CHAPTER FOUR ENVIRONMENTAL DESIGN

INTRODUCTION

The physical geography of an area affects the amount, type, and direction of development. Natural factors such as climate, topography, geology, hydrology and soils are important because they influence the costs of construction and are determining factors in assessing an area's suitability for a given type of development or use. The purpose of this comprehensive plan element is the identification of environmental resources and the assessment of developmental impacts on these resources.

Rapid growth and development can have dramatic and long-term adverse effects on the physical and social environment. As Bullitt County continues to grow, many environmental issues will continue to arise. Issues such as water quality, air quality, noise and light pollution, increased storm water runoff, and decreased open space can combine to affect the overall quality of life for residents. The depletion of natural features such as wooded hillsides, scenic valleys, rivers, creeks, and open fields will become increasingly important as residents realize that these elements contribute to the unique character of an area and are unrecoverable once a parcel of land is developed. In addition, these types of amenities also provide less visible qualities, such as cleaner air, recreational areas and wildlife habitat, all of which are equally important to the community.

LOCATION

Bullitt County, located in north central Kentucky immediately south of Louisville, has an area of approximately 300 square miles and is ranked 37th out of 120 counties in terms of land area. The Salt River and its tributaries, the Rolling Fork and Floyd's Fork drain to the west and empty into the Ohio River at West Point in Hardin County. The county contains Knob State Forest, the Bernheim Arboretum and Forest and ten lakes including, Jim Beam Lake, Duck Lake, and Ben-





nett Lake. The City of Shepherdsville is the county seat and is located along I-65 near the center of the county.

CLIMATE

The climate in Bullitt County is temperate and humid. Prevailing wind direction is from the south-southwest. The most common severe weather conditions are in the form of thunderstorms, which can bring heavy flooding along the rivers and creeks. Data from the Spatial Hazard Events and Losses Database (SHELDUS, Version 10.1) at the University of South Carolina states that twentythree floods/flash floods have occurred in the county since 1970. Tornadoes are the most devastating severe weather condition occurring in the area. Tornadoes can occur almost anywhere in Kentucky and in any terrain, hilltop or valley bottom. Since 1970, seven tornadoes have touched down in Bullitt County. Severe storms can occur in any month but are most frequent from March to July. These storms may produce damaging winds and hail. There have been nineteen incidents of hail since 1970.

Long term climatological data for the county is available from a Shepherdsville Weather Station (ID: GH#CND, USC00157334, SHEPHERDSVILLE 5 NE, KY US) and the Bernheim Forest Weather Station (ID: GHCND:USC00150630, BERNHEIM FOREST, KY US). Weather data is available from these station's from the year 1948 to 2013. The coldest days occur in January when the average monthly temperature is 38.3 degrees F. The warmest days occur in July with an average monthly temperature of 82.6 degrees F. During the period from April to November, an average of 19 days will have a maximum temperature of 90 degrees F or higher. The minimum temperature is expected to be 32 degrees F or less for an average of 33 days from December through March. The coldest temperature on record is -24 degrees F on January 20, 1994. The hottest recorded temperature was 106 degrees F on July 9, 1988.

Precipitation averages 44.9 inches annually. Records indicate that April tends to be the wettest month and August the driest. Precipitation is generally evenly distributed throughout the year. An average of seventeen days per year will have precipitation of one inch or more.

PHYSIOGRAPHY AND GEOLOGY

The physiographic regions of Kentucky are shown in Figure 4-1. Most of Bullitt County is located in the Knobs physiographic region (shown in dark-green) with the northeast tip of the county in the Outer Bluegrass region. The Knobs region is characterized by conical shaped hills and long, narrow sloping ridges in the southeast and vey steep hillsides in the western part of the county. The Outer Bluegrass is characterized by deep valleys, with flat land. The bedrock in this area is mostly composed of Ordovician limestone and shale that are easily eroded.



Figure 4-3 is a generalized geologic map of Bullitt County Kentucky prepared by the Kentucky Geologic Survey. According to the geologic map sink holes occur mostly in north central Bullitt County near Hillview and north east Bullitt County near Mt. Washington. Sink holes can also be found in Lebanon Junction and the north western edge of the county. The construction implications of these features must be addressed before any type of development occurs. Bullitt County is underlain by rocks from the Mississippian, Devonian, Silurian, Ordovician and Quaternary age. Alluvium (Quaternary age) is deposited along the western border of the county on the bottom of the Salt River. Big Clifty Sandstone (Upper Missis-

Bullitt County



sippian age) can be found in eastern Bullitt County near Mount Washington. The Louisville Limestone (Silurian age) can be found in the central-north region near Hillview. The primary formations found within the county are limestone and shale. Limestone occurs throughout the county whereas interbedded clay shales, siltstones and sandstones of the Borden Formation (Lower Mississippian age) occur primarily in the north-west and central sections of the county. The New Albany Shale, also called black shale, formed during the Devonian age can be found in the central region near Blue Lick Creek.

The faults zones that lie near Bullitt County include New Madrid fault and the Wabash Valley fault. The fault zones are formed along the edges of a broad rift or crack in the Earth's crust that occurs deep beneath the surface. The New Madrid Seismic zone shown in Figure 4-2 is located in central Mississippi Valley bordered on the north by the Ohio and Mississippi Rivers. The zone runs southwest, through eastern Missouri and western Tennessee and ends in northern Ar-

kansas. The Wabash Valley fault zone

FIGURE 4-2 SEISMIC ZONES



Source: KIPDA "Regional Hazard Mitigation Plan." 2011

shown extends north to southeastern Illinois, west to southwestern Indiana (near Indianapolis) and east into parts of northwest Kentucky.

