

SECTION 2
WATERSHED INVENTORY

2.01 GENERAL WATERSHED CHARACTERISTICS

Watershed characteristics such as land use, geology, land cover, topography, and hydrology play a role in the overall health of a waterway. Each characteristic impacts the amount and quality of runoff entering streams; and therefore, is important to understand when evaluating water quality conditions and in identifying potential sources of pollutants and the selection of controls. This section summarizes the physical and natural features of the watershed, land use, and land cover characteristics, and the demographics of the watershed.

The Curry's Fork watershed is approximately 28.52 square miles and is a tributary of Floyds Fork.¹ The major city within the Curry's Fork watershed is La Grange, located on the northeastern side of the watershed off of Interstate 71. See Figure 2.01-1 for the location of the Curry's Fork watershed in Kentucky. Although the watershed is fairly rural in nature, it has become developed with subdivisions throughout watershed. The most developed portion of the watershed is in and around La Grange. See Figure 2.01-2 for more detailed information regarding the location of the Curry's Fork watershed within Oldham County, Kentucky.

A. Physical and Natural Features

1. Subwatershed Boundaries

Curry's Fork includes four primary subwatersheds: North Curry's Fork, South Curry's Fork, Curry's Fork (main stem), and Asher's Run. They are located within the Floyds Fork Basin in Kentucky, specifically within the 10-digit Hydrologic Unit Code (HUC) #05140-102-180. The Floyds Fork Basin is located within the Salt River Basin (HUC 05140-102). Floyds Fork drains into the Salt River and the Salt River drains into the Ohio River at the southwest tip of Jefferson County.

A list of the subwatersheds and their associated HUC numbers and drainage areas are shown in Table 2.01-1. See Figure 2.01-2 for the subwatershed delineations.

Name	HUC	Area (sq mi)
North Curry's Fork	05140-102-180-100	10.05
South Curry's Fork	05140-102-180-110	9.27
Curry's Fork	05140-102-180-120	5.81
Asher's Run	05140-102-180-130	3.39
Total Watershed Area		28.52

Table 2.01-1 Subwatershed Areas

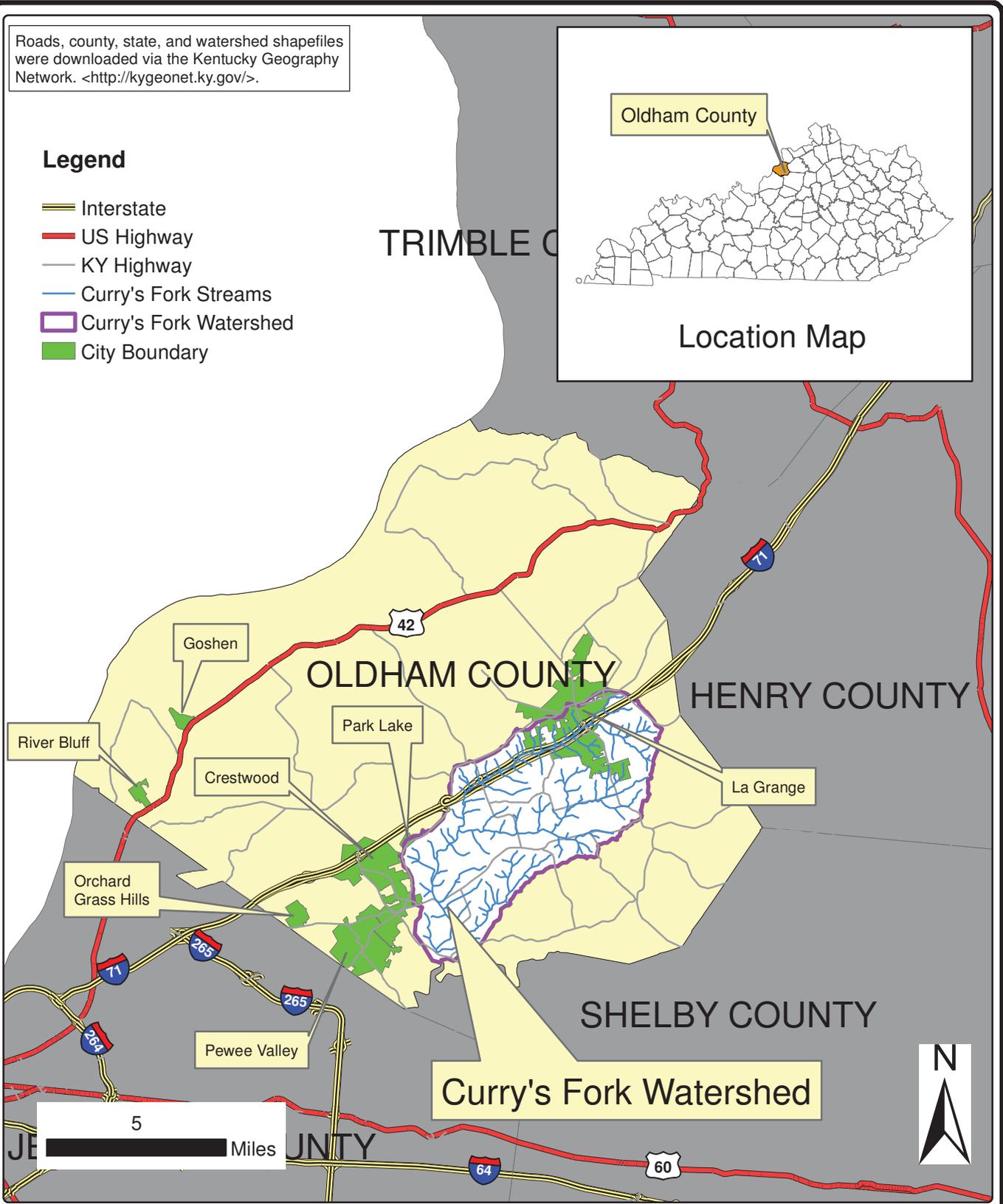
South Curry's Fork and North Curry's Fork join together south of the Buckner exit off Interstate 71. The confluence of Asher's Run and Curry's Fork is located at West Mount Zion Road and Floydsburg Road in close proximity to the Oldham County/Shelby County line.

The Curry's Fork watershed is located in the Salt River Basin. Curry's Fork discharges into Floyds Fork, which discharges into the Salt River. The Salt River, in turn, discharges into the Ohio River.¹

Roads, county, state, and watershed shapefiles were downloaded via the Kentucky Geography Network. <<http://kygeonet.ky.gov/>>.

Legend

-  Interstate
-  US Highway
-  KY Highway
-  Curry's Fork Streams
-  Curry's Fork Watershed
-  City Boundary

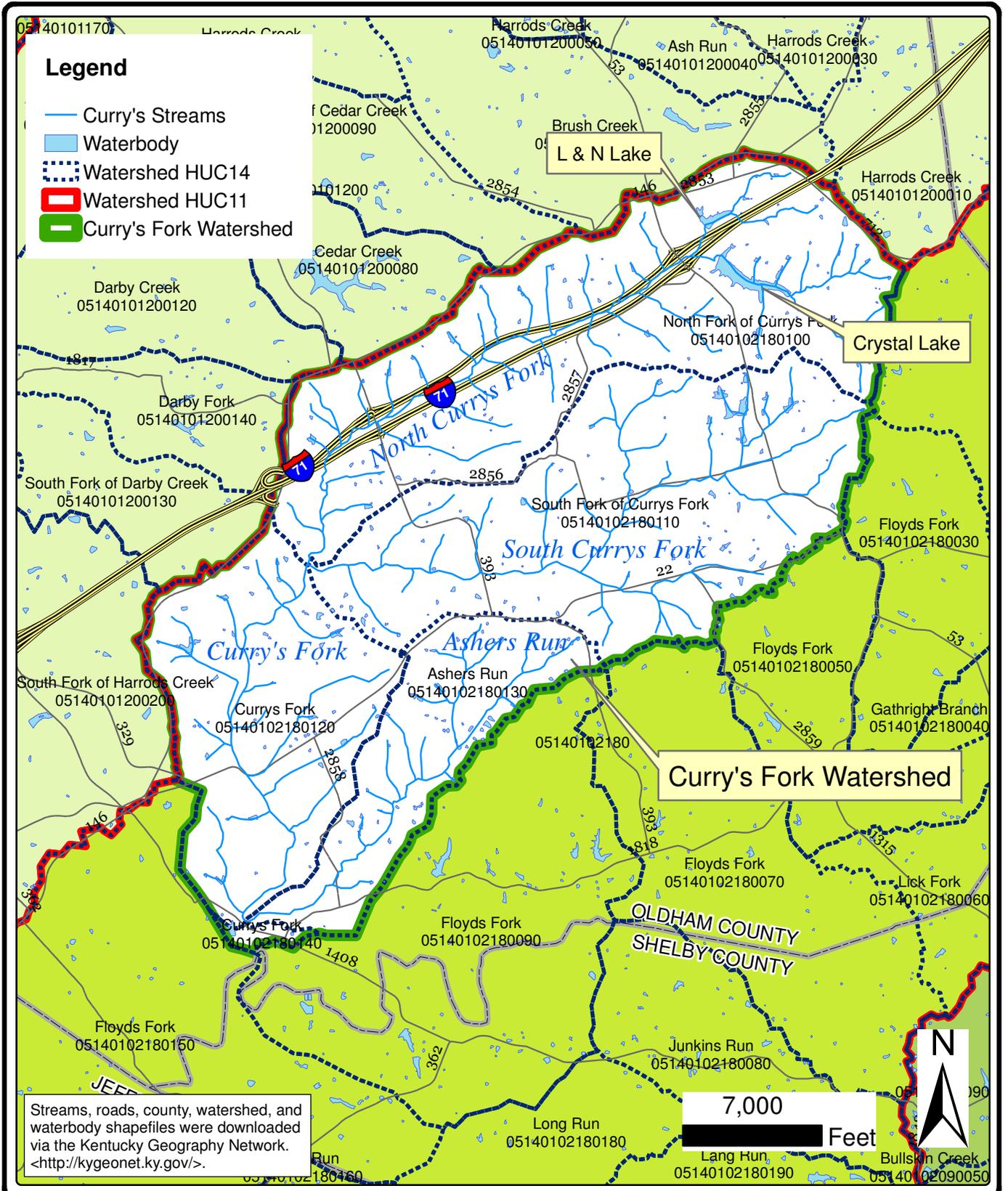


CURRY'S FORK LOCATION

CURRY'S FORK WATERSHED PLAN
OLDHAM COUNTY FISCAL COURT
OLDHAM COUNTY, KENTUCKY



FIGURE 2.01-1
5994.100



CURRY'S FORK SUBWATERSHEDS

**CURRY'S FORK WATERSHED PLAN
OLDHAM COUNTY FISCAL COURT
OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.01-2
5994.100**

2. Precipitation and Climate

Oldham County receives a moderate amount of precipitation, averaging approximately 49 inches a year. Table 2.01-2 represents the total annual rainfall information generally representative of Oldham County. This historic rainfall data is taken from the rain gauge at the Hite Creek Wastewater Treatment Plant (WWTP), which is located on the northeastern border of Jefferson County, just southwest of Oldham County outside the Curry's Fork watershed. The Louisville and Jefferson County Metropolitan Sewer District (MSD) operates this rain gauge, which automatically telemeters rainfall conditions to MSD's central computer every five minutes.

As shown in Table 2.01-3, the majority of rainfall occurs during the spring and summer months, and much occurred during the primary contact recreation season. Table 2.01-3 represents 30 years of data measured in Louisville, Kentucky.

Like most regions located in the midwest, Oldham County experiences warm summer months and cold winter months. January is typically the coldest month of the year in Oldham County, with average low and high temperatures ranging from 20°F to 40°F, respectively. July is typically the warmest month of the year, with average low and high temperatures ranging from 62°F to 88°F, respectively.

Table 2.01-4 shows the typical temperatures for each month of the year in Oldham County.

Year	Rainfall (in)
2004	49.02
2005	42.27
2006	53.50
2007	49.79
2008	48.38

Source: <http://www.msdlouky.org/aboutmsd/rainfall.cfm>

Table 2.01-2 Annual Precipitation

Month	Typical Rainfall (in)
January	2.86
February	3.3
March	4.66
April	4.23
May	4.62
June	3.46
July	4.51
August	3.54
September	3.16
October	2.71
November	3.7
December	3.64
Annual	44.39

Source: Ohio River Water Quality Fact Book, ORSANCO-1994

Table 2.01-3 Monthly Typical Precipitation

Month	Max °F	Mean °F	Min °F
January	40.2	29.8	19.3
February	45.9	33.8	21.6
March	56.2	43	29.8
April	66.9	52.4	37.9
May	76.4	62.5	48.5
June	84.3	70.8	57.3
July	88.1	75.1	62
August	86.6	73.3	60
September	80.3	66.2	52
October	69	54.4	39.7
November	56.2	44.1	32
December	44.8	34.3	23.8
Average	66.2	53.3	40.3

Source: <http://www.idcide.com/weather/ky/la-grange.htm>

Table 2.01-4 Typical Temperatures (Shelbyville Weather Station)

3. Hydrology and Surface Water Resources

Streams are traditionally classified by the Strahler Stream Order, a method used for measuring the relative size of streams. This Strahler method uses the number of tributary streams adjoining other stems of the stream to define the size of the stream. For example, when two first-order streams converge, they form a second-order stream, and when the second-order stream converges with another second-order stream, they form a third order stream. Therefore, larger streams have a greater stream order number. The stream order can range from 1 to 12. For example, a small headwater stream with no adjoining tributaries would be classified as having a stream order of 1, the Ohio River has a stream order of 8, and the Amazon River has a stream order of 12. Curry's Fork streams are classified as stream orders of 1 through 4 indicating the relatively small nature of the streams. Based on National Hydrography Dataset, there are approximately 21 miles of waterways within the Curry's Fork watershed.

Some Curry's Fork streams can have no flow during periods of drought. The upper portions of North Curry's Fork and all of Asher's Run and South Curry's Fork experienced periods of no flow in drought conditions during sampling in the recreational contact season. The main stem of Curry's Fork and the lower portion of North Curry's Fork receives a small amount of flow regardless of weather conditions. During spring, most streams maintain a small amount of flow as a result of increased rain and groundwater recharge. During periods of heavy rain, flow can exceed the height of the stream banks and flow depth can be in excess of 10 feet in the main stem of Curry's Fork.

The major reservoirs located within the Curry's Fork watershed include Crystal Reservoir and the L&N Reservoir. Both reservoirs are located in the North Curry's Fork subwatershed. The Crystal Reservoir and L&N Reservoir are known locally as Crystal Lake and L&N Lake. Therefore, they are referred to as lakes in the WP for simplicity purposes. The main surface water resources in the watershed are the Curry's Fork streams that drain into Floyds Fork. See Figure 2.01-2 for identified water bodies from the National Hydrography Dataset. The locations of impoundments throughout the watershed are important for analyzing in-stream nutrient, sediment, and dissolved oxygen (DO) levels. Impounded or pooled areas can affect water quality downstream.

Direct modification of stream channels is common in developed areas. Stream channel straightening is one the typical methods of stream modification with the intent of increasing flow velocity and quantity in a stream to reduce the risk of flooding. Increased velocity and flow conditions above what naturally occurs within a stream can have numerous detrimental effects, including increased bank erosion, lack of stable substrates, unstable habitats, and more. Figure 2.01-3 shows the stream segments affected by channel straightening in the Curry's Fork watershed identified by the University of Louisville (UL) Stream Institute.

4. Groundwater/Surface Water Interaction

Groundwater from alluvium in the county is typically hard to very hard and may contain salt or hydrogen sulfide. According to KDOW Groundwater Section of the Watershed Management Branch, the watershed primarily has areas of moderate hydrogeologic sensitivity to groundwater pollution.²⁴

Figure 2.01-4 shows the potential karst areas for the Curry's Fork watershed. It is important to note that Figure 2.01-4 shows karst potential areas based on data and field experience of Kentucky karst experts; therefore, it is not guaranteed that karst regions will be encountered in an area designated as major or moderate potential karst. A review of the KDOW's *Groundwater Sensitivity Regions of Kentucky* was also conducted and supported the findings in the karst potential map.²⁴ Additional studies and field investigations are required to determine specific karst locations. While Kentucky has some of the most karst prone areas in the world, Oldham County is primarily located in a moderate karst potential area and is therefore not known for significant karst topography. The moderate karst areas in Curry's Fork are associated with a moderate hydrogeologic sensitivity to groundwater pollution.

Although Oldham County is not located in a major karst potential area, field investigations have confirmed that some karst topography exists. Karst regions are susceptible to unique problems such as sinkhole collapses and sinkhole flooding. They are also a direct link to groundwater in many cases and can result in rapid groundwater pollution.¹ The general consensus of professionals working in this area is that karst topography does not play a major role in this watershed or in the transport of groundwater.

5. Floodplains

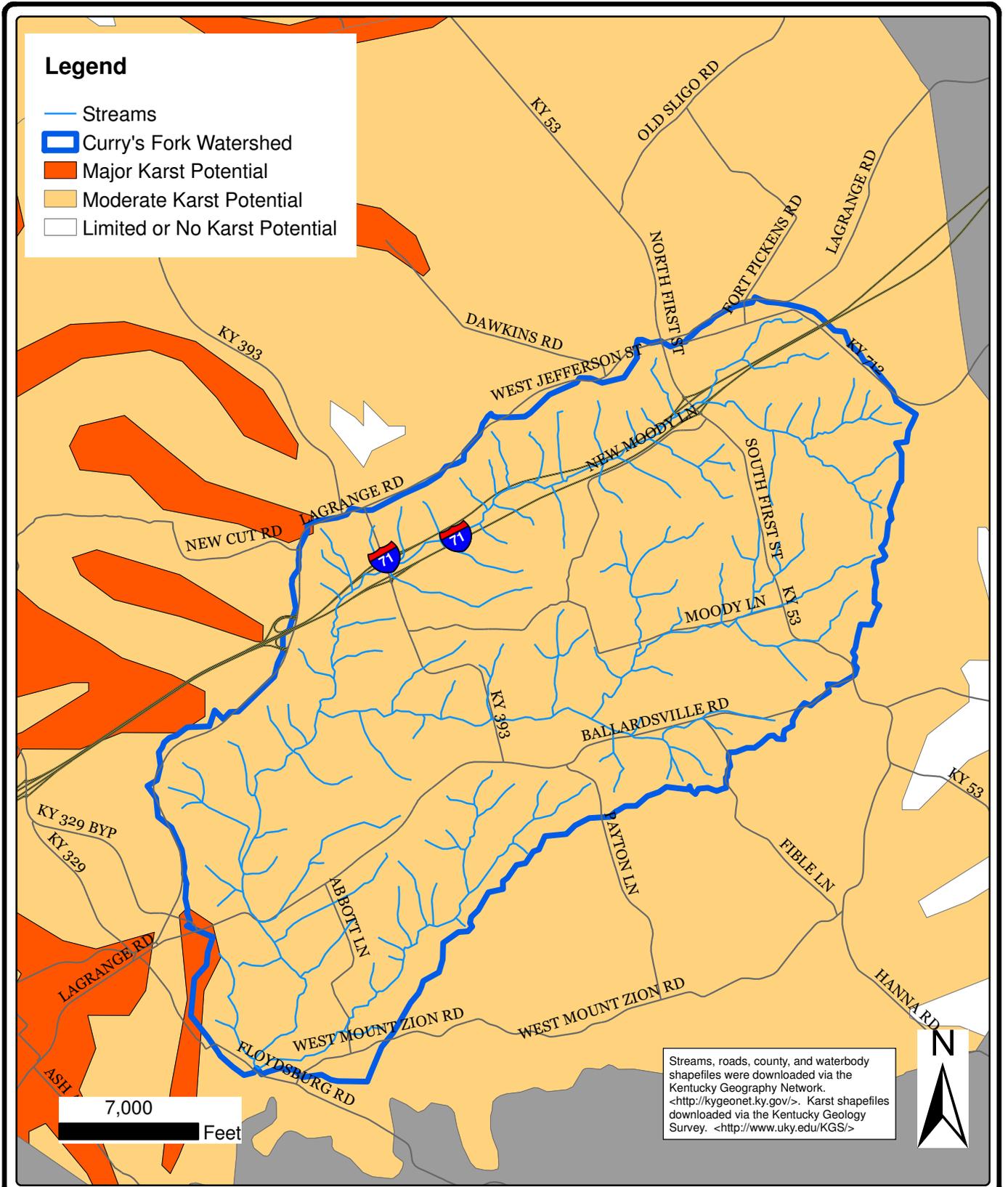
According to the Federal Emergency Management Agency (FEMA), the 100-year floodplains are located along South Curry's Fork, portions of North Curry's Fork and Asher's Run and the entire main stem of Curry's Fork.²² It is important to note that increases in impervious surfaces such as buildings and roadways may increase the potential for flooding unless properly managed. The floodplains must be examined as the population continues to grow. Figure 2.01-5 shows the floodplain classifications for the watershed identified by FEMA. Streams in Curry's Fork generally have limited floodplain area to provide overflow relief for streams during higher flow, such as wet weather events.

a. Flooding and Ponding Issues

Flooding was a common concern expressed by residents within the Curry's Fork watershed at the 2009 roundtable. Residents also provided feedback regarding the location of areas that commonly flood.

The most flood-prone areas identified by residents within the Curry's Fork watershed include an area north of the Lakewood Valley Subdivision, the Lakewood Valley Subdivision along Moody Lane, and the Borowick Subdivision area.²

See Figure 2.01-6 for the locations of these subdivisions. Refer to Appendix A for more information regarding the 2009 Roundtable.

