State Summary for New York

Information on population density, use of domestic-water supply, land use, and distribution of the 11 selected contaminants (arsenic, atrazine, benzene, deethylatrazine (CIAT), manganese, nitrate (data for nitrate consists of analyses for nitrite plus nitrate, as N, by the laboratory), perchloroethene (PCE), radon, strontium, trichloroethene (TCE), and uranium) for domestic well data for New York is shown in figures NY1–NY16. The percentage of samples greater than U.S. Environmental Protection Agency (USEPA) human-health benchmarks for National Water-Quality Assessment (NAWQA) Program major-aquifer studies that included New York and had at least 10 samples is given in table NY1. The areal extent of some NAWQA Program major-aquifer studies goes beyond the State boundary (fig. NY4). All data associated with a major-aquifer study are provided and are used in contaminant summaries even if the sampled well was located outside the State boundary. The "Selected References" section at the end of this summary lists previous New York studies that are relevant to the 11 contaminants. The USGS in New York currently (2007) has a cooperative study with the New York State Department of Environmental Conservation that has been evaluating ground-water quality in selected major hydrologic basins in New York State for a comprehensive suite of constituents since 2002. Sample collection rotates among the 14 major basins in a multi-year cycle—one to three basins are sampled each year, and eight basins were sampled as of 2006. When the data set is complete, a more comprehensive evaluation of ground-water quality in New York State will be possible (Kenneth Pearsall, U.S. Geological Survey, written commun., June 5, 2007).

In New York, the largest areas with the highest population density are located in the west-central and southeastern parts of the State (fig. NY1). About 35 percent of the domestic (private) and public drinking-water supply is obtained from ground water. The population (by census-block group for 1990) using a domestic-water supply from ground water was widespread throughout the State, with the exception of most of the northeastern part of the State and the major population centers where less than 250 people per census block group were using ground water as a domestic water supply (fig. NY2). Although New York is a heavily populated State, it also contains many forested and agriculture lands. Most of the forested areas are located in the eastern part of the State, and most of the agriculture is located in the western part of the State (fig. NY3).

Four major-aquifer studies in two principal aquifers (New York/New England crystalline-rock aquifers and glacial aquifers) were conducted in New York (fig. NY4). New York/New England crystalline rock aquifers in New York consist mostly of metamorphic and igneous rocks and generally are confined (Olcott, 1995). The regolith and fractures in the bedrock serve as the primary areas of storage and well yields generally are only a few gallons per minute, although some well yields may exceed 120 gallons per minute (Olcott, 1995).

Table NY1. Percentage of samples with concentrations greater than U.S. Environmental Protection Agency human-health benchmarks for National Water-Quality Assessment (NAWQA) Program major-aquifer studies that included New York and had at least 10 samples.

Study-Unit code for NAWQA major-aquifer study	Principal aquifer	Contaminant	Number of samples	Percentage of samples with concentrations greater than human-health benchmark
delrsus3	Glacial aquifers	Radon	12	[1]100/0.0
connsus1	New York/New England crystalline-rock aquifers	Radon	27	[1]96/37
linjsus1	New York/New England crystalline-rock aquifers	Radon	27	[1]85/19
almnsus2	Glacial aquifers	Radon	30	[1]77/0.0
almnsus2	Glacial aquifers	Manganese	30	13
delrsus3	Glacial aquifers	Manganese	12	8.3
connsus1	New York/New England crystalline-rock aquifers	Arsenic	26	3.8
linjsus1	New York/New England crystalline-rock aquifers	Arsenic	29	3.4
linjsus1	New York/New England crystalline-rock aquifers	Uranium	29	3.4

[1]First number is the percentage greater than 300 picocuries per liter (proposed Maximum Contaminant Level), and second number is the percentage greater than 4,000 picocuries per liter (alternate proposed Maximum Contaminant Level).

Several glacial aquifers occur near the land surface throughout New York and consist of aquifers in unconsolidated sand and gravel deposits of Quaternary age. Most of the individual aquifers that comprise the system are not hydraulically connected, and were formed mostly from sediments deposited by continental glaciers or by meltwater from glaciers, or from alluvium in valleys of major streams (Trapp and Horn, 1997). Most of the productive aquifers contain water under mostly unconfined conditions. Well yields are quite variable in the glacial systems because of variable thicknesses, coarseness of material, and the extent of the deposits.

Water-quality data for 11 selected contaminants (table 2) in samples from domestic-water supplies were compiled and summarized. The concentrations relative to USEPA human-health benchmarks (table 2, fig. NY5) and the number of major-aquifer studies with concentrations greater than human-health benchmarks were both considered in evaluating the potential concern to human health. This analysis assumes that current USEPA benchmarks (U.S. Environmental Protection Agency) are the most relevant and accurate measure of human-health risk.

Radon and manganese had concentrations greater than USEPA human-health benchmarks (table NY1). Arsenic and uranium also had concentrations greater than USEPA human-health benchmarks, but those concentrations were not in samples collected in New York. Radon had the greatest potential human-health concern because it had the largest percentage of samples with concentrations greater than the human-health benchmark of 300 picocuries per liter (pCi/L). All the samples (100 percent) in the delrsus3 major-aquifer study in the glacial aquifers had radon concentrations greater than 300 pCi/L, which is the proposed Maximum Contaminant Level (MCL) for radon, but none of the samples had concentrations greater than the alternate proposed MCL of 4,000 pCi/L (table NY1). Radon concentrations were greater than the proposed MCL in about 96 and 85 percent of the samples from the connsus1 and linjsus1 major-aquifer studies, respectively, in the New York/New England crystalline rock aquifers, and about 37 and 19 percent of the samples had concentrations greater than the alternative proposed MCL (table NY1). About 77 percent of samples in the almnsus2 major-aquifer study in the glacial aquifers had radon concentrations greater than the proposed MCL (table NY1). Median radon concentrations for studies in the New York/New England crystalline rock aquifers were greater than 1,000 pCi/L, and median concentrations of the glacial aquifer studies were less than 1,000 pCi/L (fig. NY5). U.S. Geological Survey (USGS) State data also showed radon concentrations to be greater than the human-health benchmark of 300 pCi/L in most of the samples collected (fig. NY13). Radon-222 is a decay product of radium-226, and radon concentrations greater than the human-health benchmark are widespread and can be attributed to natural sources in the soil and rock material in New York.

Manganese concentrations were greater than the USEPA human-health benchmark (Lifetime Health Advisory (HA) of 300 µg/L) in about 13 percent (almnsus2) and 8 percent (delrsus3) of the samples, respectively, collected for two studies in the glacial aquifers system (table NY1). USGS State data for manganese (fig. NY10) showed concentrations of several samples to be greater than their human-health benchmark, and were distributed in groups of several samples throughout the State. Some people could be using domestic-water supplies in the areas where manganese concentrations were greater than the human-health benchmark on the basis of water-use data.

USGS State data indicated that the TCE concentration in one sample was greater than the human-health benchmark (fig. NY15). TCE concentrations were not greater than the human-health benchmark in any of the NAWQA samples.

For the entire New York data set, arsenic (fig. NY6), atrazine (fig. NY7), benzene (fig. NY8), CIAT (fig. NY9), nitrate (fig. NY11), PCE (fig. NY12), strontium (fig. NY14), and uranium (fig. NY16) did not have concentrations larger than USEPA human-health benchmarks for either NAWQA or USGS State data for samples collected in New York. CIAT is a degradation product of atrazine and does not have a human-health benchmark; however, for this report, the MCL for atrazine is used as a benchmark for CIAT because their toxicities are considered equivalent.

