

Prepared in cooperation with the  
 New York State Department of Environmental Conservation  
 The U.S. Environmental Protection Agency - Region 2

## 305(b) Groundwater Quality Monitoring

*As of 2011, more than 450 wells have been sampled as part of this project.*

### Introduction

Relatively little data describing the quality of groundwater in New York State exists, yet groundwater is used as a source of drinking water by approximately one quarter of the population of the state. The objective of the 305(b) groundwater quality monitoring project is to quantify and report on ambient groundwater quality from bedrock and glacial-drift aquifers in upstate New York. An ongoing cooperative project between

the [U.S. Geological Survey \(USGS\)](#) and [New York State Department of Environmental Conservation \(NYSDEC\) Division of Water](#), this study supports NYSDEC's responsibilities under Section 305(b) of the Clean Water Act Amendments of 1977. The resulting data set will be used to establish a groundwater quality baseline for New York State, characterizing naturally occurring, or background, conditions, and to identify long-term trends.

### Approach

Groundwater quality samples are collected and analyzed using consistent, standardized methods. Each year, samples are collected from existing domestic and public supply wells in two to three of the 14 major hydrologic basins in New York State (excluding Long Island, which is monitored through local County programs). The groundwater sampling parallels surface-water sampling done as part of the [NYSDEC Rotating Integrated Basin Studies \(RIBS\)](#) program, and areas of the State are sampled once every five years. Fifty to sixty groundwater samples are collected each year from existing domestic and public supply wells using standard USGS protocols. Wells are selected to represent an approximately equal number of public and private wells, an approximately equal number of bedrock and glacial-drift wells, and to provide a

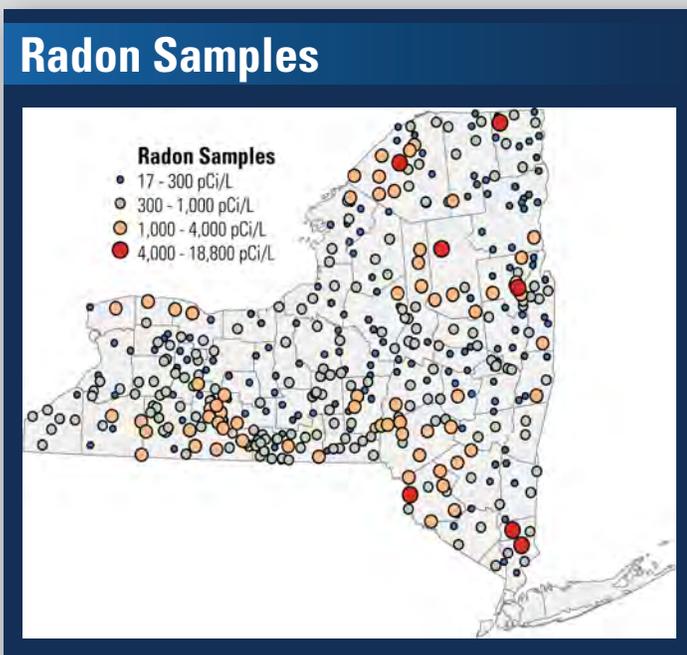


Figure 1. Radon-222 activities in 305(b) groundwater quality samples, collected since 2002.

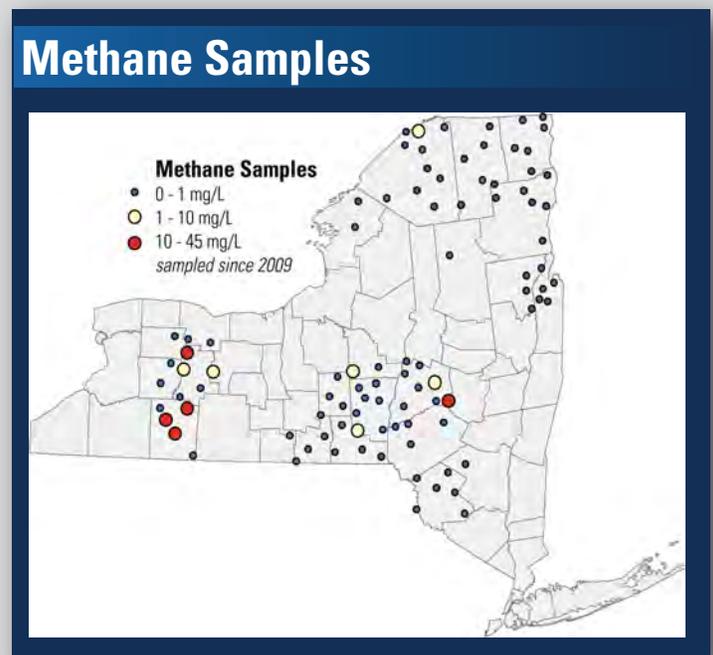


Figure 2. Dissolved methane concentrations in 305(b) groundwater quality samples, collected since 2009.

representative geographic distribution of samples. Most private wells selected for sampling are identified through [NYSDEC's Water Well Program](#).

