

### 3.2.3 AIR QUALITY

Under the Federal Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) has established air quality standards in regard to the types of air pollutants emitted by internal combustion engines, such as those in aircraft, vehicles, and other sources. These National Ambient Air Quality Standards (NAAQS) apply to the ambient air, the air that the general public is exposed to every day. Areas where the ambient air does not meet these standards are said to be non-attainment areas. Areas where the ambient air currently meets these standards are said to be in attainment.

Federal agencies are not allowed to take any action that would interfere with a State’s plan to maintain or to achieve compliance with those air quality standards. A Federal action must be “in conformity” with whichever restrictions or limitations the State has established for air emissions necessary to attain compliance with NAAQS.

Screening techniques are used to evaluate a project. These techniques involve determining the levels of emissions that would result from a proposed action. They could be models or mathematical calculations. These screening techniques must be used whether an area is in attainment or not. Pollutant thresholds have been established to determine the impact of the level of emissions. These pollutant thresholds are shown in the side panel. If the analysis indicates that a threshold is exceeded, a conformity determination would be required. The criteria pollutants for this screening are as follows:

- **Carbon Monoxide (CO).** CO is a colorless, odorless, toxic gas produced by the incomplete combustion of organic materials used as fuels. CO is emitted as a by-product of essentially all combustion.

#### National Ambient Air Quality Standards (NAAQS)

Under the CAA, the EPA has established limits on the average levels of pollutants in the air to which the general public is exposed (ambient air). Primary Standards establish the level of air quality necessary to protect public health from any known or anticipated adverse effects of a pollutant, allowing a margin of safety to protect sensitive members of the population. The Secondary Standards establish the level of air quality necessary to protect public welfare by preventing injury to agricultural crops and livestock, deterioration of materials and property, and adverse impacts on the environment, including prevention of reduced visibility.

Pollutant	Averaging Time	Standard <sup>a</sup> (µg/m <sup>3</sup> )
Ozone	1-hour	235
Carbon Monoxide (CO)	1-hour	40,000
	8-hour	10,000
Nitrogen Oxides (NO <sub>x</sub> )	Annual	100
Sulfur Dioxide (SO <sub>2</sub> )	Annual <sup>b</sup>	80
	24-hour <sup>b</sup>	365
	3-hour <sup>c</sup>	1,300
Particulate Matter (PM <sub>10</sub> )	Annual	50
	24-hour	150
Lead (Pb)	0.25 year	1.5

<sup>a</sup> Both the Primary and Secondary Standards are the same value, except for sulfur dioxide.

<sup>b</sup> Primary Standard

<sup>c</sup> Secondary Standard

- ***PM<sub>10</sub>***. *PM<sub>10</sub>* are fine particles less than 10 micrometers in diameter. *PM<sub>10</sub>* includes solid and liquid material suspended in the atmosphere and formed as a result of incomplete combustion.
- ***Sulfur Dioxide (SO<sub>2</sub>)***. *SO<sub>2</sub>* is a corrosive and poisonous gas produced mainly from the burning of sulfur-containing fuel.
- ***Nitrogen Oxides (NO<sub>x</sub>)***. *NO<sub>x</sub>* are poisonous and highly-reactive gases produced when fuel is burned at high temperatures, causing some of the abundant nitrogen in the air to burn as well.
- ***Volatile Organic Compounds (VOCs)***. *VOCs* are created when fuels or organic waste materials are burned. Most hydrocarbons (*HCs*) are presumed to be *VOCs* in the regulatory context, unless otherwise specified by the EPA.

The thresholds are referred to as “*de minimis*” criteria, and vary depending upon the pollutant. The term “*de minimis*” means “so small as to be negligible or insignificant.” If an action is below the *de minimis* emission threshold, then a conformity determination is not required.

### 3.2.3.1 Affected Environment

Jackson County, the proposed dam and reservoir sites, and the proposed routes of the raw water transmission main are in an area classified as being in attainment (KYDEP, 1999). The area is predominantly rural and agricultural. Automobile traffic on nearby highways is the only substantial contributor to the pollutant levels in the county and in the areas adjacent to the proposed alternative project sites.

### 3.2.3.2 Environmental Consequences

In the analysis of the dam, reservoir, and raw water transmission main, the types of equipment and hours of use anticipated to be necessary for construction were used to determine pollutant emission levels. The following sources from the EPA were used to analyze the data:

- Nonroad Emissions Model (EPA, 1999a);
- Mobile Source Observation Database (EPA, 1999b); and
- AP-42, Compilation of Air Pollutant Emission Factors, Vol. II Mobile Sources (EPA, 1998).

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on air quality from the site preparation, construction, operation, and connected actions associated with the proposed dam, reservoir, and raw water transmission main are:

- Affect air quality from a hazardous material or POL spill during storage and handling;
- Degrade air quality from fugitive dust emissions during site preparation, construction of access roads, and construction along existing access roads;
- Affect air quality and create fugitive dust from the equipment used during construction;

- Degrade air quality by creating emissions during the maintenance and operation ground vehicles;
- Affect air quality from reservoir operations; and
- Affect air quality from planned debris burning.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

As shown in **Table 3.2.3-1**, a total of 103,288 hours of equipment usage is projected for the largest of the three proposed alternative project sites. This is the Sturgeon Creek, 8.5 mgd site. Adjustments will be made in the analysis to show the site-specific differences between the alternatives. These site-specific differences are presented in Sections 3.2.3.2.1 through 3.2.3.2.3.

<b>Table 3.2.3-1. Planned Construction Equipment and Air Emissions</b>			
<b>Equipment Type</b>	<b>Rating</b>	<b>Number</b>	<b>Hours of Use</b>
Chip Spreader	13 watts	1	450
Air Compressor	250 CFM	1	4,500
	375 CFM	2	1,275
Sandblaster	600 psi	2	480
Chainsaw	31 inches	6	360
Compactor	18.9 inches	1	140
Concrete Pump	196 cu. yd./hr.	3	8,000
Concrete Vibrator	2.5 inches	2	12,000
	High Frequency	1	12
Crane, Hydraulic	22 ton	1	120
Lift-Crane	150 ton	1	240
Drill, Air	2.5 – 4 inches	2	1,200
Generator	2.5 KWH	2	180
Grader		3	1,200
Hydraulic Hammer	1,500 Ft#	2	250
Hydraulic Excavator, Crawler	3.125 cu. yd.	3	1,500
Land-clearer, rotary cutter	20' cut	2	750
Loader, Front End, Crawler	1.5 cu. yd.	2	800
Loader/Backhoe (LD/BH), Crawler	1 cu. yd.	3	360
Pile Hammer	40 ton	1	360
Pump Water	6 gpm	2	320
Soil Compactor		2	400
Roller	15 ton	2	750
Dozer, Crawler with Blade	D7	1	540
Dozer, Crawler, Angle tilt	D5	1	360
Tractor		2	1,200
Trencher, Walk Behind (Dam Site)		1	240

Trencher, Walk Behind (Water Main)		1	230
Truck, Dump	12 cu. yd.	10	2,400
Truck Flatbed	8 x 12 feet	12	1,600
Truck Highway	0.75 ton	6	8,000
	15,000 GVW	10	800
	43,000 GVW	12	1,200
Truck Off Highway	35 ton	6	8,000
Water Blaster	3,000 psi	1	320
Welder, Portable (Dam Site)	180 amp	1	800
Welder, Portable (Water Main)	24,000 Linear Feet	1	230
Service Truck		3	2,800
Miscellaneous Power Tools			12,000
Small Tools			24,000
Power Mulcher		1	120
Cutting Torch		1	240
Paint Sprayer		1	160
Concrete Batch Plant		1	2,400
<b>Total</b>			<b>103,288</b>

### 3.2.3.2.1 War Fork and Steer Fork

#### Dam and Reservoir

As mentioned in Section 2.4.1.2 of this EIS, two estimates of the volumes of materials needed for construction of the RCC dam at the proposed War Fork and Steer Fork project site were obtained. Based on these estimates, the range of RCC fill needed for a dam at this site would be 44,800 to 94,000 cubic yards (cu. yd.) (Kenvirons, 1999a; Sexton, 1999a). The range of conventional concrete needed for a dam at this site would be approximately 3,400 to 10,300 cu. yd. Approximately 1,080 to 3,590 cu. yd. of concrete would be needed for the upstream and spillway precast panels. Based on these estimated volumes of construction materials, the approximate number of truckloads of each raw material that would be needed for the dam are: 540 to 1,130 truckloads of cement; 1,250 to 2,600 truckloads of sand; and 2,240 to 4,700 truckloads of gravel. A concrete batch plant would be placed on-site to provide concrete for the construction. Construction activities at the proposed War Fork and Steer Fork project site are estimated to last approximately 17 months. At least part of an access road would need to be constructed. Approximately 96,380 hours of equipment use are estimated to be needed for the War Fork and Steer Fork project site, which is approximately 1.4 percent less than that projected in **Table 3.2.3-1**. The emissions associated with this level of activity are shown in **Table 3.2.3-2**.

<b>Table 3.2.3-2. War Fork and Steer Fork Construction Emissions</b>					
	<b>Pollutant</b>				
	VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Total Emissions (tons)</b>	4.29	25.83	27.24	7.55	3.25

As depicted in **Table 3.2.3-2**, none of the criteria pollutants for this screening would have emissions that would exceed 100 tons for the entire construction period, much less for a single year. As a result, a conformity determination would not be required with this plan in accordance with the CAA. Therefore, the impacts would be adverse, but less than significant.

Fugitive dust impacts would primarily be associated with the construction of the access road, the hauling and disposal of the debris in the layout areas, the burning of debris, and the operation of the concrete batch plant. Impacts associated with fugitive dust would include obscuration of safety areas such as the construction areas, roads, and highways, and a potential effect on air quality with the introduction of additional levels of particulate matter. The impacts of fugitive dust associated with the operation of the concrete batch plant would be minor. Frequent watering of the access roads and layout areas would minimize, if not alleviate, most of the problems associated with fugitive dust. Burning of debris would be in accordance with the measures outlined in 401 KAR 63:005 Open Burning. As a result, there would be minimal fugitive dust impacts resulting from the burning of debris. Also, adherence to spill prevention procedures would limit any air quality impacts associated with hazardous material or POL spillage.

The operation of the dam would require only minimal mechanization of spillways, the intake structure, and pump house. The impacts of these operations on the air quality of the area would be insignificant. Utilization of the reservoir for recreational purposes could potentially increase traffic into and out of the county, but not to the degree that would jeopardize the attainment status of the area.

### **Raw Water Transmission Main**

The area that would be affected by the construction of a raw water transmission main from the proposed reservoir at War Fork and Steer Fork lies within the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW). The proposed route for the main is planned under the ROW from the War Fork and Steer Fork reservoir site, across Turkey Foot Road, and south on KY 587 to the JCWA Treatment Plant (Kenvirons, 1999d). This equates to approximately 50,000 linear feet, or about 9.5 miles, of water transmission line that would have to be laid (Kenvirons, 1999a). The amount of activity and equipment use for this purpose has already been included and is reflected in the equipment use and emissions depicted in **Table 3.2.3-2**. Therefore, the impacts would be adverse, but less than significant.

The operation of the raw water transmission main would require only minimal mechanization. The impacts of these operations on the air quality of the area would be insignificant.

### **3.2.3.2.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

Based on an estimated RCC fill volume of 77,600 cu. yd., an estimated volume of 5,800 cu. yd. of conventional concrete, and an estimated volume of 3,570 cu. yd. of concrete for the upstream and spillway precast panels for the proposed dam at the Sturgeon Creek, 8.5 mgd site

(Kenvirons, 1999b), the approximate number of truckloads of each raw material that would be needed for the dam are: 920 truckloads of cement; 2,140 truckloads of sand; and 4,620 truckloads of gravel. The Sturgeon Creek, 8.5 mgd dam site would be accessed using KY 1071 and Mummie-Grassy Creek Road (Kenvirons, 1999c). A new road of approximately 800 linear feet, requiring less than one acre of additional land to be disturbed, may be required to access the base of the dam. This road may later be used for permanent access to the dam. It is estimated there would be 103,288 hours of equipment use for the Sturgeon Creek, 8.5 mgd site, which is reflective of that projected in **Table 3.2.3-1**. The emissions associated with this level of activity are shown in **Table 3.2.3-3**.

<b>Table 3.2.3-3. Sturgeon Creek, 8.5 mgd Construction Emissions</b>					
	<b>Pollutant</b>				
	VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Total Emissions (tons)</b>	4.37	26.29	27.89	7.74	3.32

As depicted in **Table 3.2.3-3**, none of the criteria pollutants for this screening would have emissions that would exceed 100 tons for the entire construction period, much less for a single year. As a result, a conformity determination would not be required with this plan in accordance with the CAA. Therefore, the impacts would be adverse, but less than significant. Fugitive dust impacts would be similar to those discussed in Section 3.2.3.2.1.

The operation of the dam would require only minimal mechanization of spillways, the intake structure, and pump house. The impacts of these operations on the air quality of the area would be insignificant. Utilization of the reservoir for recreational purposes could potentially increase traffic into and out of the county, but not to the degree that would jeopardize the attainment status of the area.

**Raw Water Transmission Main**

Construction of the raw water transmission main would occur in the KDOT or County ROW, as in the War Fork and Steer Fork scenario above. Following Mummie-Grassy Creek Road to KY 30 and Oak Grove Road to US 421, the water main would affect lands adjacent to the roadway (Kenvirons, 1999e). This equates to approximately 40,000 linear feet, or 7.6 miles, of water transmission line that would have to be laid (Kenvirons, 1999b). The amount of activity and equipment use for this purpose has already been included and is reflected in the equipment use and emissions depicted in **Table 3.2.3-3**. Therefore, the impacts would be adverse, but less than significant.

The operation of the raw water transmission main would require only minimal mechanization. The impacts of these operations on the air quality of the area would be insignificant.