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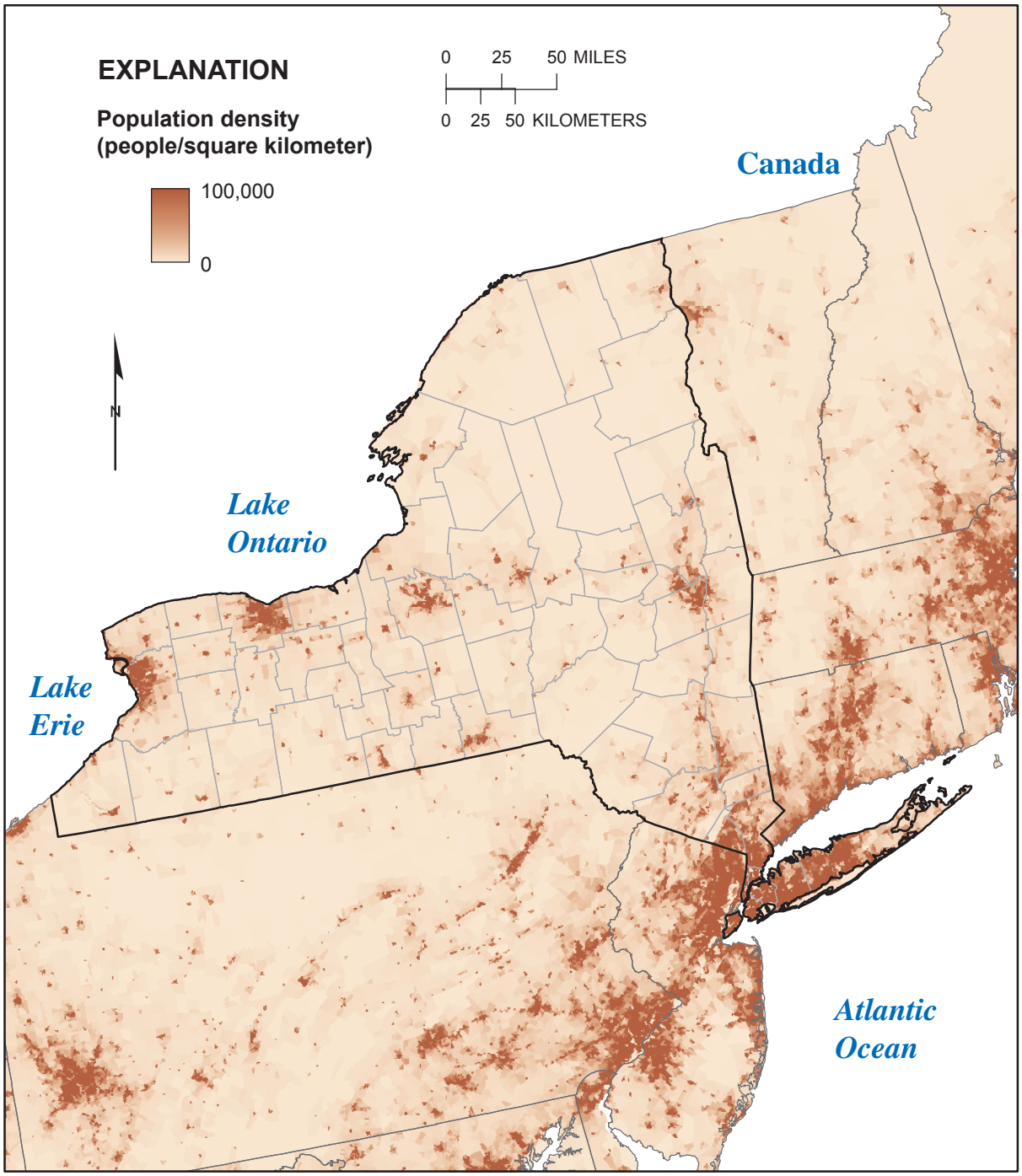
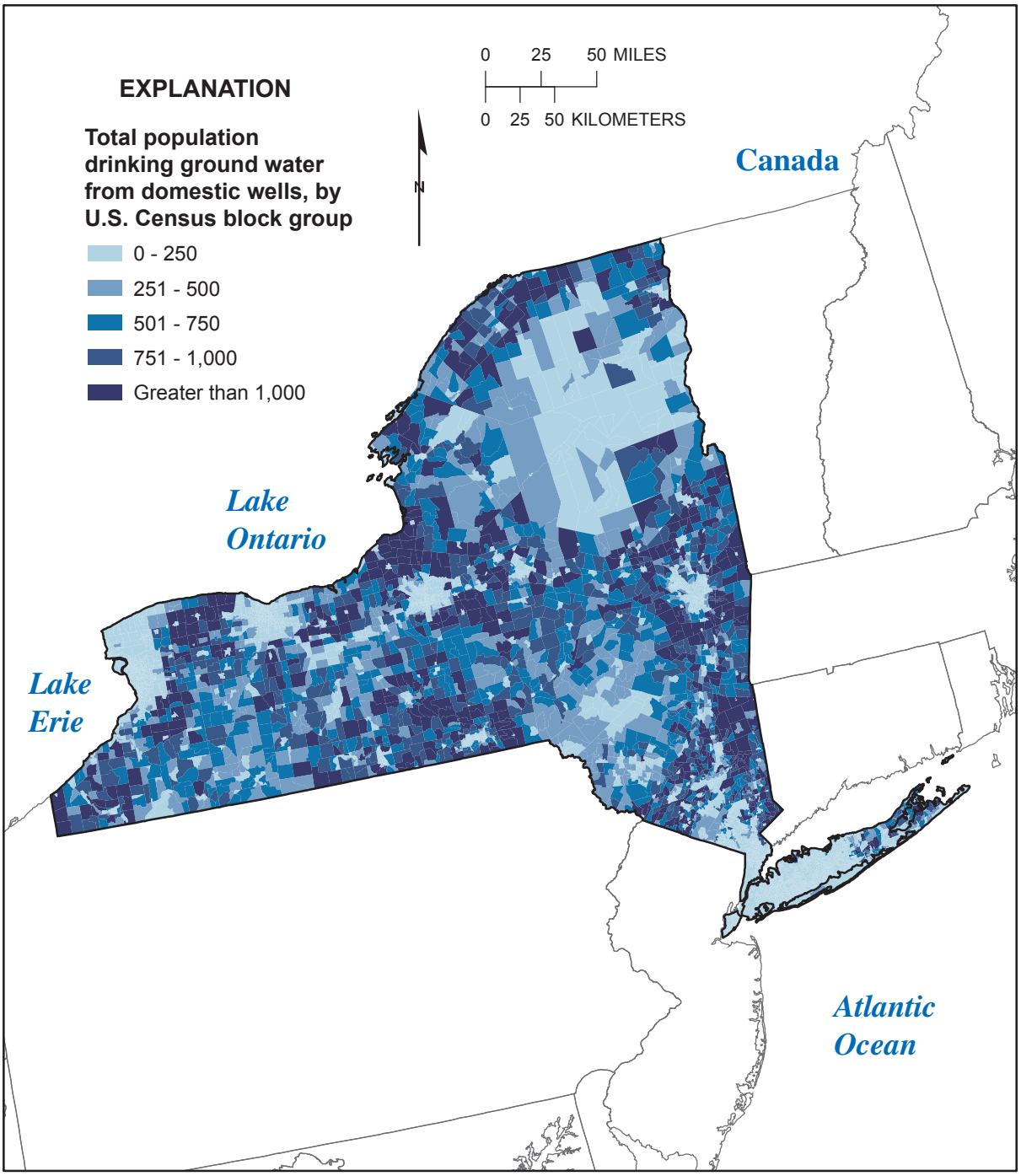


Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Figure NY1. Population density for New York and nearby States. (Data from Hitt, 2003.)



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Standard Parallels 29º30' and 45º30', central meridian -96º

Figure NY2. Population using domestic-water supply (from ground water) for New York. (Data from 1990 U.S. Census block group, Kerie Hitt, U.S. Geological Survey, written commun., 1997.)