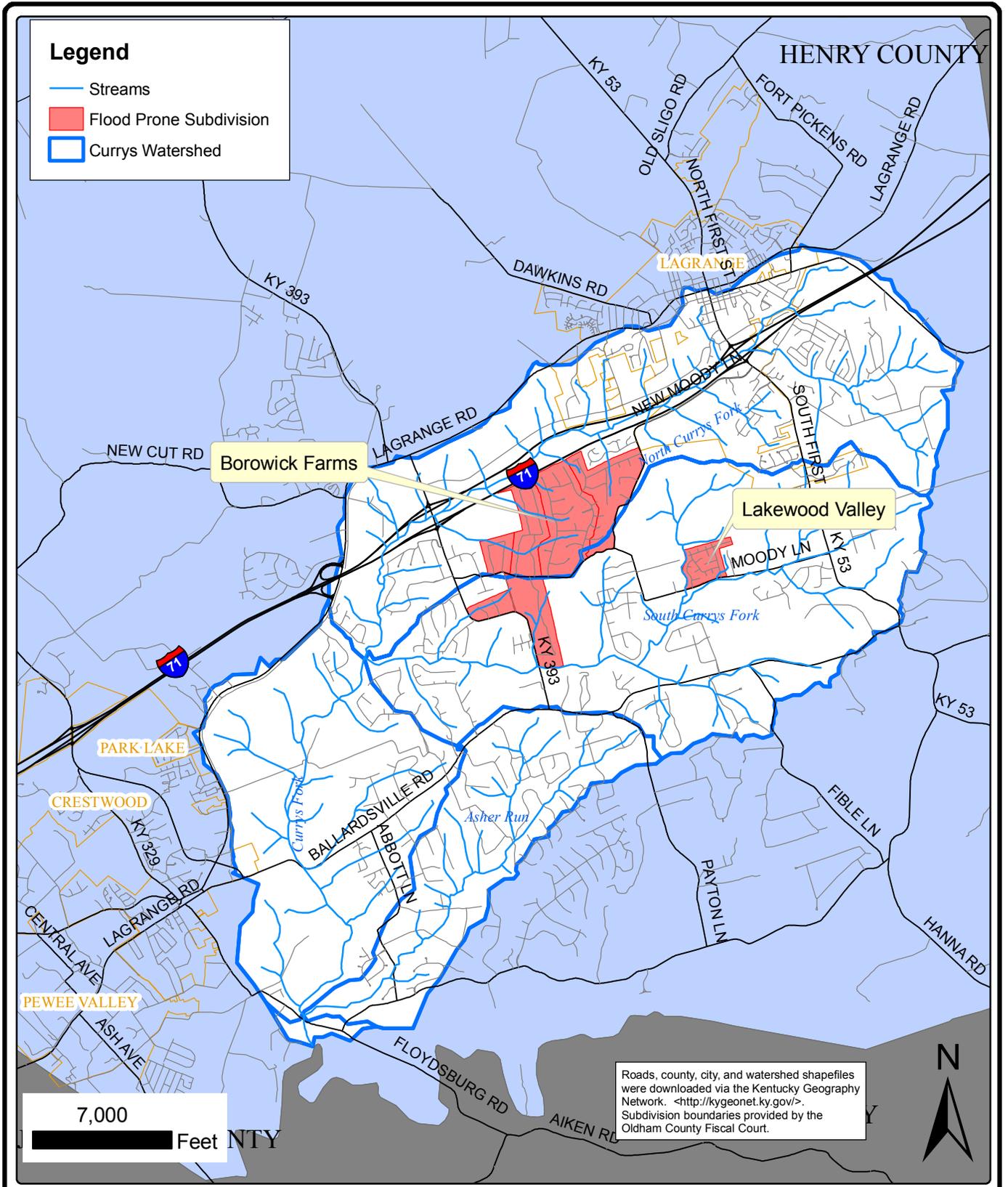


CURRY'S FORK KARST POTENTIAL

CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY



FIGURE 2.01-4
 5994.100



FLOOD PRONE SUBDIVISIONS

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.01-6
 5994.100**

6. Wetlands

Wetlands are essential to the Curry's Fork watershed. They provide wildlife habitat, recharge the groundwater table, and provide stormwater retention. Wetlands are identified by certain characteristics, including the presence of hydrophytic plants, hydric soils, and wetland hydrologic patterns. Figure 2.01-7 shows the wetlands in the Curry's Fork watershed.

7. Topography

The watershed consists mostly of gently rolling to hilly terrain. Local elevation percent slope rarely exceeds 20 percent grade. The highest elevation point in Oldham County is 920 feet and the lowest elevation is 420 feet. La Grange is at 876 feet; Buckner, 831 feet; and Crestwood, 798 feet.³ See Figure 2.01-8 for a digital elevation model.

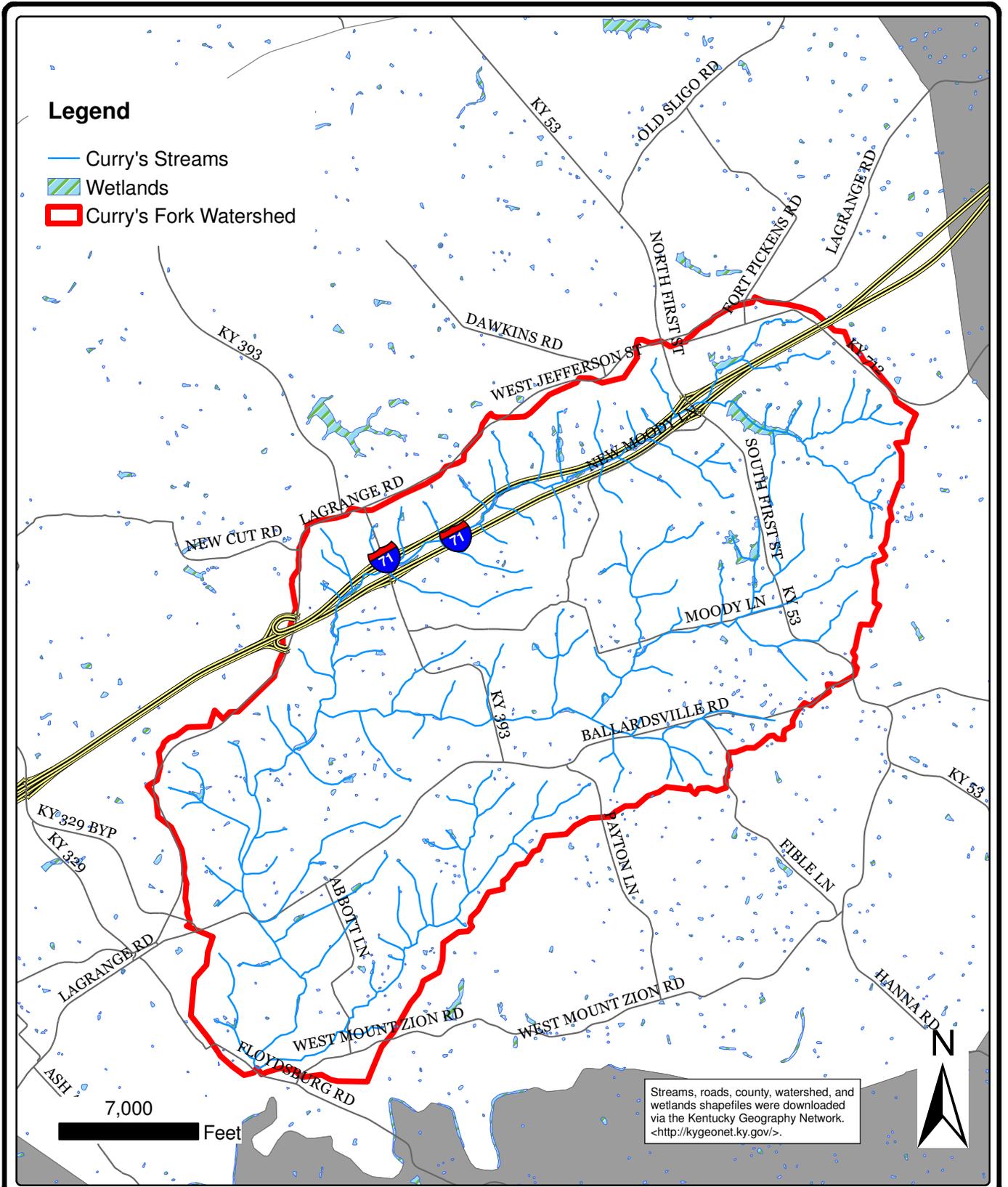
8. Geology and Soils

The Kentucky Geological Survey prepared a report for the Water Resource Development Commission which described the geologic conditions of Oldham County (1940 to 2000). It states:

“In Oldham County, water is obtained from consolidated sedimentary rocks of Ordovician, Silurian, and Devonian ages, and from unconsolidated sediments of Quaternary age. The oldest rocks found on the surface in Oldham County, the Drakes Formation, were deposited in shallow seas 490 million years ago during the Ordovician Period. In the Late Ordovician, the seas became relatively shallow, as indicated by the amounts of mud (shale) in the sediments. When the waters were clear and warm, a profusion of animal life developed, particularly brachiopods and bryozoa. Lying on top of the Ordovician rocks are the Silurian rocks, which were also deposited in warm seas, 430 million years ago. In Kentucky, the Silurian seas were commonly warm and clear, although the presence of some shale beds suggests that muddy conditions prevailed at times. Locally, numerous corals and brachiopods can be found in the Silurian limestones and dolomites. The Devonian New Albany Shale lies above the Silurian rocks.

This shale, also called the black shale, was formed when the deep sea floor became covered with an organic black muck 400 million years ago. The muck is now hard black shale (an oil shale) and is one of the most distinctive of all geologic formations in Kentucky. Over the last million years, unconsolidated Quaternary sediments have been deposited along the larger streams and rivers.”⁴

Figure 2.01-9 shows the Curry's Fork watershed overlain on its associated USGS geologic quadrangles. As Figure 2.01-9 shows, Curry's Fork is primarily underlain by rocks of the Ordovician ages with Silurian and some Devonian age along the watershed boundary, particularly on the north and west boundaries of the watershed.

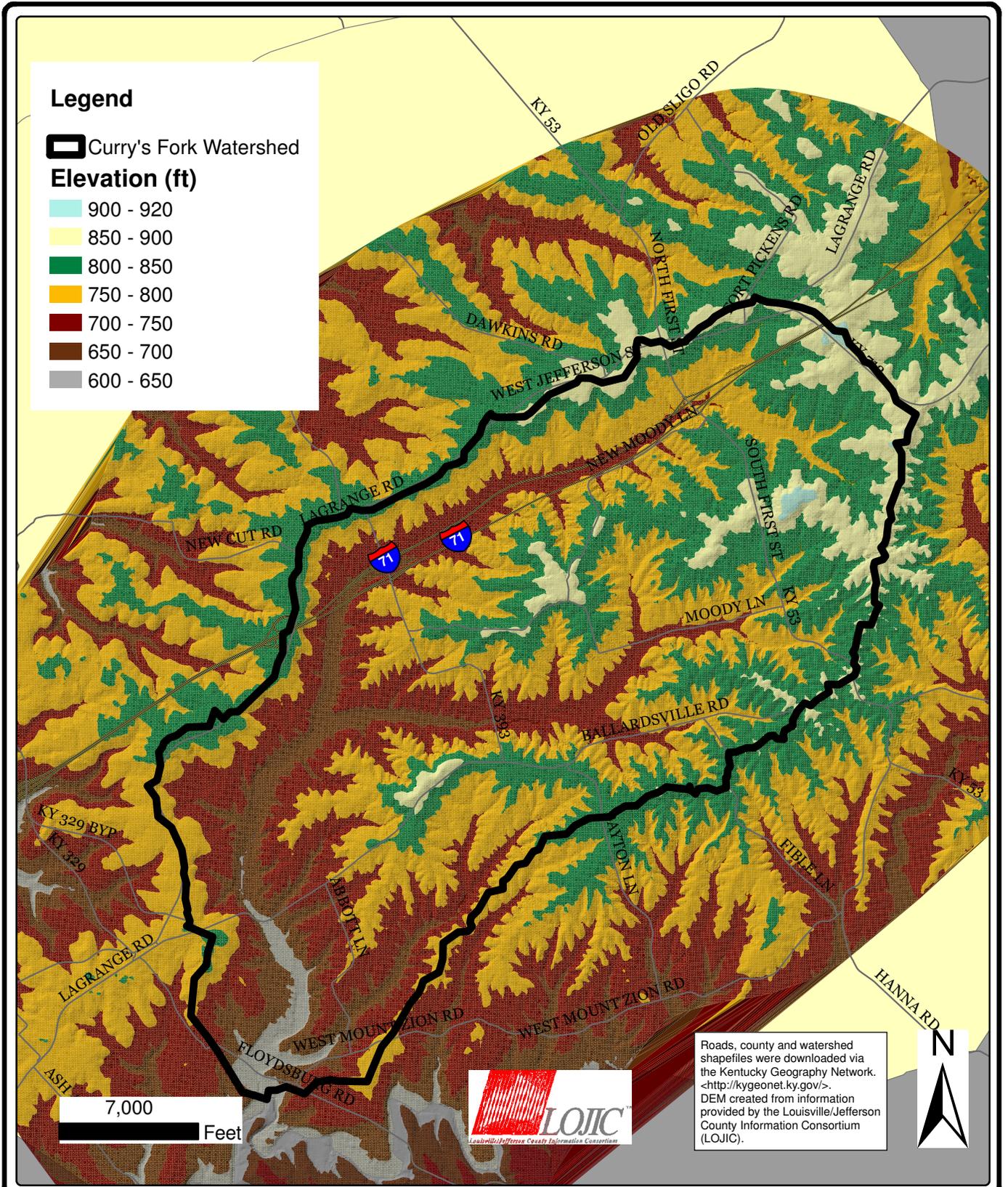


CURRY'S FORK WETLANDS

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.01-7
 5994.100**

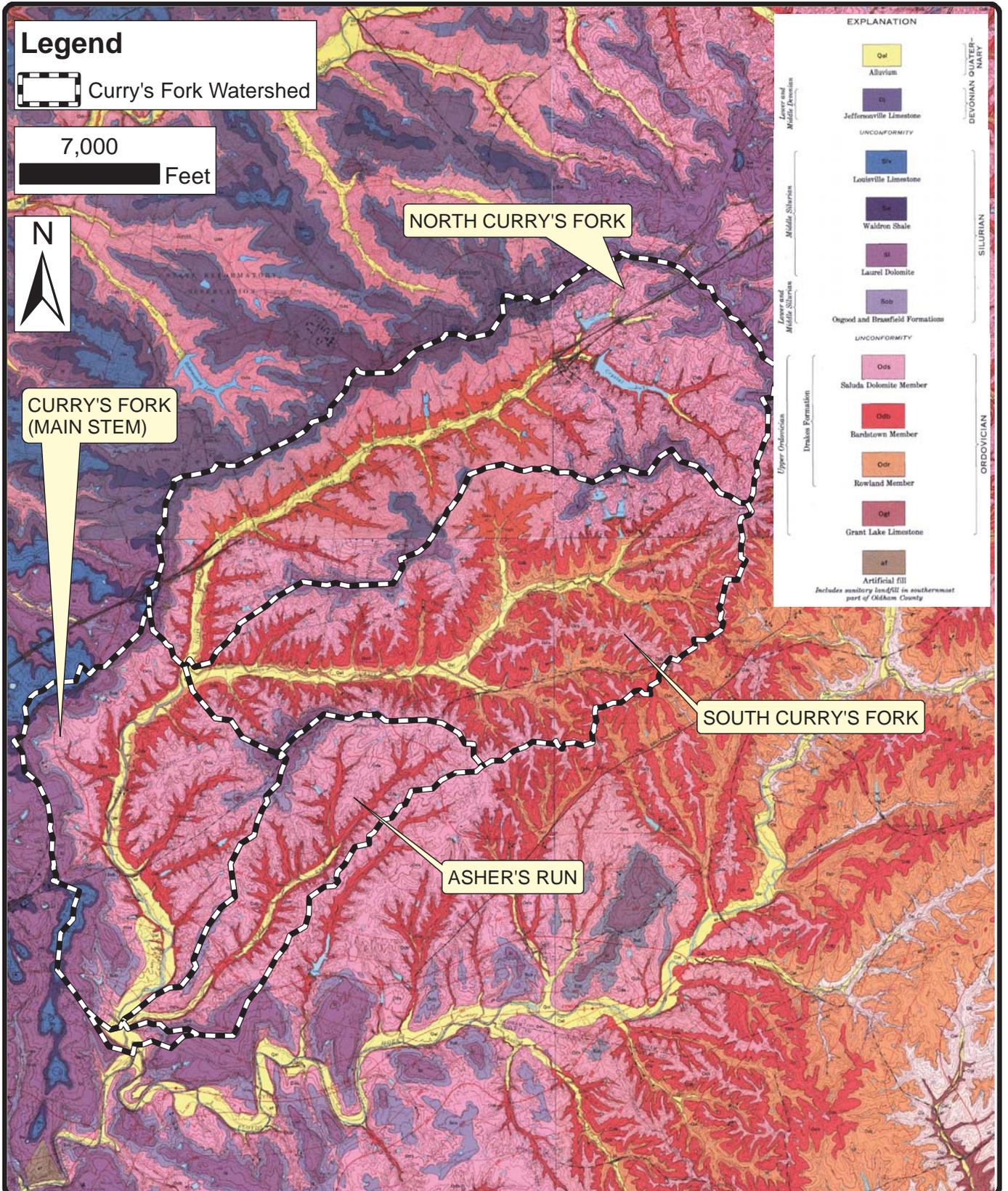


CURRY'S FORK DIGITAL ELEVATION MODEL

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.01-8
 5994.100**



**CURRY'S FORK
GEOLOGIC QUADRANGLES
CURRY'S FORK WATERSHED PLAN
OLDHAM COUNTY FISCAL COURT
OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.01-9
5994.100**

The soils in Curry's Fork tend to delineate with the drainage patterns of the streams, as shown in Figure 2.01-10. The range of soil types contained in Curry's Fork is classified primarily as silt loam or loam. Furthermore, the Natural Resources Conservation Service (NRCS) classifies soils into four hydrologic groups based on potential soil runoff. The four classifications range from A to D, where A has the smallest potential for runoff and D the largest.

See Table 2.01-5 for a description of soil groups and the acreage in Curry's Fork designated as each soil type.

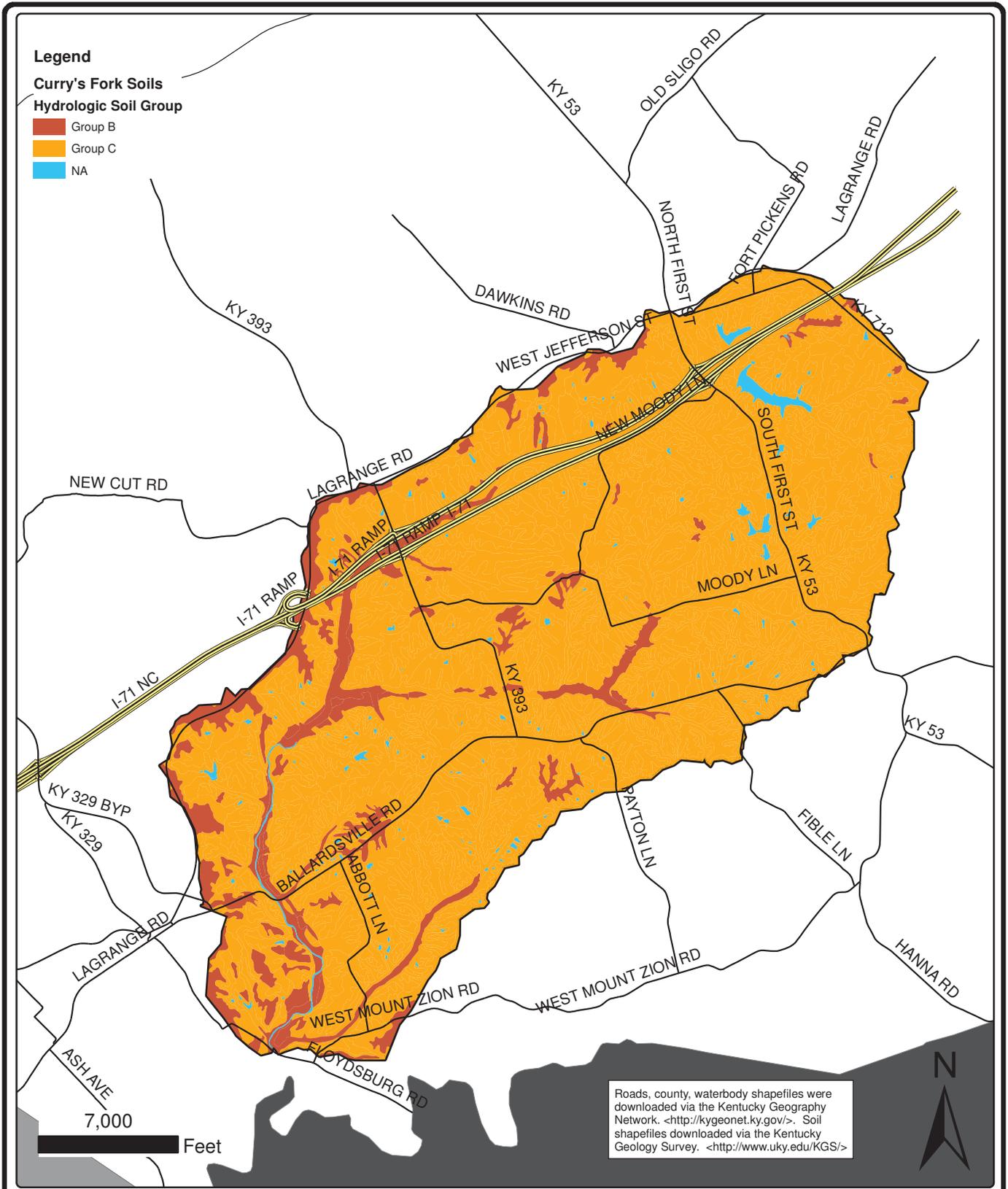
Group	Description	Minimum Infiltration Rate (mm/h)	Acreage Within Curry's Fork Designated to Each Soil Group
A	Deep sand; deep loess; aggregated silts.	>7.6	0
B	Shallow loess; sandy loam.	3.8-7.6	3,778
C	Clay loams' shallow sandy loam; soils low in organic content; soils usually high in clay.	1.3-3.8	19,002
D	Soils that swell significantly when wet; heavy plastic clays; certain saline soils.	0-1.3	0

Table 2.01-5 National Resource Conservation Service Soils

As shown in Figure 2.01-9, the majority of Curry's Fork is classified as Group C with small areas around the stream classified as Group B. Group C soils cover 82 percent of the watershed and Group B soils cover 16 percent of the watershed. The remaining area includes streams and lakes.

Class B soils are noted for high infiltration rates. However, as mentioned previously, in certain areas of the watershed the groundwater table is high, and therefore, these areas are classified as regions of moderate to high hydrogeologic sensitivity to groundwater pollution.

The Soil Conservation Service has published a book, *Soil Survey of Oldham County*, that details the attributes of the different types of soils located throughout Oldham County.^{5,6}



CURRY'S FORK SOIL HYDROLOGIC GROUP

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.01-10
 5994.100**

2.02 LAND USE AND LAND COVER

A. Land Use and Land Cover Data

Land use characteristics are important factors in determining the sources of pollution throughout the watershed. Table 2.02-1 shows the 2001 land use data for the Curry's Fork watershed.

