

The Importance of Groundwater Delivered N-fluxes to Mobile Bay, Alabama

NATASHA T. DIMOVA¹ AND DANIEL MONTIEL¹

¹201 7th Ave., Bevill Bld, Department of Geological Sciences,
University of Alabama, Tuscaloosa, AL 35406;
ntdimova@as.ua.edu

Nutrient pollution (eutrophication) in coastal areas has become a serious problem for coastlines worldwide in the last decades. It frequently leads to extensive primary productivity in the water column and manifests as harmful algae blooms (HABs). With average water flow of $\sim 1800 \text{ m}^3/\text{sec}$ the Mobile - Tensaw River system has been considered the major contributor of nutrients to the Alabama coastal waters. However, recent findings indicate that submarine groundwater discharge (SGD) may play an important role in the nutrient coastal waters budget and consequently in the development of HABs in the area, often referred as “*jubilees*” (Liefer et al., 2009 and others). This work presents new findings on the magnitude and quality of SGD and attempts to assess the significance of SGD-delivered nitrogen to the total N-budget of Mobile Bay, Alabama. SGD-derived nitrate contribution was found to be much more significant during the dry season compared to the wet season. Stable isotope ($\delta^{18}\text{O}$ and $\delta^{15}\text{N}$) analyses indicate sources of nitrate to Mobile Bay are most likely from reduced nitrate fertilizers in the coastal aquifer. Insights on the seasonal dynamics of N-fluxes have large implications for understanding HABs in the Bay.