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ABSTRACT

A decision support system (DSS) is being developed to evaluate the impacts of upland land use and land cover (LULC) change on coastal water quality in three counties (Hancock, Harrison, and Jackson) in the Mississippi Sound areas using remote sensing based LULC and water quality data. The DSS will provide analytical tools to help select the most suitable areas for restoration and sites for monitoring the progress of the coastal restoration process in Mississippi. The watersheds of interest are the Bay St. Louis, Biloxi Bay, and the Tchoutacabouffa. The years of interest for the remote sensing based LULC is 1984 – 2017. The remotely sensing based water quality parameter estimation will be calibrated and evaluated using the in situ measurements of water quality parameters measured by the Mississippi Department of Water Quality (MDEQ) and Mississippi Department of Marine Resources (MDMR). The poster presented here shows the LULC determined from the USGS NLCD datasets for the study site.

1. COASTAL WATERSHEDS UNDER STUDY

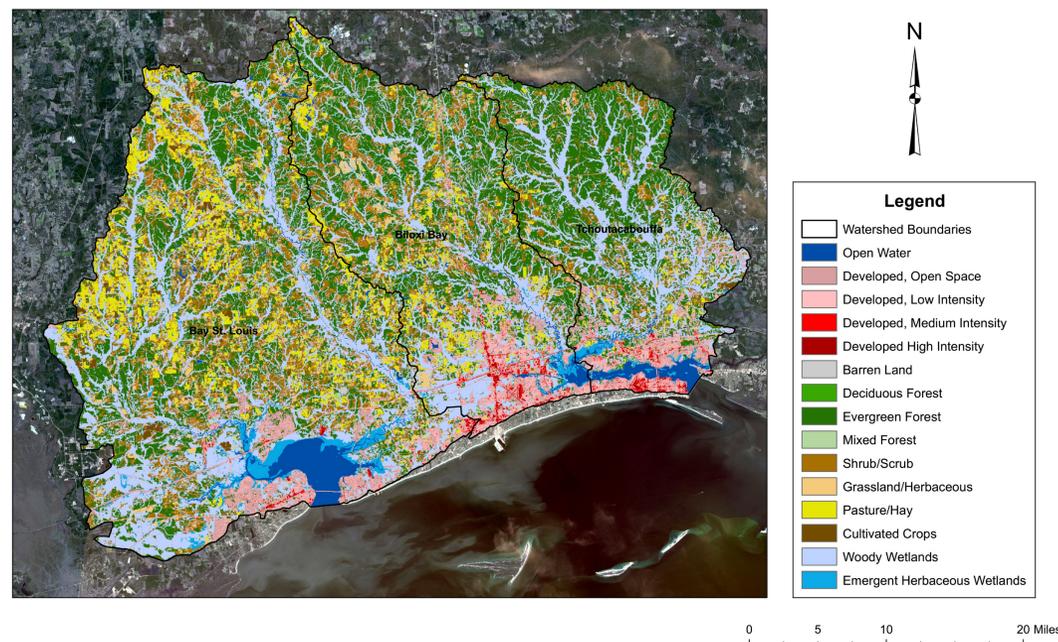
Figure 1

Bay St. Louis, Biloxi Bay, and Tchoutacabouffa Watersheds with 2015 Landsat Scene