See Figure 2.02-1 for a map of the land use throughout the watershed. As shown, the primary land uses throughout the Curry's Fork watershed are forests, pasture/hay, and developed/open green space.

Extensive tree and other vegetative cover surrounding a stream is an important characteristic for protecting the stream from harmful pollutants and erosive flow. Large agricultural regions can denote fertilizer and pesticide pollutants, and regions designated as pasture/hay land use can add pollutants such as bacteria and nutrient from animal waste. These land use characteristics are particularly a concern when the buffer area surrounding the stream is limited.

Developed/open space includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn and landscaping. These areas most

commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.

Based on the 2001 data, low, medium, and high density development accounted for only 5 percent of the total watershed area. This type of development can result in increased bacteria, nutrients, and other pollutants in runoff and increases in erosive flows if not managed properly.

Since the 2001 land use data was published, Oldham County has experienced changes in land use because of growth and development. Within the Curry's Fork watershed, the percentage of developed/open space has increased with additional residential development while agricultural and forest space has decreased. Since 2001, twelve new residential subdivisions have been built within the watershed. The majority of development occurred before 2001 though so the land use changes are not as pronounced as other areas of Oldham County. The recent economic downturn has all but stopped this development activity. Since 2008 there has been little significant change to land use in the watershed.

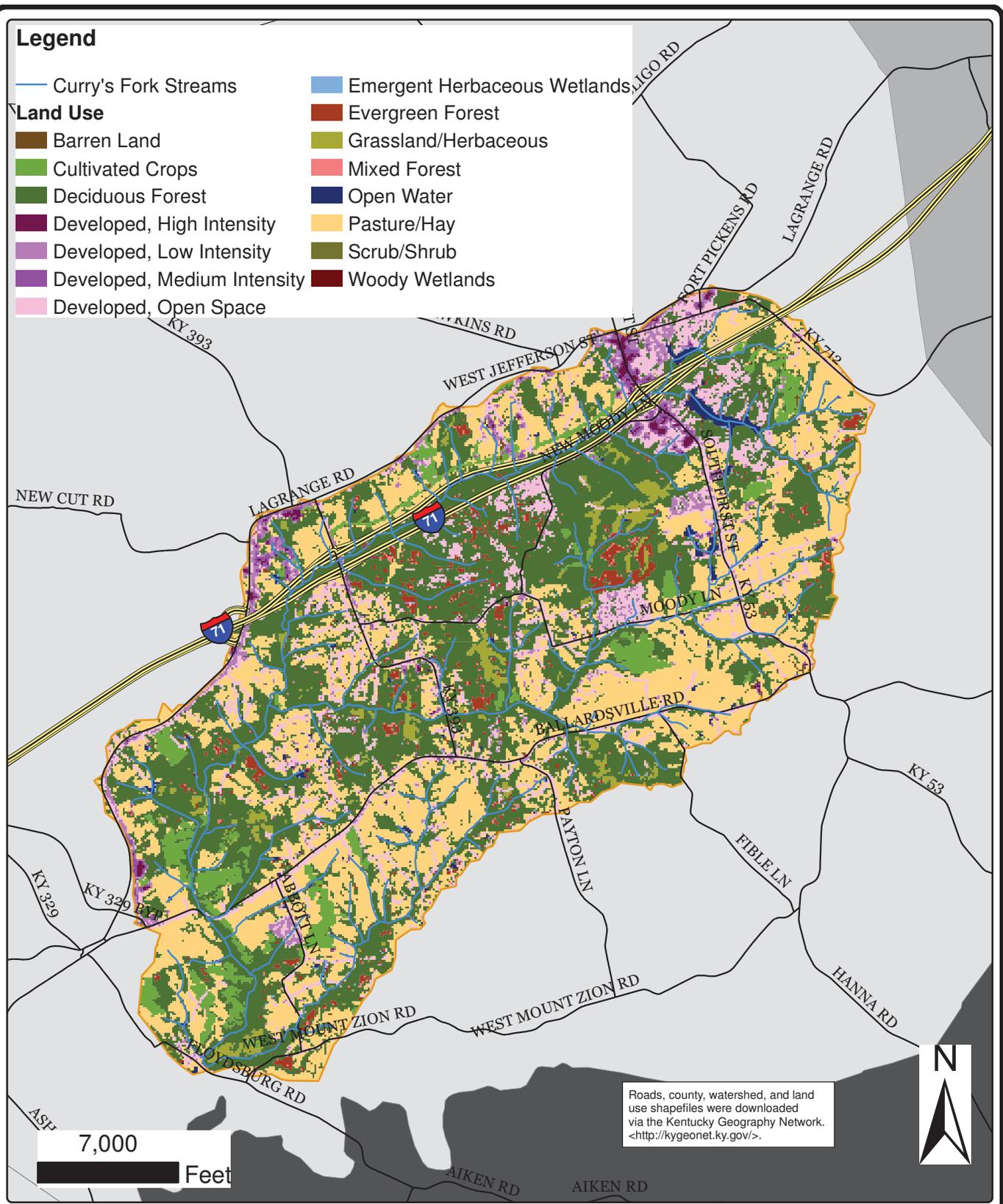
Land Use	Acres	Square Miles	Percentage	Rank
Deciduous Forest	7,695	12.0	42.2%	1
Pasture/Hay	5,583	8.7	30.6%	2
Developed, Open Space	1,995	3.1	10.9%	3
Cultivated Crops	820	1.3	4.5%	4
Developed, Low Intensity	676	1.1	3.7%	5
Evergreen Forest	421	0.7	2.3%	6
Grassland/Herbaceous	393	0.6	2.2%	7
Developed, Medium Intensity	217	0.3	1.2%	8
Open Water	170	0.3	0.9%	9
Developed, High Intensity	86	0.1	0.5%	10
Mixed Forest	81	0.1	0.4%	11
Scrub/Shrub	50	0.1	0.3%	12
Emergent Herbaceous Wetlands	37	0.1	0.2%	13
Barren Land	27	0.0	0.1%	14
Woody Wetlands	2	0.0	0.0%	15
TOTAL	18,253	28.5		

Source: http://landcover.usgs.gov/pdf/NLCD_pub_august.pdf

Table 2.02-1 2001 Watershed Land Use and Land Cover

Legend

- | | |
|-----------------------------|------------------------------|
| — Curry's Fork Streams | Emergent Herbaceous Wetlands |
| Land Use | Evergreen Forest |
| Barren Land | Grassland/Herbaceous |
| Cultivated Crops | Mixed Forest |
| Deciduous Forest | Open Water |
| Developed, High Intensity | Pasture/Hay |
| Developed, Low Intensity | Scrub/Shrub |
| Developed, Medium Intensity | Woody Wetlands |
| Developed, Open Space | |



7,000 Feet

Roads, county, watershed, and land use shapefiles were downloaded via the Kentucky Geography Network. <<http://kygeonet.ky.gov/>>.



2001 CURRY'S FORK LAND USE

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.02-1
 5994.100**

B. Vegetation

The Kentucky Department for Environmental Protection, United State Environmental Protection Agency (USEPA), and Eastern Kentucky University partnered to develop and define ecoregions within Kentucky. An ecoregion is an area of land that has similarities in ecosystems and in type, quality, and quantity of environmental resources. Oldham County is located within the Outer Bluegrass ecoregion.

The land is mainly vegetated with pastureland and cropland along with interspersed wooded areas. Natural features such as trees and other vegetation protect the streams in terms of a buffer zone and provide habitat for wildlife.

C. Forested Areas and Riparian Buffers

The natural vegetative buffer strip or riparian vegetation is important and provides many benefits for a stream. The right combination of trees, shrubs, and native grasses can improve water quality by filtering chemicals and sediment before they reach the surface water. Riparian vegetation can also stabilize stream banks, prevent soil erosion, help moderate flooding, help recharge underground water supplies, and provide wildlife habitats.^{6a}

Riparian vegetation can also help increase DO concentrations. The maximum DO concentration water can have is inversely proportional to the temperature. This means the lower the temperature, the higher the maximum DO concentration water can have until it becomes saturated and cannot hold more oxygen. Riparian vegetation provides shade for streams during the day, lowers stream temperature, and therefore increases the maximum potential DO.

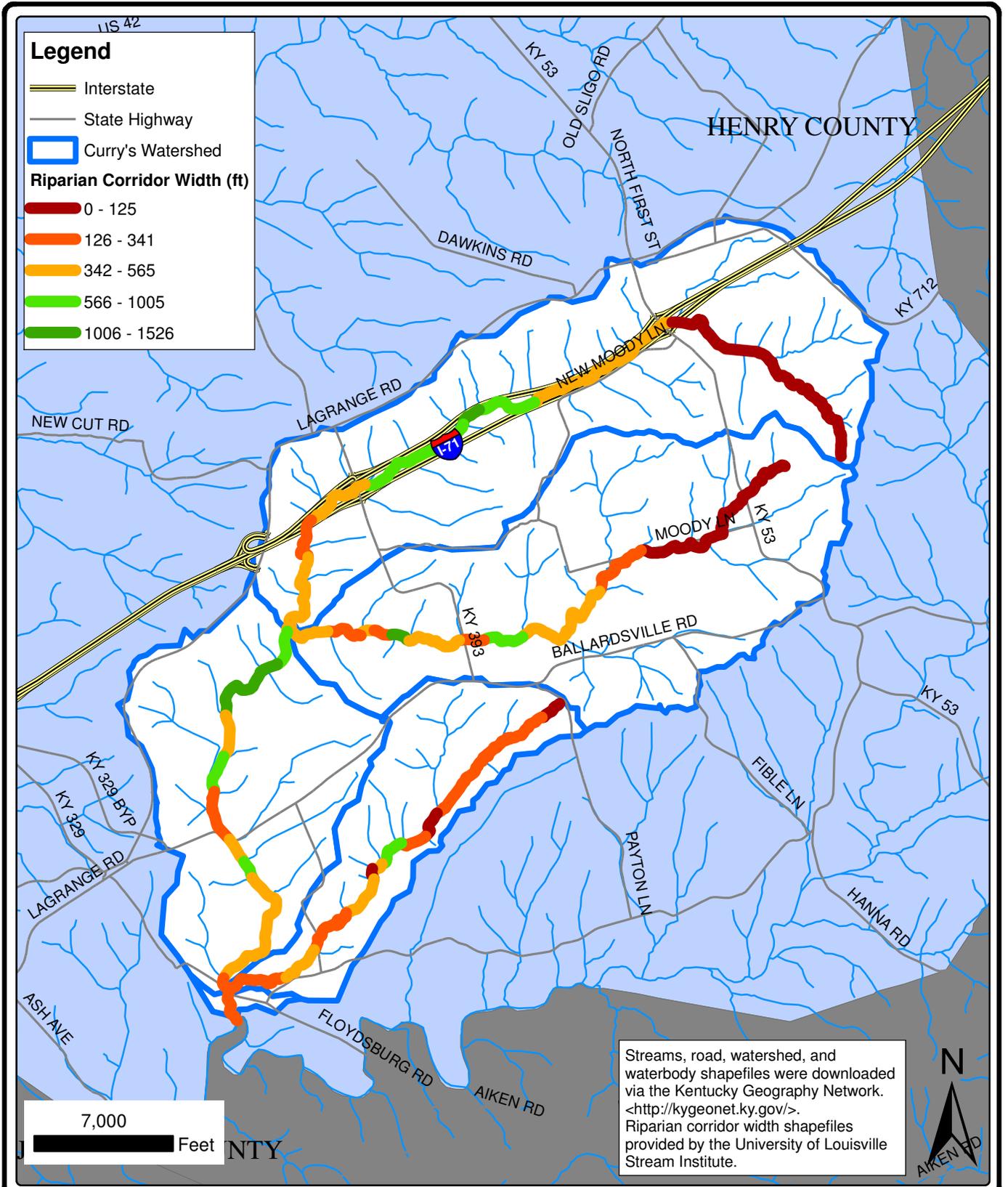
A review of aerial photography, land use, and field investigations indicates a lack of riparian vegetation primarily in the headwater areas of Upper North Curry's Fork, Upper South Curry's Fork, and Upper Asher's Run, and at the confluence of Curry's Fork and Asher's Run.

The middle and upper portion of the Curry's Fork main stem and Lower North Curry's Fork, especially between I-71, typically have wide, healthy riparian vegetation. Lower South Curry's and Lower Asher's Run have a mix of riparian vegetation widths that are dependent on development that has occurred near the streams. Figure 2.02-2 shows the measured riparian widths throughout Curry's Fork.

D. Zoning

In Oldham County, the zoning type is dependent on lot size, intended use, and required setbacks set by OCFC. The zone districts and setback requirements are shown in Appendix E.

Zoning information for the Curry's Fork watershed is described in Figure 2.02-3 and Table 2.02-2. There are three leading zoning codes that are predominate in the Curry's Fork watershed. The leading zoning codes include R-2 Residential District, which makes up 48 percent of the watershed; CO-1 Conservation District, which accounts for 20 percent; and R-1 Agricultural/Residential Districts, which makes up 12 percent. These zoning districts guide development in the watershed.

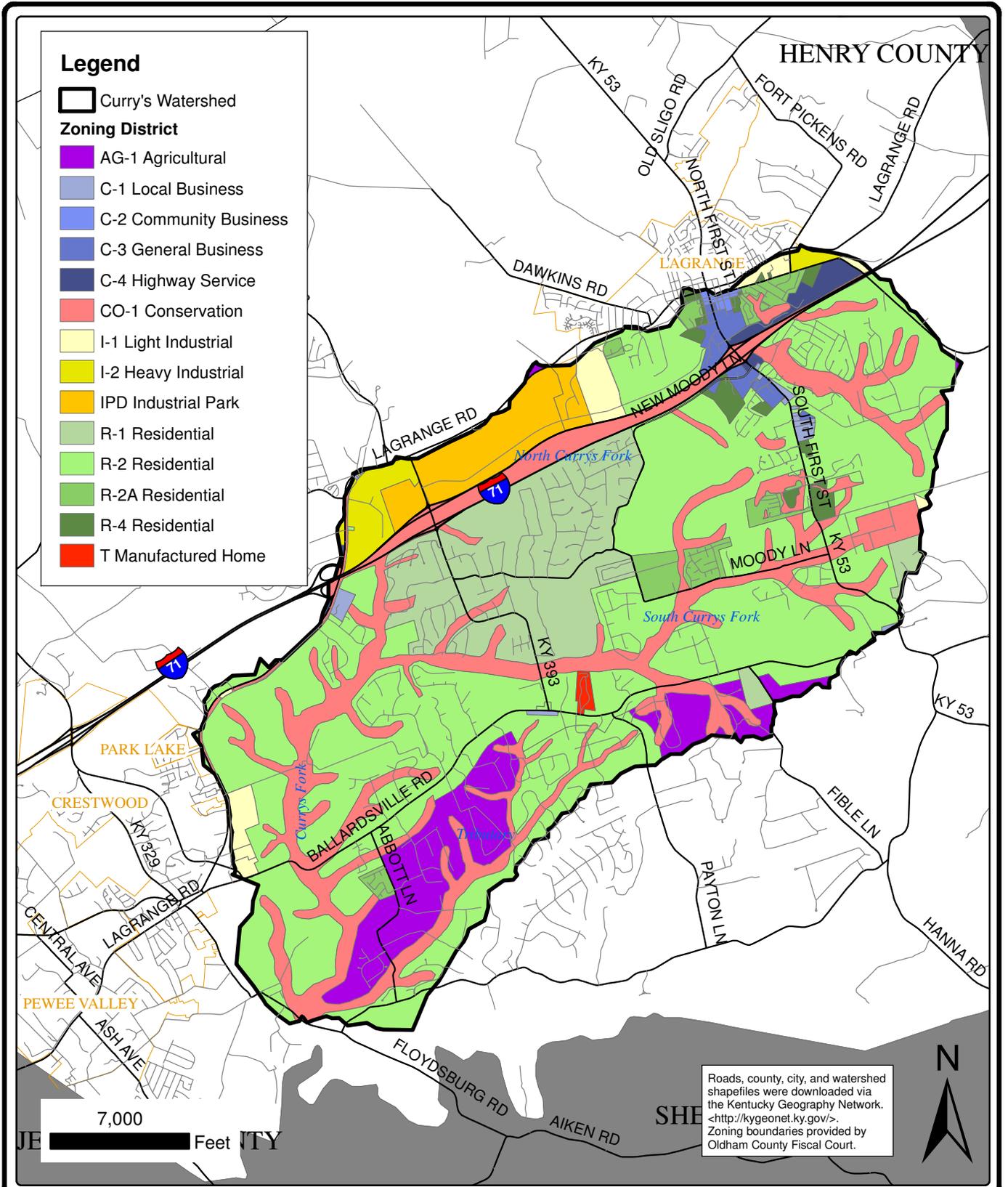


RIPARIAN CORRIDOR WIDTH

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.02-2
 5994.100**



CURRY'S FORK ZONING

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.02-3
 5994.100**

	Zone	Acres	Percentage		Zone	Acres	Percentage
Agriculture	AG-1	1,206	7%	Industrial	I-1 (light industrial)	332	2%
	Industrial Park District	498	3%		I-2 (heavy industrial)	291	2%
		1,704	9%		Industrial Park District	179	1%
					803	4%	
Commercial	C-1 (local business)	85	0%	Residential	R-1 (lower density)	2,217	12%
	C-2 (community business)	0	0%		R-2 (lower density)	8,635	48%
	C-3 (general business)	181	1%		R-2A (medium density)	446	2%
	C-4 (highway service)	149	1%		R-4 (high density)	188	1%
		415	2%		11,486	63%	
Conservation	CO-1	3,682	20%	Special	T (manufactured home)	37	0%
		3,682	20%			37	0%

Table 2.02-2 Curry's Fork Zoning

The residential zones are the most conducive for development and most of the new subdivisions in the watershed are located in these zoning districts. The Oldham County Comprehensive Zoning Ordinance describes the purpose of the R-2 Residential District as follows:

“The purpose of the R-2 Residential District is to allow, preserve, and protect the character of low density, detached single-family areas and neighborhoods at densities of up to 3.63 dwelling units per acre” (p. 15).

Page 9 of the Comprehensive Zoning Ordinance also states:

“The Conservation District is intended to promote and protect significant natural features, wooded areas, water courses, existing, and potential lake sites, other recreational and conservation resources, wildlife, habitat, present and future water supplies, and to minimize erosion of soil and the siltation and pollution of streams and lakes”.

The conservation zone is located primarily along stream corridors in the watershed and provides protection for the streams.

Oldham County has developed guidelines to minimize impacts on wetlands as development occurs around and within these areas. For example, the Oldham County Comprehensive Zoning Ordinance protects all wetlands that meet the United States Army Corps of Engineers’ (USACE) jurisdictional wetland standards. According to this ordinance, “the USACE defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted to life in saturated soil conditions.” This ordinance also calls for the protection of other natural resources.⁷

Finally, the R-1 Agricultural/Residential District is the third most prominent zoning district in the watershed whose purpose is described as follows in the Oldham County Comprehensive Zoning Ordinance:

“The purpose of the R-1 Residential District is to allow, preserve, and protect the character of low density, detached single-family areas and neighborhoods at densities ranging from one dwelling unit per acre up to 2.17 dwelling units per acre.”

This zoning district also limits the types of development possible in the watershed, largely in the northwest section.⁷

E. Subdivisions and Developed Areas

As one of the fastest growing areas in the Commonwealth of Kentucky, according to population estimates from 2000 to 2009 by the United States Census Bureau, Oldham County is becoming more densely developed (see Subsection 2.03 for more information regarding population trends in Oldham County). In addition, an increased number of subdivisions were developed throughout the Curry's Fork watershed. Increased development results in more impervious areas, which typically leads to increased sources of pollution and higher quantities of stormwater runoff entering streams at faster runoff rates. The increase in development also results in the need for new or expanded private and public [Kentucky Pollutant Discharge Elimination System (KPDES)-permitted] wastewater treatment systems. If not properly managed, development can have a negative impact on local streams. Figure 2.02-4 represents the subdivisions throughout the watershed and shows the year they were constructed. As shown in this figure, development tends to congregate along major roads with access to and from I-71 that are appropriately zoned.

F. Transportation

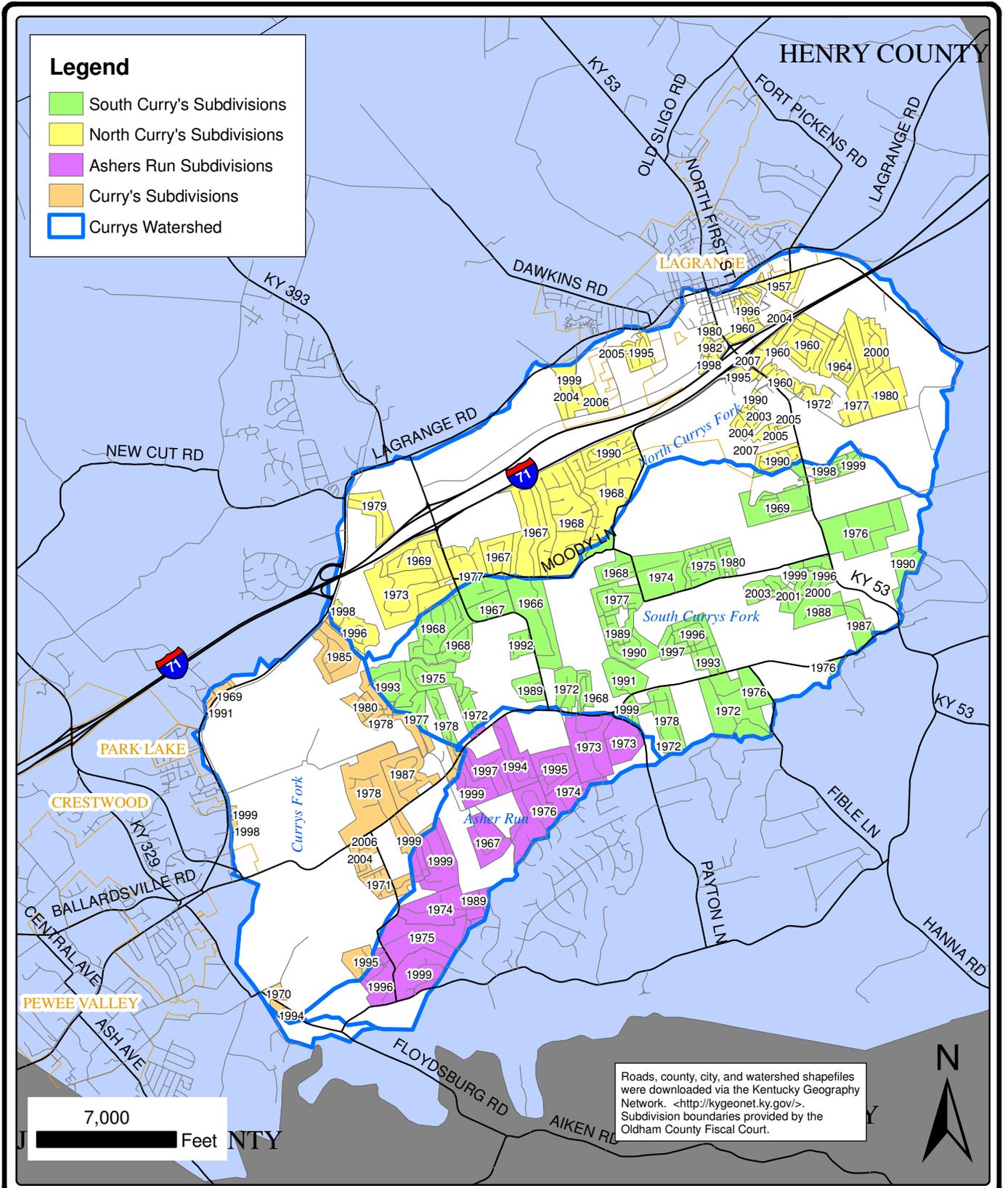
Interstate 71 runs through the north section of the Curry's Fork watershed that connects Crestwood to La Grange and on a larger scale Louisville to Cincinnati. State highways and local roads provide transportation infrastructure. The major state and local roads are Ballardsville Road, Moody Lane, KY 393, Abbott Lane, and Floydsburg Road (see Figure 2.02-5).

