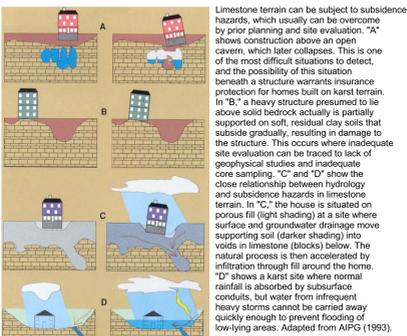


Generalized Geologic Map for Land-Use Planning: Jessamine County, Kentucky

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Natural Resources Conservation Service

Construction on Karstic Limestone



Floding in a large karst basin. Sinkhole swallets and solution channels are not large enough to carry off the water from this large storm. The problem exacerbated by development. Often the only solution is to relocate the home out of the karst floodplain. Photo by Jim Currens, Kentucky Geological Survey.

Sinkhole Flooding



Floding in a large karst basin. Sinkhole swallets and solution channels are not large enough to carry off the water from this large storm. The problem exacerbated by development. Often the only solution is to relocate the home out of the karst floodplain. Photo by Jim Currens, Kentucky Geological Survey.

Sudden-Collapse Sinkhole



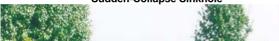
Sinkhole cover collapse. After perhaps years of slow settlement, soils over bedrock solution channels collapse rapidly and wash out, leaving sinkholes such as this. This phenomenon occurs throughout the Inner Bluegrass Karst landscape. Photo by Jim Currens, Kentucky Geological Survey.

Urban Residential Community



The Reserve at Hager Place and the Crossings at Hager Place are urban residential communities within the city of Nicholasville. Photo by Dan Carey, Kentucky Geological Survey.

Limestone—Unit 6



Radon gas can be a local problem, although it is not widely distributed in Kentucky in amounts above the Environmental Protection Agency's maximum recommended limit of 4 picocuries per liter. Unit 7 on the map, the Tanglewood Limestone, may contain high levels of uranium or radium parent materials for radon gas. The Tanglewood and several other limestones in the state contain apatite, a phosphate mineral. Uranium is sometimes part of the apatite crystal structure, and when the limestone weathers away the phosphates containing uranium can become concentrated in the soil ultimately give rise to high levels of radon. A few areas of high radon concentrations are known in the Bluegrass Region. Homes in these areas should be tested for radon, but the homeowner should keep in mind that the threat to health results from relatively high levels of exposure over long periods of time, and the remedy may simply be additional ventilation of the home.

Development Pressure



Residential and commercial development in Fayette County presses against Jessamine County and spills across the line along U.S. 68. Aerial photos (2004) from the U.S. Department of Agriculture—Farm Services Administration, National Agricultural Imagery Program.

Residential-Commercial Development



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Comparative Risk Chart for Radon Levels

Radon Level pCi/L	Estimated Annual Cancer/100	Comparable Exposure Levels	Relative Risk Estimate
200	440-1770	1500 times average outdoor level	More than 60 times background risk
100	220-630	750 times average outdoor level	For backyard smoker or 20,000 cigarettes a day
40	120-380	150 times average outdoor level	Two-pack-a-day smoker
20	60-210	75 times average outdoor level	One pack-a-day smoker
10	30-120	37 times average outdoor level	Five times non-smoker risk
4	13-50	15 times average outdoor level	Non-smoker risk of being lung cancer victim
2	7-20	Average outdoor level	Background level
0.2	1-3	Average outdoor level	Background level

