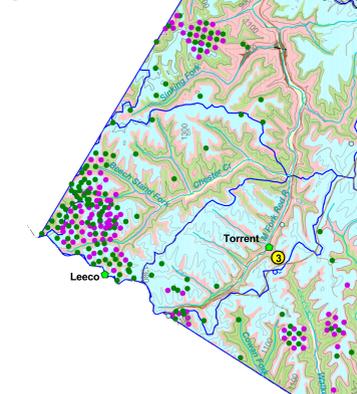




The Bert T. Combs Mountain Parkway is a major east-west transportation route through Wolfe and adjacent counties. It was the first highway to be constructed in Kentucky, and the first to have its tolls removed in 1985. Roads constitute a major land-use feature across the state, and geology plays an important role in their construction. Photo by Richard Smith, Kentucky Geological Survey.

Source-Water Protection Areas
Source-water protection areas are those in which activities are likely to affect the quality of the drinking-water source. For more information, see kgsweb.uky.edu/download/water/swapp/swapp.htm.

- EXPLANATION**
- School
 - Domestic Water wells
 - Monitoring
 - Public Spring
 - Gas well
 - Oil and gas well
 - Oil well
 - Enhanced recovery well
 - Wetlands > 1 acre (U.S. Fish and Wildlife Service, 2003)
 - Source-water protection area, zone 1
 - Watershed boundary
 - Concealed fault
 - Fault
 - 100-foot contour interval
 - Photograph location



Flooding
Alluvium and low-lying areas along streams are subject to flooding. Construction in these areas should be protected from flooding and may be subject to local housing codes. Historical records may provide information on depth of flooding. Soil scientists and engineers may also provide guidance. The depth of flooding is commonly underestimated. Flood information is available from the Kentucky Division of Water, Floodplain Management Branch, www.water.ky.gov/floods/.



Mill Creek Lake and dam is situated on the Wolfe/Powell County line near Natural Bridge State Park. The 41-acre lake is used primarily for recreation. This is an example of sandstone and limestone serving as an embankment for a reservoir. Photo by Richard Smith, Kentucky Geological Survey.

Groundwater
Most wells in valley bottoms are adequate for a domestic supply. Yields to wells become progressively less on hillsides and ridges. Deep wells penetrating over 500 feet of sandstone may yield enough water for small municipal or industrial supplies. Water from drilled wells ranges from moderately to extremely hard and contains noticeable amounts of iron. In valley bottoms, salty water may be encountered at depths as shallow as 100 feet. A few springs supply enough water for domestic use. Most springs issue from the base of sandstone and limestone formations in valley bottoms, and have large seasonal variations in flow.

For more information about groundwater in the county see Carey and Stickney (2004).

FOUNDATION AND EXCAVATION
The terms "earth" and "rock" excavation are used in the engineering sense; earth can be excavated by hand tools, whereas rock requires heavy equipment or blasting to remove.

LIMITATIONS
Slight—A slight limitation is one that commonly requires some corrective measure but can be overcome without a great deal of difficulty or expense.

Moderate—A moderate limitation is one that can normally be overcome but the difficulty and expense are great enough that completing the project is commonly a question of feasibility.

Severe—A severe limitation is one that is difficult to overcome and commonly is not feasible because of the expense involved.

LAND USES
Septic tank disposal system—A septic tank disposal system consists of a septic tank and a filter field. The filter field is a subsurface tile system laid in such a way that effluent from the septic tank is distributed with reasonable uniformity into the soil.

Residences—Ratings are made for residences with and without basements because the degree of limitation is dependent upon ease and required depth of excavation. For example, excavation in limestone has greater limitation than excavation in shale for a house with a basement.

Highways and streets—Refers to paved roads in which cuts and fills are made in hilly topography, and considerable work is done preparing subgrades and bases before the surface is applied.