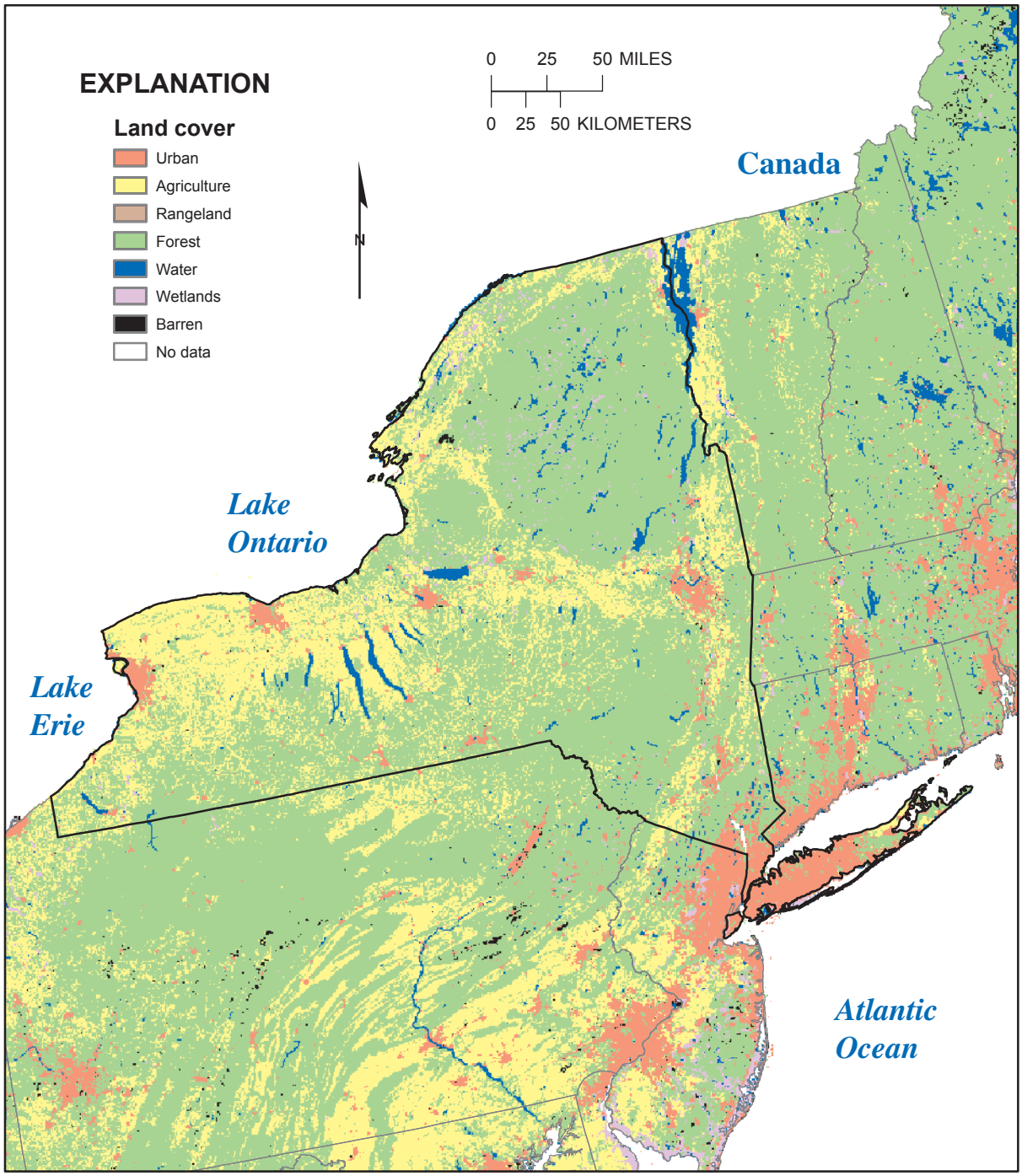

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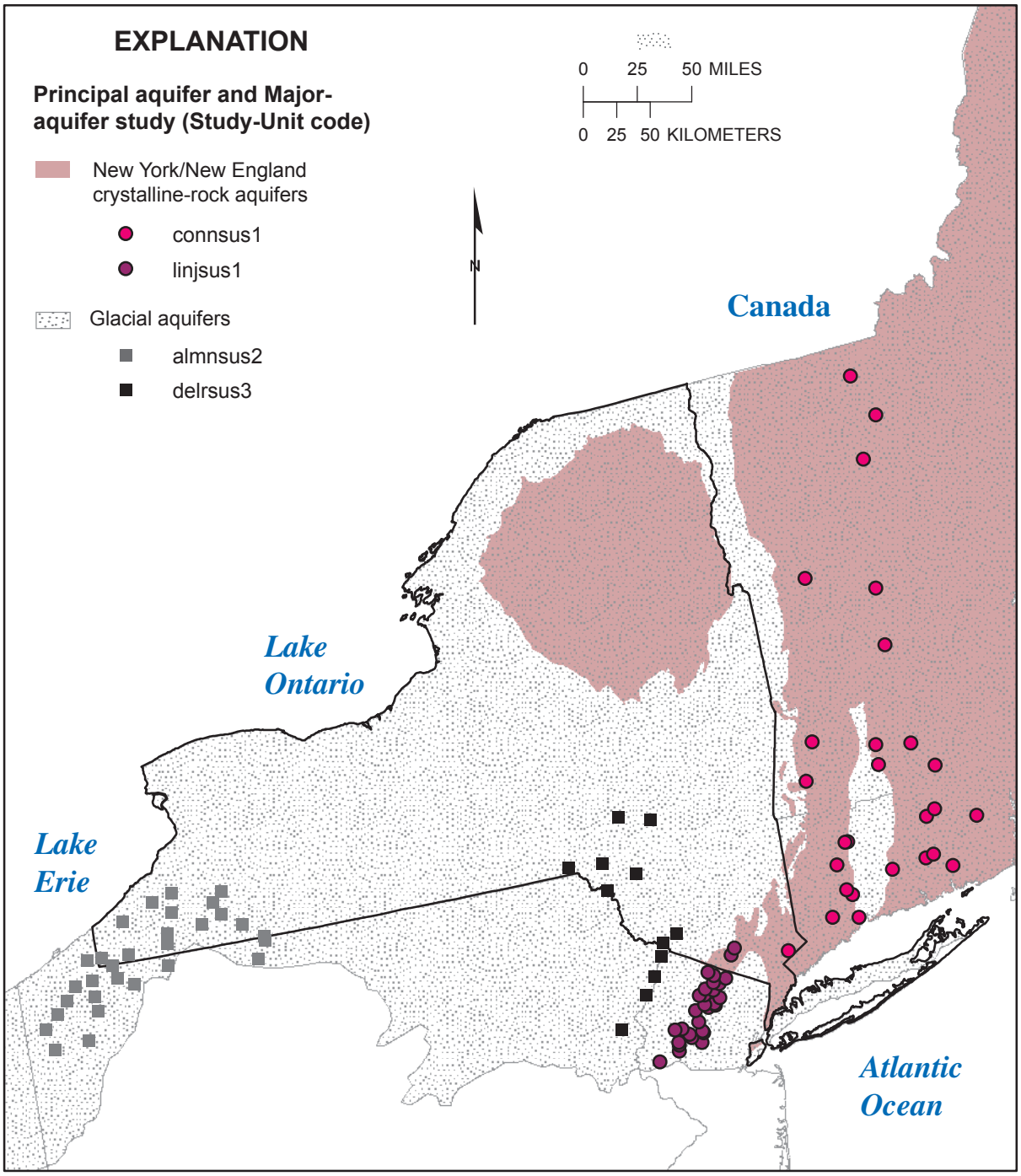
Figure NY3. Land use/land cover for New York and nearby States. (Data from Naomi Nakagaki, U.S. Geological Survey, written commun., 2005.)



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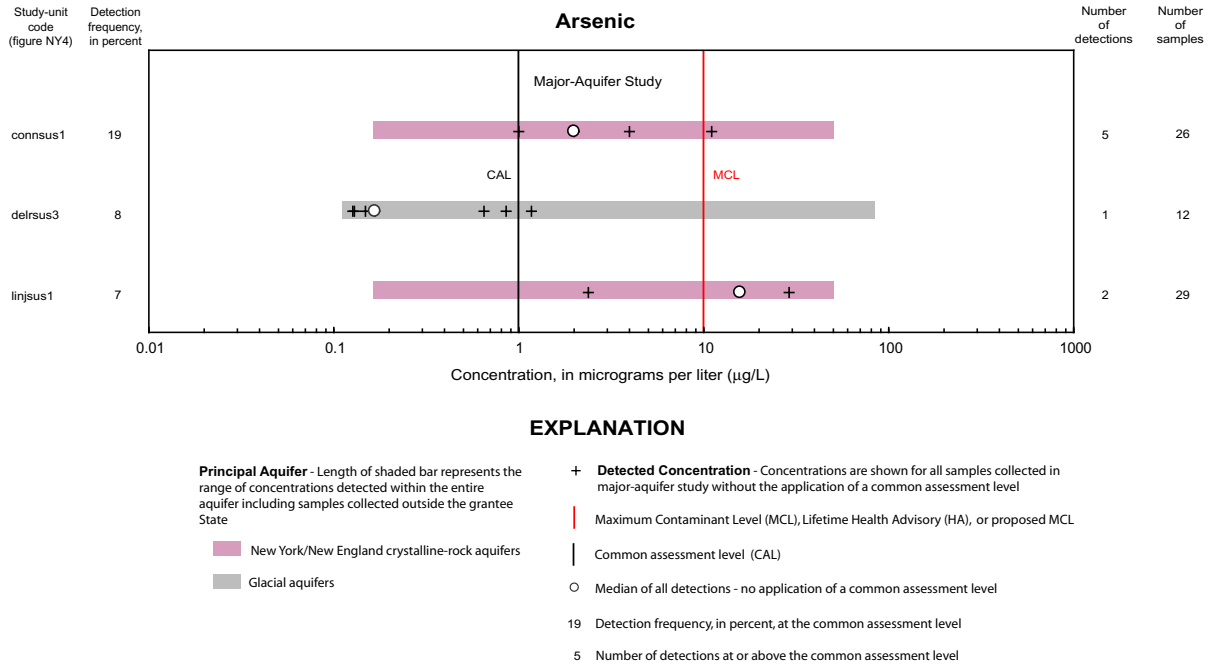
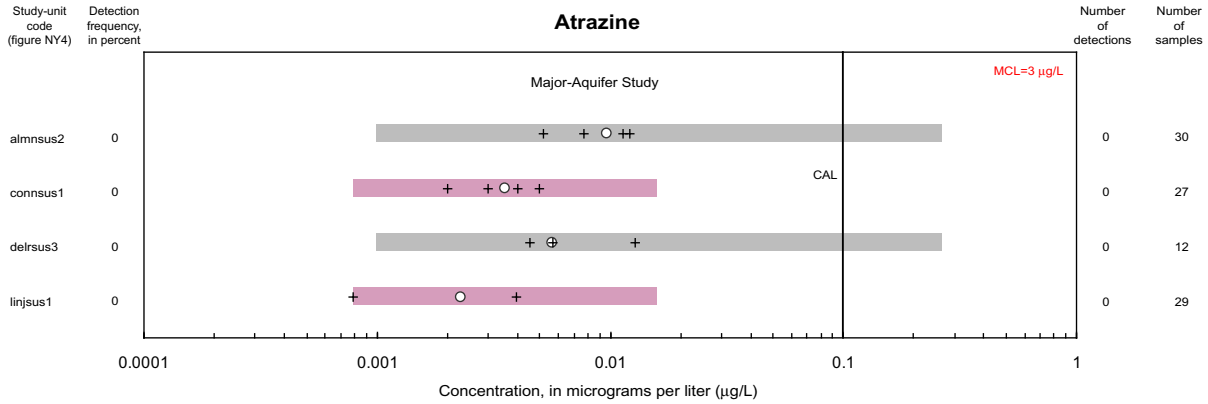
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

Figure NY4. Location of domestic wells sampled for National Water-Quality Assessment (NAWQA) major-aquifer studies that included New York.





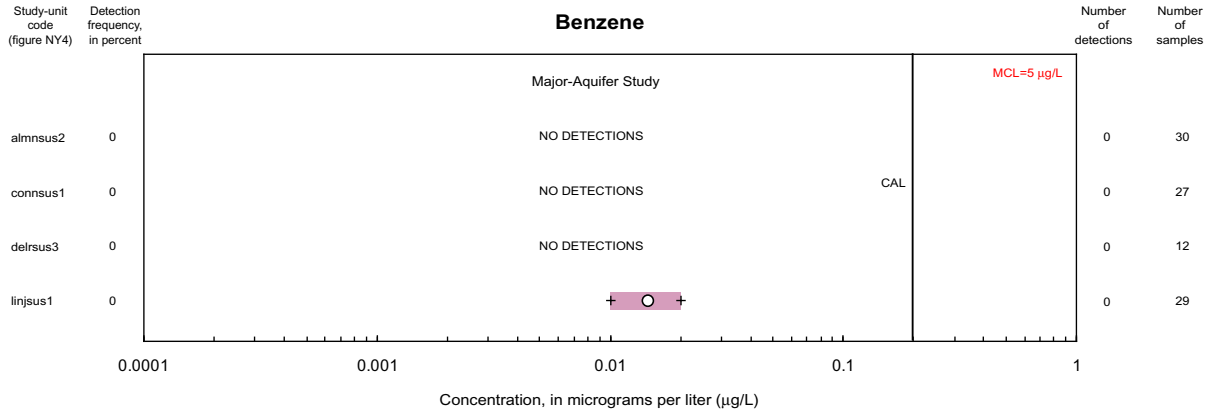
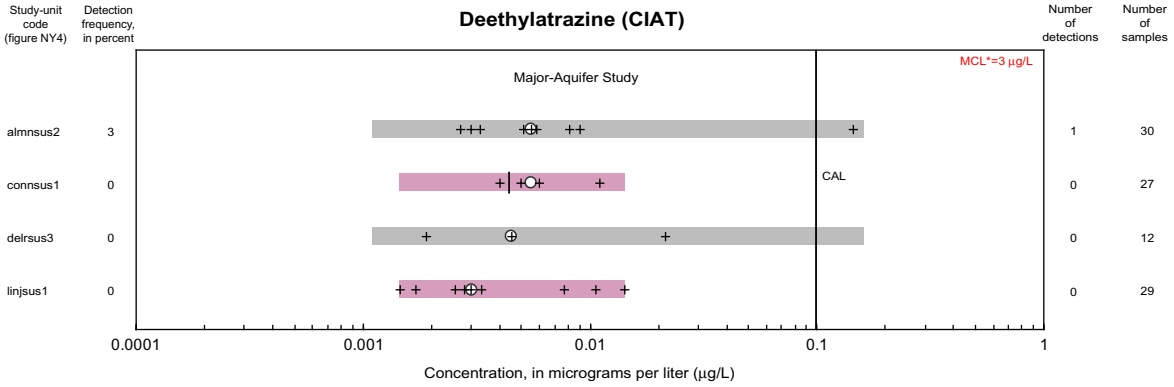
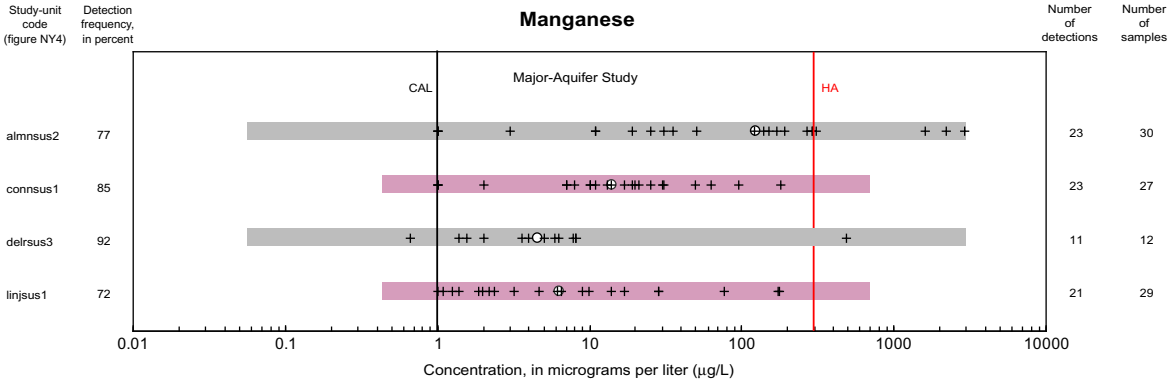
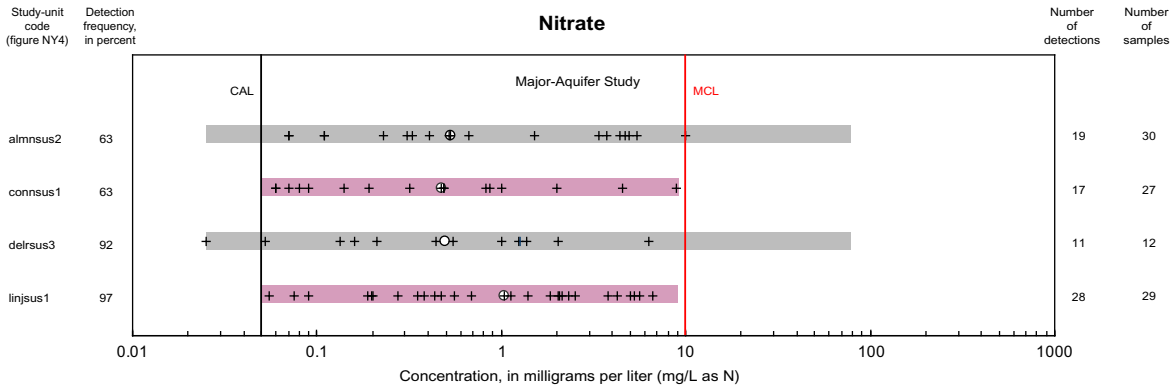