The topography and elevation in Bullitt County is shown in Figure 4-4. Figure 4-5 shows the location of known mineral resources in the county. There are various types of mineral resources in Bullitt County which include but are not limited to gas and oil wells, above and below ground mines for Rock Quarrying, Artesian Springs, Sand Pits, Shale Pits and any other type of operation that would fit in an EPA and EPB Zone. According to the Kentucky Geological Survey, there are 74 oil and gas wells within Bullitt County. A well is abandoned when it reaches the Kentucky Geological Survey James C. Cobb, State Geologist and Director Y OF KENTUCKY

Groundwater

In the Salt River Valley bottoms, and in the bottoms of the larger tributaries, most driled wells less than 100 feet deep will produce enough water for a domestic supply. Wells located in the rest of the larger valleys, and in the uplands of central Built County, will produce enough water for a domestic supply except during dry water. In the remaining upland areas in BuiltiC County (approximately half of the county), most drilled wells will not produce enough water for a dependable domes upply. Wells adom grainage lines in this area may produce enough water for a to supply. Wells adom grainage lines in this area may produce enough water for a supply. Wells adom grainage lines in the area may produce enough water for a supply. Wells adom grainage lines in this area may produce enough water for a supply. Wells adom supply and a supply and adom supply adom supply and adom supply and adom supply and a supply and adom supply adom supply and adom supply and adom supply and supply adom supply and supply addm supply addm supply and supply addm supply supply addm supply addm supply addm supply supply supply addm supply supply supply supply supply supply addm supply su c supply, except during dry weather

bughout the county, groundwater is hard or very hard, and may contain salt or rogen sulfide, especially at depths greater than 100 feet.

more information on groundwater in the county, see Carey and Stickney (2001).



Limestone Bedrock with Plumbin

Perm - Imperm Boundar

Successful pond construction must prevent water from seeping throug structured solis into limestone solution channels below. A compacted aday liner, or artificial liner, may prevent pond failure. Getting the basin tilled with water as soon as possible after construction prevents drying and cracking, and possible leakage. Of the clayers ool liner. Ponds con structed in dry weather are more apt to leak then ponds constructed in tweather. The U.S. Department of Adjicculture-Atlantal Resources and weather. The U.S. Department of Adjicculture-Textantal Resources and the weather. The U.S. Department of Adjicculture-Atlantal Resources and the adjicculture attained and adjicculture attained and adjicculture attained and adjicculture attained and adjicculture attained attained adjicculture attained adj rvice can provide guidance on the application of thes vell, U.S. Department of Agri Conservation Service.

Dams should be constructed of compacted clayey soils at slopes flatter than 3 units horizontal to 1 unit vertical. Ponds with dam heights exceeding 25 feet, or pond volumes exceeding 50 acr-6et, require permits. Contact the Kentucky Division of Water, 14 Reilly Rd., Frankfort, KY 40601, tieleptone: 502,564,3410.



References Cited

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uadrangle. Bullitt and Ne Jr. 2005. Spatial database of the Cravens quadrangle. Bullt and Netson Kentucky Kentucky Geological Survey en 12. Digitaly Vectorate Geologic and Data Control Control Control Control Control Control Control Control Statistics of the Control Control Control Control Control Control Condrariage May Control Control Control Control Control Control Condrariage May Control Control Control Control Control Control J. J. 2005. Spatial database of the Samuels quadrangle, north-entral Kentucky: Conducting May Control Control Control Control Control Control 24. Adapted from Kepferle, R.C. 1980. Geologic Causariage May Gol-2043. Academic May Control Control Control Control Control Control Control May Control Control Control Control Control Control Control May Control Control

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 – Journal angle, central Kentucky: Kentucky Gr slogic Quadrangle Data DVGQ-1225. Adapted from 1 quadrangle, central Kentucky: U.S. Geological St le 1:24,000. austabase of the Mont Washington quadrangle, north-central 1: austabase of the Mont Washington quadrangle, north-central 1: aurey, ser. 12. Digitally Vectorized Geologic Quadrangle Data Declogical Survey Geologic Quadrangle Map GO-1222, ecite 1: yabase of the Washington Quadrangle, north-central Kentuck - V 12. Digitally Vectorized Geologic Quadrange.

map of the Waterford quadrangle, north-uadrangle Map GQ-1432, scale 1:24,000 Additional Information Resources eral agencies and organization ning issues in Bullitt County:

ces.cs.uky.edu/bullitil—University of Kentucky Cooperative Extension Service www.kineticnet.net/syrcativit.html—Kentucky Resource Conservation and Deve www.thinketucky.com/editionmi/solid13—Kentucky Economic Developmen www.thinketucky.com/editionmi/solid13—Kentucky Adias and Gazetteer. guiddats.cemus; govjedfatiate2/2102.html—Kentucky Adias and Gazetteer.



Learn more about Kentucky geology at www.uky.edu/KGS/geoky/



were not accent in Built County is swelling of some of the clay in shakes in units, 5, 8, and 7. This process is exacerbated when the sin shakes in units, 5, 8, and 7. This process is exacerbated when the official share micro privile (cor's gold). Prive is a common mixerial and found distributed throughout the black shake, although it is not always and may be discontinuous both laterally and horizontally. In the presen-ure and oxygen, prive oxidizes and produces sulfuric acid. The add in clailour actionates found in water, the rock half, cruched limetedor cics win calcult carbonates round in water, the rock itser, crushed imestore d concrete. This chemical reaction produces sulfate and can form the mineral psum, whose crystallization can cause layers of shale to expand and burst, chill to swell, and concrete to crack and crumble. It can heave the foundation, slab and interior partitions resting on it, and can even damage upper floors interior partitions. This phenomenon has been responsible for extensive and intenor partitions. This phenomenon has been respon Jamage to schools, homes, and businesses in Kentucky.

We strongly suggest that anyone planning construction on these shales seek professional advice from a geologist or engineer familiar with the problem.

Swelling Shale and oundation Damage





Slope Stability

eep-sided hills with deeply incised drainages are common the county. The shales and siltstones from which the hills formed are susceptible to slumping and sliding, especial rere clay shales of unit 5 occur in slopes. Clay shales can come plastic when wet and may yield or slump if construcion or roads built on them are not adequately drained. Builders





Radon

Radon gas, although not widely distributed in Kentucky in amounts above the U.S. Environmental Protection Agency's maximum recommended limit of 4 piocuries per liter, can be a local problem. The black shales in units 5, 6, and 7 may have high levels of radon. Homes in these areas should be tested for radon, but the homework should keep in mind that the health

	COMPARAT	IVE RISK CHART for	RADON LEVELS
Redon Level pCi/L	Estimated Fatal Lung Cancers/1000	Comparable Exposure Levels	Comparable Risk Estimate
200	440 - 770	1,000 times average outdoor level	More than 60 times non-smoker risk
100	270 - 630	100 times average outdoor level	Four pack/day smoker or 20,000 chest X-rays/
40	120 - 380	100 times average outdoor level	Two-pack/day smoker
20	60 - 210		
10	30 - 120	10 times average indoor level	One pack/day smoker
4	13 - 50	10 times average outdoor level	Five times non-smoker
2	7 - 30		
1	3 - 13	Average indcor level	Non-smaker risk of fatal lung cancer
0.2	4.9	down and an and the section and	20 object Manual at