**3.2.3.2.3 Sturgeon Creek, 3.5 mgd**

As mentioned in Section 2.4.1.2, two estimates of the volumes of materials needed for construction of the RCC dam at the proposed Sturgeon Creek, 3.5 mgd project site were

obtained. Based on these estimates, the range of RCC fill needed for a dam at this site would be 20,000 to 37,300 cu. yd. (Sexton, 1999a; Kenvirons, 1999a). The range of conventional concrete needed for a dam at this site would be approximately 2,800 to 7,200 cu. yd. Approximately 360 to 2,320 cu. yd. of concrete would be needed for the upstream and spillway pre-cast panels. Based on these estimated volumes of construction materials, the approximate number of truckloads of each raw material that would be needed for the dam are: 240 to 440 truckloads of cement; 460 to 860 truckloads of sand; and 1,000 to 1,870 truckloads of gravel. The construction at the proposed Sturgeon Creek, 3.5 mgd site is anticipated to take the same amount of equipment, but not as much equipment time as at the Sturgeon Creek, 8.5 mgd site. A concrete batch plant would be placed on-site to provide concrete for the construction. Construction activities at the Sturgeon Creek, 3.5 mgd site are estimated to last 17 months. At least part of an access road would need to be constructed. As a result of this level of activity, it is estimated there would be 64,200 hours of equipment use for the Sturgeon Creek, 3.5 mgd site. This is approximately 34.3 percent less than that projected in **Table 3.2.3-1**. The emissions associated with this level of activity are shown in **Table 3.2.3-4**.

<b>Table 3.2.3-4. Sturgeon Creek, 3.5 mgd Construction Emissions</b>					
	<b>Pollutant</b>				
	VOC	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>10</sub>
<b>Total Emissions (tons)</b>	2.88	17.29	18.40	5.10	2.18

As depicted in **Table 3.2.3-4**, none of the criteria pollutants for this screening would have emissions that would exceed 100 tons for the entire construction period, much less for a single year. As a result, a conformity determination would not be required with this plan in accordance with the CAA. Therefore, the impacts would be adverse, but less than significant. Fugitive dust impacts would be similar to those discussed in Section 3.2.3.2.1.

The operation of the dam would require only minimal mechanization of spillways, the intake structure, and pump house. The impacts of these operations on the air quality of the area would be insignificant. Utilization of the reservoir for recreational purposes could potentially increase traffic into and out of the county, but not to the degree that would jeopardize the attainment status of the area.

### **Raw Water Transmission Main**

The water transmission main would be placed within the KDOT or County ROW, following a similar route to the main detailed in Section 3.2.3.2.2. The line would run northwest from the proposed Sturgeon Creek, 3.5 mgd dam along an unnamed road. It would intersect Mummie-Grassy Creek Road, following this road to KY 30, and continuing to Oak Grove Church Road. The main would run along Oak Grove Church Road to US 421, where it would then follow Beulah Lake Road to the JCWA Treatment Plant (Kenvirons, 1999e). This equates to approximately 30,000 linear feet, or about 5.7 miles, of water transmission line that would have to be laid (Kenvirons, 1999b). The amount of activity and equipment use for this purpose has already been included and is reflected in the equipment use and emissions depicted in **Table 3.2.3-4**. Therefore, the impacts would be adverse, but less than significant.

The operation of the raw water transmission main would require only minimal mechanization. The impacts of these operations on the air quality of the area would be insignificant.

### 3.2.3.2.4 No Action

Under the No Change alternative, in which nothing is done to meet the projected water and recreation needs of Jackson County, the air quality at the proposed sites and in Jackson County as a whole would remain the same. The No Change alternative would not impact the air quality of the area.

Under the No Action alternative, certain activities would be undertaken to increase the current water supply of the County, although in insufficient quantities to meet the projected need. These activities include drilling additional water wells throughout Jackson County, constructing water lines from existing resources within the County, or instituting a water conservation program within the County. Construction activities associated with these water wells and transmission lines may result in minimal adverse impacts on air quality in the vicinity of the construction sites. However, such impacts would be rated as insignificant according to the criteria listed in Appendix C of this EIS.

### 3.2.3.2.5 Summary of Impacts

The following table lists the potential impacts on air quality resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternatives sites, including the No Action alternative.

<b>Table 3.2.3-5. Summary of Impacts on Air Quality</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>• Affect air quality from a hazardous material or POL spill during storage and handling;</li> <li>• Degrade air quality from fugitive dust and emissions during site preparation, construction of access roads and along existing access roads, and from construction equipment;</li> <li>• Degrade air quality from emissions during maintenance and operation ground vehicles;</li> <li>• Affect air quality from reservoir operations; and</li> <li>• Affect air quality from debris burning.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 8.5mgd</b>	<ul style="list-style-type: none"> <li>• Affect air quality from a hazardous material or POL spill during storage and handling;</li> <li>• Degrade air quality from fugitive dust and emissions during site preparation, construction of access roads and along existing access roads, and from construction</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> </ul>

	<ul style="list-style-type: none"> <li>equipment;</li> <li>• Degrade air quality from emissions during maintenance and operation ground vehicles;</li> <li>• Affect air quality from reservoir operations; and</li> <li>• Affect air quality from debris burning.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Affect air quality from a hazardous material or POL spill during storage and handling;</li> <li>• Degrade air quality from fugitive dust and emissions during site preparation, construction of access roads and along existing access roads, and from construction equip;</li> <li>• Degrade air quality from emissions during maintenance and operation ground vehicles;</li> <li>• Affect air quality from reservoir operations; and</li> <li>• Affect air quality from debris burning.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Affect air quality from activities associated with the No Action alternative.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> </ul>

Although all impacts on air quality at all alternative proposed project sites would be insignificant, there are incremental differences between the impacts at each site. The Sturgeon Creek, 8.5 mgd project site would have the greatest impacts, followed by the War Fork and Steer Fork site, then the Sturgeon Creek, 3.5 mgd site. These variations are discussed in detail in Sections 3.2.3.2.1 through 3.2.3.2.3. These variations, however, would not change the ratings of impacts given in the above table.

### 3.2.3.3 Mitigation

Since no significant impacts are anticipated for this resource area, there are no mitigation measures planned.

## 3.2.4 BIOLOGICAL RESOURCES

### 3.2.4.1 Affected Environment

#### Dam and Reservoir

Description of the affected environment is broken down by one of the major divisions among living things, that between flora and fauna. Flora encompasses all plant life associated with a given habitat. Fauna encompasses the animal life associated with a given habitat.

#### Flora

The War Fork and Steer Fork project site is almost entirely forested, while both Sturgeon Creek sites are a mixture of fragmented woodlands, pastureland, and crop fields. The woodlands on all three project sites are predominantly second-growth, consisting of relatively young trees that have grown back on sites that had previously been cleared of their original forests by human activity, such as logging, agriculture, or surface mining. There are no virgin timber stands at any of the proposed project sites.

All three proposed reservoir sites are located within mixed deciduous forest (Braun, 1950; Sutton and Sutton, 1997), also known as the mixed mesophytic forest region of the Eastern Deciduous Forest (USFS, 1985). The mixed mesophytic forest has ample rainfall and four distinct seasons of approximately equal length. Both the overstory, or canopy, and the understory of the mixed mesophytic forest are characterized by high species diversity. The overstory is dominated by broadleaf trees, or hardwoods. Species composition varies with soil characteristics, moisture levels, and aspect, or the direction that the slope faces.

**Understory:** The vegetation layer within a forest that consists of non-woody plants, shrubs, and tree saplings.

The Daniel Boone National Forest (DBNF) has identified five plant association groups, work working groups, in the forested portion of the DBNF, of which the cove hardwood and upland hardwood working groups would be directly affected by the proposed action (Bennett, 2000). The most common canopy layer tree species found in the coves and bottomlands that would be inundated by a reservoir at any of the proposed sites include white oak, northern red oak, basswood, beech, black walnut, yellow poplar, sugar maple, red maple, river birch, cherry birch, sycamore, and hemlock. The cove hardwood association covers approximately 24 percent of the DBNF (USFS, 1998), or about 165,000 acres.

Understory vegetation in the cove hardwood association includes rhododendron, mountain laurel, ferns, blueberry, and huckleberry. Other woody components of the understory vegetation consist of flowering dogwood, sourwood, and black gum in association with seedlings and saplings of the more shade-tolerant overstory species (USFS, 1985).

A Threatened and Endangered species screening study conducted in late 1998 for the Jackson County Lake Project identified thirteen species of rare, Threatened, or Endangered plants in Jackson County (Libby et al., 1999a). Most of these species are listed by the State of Kentucky,

a status that grants no legal protection. This study, *Endangered Species Screening Study and Field Survey for the Cumberland Bean Pearly Mussel (Villosa trabalis) For a Proposed Reservoir in Jackson County, Kentucky*, is included in this EIS as Appendix I. Based on records with the Kentucky State Nature Preserves Commission (KSNPC), which maintains a large biological database on all reports of State and Federally-listed plants and animals in Kentucky and known habitat preferences, seven rare plant species are considered to potentially be present at all three proposed reservoir sites, three to potentially occur only at the War Fork and Steer Fork site, and one to potentially occur at both Sturgeon Creek sites. The two other species of rare plants identified by the study are unlikely to occur at any of the proposed project sites.

Only one of these species, running buffalo clover (*Trifolium stoloniferum*), is listed as Endangered both by the State and Federal governments. Running buffalo clover is a perennial and member of the pea family. It is one of four species of clover native to the eastern United States. It has been reported from 12 Kentucky counties, including along Little Clover Creek near the village of Eglon in Jackson County. Its preferred habitat includes low moist forests, grazed bottomlands, old trails and roads, lawns, and cemeteries with well-drained soils. It flourishes best in areas with moderate, periodic disturbances, such as light grazing, animal trails, or even occasional mowing. It could potentially occur at any of the proposed reservoir sites, although its presence is considered unlikely by some biologists (Bennett, 1999).

Fauna

The DBNF supports numerous species of wildlife. **Table 3.2.4-1** lists some of the vertebrates and invertebrates found in the DBNF, and the numbers of species of each kind.

<b>Table 3.2.4-1. Types of Wildlife Within the DBNF</b>	
<b>Group</b>	<b>Total Number of Species and Subspecies</b>
Mammals	62
Birds (breeding)	194
Reptiles	38
Amphibians	39
Fish	157
Bivalves (clams and mussels)	66

Source: USFS, 1998.

The specific portion of the DBNF in the area of the proposed project sites, the Berea Ranger District, lists 23 species of salamanders, 14 species of frogs and toads, 7 turtle species, 4 lizard species, 17 snake species, 94 species of breeding birds, and 57 mammalian species (USFS et al., 1991) as present in the area.

Common non-game mammals in this area include the short-tailed shrew, opossum, four species of bats (big brown, red, little brown, and eastern pipistrelle), muskrat, raccoon, eastern chipmunk, gray squirrel, cottontail rabbit, southern flying squirrel, woodchuck, pine vole, house mouse, white-footed mouse, eastern woodrat, gray fox, bobcat, and striped skunk (USFS et al., 1991).

Many rock outcroppings and numerous caves furnish special habitat requirements for several species of bats, including the Federally Endangered Indiana bat (*Myotis sodalis*) and Virginia big-eared bat (*Corynorhinus townsendii virginianus*). Small game mammals in the area include squirrel, cottontail rabbit, fox, and raccoon. The white-tailed deer is the largest game mammal found in the vicinity of the proposed project sites. The American black bear, while not known to be present at any of the proposed project sites, is making a gradual comeback in the forested mountains of eastern Kentucky after many years of absence.

Among the nearly 200 species of birds recorded in the vicinity of the proposed project sites are a relatively high number of warblers and flycatchers (USFS, 1985). Waterfowl are not abundant at present in this area because of the location of the project sites in relation to major migration flyways and the lack of large water bodies in Jackson County. Several bird species are hunted as small game, including bobwhite quail, ruffed grouse, American woodcock, and mourning dove. The only bird considered large game is the wild turkey, which has been restocked in recent years by the Kentucky Department of Fish and Wildlife Resources (KDFWR).

The habitats of amphibians and reptiles are strongly correlated with the temperature and moisture regimes, as well as the physical features of the area. Several species of lungless salamanders are found in the cool, moist caves present in the vicinity of the proposed project sites.

The Threatened and Endangered species screening study conducted for this EIS identified 17 State- and Federally-listed rare animal species in Jackson County (Libby et al., 1999a). Of these, one species of mussel, little spectaclecase; one dragonfly species, pygmy snaketail; one bird species, Henslow's sparrow; four bat species; and the black bear could potentially occur at any of the proposed reservoir sites. Six Threatened or Endangered species of freshwater mussels noted in the screening study, and their critical habitat, are found only in the Cumberland River watershed. Each of the three alternative proposed sites lie within the Kentucky River watershed, and would avoid impacts to these Threatened and Endangered mussels altogether.

### **Raw Water Transmission Main**

The proposed routes of the raw water transmission main leading from each of the proposed reservoir sites to the Jackson County Water Association (JCWA) Treatment Plant would run mostly alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW). In general, such transportation corridors possess very little biological value. Flora that occurs alongside roads is typically well-adapted to highly-disturbed sites and frequently consists of introduced exotic (non-native) species. Fauna consists of small and large animals trying to cross the roadway, as well as some species that may be attracted to road salts, grazing on roadside and embankment grasses, or feeding on road kill.

### 3.2.4.1.1 War Fork and Steer Fork

#### Dam and Reservoir

##### Flora

Approximately 95 percent of the 162 acres required for a reservoir, up to maximum flood level, at the War Fork and Steer Fork site is covered with second-growth forest of the cove hardwood and upland hardwood working groups, in which deciduous or broad-leaf trees predominate (USGS, No date). The only clearing of note is on private land in the upstream-most (southern) reach of War Fork, at the very edge of the affected area. Of the 116 acres up to normal pool level of the proposed reservoir, virtually the entire area, about 99 percent, is forested. An August, 1999 field survey conducted by Eco-Tech, Incorporated identified approximately 100 kinds of plants on the project site, including 8 species of ferns, more than 30 species of herbaceous (non-woody) wildflowers, and 45 species of trees and shrubs. The results of this field survey are included in Appendix L of this EIS.

