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The Wekiva Study Area (WSA) covers about 300,000 acres and includes the surface and most of the recharge area of the Wekiva River and its tributaries. In 2006, the Florida Legislature tasked the Department of Health to assess the relative contributions of different sources of nitrogen to groundwater in the WSA. As a first step, the input of nitrogen to the soil was estimated, building on a similar assessment by MACTEC in early 2007. Contributions from fertilizer applications, livestock wastewater, atmospheric deposition, and onsite and public/industrial waste water treatment systems were considered.

An estimated 18 million pounds of nitrogen are added to the WSA soils each year. Of this, about 71% is from fertilizer, and about 6% or 1.1 million pounds per year is from onsite systems. The relative contribution of atmospheric deposition, livestock, and wastewater treatment plants are estimated to be 11%, 8%, and 3%, respectively.

A comparison of fertilizer sales to the estimated amount, which was based on land-use categories and recommended application rates, suggest that fertilizer input was overestimated. Field work performed on three onsite systems in the WSA suggest that the yearly discharge per system was underestimated. These two considerations would increase the relative contribution of onsite systems to the nitrogen input, to 13%. Even then, fertilizer would remain the largest source category, contributing about 53% of the nitrogen to the WSA.

These estimates only consider what nitrogen is entering the soil; they do not quantify the nitrogen removal that occurs as nitrogen travels toward first the groundwater and then the springs. Such removal processes reduce the overall loading and may shift the relative importance of different sources.

Keywords: septic tanks, nitrogen, Wekiva Study Area, nitrogen balance, nutrient input assessment

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

Issue: Nutrient enrichment of surface, ground and coastal waters