

GROUND-WATER QUALITY IN THE BOSTON METROPOLITAN AREA

Analyses of water samples from the 29 urban wells showed that shallow ground water in recently urbanized settings in the BMA commonly contains trace amounts of nutrients, fuel, and industrial-based organic compounds. Most of the samples that contained detectable amounts of organic compounds also had excessive levels of inorganic constituents such as iron and total dissolved solids.

Nutrients

Nitrite plus nitrate, reported as nitrogen (N), was detected in 83 percent of the 29 ground-water samples (fig. 3). All detections of nitrite were less than the reporting level of 0.01 mg/L, indicating that nitrate concentrations and nitrate plus nitrite concentrations were the same. Nitrate concentrations in the water samples ranged from less than 0.05 to 10.9 mg/L. One sample had a nitrate concentration (10.9 mg/L), which exceeds the MCL for nitrate of 10 mg/L (U.S. Environmental Protection Agency, 2000). Ammonium concentrations exceeded 3 mg/L as N in two samples (fig. 3). These two samples also had excessive concentrations of methane gas (more than 3.2 mg/L), ferrous and total iron (more than 3.3 mg/L), and low concentrations of dissolved oxygen (less than 1.8 mg/L) (table 1), indicating a chemically reduced ground-water environment. Phosphorus was detected in 62 percent of the water samples, but at concentrations less than 0.02 mg/L (table 1; fig. 3).

Pesticides

Pesticides were detected at trace concentrations in a few water samples (table 2). Three of 48 pesticides were detected: atrazine, deethyl atrazine, and diazinon. Atrazine, a commonly used herbicide, was detected in four samples at concentrations ranging from 0.005 to 0.011 $\mu\text{g/L}$ —well below the USEPA's MCL of 3 $\mu\text{g/L}$ (U.S. Environmental Protection Agency, 2000). Deethyl atrazine, a break-down product of atrazine, was detected in four samples, at estimated concentrations below 0.01 $\mu\text{g/L}$. Diazinon was detected in two samples.



Hydrologist collecting a water sample.

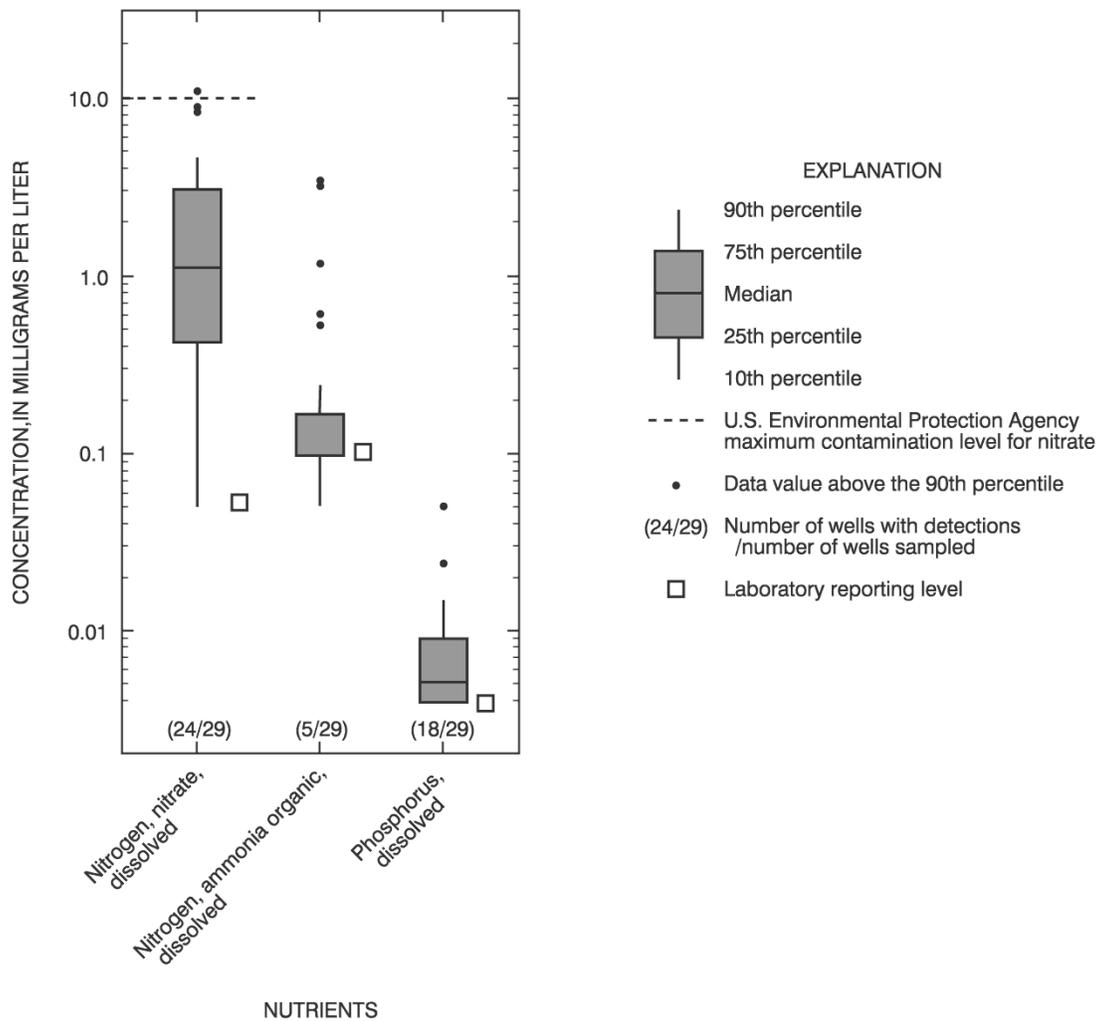


Figure 3. Distributions of concentrations of selected nutrients in water samples from 29 shallow wells in the Boston metropolitan area. [Includes estimated concentration values for organic nitrogen ammonia.]

Table 2. Statistical summary of pesticide compounds detected in water samples from 29 shallow wells in the surficial aquifers in the Boston metropolitan area

[µg/L, micrograms per liter; MCL, Maximum Contaminant Level established by the U.S. Environmental Protection Agency (2000); E, estimated concentration; --, no data; Concentration values are written as reported by the National Water Quality Laboratory without rounding.]

Pesticide compound name	Number of samples	Number of detections	Laboratory reporting level, in µg/L	Minimum concentration, in µg/L	Maximum concentration, in µg/L	MCL, in µg/L
Atrazine	29	4	0.001	0.0049	0.0109	3
Deethyl atrazine	29	4	.002	E .0012	E .0099	--
Diazinon	29	2	.002	E .0018	.0041	--