Access roads—These are low-cost roads, driveways, etc., usually surfaced with crushed stone or a thin layer of blacktop. A minimum of cuts and fills are made, little work is done preparing a subgrade, and generally only a thin base is used. The degree of limitation is based on year-around use and would be less severe if not used during the winter and early spring. Some types of recreation areas would not be used during these seasons.

Light industry and malls—Ratings are based on developments having structures or equivalent load limit requirements of three stories or less, and large paved areas for parking lots. Structures with greater load limit requirements would normally need footings in solid rock, and the rock would need to be core drilled to determine presence of caverns, cracks, etc.

Intensive recreation—Athletic fields, stadiums, etc.

Extensive recreation—Camp sites, picnic areas, parks, etc.

Reservoir areas—The floor of the area where the water is impounded. Ratings are based on the permeability of the rock.

Reservoir embankments—The rocks are rated on limitations for embankment material.

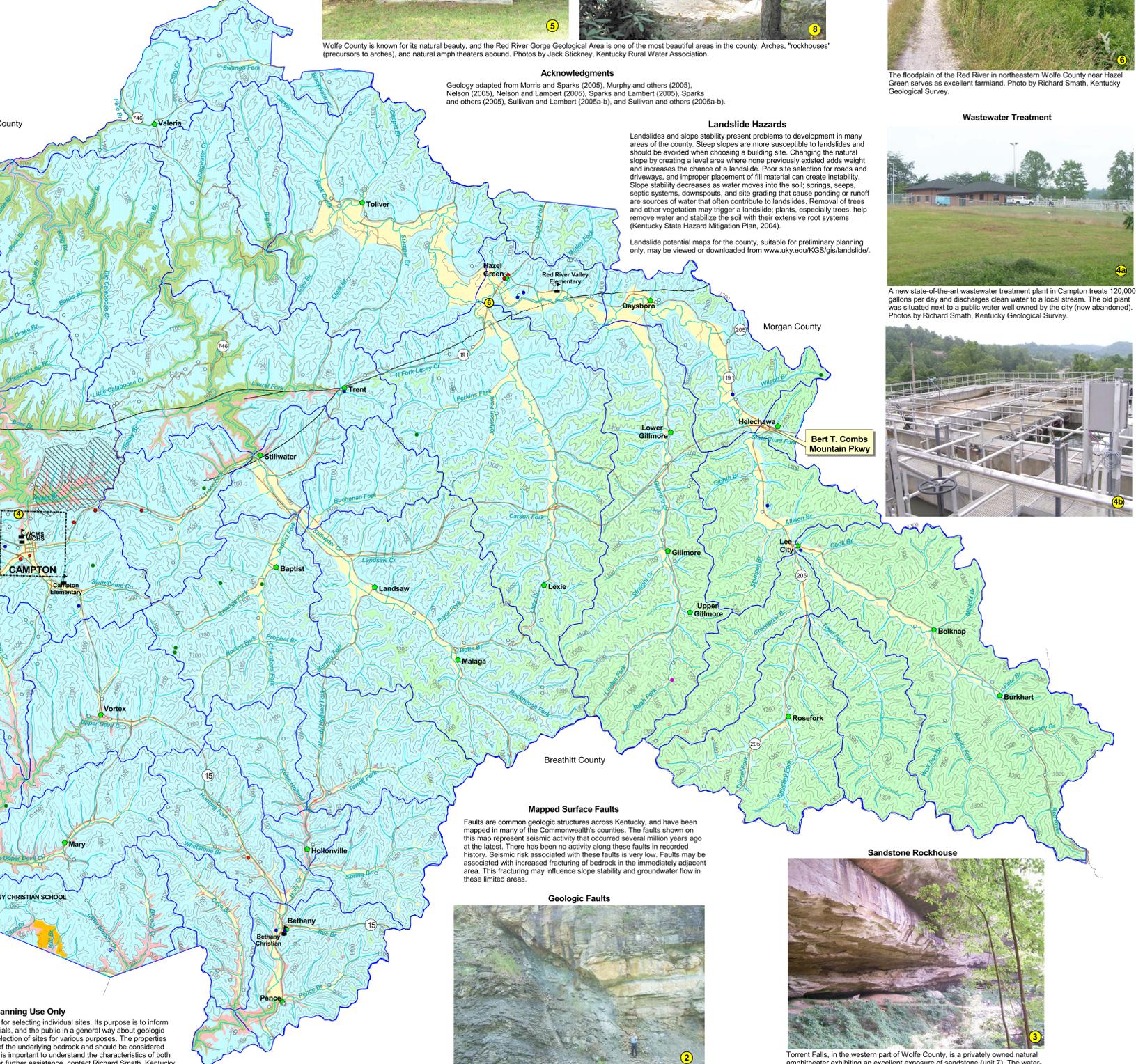
Underground utilities—Included in this group are sanitary sewers, storm sewers, water mains, and other pipes that require fairly deep trenches.