EPA recommends action be taken if indoor levels exceed 4 pC/L, which is 10 times the average outdoor level. Some EPA representatives believe dissert and claim the risks estimated in this chart are entropy to high for low levels of radion. The action level in European countries is set al 10 piccourse per liter. Note that this chart is only one estimate, it is not based upon any scientific result from a study of a large population meeting the isled orient. (from the U.S. Environmental Protection Agency)



Generalized Geologic Map for Land-Use Planning:

Bullitt County, Kentucky Bart Davidson, Stephen F. Greb, and Daniel I. Carey

Acknowledgments Geology adapted from Bhattarai (2005=c), Nelson (201, 2002=c), Nelson and Spar (2002=b), and Zhang (2002=c). Thansis to Paul Howell, U.S. Department of Agricult. Natural Resources Conservation Service, for pond construction allustrations. Sinkhole Interpretation and these (2004). Thankis to Jam Currens, Kentucky Geological Survey, f

FIGURE 4-3



Fort Knox Military

Reservation





Commercial parks and development are common in the flat land in the northern part of the county and along the Interstate. Likewise, thren has been considerable suburban residential growth in these areas because of the county's proximity to Louisville. New develo ments require water sources, storm drainage, severs, power lines roads, and other infrastructure. Adequate sewage disposal is an on in this county, because much of the ted for septic tank or cesspool method

Fort Knox

county. Since Fort Knox is an active military reservation, access to limited and land use is strictly regulated by the U.S. Army. Access to the Fort Knox Wildlife Management Area for hunting and fishing is

est quarter of the





1 inch equals 1 mile Copyright 20 of Kentucky, Survey.



of this map and of Geological Survey publications call:

859.257.3896 or 877.778.7827 (toll free)

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



Scale 1:63,360

05 by the University Kentucky Geological	

7.5-Minut PLANNING GUIDANCE TABLE DEFINITIONS FOUNDATION AND EXCAVATION

The terms "earth" and "rock" excavation are used in the engineering sense; earth can be excavated by han 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. Noderate—A moderate limitation is one that can normally be overcome but the difficulty and expense an 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 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 uniform 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 limit than excavation in shafe for a house with a basement.

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

Access roads—These are low-cost mads, driveways, etc., usually surfaced with crushed stone or a thin layer of blocktop. 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 th writter and early spring. Some types of recreation areas would not be used during these sessors.

Light industry and malis—Ratings are based on developments having structures or equivalent load limit require three stories or less, and large paved areas for parking lots. Structures with greater load limit requirements wou need tootings in solid rock, and the rock would need to be core difield to determine presence of cavems, cracks 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. servoir 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.

For Planning Use Only

is of the soils and the under lying rock.

45

EXPLANATION

Monitoring Public Spring Gas well

Urban service bounda

Sinkholes Artificial fill

-- Concealed fault

----- Ft. Knox boundary

Photograph locatio

Foundation and Excavation

material; easy to

Rock Unit

. Silt, sand, and gravel

2. Limestone

3. Limestone, dolomite, and shale

. Dolomite

5. Siltstone, shale*

6. Shale*

limestone'

8. Siltstone, dolomite, and limeston

Sandstone

See discussions of swelling shales and soils and slope stability

Karst Potential Rating

40-foot contour interval

Wetlands > 1 acre (U.S. Fish & Wildlife Service, 2003) Watershed boundaries

School er wells Domesti

For further assistance, contact the Kentucky Geological Surve a Place



MAP AND CHART 90 Series XII, 2005

antal Protection



ever use sinkholes as dumps. All waste, but especially pesticides, paints, hou utomobile batteries, and used motor oil, should be taken to an appropriate rec lake sure runoff from parking lots, streets, and other urban areas is routed through a deten nd sediment trap to filter it before it flows into a sinkhole.

Make sure your home septic system is working properly and that it's not discharging sewage into a crevice or sinkhole.

Keep cattle and other livestock out of sinkholes and sinking streams. There are other methods of providing water to livestock.

Construct waste-holding lagoons in karst areas carefully, to prevent the bottom of the lagoon fro collapsing, which would result in a catastrophic emptying of waste into the groundwater. If required, develop a groundwater protection plan (410KAR5:037) or an agricultural water quality plan (KRS224.71) for your land use.

(From Currens, 2001)



typical in areas of karst geology, which streams, sinkholes, and springs, Many d for any type of deve

C.

-



m Arboretum and Research Forest was established in the 1930's in south-central Bullitt County. It he largest collections of American hollies in North America. The park offers miles of hiking trails and so public programs. The new visitors center is constructed with a sector system that uses peat filter s) to purify wastes. Photos by Stephen Greb. Kentucky (

Planning Guidance by Rock Unit Type

Limestone terrain can be subject to subsi hazards, which usually can be overcome by prior planning and site evaluation. "A" shows construction above an open cavem, which later collapses. This is one of the most difficult situations to detect, sibility of this situation and the possibil beneath a struc n "B," a h tually is partially adually, resulting in damage t on can be traced to lack or geophys core sar ai ocuules and inadequate ling. "C" and "D" show the terrain. In "C," the house is situated or porous fill (light shading) at a site whe terrain. In "C," the house is situal porous fill (light shading) at a site surface and groundwater drainag supporting soil (darker shading) voids in limestone (blocks) below natural process is then accelerat infiltration through fill around the "D" shows a karst site where nor "ainfall is abcorded the unburden rainfall is at conduits, bu heavy storm quickly enou