Radon

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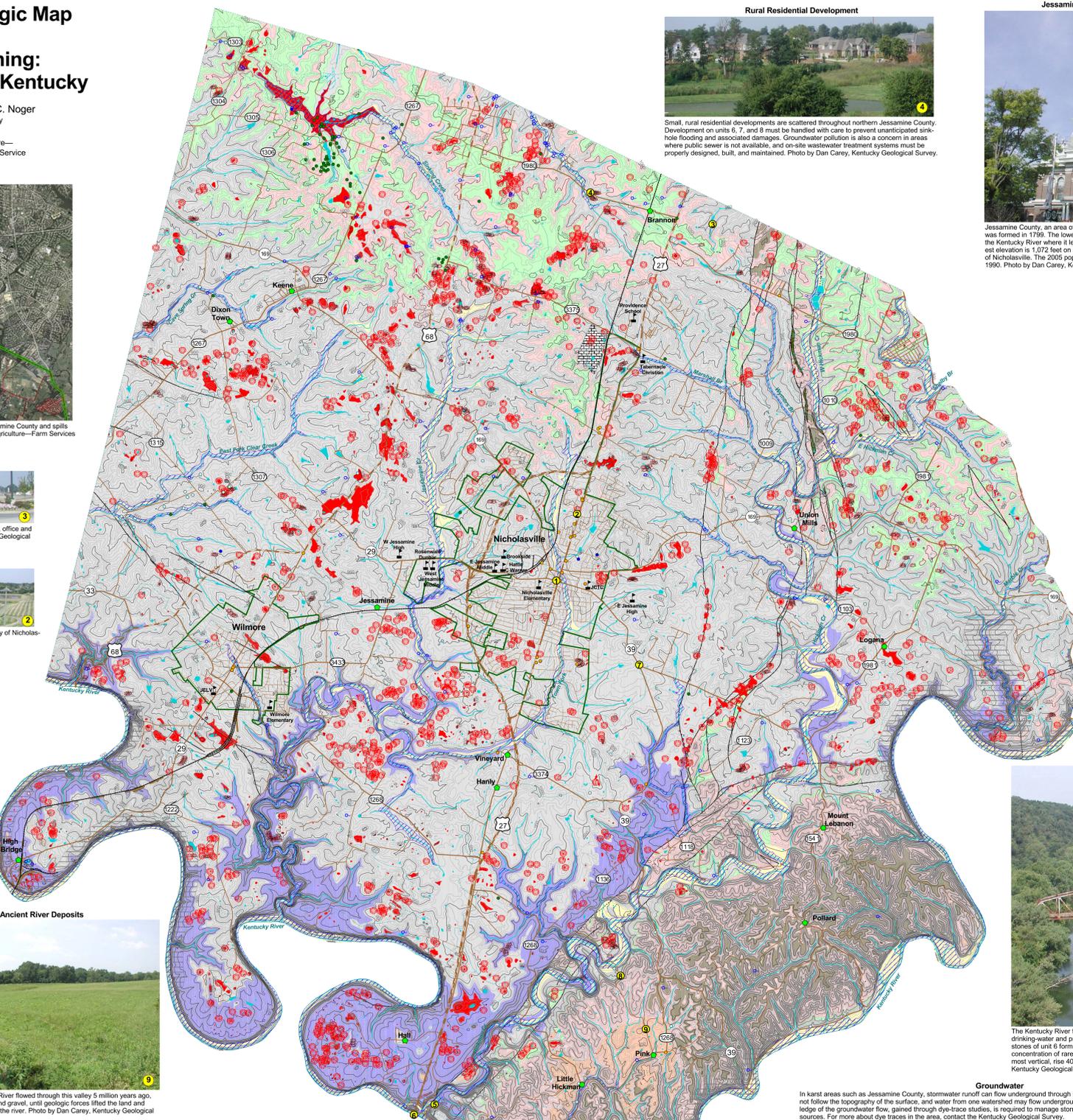
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EXPLANATION

- School
- Water Wells
 - Domestic
 - Industrial
 - Monitoring
 - Public
 - Agriculture
 - Spring
 - Rock outcrop
 - Sinkhole
- Railroad
- Watershed boundary
- Concealed geologic fault
- Geologic fault
- Urban Service Boundary
- Source-water protection area, zone 1
- Flood zones (FEMA, 2005)
 - Wetlands > 1 acre (U.S. Fish and Wildlife Service, 2003)
- Limestone quarry
- Mapped sinkholes
- Photo location
- 10-foot contour interval

Source-Water Protection Areas

Source-water protection areas are those in which activities are likely to affect the quality of the drinking-water source. From more information, see www.water.ky.gov/wpp.htm.

Seepage

Seepage at the boundary between overlying permeable and underlying impermeable rocks. Often not evident during dry-weather construction, it can produce a variety of problems, including foundation disturbance, flooding, soil movement, wet basements, and failure of onsite wastewater treatment systems. These problems are common with construction on bedrocked steep slopes. (photo by Paul Howell)

Pond Construction

Deny water access to permeable materials and/or alter materials to an impermeable condition

Anti-Leakage Strategy

Deny water access to permeable materials and/or alter materials to an impermeable condition

Top of Dam

Structured Clay Soil

Limestone Bedrock with Plumbing Perm-Imperm Boundary

Successful pond construction must prevent water from seeping through structured soils into limestone solution channels below. A compacted clay liner or artificial liner may prevent pond failure. Getting the basin filled with water as soon as possible after construction prevents drying and cracking, and possible leakage, of the clay soil liner. Ponds constructed in dry weather are more apt to leak than ponds constructed in wet weather. A geotechnical engineer or geologist should be consulted regarding the requirements of a specific site. Other leakage prevention measures include synthetic liners, bentonite, and asphaltic emulsions. The U.S. Department of Agriculture—Natural Resources Conservation Service can provide guidance on the application of these liners to new construction, and for treatment of existing leaking ponds.

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Geology of Kentucky

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For more information on Kentucky geology, go to www.uky.edu/kgs/geology

Scale 1:42,000
1 inch equals 2/3 mile

2 Miles

View the KGS World Wide Web site at www.uky.edu/kgs

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