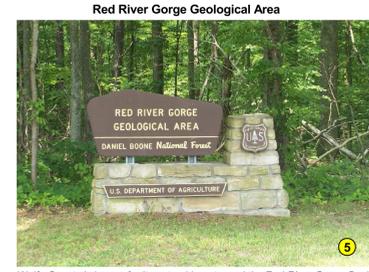
Wolfe County, an area of 223 square miles, was formed in the Eastern Coalfield in 1860. The highest elevation, 1,460 feet, is on a ridge near the Breathitt County line, 3.5 miles southwest of Lee City. The lowest elevation, 650 feet, is where the county boundary crosses a meander of the North Fork of the Kentucky River. The 2005 population of 6,875 (51 people per square mile) was 2.7 percent smaller than the population in 2000.

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

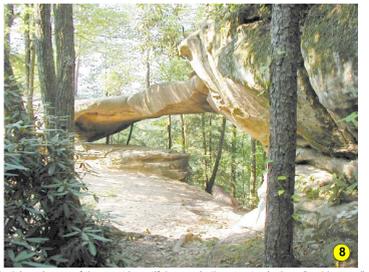
Richard A. Smath, Bart Davidson, Daniel I. Carey
Kentucky Geological Survey
John F. Stickney
Kentucky Rural Water Association



For Planning Use Only
This map is not intended to be used for selecting individual sites. Its purpose is to inform land-use planners, government officials, and the public in a general way about geologic bedrock conditions that affect the selection of sites for various purposes. The properties of thick soils may supercede those of the underlying bedrock and should be considered on a site-to-site basis. At any site, it is important to understand the characteristics of both the soils and the underlying rock. For further assistance, contact Richard Smith, Kentucky Geological Survey, 859.257.5500 x119. For more information, and to make custom maps of your local area, visit our Land-Use Planning Internet Mapping Web Site at kgsmap.uky.edu/web/site/kyuplan/viewer.htm.



Wolfe County is known for its natural beauty, and the Red River Gorge Geological Area is one of the most beautiful areas in the county. Arches, "rockhouses" (precursors to arches), and natural amphitheaters abound. Photos by Jack Stickney, Kentucky Rural Water Association.



Wolfe County is known for its natural beauty, and the Red River Gorge Geological Area is one of the most beautiful areas in the county. Arches, "rockhouses" (precursors to arches), and natural amphitheaters abound. Photos by Jack Stickney, Kentucky Rural Water Association.

Acknowledgments
Geology adapted from Morris and Sparks (2005), Murphy and others (2005), Nelson (2005), Nelson and Lambert (2005), Sparks and Lambert (2005), Sparks and others (2005), Sullivan and Lambert (2005a-b), and Sullivan and others (2005a-b).