A cooperative biodiversity inventory in 1991 identified a corridor along War Fork, located several miles downstream of the proposed project site, as one of ten “significant areas” within the Berea Ranger District (USFS et al., 1991). Areas were deemed “significant” based on the presence of concentrations of several rare species, a particularly good population of a rare species, or a special ecological feature. Two plant species were found downstream of the War Fork and Steer Fork project site, toward Station Camp Creek, and could possibly occur within the upstream project area. These plant species are synandra, listed as Sensitive by the USFS, and the Canadian yew, listed as Threatened by the State. Six other plants of interest, including the big-leafed aster, hairy rich-wood sedge, dwarf ginseng, running mountain phlox, white azalea, and barren strawberry, also occur in this area. None of these were observed in the August, 1999 field survey of the proposed project site.

The Threatened and Endangered species screening study conducted for this EIS, which included an extensive review of literature, records, and data from the KSNPC, specifically noted the likely presence of two State-listed species at the War Fork and Steer Fork project site (Libby et al., 1999a). These are the Endangered lettuce-leaf saxifrage, which occurs along brooks, wet rocks, and seeping stream banks, and the spinulose wood fern, listed as Special Concern by the State of Kentucky, which is known to occur at the War Fork and Steer Fork project site and, in general, occurs in mesophytic forests and low, wet acidic or calcareous woodlands. Neither of these was observed in the August, 1999 field survey.

Due to the status of running buffalo clover as a Federally-listed Endangered species, a survey will be conducted for this species in the spring of 2000 at the War Fork and Steer Fork project site.

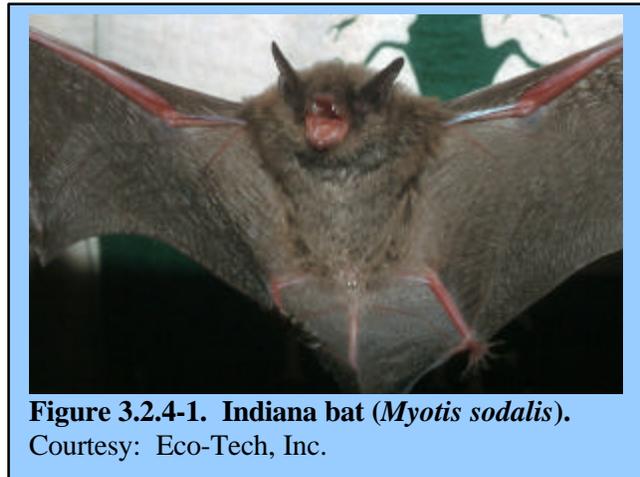
##### Fauna

The KDFWR has limited data on the occurrence of native fishes on War Fork in the vicinity of the proposed project. In 1987, seven common species were found on War Fork next to the

Turkey Foot Campground: central stone-roller, white sucker, sculpin intergrades, rainbow darter, fantail darter, southern redbelly dace, and creek chub (Stephens, 1999b). None of these are State- or Federally-listed. The KDFWR also stocks War Fork in the vicinity of the Turkey Foot Campground with rainbow trout from the Wolf Creek National Fish Hatchery four to five times a year (Bishop, 1999; Stephens, 1999a). This stocking supports a recreational fishery that KDFWR rates as “good” (Stephens, 1999b).

In 1993, the U.S. Forest Service (USFS) conducted a fish inventory of War Fork near its tributary, Hughes Fork, just downstream of the proposed project site (Walker, 1994). Six of the same species identified by the KDFWR in 1987 were found, and fish diversity was ranked as “relatively good.” The USFS also sampled macroinvertebrates (aquatic insects) that same year at a site within the proposed reservoir footprint, counting specimens from 16 genera. This was also considered diverse and provides evidence that the water quality in the War Fork watershed is very clean and not significantly impacted by land uses in the drainage area.

In 1991, seven listed animal species were found in the War Fork “significant area” downstream of the project site: the green salamander, pygmy shrew, eastern wood rat, northern long-eared bat, Indiana bat, Rafinesque’s big-eared bat, and Virginia big-eared bat (USFS et al., 1991). Of these, the Indiana bat and the Virginia big-eared bat are considered the two species of greatest concern; they are both State- and Federally-listed as Endangered. A discussion of the life histories of these two bats is provided in Appendix J of this EIS. A photograph of the Indiana bat is provided in **Figure 3.2.4-1**.



Downstream of the Turkey Foot Campground, in the karst area through which War Fork runs, are some of the best caves in this part of the DBNF for Indiana bat hibernation, including Wind Cave, War Fork Cave, and Cedar Post Cave (USFS et al., 1991). Due to the relative proximity of these caves to the proposed War Fork and Steer Fork reservoir site, the fact that both bat species forage on moths and other insects in forests, and the fact that Indiana bats utilize the sloughing bark of dead and dying trees as maternity colonies, surveys were conducted for both the Indiana and Virginia big-eared bats. These surveys consisted of mist netting, cliffline, and winter habitat surveys, conducted in accordance with guidelines from the U.S. Fish and Wildlife Service (USFWS) recovery plan for the Indiana bat (Libby et al., 1999b). These surveys are included in this EIS as Appendix J, *Preliminary Survey for the Federally Endangered Indiana Bat (*Myotis sodalis*) and Virginia Big-Eared Bat (*Corynorhinus townsendii virginianus*) at the Proposed Sturgeon Creek and War Fork Reservoir Sites in Jackson County, Kentucky*.

In the summer of 1999, four sites were mist-netted on the proposed War Fork and Steer Fork reservoir footprint, for a total of 13 net-nights. A location map for this survey is provided in

Appendix J. A total of 85 bats of 5 species were captured, including the eastern red bat, eastern pipistrelle, northern long-eared bat, big brown bat, and little brown bat. No Indiana or Virginia big-eared bats were captured at the proposed War Fork and Steer Fork project site. Nevertheless, forests and rockshelters within this site do provide potential foraging and roosting habitat for both species. In addition, both the USFS and the U.S. Fish and Wildlife Service (USFWS) are on record stating that these bats are very likely to exist within these stands (Bennett, 2000; Barclay, 2000).

Winter habitat surveys for Indiana and Virginia big-eared bat hibernacula have just been completed. The required mist-netting will be completed after May 15, 2000. In addition, a complete cliffline survey will be completed in the summer of 2000 to determine whether Virginia big-eared bat summer habitat is present at the War Fork and Steer Fork project site.

**Hibernaculum:** Any case or covering for protecting an organism during winter hibernation, such as caves, rockshelters, or mine portals.

### **Raw Water Transmission Main**

The approximately 9.5-mile route for the raw water transmission main leading from the proposed War Fork and Steer Fork reservoir to the JCWA Treatment Plant would run alongside existing roadways in the ROW for all but about one mile. This one-mile portion would run through a mixture of fields and second-growth woodland. Areas of particular biological importance to both aquatic and terrestrial organisms are creek crossings, although upland habitats are important for Indiana bats. In addition to one or two crossings of Hughes Fork, a tributary of War Fork, there are a number of minor and intermittent creeks that would be crossed en route. Preliminary engineering analysis estimates a total of 60 linear feet of creek crossings (Kenvirons, 1999a). Much of the proposed route would follow KY 587, which runs along the high divides between several watersheds, thereby avoiding most direct contact with watercourses. No forested wetlands would be encountered by the proposed water transmission main.

#### **3.2.4.1.2 Sturgeon Creek, 8.5 mgd**

##### **Dam and Reservoir**

###### *Flora*

Approximately 40 percent of the 740 acres required for a reservoir, up to maximum flood level, at the Sturgeon Creek, 8.5 mgd site is covered with fragmented second-growth forest of the cove hardwood association, in which deciduous or broad-leaf trees predominate. The remainder is cleared land in a mixture of pasture, hayfields, and cultivated crops, with the former two predominant. Of the 467 acres up to normal pool level of the proposed reservoir at this site, approximately 40 percent is wooded, much of which is concentrated in an approximately one-mile long segment of Blackwater Creek, which runs upstream from its confluence with Sturgeon Creek.

No Endangered, Threatened, or Special Concern plants or plant communities are reported to exist at the Sturgeon Creek, 8.5 mgd project site (Libby et al., 1999a).

Fauna

Due to the predominance of cleared land interspersed with fragmented woodlands in the proposed Sturgeon Creek, 8.5 mgd reservoir footprint, all resident species of terrestrial vertebrates, including mammals, birds, reptiles, and amphibians, must be well-adapted to “edge” habitats and the presence of people, human activities, and domestic animals. Common mammals include the groundhog, cottontail rabbit, whitetail deer, gray squirrel, eastern chipmunk, raccoon, striped skunk, opossum, and red fox.

As discussed in Section 3.2.2.1.2, the Kentucky Division of Water (KDOW) and the KSNPC maintain water quality and aquatic habitat monitoring stations downstream of the proposed Sturgeon Creek, 8.5 mgd project site, the closest of which is about eight miles away. The KDOW and KSNPC stations on the Sturgeon Creek mainstem indicate that it is excellent aquatic habitat, reflected in an abundant, diverse assemblage of fish, macroinvertebrates, and algae

**Diatoms:** A class of yellow-green algae, which are important in aquatic food chains.

(KDOW, 1997). Thirty-three species of fish are found at the KDOW station, including many species intolerant of pollution. There are also 153 species of diatoms present. Both Sturgeon Creek stations scored in the excellent range on the Index of Biological Integrity, a measure of aquatic habitat quality.

There are no such stations, and there have been no surveys, within the boundaries of the Sturgeon Creek, 8.5 mgd project site. The late summer low flows of Sturgeon Creek, during which the stream consists of a series of discontinuous shallow pools connected by trickles of water, suggests that only small fish tolerant of moderately low-oxygen levels and elevated water temperatures could survive these periods.

No Endangered, Threatened, or Special Concern animals are reported to exist at the Sturgeon Creek, 8.5 mgd project site (Libby et al., 1999a). However, due to the general proximity of this site to documented hibernacula, roosting sites, and foraging habitats of the State- and Federally-listed Endangered Indiana bat and Virginia big-eared bat, surveys are being conducted, consisting of mist netting, cliffline, and winter habitat surveys. These surveys are being conducted in accordance with guidelines from the USFWS recovery plan for the Indiana bat (Libby et al., 1999b). These surveys are provided in this EIS in Appendix J.

In the summer of 1999, eight sites were mist-netted on and in the vicinity of the proposed Sturgeon Creek, 8.5 mgd reservoir site, for a total of sixteen net-nights. A location map of the surveyed areas is provided in Appendix J of this EIS. Five of the sites were located within the proposed reservoir footprint. A total of 128 bats of 5 species were captured, including the eastern red bat, eastern pipistrelle, northern long-eared bat, big brown bat, and little brown bat. No Indiana or Virginia big-eared bats were captured at the Sturgeon Creek, 8.5 mgd project site. Nevertheless, forests and rockshelters along the stream do provide potential foraging and roosting habitat for both species.

Winter habitat surveys for hibernacula have recently been completed for the Indiana and Virginia big-eared bats. The required mist-netting will be completed after May 15, 2000. In addition, a

complete cliffline survey will be completed in the summer of 2000 to determine whether the Virginia big-eared bat summer habitat is present at the Sturgeon Creek, 3.5 mgd project site.

### **Raw Water Transmission Main**

The approximately 7.6-mile route for the raw water transmission main leading from the proposed Sturgeon Creek, 8.5 mgd reservoir to the JCWA Treatment Plant would run alongside existing roadways in the ROW for almost the entire distance. Areas of particular biological importance to both aquatic and terrestrial organisms are creek crossings, although upland habitats are important for Indiana bats. In addition to one crossing of Blackwater Creek, a tributary of Sturgeon Creek, there are a number of minor and intermittent creeks that would be crossed en route. Preliminary engineering analysis estimates a total of 300 linear feet of creek crossings (Kenvirons, 1999b). No forested wetlands would be encountered by the proposed water transmission main.

#### **3.2.4.1.3 Sturgeon Creek, 3.5 mgd**

### **Dam and Reservoir**

#### *Flora*

Approximately 30 percent of the 440 acres required for a reservoir, up to maximum flood level, at the Sturgeon Creek, 3.5 mgd site is covered with second-growth forest of the cove hardwood association, in which deciduous or broad-leaf trees predominate. The remainder is cleared land in a mixture of pasture, hayfields, and cultivated crops, with the former two predominant. Of the 264 acres up to normal pool level of the reservoir at this site, approximately 30 percent is wooded.

As the boundaries of the Sturgeon Creek, 3.5 mgd project site lie within those of the Sturgeon Creek, 8.5 mgd site, the discussion of flora provided in Section 3.2.4.1.2 applies equally to the Sturgeon Creek, 3.5 mgd alternative.

No Endangered, Threatened, or Special Concern plants or plant communities are reported to exist at the Sturgeon Creek, 3.5 mgd project site (Libby et al., 1999a).

#### *Fauna*

No Endangered, Threatened, or Special Concern animals are reported to exist at the Sturgeon Creek, 3.5 mgd project site (Libby et al., 1999a). However, due to the general proximity of this site to documented hibernacula, roosting sites, and foraging habitat of the State- and Federally-listed Endangered Indiana bat and Virginia big-eared bat, surveys are being conducted, consisting of mist netting, cliffline, and winter habitat surveys. These surveys are being conducted in accordance with guidelines from the USFWS recovery plan for the Indiana bat (Libby et al., 1999b). These surveys are included in this EIS in Appendix J.

In the summer of 1999, four sites were mist-netted within and adjacent to the proposed Sturgeon Creek, 3.5 mgd reservoir site, for a total of eight net-nights. A location map of these surveyed areas is provided in Appendix J of this EIS. A total of 29 bats of 5 species were captured, including the eastern red bat, eastern pipistrelle, northern long-eared bat, big brown bat, and little brown bat. No Indiana or Virginia big-eared bats were captured at the Sturgeon Creek, 3.5 mgd project site. Nevertheless, forests and rockshelters along the stream do provide potential foraging and roosting habitat for both species.

Winter habitat surveys for hibernacula have recently been completed for Indiana and Virginia big-eared bats. The required mist-netting will be completed after May 15, 2000. In addition, a complete cliffline survey will be completed in the summer of 2000 to determine whether the Virginia big-eared bat summer habitat is present at this site.

