

Land Use Impacts on Estuarine Areas in South Carolina and the Southeast Region, USA: An Overview (52)

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The most important factor in the decline of environmental conditions within the coastal zone has been the unprecedented increase in human population growth, particularly in the southeastern United States. To begin to understand the impacts of development on coastal ecosystems, several studies were initiated in South Carolina: Urbanization in Southeast Estuarine Systems (USES), the Tidal Creek Project (TCP) and the Land Use-Coastal Ecosystem Study (LU-CES). The overall mission of these studies was to provide sound science to guide coastal land use decision making. They have utilized ecosystem-level spatial and temporal scale analysis to produce data that leads to a better understanding and ultimately models of ecosystem structure and function are used to elucidate cause and effect relationships between land use and coastal condition. These studies have focused on predicting future urban growth and defining clear linkages between land use and environmental health within estuarine systems beginning at the tidal creek scale (TCP) and broadening to include both high salinity (USES) and riverine (LU-CES) estuaries with tidal ranges of 2-3 meters during spring tides. These studies have documented direct impacts from coastal development including (1) increased imperviousness and resulting increased loading of nutrients, coliform bacteria and other environmental pathogens, and chemical contaminants; (2) increased downgrades in water quality and restricted harvesting in molluscan shellfish growing waters; (3) increased levels of trace metals, PAHs, pesticides and PCBs in sediment and tissues; (4) direct toxicity of sediments to macropelagic, epibenthic and benthic fauna to sediments contaminated by urban NPS runoff; and (5) population changes (e.g., species abundance, sex ratios, reproductive output, growth and development) in keystone species including crustaceans, mollusks and annelids. This presentation will provide a broad overview of the three studies which will be followed by presentations focusing on specific topic areas from the three studies. A concluding presentation will summarize all of the activities and provide some next steps.