PAC

	Flaming Guidance by Rock Ontertype									
	Septic System	Residence with Basement	Highways and Streets	Access Roads	Light Industry and Malls	Intensive Recreation	Extensive Recreation	Reservoir Areas	Reservoir Embankments	Underground Utilities
	Severe limitations. Failed septic systems can contaminate groundwater. Refer to soil report (Whitaker and Waters, 1986).	Water in alluvium may be in direct contact with basements. Refer to soil report (Whitaker and Waters, 1986).	Slight limitations. Refer to soil report (Whitaker and Waters, 1986).	Slight to moderate limitations. Refer to soil report (Whitaker and Waters, 1986).	Slight to moderate limitations. Avoid construction in flood- plain. Refer to soil report (Whitaker and Waters, 1986).	Refer to soil report (Whitaker and Waters, 1986).	Refer to soil report (Whitaker and Waters, 1986).	Refer to soil report (Whitaker and Waters, 1986).	Not recommended. Refer to soil report (Whitaker and Waters, 1986).	Not recommended. Refer to soil report (Whitaker and Waters, 1986).
	Severe limitations. Impermeable rock. Locally fast drainage through fractures and sinks. Danger of groundwater con- tamination.	Severe to moderate limitations. Rock excavation may be required.	Moderate limitations. Rock excavation possible. Local drainage problems, especially on shale. Sinks common and caves possible.	Moderate limitations. Rock excavation. Possible steep slopes. Slight limitations with suitable topography.	Slight to severe lim- itations, depending on topography. Rock excavation. Sinks common. Local drainage problems. Groundwater contam- ination possible.	Slight to moderate limitations, depending on activity and topog- raphy. Possible steep wooded slopes.	Slight to severe limita- tions, depending on activity and topog- raphy. Possible steep wooded slopes. Slight limitations for forest or nature preserve.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate limitations. Possible rock excavation.
on	Moderate to severe limitations. Imperme- able rock. Locally fast drainage through frac- tures and sinks to water table, with pos- sible contamination.	Severe to moderate limitations. Rock excavation may be required.	Moderate limitations. Rock excavation possible. Local drainage problems, especially on shale. Sinks common and caves possible.	Moderate limitations. Rock excavation likely. Local drainage problems. Sinks common.	Slight to severe lim- itations, depending on topography. Rock excavation. Sinks common. Local drainage problems. Groundwater contam- ination possible.	Slight to severe limitations, depending on activity and topog- raphy. Possible steep wooded slopes. Sinks common.	Slight to severe limita- tions, depending on activity and topog- raphy. Possible steep wooded slopes.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate limitations. Possible rock excavation.
	Moderate to severe limitations. Imperme- able rock. Locally fast drainage through frac- tures and sinks to water table, with pos- sible contamination.	Moderate to severe limitations. Rock ex- cavation may be required.	Moderate limitations. Rock excavation possible. Local drainage problems, especially on shale. Sinks common and caves possible.	Severe to moderate limitations. Rock ex- cavation. Possible steep slopes and narrow ravines.	Moderate to slight limitations, depending on topography. Rock excavation. Local drainage problems. Sinks common.	Moderate to slight limitations, depending on activity and topog- raphy. Possible wooded slopes.	Slight to severe limita- tions, depending on activity and topog- raphy. Possible steep wooded slopes.	Moderate to slight limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate to slight limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate limitations. Possible rock excavation.
n	Moderate to severe limitations. Imperme- able rock. Possible thin soils.	Moderate to severe limitations. Rock ex- cavation: locally, upper few feet may be rippable.	Severe limitations. Rock excavation; locally, upper few feet may be rippable. Steep slopes. Possible expansion of shales.*	Moderate limitations. Rock excavation. Steep slopes.	Severe limitations. Rock excavation; locally, upper few feet may be rippable. Steep slopes. Possible expansion of shales.*	Severe limitations. Steep slopes.	Slight to moderate limitations.	Slight limitations. Reservoir may leak where rocks are fractured.	Moderate limitations.	Moderate limitations. Possible rock excavation.
	Severe limitations. Thin soils and low permeability.	Severe limitations. Low strength, slump- ing, and seepage problems.	Severe limitations. Low strength, slump- ing, and seepage problems.	Severe limitations. Low strength, slump- ing, and seepage problems.	Severe limitations. Low strength, slump- ing, and seepage problems.	Moderate to severe limitations. Depending on activity.	Severe to slight limita- tions, depending on activity and topog- raphy.	Slight limitations for small ponds.	Severe limitations. Poor strength and stability.	Moderate limitations Possible rock excavation.
n	Severe to moderate limitations. Imperme- able rock. Locally fast drainage through frac- tures and sinks. Pos- sible groundwater contamination.	Moderate to severe limitations. Rock excavation may be required.	Moderate limitations. Rock excavation possible. Possible drainage and slumping problems on shale. Sinks common and caves possible.*	Moderate limitations. Rock excavation likely. Local drain- age problems. Sinks common.	Slight to severe limitations, depending on topography. Rock excavation possible. Sinks common. Local drainage problems. Possible groundwater contamination.*	Severe to slight limitations, depending on activity and topog- raphy. Possible wooded slopes. Sinks common.	Severe to slight limitations, depending on activity and topog- raphy. Possible wooded slopes.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate limitations Possible rock excavation.
on	Severe limitations. Thin soils and imper- meable rock. Fast drainage through fractures and sinks to water table, with pos- sible contamination.	Moderate to severe limitations. Rock excavation may be required.	Severe to moderate limitations. Rock excavation may be required. Possible steep slopes.	Severe to moderate limitations. Rock excavation may be required. Possible steep slopes.	Severe to moderate limitations. Rock excavation may be required. Possible steep slopes.	Severe to moderate limitations. Rock excavation may be required.	Severe to slight limitations, depend- ing on activity and topography. Possible wooded slopes.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate limitations. Possible rock excavation.
an	Severe limitations. Thin soils.	Moderate to severe limitations. Rock excavation. Steep slopes.	Moderate to servere limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Rock excavation. Possible steep slopes.	Severe to moderate limitations. Rock excavation. Possible steep slopes.	Severe to slight limitations, depending on activity and topog- raphy. Possible wooded slopes.	Severe to slight limitations, depend- ing on activity and topography. Possible wooded slopes.	Moderate limitations. requires liner material. Permeable rock.	Moderate to severe limitations. Difficult to excavate.	Moderate to severe limitations. Highly variable amount of rock and earth ex- cavation. Steep slopes possible.

1







usissons (concrete columns) must be constructed weight of industrial buildings in areas with caves an (karst geology). Photo by Bart Davidson, Kenturkv f Survey.



Karst Geology

e term "karst" refers to a landscape o es, springs, sinking st round), and undergrou into fractured and soluble bedrock (us







FIGURE 4-5 BULLITT COUNTY MINERAL RESOURCES

2015 Comprehensive Plan Bullitt County, Kentucky

LEGEND



MAP INFORMATION

Data Sources: April, 2006 KY Geologic Survey, University of Kentucky Kentuckiana Regional Planning & Development Agency 2012 U.S. Census TIGER Line Data

> Cartography by: Nikita Moye

PAGE 4-7

end of its useful life or is a dry hole. At this point, there is nothing visible on the surface or on the site to indicate the presence of an abandoned well. The Kentucky Department for Natural Resources has established well abandonment procedures that ensure public safety. There are no coal exploration sites Bullitt County.