### **Raw Water Transmission Main**

The approximately 5.7-mile route for the raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir to the JCWA Treatment Plant would run alongside existing roadways in the ROW for almost the entire distance. Areas of particular biological importance to both aquatic and terrestrial organisms are creek crossings, although upland habitats are important for Indiana bats. In addition to one crossing of Blackwater Creek, a tributary of Sturgeon Creek, there are a number of minor and intermittent creeks that would be crossed en route. Preliminary engineering analysis estimates a total of 90 linear feet of creek crossings (Kenvirons, 1999b). No forested wetlands would be encountered by the proposed water transmission main.

## **3.2.4.2 Environmental Consequences**

The potential impacts on biological resources were derived from evaluating features of the proposed action that could affect these resources, and by considering ecological characteristics of each of the proposed project sites. Impacts on biological resources common to all alternative proposed project sites are discussed in Section 3.2.4.2, while site-specific impacts are discussed in Sections 3.2.4.2.1 through 3.2.4.2.3.

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on biological resources from the site preparation, construction, operations, and connected actions associated with a dam, reservoir, and raw water transmission main are:

- Displace terrestrial wildlife/vegetation by the removal of vegetation and disturbance from heavy construction equipment;
- Eliminate potential habitats, but unlikely to adversely affect, Federally-listed Threatened and Endangered species from removal of vegetation;
- Short-term harm to wildlife and vegetation by degrading air quality from fugitive dust, burning of vegetation, and emissions generated by construction equipment;
- Short-term harm to aquatic biota from degraded water quality due to increased surface water runoff and soil erosion resulting from removal of vegetation;

- Short-term harm to wildlife, vegetation, and aquatic biota from risk of POL/chemical spills during storage and handling;
- Permanently eliminate terrestrial plant communities, wildlife habitat, and stream aquatic habitat by replacing it with lacustrine (lake) habitat;
- Gain lacustrine fish species by changing habitat from stream to lake;
- Long-term effects on downstream aquatic biota by changing water temperatures and lowering dissolved oxygen;
- Long-term effects on downstream aquatic biota and riparian vegetation from reduced water flows;
- Permanently block migration of small terrestrial and aquatic mammals, amphibians, and reptiles through the impoundment area;
- Attract waterfowl, wading birds, and shorebirds to the reservoir; and
- Encounter problems with aquatic weeds and mosquito breeding at the reservoir.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

### **Dam and Reservoir**

Most kinds of terrestrial wildlife would be temporarily displaced in and adjacent to the construction site during the approximately 1.5-year construction period. This would occur from direct habitat modification, resulting from clearing trees on wooded areas within the normal pool level of the proposed reservoir, as well as substantial earth-moving and grading in the vicinity of the proposed dam site, staging area, materials layout area, and stockpiling sites. Forest species which depend on trees, shrubs, ground cover, and soils for food, shelter, and resting would be driven out of the area or destroyed almost immediately. Temporary habitat displacement would also occur within a zone of influence around the immediate dam construction site, and to a smaller extent, and shorter duration, near the areas in which woodlands are clear-cut. Habitat displacement at these sites would occur from the effects of equipment noise, potential blasting, fugitive dust, vibration, and the disruptive movements of vehicles and workers. Overall, due to the relatively short duration and limited extent of these activities, this disturbance would not result in a significant impact to wildlife.

Permanent habitat modification at each of the three proposed project sites could have some long-term adverse impacts on both common species and several species of State or Federally-listed Sensitive, Threatened, and Endangered plants and animals either by physically removing or destroying an immobile organism (plants or animals that cannot move quickly) or by eliminating an organism's habitat for feeding, nesting, or resting (animals). Individual animals occupying habitat, which has been permanently displaced by a man-made development, cannot normally be accommodated on nearby lands because these habitats are usually already at or near carrying capacity. The carrying capacity of a habitat is the population size of a given species that can be supported indefinitely by the resources of that habitat.

The Threatened and Endangered species screening study, provided in this EIS as Appendix I, identifies six species of State-listed plants, and one Federally-listed species, which may be present at each of the proposed reservoir sites (Libby et al., 1999a). The State-listed plant

species are: grass pink, an orchid; scarlet Indian paintbrush, a figwort; wood lily; Loesel's twayblade, an orchid; lettuce-leaf saxifrage; and shining ladies'-tresses, an orchid. A seventh species, running buffalo clover, is listed as Endangered by both the State and Federal governments. However, it is not known whether this species occurs at any of the proposed project sites (Bennett, 1999). A ground survey will be conducted in the spring of 2000 to ascertain whether or not it is present.

The Threatened and Endangered species screening study also cataloged eight State-listed animal species which may occur at any or all of the alternative project sites: little spectaclecase, a mussel; pygmy snaketail, a dragonfly; Henslow's sparrow, a bird; Rafinesque's big-eared bat; Virginia big-eared bat; Indiana bat; eastern small-footed myotis, a bat; and the American black bear (Libby et al., 1999a). Of these, the Virginia big-eared and the Indiana bat are also Federally-listed as Endangered. As described in Section 3.2.4.1, surveys are currently underway for these two species in keeping with USFWS protocol. To date, neither bat species has been captured from any of the alternative sites. Field work will conclude in the summer of 2000.

It is important to emphasize that biologists with both the USFS and the USFWS are on record stating that these bats are very likely to exist within the War Fork and Steer Fork project area in particular (Bennett, 2000; Barclay, 2000). If foraging area were a limiting factor, permanent flooding of any of the proposed reservoir sites, but particularly the War Fork and Steer Fork site, could conceivably reduce the size of the foraging area and food supply needed to sustain present numbers of local bat populations, and thus proportionately reduce the population. However, it is not believed that food supply is the limiting factor for local populations (Libby, 2000b). In addition, both species of bats display some flexibility in their food habits (Libby et al., 1999b). While Indiana bats forage primarily in upland, bottomland, and riparian forests, they also utilize forest and cropland edges, fallow fields, and areas of impounded water. Virginia big-eared bats forage along canyon walls, forest edges along intermittent streams, and old fields. Thus, there may not be diminished foraging habitat or food availability due to the impoundment of a reservoir at any of the proposed sites.

If presently-undocumented hibernacula or maternity colonies for either or both species are discovered at any of the proposed project sites, then the magnitude of the impact would become more significant. To date, due to the lack of any confirmed utilization of any of the sites for foraging, roosting, or maternity colonies, it appears that none of the proposed alternatives would adversely affect either Endangered bat. Thus, the impact of the project on these species is likely to be insignificant.

However, one caveat should be attached to this rating. While geologic maps of the War Fork area indicate that outcrops of the Newman Limestone formation associated with karst topography are restricted to areas downstream of Turkey Foot, representatives of the USFS report also having observed limestone in the vicinity of the proposed War Fork and Steer Fork dam site, located several hundred yards upstream. These representatives have expressed some concern over whether a reservoir upstream may lead to seepage; dissolving of limestone; underground channel formation, utilization, or enlargement; and the eventual flooding of caves used for roosting and hibernacula by Indiana and Virginia big-eared bats. These problems may arise by impounding water to create the proposed reservoir, by creating hydrostatic pressure within the

reservoir, or by placing certain rock strata into constant contact with standing water. While most geologists and geotechnical experts consulted to date believe that such problems to be highly unlikely (Mossberger, 2000; Yost, 2000; Straw, 2000a; 2000c), and one experienced Indiana bat biologist has never observed such problems elsewhere (Libby, 2000a; 2000b), further geotechnical investigation will be carried out to address this concern.

With regard to all of the State-listed plant and animal species cited above, the amount of temporary bottomland forest habitat disturbance and permanent loss would be a very small fraction of the regional supply of this habitat type. The largest proposed reservoir site would only eliminate about one-tenth of one percent of the regional area of cove hardwood or bottomland forest. This is an insignificant amount and is, therefore, likely to represent an insignificant loss of potential habitat range to any of the above listed species, even if they do occur on the project site.

At each of the proposed project sites, there may be some short-term impact to vegetation from the deposition of fine particulate matter, dust, and ash on leaves resulting from fugitive dust, burning slash, concrete mixing, and emissions from heavy earth-moving equipment. This could interfere with the ability of leaves to photosynthesize, or convert carbon dioxide and water into food in the presence of sunlight, and thus, reduce plant growth and vitality. If it occurs, this would be of limited extent and short duration, and would therefore be an insignificant impact.

As discussed in Section 3.2.2 of this EIS, clearing, grading, excavation, and stockpiling would expose soils and could lead to soil erosion, turbidity, and sedimentation problems. Fine suspended sediments could cause turbidity, or opaque water, which is harmful to many aquatic organisms. Later, when sediments settle out in slower-moving water, they accumulate as mud on the stream bottom and banks, which would also be an adverse impact biologically, as bottom-dwelling plants and animals could be smothered.

Other short-term impacts to aquatic and terrestrial plants and animals may possibly occur from accidental spills or improper handling of chemicals and POLs during construction. As mentioned in Section 3.2.2 of this EIS, erosion, its subsequent water quality and biological impacts, and the risk of biologically-harmful spills/releases of chemicals and POLs can all be minimized through the diligent application of Kentucky's best management practices (BMPs) (KNREPC, 1994). A number of BMPs exist to reduce the risk of chemical/POL spills, to stabilize soils, and to control surface water runoff and sediments. Overall, the potential impacts on vegetation and wildlife from POL/chemical spills would be insignificant at all proposed project sites, due to their short term, limited extent, uncertain likelihood, and potential for control with BMPs.

Under the proposed action, forested bottomland habitat would be permanently eliminated at each of the project sites and replaced with lentic aquatic habitat (standing water). In addition, stream and riparian habitat would be permanently inundated. Portions of local populations of several common native fish, amphibians, reptiles, and aquatic insects and macroinvertebrates adapted to and dependent on the current hydrologic regime and habitat features of the existing stream segments would be eliminated as the project sites are flooded. While the magnitude of these

population losses would be minor, due to their permanent duration and certainty of occurrence, they are considered to be moderately significant overall.

There would be an overall gain in aquatic biodiversity at each of the proposed project sites due to the creation of lake habitat and the addition of lake-oriented, or lacustrine, fish and other organisms. It is expected that the KDFWR would help develop and manage a warm-water sport fishery on the proposed reservoir. This would probably consist of largemouth bass, bluegill, channel catfish, redeye sunfish, and perhaps white and/or black crappie (Stephens, 1999a). Aquatic insects and other macroinvertebrates and plankton would also shift to species more adapted to lake environments. It is likely that waterfowl, shorebirds, such as sandpipers, and wading birds, such as herons and egrets, would be attracted to the reservoir. Among waterfowl, this might include both resident species, such as mallard and wood ducks, that could nest in the immediate vicinity. It could also include greater numbers and more species of migratory ducks and geese for short stays during fall migration. Increased fish, waterfowl, shorebird, and wading bird habitat would be considered a beneficial effect of the proposed project.

At each of the alternative project sites, there would be short and long-term impacts on downstream water quality, flow patterns, and volumes, which have possible implications for aquatic and riparian biological resources. These biophysical effects would be most pronounced immediately downstream of the proposed dam site, before the entry of any tributary side streams. These effects may include reductions in aggregate flow, stream velocities, and sediment transport; possible reductions in dissolved oxygen (DO); and changes (increases or decreases) in summer water temperature. Aquatic organisms in any stream are affected by and dependent on the physical, chemical, and biological processes occurring upstream, processes which would be disrupted and permanently altered by constructing and operating a reservoir (Rochester et al., 1984). For example, if dam releases are from deep layers in the reservoir (hypolimnion), the clear, cool, nutrient-rich water may favor filamentous green algae, and insect larvae of species tolerant of low DO. On the other hand, releases from the upper layer (epilimnion), containing dense plankton populations and higher DO, often support more abundant downstream populations of net-spinning caddisflies and other filter feeders. Downstream aquatic communities would change in response to the changed hydrology. Given the characteristics of all three proposed project sites, these changes would not necessarily be adverse, but they would be moderately significant.

Changes to downstream water quality and quantity would be greatest while the proposed reservoir is filling, when flows would be reduced to the minimum flow, 7Q10, permitted by the State. During this phase, which could last several months to several years, fish, aquatic insects, and macroinvertebrates may become stressed due to a number of factors, including higher water temperatures, smaller pools, non-existent riffles, easier predation by mammals and birds, and reduced food in the form of detritus, eggs, and larvae.

Over the lifetime of the project, in general, existing high winter flows would be reduced by about one-third to two-thirds in the stream segment immediately below the dam. During more critical lower-flow periods in the summer and fall, average discharge would not change substantially from existing levels. During drought years, due to 7Q10 requirements, it might even be higher

than at present. With the inflow of tributaries a short distance downstream, these effects would be most evident over the first few miles, after which their insignificance would diminish.

Likewise, impacts to riparian vegetation along downstream stream banks would likely be minimal and limited in extent because some surface flows and subsurface water would be maintained. With reduced average winter flows and some reduction in flooding frequency and volume, as well as reduced sediment transport, stream banks may become somewhat more thickly-vegetated with certain perennials that are not dependent on flooding, scouring, or sediment deposition for germination. This would be a moderately significant impact.

None of the proposed reservoirs would be large enough to pose a significant barrier to migration or movement of larger animals. Movement or migration of smaller animals, such as amphibians and some reptiles, with smaller home ranges would likely be affected. Since none of these species are listed as Threatened or Endangered, any population losses would not be significant, but the permanence and certainly of these changes lead to a rating of moderately significant according to the criteria listed in Appendix C of this EIS.

Based on experience with artificial lakes elsewhere in eastern Kentucky, neither aquatic weeds nor breeding mosquitoes are likely to be a significant problem at the proposed reservoir (Bishop, 1999; Stephens, 1999a). Eutrophication, a potential water quality problem, could adversely impact the sport fish populations anticipated to be developed as recreational fishery in the reservoir. Given the wooded and rural nature of the watersheds at all of the proposed project sites, as well as proposed restrictions on surrounding development within the 300-foot buffer zone, eutrophication is not likely to be a problem. It may be necessary to implement a long-term water quality protection plan throughout the upstream watershed of whichever site is chosen as the final location of the project.