There is an active railroad line located along the northwestern border of the watershed.

Roads and highways increase the amount of impervious area and can be a source of pollutants such as total suspended solids (TSS), metals, and salts. Furthermore, highway/road/bridge runoff is listed as a source of impairment in the 303(d) List.

G. Livestock

As defined in Subsection 2.02: Land Use and Land Cover and shown in Table 2.02-1, pasture/hay is one of the predominant land use characteristic in the Curry's Fork watershed. Sporadic pasture-based livestock operations are located within the watershed. Despite the significant amount of land designated as pasture/hay, livestock operations are not a common practice throughout the watershed.

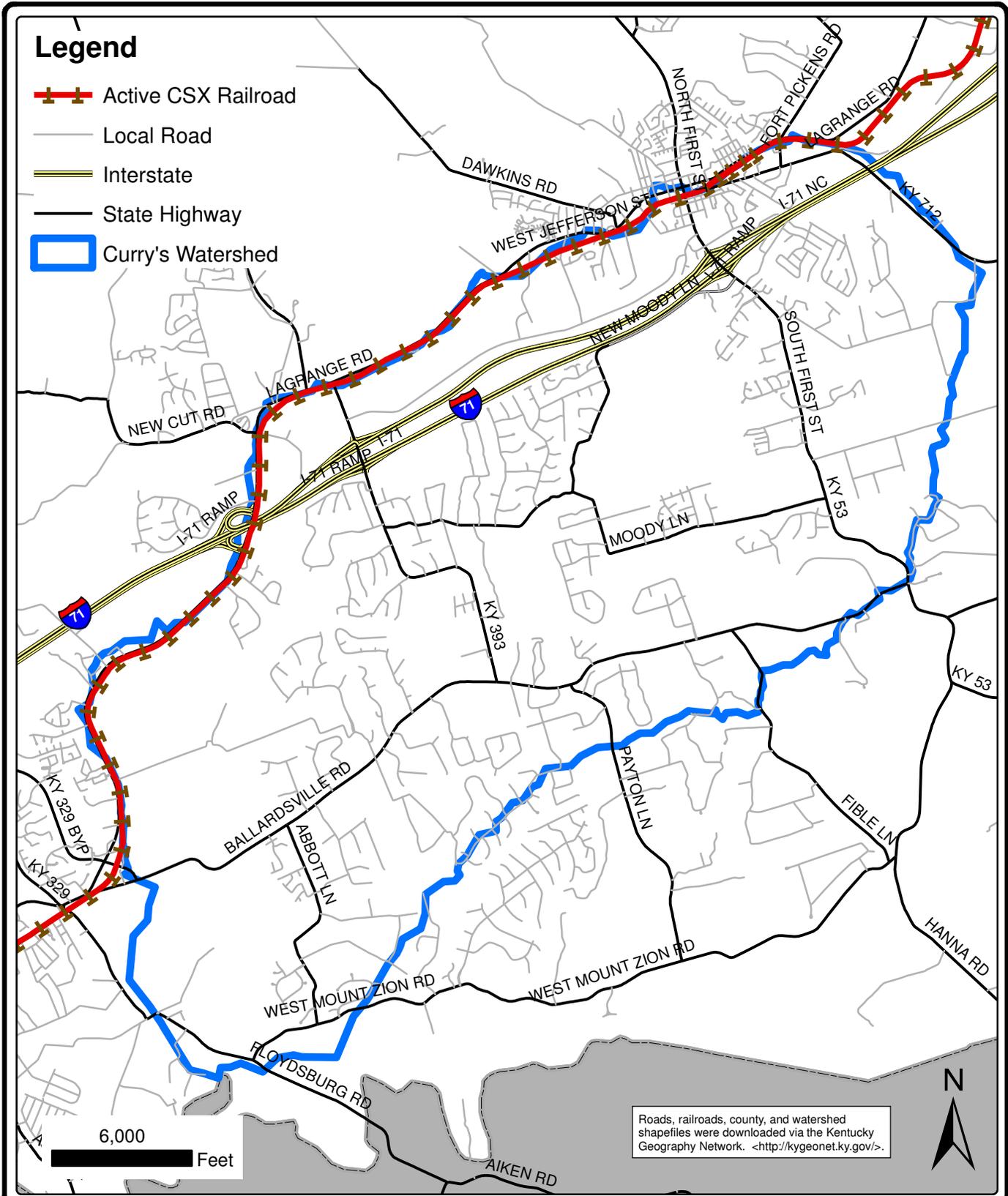


CURRY'S FORK SUBDIVISIONS

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.02-4
 5994.100**



CURRY'S FORK TRANSPORTATION

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.02-5
 5994.100**

The 2007 Census of Agriculture, published by the United States Department of Agriculture (USDA) and Kentucky Agricultural Statistics Service, reports on farms and ranches in the United States. It provides information regarding land use and ownership, operator characteristics, production practices, and income and expenditures. Most importantly for this document, it provides information on the number of livestock located in each county throughout the United States.

Table 2.02-3 represents the livestock inventory throughout Oldham County.⁸ Based on the January 2010 county cattle estimates, cattle is split approximately equally between beef and dairy cows.⁹ Horses are relatively common in Oldham County but are primarily located outside of the Curry's Fork watershed.

There are 461 farms in Oldham County. Within the Curry's Fork watershed, many farms tend to be smaller operations consisting of only a few animals or are marginally active. There are a few small farm operations in the South Curry's Fork, Curry's Fork main stem, and Asher's Run subwatersheds. The relatively high rank of "other animals" support reports of nontraditional farm animals being kept.

Livestock	No.
Cattle	8,319
Ducks	323
Hogs/Pigs	18
Horses/Ponies	2,838
Layers	669
Other Poultry	526
Other/Livestock	280
Sheep/Lambs	73
Turkeys	N/A

Table 2.02-3 2007 Oldham County Livestock Estimates

H. Fish and Wildlife

The Kentucky Department of Fish and Wildlife Resources (KDFWR) publishes a list of species observations for selected counties. In this list, the Kentucky State Nature Preserves Commission (KSNPC) specifies whether the species is endangered, threatened, special concern, historic, extirpated, or not of concern. Table 2.02-4 lists the species and status included in the December 2009 KSNPC County List Report.

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TABLE 2.02-4

THREATENED AND/OR ENDANGERED SPECIES IN OLDHAM COUNTY

Taxonomy Group	Scientific Name	Common Name	KSNPC Status	US Fish and Wildlife Status
Vascular Plants	<i>Castanea pumila</i>	Allegheny Chinkapin	T	
Vascular Plants	<i>Dichanthelium boreale</i>	Northern Witchgrass	S	
Vascular Plants	<i>Dryopteris carthusiana</i>	Spinulose Wood Fern	S	
Vascular Plants	<i>Heteranthera dubia</i>	Grassleaf Mud-plantain	S	
Vascular Plants	<i>Ranunculus ambigens</i>	Waterplantain Spearwort	S	
Vascular Plants	<i>Vallisneria americana</i>	Eelgrass	S	
Vascular Plants	<i>Veratrum woodii</i>	Wood's Bunchflower	T	
Vascular Plants	<i>Vitis labrusca</i>	Northern Fox Grape	S	
Freshwater Mussels	<i>Cyprogenia stegaria</i>	Fanshell	E	LE
Freshwater Mussels	<i>Fusconaia subrotunda</i>	Longsolid	S	
Freshwater Mussels	<i>Lampsilis abrupta</i>	Pink Mucket	E	LE
Freshwater Mussels	<i>Lampsilis ovata</i>	Pocketbook	E	
Freshwater Mussels	<i>Obovaria retusa</i>	Ring Pink	E	LE
Freshwater Mussels	<i>Plethobasus cyphus</i>	Sheepnose	E	C
Freshwater Mussels	<i>Pleurobema plenum</i>	Rough Pigtoe	E	LE
Freshwater Mussels	<i>Pleurobema rubrum</i>	Pyramid Pigtoe	E	SOMC
Freshwater Mussels	<i>Quadrula fragosa</i>	Winged Mapleleaf	X	LE
Freshwater Mussels	<i>Villosa lienosa</i>	Little Spectaclecase	S	
Crustaceans	<i>Orconectes jeffersoni</i>	Louisville Crayfish	E	SOMC
Insects	<i>Nehalennia irene</i>	Sedge Sprite	E	
Insects	<i>Satyrium favonius ontario</i>	Northern Hairstreak	S	
Fishes	<i>Percopsis omiscomaycus</i>	Trout-perch	S	SOMC
Breeding Birds	<i>Aimophila aestivalis</i>	Bachman's Sparrow	E	SOMC
Breeding Birds	<i>Ammodramus henslowii</i>	Henslow's Sparrow	S	SOMC
Breeding Birds	<i>Bartramia longicauda</i>	Upland Sandpiper	H	
Breeding Birds	<i>Botaurus lentiginosus</i>	American Bittern	H	
Breeding Birds	<i>Chondestes grammacus</i>	Lark Sparrow	T	
Breeding Birds	<i>Cistothorus platensis</i>	Sedge Wren	S	
Breeding Birds	<i>Dolichonyx oryzivorus</i>	Bobolink	S	
Breeding Birds	<i>Passerculus sandwichensis</i>	Savannah Sparrow	S	
Breeding Birds	<i>Riparia riparia</i>	Bank Swallow	S	
Breeding Birds	<i>Thryomanes bewickii</i>	Bewick's Wren	S	SOMC
Mammals	<i>Myotis grisescens</i>	Gray Myotis	T	LE
KSNPC Status:		US Fish and Wildlife Status:		
N or Blank =	None	Blank =	None	
E =	Endangered	C =	Candidate	
T =	Threatened	LT =	Listed as Threatened	
S =	Special Concern	LE =	Listed as Endangered	
H =	Historic	SOMC =	Species of Management	
X =	Expired		Concern	

Source: County Report of Endangered, Threatened, and Special Concern Plants, Animals, and Natural Communities of Kentucky. Kentucky State Nature Preserve Commission, December 2009.

I. Impervious Cover

Figure 2.02-6 and Table 2.02-5 show the amount of impervious cover in the Curry's Fork subwatersheds. Curry's Fork has an overall percent impervious cover of about 8 percent. The subwatershed with the highest percentage of impervious cover is North Curry's Fork at 10.5 percent because part of La Grange is located within its boundary. All other subwatersheds have an impervious cover of less than 8 percent because there are no other large impervious areas or cities located within them.

Subwatershed	Building Area (acres)	Road Area (acres)	Driveway Area (acres)	Total Impervious Area (acres)	Watershed Area (acres)	Percent Impervious
North Curry's Fork						
Upper	29.1	27.1	42.2	98.4	1,396.0	7.0%
Lower	153.9	185.2	238.4	577.5	5,037.1	11.5%
Subtotal	182.9	212.3	280.6	675.9	6,433.1	10.5%
South Curry's Fork						
Upper	28.8	27.5	42.5	98.8	1,670.0	5.9%
Lower	92.5	76.1	127.2	295.8	4,260.7	6.9%
Subtotal	121.2	103.6	169.7	394.6	5,930.7	6.7%
Asher's Run						
Upper	27.6	25.4	33.0	86.0	1,010.2	8.5%
Lower	20.7	23.4	28.8	72.9	1,157.9	6.3%
Subtotal	48.3	48.8	61.8	158.8	2,168.2	7.3%
Curry's Fork - Main Stem						
Main Stem	49.6	56.5	88.5	194.6	3,721.0	5.2%
Curry's Fork - Entire Watershed						
Watershed Total	402.0	421.2	600.6	1,423.9	18,252.9	8%

Source: Impervious areas created from information provided by the Louisville/Jefferson County Information Consortium (LOJIC).

Table 2.02-5 Curry's Fork Impervious Cover

J. Future Land Use Changes

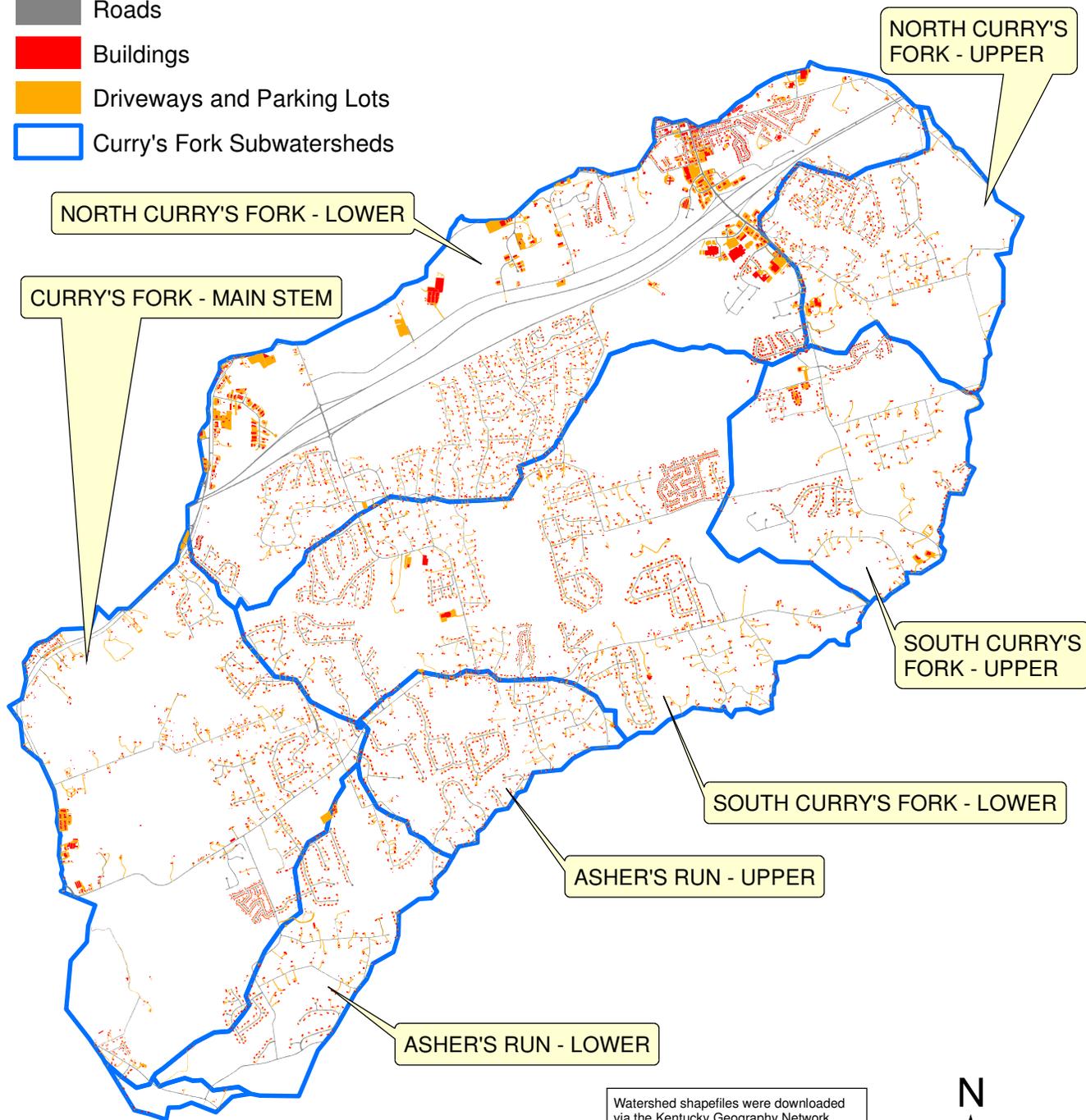
In May of 1999, Oldham County elected officials, Planning Commission members, and vested stakeholders began developing a document that created a vision for the future of Oldham County: Outlook 2020; The Future by Design. This document establishes the goals and objectives for the community as it develops and grows. It includes policies related to land use, transportation, community facilities, the environment, the government, business, and industry.

Future land use goals from the Outlook 2020 document include the following:

1. Provide for planned and orderly growth to protect land from premature or unsuitable development.
2. Encourage the preservation and development of a range of housing opportunities.
3. Plan for economic development that provides for increased tax revenues with a wide variety of employment opportunities that support the maintenance of a high level of community facilities and services and provide job opportunities for Oldham County residents.

Legend

-  Roads
-  Buildings
-  Driveways and Parking Lots
-  Curry's Fork Subwatersheds



6,000 Feet



Watershed shapefiles were downloaded via the Kentucky Geography Network. <<http://kygeonet.ky.gov/>>. Impervious Areas created from information provided by the Louisville/Jefferson County Information Consortium (LOJIC).



CURRY'S FORK IMPERVIOUS AREAS

CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY



FIGURE 2.02-6
 5994.100

4. Maintain a consistent and understandable development review process that encourages and accommodates citizen involvement in decisions affecting and implementing the Comprehensive Plan.

Transportation goals include the following:

1. Provide the citizens of Oldham County with a well-planned and coordinated system of major thoroughfares and collectors that are safe, cost-effective, and responsive to planned growth and development.
2. Coordinate the Major Thoroughfare Plan with other modes of travel, including bus transit, rail, airport, pedestrian, and bicycle to comprehensively address mobility issues and needs within Oldham County.
3. Protect and preserve scenic or culturally important transportation corridors and resources.

Community facility goals include the following:

1. Provide for needed community facilities and services (where infrastructure can support it), through the wise, planned, and equitable use of the community's monetary, physical, and human resources.
2. Plan, establish guidelines, and coordinate efforts for appropriate levels of sewage disposal, potable water, and solid waste collection and disposal services to urban and rural areas within Oldham County in conjunction with the agencies that have jurisdiction of these services.
3. Maintain Oldham County's high level of educational and enrichment opportunities through continued investment in the human and physical resources necessary to meet educational, informational, and diverse recreational needs of a growing population.
4. Provide a system of public parks, diverse recreation facilities, open spaces, and greenways that support the preservation of the county's natural and scenic resources, wildlife habitats, and serve neighborhoods and communities.

Environmental goals include the following:

1. Preserve and improve the quality of Oldham County's natural resources, including water, air, and soil, while protecting the health, safety, and welfare of its citizens through a watershed based approach to environmental planning and stormwater management.
2. Allow site development that does not adversely impact environmental features and resources, or air quality, and minimizes noise and lighting impacts to or from adjacent and nearby uses.

3. Protect and enhance the Ohio River corridor, and its tributaries as a valuable county natural resource.

Governmental goals include the following:

1. Participate with local jurisdictions, neighboring and regional counties, cities, governmental agencies, transportation agencies, utilities, planning commissions, stakeholders, landowners, and business development groups in developing solutions for common issues or opportunities.
2. Provide a high level of police, fire, and emergency medical services to all areas of the county.

Business and industrial goals include the following:

1. Promote business and industrial development that is compatible with Oldham County's vision statement to provide an increased and balanced property tax base, and more jobs in Oldham County, with higher average wages.
2. Maintain the county's incorporated cities as attractive centers for public and private business activity.
3. Support and encourage agriculture for the purpose of recognizing the cultural heritage of the community and the agricultural contribution to the economic base.¹⁰

Several areas within Curry's Fork are identified for additional development; the two largest areas are Commerce Parkway and the Oldham Reserve. Potential Commerce Parkway development would be located along Commerce Parkway on the north side of I-71 between Highway 393 and Button Lane.