Landslide Hazards
Landslides and slope stability present problems to development in many areas of the county. Steep slopes are more susceptible to landslides and should be avoided when choosing a building site. Changing the natural slope by creating a level area where none previously existed adds weight and increases the chance of a landslide. Poor site selection for roads and driveways, and improper placement of fill material can create instability. Slope stability decreases as water moves into the soil, springs, seeps, septic systems, downspouts, and site grading that cause ponding or runoff are sources of water that often contribute to landslides. Removal of trees and other vegetation may trigger a landslide; plants, especially trees, help remove water and stabilize the soil with their extensive root systems (Kentucky State Hazard Mitigation Plan, 2004).
Landslide potential maps for the county, suitable for preliminary planning only, may be viewed or downloaded from www.uky.edu/KGS/gis/landslide/.

Mapped Surface Faults
Faults are common geologic structures across Kentucky, and have been mapped in many of the Commonwealth's counties. The faults shown on this map represent seismic activity that occurred several million years ago at the latest. There has been no activity along these faults in recorded history. Seismic risk associated with these faults is very low. Faults may be associated with increased fracturing of bedrock in the immediately adjacent area. This fracturing may influence slope stability and groundwater flow in these limited areas.

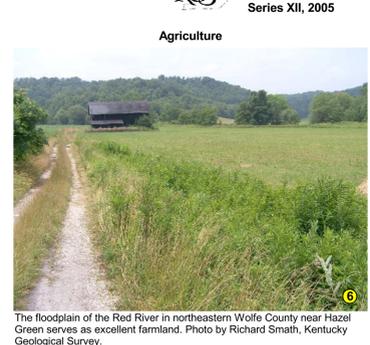
Geologic Faults
This exposure of the Glencairn Fault of the Irvine-Point Creek Fault Zone shows how geology can affect land use on a local scale. Land-use planners in this area would be confronted with two completely different types of rocks over a small area. Photo by Richard Smith, Kentucky Geological Survey.

Additional Resources
Listed below are Web sites for several agencies and organizations that may be of assistance with land-use planning issues in Wolfe County:
ces.ca.uky.edu/wolfe-UK Cooperative Extension Service
www.kincnet.net/kyrcd/kyr.html—Kentucky Resource Conservation and Development
www.kradcd.org/—Kentucky River Area Development District
www.thinkkentucky.com/edis/cmty/cmtyindex.htm—Detailed county statistics
www.uky.edu/KentuckyAtlas/21237.html—Kentucky Atlas and Gazetteer
quickfacts.census.gov/qfd/states/21/21237.html—U.S. Census data

7.5-Minute Topographic Map Index
A grid showing the location of Wolfe County within the surrounding topographic map sheets.



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The floodplain of the Red River in northeastern Wolfe County near Hazel Green serves as excellent farmland. Photo by Richard Smith, Kentucky Geological Survey.



A new state-of-the-art wastewater treatment plant in Campton treats 120,000 gallons per day and discharges clean water to a local stream. The old plant was situated next to a public water well covered by the city (now abandoned). Photos by Richard Smith, Kentucky Geological Survey.



Torrent Falls, in the western part of Wolfe County, is a privately owned natural amphitheater exhibiting an excellent exposure of sandstone (unit 7). The water fall is not flowing in this picture because of moderate drought conditions at the time the photo was taken (July 2005). Notice the two geologists at lower right for scale. Photo by Richard Smith, Kentucky Geological Survey.