### **Raw Water Transmission Main**

Biological impacts from constructing the raw water transmission main from any of the proposed alternative reservoir sites to the JCWA Treatment Plant would be minimal, except for the possibility of turbidity and accidental chemical spills at stream crossings. This potential impact would be of very limited extent and duration, and therefore, is considered insignificant.

#### **3.2.4.2.1 War Fork and Steer Fork**

The major biological impact associated with, and specific to the War Fork and Steer Fork alternative would be the elimination of approximately 115 acres of contiguous, bottomland or cove hardwood and upland hardwood forest located within the DBNF. This represents about 0.07 percent of the total acreage of this forest type in the DBNF. Due to the generally high habitat quality and unfragmented character of the cove hardwood forest stands at the War Fork and Steer Fork project site, the extent of forested habitat loss at this site would be considered moderately significant. Approximately three miles of flowing stream and riparian habitat along War Fork and its tributary, Steer Fork, would also be replaced with another type of aquatic habitat, open water lake.

In addition to the seven species of State-listed plants and eight species of listed animals, several of which are also Federally-listed, discussed in Section 3.2.4.2, which could occur at any of the proposed reservoir sites, the War Fork and Steer Fork project site is considered particularly suitable for the possible presence of three other State-listed plants: Lucy Braun's white snakeroot, spinulose wood fern, and the Canadian yew (Libby et al., 1999a). The first two of these are listed as Special Concern, and the third Threatened, by the KSNPC. Overall, the potential impact on these State-listed biological resources would be moderately significant, in view of the magnitude, duration, extent, and likelihood of occurrence of the impact.

Since the War Fork and Steer Fork project site has many significant living aquatic resources immediately downstream, potential impacts of construction-generated erosion, turbidity, and sedimentation on biological resources at this site would be moderately significant.

One species of fish, rainbow trout, are very sensitive to DO levels. Currently, War Fork has a healthy level of DO, high enough to support a recreational trout fishery (Bishop, 1999; Stephens, 1999a, 1999b). As discussed in Section 3.2.4.2, releases of impounded water from the bottom of a reservoir tend to have low oxygen levels, which have caused problems for trout fisheries in other areas of Kentucky, such as immediately downstream of Lake Cumberland at the Wolf Creek National Fish Hatchery (Gray, 1999). Although Lake Cumberland releases water from a multi-level intake, when the lake "turns over" twice a year with the changing seasons, deep, low-oxygen water rises to the surface. At these times, DO in water released downstream drops to three to four milligrams per liter (mg/l), below the six mg/l threshold at which trout begin to get stressed. If it is decided to continue stocking rainbow trout at War Fork after the dam is completed and the reservoir filled, lake and fishery managers would have to cooperate to address this potential problem through some combination of release/outlet controls and/or methods of aeration.

If the War Fork and Steer Fork site is chosen as the final project location, the aggregate effect on biological resources within the upper reaches of the Wild and Scenic Study River segment downstream would be moderately significant.

#### **3.2.4.2.2 Sturgeon Creek, 8.5 mgd**

Approximately 185 acres of bottomland, cove hardwood, and riparian forest would be eliminated by the project at the Sturgeon Creek, 8.5 mgd site. This represents only about 0.11 percent of the total acreage of this forest type in the nearby DBNF. Moreover, these woodlands are fragmented or patchy. For these reasons, their elimination would be an insignificant biological impact. In addition, approximately six miles of flowing stream aquatic habitat along Sturgeon Creek and several of its tributaries would be replaced with open water lake aquatic habitat.

In addition to the seven species of State or Federally-listed plants and eight species of listed animals that may be present, discussed in Section 3.2.4.2, the Sturgeon Creek, 8.5 mgd site is considered particularly suitable for the possible presence of one other rare plant species, Kentucky lady's-slipper, listed as Special Concern by the KSNPC (Libby et al., 1999a). Overall, the potential impact on these sensitive biological resources would be moderately significant, in view of the magnitude, duration, extent, and likelihood of occurrence of the impact.

While the Sturgeon Creek, 8.5 mgd project site has no outstanding or unique living aquatic resources immediately downstream, the State of Kentucky has classified all of Sturgeon Creek as a reference reach in recognition of its generally high aquatic habitat value. Therefore, potential impacts of erosion, turbidity, and sedimentation on biological resources at this site would be rated as moderately significant.

#### **3.2.4.2.3 Sturgeon Creek, 3.5 mgd**

Approximately 80 acres of bottomland, cove hardwood, and riparian forest would be eliminated by the project at the Sturgeon Creek, 3.5 mgd site. This represents only about 0.05 percent of the total acreage of this forest type in the nearby DBNF. Moreover, these woodlands are fragmented or patchy. For these reasons, their elimination would be an insignificant biological impact. In addition, approximately 3.5 miles of flowing stream aquatic habitat along Sturgeon Creek and several of its tributaries would be replaced with open water lake aquatic habitat.

In addition to the seven species of State or Federally-listed plants and eight species of listed animals, discussed in Section 3.2.4.2, the Sturgeon Creek, 3.5 mgd site is considered particularly suitable for the possible presence of one other rare plant species, Kentucky lady's-slipper, listed as Special Concern by the KSNPC (Libby et al., 1999a). Overall, the potential impact on these rare biological resources would be moderately significant, in view of the magnitude, duration, extent, and likelihood of occurrence of the impact.

While the Sturgeon Creek, 3.5 mgd project site has no outstanding or unique living aquatic resources immediately downstream, the State of Kentucky has classified all of Sturgeon Creek as a reference reach in recognition of its generally high aquatic habitat value. Therefore, potential impacts of erosion, turbidity, and sedimentation on biological resources at this site would be rated as moderately significant.

#### **3.2.4.2.4 No Action**

Under the No Change alternative, in which nothing is done to meet the projected water and recreation needs of Jackson County, there would be no impacts on biological resources in the area. Biological conditions would remain the same.

Under the No Action alternative, a dam and reservoir would not be constructed at any of the alternative sites to meet the projected water and recreation needs of Jackson County. However, as Jackson County has a documented need for water, it is assumed that certain activities would occur to increase the water supply of the County, although in insufficient quantities to meet the projected need. These activities may include drilling additional water wells throughout the County, constructing water transmission lines from existing resources in the County to the JCWA Treatment Plant, or instituting a water conservation program in Jackson County. Although all short-term and long-term, direct and indirect impacts on biological resources would be avoided at both War Fork and Sturgeon Creek, drilling an extensive, dispersed network of water wells around the County, if it occurred in areas of more natural, wooded habitat, could cause some temporary disturbance and displacement of wildlife and vegetation, as well as

possibly contribute to longer-term habitat fragmentation. However, these impacts are not likely to be significant.

Tapping into existing sources of surface water within Jackson County, such as intermittent streams, would produce minimal direct impacts on biological resources at those sites. Constructing water lines along existing roads from these sources to the JCWA Treatment Plant would also have insignificant biological impacts.

Similarly, implementation of a vigorous water conservation program in Jackson County would entail virtually no direct or indirect adverse impacts on existing biological resources in the County or elsewhere.

### 3.2.4.2.5 Summary of Impacts

The following table lists the potential impacts on biological resources resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

<b>Table 3.2.4-2. Summary of Impacts on Biological Resources</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>Temporarily displace terrestrial wildlife due to removal of vegetation and disturbance from construction equipment;</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
	<ul style="list-style-type: none"> <li>Eliminate potential habitats, but unlikely to adversely affect, Federally-listed Threatened and Endangered species from permanent removal of vegetation;</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
	<ul style="list-style-type: none"> <li>Short-term harm to wildlife/vegetation by degrading air quality;</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
	<ul style="list-style-type: none"> <li>Short-term harm to downstream aquatic biota from degraded water quality;</li> </ul>	<ul style="list-style-type: none"> <li>Moderately Significant</li> </ul>
	<ul style="list-style-type: none"> <li>Short-term harm to wildlife, vegetation, and aquatic biota from risk of POL/chemical spills during storage and handling;</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
	<ul style="list-style-type: none"> <li>Short-term harm to downstream aquatic biota from flow reductions during impoundment;</li> </ul>	<ul style="list-style-type: none"> <li>Moderately Significant</li> </ul>
	<ul style="list-style-type: none"> <li>Permanently eliminate existing terrestrial plant communities and wildlife habitat;</li> </ul>	<ul style="list-style-type: none"> <li>Moderately Significant</li> </ul>
	<ul style="list-style-type: none"> <li>Permanently eliminate stream aquatic habitat by replacing it with lacustrine (lake) habitat;</li> </ul>	<ul style="list-style-type: none"> <li>Moderately Significant</li> </ul>
	<ul style="list-style-type: none"> <li>Gain lacustrine fish species by changing habitat from stream to lake in impoundment area;</li> </ul>	<ul style="list-style-type: none"> <li>Moderately Significant</li> </ul>
	<ul style="list-style-type: none"> <li>Long-term effects on downstream aquatic biota and riparian vegetation from changes in water</li> </ul>	<ul style="list-style-type: none"> <li>Moderately Significant</li> </ul>

	<p>temperature, reduced DO, and reduced water flows;</p> <ul style="list-style-type: none"> <li>• Permanently block migration of small terrestrial and aquatic mammals, amphibians, and reptiles due to reservoir;</li> <li>• Attract migratory and nesting waterfowl, shorebirds, and wading birds at the reservoir; and</li> <li>• Encounter problems with aquatic weeds and mosquito breeding at the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately Significant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>• Temporarily displace terrestrial wildlife due to removal of vegetation and disturbance from construction equipment;</li> <li>• Eliminate potential habitats, but unlikely to adversely affect, Federally-listed Threatened and Endangered species from permanent removal of vegetation;</li> <li>• Short-term harm to wildlife/vegetation by degrading air quality;</li> <li>• Short-term harm to downstream aquatic biota from degraded water quality;</li> <li>• Short-term harm to wildlife, vegetation, and aquatic biota from risk of POL/chemical spills during storage and handling;</li> <li>• Short-term harm to downstream aquatic biota from flow reductions during impoundment;</li> <li>• Permanently eliminate existing terrestrial plant communities and wildlife habitat;</li> <li>• Permanently eliminate stream aquatic habitat by replacing it with lacustrine (lake) habitat;</li> <li>• Gain lacustrine fish species by changing habitat from stream to lake in impoundment area;</li> <li>• Long-term effects on downstream aquatic biota and riparian vegetation from changes in water temperature, reduced DO, and reduced water flows;</li> <li>• Permanently block migration of small terrestrial and aquatic mammals, amphibians, and reptiles due to reservoir;</li> <li>• Attract migratory and nesting waterfowl, shorebirds, and wading birds at the reservoir; and</li> <li>• Encounter problems with aquatic weeds and mosquito breeding at the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Temporarily displace terrestrial wildlife due to removal of vegetation and disturbance from construction equipment;</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> </ul>

	<ul style="list-style-type: none"> <li>• Eliminate potential habitats, but unlikely to adversely affect, Federally-listed Threatened and Endangered species from permanent removal of vegetation;</li> <li>• Short-term harm to wildlife/vegetation by degrading air quality;</li> <li>• Short-term harm to downstream aquatic biota from degraded water quality;</li> <li>• Short-term harm to wildlife, vegetation, and aquatic biota from risk of POL/chemical spills during storage and handling;</li> <li>• Short-term harm to downstream aquatic biota from flow reductions during impoundment;</li> <li>• Permanently eliminate existing terrestrial plant communities and wildlife habitat;</li> <li>• Permanently eliminate stream aquatic habitat by replacing it with lacustrine (lake) habitat;</li> <li>• Gain lacustrine fish species by changing habitat from stream to lake in impoundment area;</li> <li>• Long-term effects on downstream aquatic biota and riparian vegetation from changes in water temperature, reduced DO, and reduced water flows;</li> <li>• Permanently block migration of small terrestrial and aquatic mammals, amphibians, and reptiles due to reservoir;</li> <li>• Attract migratory and nesting waterfowl, shorebirds, and wading birds at the reservoir; and</li> <li>• Encounter problems with aquatic weeds and mosquito breeding at the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Damage habitat along water transmission line routes during construction activities; and</li> <li>• Temporarily degrade aquatic habitat from turbidity and sedimentation during water line construction at stream crossings.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> </ul>

In comparing the relative significance of the potential biological impacts of all three reservoir alternatives, the War Fork and Steer Fork site would have the greatest impact, followed by the Sturgeon Creek, 8.5 mgd site, and then the Sturgeon Creek, 3.5 mgd site. The biological impacts are generally greater at the War Fork and Steer Fork site because of its intact, more natural, forested habitat and its inclusion in the DBNF. In addition, the two species of Federally-listed Endangered bats are more likely to occur there. Even though the summary table above shows the Sturgeon Creek, 8.5 mgd and Sturgeon Creek, 3.5 mgd sites as having identical impact ratings, the impacts at the Sturgeon Creek, 3.5 mgd site are relatively smaller, roughly in proportion to the smaller size of the proposed reservoir at that site.

### 3.2.4.3 Mitigation

Some of the mitigation measures discussed in Section 3.2.2.3 of this EIS would also serve to reduce impacts on biological resources. These include preparation and diligent implementation of a Stormwater Pollution Prevention Plan, adoption of soil protection measures, avoidance of water contamination from POL and chemical spills, prevention of sedimentation and turbidity, and mitigation of stream and wetland losses. In addition, during operation of the dam and reservoir, operators would have to comply with Kentucky's 7Q10 and pass-through provisions for maintaining minimum downstream flows.

In addition to protecting a 300-foot buffer zone around the proposed reservoir from land uses that could impair water quality and lake biota, it is recommended that preparation and implementation of a non-point source pollutant control plan be considered for the upstream watershed of the reservoir site selected. This could help prevent future problems with eutrophication in the reservoir.

Given its location immediately upstream of important water-dependent resources and uses dependent on in-stream flows, if the War Fork and Steer Fork site is chosen as the final project location, additional mitigation measures designed to minimize changes to downstream flows and water quality may be considered. These include the following:

- Installation of a multi-level water intake structure in order to mix releases of water from different depths of the reservoir, thereby avoiding extremes of DO and water temperature.
- Downstream releases of water that exceed 7Q10 or pass-through rates during low-flow months, as long as excessive drawdown in the reservoir or loss of water to withdrawal does not occur. This could be done during impoundment of the reservoir and/or during the permanent operational phase.

