

Title: Nutrient Loads in the Biscayne Bay Watershed, South Florida (1994-2006): A Trend Analysis

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Abstract

South Florida has experienced rapid population growth in the past 20 years. The increased population impacts regional water resources such as the Biscayne Bay, a barrier-island lagoon located along the southeastern Florida coastline. The Biscayne Bay watershed (2,500 km²) includes sections of both Miami-Dade and Broward counties as nineteen drainage canals reduce watershed flooding during storm events and also transport pollutants to the bay. South Florida residents therefore interact with Biscayne Bay, whether directly or indirectly, because the estuary functions as a sink for byproducts from nonpoint sources (both agricultural and urban) and waste treatment and disposal facilities in the watershed. Using surface water flow data, nitrate/nitrite-nitrogen (NO_x-N), ammonia (NH₃-N), and total phosphorus (TP) concentrations, we plan to conduct a trend analysis of nutrient loads from ten water quality monitoring stations throughout the watershed for the period 1994-2006. Daily flow data and monthly nutrient concentrations will be obtained from the South Florida Water Management District (SFWMD) and Miami-Dade Department of Environmental Resources Management (DERM), respectively. The ten water quality stations are located in areas containing agricultural, urban and mixed land uses. The USGS LOADEST (Load Estimator) model will be used to estimate nutrient loads for the ten water quality stations from 1994-2006. South Florida has distinct wet and dry seasons and the trend analysis will include the seasonal-Kendall test to evaluate seasonal effects. Land use patterns may potentially influence pollutant characteristics and the trend analysis is one aspect of a larger project linking watershed development to historical water quality data. The trend analysis is an initial step to explore the relative influence of development patterns on water quality within the watershed. Overall results are expected to enhance management strategies for attaining realistic water quality goals considering land-use development.

Keywords: water quality, nutrients, land use

Challenge: Population growth and land use change impacts to water resource sustainability

Issue: Nutrient enrichment of surface, ground and coastal waters