

Geo-Spatial Analytics Lab

MISSION

The alarming rate of degradation of our environment, viz. soil and water resources require immediate attention. Environmental models integrated with a Geographic Information System (GIS) and remote sensing (RS) provide a valuable tool to address these environmental issues at various scales in a spatially explicit way. Therefore, the research agenda for the Geo-Spatial Analytics Laboratory (G-SAL) includes the development, implementation and analysis of environmental models using approximation tools such as Fuzzy Logic, Neural Networks (NN), Neuro-fuzzy and Support Vector Machines (SVM) integrated with a GIS and RS.

The environmental models developed and/or implemented by the G-SAL are targeted for water resource protection (water quality/quantity, soil erosion, sediment and nutrient loading). It is intended that the environmental models developed and utilized by our research team will provide resource managers and policy makers an effective tool for environmental monitoring and management to ensure sustainable growth.



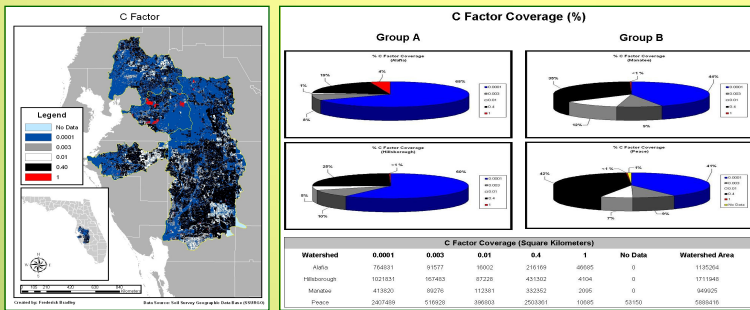
Photos (from left):

1. Dr. Barnali Dixon, Associate Professor from the University of South Florida St. Petersburg. Faculty Advisor of the Geo-Spatial Analytics Lab.
2. Local High School Student winners of the 2007 GIS Day Olympics.

A SNAPSHOT OF PROJECTS & RESEARCHERS

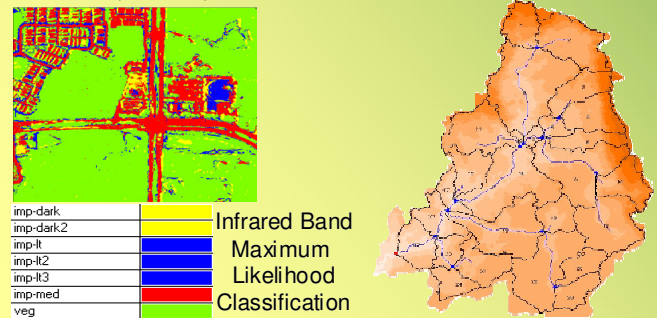
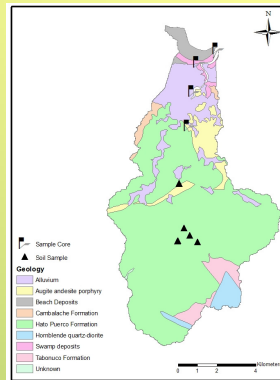
Frederick Bradley, is currently a research assistant in the Geo-Spatial Analytics lab and will begin work on his Master's Summer 2008. His recent work has focused on soil erosion modeling using the Revised Universal Soil Loss Equation (RUSLE) and statistical analysis to characterize contaminant transport pathways in select Florida Watersheds. Fred hopes to continue to study these terrestrial-aquatic relationships by incorporating the Soil Water Assessment Tool (SWAT) model and Remote Sensing techniques (MODIS) with field validation (using the ASD Field Spec).

Julie Earls, has an M.S. in Environmental Health and is currently working on using the Soil Water Assessment Tool (SWAT) to model flow and water quality in central Florida drainage basins. She is also working on using remote sensing tools to delineate impervious surfaces for water budget calculation in order to determine the effects of urbanization on water quantity. In addition, Julie is studying the sensitivity analysis of the SWAT model to various resolution of spatially explicit data.



Four River basin study using RUSLE analyses (C Factor - land cover classification).

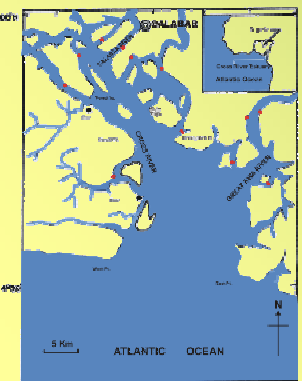
Nekesha Williams is currently a Bridge scholar between the College of Marine Science & the Dept. of Environmental Science, Policy & Geography. She is working on her PhD to identify erosional and depositional areas in the landscape using geo-spatial technologies. The purpose is to examine the relationship between soil erosion, sediment yields and sedimentation rates in tropical estuaries (Puerto Rico) using an integrative approach. While it has been established that watersheds are a major source of sediment to coastal environments; very little attempt has been made to link soil erosion and sediment yields from watersheds to sedimentation rates in downstream aquatic environments. Objectives of this study are to: describe watershed morphology and characteristics of study watersheds; quantify sediment yields from erosion prone areas using RUSLE and AQNPS; determine sediment accumulation rates in estuarine systems using radionuclide activity concentration and determine the statistical relationship between soil erosion, sediment yields and sediment accumulation rates computed for study estuaries.



Impervious surface results from remote sensing classification.

Charlie Creek drainage basin with sub-basins delineated by SWAT model.

Francis Nwosu is a visiting post-doctoral scholar from the University of Calabar, Nigeria, where he conducts research on various aspects of Fisheries, Ecosystems and Coastal Zone Management. Dr. Nwosu is learning about GIS and Remote Sensing Application to Fisheries in Dr. Dixon's Geo-Spatial Analytics Lab. While at USF, Dr. Nwosu will focus on mapping mangrove habitat to indicate the reproductive categories of spawning, nursery and juvenile/fingerling. Dr. Nwosu aims to broaden the scope of his contributions to fisheries and ecosystem dynamics with the emerging inseparability and relationship between fisheries management and ecosystem conservation.



Map of Cross River Estuary (Study Area) Showing Sampling Sites (Red Dots)

Dr. Nwosu plans to apply the knowledge gained from this project to understanding, management and conservation of the dynamic systems of Nigeria's fisheries and environment.

CONTACT US

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