Additional winter and summer surveys are underway to determine whether the two Endangered bat species known to be present in the general vicinity, the Indiana bat and the Virginia big-eared bat, actually hibernate, forage, or establish maternity colonies on any of the proposed reservoir sites. Depending on the results of these surveys, informal consultation would be continued, or formal consultation initiated, with the USFWS under Section 7 of the Endangered Species Act. One mitigation measure that would avoid potential adverse impacts on Indiana bat maternity colonies is the clearing of the reservoir footprints during the winter months, when bats are hibernating in caves and not using tree trunks.

The only other State- and Federally-listed Endangered species that might be present at each of the proposed reservoir sites is the running buffalo clover. Surveys will be conducted to determine its presence in the spring of 2000. Other State-listed species known to occur in Jackson County could be identified at this time. It is also possible that other rare species not previously reported from Jackson County could be found in suitable habitat.

### 3.2.5 NOISE

The pattern (location, duration, timing and frequency) of activities gives rise to a pattern of noise. The loudest sounds that can be detected comfortably by the human ear have intensities that are 1,000,000,000,000 times larger than those of sounds that can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level. The loudness of sound as heard by the human ear is measured on the A-weighted decibel (dBA) scale. Normal speech has a sound level of approximately 60 dBA. Sound levels above about 120 dBA begin to be felt inside the human ear as discomfort and eventually pain at still higher levels (DOD, 1978). **Table 3.2.5-1** gives examples of common noise levels and their effects on the human ear.

Source	Decibel Level (dBA)	Exposure Concern
Soft Whisper	30	Normal safe levels.
Quiet Office	40	
Average Home	50	
Conversational Speech	66	
Busy Traffic	75	May affect hearing in some individuals depending on sensitivity, exposure length, etc.
Noisy Restaurant	80	
Average Factory	80 - 90	Continued exposure to noise over 90 dB may eventually cause hearing impairment.
Pneumatic Drill	100	
Automobile Horn	120	
Jet Plane or Gunshot Blast	140	Noises at or over 140 dB may cause pain.

Source: EPA, 1986

Certain land uses, facilities, and the people associated with them are more sensitive to a given level of noise than other uses. Such “sensitive receptors” include schools, churches, hospitals, retirement homes, campgrounds, wilderness areas, hiking trails, and some species of Threatened or Endangered wildlife. **Table 3.2.5-2** shows the recommended noise levels around different types of land use.

Land Use Category	Noise Levels (dBA)			
	Clearly Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	< 60	60 - 65	65 - 75	> 75
Commercial, Retail	< 65	65 - 75	75 - 80	> 85
Commercial, Wholesale	< 70	70 - 80	80 - 85	> 85
Manufacturing	< 55	55 - 70	70 - 80	> 80
Agricultural, Animal Breeding	< 60	60 - 75	75 - 80	> 80
Agricultural, Farming	< 75	> 75	N/A	N/A

Natural Recreation Areas	< 60	60 - 75	75 - 85	> 85
Hospitals	< 60	60 - 65	65 - 75	> 75
Schools	< 60	60 - 65	65 - 75	> 75
Libraries	< 60	60 - 65	65 - 75	> 75
Churches	< 60	60 - 65	65 - 75	> 75
Nursing Homes	< 60	60 - 65	65 - 75	> 75
Playgrounds	< 55	55 - 65	65 - 75	> 75

Source: HUD, 1991.

### 3.2.5.1 Affected Environment

#### Dam and Reservoir

The areas surrounding the proposed dam and reservoir sites are predominately rural in nature. The land use is predominately agricultural. Agricultural activities and automobile traffic on nearby highways contribute to the noise levels in the area. Although average local noise measurements have not been accomplished, it is estimated the noise levels would be less than 45 dB, or that typical of a rural area.

#### Raw Water Transmission Main

The proposed raw water transmission main would run underground from the pump station at the proposed reservoir to the JCWA Treatment Plant at Tyner Lake. The main would run mostly alongside existing roadways within the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW).

#### 3.2.5.1.1 War Fork and Steer Fork

#### Dam and Reservoir

Table 3.2.5-3 shows the nearest sensitive noise receptors to the proposed War Fork and Steer Fork dam site.

<b>Table 3.2.5-3. Nearest Sensitive Noise Receptors To The War Fork and Steer Fork Dam Site</b>		
<b>Receptor</b>	<b>Location</b>	<b>Distance (miles)</b>
Residence	War Fork Headwaters	1
Campground	Turkey Foot	0.5
Hospital	Berea	22
School	Tyner	8
Church	Macedonia	2.5
Retirement Home	McKee	4.8

**Raw Water Transmission Main**

The raw water transmission main leading from the pump station at the proposed War Fork and Steer Fork reservoir would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road. The main would run southwest along Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the transmission main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water (Kenvirons, 1999d). This equates to approximately 50,000 linear feet, or about 9.5 miles, of water transmission line that would have to be laid (Kenvirons, 1999a).

**3.2.5.1.2 Sturgeon Creek, 8.5 mgd**

**Dam and Reservoir**

Table 3.2.5-4 shows the nearest sensitive noise receptors to the proposed Sturgeon Creek, 8.5 mgd dam site.

<b>Table 3.2.5-4. Nearest Sensitive Noise Receptors To The Sturgeon Creek , 8.5 mgd Dam Site</b>		
<b>Receptor</b>	<b>Location</b>	<b>Distance (miles)</b>
Residence	Along Grassy Creek	0.5
Hospital	Manchester	18.5
School	Tyner	4.7
Church	Rock Springs Church, KY 30	1.8

**Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 8.5 mgd reservoir would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e). This equates to approximately 40,000 linear feet, or about 7.6 miles, of water transmission line that would have to be laid (Kenvirons, 1999b).

**3.2.5.1.3 Sturgeon Creek, 3.5 mgd**

**Dam and Reservoir**

Table 3.2.5-5 shows the nearest sensitive noise receptors to the proposed Sturgeon Creek, 3.5 mgd dam site.

**Table 3.2.5-5. Nearest Sensitive Noise Receptors To The Sturgeon Creek, 3.5 mgd Dam Site**

Receptor	Location	Distance (miles)
Residence	Along Grassy Creek	1.8
Hospital	Manchester	17.6
School	Tyner	4.4
Church	Rock Springs Church, KY 30	1.5
Retirement Home	McKee	8.6

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir would run northwest from the dam site along an unnamed road. It would intersect Mummie-Grassy Creek Road, following this road to KY 30 and eventually continuing to Oak Grove Church Road. The main would run along Oak Grove Church Road to US 421, where it would then follow Beulah Lake Road to the treatment plant (Kenvirons, 1999b). This equates to approximately 30,000 linear feet, or about 5.7 miles, of water transmission line that would have to be laid.

## **3.2.5.2 Environmental Consequences**

Noise impacts were derived by identifying features of the proposed action that would create noise at each of the alternative project sites, by predicting the maximum noise level and duration expected at each of the sites, and by anticipating the level of noise expected to reach the nearest sensitive receptors to each of the sites.

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts to noise resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main are:

- Disturb or displace wildlife from noise created during the site preparation and construction activities;
- Affect residents from noise created during the site preparation and construction activities;
- Affect residents and wildlife from noise created during possible blasting; and
- Affect residents and wildlife from noise created during operation of the reservoir.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

### **Dam and Reservoir**

As shown in **Table 3.2.5-6**, a total of 103,288 hours of equipment usage is projected for the largest of the three proposed project sites. This is the Sturgeon Creek, 8.5 mgd project site. Adjustments will be made in the analysis to show the difference between the alternatives.

**Table 3.2.5-6. Planned Construction Equipment and Hours of Use**

<b>Equipment Type</b>	<b>Rating</b>	<b>Number</b>	<b>Hours</b>
Chip Spreader	13w	1	450
Air Compressor	250 CFM	1	4,500
	375 CFM	2	1,275
Sandblaster	600 psi	2	480
Chainsaw	31 inches	6	360
Compactor	18.9 inches	1	140
Concrete Pump	196 cu. yd./hr	3	8,000
Concrete Vibrator	2.5 inches	2	12,000
	High Frequency	1	12
Crane, Hydraulic	22 tons	1	120
Lift-Crane	150 tons	1	240
Drill, Air	2.5 - 4 inches	2	1,200
Generator	2.5 KWH	2	180
Grader		3	1,200
Hydraulic Hammer	1,500 Ft#	2	250
Hydraulic Excavator, Crawler	3.125 cu. yd.	3	1,500
Land-clearer, Rotary Cutter	20 Feet Cut	2	750
Loader, Front End, Crawler	1.5 cu. yd.	2	800
Loader/Backhoe (LD/BH), Crawler	1 cu. yd.	3	360
Pile Hammer	40 tons	1	360
Pump Water	6 gpm	2	320
Soil Compactor		2	400
Roller	15 tons	2	750
Dozer, Crawler with Blade	D7	1	540
Dozer, Crawler, Angle tilt	D5	1	360
Tractor		2	1,200
Trencher, Walk Behind (Dam Site)		1	240
Trencher, Walk Behind (Water Line)		1	230
Truck, Dump	12 cu. yd.	10	2,400
Truck, Flatbed	8 x 12	12	1,600
	0.75 ton	6	8,000
	15,000 GVW	10	800
Truck, Highway	43,000 GVW	12	1,200
	35 tons	6	8,000
Truck, Off Highway			
Water Blaster	3,000 psi	1	320
Welder, Portable (Dam Site)	180 amp	1	800
Welder, Portable (Water Main)	24,000 Linear Feet	1	230
Service Truck		3	2,800
Miscellaneous Power Tools			12,000
Small Tools			24,000
Power Mulcher		1	120
Cutting Torch		1	240

Paint Sprayer		1	160
Concrete Batch Plant		1	2,400
<b>Total</b>			<b>103,288</b>

Although there would be noise associated with site preparation and construction activities for their duration, it is the maximum noise level that is of primary concern. The maximum noise level represents the worst-case scenario for the level of noise generated a project site at any given time. As this is a worst-case scenario, noise levels to be generated at any of the proposed project sites are expected to be less than the maximum level. The method used to determine the maximum level is described below.

From **Table 3.2.5-6**, the study team selected the types of equipment known to generate the highest level of noise, and which could be reasonably expected to all be operating at the same time at any of the proposed project sites. The study team then determined the anticipated number of each type of equipment that could be operating at once. **Table 3.2.5-7** lists these types of equipment, the number of each type to be used for this worst case scenario, and the resulting noise levels of each type of equipment. These noise levels were added together to generate the maximum noise level scenario for this analysis. The method for computation of total noise is presented in the text box on the next page.

<b>Table 3.2.5-7. Equipment Utilization for Noise Analysis (Maximum Noise)</b>		
<b>Equipment Type</b>	<b>Number</b>	<b>Noise (dBA)</b>
Cranes	1	91.0
Dozers	2	90.0
Front End Loaders	2	93.0
Backhoes	2	88.0
Graders	2	88.0
Air Compressors	2	89.0
Pumps	2	80.0
Highway Trucks	8	78.0
Heavy Off-Road Trucks	6	78.0
<b>Total Noise</b>		<b>100.84</b>

The U.S. Department of Transportation’s Federal Highway Administration Construction Noise methodology was used for assessing the noise for this analysis (DOT, 1981). The analysis assumed each of the above pieces of equipment would be operated at the same time at a normal operations tempo. As a result, the total amount of noise generated from all of this equipment operating at the same time would be 100.84 dBA, which, as reflected in **Table 3.2.5-6**, would be the equivalent of a pneumatic drill.

### TOTAL NOISE COMPUTATIONS

Because of the logarithmic nature of the decibel (dB) unit, sound levels cannot be added or subtracted directly. However, there are some simple rules of thumb. First, if a sound intensity is doubled, the sound level increase by 3 dB, regardless of the initial sound level. For example:

$$\begin{aligned} 60 \text{ dB} + 60 \text{ dB} &= 63 \text{ dB} \\ &\text{and} \\ 80 \text{ dB} + 80 \text{ dB} &= 83 \text{ dB} \end{aligned}$$

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60 \text{ dB} + 70 \text{ dB} = 70.4 \text{ dB}$$

It is possible that blasting may be required for the construction of the dam, especially near the foundation. Time and cost would be the primary reasons for the selection of blasting over other methods. A graduated blasting plan would be developed. The plan would include a detailed description of the methods and equipment used for each operation and the sequence of operations. The graduated blasting plan would require beginning with small charges and graduating the size of the charge. Seismic and noise monitors would be placed around the site to ensure minimal disruption from noise or vibration. The plan would be coordinated with the Kentucky Division of Explosions and Blasting.

### **Raw Water Transmission Main**

The impacts on noise associated with the construction of the raw water transmission main would be the same regardless of the route chosen. Therefore, there are no site-specific impacts associated with this activity. Construction of the water main would involve three basic steps: trench excavation, pipe-laying, and trench backfilling (Williams, 1999b). Some clearing of vegetation may be required for construction. Construction of the proposed water main would take place simultaneously with that of the proposed dam (JCEC, 1999).

The equipment associated with the construction of the raw water transmission main would primarily consist of a trencher, welder, and trucks to deposit the piping for the transmission main. The noise associated with a trencher could be compared to that of a backhoe. At a distance of 500 feet, the noise emanating from a backhoe would be approximately 61 dBA. This, in addition to the short duration of the activity, would indicate the impacts would be adverse, but less than significant.

Operation of the raw water transmission main leading from the proposed reservoir would require only minimal mechanization. The noise impacts of these operations would be insignificant.