SOILS

Detailed soil information and general soil maps can be found in the Soil Survey of Bullitt County, Kentucky published by the U.S. Department of Agriculture, Natural Resource Conservation Service. The general soil map found in the Soil Survey shows that there are seven soil associations in Bullitt County as described below. More specific soil information is shown on Figure 4-6 which show soils series for the county.

Soil associations are generalized groupings of similar soils with common relief and drainage patterns. While specific soil information must be consulted to determine the suitability of a particular site for various land uses, the associations can provide information for general planning purposes. The following paragraphs summarize the seven associations found within Bullitt County.

NOLIN-OTWELL-SENSABAUGH- The Nolin-Otwell-Sensabaugh soil association is found on the western edge of Bullitt County. Formed on floodplains, foot slopes, and along major streams, these soils are deep, well drained and have moderate and moderately rapid permeability. General woodlands are the primary land uses of this soil association. Soils in this association are most suited for woodland. The hazard of flooding is the main limitation for urban uses.

GARMON-CRIDER - The Garmon-Crider soil association is very steep to gently sloping, located in north-west Bullitt County, primarily in the Fort Knox Military Reservation. Formed on hillsides and ridgetops it tends to be moderately deep with well drained soils that are mainly loamy throughout. Farmland is the primary use of this soil with a few small communities and housing units. Due to the steepness of slope, soils located on hillsides are poorly suited for urban use. Soils located on ridgetops are most suited for urban uses.

Bullitt County



MCGARY-MARKLAND - The McGary-Markland soil association contains nearly level to steep soil found on stream terraces. These poorly drained to well drained soils that have a clayey subsoil, and are found in central and west Bullitt County, in the Fort Knox Military Reservation, and in part of Shepherdsville and Lebanon Junction. About a 18% of Bullitt County is covered by this soil association and it is primarily used for urban development. The soils in this association are poorly suited for most urban uses. Very slow permeability and the hazard of flooding are the main limitations to most urban uses.

ROCKCASTLE-COLYER-TRAPPIST- The Rockcastle-Colyer-Trappist soil association is located on hillsides and ridgetops. These shallow, excessively drained, strongly sloping to steep soils have a fined textured to moderately fine textured subsoil. Located in south-east and north Bullitt County this soil association covers 23% of the county. Most of the acreage found in this soil association is wooded. The soils in forested areas are well suited to woodland and wildlife habitat. This soil association is not suited for most urban uses due to the danger of slippage in the unstable clay shales and the steepness of slope.

CANEYVILLE-CRIDER - The Caneyville-Crider soil association is gently sloping to very steep. It is located in north-west Bullitt County in parts of Hillview, Fox Chase, Hebron Estates, Pioneer Village and Mount Washington. Formed on hill-sides and ridgetops it tends to be moderately deep and deep with well drained soils that have clayey and loamy subsoil. This soil association makes up 26% of the county with urban development being the primary land use of the soil. Most of the gently sloping and sloping soils in this association are suitable for urban uses. The moderately slow permeability of the subsoil and depth to bedrock are limitations in some areas.

BEASLEY-FAYWOOD - The Beasley-Faywood soil association contains gently sloping to very steep soil found on hillsides and ridgetops. These deep to moderately deep well drained soils have a clayey subsoil. They are found in the western edge of north Bullitt County and in parts of Mount Washington. About seven per-



cent of Bullitt County is covered by this soil association. It is primarily used for urban development with some pasture. Most soils in this association are poorly suited for urban use due to the steepness of slope, depth of bedrock, and the moderately slow to slow permeability. The gently sloped hills are suited for some urban uses.

NOLIN-LAWRENCE-NEWARK- The Nolin-Lawrence-Newark soil association is located on floodplains and low stream terraces. These nearly level, deep well drained and somewhat poorly drained soils are loamy throughout. Located along the Salt River and Cox Creek in east Bullitt County, this soil association covers one percent of the county. Most of the land with this soil is woodland with some residential. This soil association is not suited for most urban uses due to wetness and the hazard of flooding. Most of the soil in this association is suited to cultivated crops.

LOWELL-FAIRMONT-SHELBYVILLE- The Lowell-Fairmont-Shelbyville soil association is located on ridgetops and shoulder slopes. These deep well drained soils have moderately slow permeability. Most of the land with this soil is wood-land with some residential and can be found on eastern tip of Bullitt County. Most of the soil in this association is suited to cultivated crops. This soil association is not suited for most urban uses due to the hazard of erosion and shallow soil depths.

PEMBROKE-BEASLEY-SORYDON- The Pembroke-Beasley-Corydon association has deep to shallow well drained to somewhat excessively drained soils. They range from nearly level to moderately steep slopes. The land with this soil is woodland and is found on the eastern tip of Bullitt County near Bernheim Forest. This soil is most suited for raising livestock and farming enterprise. This soil association is not suited for most urban uses due to erosion hazards.

Bullitt County



PRIME FARMLAND SOILS

According to the U.S. Department of Agriculture, Natural Resource Conservation Service, prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is also available for these uses. Prime farmland can be cropland, pastureland, rangeland, forest land or land other than those used for urban purposes or covered with water. Prime farmland has the soil quality, growing season and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time. They either do not flood frequently or are protected from flooding. The following soils found in Bullitt County are considered to be potential prime farmland soils:

Symbol	Name	
BeB	Beasley Silt Loam	2-6 percent slopes
Bo	Boonesboro Silt Loam	
CaB	Caneyville Silt Loam	2 to 6 percent slopes
CrB	Crider Silt Loam	2 to 6 percent slopes
EkA	Elk Silt Loam	0 to 2 percent slopes
EkB	Elk Silt Loam	2 to 6 percent slopes
2 to 6 percent		
ElA	Elk Silt Loam	0 to 2 percent slopes
ElB	Elk Silt Loam	2 to 6 percent slopes
La	Lawrence Silt Loam	(1)
Le	Lawrence Silt Loam	(1)
LoB	Lowell Silt Loam	2 to 6 percent slopes
MaB	Markland Silt Loam	2 to 6 percent slopes
Mc	McGary Silt Loam	(1)
Mv	McGary Variant Silt Loam	(1)
Mo	Montgomery Silty Clay Loam	(1)
Ne	Newark Silt Loam	(1, 2)

List of potential prime farmland soils continued on page 4-15.