Figure NY5. Statistical summary for 11 selected contaminants by major-aquifer study using domestic-well data from National Water-Quality Assessment (NAWQA) studies for New York (includes studies for which at least 10 analyses were available).



* For this report, the MCL for atrazine is used as a benchmark for deethylatrazine because their toxicities are considered equivalent (see report text)





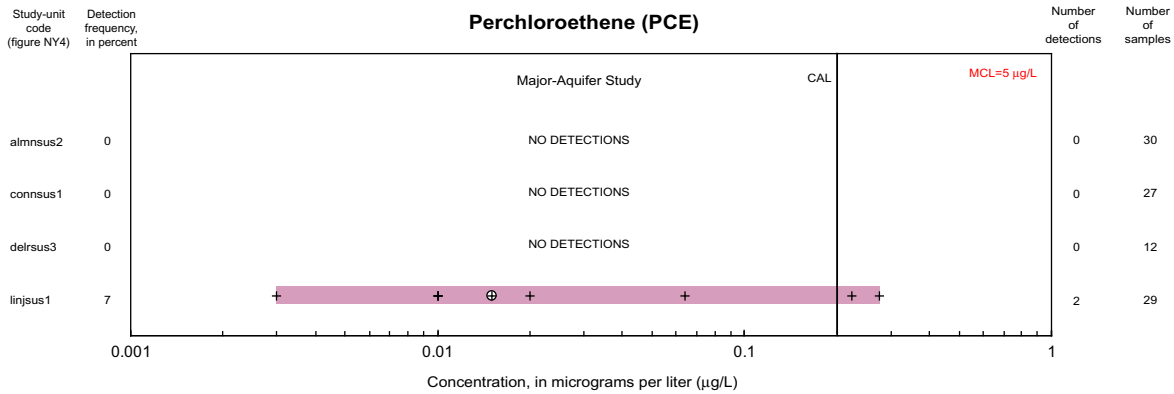
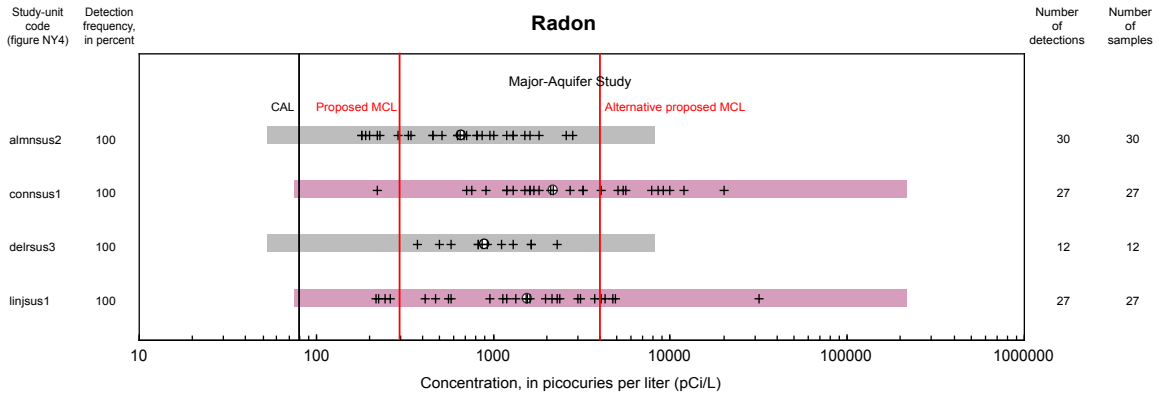
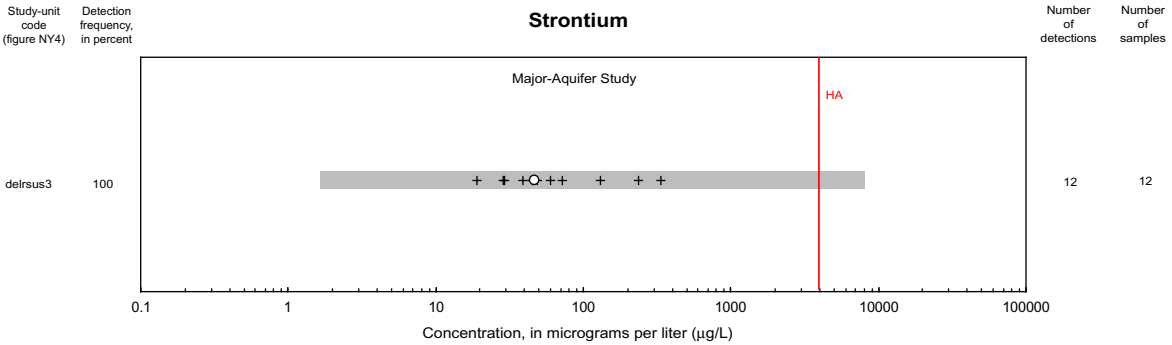
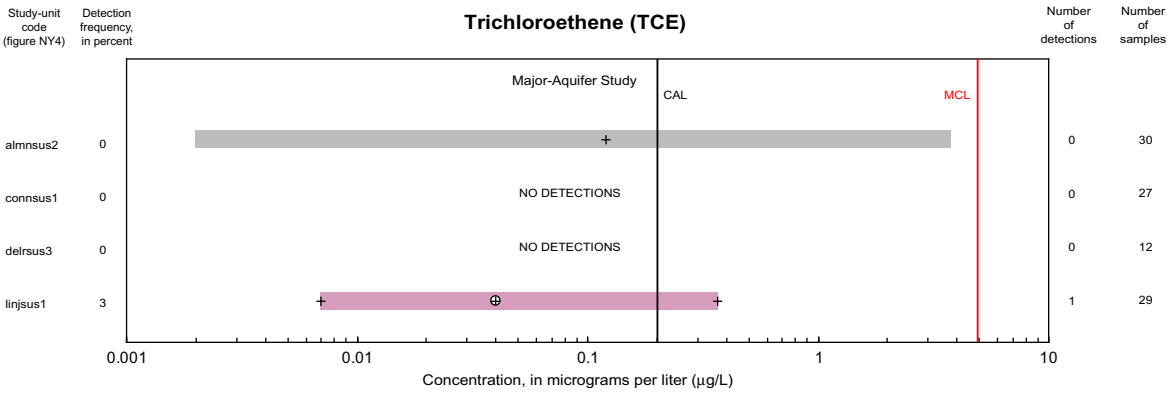


Figure NY5. Statistical summary for 11 selected contaminants by major-aquifer study using domestic-well data from National Water-Quality Assessment (NAWQA) studies for New York (includes studies for which at least 10 analyses were available).—Continued