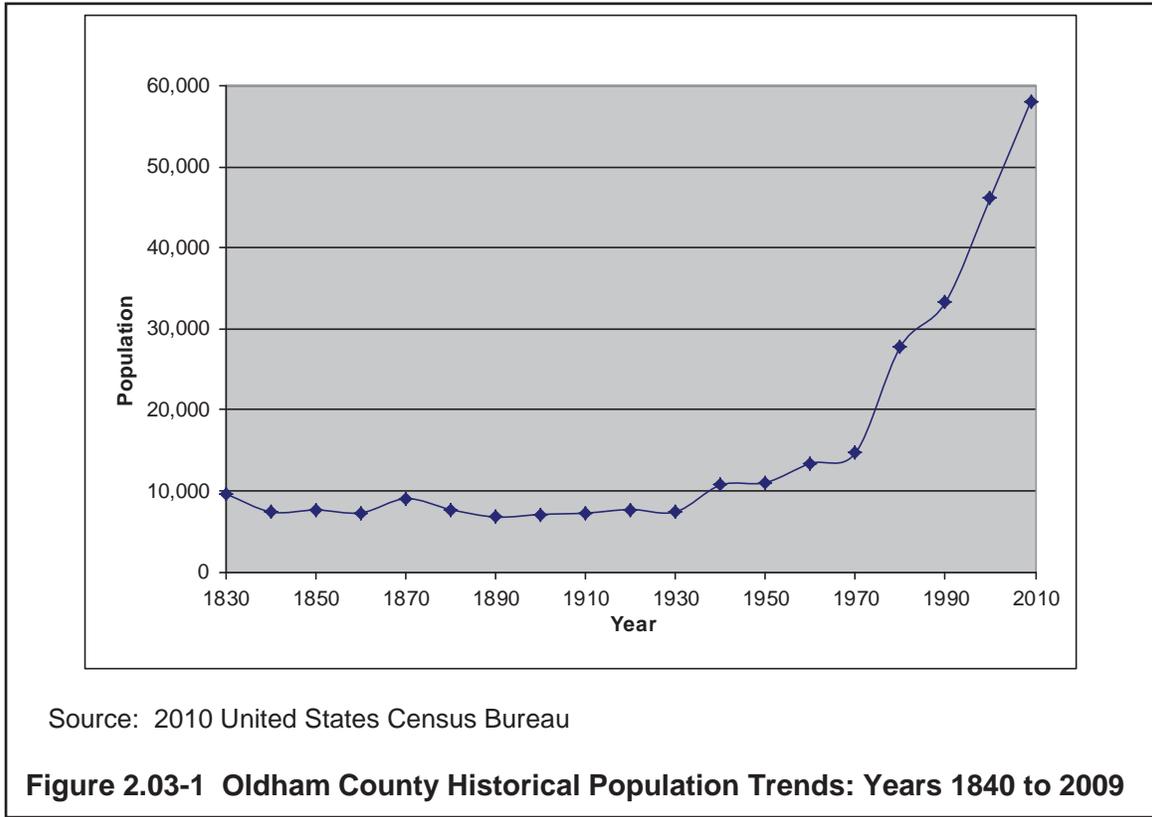
The Oldham Reserve is approximately 1,000 acres planned for office, retail, and residential development located immediately southwest of La Grange along New Moody Lane. Additional residential development is also anticipated in South Curry's Fork between Evergreen Road and Fox Trail Drive.¹⁰

2.03 DEMOGRAPHIC CHARACTERISTICS

A. Population Growth

Oldham County had the eighth highest population increase and the sixth highest percent population increase in Kentucky with a 26 percent increase in population from 2000 to 2009 based on population from the United States Census Bureau.

The population was relatively stable from its formation in 1823 until about 40 years ago. Since 1970, the population has more than tripled and has grown at a consistent rate of approximately 1,100 capita per year (see Figure 2.03-1 for historical population trends).



Although this county was previously a predominantly rural and agricultural community, development from the Louisville metropolitan area has spread into Oldham County causing a significant increase in suburban growth in this area. This increase in population results in new developments, urbanization, and increased impervious area throughout the watersheds.

Furthermore, significant population growth and development results in more sources of pollution and higher quantities of stormwater runoff entering streams at faster runoff rates, as well as an increased demand for wastewater needs throughout the region. Oldham County experienced a large growth spurt from 1980 to 2000 when the population jumped from approximately 27,000 to 46,000 (increasing 66 percent). From 2000 to 2009, the county population increased approximately 26 percent. The Oldham County Outlook 2020 Comprehensive Plan reports that the percent change in population from 1990 to 2020 is projected to be 38.8 percent. La Grange alone is predicted to have a population increase of 41.5 percent.^{10,11}

B. Demographics

Table 2.03-1 presents the 2010 census information for Oldham County. The 2010 census table summarizes demographic information and provides a frame of reference. The national average is included. As noted, the median age is 38.6 years and 73.3 percent of the people in Oldham County are between the ages of 18 and 66.

Oldham County is one of the most educated counties in the state of Kentucky; 90.6 percent of the population are high school graduates or higher, and 37.1 percent have earned a bachelor's degree or higher.¹¹

C. Economics

As shown in Table 2.03-1, Oldham County is relatively wealthy in comparison to the national averages.

The median household income is \$25,000 or more above the national average. The percentage of individuals and families below the poverty line is also about one-third of the national average. Furthermore, according to the Oldham County Outlook 2020 Comprehensive Plan, the predicted job growth increase from 1990 to 2020 represents more than 14,400 new jobs, a percentage increase of about 110 percent over the 30-year period.

However, the current economic condition may skew these predictions, as they were made about 10 years ago.¹¹

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TABLE 2.03-1–OLDHAM COUNTY CENSUS DATA 2010

	Oldham County No.	Oldham County Percentage	United States Statistics
General Characteristics			
Total population	56,194		
Male	29,895	53.2	49.30%
Female	26,299	46.8	50.70%
Median age (years)	38.6	(X)	36.5
Under 5 years	3,208	5.7	6.90%
18 years and over	41,204	73.3	75.40%
65 years and over	4,711	8.4	12.60%
One race	55,673	99.1%	97.8%
White	51,748	92.1	74.50%
Black or African American	2,816	5	12.40%
American Indian and Alaska Native	105	0.2	0.80%
Asian	565	1	4.40%
Native Hawaiian and Other Pacific Islander	52	0.1	0.10%
Some other race	387	0.7	5.60%
Two or more races	521	0.9	2.20%
Hispanic or Latino (of any race)	1,350	2.4%	15.1%
Household population	51,944		
Group quarters population	(X)	(X)	(X)
Average household size	2.71	(X)	2.6
Average family size	3.02	(X)	3.19
Total housing units	20,168		
Occupied housing units	19,144	94.9%	88.2%
Owner-occupied housing units	16,483	86.1%	66.9%
Renter-occupied housing units	2,661	13.9%	33.1%
Vacant housing units	1,024	5.1%	11.8%
Social Characteristics			
Population 25 years and over	36,985		
High school graduation or higher	(X)	90.6%	84.6%
Bachelor's degree or higher	(X)	37.1%	27.5%
Civilian veterans (civilian population 18 years and over)	4,597	11.2%	10.1%
Disability status (population 5 years and over)	(X)	(X)	(X)
Foreign born	1,629	2.9%	12.4%
Male, now married, except separated (population 15 years and over)	14,779	62.1	52.3%
Female, now married, except separated (population 15 years and over)	13,142	65.2	48.4%
Speak a language other than English at home (population 5 years and over)	1,965	3.7	19.6%
Economic Characteristics			
In labor force (population 16 years and over)	28,015	65.3	65.0%
Mean travel time to work in minutes (workers 16 years and over)	25.3	(X)	25.2
Median household income (in 2009 inflation adjusted dollars)	78,460	(X)	51,425
Median family income (in 2009 inflation adjusted dollars)	90,159	(X)	62,363
Per capita income (in 2009 inflation adjusted dollars)	34,731	(X)	27,041
Families below poverty level	(X)	3.3	9.9%
Individuals below poverty level	(X)	5.4	13.5%

Source: 2000 US Census

2.04 WASTEWATER, WATER, AND STORMWATER

A. Kentucky Pollutant Discharge Elimination System Permits

The National Pollutant Discharge Elimination System (NPDES) Program was established by the Federal Water Pollution Control Act Amendments of 1972 and has significantly reduced the amount of pollutant discharges in streams across the country. The program requires states to quantify and develop the pollutant loadings that can be discharged into the streams without being detrimental to water quality. Kentucky waters are regulated by the KPDES program. Under KPDES, all facilities that discharge waste from any point source into waters of the United States must obtain a permit from the Commonwealth of Kentucky. A point source is considered to be any concentrated discharge into the environment, for example, end-of-pipe discharges from a WWTP.

The permit process provides two levels of control including technology-based limits and water quality-based limits. Technology-based limits are determined by the ability of the same industrial or municipal dischargers to treat wastewater.

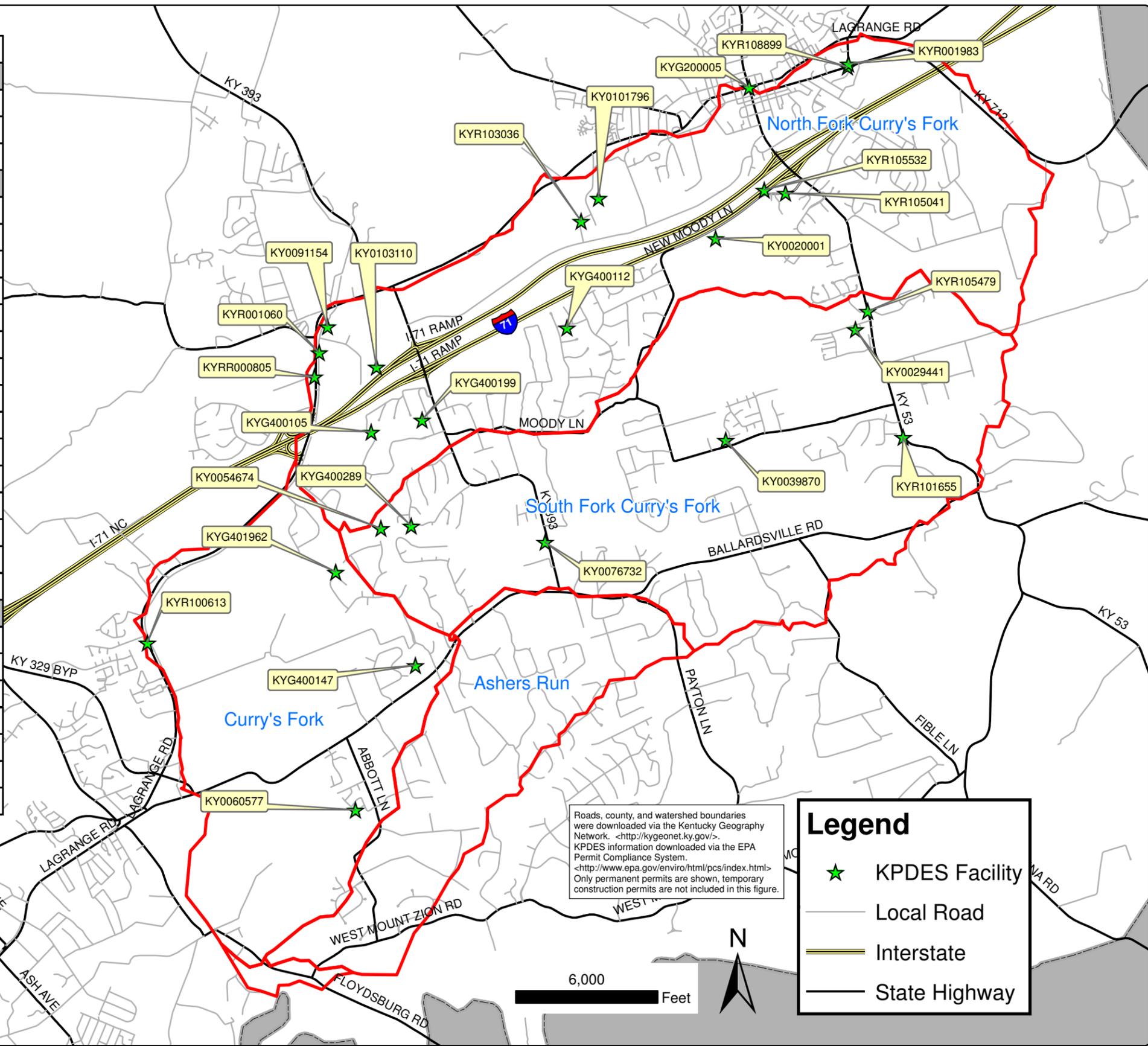
If technology-based limits are not adequate, water quality-based limits are set to protect the water body. Furthermore, the three categories of pollutants regulated by the NPDES program include conventional pollutants, such as the five-day biochemical oxygen demand, total suspended solids (TSS), pH, fecal coliform, oil and grease; toxic pollutants such as metals and manmade organics; and nonconventional pollutants such as ammonia, nitrogen, phosphorus, chemical oxygen demand, and whole effluent toxicity.

Through the permitting process, the locations of point sources are known and it is relatively easy to characterize the flow and type of pollutants that may be discharging. KPDES-permitted discharge points typically have a registered latitude and longitude point. Many permitted facilities are required to monitor their discharge for specified pollutants based on industry standards.

Over 25 KPDES-permitted facilities were located throughout the Curry's Fork watershed at the time of this report. Stormwater KPDES permits and their associated construction/erosion control permitting for the municipal separate stormwater system (MS4) communities are discussed separately in Subsection 2.06. Figure 2.04-1 shows the location of KPDES sites within the Curry's Fork watershed. Table 2.04-1 lists the KPDES sites and their standard industrial classification (SIC) code. SIC codes are used by business and governments to classify business establishments according to the type of economic activity. There are no KPDES facilities within Asher's Run; temporary construction and stormwater permits are not included in Figure 2.04-1 and Table 2.04-1.

Table 2.04-1 lists the primary WWTPs and package treatment plants (PTP) in the watershed. WWTPs and PTPs differ in the fact that PTPs are typically small waste treatment facilities that are either prefabricated or prebuilt and handle the specific needs of a small community or development. WWTPs are typically larger facilities with multiple wastewater treatment processes. WWTPs and PTPs are sometimes referred to as sanitary or sewage treatment plants (STP) as part of the facility name in permits. Facilities in this section will be named in accordance with the wording used in the KPDES permit.

KPDES ID	Facility Name
Curry's Fork Subwatershed	
KY0060577	Country Village STP
KYG400147	Ebbs Residence
KYR100613	Camden Manor Subdivision
North Curry's Fork Subwatershed	
KYG400105	McCarson Residence
KYG400199	Von Kannel Residence
KYRR000805	Torbitt & Castleman Co.
KY0103110	Buckner STP
KYR001060	East & Westbrook Constructoin Co. Inc.
KYG400112	Parrott Residence
KY0091154	Catalyst Technology Midwest
KY0020001	La Grange STP
KYR103036	La Grange Commerce Center
KY0101796	Allstate Ready Mix Inc.
KYR105041	Tri County Baptist Hosptial
KYR105532	Heritage Hills Subdivision
KYG200005	Oldham Co. Fiscal Court
KYR108899	Summit Parks Subdivision
KYR001983	Lesco Design & Manufacturing Co. Inc.
South Curry's Fork Subwatershed	
KY0076732	Centerfield Elementary
KY0054674	Lockwood Estates Subdivision STP
KYG400289	Gibson Residence
KY0039870	Lakewood Valley Subdivision STP
KYR101655	Prestwick Estates
KY0029441	Green Valley Apartments
KYR105479	La Grange Presbyterian Church



CURRY'S FORK KPDES PERMITTED FACILITIES

CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KY



FIGURE 2.04-1
 5994.100

TABLE 2.04-1

KPDES SITES AND FACILITIES

KPDES ID	Facility Name	SIC Code ¹	SIC Description
Curry's Fork Subwatershed			
KY0060577	Country Village STP	6552	Land Subdividers and Developers, Except Cemeteries
KYG400147	Ebbs Residence	6514	Operators of Dwellings other than Apartment Buildings
KYR100613	Camden Manor Subdivision	8741	Management Services
North Curry's Fork Subwatershed			
KYG400105	McCarson Residence	6514	Operators of Dwellings other than Apartment Buildings
KYG400199	Von Kannel Residence	6514	Operators of Dwellings other than Apartment Buildings
KYRR000805	Torbitt & Castleman Co.	2099	Miscellaneous Food Preparations
KY0103110	Buckner STP	4952	Sewerage Systems
KYR001060	East & Westbrook Construction Co. Inc.	3273	Ready-mixed Concrete
KYG400112	Parrott Residence	6514	Operators of Dwellings other than Apartment Buildings
KY0091154	Catalyst Technology Midwest	8711	Engineering Services
KY0020001	La Grange STP	4952	Sewerage Systems
KYR103036	La Grange Commerce Center	8741	Management Services
KY0101796	Allstate Ready Mix Inc.	3273	Ready-mixed Concrete
KYR105041	Tri County Baptist Hospital	8741	Management Services
KYR105532	Heritage Hills Subdivision	8741	Management Services
KYG200005	Oldham County Fiscal Court	9511	Air and Water Resource and Solid Waste Management
KYR108899	Summit Parks Subdivision	1794	Excavation Work
KYR001983	Lesco Design & Manufacturing Co. Inc.	3535	Conveyors and Conveying Equipment
South Curry's Fork Subwatershed			
KY0076732	Centerfield Elementary	8211	Elementary and Secondary Schools
KY0054674	Lockwood Estates Subdivision STP	6552	Land Subdividers and Developers, Except Cemeteries
KYG400289	Gibson Residence	6514	Operators of Dwellings other than Apartment Buildings
KY0039870	Lakewood Valley Subdivision STP	6552	Land Subdividers and Developers, Except Cemeteries
KYR101655	Prestwick Estates	8741	Management Services
KY0029441	Green Valley Apartments	6513	Operators of Apartment Buildings
KYR105479	La Grange Presbyterian Church	8741	Management Services

¹Standard Industrial Classification

Source: USEPA Permit Compliance System (PCS), 2010

The wastewater needs of this watershed are met by both sewer and on-site systems (typically septic systems). Only 16 percent of the watershed area is served by public sewers. Sewer services are supplied by both the Oldham County Environmental Authority (OCEA) formerly the Oldham County Sewer District (OCSD) and La Grange Utility Commission (LUC). Refer to Subsection 2.06 for more information about the OCEA and LUC.

The OCEA provides for collection and treatment of wastewater throughout the county with the exception of the cities of La Grange (portions of which are in Curry's Fork) and Crestwood, which is outside of Curry's Fork.

Sanitary sewer services within these cities is provided by the LUC. Within the Curry's Fork watershed, the OCEA operates the five PTPs listed below:

1. Buckner
2. Country Village
3. Green Valley
4. Lakewood Valley
5. Lockwood Estates

The LUC manages and operates the one WWTP in the watershed, La Grange WWTP located in the northeast portion of the watershed.

The Oldham County Board of Education owns and operates a PTP at Centerfield Elementary. Based on reviews of discharge monitoring reports (DMRs), WWTP, and PTP effluent in the watershed has shown exceedances of the allowable pollutant levels within the past 5 years.

The pollutants being discharged into the stream by these KPDES facilities can be detrimental to the health of the streams in excessive amounts. Furthermore, these sites are not required to monitor the nutrient content of the effluent, and most are not required to monitor the phosphorus content within the effluent.

A summary of permit violations by many of the KPDES sites throughout each subwatershed can be found in Table 2.04-2.

La Grange WWTP is located in the North Curry's Fork subwatershed and serves the entire La Grange including areas located outside the Curry's Fork watershed but within the city limits. Although Table 2.04-2 shows La Grange fecal coliform, DO, and TSS with the highest historical percentage exceedance rates, recent plant upgrades have improved the effluent water quality.

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TABLE 2.04-2–KPDES EXCEEDANCE SUMMARY

KPDES Facility	Sample Period	Pollutant	Number of Violations	Number of Samples	Percent Exceedance
North Curry's Fork Subwatershed					
La Grange WWTP	January 1998 to January 2010	Fecal Coliform	27	143	19%
		<i>E. coli</i>	0	1	0%
		Nitrogen, Ammonia (As N)	7	150	5%
		Nitrogen, Total (As N)	0	1	0%
		Dissolved Oxygen	10	142	7%
		pH	1	142	1%
		Phosphorus	0	1	0%
		TSS	18	160	11%
Buckner STP	March 2000 to January 2010	Fecal Coliform	29	105	28%
		<i>E. coli</i>	0	14	0%
		Nitrogen, Ammonia (As N)	21	140	15%
		Nitrogen, Total (As N)	0	14	0%
		Dissolved Oxygen	1	119	1%
		pH	2	119	2%
		Phosphorus	95	119	80%
		TSS	47	167	28%
South Curry's Fork Subwatershed					
Green Valley Apartments PTP	December 1996 to December 2009	Fecal Coliform	30	148	20%
		Nitrogen, Ammonia (As N)	29	148	20%
		Dissolved Oxygen	24	148	16%
		pH	1	148	1%
		TSS	39	148	26%
Lakewood Valley Subdivision PTP	July 1992 to January 2010	Fecal Coliform	9	137	7%
		<i>E. coli</i>	1	9	11%
		Nitrogen, Ammonia (As N)	4	147	3%
		Nitrogen, Total (As N)	0	9	0%
		Dissolved Oxygen	16	146	11%
		pH	3	146	2%
		Phosphorus	0	63	0%
		TSS	5	146	3%
Lockwood Estates Subdivision PTP	December 1996 to January 2010	Fecal Coliform	8	138	6%
		<i>E. coli</i>	0	8	0%
		Nitrogen, Ammonia (As N)	9	150	6%
		Nitrogen, Total (As N)	0	8	0%
		Dissolved Oxygen	5	150	3%
		pH	1	150	1%
		Phosphorus	0	8	0%
		TSS	16	150	11%
Curry's Fork Subwatershed					
Country Village PTP	August 1997 to January 2010	Fecal Coliform	26	142	18%
		<i>E. coli</i>	1	7	14%
		Nitrogen, Ammonia (As N)	8	146	5%
		Nitrogen, Total (As N)	0	7	0%
		Dissolved Oxygen	15	146	10%
		pH	0	146	0%
		Phosphorus	0	7	0%
		TSS	28	146	19%

Source: USEPA PCS, 2010

La Grange WWTP experienced no fecal coliform or DO permit exceedances and only one TSS exceedance within the past three years.

The Buckner STP is located in the North Curry's Fork subwatershed and serves the Buckner area, which includes areas outside the Curry's Fork watershed. DMRs indicate improvements to the chemical treatment process have reduced effluent phosphorus levels. Construction to decommission the Buckner STP was initiated in 2011.

The Green Valley Apartments PTP is located in the South Curry's Fork subwatershed and serves the Green Valley apartment complex located south of La Grange. A review of DMRs for the Green Valley Apartments PTP indicates it has not experienced a substantial increase or decrease in effluent quality. DMRs did note that some high TSS levels were a result of hydraulic overloading caused by inflow and infiltration (I/I) issues. The Green Valley Apartment PTP is scheduled to be decommissioned beginning in 2012.

The Lakewood Valley PTP is located in the South Curry's Fork subwatershed and serves the Lakewood Valley subdivision on the north side of Moody Lane. DMRs indicate most parameters have been in compliance within the past three years except DO. Eleven of the 16 total permit exceedances for DO occurred within the past three years. The Lakewood Valley PTP is selected for decommissioning as part of OCEA's plan to regionalize wastewater treatment in Oldham County in the next 11 to 20 years.

The Lockwood Estates PTP is located in the South Curry's Fork subwatershed and serves the Lockwood Estates subdivision. Lockwood Estates PTP performance has been mostly consistent throughout the time period analyzed except for nitrogen, which has improved over the past 5 years. The Lockwood Estates PTP is selected for decommissioning as part of OCEA's plan to regionalize wastewater treatment in Oldham County in the next 11 to 20 years.