Symbol	Name			
NhA	Nicholson Silt Loam	0 to 2 percent slopes		
NhB	Nicholson Silt Loam	2 to 6 percent slopes		
No	Nolin Silt Loam	2 to 6 percent slopes		
OtA	Otwell Silt Loam	0 to 2 percent slopes		
OtB	Otwell Silt Loam	2 to 6 percent slopes		
OwB	Otwell Silt Loam	2 to 6 percent slopes		
Sg	Sensabaugh Gravelly Loam			
ShB	Shelbyville Silt Loam	2 to 6 percent slopes		
WoB	Woolper Silty Clay Loam	2 to 6 percent slopes		
ZaB	Zanesville Silt Loam	2 to 6 percent slopes		
1) Prime farmland if drained properly.				

2) Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season.

In addition to prime farmland the Soil Conservation Service has also identified farmlands of statewide importance. This is land that is of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Generally, farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high of a yield as prime farmlands when conditions are favorable. The following soils found in Bullitt County may indicate farmland of statewide importance:

Symbol	Name	
BeC	Beasley Silt Loam	6 to 12 percent slopes
CaC	Caneyville Silt Loam	6 to 12 percent slopes
CrC	Crider Silt Loam	6 to 12 percent slopes
EkC	Elk Silt Loam	6 to 12 percent slopes
FaC	Faywood Silt Loam	6 to 12 percent slopes
HaC	Hagerstown Silt Loam	6 to 12 percent slopes
LoC	Lowell Silt Loam	6 to 12 percent slopes
NhC	Nicholson Silt Loam	6 to 12 percent slopes
OtC	Otwell Silt Loam	6 to 12 percent slopes
WoC	Woolper Silty Clay Loam	6 to 12 percent slopes
ZaC	Zanesville Silt Loam	6 to 12 percent slopes





SLOPES

Virtually flat land can be used for intensive activity, while slopes in excess of 20 percent present limitations unless efficient adjustment occurs. Residential development can take place on sites utilizing land that industrial development must forego if adjusted. The location and concentration of slopes in the form of hills, ridges, valleys and plains can force development into large clusters or break it up into dispersed patterns. Bullitt County's topography has structured the form of its small communities and guided the location of major transportation routes. The suitability of different degrees of unadjusted slope for development is shown in Table 4 -1. Figure 4-4 shows the topography of Bullitt County. Testing for slope stability should be considered before any type of development takes place.

Visual indications of unstable slopes include previous slides or slumps, cracking of the top of the slope, tilting of fences, retaining walls, utility poles or trees, new cracks in foundations and sidewalks and slowly developing and widening cracks in the ground or paved areas.

Development of unadjusted steep slopes can accelerate erosion, increase runoff, and decrease the volume of water absorbed and filtered as groundwater. Damage to buildings and other man made structures can occur on unstable slopes. Commercial and industrial development should be restricted on unadjusted slopes steeper than 12%. Developers of residential property on such slopes should be required to meet standards of efficient techniques. In certain instances, the planning commission should consider requiring the submittal of geotechnical reports prior to approving a site plan or subdivision plat on land with excessive slopes.

Table 4-1				
Unadjusted Slope Suitability for Urban Development				
Limitations	Suitability Rating	Residential	Commercial	Industrial Park
Slight	Optimum	0-6%	0-6%	0-2%
Moderate	Satisfactory	6-12%	6-12%	2-6%
Severe	Marginal	12-18%	12-18%	6-12%
Very Severe	Unsatisfactory	18%+	18%+	12%+

Source: Kiefer, Ralph W., "Terrain Analysis for Metropolitan Area Planning," Journal of the Urban Planning Division. Proceedings of the American Society of Civil Engineers. Dec, 1967.

FLOODPLAINS

Floodplains are low lying areas that are susceptible to flooding. Bullitt County has areas that have been officially designated by the Federal Emergency Management Agency (FEMA) as flood hazard areas. Bullitt County's effective Flood Insurance Rate Maps (FIRMs) displayed in Figure 8-1 are dated December, 16 2004. The effective FIRM maps are available in PDF and GIS format from FEMA. According to the KY Division of Water, the revised preliminary FIRMs were sent to the communities within Bullitt County on October 25, 2013. As final updated maps were not expected to be available in the near future, they are not included in this plan.

The Floodplain Ordinance for Bullitt County was adopted in December, 2004. Hillview, Shepherdsville, Lebanon Junction and Pioneer Village are the only cities within the County that currently participate in the flood management program. Shepherdsville Floodplain Coordinator is the Deputy City Clerk. Hillview adopted their Floodplain Ordinance in November, 2005 and the Coordinator the City Clerk. Lebanon Junction adopted their Floodplain Ordinance in October, 1989 and the Coordinator is the City Clerk. The Bullitt County Planning and Zoning Director is the Floodplain Coordinator for Bullitt County and Pioneer Village.

Figure 8-1 shows the location of flood hazard areas in Bullitt County, which run parallel to the creeks and rivers. Table 4-2 identifies the percentage of the city that is located within the floodplain. Subdivision or other higher intensity uses can increase flooding if proper storm water management techniques are not implemented during the planning and development process. Watersheds can also be impaired from improper sewage treatment and storm water run-off.

Bullitt County



TABLE 4-2				
% OF AREA IMPACT				
CITY % IN FLOODPL				
Fox Chase	9.35%			
Hebron Estate	1.84%			
Hillview	5.21%			
Hunters Hollow	0.00%			
Lebanon Junction	39.82%			
Mt. Washington	0.59%			
Pioneer Village	1.72%			
Shepherdsville	64.75%			
Source: KIPDA "Regional Hazard Mitigation Plan: 2011"				

According to the 2004 Flood Insurance Study, major floods have occurred in Bullitt County in January 1937, May 1961, March 1964, and March 1997. "The maximum flood stage recorded was that of the 1937 flood, which reached an elevation of 453.88 feet National Geodetic Vertical Datum of 1929 (NGVD) in Shepherdsville. The May 1961 flood reached an elevation of 447.42 feet NGVD, the March 1964 flood crested at 448.08 feet NGVD, and the March 1997 flood crested at 447.50 feet NGVD. The most recent flood in Bullitt County occurred in April 2011, and reached an elevation of 436.67 feet NGVD. These elevations were recorded at the State Highway 61 gaging station at the Salt River." (Flood Insurance Study, 2004)

SUPERFUND SITES

In 1980 Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments & Reauthorization Act (SARA), better known as Superfund. Superfund is EPA's program to identify, investigate and clean up uncontrolled or abandoned hazardous waste sites throughout the United States. There are currently three identified EPA Superfund sites in Bullitt County as listed below.