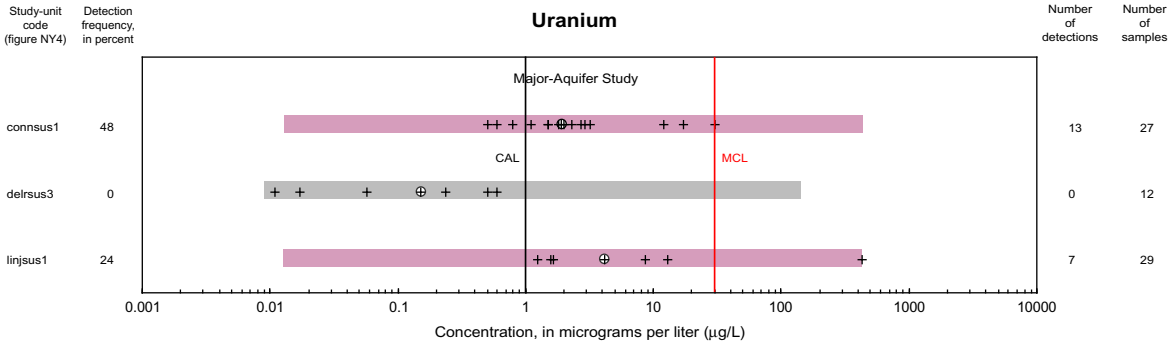
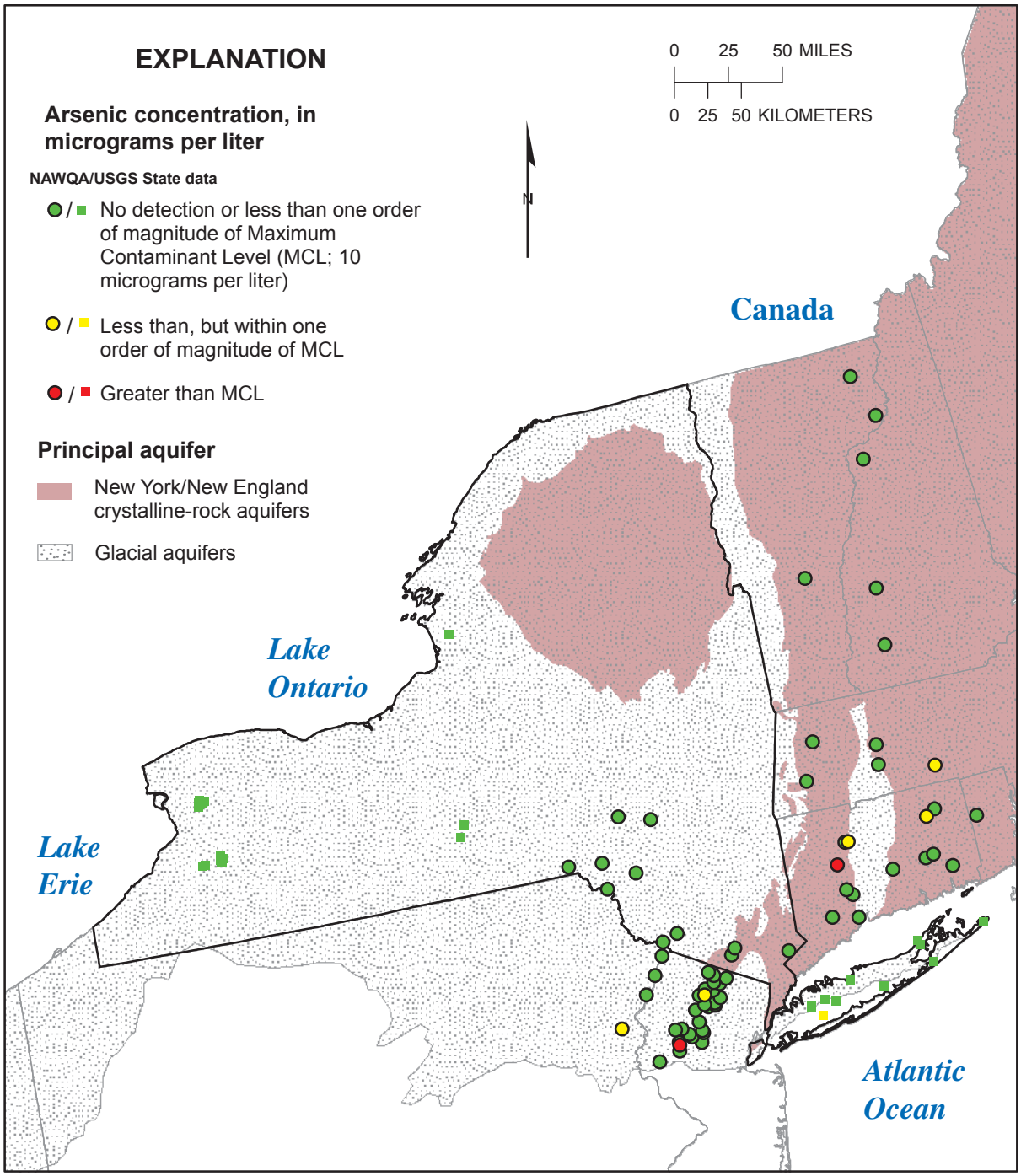


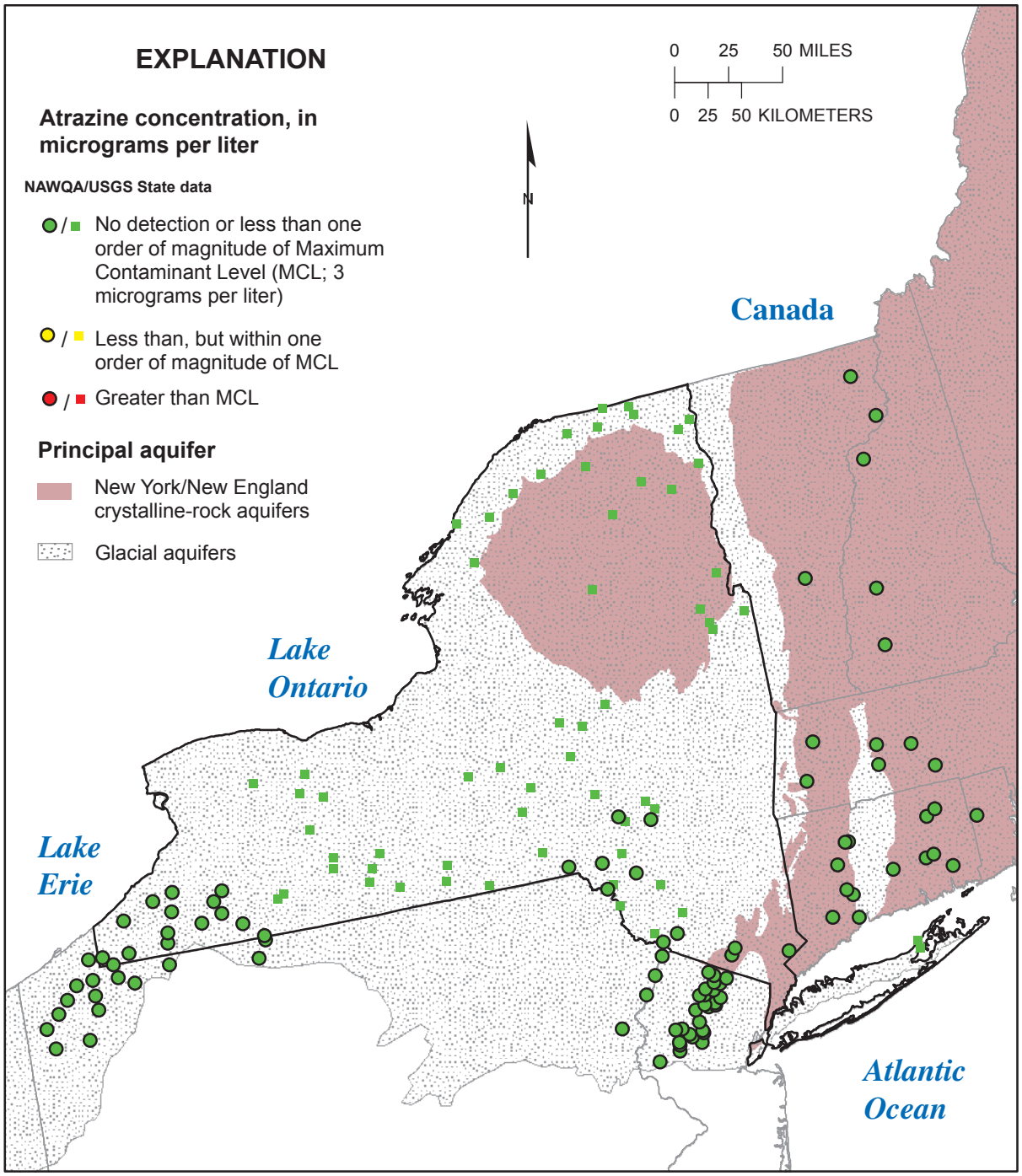
Figure NY5. Statistical summary for 11 selected contaminants by major-aquifer study using domestic-well data from National Water-Quality Assessment (NAWQA) studies for New York (includes studies for which at least 10 analyses were available).—Continued



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

Figure NY6. Concentration of arsenic in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



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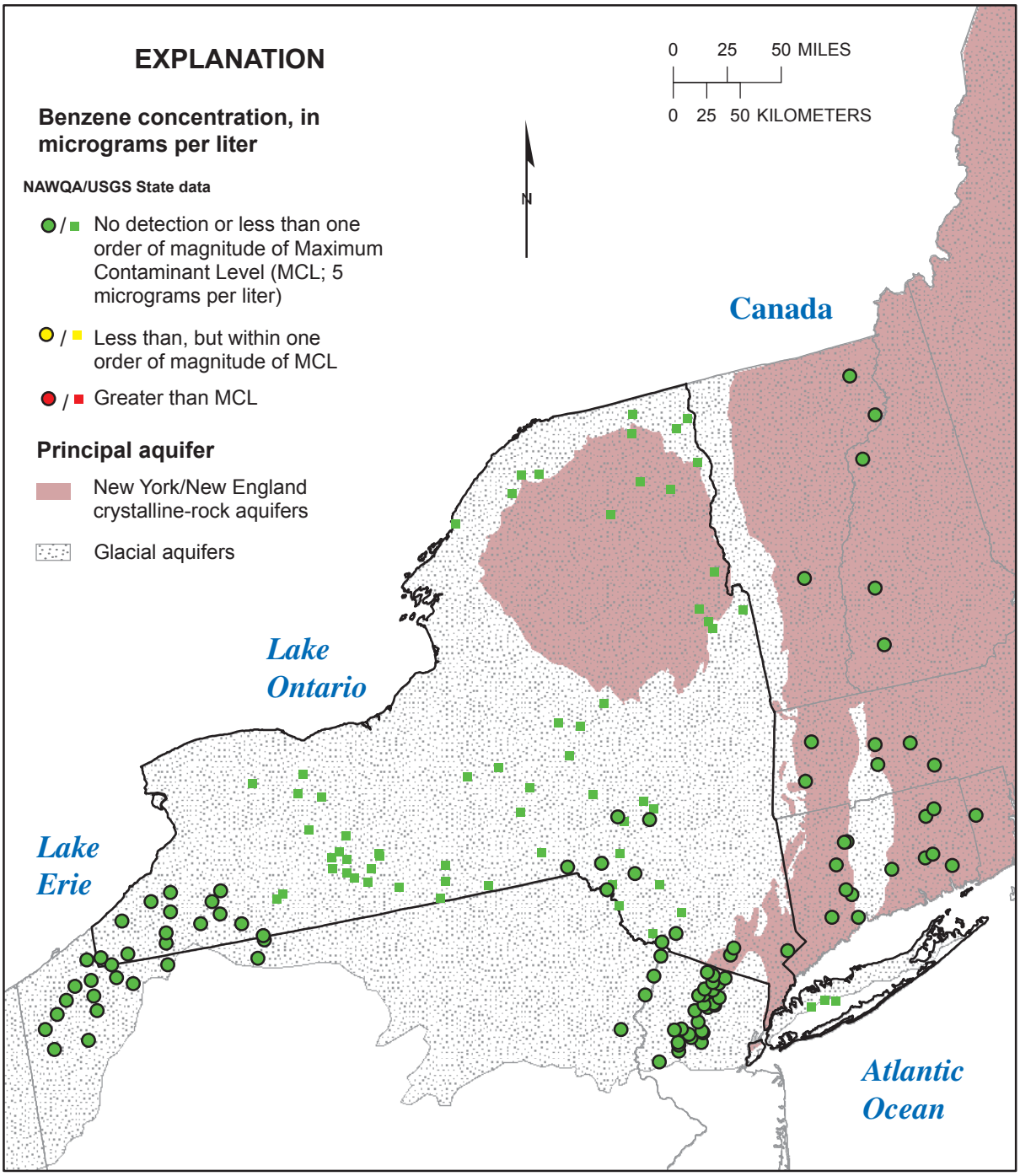
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