Planning Guidance by Rock Unit Type

Rock Unit	Foundation and Excavation	Septic Drain Fields	Residence with Basement	Highways and Streets	Access Roads	Light Industry and Malls	Intensive Recreation (Athletic fields, nature playgrounds, etc.)	Extensive Recreation (Hiking trails, nature preserves, etc.)	Reservoir Areas	Reservoir Embankments	Underground Utilities
1. Alluvium	Fair to good foundation material. Easy to excavate. Refer to soil report (Hayes, 1993).	Severe limitations. Failed septic systems can contaminate groundwater. Refer to soil report (Hayes, 1993).	Water in alluvium may be in direct contact with basements. Refer to soil report (Hayes, 1993).	Slight limitations. Refer to soil report (Hayes, 1993).	Slight to moderate limitations. Refer to soil report (Hayes, 1993).	Slight to moderate limitations. Refer to soil report (Hayes, 1993).	Refer to soil report (Hayes, 1993).	Refer to soil report (Hayes, 1993).	Not recommended. Refer to soil report (Hayes, 1993).	Not recommended. Refer to soil report (Hayes, 1993).	Not recommended. Refer to soil report (Hayes, 1993).
2. High-level gravel deposits	Fair to good foundation material. Moderately easy to excavate.	Slight to moderate limitations. Variable thickness and permeability.	Severe limitations. Shallow water table may be present.	No limitations.	No limitations.	No limitations.	No limitations.	No limitations.	Severe limitations. Leaky reservoir material.	Severe limitations. Leaky reservoir material.	Slight to moderate limitations. Variable materials.
3. Shale, sandstone, limestone	Good foundation material. Difficult to excavate. Possible pyrite expansion in shales.	Severe limitations. Impermeable rock. Locally fast drainage through fractures and sinks to water table; possible groundwater contamination.	Severe limitations. Rock excavation may be required.	Moderate limitations. Rock excavation. Steep slopes.	Moderate limitations. Rock excavation. Possible steep slopes. Slight limitations with suitable topography.	Severe to moderate limitations, depending on topography. Rock excavation. Local drainage problems.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Severe to moderate limitations. Reservoir may leak where rocks are fractured.	Severe to moderate limitations. Reservoir may leak where rocks are fractured.	Severe to moderate limitations. Possible rock excavation.
4. Shale, sandstone, limestone	Good to excellent foundation material. Difficult to excavate. Possible pyrite expansion in shales.	Severe limitations. Impermeable rock. Locally fast drainage through fractures and sinks to water table; possible groundwater contamination.	Severe to moderate limitations. Rock excavation may be required.	Severe limitations. Steep slopes.	Moderate limitations. Rock excavation. Steep slopes.	Moderate limitations. Rock excavation. Steep slopes.	Severe to slight limitations, depending on topography. Rock excavation. Local drainage problems.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured.	Severe to moderate limitations. Possible rock excavation.
5. Shale, siltstone, limestone	Good to excellent foundation material. Difficult to excavate. Possible pyrite expansion in shales.	Severe limitations. Impermeable rock. Locally fast drainage through fractures and sinks to water table; possible groundwater contamination.	Severe to moderate limitations. Rock excavation may be required.	Severe limitations. Steep slopes.	Moderate limitations. Rock excavation. Steep slopes.	Moderate limitations. Rock excavation. Steep slopes.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured.	Severe to moderate limitations. Possible rock excavation.
6. Sandstone, siltstone, shale	Fair to good foundation material. Difficult to excavate. Possible pyrite expansion in shales.	Severe limitations. Impermeable rock. Locally fast drainage through fractures and sinks to water table; possible groundwater contamination.	Severe to moderate limitations. Rock excavation may be required. Possible steep slopes.	Severe to moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Rock excavation. Steep slopes.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured.	Severe to moderate limitations. Possible rock excavation.
7. Sandstone	Fair to good foundation material. Difficult to excavate.	Severe limitations. Thin soils.	Severe to moderate limitations. Rock excavation may be required. Possible steep slopes.	Severe to moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Rock excavation. Steep slopes.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured.	Severe to moderate limitations. Possible rock excavation.
8. Dolomite	Excellent foundation material. Difficult to excavate.	Severe limitations. Impermeable rock. Locally fast drainage through fractures and sinks to water table; possible groundwater contamination.	Severe limitations. Rock excavation may be required.	Severe limitations. Steep slopes.	Severe to moderate limitations. Rock excavation. Steep slopes.	Moderate to slight limitations, depending on topography. Rock excavation. Local drainage problems.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for nature preserves.	Moderate to slight limitations. Reservoir may leak where rocks are fractured.	Moderate to slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Rock excavation.