Tri-City Disposal Company

Location: KY 1526, Shepherdsville, KY Affected Media: Ground water, Soil, Surface Water Cleanup Status: Construction Complete - physical cleanup activities have been completed. Human Exposure Under Control: EPA is working to determine Groundwater Migration Under Control: There is insufficient data to determine Sitewide Ready for Anticipated Use: No

The 349 acre site includes a 57acre landfill and several residential properties. From 1964 to 1967, the Tri-City Disposal Company operated a landfill at the site. The company disposed of highly volatile liquid wastes, lumber scraps and fiberglass insulation materials from various Louisville area industries at the on-site landfill. EPA placed the site on the National Priorities List (NPL) in 1989 because of contaminated ground water, soil and surface water resulting



from landfill operations. EPA, the Kentucky Department for Environmental Protection (KDEP) and the site's potentially responsible parties (PRPs) have investigated site conditions and taken steps to clean up the site in order to protect people and the environment from contamination.

Bullitt County



Smith's Farm

Location: Pryor Valley Rd., Brooks, KY Affected Media: Ground water, Leachate, Sediment, Soil, Surface water Cleanup Status: Construction complete - physical cleanup activities have been completed Human Exposure Under Control: Yes Groundwater Migration Under Control: NA

Sitewide Ready for Anticipated Use: Yes

The Smith's Farm site includes both an uncontrolled dump that received industrial waste from around the 1940s until the 1970s and an industrial landfill operated until 1989. The site originally included an 80acre unpermitted former drum disposal area; a 40-acre formerly permitted landfill; and several smaller, isolated disposal areas where unpermitted disposal of hazardous waste occurred over at least 30 years. EPA placed Smith's Farm on the National



Priorities List (NPL) in 1986 because of contaminated ground water, sediment, soil, and surface water resulting from waste disposal activities at the site. EPA, the Kentucky Department for Environmental Protection (KDEP) and the site's potentially responsible parties (PRPs) have investigated site conditions and taken steps to clean up the site in order to protect people and the environment from contamination. Site contamination does not currently threaten people living and working near the site.

A.L. Taylor (Valley of the Drums)

Location: KY 1020, Brooks, KY Affected Media: Ground water, Soil, Surface water Cleanup Status: Deleted from the National Priorities List (NPL) Human Exposure Under Control: Yes

The A.L. Taylor site was used for a waste disposal operation from 1967 to 1977. The owner dug up pits on site and emptied the contents of waste drums from area paint and coating industries into the pits before recycling the drums. After the Commonwealth of Kentucky stopped the owner from burying solvents, the site owner used soil from the nearby hillsides to cover the disposal pits. In addition, the owner stored thousands of drums on site, especially during the later years



of site operations. The owner received and disposed of waste at the site until 1977. EPA placed the site on the National Priorities List (NPL) in 1983 because of contaminated ground water, soil and surface water resulting from waste handling practices. EPA, the Kentucky Department for Environmental Protection (KDEP) and the site's potentially responsible parties (PRPs) investigated site conditions and took steps to clean up the site in order to protect people and the environment from contamination. Site contamination does not currently threaten people living and working near the site.

AIR QUALITY

Air quality is monitored by the Division of Air Quality Control of the Kentucky Natural Resources and Environmental Protection Cabinet, Department for Environmental Protection. The "Kentucky Ambient Air Quality Report" which is produced by the Technical Services Branch of the Kentucky Division of Air Quality is issued annually. The last report issued summarizes statistical results of monitoring conducted during the year 2007 to measure outdoor concentrations of air pollutants in the Commonwealth. The primary source of data for the report is the Air Quality Surveillance Network operated by the Kentucky Division for Air Quality which has operated an air quality monitoring network since July 1967.





Bullitt County is located within the Appalachian Intrastate North Central Kentucky Intrastate Air Quality Control Region which includes the following 14 counties: Bullitt, Breckinridge, Grayson, Hardin, Henry, Larue, Marion, Meade, Nelson, Oldham, Shelby, Spencer, Trimble and Washington. In 2007, the Air Quality Surveillance Network had three monitors in this area as follows:

LOCATION	AQS ID
2nd Carpenter St Shepherdsville, KY, Bullitt County	21-029-0006
801 N. Miles St Elizabethtown, KY, Hardin County	21-093-0006
DOT Garage, 3995 Morgan - Buckner, KY, Oldham County	21-185-0004

The Division of Air Quality also has an Air Quality Index (AQI) used for reporting daily air quality for the five major air pollutants regulated by the Clean Air Act: ground level, ozone, particulate pollution, carbon monoxide, sulfur dioxide, and nitrogen dioxide. An AQI value of 50 represents good air quality with little potential to affect public health while an AQI value over 300 represents hazardous air quality. An AQI value of 100 generally corresponds to the national air quality standard. Therefore, AQI values of 100 are generally satisfactory while values above 100 are considered to be unhealthy - at first for certain sensitive groups of people, then for everyone as AQI values get higher. As part of the 2007 Kentucky Ambient Air Quality Report, a map was generated showing the Air Quality Index for the number of days in which the AQI is above 100 for each county (if data is available). On this map, it shows that Bullitt County had 6-10 days above an AQI of 100.

NOISE

Excessive noise levels can impact the quality of life, health and safety. The most offensive noise is primarily created from air traffic, vehicles, railroad, military reservations, earth products and industrial uses. Transportation Corridors are primary sources. Mitigation requirements will be addressed.

As a portion of Fort Knox Military Reservation is located within Bullitt County, noise levels should be considered when new development is proposed. According to the 2008 "Fort Knox Joint Land Use Study" noise from blasting extends off the Fort Knox military installation along the eastern and southeastern boundary

near the city of Lebanon Junction. Figure 4-7 illustrates the noise contours for the large caliber weapons. For the small caliber weapons peak noise levels must also be considered. Figure 4-8 illustrates the noise contours for small arms at Fort Knox. Exposure to noise within this area is severe and development within this area should be limited to activates such as industrial, manufacturing, transportation and resource production. Residential within the Noise II Zone should be prohibited.