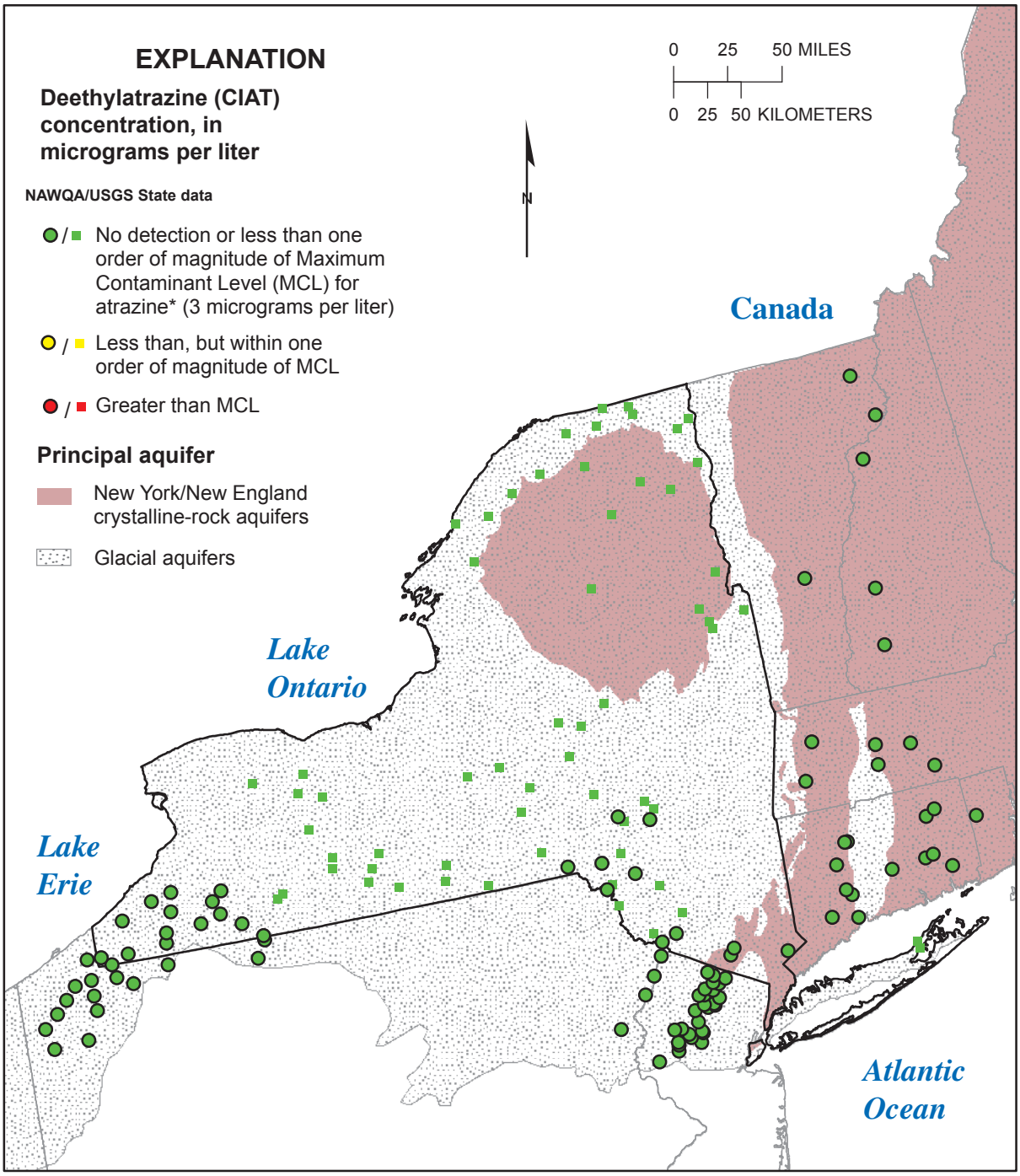
Figure NY7. Concentration of atrazine in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

Figure NY8. Concentration of benzene in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).

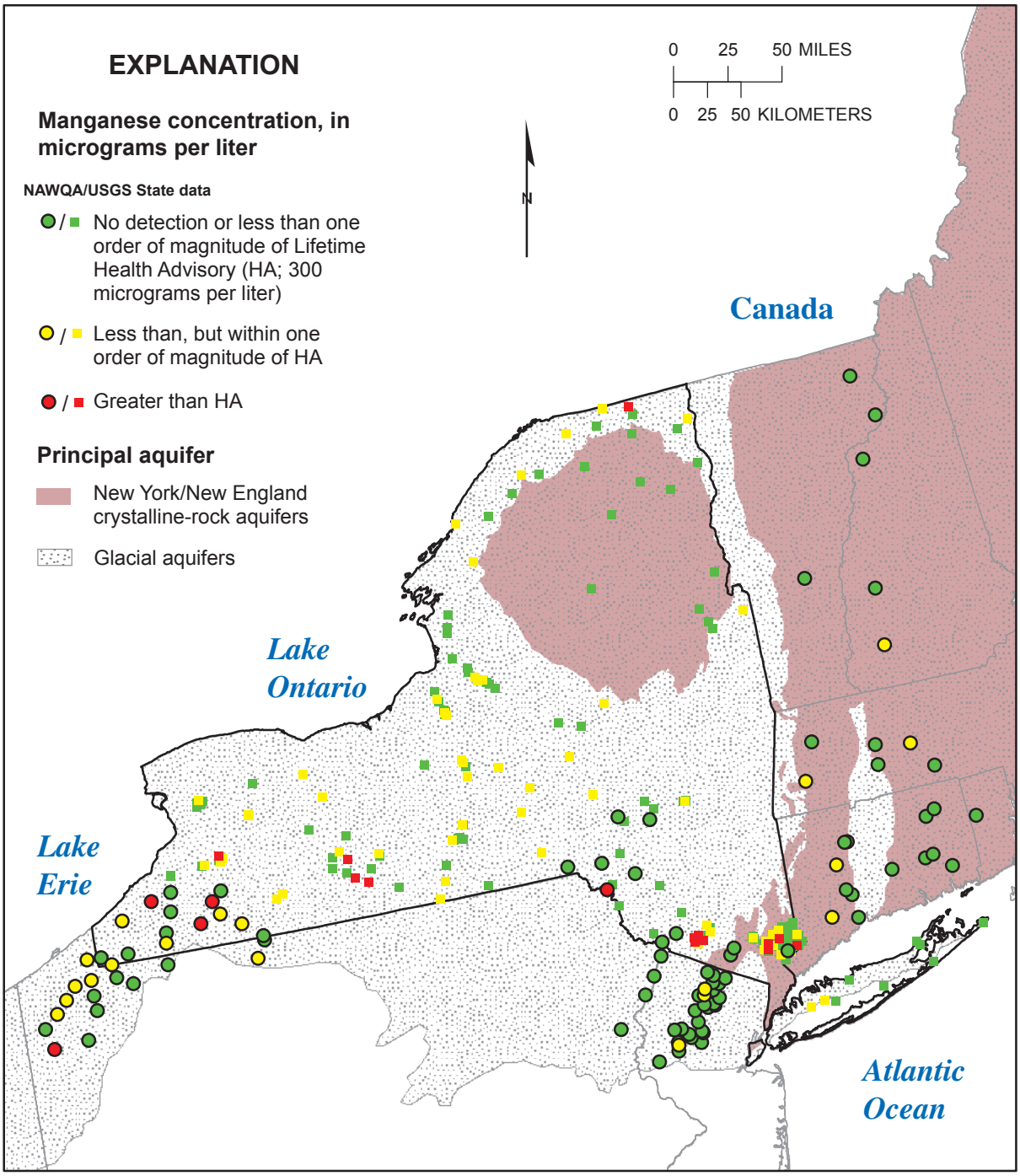


Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

* For this report, the MCL for atrazine is used as benchmark for deethylatrazine because their toxicities are considered equivalent (see report text).

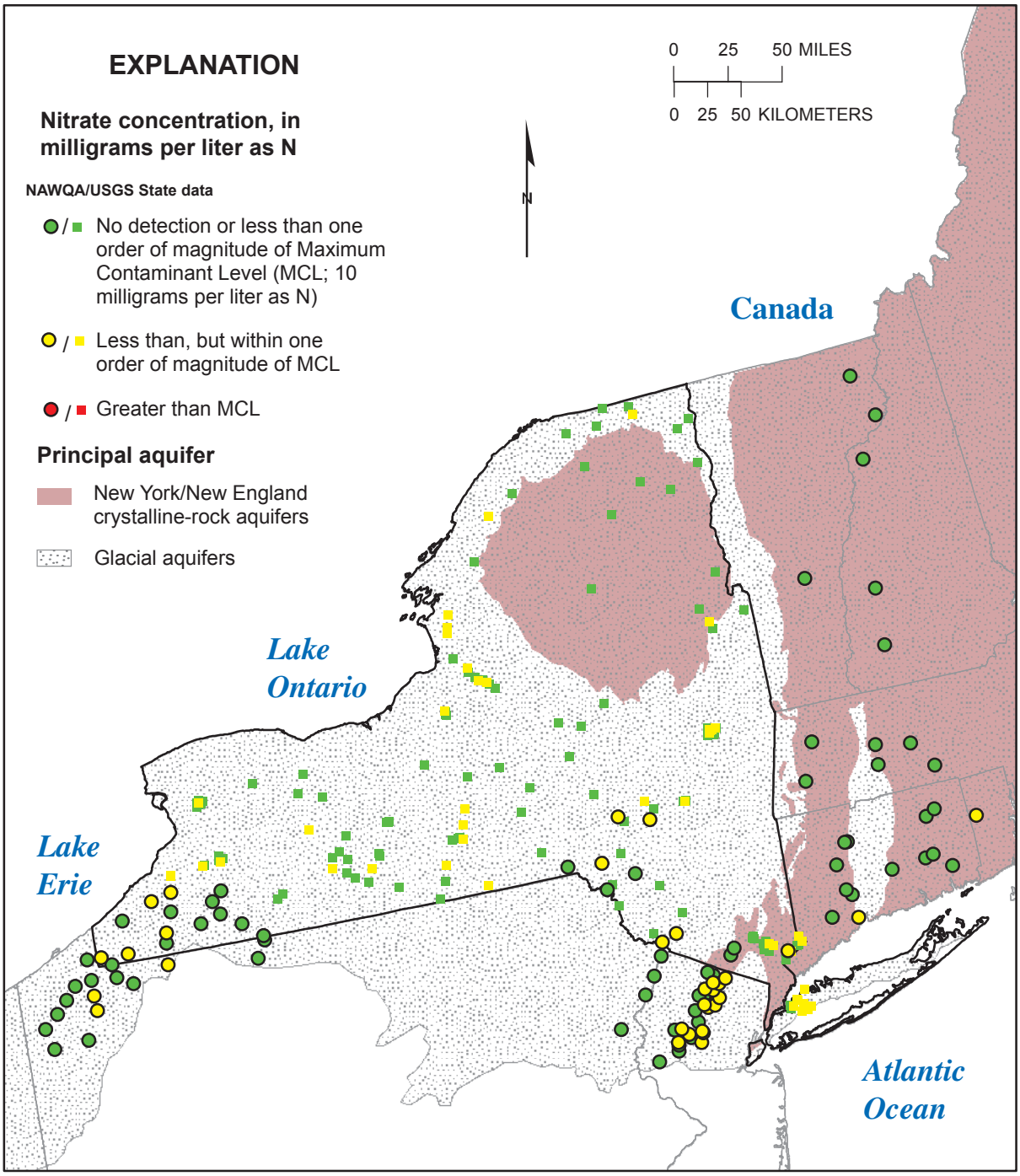
Figure NY9. Concentration of deethylatrazine (CIAT) in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