The Country Village PTP is located in the Curry's Fork main stem subwatershed and serves the Country Village subdivision. On several occasions, DMRs indicated the plant suffered from hydraulic overloads caused by I/I issues that resulted in effluent not meeting permit standards. The Country Village PTP was selected for decommissioning as part of OCEA's plan to regionalize wastewater treatment in Oldham County in the next 11 to 20 years.

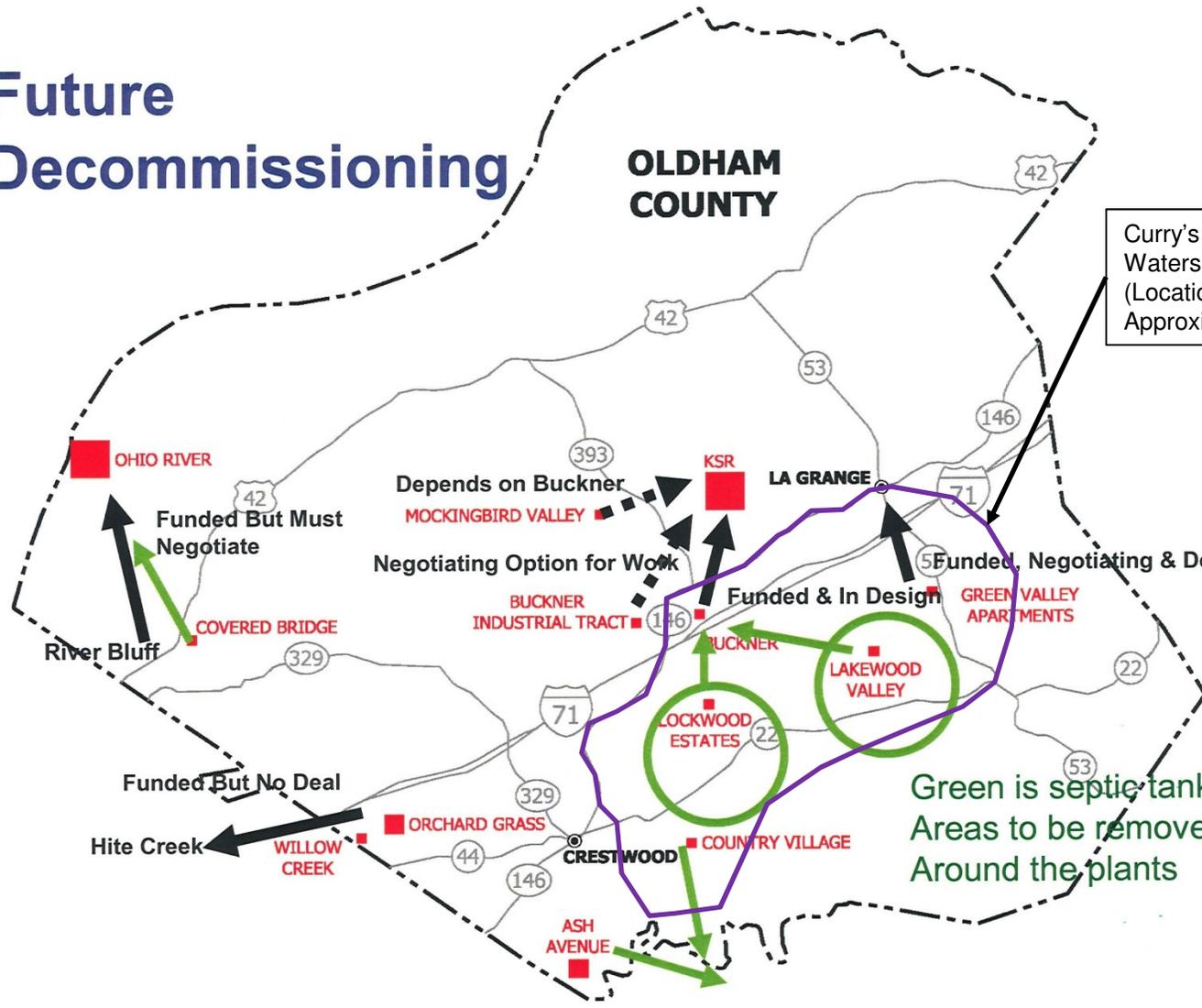
The OCEA is in the planning process of regionalizing treatment facilities within Oldham County. Figure 2.04-2 shows the preliminary plan for the future decommissioning and regionalization of OCEA facilities. In this plan, all STPs and PTPs within Curry's Fork will be decommissioned except for La Grange WWTP. Sewer service will be extended to areas adjacent to decommissioned STPs and PTPs. Wastewater from the decommissioned plants will be pumped to the Kentucky State Reformatory (KSR) WWTP or La Grange WWTP except for the Country Village PTP. The regionalization projects will also include sewer remediation to reduce I/I.

Five residents within Curry's Fork operate their own permitted residential treatment systems as shown on Table 2.04-1. A review of the discharge records indicated four of the five permitted residential systems were generally in compliance with permit requirements.

Future Decommissioning

OLDHAM COUNTY

Curry's Fork Watershed Boundary
(Location is Approximate)



Green is septic tank
Areas to be removed
Around the plants

PRELIMINARY PLAN FOR FUTURE DECOMMISSIONING
AND REGIONALIZATION
CURRY'S FORK WATERSHED PLAN
OLDHAM COUNTY FISCAL COURT
OLDHAM COUNTY, KENTUCKY

B. Septic System and Other On-site Wastewater Areas

As previously mentioned, 16 percent of the watershed area is served by public sewers and PTPs; therefore, 84 percent of the population within this watershed is served by on-site systems such as septic systems.

Figure 2.04-3 represents the areas of the watershed that are not served by the sewer district or the utilities commission, and therefore, use on-site systems. On-site sewage disposal systems include septic tank absorption fields, septic lagoons and wetlands, septic spray systems, and septic holding tanks. OCEA is currently exploring options to provide wastewater treatment to unsewered portions of Oldham County. This includes evaluating alternative approaches beyond traditional gravity sewers. Plans are under development and will be included as part of the overall regional approach being finalized in negotiations between KDOW and OCEA.

In Oldham County, the septic tank absorption field is the most widely utilized on-site wastewater system and the success of this system is dependent on soil permeability, construction methods, depth of groundwater table, depth to bedrock, slopes, and user maintenance.

A failing septic system can contribute to nonpoint source pollution and groundwater pollution by allowing improperly treated waste to be carried into waterways by runoff and into groundwater sources through infiltration.

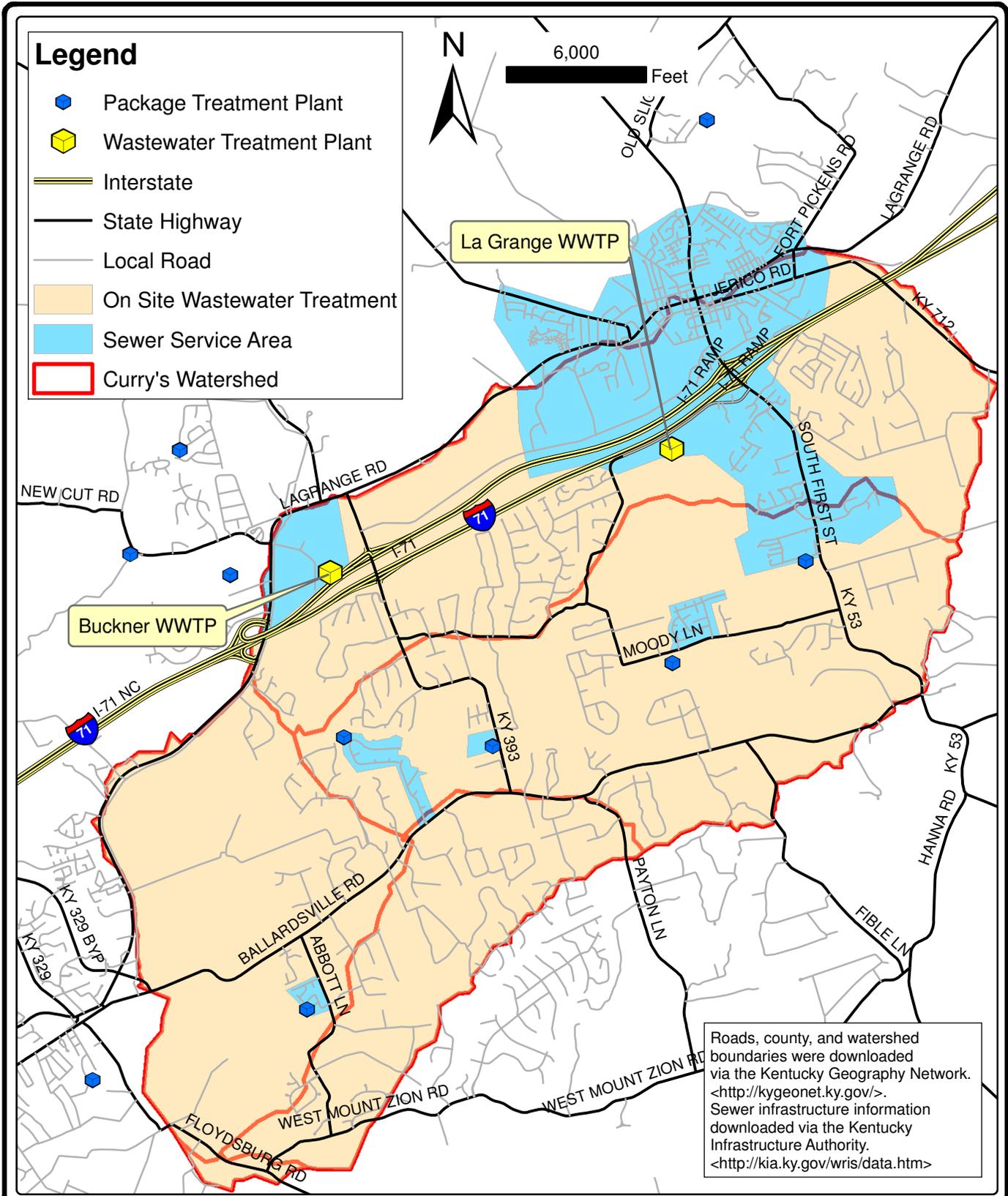
According to the Oldham County Health Department (OCHD) and input from other local stakeholders, very few on-site systems are failing in Curry's Fork. Borowick Farms, Woods of Hillview, Foxwood, Westwood, and Croftboro Farms Subdivisions were identified as areas of potential concern for failing systems in the watershed by the Technical Committee (TC).

Some areas with inadequate soil conditions that are not served by public sewer systems utilize septic tank absorption fields.

The NRCS has compiled extensive information regarding the nature of Kentucky's soils. Two important factors included in this information include the soil suitability for septic tank absorption fields and soil suitability for sewage lagoons. The effluent from septic tanks is distributed into the soil in septic tank absorption fields.

According to NRCS soils report, unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage can affect public health.⁵

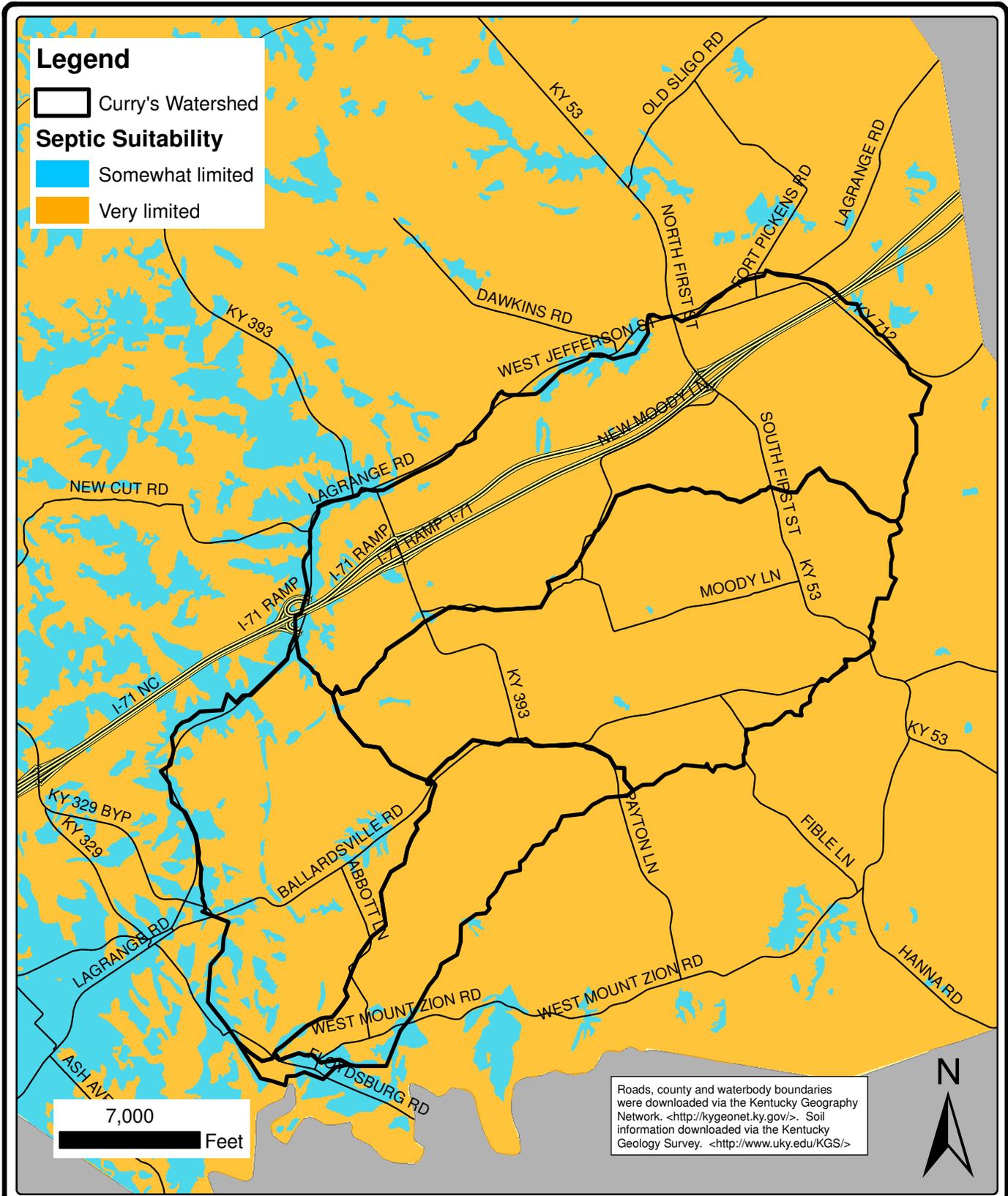
As shown in Figure 2.04-4, the soils throughout the Curry's Fork watershed have very limited suitability for septic tank absorption fields; and therefore, NRCS has deemed the soil properties and site features as unfavorable or difficult to overcome and that special design, significant increases in construction costs, and possibly increased maintenance are required.⁵ It is sometimes possible to use an alternative on-site wastewater treatment system under these conditions. Otherwise, holding tanks may be used, which need to be pumped out periodically and the contents may be landspread or hauled to a WWTP.



SEWER SERVICE AND ON-SITE WASTEWATER SYSTEM AREAS
CURRY'S FORK WATERSHED PLAN
OLDHAM COUNTY FISCAL COURT
OLDHAM COUNTY, KY



FIGURE 2.04-3
5994.100



CURRY'S FORK SOILS SEPTIC SUITABILITY

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.04-4
 5994100**

Groundwater Protection Plans are required for all site sewage treatment systems, including alternative systems, holding tanks, and land spreading.

Furthermore, any shallow pond that is constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes is considered to be a sewage lagoon. According to the NRCS soil report, to minimize seepage and contamination of groundwater, soils must be nearly impervious for the lagoon floor and sides.

Figure 2.04-5 shows the results of the soil report as being very limited for such an application. Once again, this means that NRCS has deemed the soil properties and site features as unfavorable or difficult to overcome and that special design, significant increases in construction costs, and possibly increased maintenance are required.

This analysis indicates that soils throughout the Curry's Fork watershed are not suitable for septic systems without special considerations during construction and operation.

C. Drinking Water Supply and Distribution

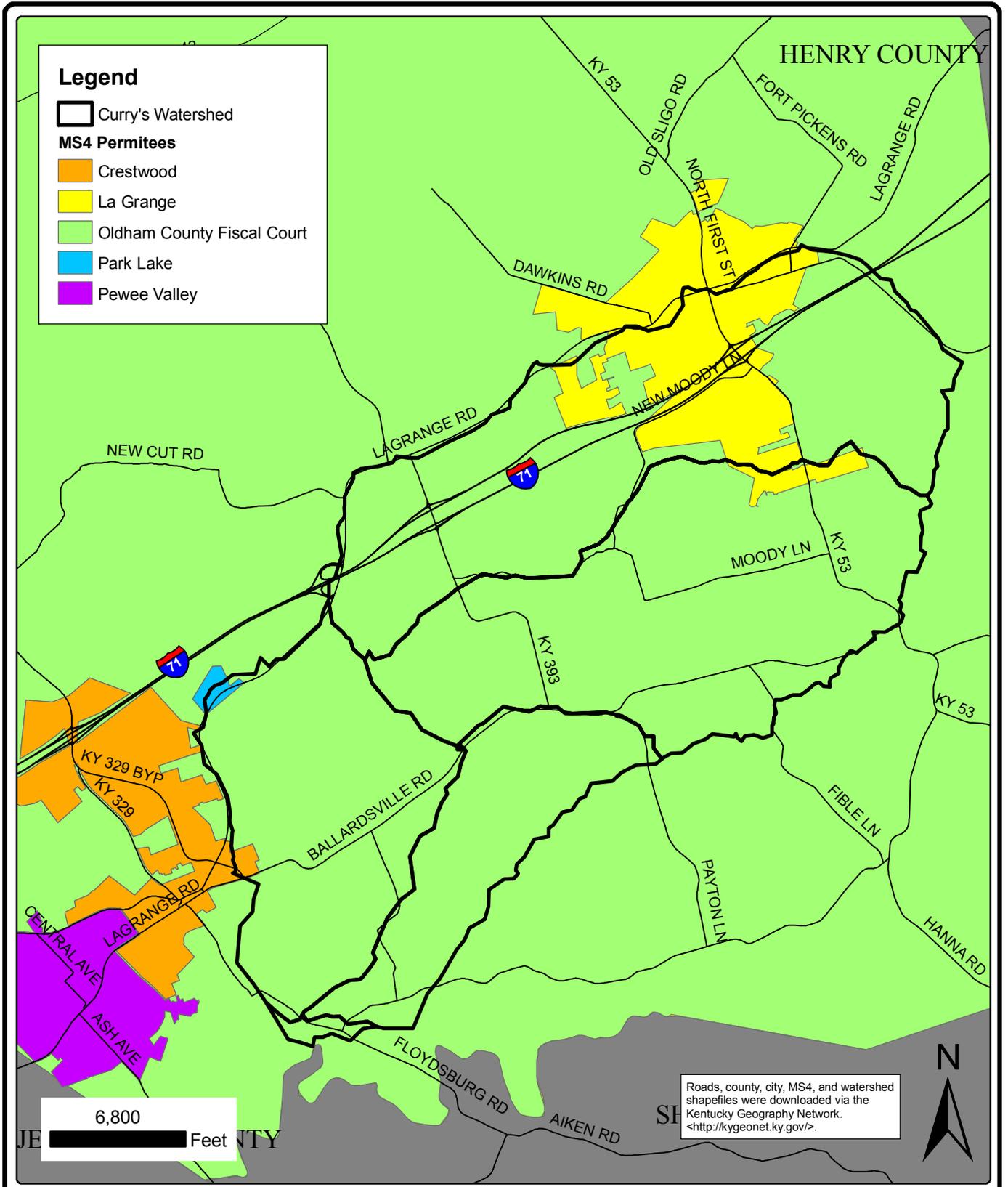
Drinking water needs in Oldham County are primarily met by public utilities and a small amount of private domestic water supplies. The water service in Oldham County is provided by five utilities, including Oldham County Water District (OCWD), Louisville Water Company, and LUC. The OCWD and LUC supply water to the Curry's Fork community. The majority of the water supply is from groundwater resources. The WTP treats water obtained from a series of wells in the Ohio River alluvium, which holds several billion gallons of water. There are no intakes for drinking water in the Curry's Fork watershed; therefore, there are no source water protection plans in the watershed.

D. MS4 Program

Oldham County and La Grange are considered Phase 2 communities under the KPDES Stormwater Program. The program "regulates stormwater discharges from three potential sources: MS4s, construction activities, and industrial activities.

Most stormwater discharges are considered point sources, and operators of these sources may be required to obtain a KPDES permit before they can discharge. This permitting mechanism is designed to prevent stormwater runoff from washing harmful pollutants into local surface waters such as streams, rivers, lakes or coastal waters."¹² Figure 2.04-6 shows the boundaries of the MS4 programs in Curry's Fork.

More detailed information on the MS4 program is located in Subsection 2.06.



CURRY'S FORK MS4 AREAS

**CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.04-6
 5994.100**

2.05 REGULATORY STATUS OF WATERWAYS

State regulatory agencies are required to develop water quality standards (WQS) to support the goals of the Clean Water Act (CWA). In accordance with the Code of Federal Regulations (CFR), 40 CFR 131.2, the goal of WQS should:

1. Include provisions for restoring and maintaining chemical, physical, and biological integrity of State waters.
2. Provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water ("fishable/swimmable").
3. Consider the use and value of state waters for public water supplies, propagation of fish and wildlife, recreation, agricultural and industrial purposes, and navigation.

The three major components of WQS include designated uses, numeric and narrative water quality criteria, and antidegradation policies. The USEPA defines the importance of WQS as government regulations to help “protect and restore the quality of the nation’s surface waters and to help identify water quality problems caused by improperly treated wastewater discharges, runoff, or discharges from active or abandoned mining sites, sediment, fertilizers, and chemicals from agricultural areas, and erosion of stream banks caused by improper grazing practices.”

