Radon Levels (pCi/L) in a Geologic Context, Boyle County, Kentucky

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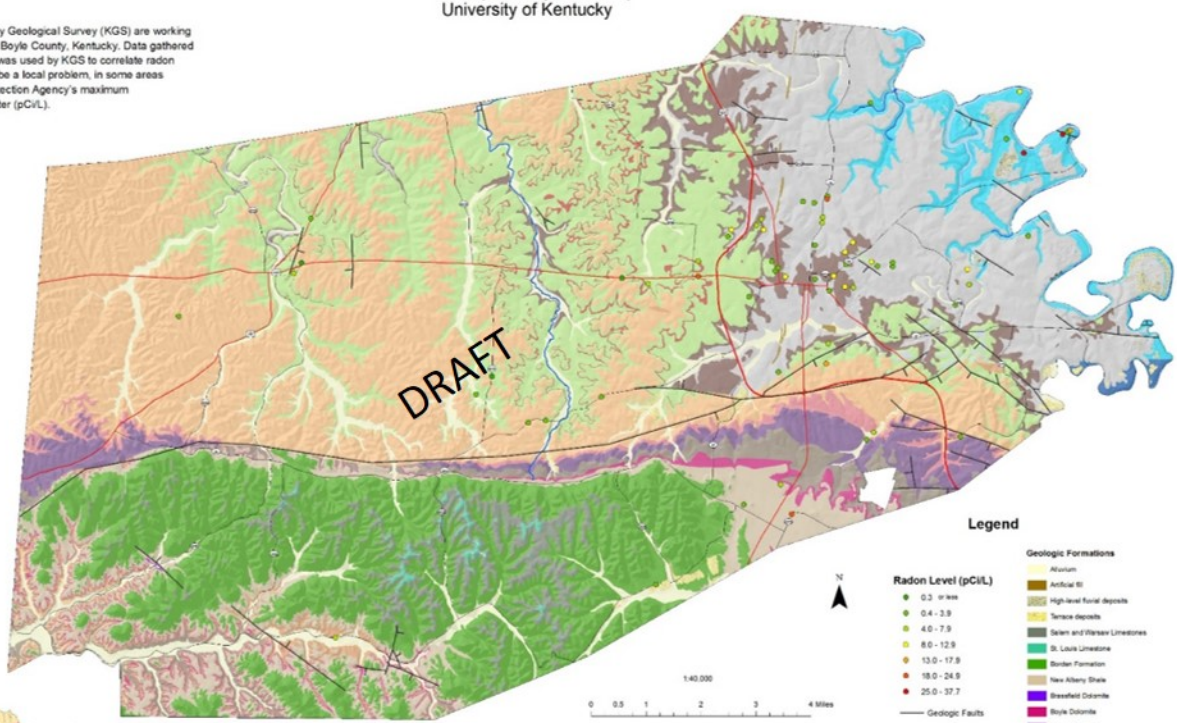
Purpose:

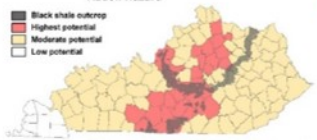
The UK College of Nursing and Kentucky Geological Survey (KGS) are working in conjunction assessing radon levels in Boyle County, Kentucky. Data gathered and provided by the College of Nursing was used by KGS to correlate radon levels to geologic units. Radon gas can be a local problem, in some areas exceeding the U.S. Environmental Protection Agency's maximum recommended limit of 4 picocuries per liter (pCi/L).

A ventilation system removes radon from the basement of this home. Photo by Dan Carey.

An outcrop of the Tanglewood Limestone, a producer of radon. Photo by Bethany Overfield.



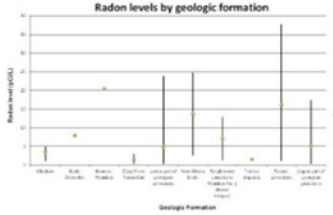
Radon Hazard



Radon is a colorless, odorless gas. It is produced by the radioactive decay of naturally occurring uranium in the soil and water. Kentucky has geologic units that are often high radon emitters: the oil-and-gas producing Devonian-age black shale (see map) and a number of limestones of various ages, especially the limestones in the Bluegrass Region that were once mined for phosphates. In limestones, it is not the limestone itself that is problematic, but the thick clayey soils that develop from the limestone and concentrate small amounts of uranium in clays and phosphate minerals.

(from Geologic Hazards in Kentucky, KGS MCS_185_12, 2008)

Radon levels by geologic formation



Geologic formation	Number of data points	Max. Radon level (pCi/L)	Min. Radon level (pCi/L)	Avg. Radon level (pCi/L)
Alluvium	4	9	3.7	7.45
Boyle Dolomite	1	7.9	7.9	7.90
Brannon Member	1	20.4	20.4	20.40
Clays Ferry Formation	9	2.9	0.4	1.47
Lower part of Lexington Limestone	22	13.1	0.3	4.04
New Albany Shale	3	24.7	3.7	13.70
Tanglewood Limestone Member No. 1 (lower tongue)	14	13.8	1.3	7.01
Terrace deposits	1	1.5	1.5	1.50
Tyrone Limestone	6	19.9	3.1	10.10
Upper part of Lexington Limestone	9	17.8	0.3	5.01
Grand total	99	37.7	0.3	9.46