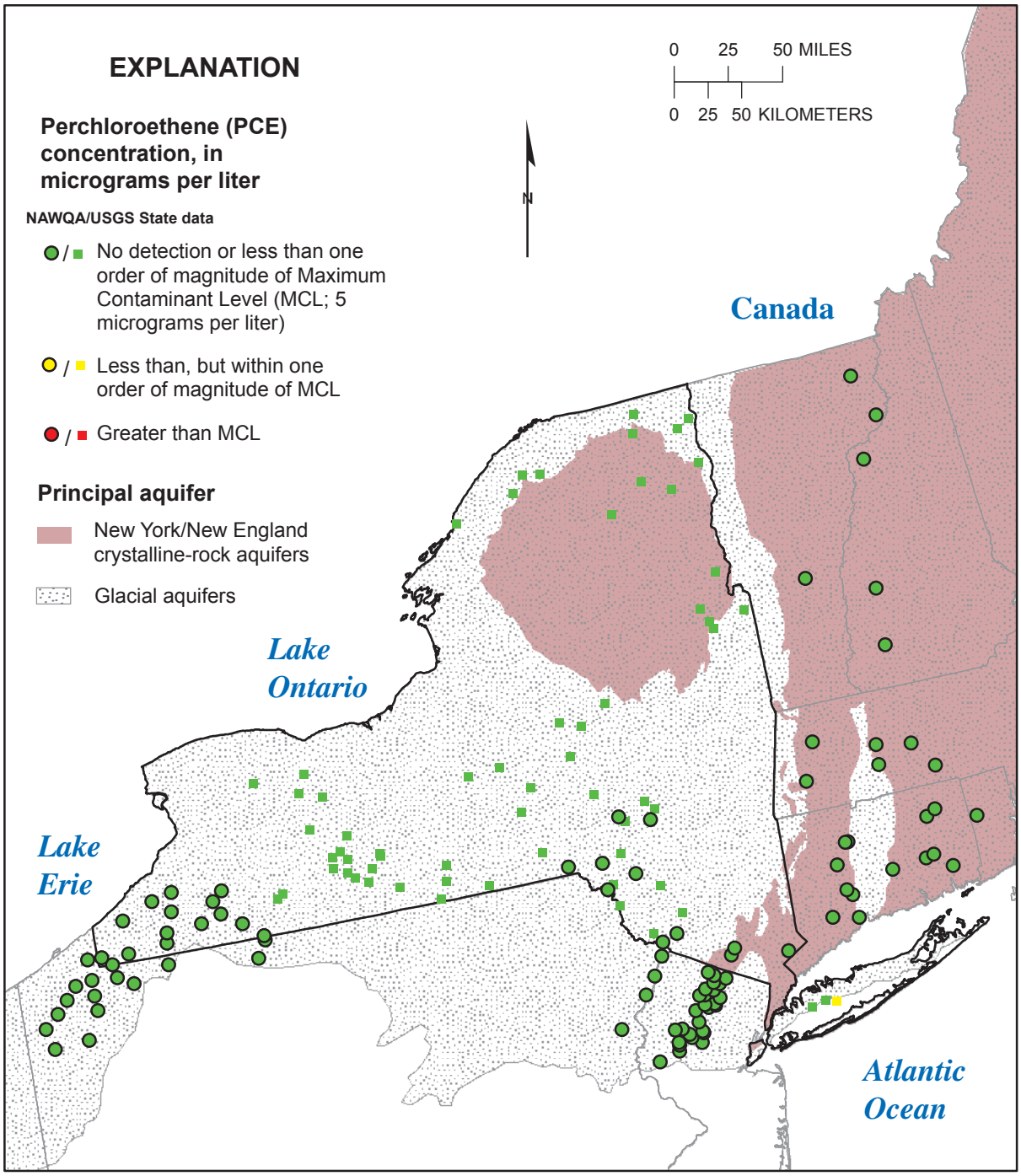
Figure NY10. Concentration of manganese in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

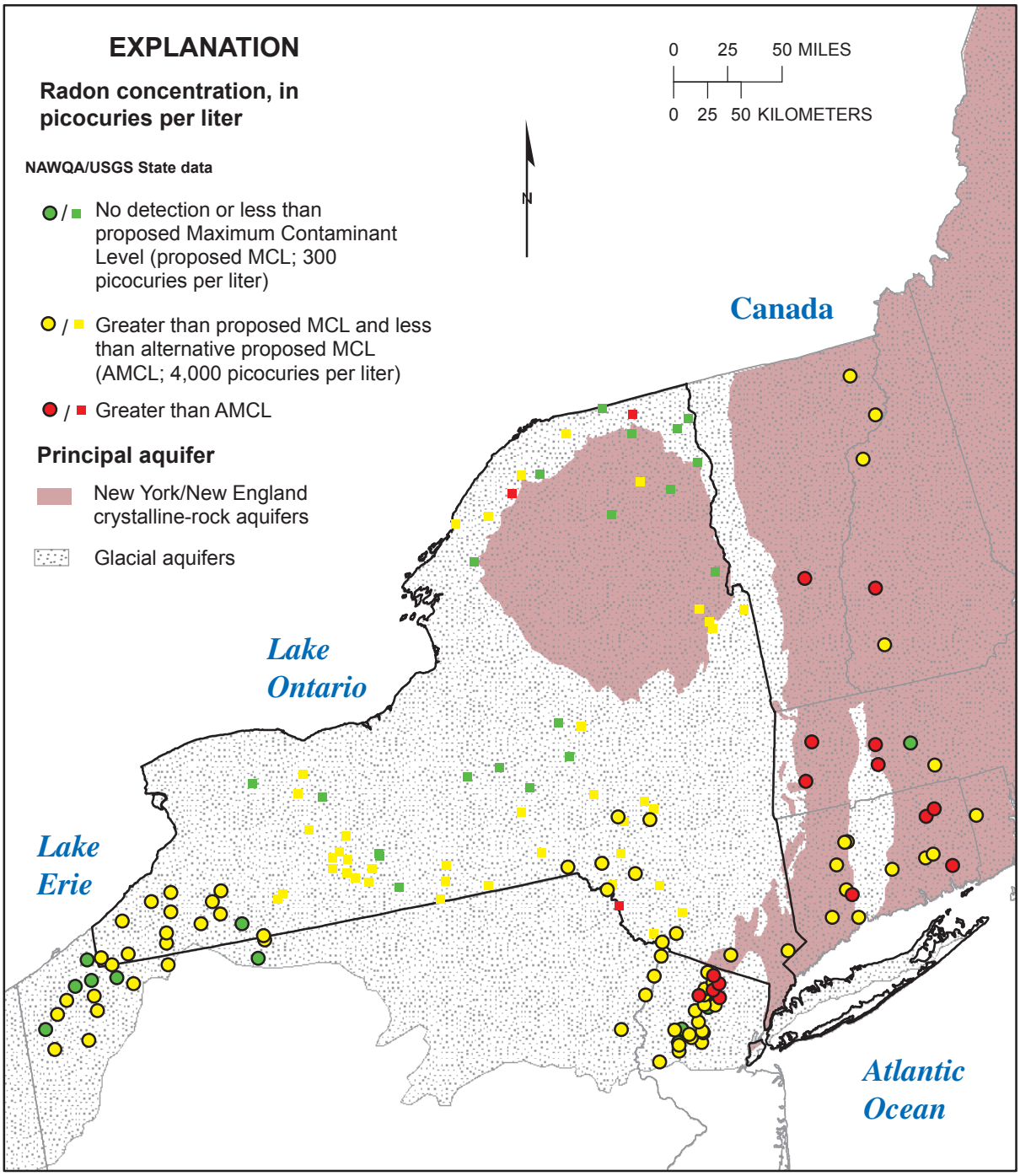
Figure NY11. Concentration of nitrate in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