These standards also support efforts to achieve and maintain protective water quality conditions. These efforts include total maximum daily loads (TMDLs) for point sources of pollution, load allocations for nonpoint sources of pollution, water quality management plans, NPDES water quality-based effluent limitations for point source discharges, water quality certifications under Clean Water Act 401, various reports that document current water quality conditions, and Clean Water Act 319 management plans for the control of nonpoint sources of pollution.¹³

A. Designated Uses

Appropriate uses of the water body, which are established by the states, are determined through consideration of the use and value of the water body as well as the suitability of a water body for these uses. The USEPA defines the suitability of a water body through consideration of “the physical, chemical, and biological characteristics of the water body, its geographical setting and scenic qualities, and economic considerations.”¹⁴ The states must conduct a use attainability analysis for any water body that does not include the fishable/swimmable goal identified in the CWA.

Kentucky WQS, outlined in Kentucky Administrative Regulation (KAR) KAR 10:026, define six different designated uses, including warm water aquatic habitat, cold water aquatic habitat, primary contact recreation, secondary contact recreation, domestic water supply, and outstanding state resource water. Although fish consumption is listed as an impaired use on the 303(d) List, it is not considered a designated use in Kentucky numeric quality standards. Fish consumption is an implied use in 401 KAR 10:031 Section 2, and through human health criteria in Section 6. Fish consumption, in conjunction with aquatic life use, assesses the attainment of fishable goals of the CWA. In 1992, assessment of the fishable goal was separated into these two categories because the fish consumption

advisory does not preclude attainment of the aquatic life use and vice versa. The separation of fish consumption and aquatic life use support gives a clear picture of water quality conditions [2010 305(b) List, Kentucky Environmental and Public Protection Cabinet (EPPC)]. Although this statute specifically identifies many surface waters throughout Kentucky and their respective designated uses, any surface water that is not specifically listed in the Kentucky WQS is, by default, designated as suitable for support of warm water aquatic habitat, primary contact recreation, secondary contact recreation, and domestic water supply.

The designated uses of Curry's Fork are specifically established within 401 KAR 10:026 as: warm water aquatic habitat, primary contact recreation, and secondary contact recreation. The designated uses for the other tributaries within the watershed, including North Curry's Fork, South Curry's Fork, and Asher's Run, are not specified in the Kentucky WQS; and therefore, by default their uses include warm water aquatic habitat, primary contact recreation, secondary contact recreation and domestic water supply.

1. Numeric and Narrative Criteria

States must adopt water quality criteria that properly protect the designated uses of the waterbodies throughout the state.

States may adopt the criteria established by the USEPA in Section 304(a) of the CWA, modify these criteria to meet site-specific conditions, or adopt criteria based on other scientifically-defended methods.¹⁴

These criteria include both numeric and narrative standards. Throughout the water quality data analysis section of this report, maximum allowable values denote the limits established by the Kentucky WQS. For certain parameters such as TSS and nutrients, the State has not established numeric water quality criteria. However, the USEPA has established recommended values of pollutant concentrations. These are nonenforceable values recommended to promote healthy water quality and aquatic habitats. The values are noted and used for data comparison purposes, which lead to source identification and target implementation.

In addition, Kentucky Division of Water (KDOW) developed draft ranges of target averages for several nutrients for Curry's Fork ecoregion.

Water quality criteria used for this report is discussed further in detail in Section 4.

2. Antidegradation Policies

The WQS regulations established in the CWA require states to develop a tiered antidegradation program. This program provides for the prevention, abatement, and control of water pollution. According to Kentucky WQS, "it is the policy of the commonwealth to conserve its waters for legitimate uses and to safeguard from pollution the uncontaminated waters of the commonwealth, prevent the creation of any new pollution in the waters of the commonwealth, and abate any existing pollution." The antidegradation policy requires

surface waters to be placed into one of the four categories including outstanding national resource waters, exceptional waters, high quality water, and impaired water. Amongst the categories, Curry's Fork is considered a high quality water.

B. Impairment Status

Curry's Fork has one stream segment listed on the 303(d) List and one additional stream segment in the 305(b) report; their locations are shown in Figure 1.01-1.

Refer to Table 1.01-1 for the impairment status as it is listed in the 303(d) List and Table 1.01-2 for the impairment status of the additional stream segment listed in the 305(b) report.

C. Special Use Waters

There are no special use waters located within the Curry's Fork Watershed. Special use waters are rivers, streams, and lakes listed in KAR or the Federal Register as: cold water aquatic habitat, exceptional waters, reference reach waters, outstanding state resource waters, outstanding national resource waters, state wild rivers, or federal wild and scenic rivers.

However, during review of the biological data at a Water Quality Data Analysis Team (WQDAT) meeting, KDOW staff noted that species collected and identified during the project would warrant consideration for listing as a Outstanding State Resource Water and/or Exceptional Water. KDOW is encouraged to review the biological species list for consideration.

D. TMDL Reports

A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards. One TMDL has been approved that includes portions of the Curry's Fork watershed, the *Floyds Fork Drainage Biological and Water Quality Investigation for Stream Use Designation*. The TMDL was approved in 1997. Because new DO data was being collected for this WP and the data used in the 1997 TMDL was deemed too old to be applicable conditions, the data from this TMDL was not used for this WP.

2.06 EXISTING RELEVANT PROGRAMS

The information in this section was provided in narrative and written format by representatives of the respective programs/agencies during a series of TC meetings in the summer of 2010.

A. Oldham County Sewer District (now OCEA)

The OCSD provides sanitary sewer service to residents in Oldham County with the exception of the cities of La Grange and Crestwood. In November 2008, Oldham County engaged Veolia Water North America to manage the operations of the District.

The OCSD has engaged in a successful program to enhance the system's performance and meet regulatory compliance. Numerous improvements to the system's piping, pumping, and treatment facilities have resulted in a 93 percent reduction in violations. OCSD has a long-term plan to decommission the failing treatment plants in the system and reroute flows to the treatment facility at the Kentucky State Reformatory.

1. Funding Sources

OCSD is funded by utility fees, grants, federal, or state loans.

2. Watershed Programs and Initiatives

OCSD is currently engaging (or planning to engage) in the following activities:

- a. Decommission the Buckner, Lockwood Estates, Lakewood Valley, and Green Valley treatment plants.
- b. Conduct a septic tank study/survey to assess the condition of septic tanks within the District's service area and attempt to quantify its impacts on water quality.
- c. Upgrade and/or rehabilitate the treatment plants.
- d. Repair the wastewater system to reduce I/I.
- e. Explore the feasibility of establishing a responsible management entity for septic systems and other on-site wastewater disposal systems.
- f. Include numerous approaches to wastewater management including cluster systems, traditional sewers with treatment plants, managed septic systems, and other strategies as appropriate.
- g. Work with the Health Department to complete a septic system inspection program to better assess the true status of septic systems throughout the OCSD's service area.
- h. Establish a water quality monitoring program throughout the watershed that will include sampling sites tested as part of this WP so that water quality changes can be quantified over time.

The OCSD has merged with the Oldham County Storm Water Management District to form the Oldham County Environmental Authority.

B. Oldham County Storm Water Management District (now OCEA)

The Oldham County Storm Water Management District was established by ordinance of the OCFC on August 6, 2008. The MS4 program serves Oldham County and its copermittees: City of Crestwood, Goshen, Orchard Grass Hills, Pee Wee Valley and River Bluff. La Grange is currently evaluating whether to be a copermittee. In September 2009, Oldham County engaged Veolia Water North America to manage the stormwater district. The Oldham County Storm Water Management District and the OCSD merged to form the OCEA, which is the lead copermittee of the MS4 program.

The Storm Water Management District's MS4 program follows the KPDES permit. The program is intended to improve the water quality by reducing the quantity of pollutants that flow into the MS4 system during rain events.

There are six components of a MS4 Program:

1. Public Education and Outreach.
2. Public Participation and Involvement.
3. Illicit Discharge Detection and Elimination.
4. Construction Site Runoff Control.
5. Postconstruction Runoff Control.
6. Pollution Prevention/Good Housekeeping.

1. Funding Sources

The MS4 program is funded entirely by stormwater fees. Grants or low interest government loans for improvement projects may be sought to implement the MS4 program.

2. Watershed Programs and Initiatives

The Storm Water Management District is currently engaging or planning to engage in the following activities that relate to watershed management:

- a. Create and distribute educational material related to water quality and best management practices (BMPs) via www.oldhamcountycleanwater.com, brochures/fact sheets, media outlets, schools, and community events.
- b. Identify appropriate BMPs for the Storm Water Management District and assist with its implementation.
- c. Work with other agencies and groups to improve water quality in the watershed such as the Solid Waste Department's E-waste collection.
- d. Map the stormwater management system.
- e. Find and eliminate any illicit discharges into the stormwater system.

- f. Enforce ordinances and proper erosion and sediment control. These efforts include reviewing drawings before construction and on-site inspections.
- g. Educate Oldham County employees on good housekeeping and pollution prevention practices.
- h. Fund grants to build rain gardens. Six grants of up to \$500 each have been awarded to offset the costs for materials and equipment to create new rain gardens. This program is expected to continue on a yearly basis. These grants are targeted towards homeowners and other smaller scale construction opportunities.
- i. Seek opportunities to construct larger demonstration projects in high visibility public areas/buildings. School and municipal buildings are being targeted especially as potential demonstration sites.
- j. Take water quality samples across the county beginning in the summer of 2010, (in conjunction with the Oldham County Sanitation District). This sampling effort has been coordinated with the Watershed Plan so that the sampling sites used in the Watershed Plan will be included in the District's program. Sampling is planned to occur twice a year (once in the summer and once in the winter) and will include the major waterways throughout the county.
- k. Document activities and progress through annual reports to KDOW.
- l. Update the Stormwater Quality Management Plan (SWQMP) as required or necessary.

C. La Grange Utilities Commission (LUC)

The LUC provides water and sewer services to residents of La Grange and some of the surrounding areas. Water is purchased from the OCWD and is pumped from wells under the Ohio River bed at Westport, Kentucky, and then processed, treated, and pumped into the water lines. Since the Ohio River is outside of Curry's Fork, there is no drinking water protection plan that is applicable. LUC provides drinking water service to approximately 3,200 customers and wastewater service to nearly 2,700 customers, the majority of whom are located within the Curry's Fork watershed.

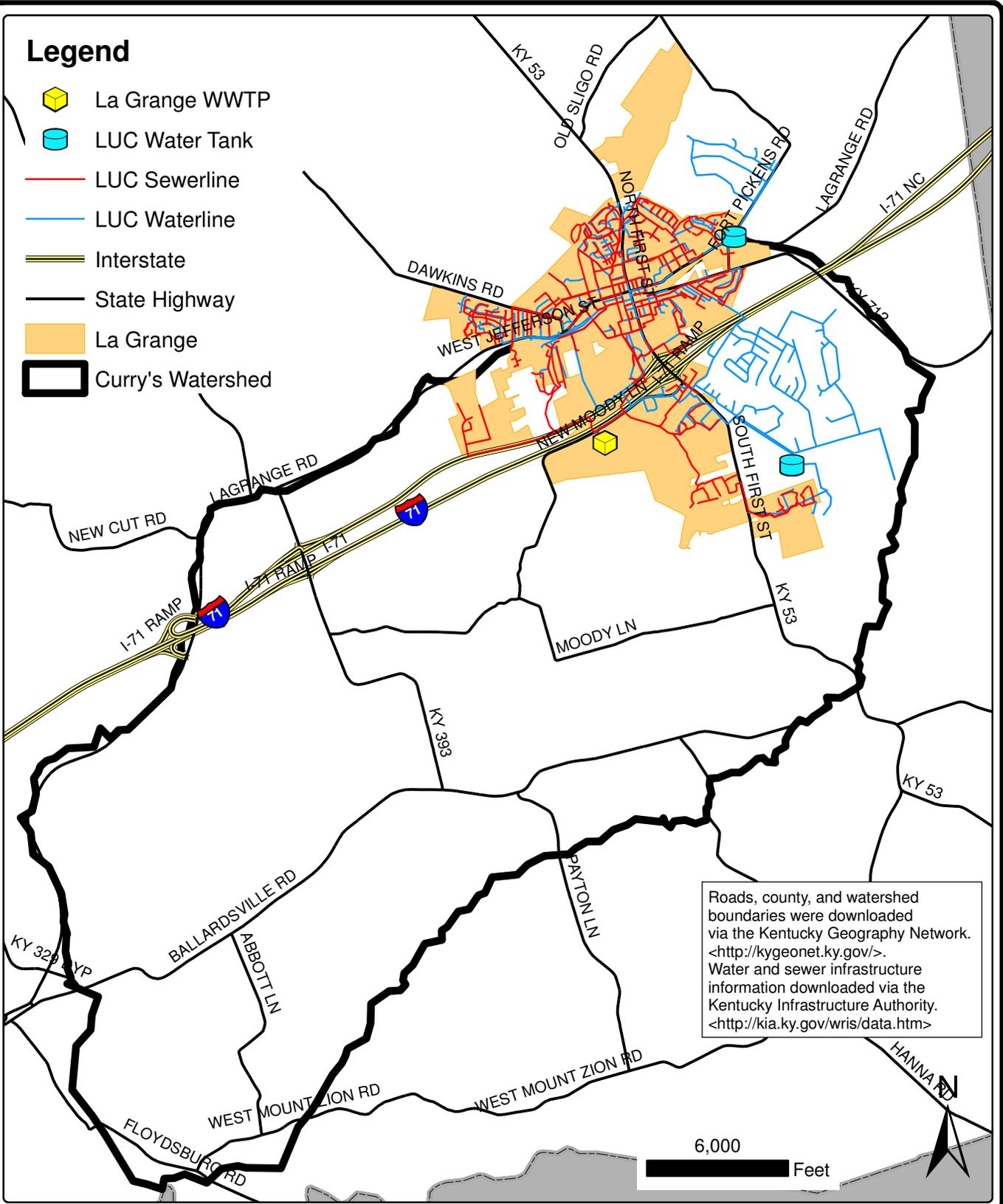
Figure 2.06-1 shows the extent of LUC's water and wastewater service within the watershed. All wastewater flows to La Grange WWTP, which discharges to Curry's Fork. LUC also bills and provides garbage service for La Grange, which has a franchise agreement with Industrial Disposal Company.

1. Funding Sources

Operation of LUC is funded primarily through monthly water and sewer charges. Bonds, loans, and grants have also been used to fund capital water and wastewater projects.

Legend

-  La Grange WWTP
-  LUC Water Tank
-  LUC Sewerline
-  LUC Waterline
-  Interstate
-  State Highway
-  La Grange
-  Curry's Watershed



Roads, county, and watershed boundaries were downloaded via the Kentucky Geography Network. <http://kygeonet.ky.gov/>.
 Water and sewer infrastructure information downloaded via the Kentucky Infrastructure Authority. <http://kia.ky.gov/wris/data.htm>

**LA GRANGE UTILITY COMMISSION
 WATER AND SEWER LINES
 CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.06-1
 5994.100**

2. Watershed Programs and Initiatives

LUC is currently engaging or planning to engage in the following activities that relate to watershed management:

- a. LUC is treating wastewater to meet new, lower, phosphorous limits in its KPDES permit. Chemicals are currently being added to the treatment process to remove phosphorous before effluent is discharged into the watershed.
- b. In May 2008, a significant upgrade project was completed at La Grange WWTP that improved its ability to treat wastewater and installed an ultraviolet radiation system as the disinfection process.
- c. Expansion of the LUC water distribution and wastewater collection system is anticipated to occur as vacant land in its service areas is developed in the future. The LUC water and wastewater service area is bordered on all sides by county water or sewer providers. LUC is focused on improving its existing system as well as participating in a regional wastewater treatment program.

D. Oldham County Water District (OCWD)

The OCWD was created in 1964 with the financial help of Farmers Home Administration.

The OCWD presently serves 8,000 residential customers within the county, which includes most of the residents in Curry's Fork, and three institutions of the Kentucky State Reformatory. It also provides bulk water for resale to La Grange. The OCWD treats groundwater from the Ohio River alluvium to supply its customers and also has an emergency interconnection with Henry County Water.

The OCWD has a supply capacity of approximately 6 million gallons per day (mgd) and has reached that limit on a few peak demand days, typically in the summer. The existing treatment plant was constructed in 1981 and with a ongoing expansion and is expected to meet the needs of the county until 2025 without any major additions. When the expansion project is complete, the new supply capacity will be approximately 13 mgd. See Figure 2.06-2.

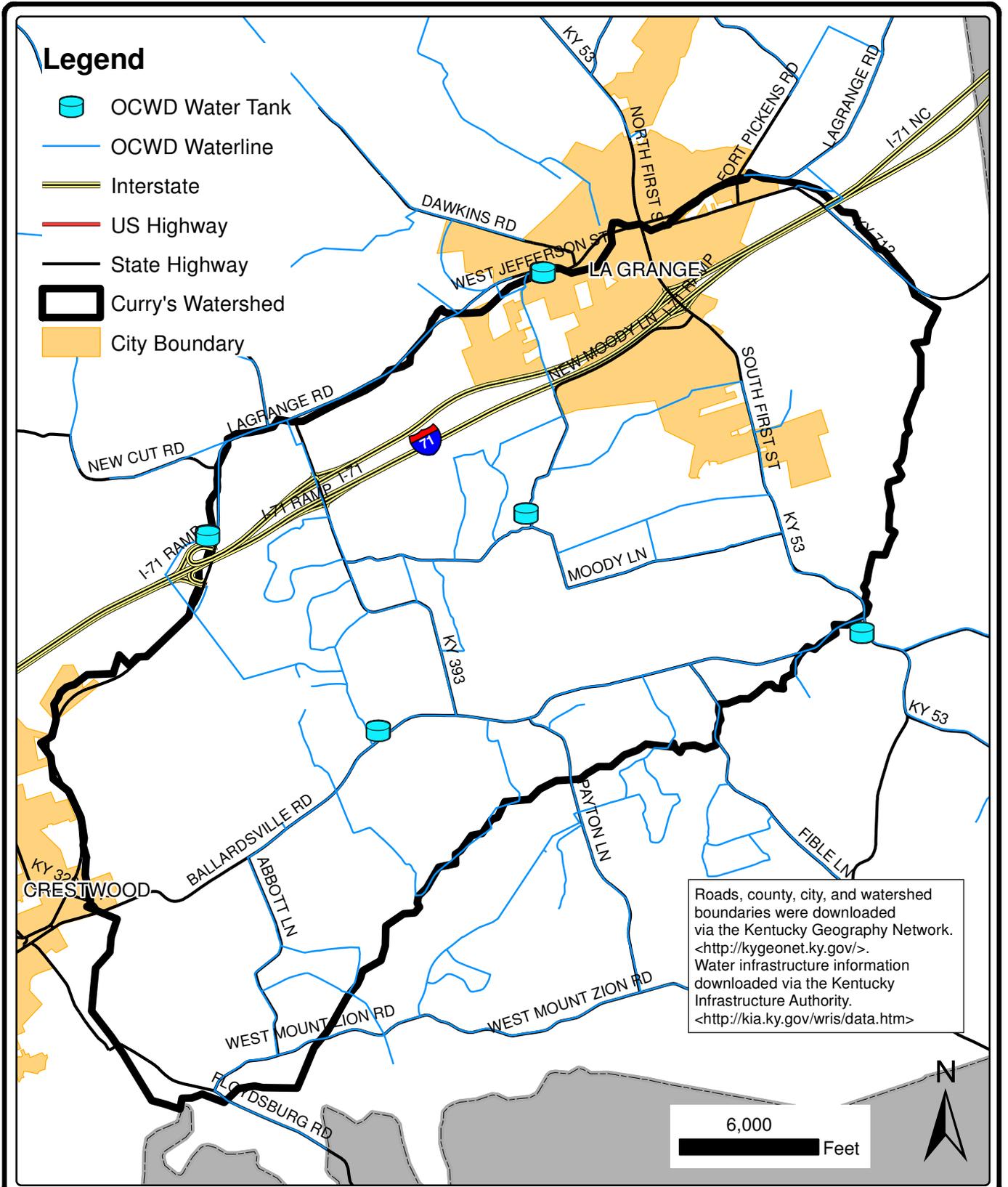
1. Funding Sources

The OCWD is funded by utility bills paid by its customers. Grants and loans also finance projects and programs, when available.

2. Watershed Programs and Initiatives

The OCWD is currently engaging or planning to engage in activities that relate to watershed management:

- a. In its role of providing water throughout the county, the OCWD is one of the first groups to become aware of proposed construction projects and growth. Knowledge of where growth is occurring or is planned to occur can help identify



**OLDHAM COUNTY WATER DISTRICT
 WATER INFRASTRUCTURE
 CURRY'S FORK WATERSHED PLAN
 OLDHAM COUNTY FISCAL COURT
 OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.06-2
 5994.100**

potential opportunities to incorporate watershed restoration or protection within these projects, install BMPs, and other activities to improve water quality.

- b. The OCWD already invests a significant level of attention and funds to make certain that work completed in and around streams has a minimal impact and is properly restored. These efforts can be used as an example for others doing work in the watershed.

E. Oldham County Cooperative Extension Office

Kentucky's two land grant universities, the University of Kentucky and Kentucky State University, serve as partners in conducting research, providing educational program materials, and technical assistance through the local Cooperative Extension Service offices.

The program delivery process involves extension faculty, county agents, advisory council members, volunteer leaders, and the general public.

The extension office's goal is to distribute research-based advice and information on anything that grows. The Oldham County office has staff that focuses on horticultural/agriculture/natural resource programs, family/consumer sciences, and youth development (4-H).

Locally, the horticultural, agricultural, and natural resources programs focus on two basic categories:

- Help farm enterprises be profitable using environmentally sound practices.
- Help homeowners grow their own food and landscapes using environmentally sound practices.

Programs are geared to helping businesses earn a profit and/or homeowners save money in addition to being environmentally sound.

1. Funding Sources

Oldham County Cooperative Extension Service is funded by the University of Kentucky, College of Agriculture, and OCFC.

2. Watershed Programs and Initiatives

The extension office is currently engaging or planning to engage in activities that relate to watershed management:

- a. The equine industry is Oldham County's top agricultural moneymaker. The extension office offers three programs geared toward improving equine management: Horse Cents, Horse Grazing School, and Horse College.
- b. The Oldham County Cattleman's Association was formed in the fall of 2009 and builds on other extension programs such as Master Cattleman, Advanced Master Cattleman, and Master Grazer.

