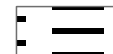





Areas of Relative Susceptibility to Elevated Radon in Groundwater in North Carolina

Explanation of overlay symbols:

 Radon susceptibility extrapolated to areas without groundwater data. Extrapolation assumes similar rock types will yield similar Rn concentrations.

Outlier points that exceed predicted susceptibility*
n = 144 analyses

-  groundwater sample location with Radon 10,000 pCi/L or greater
-  groundwater sample location with Radon 4,000 - 9999 pCi/L
-  groundwater sample location with Radon 300 - 3999 pCi/L

*Outlier data points that exceed predicted Rn susceptibility may be due to:
1) mapping limitations (e.g. unmapped felsic intrusive bodies may "infest" low Rn potential rocks; contacts may not be mapped accurately at the scales being investigated; and the subsurface orientation of high dis-Rn bodies may influence whether or not a well penetrates the unit at depth), and (or) 2) current or historic flowpath geochemistry that can move radium from its original source to distant locations (Ra-226 half life = 1622 y). Inconsistencies also may be due to factors that have not been properly understood or measured (construction details such as depth, casing depth, and yield often are unavailable).

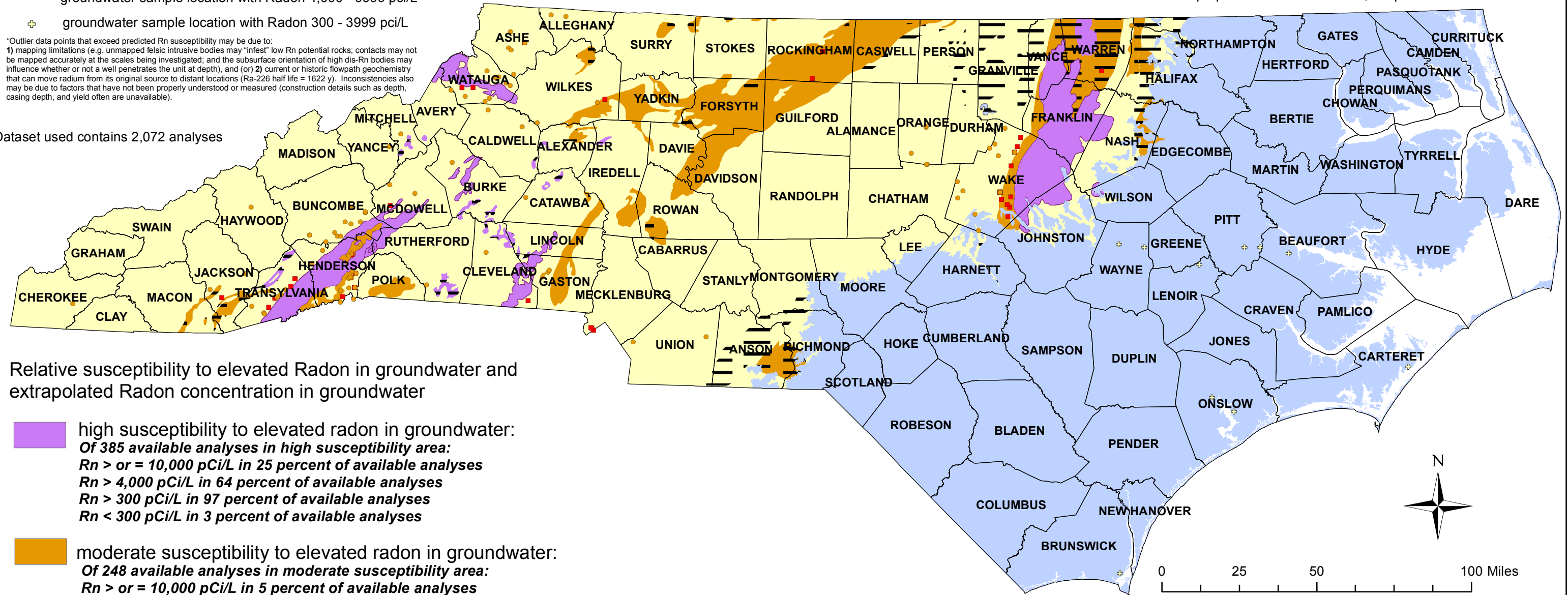
Dataset used contains 2,072 analyses

By
Philip J. Bradley, Division of Energy, Mineral and Land Resources - North Carolina Geological Survey
Ted Campbell, Division of Water Resources, Water Quality Regional Operations Section


Preliminary - Draft


Version 2: 2/3/2015

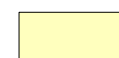
U.S. EPA proposed MCL for community water supplies = 300 pCi/L
U.S. EPA proposed alternate MCL = 4,000 pCi/L




Relative susceptibility to elevated Radon in groundwater and extrapolated Radon concentration in groundwater

 high susceptibility to elevated radon in groundwater:
Of 385 available analyses in high susceptibility area:
Rn > or = 10,000 pCi/L in 25 percent of available analyses
Rn > 4,000 pCi/L in 64 percent of available analyses
Rn > 300 pCi/L in 97 percent of available analyses
Rn < 300 pCi/L in 3 percent of available analyses

 moderate susceptibility to elevated radon in groundwater:
Of 248 available analyses in moderate susceptibility area:
Rn > or = 10,000 pCi/L in 5 percent of available analyses
Rn > 4,000 pCi/L in 27 percent of available analyses
Rn > 300 pCi/L in 96 percent of available analyses
Rn < 300 pCi/L in 4 percent of available analyses

 low to moderate susceptibility to elevated radon in groundwater:
Of 1,369 available analyses in low to moderate susceptibility area:
Rn > or = 10,000 pCi/L in 2 percent of available analyses
Rn > 4,000 pCi/L in 10 percent of available analyses
Rn > 300 pCi/L in 83 percent of available analyses
Rn < 300 pCi/L in 17 percent of available analyses

 relatively low susceptibility to elevated radon in groundwater:
Of 70 available analyses in low susceptibility area:
Rn > or = 10,000 pCi/L in 1 percent** of available analyses
Rn > 4,000 pCi/L in 11 percent of available analyses
Rn > 300 pCi/L in 40 percent of available analyses
Rn < 300 pCi/L in 60 percent of available analyses

**Location is within extreme up-dip Coastal Plain in southern Wake County. Well likely penetrates Coastal Plain sediments and utilizes groundwater from crystalline rocks.