The Louisville International Airport (KSFD) is the only large commercial airport within 15 miles of Bullitt County. Figure 4-9 illustrates the 2011 noise contours for KSDF. The Bluelick airport is the only airport within Bullitt County but it does not carry commercial traffic. Godman Army Airfield is located on Fort Knox on the west end near Muldraugh and is used exclusively for military aviation missions.

One primary highway of concern for noise in Bullitt County is Interstate 65 (I-65) which runs from north to south through the county. The 2011 average daily traffic count (ADT) at the north end of I-65 is between 76,935 and 91,625; and at the south end, the ADT is between 52,017 and 66,576. A preliminary noise analysis based on this ADT indicates that a site specific noise assessment should be conducted if any noise sensitive uses such as a residential use, hospital, nursing homes etc are proposed within 1000 feet of I-65 on the north end; 700 feet of I-65 on the south end. Other highways of concern are US 31-E, KY 44 and KY 61.

The CSX Railroad, which crosses Bullitt County from north to south is the only major railroad in Bullitt County. An average of 18 trains per day pass through the Bullitt County planning area. RJ Corman maintains a railroad line that runs from east to west from Belmont to Nelson County; this track has a limited amount of railroad traffic. (For more information on CSX see Chapter 7 Rail Transportation).

The main issues involved in any noise analysis are how much noise a site is exposed to, what types of activities are affected and what design or attenuation measures can be used to keep noise to an acceptable level. Outdoor noise levels are of greatest concern in residential areas especially at night when sleep is disrupted. **Bullitt County**



There are three basic way to mitigate high noise exposures. Relocating noise sensitive uses out of the high noise areas is the best and most desirable approach. A second mitigation approach is a noise barrier. Barriers can be actual walls, earthen mounds (called berms) or even other buildings. The barrier has to break the line of sight between the noise source and the noise sensitive use to be effective. The effectiveness of a noise barrier can be reduced by as much as 50% if the barrier is not long enough or tall enough to completely break the line of sight. The third noise mitigation approach is to incorporate noise attenuation measures into the building's themselves. This is not a desirable mitigation method because it leaves the outside areas of the building exposed to high noise levels. Noise attenuation measures incorporated into buildings include: sealing off leaks around windows, doors and vents; reducing the need for open windows by providing central air conditioning; locating windows away from the noise source; and designing exterior walls which attenuate noise.

ENDANGERED SPECIES

The primary concern for the impacts of development on plant and animal life is the effect on rare and endangered species. A total of five species of Federally listed Endangered species potentially exist in Bullitt County according to the Kentucky Department of Fish and Wildlife Resources. Of this number, three are mollusks (or freshwater mussels) and two are bats. In addition one plant species, the Kentucky glade cress has been proposed for listing as a federally threatened species. The species are listed in Table 4-3 as follows:

BOLENT COONT ENDANGERED STECRES						
Endangered Species	Federal Status	State Status	Location			
Gray Mytois Bat	Endangered	Threatened	Area cave or cave like habitats			
Indiana Bat	Endangered	Endangered	Caves with 39-46 deg. f. temps.			
Rink Pink Mussel	Endangered	Endangered	Area Rivers and Streams			
Orangefoot Pimpleback Mussel	Endangered	Endangered	Area medium to large Rivers			
Club Shell Mussel	Endangered	Endangered	Area Rivers and Streams			

TABLE 4-3 BULLITT COUNTY ENDANGERED SPECIES









PAGE 4-25

In May, 2013 the U.S. Fish and Wildlife Service proposed to designate critical habitat for the Kentucky glade cress which is only found in southern Jefferson County and Bullitt County, Kentucky. Glade cress grows on areas of flat soil, usually the thin soils and gravel around dolomite rock outcrops. It is also found in lawns and pastures where moist bare soil is predominant in the spring. The natural rock outcrops



in this area are another important habitat for glade cress but very few remain today. The surface dolomitic limestone has created unusual conditions for plant growth, generally wet in the spring when water is held near the surface and then very dry due to the lack of soil and other vegetation throughout the summer. Glade cress takes advantage of this moist spring by flowering in March and dispersing its seed in May and June, before the other plants can establish. Figure 4-10 identifies 5 critical habitat areas located in Bullitt County: *Unit 2* - Old Mans Run; *Unit 3* - Mount Washington; *Unit 4* - Cedar Creek, *Unit 5* - Cox Creek; *Unit 6* - Rocky Run. Each unit contains all of the primary physical or biological features essential to the conservation of the Kentucky glade cress.

Unit 2 totals 1,014 acres and extends into Bullitt County and Jefferson County. It is located just south of the Jefferson/Bullitt County line and extends north of Old Mans Run. Unit 3 consists of 42 acres primarily within or adjacent to the city limits of Mount Washington, north of Old Mills Road (KY 44). Unit 4 consists of 547 acres and is located south of the Salt River and northeast of Cedar Grove. This seems to represent the core of the remaining high-quality habitat for Kentucky glade cress. The KY State Nature Preserve Commission currently owns 83 acres and the Nature Conservancy owns 91 acres within this unit.

Unit 5 consists of 58 acres and includes two subunits north of Cedar Grove Road (KY 480) and east of Clarks Lane (KY 1442). These subunits are important for maintaining the distribution and genetic diversity of the species. *Unit 6* consists of 374 acres in Bullitt County, Kentucky. This unit appears to represent the largest intact glade habitat remaining within the range of the species. The designated critical habitat's may require special management considerations or protection to ad-

Bullitt County



dress potential adverse effects associated with development on private land, incompatible commercial, or agricultural practices, and horseback riding.



SUMMARY

The purpose of this chapter is to identify development impacts on the environment within the planning period and to determine how Bullitt County can continue to develop without destroying its natural resources and quality of life. The following paragraph summarizes recommendations that are a product of this chapter and the goals and objectives.

As Bullitt County continues to grow the environmental resources of the County will be heavily impacted as the need for additional housing, commercial and community facilities increase. As part of the development process, geologic hazards, such sinkholes and Superfund sites should be mapped. Standards should be created that outline the procedures necessary to mitigate the creation of addi-

tional environmental hazards. Where development is planned a search should be performed for abandoned oil and gas wells near project sites. When environmentally sensitive areas are identified there should be greater collaboration between the County and City governments to discourage development in these areas.



