

Criteria for mapping constituents

Table 1 lists the chemical constituents that met the criteria for a statistical analysis of decadal-scale changes in concentrations in groundwater between Cycle 1 (1988–2001) and Cycle 2 (2002–2012) of the National Water-Quality Assessment (NAWQA) Project. Mapped constituents met one of the four following criteria:

- 1) Constituents that exceeded a Maximum Contaminant Level or other human-health benchmark in more than 1 percent of public- or domestic-supply wells ^(1,2,3); or
- 2) Constituents that exceeded a Secondary Maximum Contaminant Level in more than 1 percent of public- or domestic-supply wells ^(1,2,3); or
- 3) The five most frequently detected pesticide compounds and volatile organic compounds (VOCs) in groundwater ^(4,5); or
- 4) Constituents of special or regional interest.

Table 1. Constituents meeting analysis criteria, results mapped

[µg/L, micrograms per liter; mg/L, milligrams per liter; SMCL, Secondary Maximum Contaminant Level]

Constituent name	Constituent class	Benchmark	Units	Why study
Arsenic	inorganic	10	µg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Boron	inorganic	6,000	µg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Chloride	inorganic	250	mg/L	Exceeded SMCL in more than 1 percent of domestic-supply or public-supply wells
Fluoride	inorganic	4	mg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Iron	inorganic	300	µg/L	Exceeded SMCL in more than 1 percent of domestic-supply or public-supply wells
Manganese	inorganic	300	µg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Molybdenum	inorganic	40	µg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Nitrate (measured as nitrite plus nitrate)	inorganic	10	mg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Orthophosphate	inorganic	None	mg/L	Constituent of special or regional interest: Possible source of discharge to surface water bodies
Strontium	inorganic	4,000	µg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Sulfate	inorganic	250	mg/L	Exceeded SMCL in more than 1 percent of domestic-supply or public-supply wells
Total Dissolved Solids	inorganic	500	mg/L	Exceeded SMCL in more than 1 percent of domestic-supply or public-supply wells
Uranium	inorganic	30	µg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Atrazine	organic	3	µg/L	One of the five most frequently detected pesticide compounds in groundwater in the Nation
Chloroform	organic	80	µg/L	One of the five most frequently detected volatile organic compounds in groundwater in the Nation
Deethylatrazine	organic	None	µg/L	One of the five most frequently detected pesticide compounds in groundwater in the Nation
Dieldrin	organic	0.002	µg/L	Exceeded human-health benchmark in more than 1 percent of public-supply wells
Methyl <i>tert</i> -butyl ether	organic	20	µg/L	One of the five most frequently detected volatile organic compounds in groundwater in the Nation
Metolachlor	organic	700	µg/L	One of the five most frequently detected pesticide compounds in groundwater in the Nation
Simazine	organic	4	µg/L	One of the five most frequently detected pesticide compounds in groundwater in the Nation
Prometon	organic	400	µg/L	One of the five most frequently detected pesticide compounds in groundwater in the Nation
Tetrachloroethene	organic	5	µg/L	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells, and one of the five most frequently detected volatile organic compounds in groundwater in the Nation
Toluene	organic	1,000	µg/L	One of the five most frequently detected volatile organic compounds in groundwater in the Nation
Trichloroethene	organic	5	µg/L	One of the five most frequently detected volatile organic compounds in groundwater in the Nation

Table 2. Constituents met criteria, not mapped due to insufficient data

Gross alpha (α)	inorganic	15	picouries per liter	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Radium 226 plus Radium 228	inorganic	5	picouries per liter	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells
Radon	inorganic	300 (Alternate 4,000)	picouries per liter	Exceeded human-health benchmark in more than 1 percent of domestic or public-supply wells

References Cited:

- 1-DeSimone, L.A., Hamilton, P.A., and Gilliom, R.J., 2009, Quality of water from domestic wells in principal aquifers of the United States, 1991–2004—Overview of major findings: U.S. Geological Survey Circular 1332, 48 p. [Also available at <http://pubs.usgs.gov/circ/circ1332/>.]
- 2-Toccalino, P.L., and Hopple, J.A., 2010, The quality of our Nation's waters—Quality of water from public supply wells in the United States, 1993–2007—Overview of major findings: U.S. Geological Survey Circular 1346, 58 p. [Also available at <http://pubs.usgs.gov/circ/circ1346/>.]
- 3-Ayotte, J.D., Gronberg, J.M., and Apodaca, L.E., 2011, Trace elements and radon in groundwater across the United States: U.S. Geological Survey Scientific Investigations Report 2011–5059, 115 p. [Also available at <http://water.usgs.gov/nawqa/trace/pubs/sir2011-5059/>.]
- 4-Zogorski, J.S., Carter, J.M., Ivahnenko, Tamara, Lapham, W.W., Moran, M.J., Rowe, B.L., Squillace, P.J., and Toccalino, P.L., 2006, The quality of our Nation's waters—Volatile organic compounds in the Nation's ground water and drinking-water supply wells: U.S. Geological Survey Circular 1292, 101 p. [Also available at <http://pubs.usgs.gov/circ/circ1292/>.]
- 5-Gilliom, R.J., Barbash, J.E., Crawford, C.G., Hamilton, P.A., Martin, J.D., Nakagaki, Naomi, Nowell, L.H., Scott, J.C., Stackelberg, P.E., Thelin, G.P., and Wolock, D.M., 2006, The quality of our Nation's waters—Pesticides in the Nation's streams and ground water, 1992–2001: U.S. Geological Survey Circular 1291, 172 p. [Also available at <http://pubs.usgs.gov/circ/2005/1291/>.]