Samples are analyzed for more than 100 constituents, including physical parameters, dissolved gases, nutrients, major ions, trace elements, bacteria, radiochemicals, total organic carbon, volatile organic compounds, and pesticides. The data are made available through the USGS National Water Information System and project reports. The project began in 2002 with a pilot study in the Mohawk River Basin, and sampling completed in 2008 represented the conclusion of a first round of groundwater-quality sampling throughout upstate New York State. As basins are sampled for the second and third time, approximately 20 percent of samples are collected from wells that previously have been sampled as part of this study. At the completion of the 2011 sampling season, more than 450 unique wells have been sampled as part of this project. Additional shale-gas-formation-relevant analyses, including dissolved-methane-gas concentration, were added in 2009.

## Results

Results of the groundwater quality sampling have shown that groundwater quality in New York State is generally good, but can vary greatly depending on local hydrogeology and land use. The most common constituents to exceed existing or proposed drinking water standards include radon-222, iron, manganese, and coliform bacteria.

Examples of study-wide results are shown in figures 1 and 2 for radon-222 and dissolved methane gas. The highest radon-222 activities detected, as much as 18,800 picocuries per liter, were found in samples collected from wells finished in crystalline bedrock. Radon-222

activities in many samples exceeded 300 picocuries per liter, part of a proposed drinking water standard, but few exceeded 4,000 picocuries per liter. Most samples had less than one milligram per liter of dissolved methane, but some samples had more than 20 milligrams per liter of dissolved methane. The maximum concentration of dissolved methane detected was more than 45 milligrams per liter in a sample from the Mohawk River Basin.

## Related Publications

Nystrom, E.A., 2011, Groundwater quality in the Lake Champlain Basin, New York, 2009: U.S. Geological Survey Open-File Report 2011-1180, 42 p., <http://pubs.usgs.gov/of/2011/1180/>.

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Risen, A.J., and Reddy, J.E., 2011, Groundwater quality in the Eastern Lake Ontario Basin of New York, 2008: U.S. Geological Survey Open-File Report 2011-1074, 32 p., <http://pubs.usgs.gov/of/2011/1074>.

Nystrom, E.A., 2010, Groundwater quality in the Lower Hudson River Basin, New York, 2008: U.S. Geological Survey Open-File Report 2010-1197, 39 p., <http://pubs.usgs.gov/of/2010/1197/>.

Eckhardt, D.A., Reddy, J.E., and Shaw, S.B., 2009, Groundwater quality in central New York, 2007: U.S. Geological Survey Open-File Report 2009-1257, 40 p., <http://pubs.usgs.gov/of/2009/1257/>.

Nystrom, E.A., 2009, Ground-water quality in the Upper Hudson River Basin, New York, 2007: U.S. Geological Survey Open-File Report 2009-1240, 37 p., <http://pubs.usgs.gov/of/2009/1240/>.

Nystrom, E.A., 2008, Ground-water quality in the Mohawk River Basin, New York, 2006: U.S. Geological Survey Open-File Report 2008-1086, 33 p., <http://pubs.usgs.gov/of/2008/1086/>.

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quality in western New York, 2006: U.S. Geological Survey Open-File Report 2008-1140, 36 p., <http://pubs.usgs.gov/ofr/2008/1140/>.

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Nystrom, E.A., 2007, Ground-water quality in the St. Lawrence River Basin, New York, 2005-06: U.S. Geological Survey Open-File Report 2007-1066, 33 p., <http://pubs.usgs.gov/of/2007/1066/>.

Nystrom, E.A., 2006, Ground-Water Quality in the Lake Champlain Basin, New York, 2004: U.S. Geological Survey Open-File Report 2006-1088, 21 p., <http://ny.water.usgs.gov/pubs/of/of061088/>.

Hetcher-Aguila, K.K. and Eckhardt, D.A.V., 2006, Ground-water quality in the upper Susquehanna River Basin, New York, 2004-05: U.S. Geological Survey Open-File Report 2006-1161, 20 p., <http://ny.water.usgs.gov/pubs/of/of061161/>.

Hetcher-Aguila, K.K., 2005, Ground-Water Quality in the Chemung River Basin, New York, 2003: U.S. Geological Survey Open-File Report 2004-1329, 19 p., <http://ny.water.usgs.gov/pubs/of/of041329/>.

## Primary Researchers

Elizabeth Nystrom  
USGS  
(518) 285-5634  
425 Jordan Road  
Troy, NY 12180-8349  
nystrom@usgs.gov

Jim Reddy  
USGS  
(607) 266-0217  
30 Brown Road  
Ithaca, NY 14850  
jreddy@usgs.gov

## For Additional Information

Visit the New York Water Science Center Web site at: <http://ny.water.usgs.gov>  
Or contact Ward O. Freeman, Director  
(518) 285-5665 dc\_ny@usgs.gov