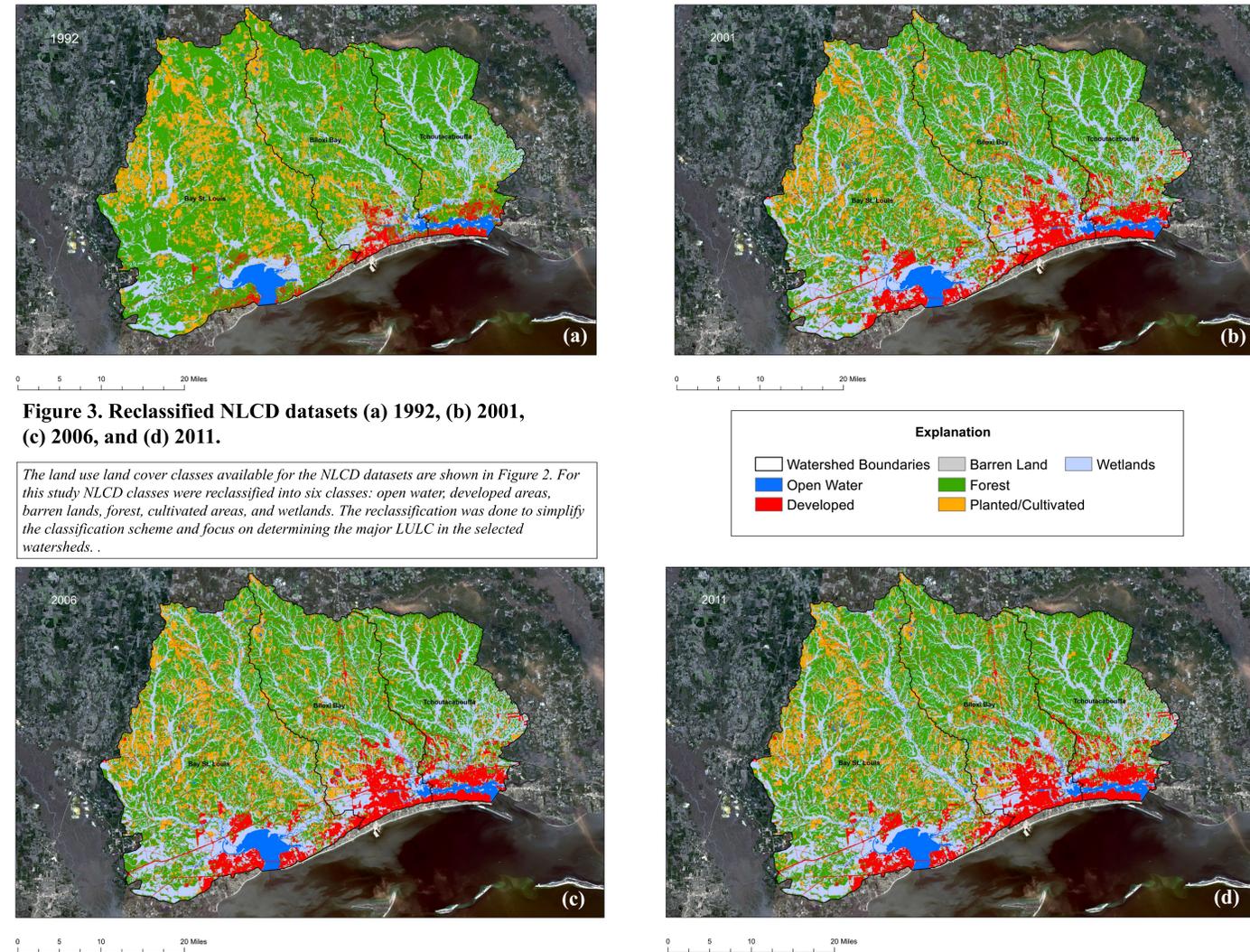


2. NATIONAL LAND COVER DATA (NLCD) FOR THE SELECTED WATERSHEDS

Figure 2
 Bay St. Louis, Biloxi Bay, and Tchoutacabouffa Watersheds with 2001 NLCD Landcover Data



3. TIME SERIES OF RECLASSIFIED NLCD FOR THE WATERSHEDS (1992-2011)



4. Future Research

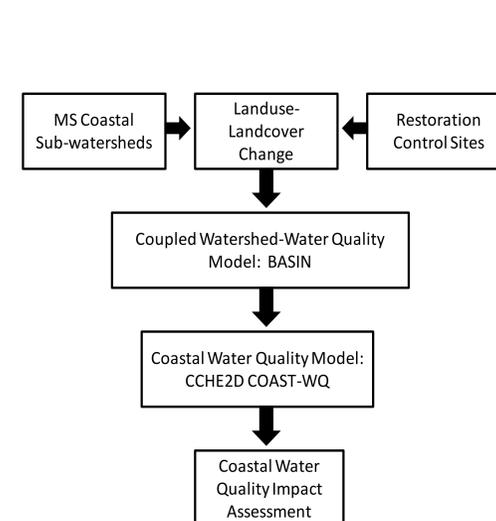


Figure 4. Proposed coupled watershed process and coastal water quality modeling

- The development of a decision support system (DSS) (Figure 4) by integrating remote sensing and geospatial analysis with existing and validated numerical watershed models to analyze potential restoration decisions and provide possible outcome scenarios.
- The DSS will integrate geospatial data characterizing the drainage networks, satellite observed LULC and water quality estimation, and the EPA's coupled watershed and water quality model Better Assessment Science Integrating point & Non-point Sources (BASIN), which has been developed and tested by the EPA.
- Satellite observed water quality estimation will be calibrated and validated by the Ambient Beach Monitoring Network (ABMN) and the Ambient Bridge Network (ABN) provided by the Mississippi Department of Environmental Quality (MDEQ) and Mississippi Department Marine Resources (MDMR). ABMN and ABN record physical and chemical data: pH, temperature, dissolved oxygen, nutrients, suspended solid, turbidity, specific conductance, and certain water column toxicants.
- The interface to the model and the DSS will be in a web mapping service created as part of the project. The web mapping service will be developed inside a Geographic Information System (GIS) and will allow users to evaluate potential development projects through a web portal. The integrated models will accept user input for a selected area, run the scenario, and present the results in a geographic format.



Figure 5. Ambient Beach Monitoring Network (ABMN), MDEQ.