Accommodating Land Use Change in the Coastal Zone: The Challenges of Linking Science-to-Management to Achieve Sustainable Communities (61)

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The population of coastal counties of the southeastern United States has increased 64% between 1970 and 1990. The Southeast region exhibited the largest rate (58 percent) of population growth in the country between the 1980 and 2003; three of the ten states with the highest percent change in population growth were located in the Southeast, and this trend is expected to continue, especially along the coast. Significant impacts to the coastal landscape, estuarine water quality, and coastal ecosystem integrity are predicted as a result.

Over the last 15 years, several multi-disciplinary studies (e.g., Urbanization in Southeastern Estuarine Systems, the Tidal Creek Project, and the Land Use-Coastal Ecosystem Study) have generated science-based information to help guide coastal land use decision-making in the southeastern US. These studies have utilized ecosystem-level spatial and temporal scale analysis and modeling of ecosystem structure and function in an attempt to improve our ability to identify and understand cause-and-effect relationships between land use activities and coastal ecosystem condition. These studies have offered suggestions on how to manage coastal ecosystems under development pressure and how to address environmental issues associated with urbanization along the region's coastal zone. It is clear that we must continue to generate and apply science-based knowledge soon, even in the face of continuing uncertainty. The current pace of coastal development in the southeast US does not permit us the luxury of delay.

Future efforts to understand the relationships between land use and marine ecosystem condition must be multidisciplinary, and must include the social sciences. In developing future programs, complex challenges to the scientific community remain. We must recognize that temporal and spatial variability scales determine the outcome of numerous biotic, chemical, and physical processes. We must develop the means by which one can distinguish "signals" peculiar to each land use, while at the same time identifying "indicators" that reflect the cumulative effects of all land use types in that area. We also need to improve our ability to document and model natural variations in estuaries in order to distinguish them from human-induced variability. And finally, we must address the "science-to-management disconnect," which manifests itself in at least three ways: temporal differences between scientific information delivery and land use decision-making, lack of clear and open communication, and the need for improved technical information transfer mechanisms.

The opportunity for scientifically sound decision-making still remains in the southeastern United States; unfortunately, the scientific knowledge available or needed to make these decisions has not kept pace. The cumulative and causative effects of land-use change on coastal resources within the region remain poorly understood. New management strategies will be needed by urban and regional planners and resource managers as they seek to balance population growth and land use change with resource conservation. Society must take a preventive health care approach in managing coastal environments in the future. The "Precautionary Principal" should be applied when dealing with the uncertainties of the science needed to make effective land-use decisions