muddy plumes in Big Creek Lake. These events cause public water quality to decrease and place strain on treatment measures used by our partner, MAWSS.

>>[Walt]: How were you able to go about this analysis?

>>[Allison]: Simple photographs of Big Creek lake have shown these large plumes. We combined this imagery with NASA's EOS which allowed us to quantitatively analyze sediment. We obtained daily total suspended sediment concentrations taken by the MODIS sensor aboard the Terra satellite from January 2005 to the present. This timeframe

includes dates before construction of US Highway 98, during construction, and after construction was suspended. These measurements have been correlated to days of increased precipitation and wind speed in order to determine if construction was contributing to sedimentation in the Lake.

>>[Courtney]: Thanks Taylor and Allison. This semester has been phase 1 of a two semester project on the future of the Converse reservoir. This semester, we have looked at the history of sediment in the lake and laid a foundation for the next team to model urban growth along the new highway. In the second semester, the SLEUTH urban growth model will be applied to the watershed and the surrounding area. SLEUTH is a cellular automata model, meaning it will treat the pixels of a satellite image as discreet cells and attempt to discover the parameters that control urban growth in the area. The parameters, or inputs, of the model are right in the name: SLEUTH (pause) SLEUTH stands for slope, land cover, exclusion, urban extent, transportation, and hillshade (very slow as you go over these). After the model determines the rules for urban growth, it will apply these rules into the future to model upcoming urbanization.

>>[Debbie]: This semester, we focused on creating these inputs to be used in the model in the upcoming spring term. SLEUTH's primary inputs are a series of historical land classifications, which the model uses to learn urban trends in the Mobile area. We gathered much of our land classification data from the National Land Cover Database. We also supplemented these classifications with our own. Another important layer was the current transportation network as urban growth tends to take place along major transportation arteries.

>>[Walt]: We look forward to running and calibrating the SLEUTH model in the spring. Its various outputs will show the future of urban extent in the Converse watershed. These urbanization scenarios will be presented to our partner, MAWSS, as well as an analysis of how future urban areas will change the water quality of the Converse Reservoir. With these results, it is our hope that we will be able to better equip the Mobile Area water and Sewer System to anticipate and address issues that arise from a more urban watershed. For the Mobile County Health Department DEVELOP team, I'm Walt Clark, and we look forward to seeing you for part two in the spring.