NEW JERSEY'S AMBIENT GROUND WATER QUALITY MONITORING NETWORK: NETWORK DESIGN AND STATUS OF SHALLOW GROUND-WATER QUALITY

Michael Serfes and Raymond Bousenberry, NJDEP/NJGS, and Jacob Gibs, USGS
New Jersey Geological Survey (NJGS)
PO Box 427
Trenton, NJ 08625-0427

The 150 well, New Jersey, Ambient Ground-Water Quality Monitoring Network (AGWQMN) is stratified as a function of land use yielding information about the quality of shallow ground water in agricultural, urban and undeveloped land use areas. The major goals of this New Jersey Department of Environmental Protection (NJDEP)/U.S. Geological Survey (USGS) cooperative network are to evaluate the status of and trends in shallow-ground-water quality as a function of land use related non-point source contamination stressors. Network wells are screened just below the water table and are sampled 30 per year on a 5-year cycle. The first cycle was completed and the second started in 2004. The New Jersey Geological Survey (NJGS) manages the network design, well installation, well maintenance, and summarizes and interprets data for various publications. The NJDEP Bureau of Fresh Water and Biological Monitoring and the USGS collect the ground-water samples, and the USGS National Water Quality Laboratory analyzes them. Data quality assurance, initial reporting, and data availability are major activities of the USGS. Chemical and physical characteristics determined (or measured) at each well include: field parameters, such as, pH, specific conductivity, dissolved oxygen, temperature and alkalinity; major ions, trace elements, gross-alpha particle activity, volatile organic compounds (VOCs), and pesticides. Total dissolved solids concentrations, as well as the concentration, frequency, and variety of trace elements, nutrients, VOCs and pesticides are found at significantly higher levels in wells located in agricultural and urban areas than from wells in undeveloped areas. Shallow ground water in agricultural land-use areas have the highest frequency of pesticide detections, highest median nitrate concentrations and the maximum nitrate concentration of 56 mg/L and highest gross alpha particle activity. These concentrations are likely related to the application of agricultural chemicals. In urban areas, dissolved oxygen concentrations generally are lower and dissolved solids, dissolved iron, chloride, and VOC (such as MTBE) concentrations generally are higher than in other land uses likely due to transportation and domestic and industrial waste water.

KEYWORDS

Ground water, monitoring, land use, nutrients, major ions, trace elements, VOCs, pesticides, and gross alpha