### 3.2.5.2.1 War Fork and Steer Fork

#### Dam and Reservoir

As mentioned in Section 2.4.1.2, two estimates of the volumes of materials needed for construction of the RCC dam at the War Fork and Steer Fork project site were obtained. Based on these estimates, the range of RCC fill needed for a dam at this site would be 44,800 to 94,000 cubic yards (cu. yd.) (Kenvirons, 1999a; Sexton, 1999a). The range of conventional concrete, or bedding mix, needed for a dam at this site would be approximately 3,400 to 10,300 cu. yd. Approximately 1,080 to 3,590 cu. yd. of concrete would be needed for the upstream and spillway pre-cast panels. Based on these estimated volumes of construction materials, the approximate number of truckloads of each raw material that would be needed for the dam are: 540 to 1,130 truckloads of cement; 1,250 to 2,600 truckloads of sand; and 2,240 to 4,700 truckloads of gravel. The War Fork and Steer Fork site would be accessed using Turkey Foot Road and a new road adjacent to War Fork (Kenvirons, 1999c). The new access road would require an additional 3 to 5 acres to be disturbed for construction, and would be approximately 3,500 feet (about 0.7 miles) in length. This road may later be used for permanent access to the dam. A concrete batch plant would be placed on-site to provide concrete for the construction.

The total duration of construction activities for the War Fork and Steer Fork project site would be approximately 17 months. It is estimated there would be 96,380 hours of equipment use for the War Fork Steer Fork site, which is approximately 1.4 percent less than that projected in **Table 3.2.5-6**. However, it is estimated the maximum noise level for the construction site would still be 100.84 dBA. As a result, **Table 3.2.5-8** depicts the maximum noise level anticipated for the nearest sensitive noise receptors to the proposed War Fork and Steer Fork construction site.

<b>Table 3.2.5-8. Maximum Noise Level Anticipated For The Nearest Sensitive Noise Receptors To The War Fork Steer Fork Site</b>			
<b>Nearest Receptor</b>	<b>Location</b>	<b>Distance (miles)</b>	<b>Maximum Noise (dBA)</b>
Residence	War Fork Headwaters	1	53.61
Campground	Turkey Foot	0.5	59.63
Hospital	Berea	22	26.76
School	Tyner	8	35.55
Church	Macedonia	2.5	45.65
Retirement Home	McKee	4.8	39.98

Noise decreases over distance. For a point source of noise, the sound level decreases by 6 dB for every doubling of distance from the source (DOD, 1978). Therefore, the highest noise level experienced by any of the sensitive noise receptors would be 59.63 dBA, which would be experienced by the Turkey Foot Campground. This is still well within acceptable limits as shown in **Table 3.2.5-2**. Also, although the levels of construction noise would disturb wildlife near to the construction site, the levels of noise should not be enough to harm them.

Blasting, if utilized, would plant charges below ground. The depth of the charges, the muffling of the actual charges by fill, and intervening terrain between the construction site and the nearest sensitive receptors should ensure the noise level to be that equal to or less than the maximum predicted construction noise. As a result, the impacts associated with blasting at the War Fork and Steer Fork project site would be insignificant.

The operation of the dam would require only minimal mechanization of the spillways, intake structure, and pump station. The noise impacts of these operations would be insignificant. Utilization of the proposed reservoir for recreational purposes could potentially increase traffic into and out of the vicinity of the reservoir, but not to the degree that would raise the noise levels significantly.

### 3.2.5.2.2 Sturgeon Creek, 8.5 mgd

#### Dam and Reservoir

Based on an estimated RCC fill volume of 77,600 cu. yd., an estimated volume of 5,800 cu. yd. of conventional concrete, and an estimated volume of 3,570 cu. yd. of concrete for the upstream and spillway pre-cast panels for the proposed dam at the Sturgeon Creek, 8.5 mgd site (Kenvirons, 1999b), the approximate number of truckloads of each raw material that would be needed for the dam are: 920 truckloads of cement; 2,140 truckloads of sand; and 4,620 truckloads of gravel. The Sturgeon Creek, 8.5 mgd dam site would be accessed using KY 1071 and Mummie-Grassy Creek Road (Kenvirons, 1999c). A new road of approximately 800 linear feet, requiring less than one acre of additional land to be disturbed, may be required to access the base of the dam. This road may later be used for permanent access to the dam.

It is estimated there would be 103,288 hours of equipment use at the Sturgeon Creek, 8.5 mgd project site, which is reflective of that projected in **Table 3.2.5-6**. It is estimated the maximum noise level for the construction site would be 100.84 dBA. As a result, **Table 3.2.5-9** depicts the maximum noise level anticipated for the nearest sensitive noise receptors to the proposed Sturgeon Creek, 8.5 mgd construction site.

<b>Table 3.2.5-9. Maximum Noise Level Anticipated For The Nearest Sensitive Noise Receptors To The Sturgeon Creek, 8.5 mgd Site</b>			
<b>Receptor</b>	<b>Location</b>	<b>Distance (miles)</b>	<b>Maximum Noise (dBA)</b>
Residence	Along Grassy Creek	0.5	59.64
Hospital	Manchester	18.5	28.27
School	Tyner	4.7	40.17
Church	Rock Springs Church, KY 30	1.8	48.50

The highest noise level experienced by any of the sensitive noise receptors would be 59.64 dBA, experienced by the residences along Grassy Creek. This is still well within acceptable limits as shown in **Table 3.2.5-2**. Also, as with the War Fork and Steer Fork site, the levels of construction noise would disturb wildlife near to the construction site, although not to the extent

that would cause them harm. The effects of blasting, if it were to occur, would be the same as those discussed in Section 3.2.5.2.1.

Operation of the dam would require only minimal mechanization of the spillways, intake structure, and pump station. The noise impacts of these operations would be insignificant. Utilization of the reservoir for recreational purposes could potentially increase traffic into and out of the vicinity of the reservoir, but not to the degree that would raise the noise levels significantly.

### 3.2.5.2.3 Sturgeon Creek, 3.5 mgd

#### Dam and Reservoir

As mentioned in Section 2.4.1.2, two estimates of the volumes of materials needed for construction of the RCC dam at the Sturgeon Creek, 3.5 mgd project site were obtained. Based on these estimates, the range of RCC fill needed for a dam at this site would be 20,000 to 37,300 cu. yd. (Sexton, 1999a; Kenvirons, 1999a). The range of conventional concrete, or bedding mix, needed for a dam at this site would be approximately 2,800 to 7,200 cu. yd. Approximately 360 to 2,320 cu. yd. concrete would be needed for the upstream and spillway pre-cast panels. Based on these estimated volumes of construction materials, the approximate number of truckloads of each raw material that would be needed for the dam are: 240 to 440 truckloads of cement; 460 to 860 truckloads of sand; and 1,000 to 1,870 truckloads of gravel. The Sturgeon Creek, 3.5 mgd dam site would be accessed using either KY 30, Gregory Road, and an unnamed road adjacent to Blackwater Creek and Sturgeon Creek, or by using the planned realignment of KY 30 (Kenvirons, 1999c). A concrete batch plant would be placed on site to provide concrete for the construction.

The construction at the proposed Sturgeon Creek, 3.5 mgd site is anticipated to take the same amount of equipment, but not as much equipment time, as at the Sturgeon Creek, 8.5 mgd site. The total duration of the construction activities for Sturgeon Creek, 3.5 mgd site would be approximately 17 months. As a result of this level of activity, it is estimated there would be about 64,200 hours of equipment use at the Sturgeon Creek, 3.5 mgd project site. This is approximately 34.3 percent less than that projected in **Table 3.2.5-6**. However, it is estimated the maximum noise level for the construction site would still be 100.84 dBA. As a result, **Table 3.2.5-10** depicts the maximum noise level anticipated for the nearest sensitive noise receptors to the proposed Sturgeon Creek, 3.5 mgd construction site.

<b>Table 3.2.5-10. Maximum Noise Level Anticipated For The Nearest Sensitive Noise Receptors To The Sturgeon Creek, 3.5 mgd Project Site</b>			
<b>Receptor</b>	<b>Location</b>	<b>Distance (miles)</b>	<b>Maximum Noise (dBA)</b>
Residence	Along Grassy Creek	1.8	48.50
Hospital	Manchester	17.6	28.70
School	Tyner	4.4	40.74
Church	Rock Springs Church, KY 30	1.5	50.09
Retirement Home	McKee	8.6	34.92

The highest noise level experienced by any of the sensitive noise receptors would be 50.09 dBA, experienced by the Rock Springs Church along KY 30. This is still well within acceptable limits as shown in **Table 3.2.5-2**. In addition, as with the other two alternatives, the levels of noise generated by construction at the Sturgeon Creek, 3.5 mgd site would disturb wildlife near to the construction site, although not to the extent that would cause them harm. The effects of blasting, if it were to occur, would be the same as those discussed for the other two alternatives.

Operation of the dam would require only minimal mechanization of the spillway, intake structure, and pump station. The noise impacts of these operations would be insignificant. Utilization of the proposed reservoir for recreational purposes could potentially increase traffic into and out of the vicinity of the reservoir, but not to the degree that would raise the noise levels significantly.

### 3.2.5.2.4 No Action

Under the No Change alternative, in which nothing is done to meet the projected water and recreation needs of Jackson County, there would be no noise impacts. Noise levels in the vicinity of the proposed project sites would remain the same.

Under the No Action alternative, certain activities would be undertaken to increase the current water supply in Jackson County, although in insufficient quantities to meet the projected need. These activities may include drilling additional water wells throughout the County, constructing water transmission lines from existing resources within Jackson County, or instituting a water conservation program within the County. Construction activities associated with the No Action alternative may increase noise levels around the construction sites, but impacts associated with these increases would be minimal.

### 3.2.5.2.5 Summary of Impacts

The following table lists the impacts on noise resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each alternative project site, including the No Action alternative.

<b>Table 3.2.5-11. Summary of Impacts On Noise</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>Disturb or displace wildlife from noise created during the site preparation and construction activities;</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
	<ul style="list-style-type: none"> <li>Affect residents from noise created during the site preparation and construction activities;</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
	<ul style="list-style-type: none"> <li>Affect residents and wildlife from noise created during possible blasting; and</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
	<ul style="list-style-type: none"> <li>Affect residents and wildlife from noise created during operation of the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>

<p><b>Sturgeon Creek, 8.5mgd</b></p>	<ul style="list-style-type: none"> <li>• Disturb or displace wildlife from noise created during the site preparation and construction activities;</li> <li>• Affect residents from noise created during the site preparation and construction activities;</li> <li>• Affect residents and wildlife from noise created during possible blasting; and</li> <li>• Affect residents and wildlife from noise created during operation of the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<p><b>Sturgeon Creek, 3.5 mgd</b></p>	<ul style="list-style-type: none"> <li>• Disturb or displace wildlife from noise created during the site preparation and construction activities;</li> <li>• Affect residents from noise created during the site preparation and construction activities;</li> <li>• Affect residents and wildlife from noise created during possible blasting; and</li> <li>• Affect residents and wildlife from noise created during operation of the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<p><b>No Action</b></p>	<ul style="list-style-type: none"> <li>• Disturb or displace wildlife from noise created during construction activities associated with the No Action alternative; and</li> <li>• Affect residents from noise created during construction activities associated with the No Action alternative.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> </ul>

Although all impacts on noise at all alternative project sites would be insignificant, there are incremental differences between the impacts at each site. These differences are discussed in detail in Sections 3.2.5.2.1 through 3.2.5.2.3. These variations, however, would not change the ratings of impacts listed in the above table.

If construction activities were to occur under the No Action alternative, impacts from noise would be much less than at any of the proposed alternative project sites.

### 3.2.5.3 Mitigation

Since no impacts are anticipated for this resource area, there are no mitigation measures planned.

## 3.2.6 RECREATION

### 3.2.6.1 Affected Environment

Recreation includes all of the group and individual leisure activities within a given area. All three proposed project sites lie within the eastern portion of Jackson County, Kentucky. Section 3.2.6.1 discusses the existing recreational opportunities and aspects of the affected environment common to all alternative project sites. Sections 3.2.6.1.1 through 3.2.6.1.3 discuss site-specific aspects of the affected environment.

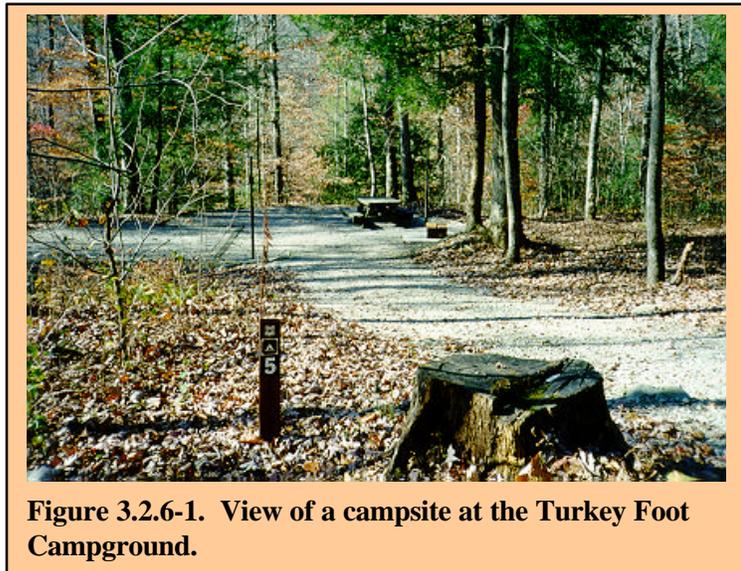
Section 1.2.2 of this EIS discusses the recreation needs in Jackson County and the surrounding region. There is an identified deficiency in recreation supply for camping sites, picnicking tables, hiking trails, and swimming areas. No deficiency exists for fishing, boating, water skiing, or canoeing in this area.

#### 3.2.6.1.1 War Fork and Steer Fork

##### Dam and Reservoir

The proposed War Fork and Steer Fork project site lies at the edge of the Daniel Boone National Forest (DBNF). The proposed dam site and most of the proposed reservoir area are on land managed by the U.S. Forest Service (USFS). Of the approximately 116 acres up to normal pool level of the proposed reservoir at this site, approximately 109 acres (93.5 percent) are managed by the USFS. Of the land within the maximum flood level and 300-foot buffer around the normal pool elevation of the reservoir, approximately 283 of the 337 acres (84.0 percent) are currently managed by the USFS.

There are several active recreational uses in the immediate area of the War Fork and Steer Fork project site. The Turkey Foot Campground lies within the DBNF, approximately 0.5 miles downstream from the proposed dam site. Two segments of the Sheltowee Trace National Recreational Trail run through the Turkey Foot Campground (Allen, 1999). War Fork is regularly stocked with trout and is actively fished (Stephens, 1999a). There is local use of the USFS land for hunting by local and regional residents (Allen, 1999).