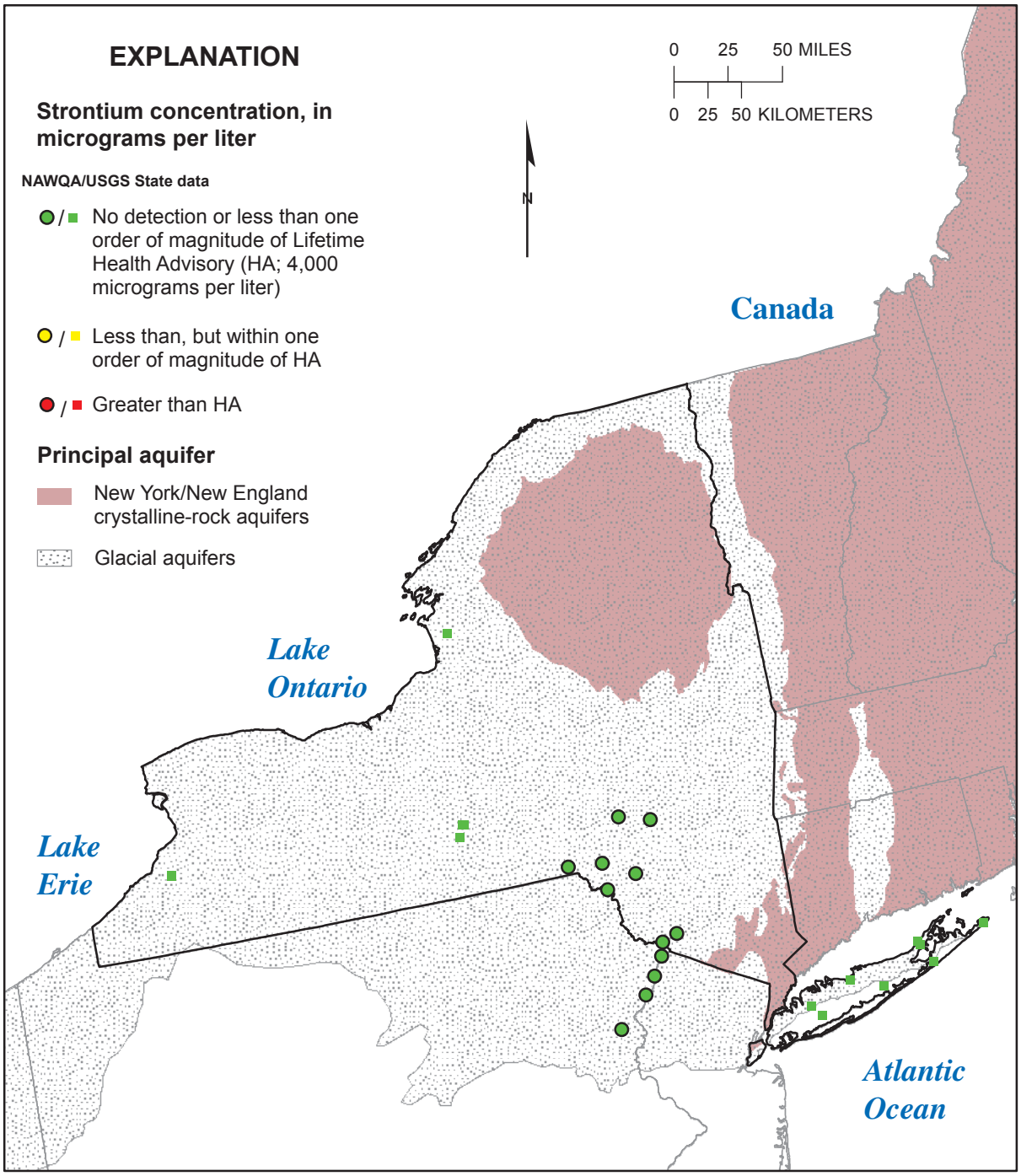
Figure NY12. Concentration of perchloroethene (PCE) in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

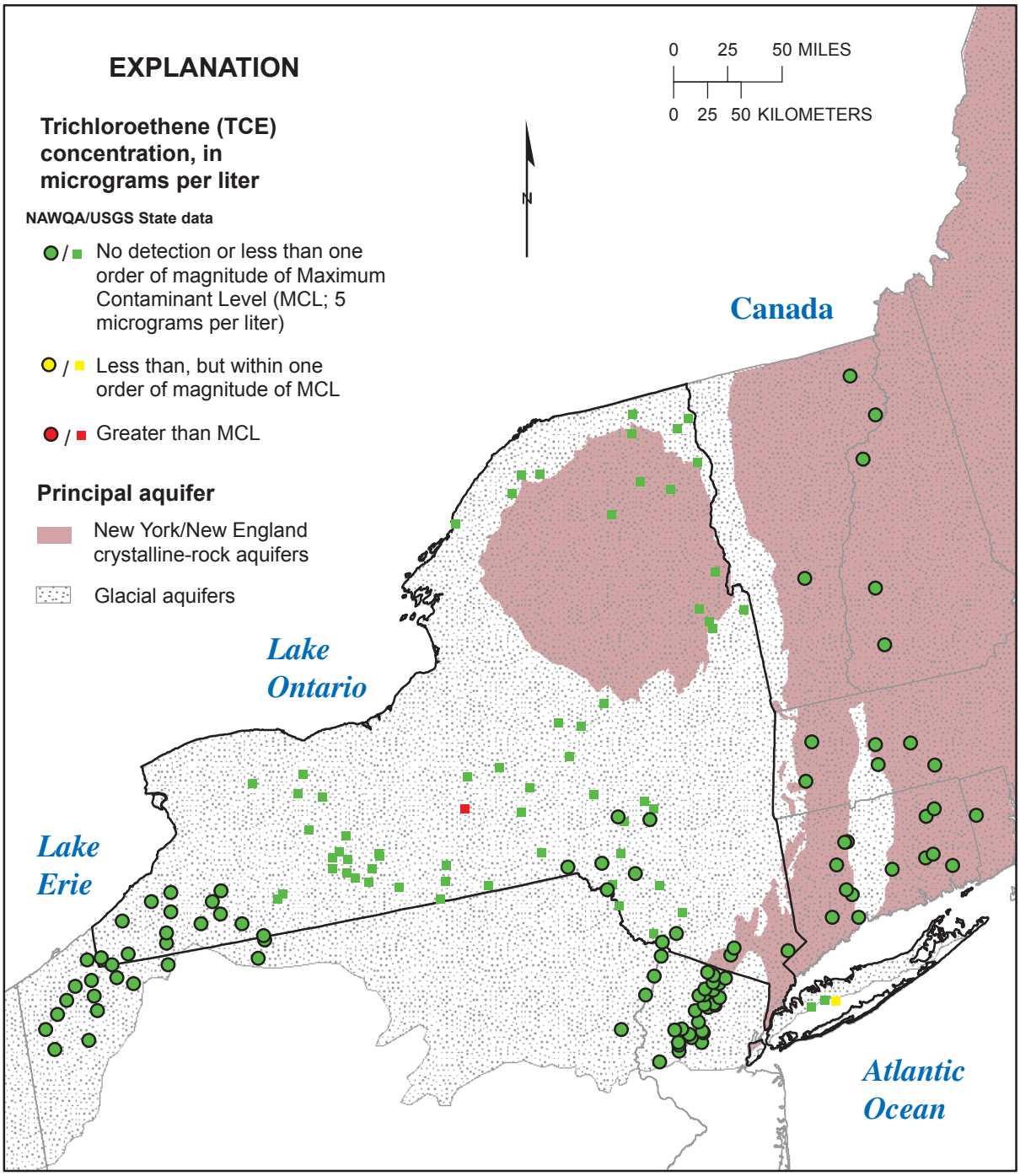
Figure NY13. Concentration of radon in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

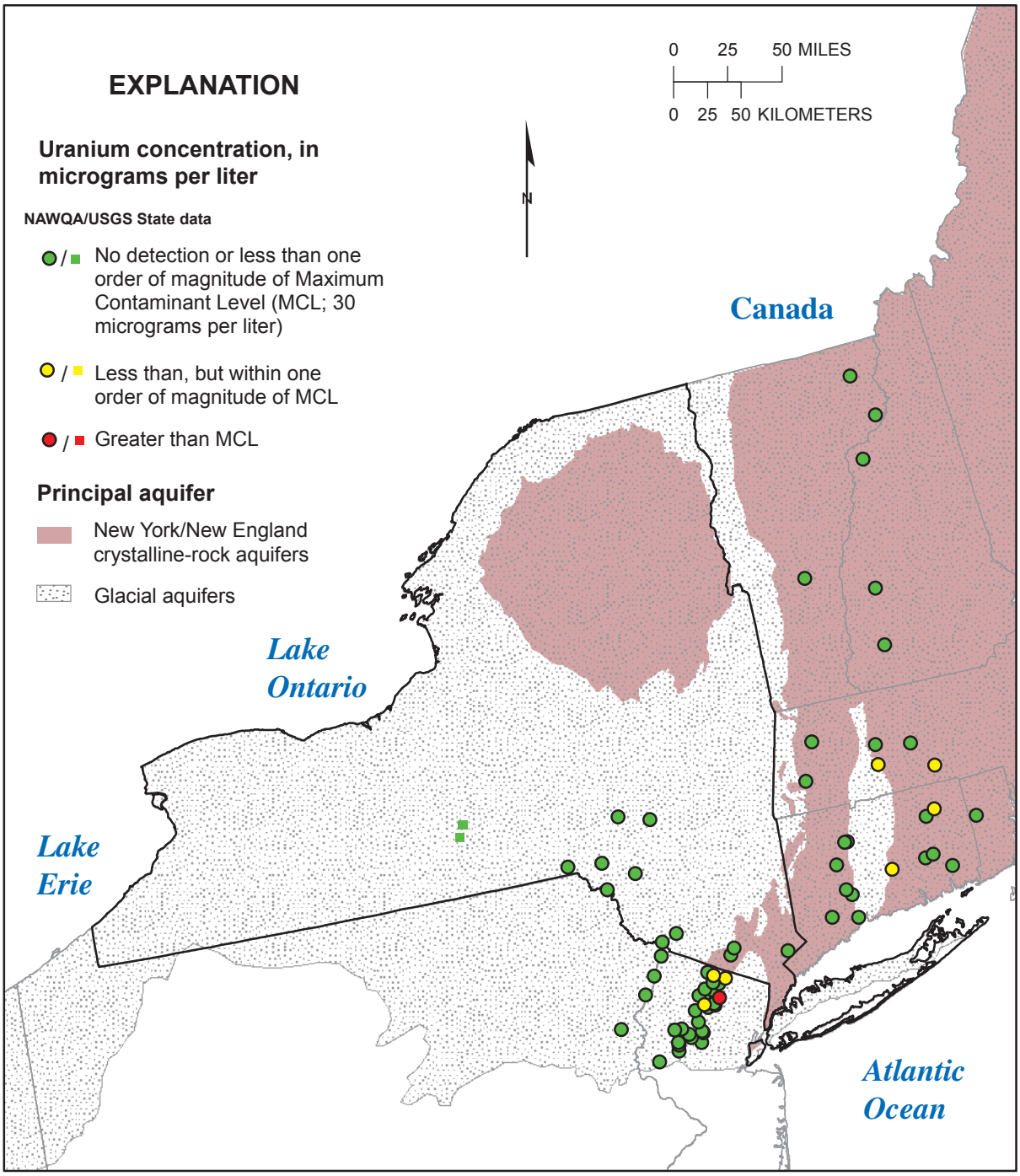
Figure NY14. Concentration of strontium in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

Figure NY15. Concentration of trichloroethene (TCE) in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).



Base information from U.S. Geological Survey digital data, 1:2,000,000
Albers Equal-Area projection
Standard Parallels 29°30' and 45°30', central meridian -96°

Principal aquifer data from U.S. Geological Survey, 2003

Figure NY16. Concentration of uranium in samples from domestic wells in New York and nearby States (from National Water-Quality Assessment (NAWQA) studies and U.S. Geological Survey (USGS) State data in the National Water Information System (NWIS)).