

# *Time-Series Sampling for Nutrients and Bacteria in Ground Water at Four North Florida Dairy Farms and Three Springs Along the Suwannee River, 1990-93*

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Nitrate concentrations exceeded the primary drinking-water standard of 10 milligrams per liter as nitrogen in water samples from 24 of 51 monitoring wells sampled periodically from 1990-93 at 4 dairy farms in Lafayette and Suwannee Counties in northern Florida. The greatest concentrations of nitrate were detected in ground water from monitoring wells with 10-foot screens completed at the water table located downgradient from unlined wastewater lagoons and defoliated areas of intensive cattle use. Water from wells completed 10 feet deeper in the saturated zone, wells completed in areas with lower waste-loading rates (such as pastures), and wells located upgradient of wastewater lagoons and intensive-use areas had lesser concentrations of nitrate, but nitrate concentrations in water from those wells generally exceeded those from ambient-network wells sampled in the area by the Florida Department of Environmental Protection. Nitrate concentrations in water discharged to the Suwannee River from three springs in the vicinity of those and other dairy farms ranged from 2 to 7 milligrams per liter, which also was greater than nitrate concentrations in water sampled from ambient-network wells.

Most of the wells produced water containing dissolved oxygen, which favors the formation of nitrate (nitrification) from organic and ammonium compounds of nitrogen. Concentrations of organic and ammonium nitrogen generally were much less than nitrate concentrations. Phosphorus and orthophosphate-phosphorus concentrations were similar to concentrations measured in water samples from ambient-network wells. To investigate the potential for denitrification (reduction of nitrate to nitrous oxide or dinitrogen gases), counts of denitrifying bacteria were made in water from selected monitoring wells. Counts of those bacteria commonly exceeded 10,000 colonies/100 milliliters, but because most water samples contained dissolved oxygen, denitrification probably does not occur in shallow ground water in the area. Counts of fecal coliform and fecal streptococcal bacteria in water samples from selected wells commonly exceeded 1,000 colonies per 100 milliliters.

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