- c. With a goal of minimizing the amount of pesticide being applied while maximizing crop yields, the extension office offers training on pesticide application and insect trapping. Similarly, the extension office has classes on pest management for nurseries, greenhouse basics, and hosts nursery field days.
- d. The extension office has programs geared toward the private home owner as well. Popular programs include the Master Gardener as well as classes on rain gardens, landscape design, and vegetable gardening. The Master Gardener program requires participants to contribute volunteer hours to the community and has been utilized in other watersheds for reforestation efforts, creating rain gardens, and reestablishing vegetative buffers.
- e. Pasture assessments, crop/landscape/garden advice and information, soil testing, plant disease diagnosis, and plant/weed/insect identification are all traditional extension services that are also provided by the Oldham County Extension Office.
- f. Programs that will become available in 2009 include a lawn care seminar (a 2007 soils survey that found a significantly large number of private lawns were over fertilized with potassium and phosphorous versus agricultural lands), basic/introductory farming ("Green Acres"), and classes on selecting trees for home landscaping.

F. Oldham County Planning and Development Services (OCPDS)

The OCPDS office is a land use agency created by local government to guide the county's physical development. To achieve this, the Planning and Development office prepares long-range plans to provide for balanced growth. It reviews development proposals for compliance with locally adopted plans and regulations. It monitors development activity and requires conformance through property code enforcement. It is also responsible for issuing construction permits within Oldham County.

1. Funding Sources

The Planning and Development Services office is funded through fees and the county's general fund.

2. Watershed Programs and Initiatives

The Planning and Development Services office is currently engaging or planning to engage in activities related to watershed management:

- a. As the coordinator of long-term planning in the county and issuer of construction permits, the Planning and Development Services office is in a unique position to understand where growth is occurring or planning to occur.
- b. Enforcement of the Wastewater Capacity Assurance ordinance helps promote responsible development by making certain that sufficient wastewater treatment

collection and treatment capacity is available for a proposed development. Mitigation is an option for projects that cannot assure capacity without additional efforts. Example mitigation measures include evidence of preliminary approval by KDOW for the construction of a new facility or improvements to an existing facility and that the new treatment facility capacity or the improved treatment plant capacity will be sufficient to serve the proposed development. Mitigation measures are described in detail in the Oldham County Comprehensive Zoning Ordinance, Division 270 Capacity Standards, Part 5: Mitigation, which is available on the Oldham County Fiscal Court Web site (<http://www.oldhamcounty.net/>). These mitigations efforts can be leveraged with watershed planning/protection/restoration projects to extend their benefits.

- c. Enforcement of the Floodplain and No Disturb Zone Ordinances: The Planning and Development Services office requires that a No Disturb Zone of a minimum of 25 feet of vegetative buffer be maintained between the top of the stream bank and any proposed development. In addition, the Floodplain Ordinance forbids construction within the floodplain and requires that any development greater than five acres or with more than 50 homes establish a floodplain elevation. Construction will not be allowed within the area defined by the newly established floodplain.
- d. Enforcement of the Green Space Ordinance: The Planning and Development Services office limits the amount of impervious surface in a commercial zone to 60 percent. This is significantly more stringent than most areas and provides a high level of protection for the watershed. The county allows developers to use trade-offs such as rain gardens and pervious pavement to earn credits toward meeting the required level of pervious space.

G. Oldham County Health Department (OCHD)

OCHD is responsible for permitting the construction of on-site sewage treatment systems, such as septic tanks and leach fields. It also responsible for enforcing applicable standards and investigating potentially failing systems. The OCHD relies on a compliant system to identify potentially failing systems. A typical example would be a neighbor calling to report unusual/unpleasant smells from the house next door. The OCHD would visit the house in question and investigate the complaint to determine if the cause is related to the property's on-site system. Fortunately, there are few areas within the watershed that have chronic failures of systems and complaints are few.

1. Funding Sources

The OCHD is funded through the State's executive budget.

2. Watershed Programs and Initiatives

The OCHD is currently engaging (or planning to engage) in the following activities related to watershed management:

- a. Evaluate any potential building/construction site for the suitability of an on-site treatment system. This allows the OCHD to serve as a screen tool to prevent builders from using an unsuitable site.
- b. Permit any new construction within the watershed that will utilize an on-site treatment system for sewage to make certain systems are properly sized and constructed.
- c. Investigate reports of failing systems. This gives the OCHD the ability to enforce codes and remove potential pollution sources from the watershed.

H. Oldham County Solid Waste and Recycling Department (Solid Waste Department)

The Solid Waste Department is responsible for all solid waste and recycling service delivery for the residents of Oldham County without city-provided service. The Department of Solid Waste also addresses illegal dumping, permitting of waste haulers, preparation of the annual state report, and implementation of the Solid Waste Five-Year Plan. Services to the unincorporated area of Oldham County are completed through a franchise agreement with a private waste hauler. Incorporated cities may join the agreement.

The Solid Waste Department provides once weekly collection of garbage and yard waste. In addition, there is an annual large item pick-up service. The department encourages residents to recycle and dispose of wastes properly.

The Solid Waste Department operates a recycling center and is responsible for collected recyclables from Oldham County Schools and government facilities/offices. To help educate residents, the department has produced several short videos on recycling and solid waste management.

The recycling center is open 24 hours a day and is staffed to help residents. The center also collects electronic waste (E-waste) all year, in addition to a special E-waste collection event held after Christmas every year.

1. Funding Sources

The Solid Waste Department is funded by quarterly bills to users of their services. The recycling center is funded through the Oldham County general fund. Some specific programs, such as the hazardous household waste collection, are funded through grants.

2. Watershed Programs and Initiatives

The Solid Waste Department is currently engaging or planning to engage in the following activities that relate to watershed management:

- a. Host several specialty waste collection events such as:
 - (1) E-waste (electronics, computers, and TVs).
 - (2) Household hazardous waste.

- (3) Shredding events.
- (4) Drug and medicine collection program (in the planning stages).
- b. Organize a roadside litter pick-up program that utilizes nonprofit groups and community organizations.

I. Oldham County Conservation District (Conservation District)

The Conservation District's mission is to help in the protection of Oldham County's natural resources by working hand-in-hand with government agencies, industry, schools, businesses, and individual landowners. The Oldham County Soil and Water Conservation District was formed as a local subdivision of state government in 1946.

1. Funding Sources

The Conservation District is funded through the State of Kentucky through the Division of Conservation under the Department for Natural Resources.

2. Watershed Programs and Initiatives

The Conservation District is currently engaging or planning to engage in the following activities that relate to watershed management:

- a. The Conservation District provides assistance to landowners in developing and implementing Agriculture Water Quality Plans. An Agricultural Water Quality Plan is a compilation of BMPs from six different areas: silviculture, pesticides/fertilizers, farmstead, crops, livestock, streams, and other waters.
- b. The Kentucky Water Quality Cost Share Program provides between 50 percent and 75 percent of cost share assistance for a variety of practices intended to improve water quality.

J. Natural Resources Conservation Service (NRCS)

As part of the United States Department of Agriculture, NRCS leads conservation efforts for all natural resources to ensure that private lands are conserved, restored, and are more resilient to environmental challenges. NRCS works with landowners through conservation planning and assistance designed to benefit the soil, water, air, plants, and animals that result in productive lands and healthy ecosystems. The local office of NRCS works to help in the protection of Oldham County's natural resources by working hand in hand with government agencies, industry, schools, businesses, and individual landowners.

1. Funding Sources

The NRCS is funded through Congress. Programs are generally funded through the Farm Bill which requires landowners to register their property with the United States Department of Agriculture Farm Service Agency (FSA) to be eligible for programs.

2. Watershed Programs and Initiatives

The NRCS is currently engaging or planning to engage in activities related to watershed management:

- a. The Environmental Quality Incentives Program offers financial and technical assistance to agriculture and forestry producers to promote production, management, and environmental quality as compatible goals. It is primarily a livestock and water quality cost shared program.
- b. The Wildlife Habitat Incentives Program offers financial and technical assistance to agriculture and forestry producers to promote wildlife friendly habitat. Applicable practices for this program include:
 - (1) Fencing sensitive areas.
 - (2) Establishing tree and shrub plantings.
 - (3) Developing buffers.
 - (4) Establishing shallow water areas.
 - (5) Establishing native grasses.
 - (6) Fescue eradication.
 - (7) Managing woodlands for invasive species and timber stand improvement.
- c. The Conservation Security Program offers financial and technical assistance to agriculture and forestry producers to enhance current conservation programs through BMPs and better management. The program will make payments for improving existing systems and requires documentation of those systems. Landowners that participate in this program will have to certify the work that may be verified with spot checks by NRCS personnel.
- d. The Continuous Conservation Reserves Program offers financial and technical assistance to agriculture and forestry producers to implement buffer systems along streams, waterways, sinkholes, and cropland field borders. Buffers must be made of native species and be 120 feet wide. Payments are made as part of annual 10- to 15-year rental program based on soil productivity.
- e. The Wetland Reserves Program offers financial and technical assistance to agriculture and forestry producers to protect, preserve, and enhance critical wetland on agricultural lands. The Program offers conservation easements, wetland restoration, and annual payments. There are a range of easement program options that allow funding opportunities to increase as the length of the easement increases. To be eligible, wetlands must have been converted previously.
- f. The local NRCS office provides personnel and assistance to residents on soils, water, geology, woodland management, wildlife habitat management, and conservation planning.

- g. Information on other NRCS programs can be found at www.nrcs.usda.gov/programs.

K. Oldham County Board of Education (OCBE)

OCBE is responsible for the education of approximately 12,000 students throughout the county. Student enrollment has increased and is expected to continue to grow in the future. Oldham County schools are among the best performing districts in the Commonwealth. OCBE consists of a preschool, 10 elementary schools, four middle schools, three high schools, an alternative school, a career center, and a center for the arts and community education. Figure 2.06-3 shows the locations of OCBE's facilities within the county.

OCBE continues to promote environmental education in and out of the classroom in mandated curriculum and in unique methods. One unique way has been the granting of an easement on OCBE property for a stream restoration project.

The property is planned to be developed into a new high school and the location of the project will create numerous engagement opportunities for students, teachers, parents, and the general public.

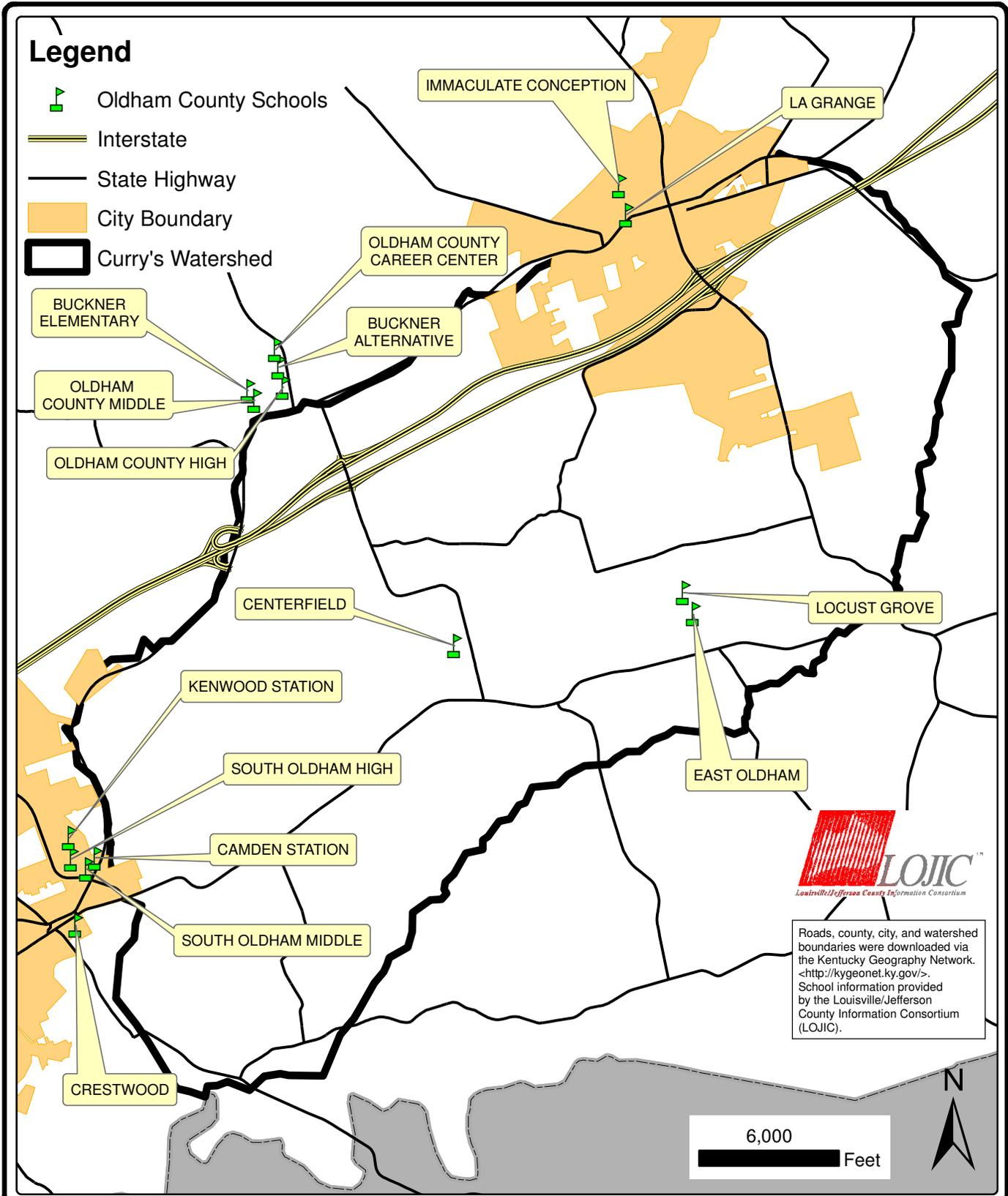
1. Funding Sources

OCBE is funded primarily by local property taxes. Educational grants also contribute towards funded district activities.

2. Watershed Programs and Initiatives

OCBE is currently engaging or planning to engage in activities that relate to watershed management:

- a. State curriculum standards require OCBE to engage in environmental education. These efforts include indoor classroom/laboratory and outdoor field trips/outdoor classrooms education.
- b. OCBE has granted a large easement at the site of a future high school to allow for a stream restoration project.
- c. OCBE owns and operates two STPs. One of which, Centerfield Elementary, is within the Curry's Fork Watershed. At schools that are not served by traditional sewers, violations have occurred during the summer months because of low flow conditions. OCBE would prefer to decommission these plants and would take them out of service if sewers were extended to the schools.



**OLDHAM COUNTY BOARD OF EDUCATION
SCHOOL LOCATIONS
CURRY'S FORK WATERSHED PLAN
OLDHAM COUNTY FISCAL COURT
OLDHAM COUNTY, KENTUCKY**



**FIGURE 2.06-3
5994.100**

L. University of Louisville (UL) Stream Institute

The UL Stream Institute conducts applied research in the assessment, design, and restoration of streams, wetlands, and watersheds. The primary goal of the institute is to improve the techniques and methods used in aquatic resource mitigation. Designs and assessments incorporate the interaction of channel hydraulics and stream morphology with ecological functions so that restored stream systems are physically and biologically sustainable.

1. Funding Sources

The Stream Institute works closely with numerous local, state, and federal agencies to coordinate funding opportunities.

2. Watershed Programs and Initiatives

The Stream Institute is currently engaging or planning to engage in the following activities that relate to watershed management:

- a. Lead the design and construction of a stream restoration project on Moody Lane. This project will restore approximately 3,700 linear feet of stream on the site of a future high school. The property is owned by the Board and was made possible through an easement granted by the Board and a grant from the United States Fish and Wildlife Service (FWS). This project is being used as the matching funds for the 319(h) grant that paid for the development and implementation of this watershed plan.
- b. Complete geomorphic and sediment studies as part of the restoration project and the watershed plan that will assist in documenting and understanding the dynamics of the watershed and identify priorities for restoration/protection.
- c. Coordinate a Natural Channel Design Working Group to educate and collaborate with agencies involved in stream restoration.

The stream restoration site is located off Moody Lane in the South Curry's Fork watershed. A total of 3,700 linear feet is being restored. UL Stream Institute watershed management activities include the following:

- a. Stream Restorations (limited to reach-scale mitigation projects).
- b. Geomorphic and sediment assessments to assist in sediment reduction programs.

The Stream Institute works closely with KDOW, the USACE, KDFWR (in lieu fee recipient), United States Fish and Wildlife Service (FWS), United States Forest Service, Kentucky Division of Forestry, and the Kentucky Transportation Cabinet (KYTC)-Environmental Analysis Department.

M. Kentucky Division of Water (KDOW)

The mission of the KDOW is to manage, protect, and enhance the quality and quantity of the Commonwealth's water resources for present and future generations through voluntary, regulatory, and educational programs. Two programs have been specifically identified that are ongoing within the Curry's Fork watershed. Other programs may be developed or implemented at a later date that would also be applicable.

1. 401 Permitting Process

Projects that involve the discharge of dredged or fill materials into waters of the United States, including wetlands, are regulated by the United States Army Corps (USACE) of Engineers under CWA Section 404 and require Section 401 certification. Examples of activities that may require a Section 404 permit and Section 401 water quality certification are stream relocations, road crossings, stream bank protection, construction of boat ramps, placing fill, grading, dredging, ditching, mechanically clearing a wetland, building in a wetland, constructing a dam or dike, and stream diversions.

The CWA Section 401 Water Quality Certification Program in Kentucky ensures that activities involving a discharge into waters of the state and requiring a federal permit or license are consistent with Kentucky's WQS in Title 401, Chapter 5, of the KAR.

KDOW 401 program's goal is minimizing and mitigating in-stream and near-stream disturbances. Monitoring, assessing, and permitting are all required certification activities.

a. Funding Sources

The 401 Permitting Program is funded through the state's general fund, permitting fees, and federal grants.

b. Watershed Programs and Initiatives

The 401 Permitting Program is currently engaging or planning to engage in activities that relate to watershed management:

- (1) The permitting process allows KDOW staff to be aware of upcoming projects that may impact the waters of Curry's Fork.
- (2) Monitoring and mitigation requirements can be directed towards improvements within the watershed.

2. Groundwater Protection Plans

Anyone engaged in activities that have the potential to pollute groundwater must develop and implement a groundwater protection plan (GPP). A GPP identifies activities at a facility and defines the best management practices (BMPs) that will be used to protect the groundwater nearby. Administrative regulations for GPPs are described in 401 KAR 5:037.

Typical activities that require a GPP include:

- (1) Pesticide storage, handling, or commercial application.
- (2) Land treatment and/or disposal of a pollutant or waste.
- (3) Storage of bulk materials in tanks, drums, or other containers.
- (4) Transmission pipe lines.
- (5) On-site sewage treatment and disposal systems.
- (6) Storage, handling, or application of road oil, dust suppressants, or deicing agents in a central location.
- (7) Mining or related activities.
- (8) Installing, constructing, operating wells or borings.

a. Funding Sources

The GPP program is funded through the state's general fund, permitting fees, and federal grants.

b. Watershed Programs and Initiatives

The GPP program is currently engaging or planning to engage in activities that relate to watershed management:

- (1) Protecting the quality of groundwater inherently benefits the streams within the Curry's Fork watershed. A significant amount of the stream flow in the watershed comes from groundwater.
- (2) Providing generic GPPs to homeowners with residential septic systems.
- (3) GPPs can be used to identify potential threats to the watershed.
- (4) BMPs defined in GPPs can be leveraged to also protect/improve surface water.
- (5) GPPs are not required to be submitted to the state unless:
 - (a) Called in by a Department of Environment inspector.
 - (b) Called in by the Groundwater Section's GPP program.
 - (c) Required by Division of Enforcement through an Agreed Order.

N. United States Army Corps of Engineers (USACE)

The USACE, Regulatory Branch, implements Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the CWA which includes the following:

1. Regulation of the placement of any structure or work in, under, or over "traditionally navigable water."
2. Regulates the discharge of dredged or fill material into "waters of the U.S."

The CWA 404 program addresses protecting streams and wetlands. There are two major divisions under this program; Section 10 (rivers and harbors) and the CWA 404. The CWA 404 includes wetlands, ponds, and streams. If construction activities are occurring in the waters of the United States, an alternatives analysis shall be developed. The analysis reviews the location of construction, the process to minimize impacts to the body of water, and the cumulative impacts. Depending on the action, it may require mitigation to replace the environmental value of the disturbance. Preferred mitigation includes bank stabilization in lieu of fee, and on-site or off-site permittee responsibility. The USACE's role is regulatory in nature; therefore, no special agency programs exist.

1. Funding Sources

USACE is funded through Congress.

2. Watershed Programs and Initiatives

The USACE is currently engaging or planning to engage in activities that relate to watershed management:

- a. The goal of the USACE's regulatory authority is to facilitate navigation and to avoid, minimize, and mitigate physical impacts to the waters of the United States. The avoidance, minimization, and mitigation of impacts to the waters of the United States are consistent with the goals of the watershed plan.
- b. In its role in reviewing and approving activities that may impact the waters within Curry's Fork, the USACE is often aware of planned projects within the watershed as long as the projects involve waters of the United States.
- c. The 2008 Mitigation Rule [332.3(c)] requires to the extent appropriate and practicable, the USACE to use a watershed approach to establish compensatory mitigation. These projects would likely be consistent with other watershed efforts and would likely contribute to the improvement of the quality of the watershed.

O. Source Water Protection Plans

Source Water Protection Plans are required by the Safe Drinking Water Act and state statutes. Counties are required to develop long-range supply assessment and protection plans. The Kentuckiana Regional Planning and Development Agency led the preparation of the Oldham County plan.

P. Wellhead Protection Areas

The Safe Drinking Water Act requires wellhead protection programs to be developed for public water supplies that draw from groundwater. As there are no public drinking water supply sources within Curry's Fork, there are no applicable plans or programs within the watershed.

Q. Past and Current Watershed Plans

1. Floyds Fork WP

Efforts on developing a watershed plan for Floyds Fork were suspended in May 2008 pending resolution of legal disputes.

Curry's Fork drains into Floyds Fork, which is a major tributary of the Salt River. The main stem of Floyds Fork and several tributaries are listed as impaired on the 2008 303(d) List. To address the nonpoint source pollution in the Floyds Fork watershed, the Floyds Fork Environmental Association, KWA, and Fuller, Mossbarger, Scott, and May Engineers (now Stantec) teamed up to develop a WP. The Floyds Fork WP is funded in part by a FFY2003 Clean Water Act Section 319(h) grant awarded by the USEPA through KDOW. For more information about the Floyds Fork WP, visit the KWA Web site at <http://www.kwalliance.org/>.

2. Darby Creek WP

The Darby Creek WP was completed in June 2010 and can be viewed at www.kwalliance.org. Darby Creek is located in Oldham County but is not part of the Curry's Fork watershed.