**Figure 3.2.6-1. View of a campsite at the Turkey Foot Campground.**

The Turkey Foot Campground has fifteen campsites, five picnic tables, vault toilets, a picnic area, a swimming area, and a playing field. No water is available at the campground. The campground is open from April through November, but is only fully used on holiday weekends during the summer. Locals use the picnic area for family gatherings (Allen, 1999). **Figure 3.2.6-1** provides a picture of one of the campsites at the Turkey Foot Campground.

The Sheltoewe Trace is a historic Indian trail, which runs from northern to southern Kentucky. Two segments run through the Turkey Foot Campground. One segment runs roughly west from the campground and is open to hiking, biking, off-road vehicles (ORV), and horseback riding. This segment is used primarily by ORV and horseback riders. The other segment of the Sheltoewe Trace runs north from the campground and is limited to hiking only (Allen, 1999).

The portion of War Fork at Turkey Foot Campground is stocked with rainbow trout four times each year, in March, April, May, and June, by the Kentucky Department of Fish and Wildlife Resources (KDFWR). Seven to nine hundred trout, six to eight inches in length, are stocked each time. The War Fork Fishing Derby is held each summer for children, when four or five large (six-pound) trout, in addition to the normal stock, are released. There are no native brook trout in Kentucky, but small numbers of stocked trout survive to the next year (Stephens, 1999a). War Fork also supports fishable stocks of native species, including creek chubs, which can reach eight to nine inches in length (Bishop, 1999).

Hunted wildlife in the War Fork area includes wild turkeys, ruffed grouse, whitetail deer, squirrel, and raccoon. The War Fork area is known within Jackson County for its healthy wild turkey population, which was stocked about fifteen years ago (Edwards, 1999).

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed War Fork and Steer Fork reservoir would run approximately 9.5 miles to the JCWA Treatment Plant. All but approximately one mile would follow alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW). The transmission main would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road. The main would run southwest along Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the transmission main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water (Kenvirons, 1999d). There are no known recreational facilities or uses along this route.

#### **3.2.6.1.2 Sturgeon Creek, 8.5 mgd**

##### **Dam and Reservoir**

The proposed Sturgeon Creek, 8.5 mgd reservoir would cover an estimated 767 acres at the normal pool elevation of 990 feet. An approximated total of 1,119 acres would be required for the combined maximum flood level of the reservoir and a 300-foot buffer surrounding the normal pool at this site. All of the land at the Sturgeon Creek, 8.5 mgd site is privately-owned. There are no known developed recreational facilities within the area of the proposed reservoir.

Most of the recreation around the proposed Sturgeon Creek, 8.5 mgd project site is informal and primarily used by local residents.

Overall, wildlife that is currently hunted at this project site is similar to those listed in Section 3.2.6.1.1 for the War Fork and Steer Fork project site, but of limited access due to the private land. Wild turkeys may be present, but the area is not known for them (Edwards, 1999). Sturgeon Creek supports fishable stocks of native species, including creek chubs, which can reach eight to nine inches in length. Sturgeon Creek also supports fishable stocks of native Muskie (Bishop, 1999).

### **Raw Water Transmission Main**

The raw water transmission main leading from proposed Sturgeon Creek, 8.5 mgd reservoir would follow alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e). There are no known recreational facilities or uses along this route.

### **3.2.6.1.3 Sturgeon Creek, 3.5 mgd**

#### **Dam and Reservoir**

The proposed reservoir at the Sturgeon Creek, 3.5 mgd site would cover an estimated 264 acres at the normal pool elevation of 980 feet. The combined maximum flood level and 300-foot buffer surrounding the normal pool level of the reservoir at this site would cover approximately 643 acres. All of the land at the Sturgeon Creek, 3.5 mgd project site is privately-owned. Since the boundaries of the Sturgeon Creek, 3.5 mgd project site lie mostly within those of the Sturgeon Creek, 8.5 mgd site, the recreational opportunities around the Sturgeon Creek, 3.5 mgd site are similar to those presented in Section 3.2.6.1.2.

#### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir would follow alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run northwest alongside an unnamed road, turning southwest and intersecting Mummie-Grassy Creek Road. The main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e). There are no known recreational facilities or uses along this route.

### 3.2.6.2 Environmental Consequences

Potential impacts on recreation were determined through evaluation of the existing recreational opportunities around the proposed project sites, the types of activities under the proposed action that would affect these opportunities, the duration of these activities, and the size of the affected areas. Section 3.2.6.2 discusses the impacts on recreation common to all alternative project sites, while Sections 3.2.6.2.1 through 3.2.6.2.3 discuss site-specific impacts.

As identified in the environmental diagram, **Figure 3.1-1**, the potential impacts on recreation from the site preparation, construction, operations, and connected actions associated with the dam, reservoir, and raw water transmission line are:

- Change or limit available downstream recreational opportunities due to lowered water quality or modified outflow timing;
- Affect recreational activities at vantage points due to the physical appearance of the construction and the dam;
- Restrict recreational activities at the reservoir from periods of low lake level or outflow due to seepage, evaporative loss, or water withdrawal; and
- Increase recreational opportunities due to the creation of a reservoir.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

#### **Dam and Reservoir**

Construction of the proposed recreational facilities associated with the proposed reservoir would start after the beginning of the dam construction, but could take place at any time after that (JCEC, 1999). The boat ramp and boat dock facilities would be constructed prior to the completion of impoundment. Brush and some trees would be cleared, roads and parking areas would be graded, restrooms and other minor facilities would be constructed, and trails would be built. All facilities would be designed to follow the natural contours of the land and to minimize grading, where possible. The total land area impacted by the proposed recreational facilities would most likely be between 20 and 35 acres, but no more than 50 acres (JCEC, 1999). During some phases of construction, work would take place continually. The constant construction activity and movement of heavy equipment could limit the enjoyment of any adjacent recreational uses.

The physical appearance of construction may reduce the enjoyment of some recreation users in the vicinity. Noise generated by construction equipment and activities may also adversely affect recreation uses of the area, but not to a significant extent. The physical appearance of the proposed dam, when completed, could also limit enjoyment from downstream vantage points, which could cause a long-term adverse impact recreational uses.

Swimming, fishing, and other water-related activities would be impacted during construction, impoundment, and operation of the proposed reservoir. During the site preparation and construction, increased sedimentation would decrease water quality somewhat, limiting

downstream recreation. The water might be less appealing to swim in, or the quality may be too poor for fish populations.

During the impoundment of the proposed reservoir, downstream flows would be reduced to the 7Q10, the minimum flow required to maintain water quality and aquatic life. As a result, most water-related recreation would be severely limited. After impoundment of the proposed reservoir is complete, the timing of the water flow would change and the amount of the water within the stream channel would decrease. Assuming potable water is withdrawn evenly throughout the year, with more precipitation occurring in early winter and spring to early summer, the reservoir would fill during early winter and normal flows would occur only in spring and early summer. The normal summer, fall, and winter flows would be reduced to the minimum discharge, or 7Q10. This limited flow could adversely affect aquatic recreation in summer, fall, and winter in the portions of the stream immediately below the dam.

The temperature and composition of the water flowing through the dam could also change, depending on where the water is taken from within the reservoir. If the amount of dissolved oxygen (DO) is too low, or the water is too warm, trout fishery could be negatively impacted. These impacts could be minimized by controlling the characteristics of the outflow from the proposed dam, as discussed in detail in Section 3.2.6.3.

Recreation opportunities in Jackson County and the surrounding region would increase with the creation of the proposed reservoir. The proposed recreation facilities would supply opportunities for camping, hiking, picnicking, swimming, and boating. Fishing opportunities and waterfowl hunting could also be supplied by the reservoir.

The KDFWR would be interested in helping to establish a lake-based fishery at the proposed reservoir. The fish population could potentially include such species as largemouth bass, bluegill, channel catfish, redeye sunfish, and white or black crappie (Stephens, 1999). The proposed reservoir could attract waterfowl, primarily Wood Ducks and Canadian Geese. If permitted, these populations could be hunted using lead-free shot (Edwards, 1999).

### **Raw Water Transmission Main**

As all of the proposed routes for the raw water transmission main would follow alongside existing roadways in the KDOT or County ROW, the impacts on area recreation would be limited. In some cases, construction could slow traffic and delay arrival at a recreation location, but this would be of a very limited time period, and have no significant impact.

### **3.2.6.2.1 War Fork and Steer Fork**

#### **Dam and Reservoir**

While the exact types and locations of the proposed recreational facilities at the War Fork and Steer Fork project site have not yet been specified, they could include any or all the following: boat docks; a boat ramp; gravel parking for 20 vehicles with trailers; a picnic area with 10 tables and associated parking; restroom facilities, either septic tanks, composting, or storage-type; a

defined or improved swimming area with an imported sand beach, but no lifeguard; a camping area with 20 campsites; and hiking trails. The hiking trails would connect the different activity areas.

The Turkey Foot Campground has existing recreational uses that would be heavily impacted during the construction of the proposed War Fork and Steer Fork dam and reservoir. The swimming area at the campground might not be useable during construction and impoundment, and water quality issues would limit fishing during the same period. Since the campground is most heavily-used on weekends, especially holiday weekends, it is recommended that construction on these days be minimized or eliminated. Construction noise could also affect visitors' enjoyment of the area. These short-term, localized impacts on downstream recreation would be moderately significant.

The Turkey Foot Campground could also be impacted over the lifetime of the project. Water temperature, DO, and flow amount and timing could all affect swimming and fishing. If the dam is visible from the campground, it could detract from the quality of the visit. This could result in a long-term, moderately significant impact on downstream recreation.

Most of the land within the proposed War Fork and Steer Fork impoundment area is USFS property, which would be no longer available for this use if this site is chosen as the final project location. Additional land would be acquired to be exchanged with the USFS, which would result in no net loss of forest area.

### **3.2.6.2.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

The exact types and locations of the proposed recreational facilities at the Sturgeon Creek, 8.5 mgd project site have not yet been specified, but could include any or all the following: boat docks; a boat ramp; gravel parking for 30 vehicles with trailers; a picnic area with 15 tables and associated parking; restroom facilities, either septic tanks, composting, or storage-type; a defined or improved swimming area with an imported sand beach, but no lifeguard; a camping area with 30 campsites; and hiking trails. The hiking trails would connect the different activity areas. The recreational facilities at this site would be slightly greater in size and quantity, as the lake would be larger and could attract more visitors.

No known recreational facilities are located within the Sturgeon Creek, 8.5 mgd project site. Although current informal recreational uses in the area of the proposed reservoir, such as fishing along Sturgeon Creek, would be affected by the construction at this site, they would be replaced by other types. Therefore, impacts of the proposed project on current recreational uses in this area would be minimal.

As the physical appearance of the proposed dam would not clash with the appearance of the agricultural development of the area, it should not limit enjoyment from downstream vantage points. Therefore, the appearance of the dam would not impact recreational uses.

### 3.2.6.2.3 Sturgeon Creek, 3.5 mgd

#### Dam and Reservoir

While the exact types and locations of the proposed recreational facilities at the Sturgeon Creek, 3.5 mgd project site have not yet been specified, they could include any or all the following: boat docks; a boat ramp; gravel parking for 20 vehicles with trailers; a picnic area with 10 tables and associated parking; restroom facilities, either septic tanks, composting, or storage-type; a defined or improved swimming area with an imported sand beach, but no lifeguard; a camping area with 20 campsites; and hiking trails. The hiking trails would connect the different activity areas.

No known recreational facilities are located within the Sturgeon Creek, 3.5 mgd project site. Although current informal recreational uses in the area of the proposed reservoir, such as fishing along Sturgeon Creek, would be affected by the construction at this site, they would be replaced by other types. Therefore, impacts of the proposed project on current recreational uses in this area would be minimal.

As the physical appearance of the proposed dam would not clash with the appearance of the agricultural development of the area, it should not limit enjoyment from downstream vantage points. Therefore, the appearance of the dam would not impact recreational uses.

#### **3.2.6.2.4 No Action**

Under the No Change alternative, nothing would be done to meet the water and recreation needs of Jackson County. Although the No Change alternative would not directly cause any adverse impacts to recreation at any of the proposed project sites, or in Jackson County as a whole, this alternative would not create any new recreational opportunities. Therefore, this alternative would do nothing to change the current shortage of recreation in Jackson County, nor would it meet the projected water need.

Under the No Action alternative, a dam and reservoir would not be constructed to meet the projected water and recreation needs of Jackson County, but other activities would be undertaken to increase the current water supply. While these activities would cause very minimal, if any, adverse effects on recreation, and while no recreational opportunities would be directly affected by the absence of the reservoir, no new opportunities would be created. Area residents would continue to travel farther for their recreation. In addition, the amount of people visiting this part of Jackson County would remain the same.

#### **3.2.6.2.5 Summary of Impacts**

The following table lists the potential impacts on recreation resulting from the site preparation, construction, operation, and connected actions associated with the dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

**Table 3.2.6-2. Summary of Impacts on Recreation**

<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>• Short and long-term reduction of recreational opportunities within the project area and downstream; and</li> <li>• Increased recreational opportunities provided by the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately Significant</li> <li>• Very Significant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>• Short and long-term reduction of recreational opportunities within the project area and downstream; and</li> <li>• Increased recreational opportunities provided by the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Very Significant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Short and long-term reduction of recreational opportunities within the project area and downstream; and</li> <li>• Increased recreational opportunities provided by the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Very Significant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Short and long-term reduction of recreational opportunities due to construction activities; and</li> <li>• Continued recreation needs within Jackson County and the surrounding area.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Very Significant</li> </ul>

### 3.2.6.3 Mitigation

Because the Turkey Foot Campground on War Fork is most heavily used on weekends, especially holiday weekends, it is recommended that construction on these days be minimized or eliminated.

In order to minimize the effects of the physical appearance of construction on downstream recreational uses, it is recommended that a buffer strip of trees be left between the construction sites and the adjacent recreational facilities, especially below the War Fork and Steer Fork site. This buffer strip should be of maximum width, or at least 100 feet, if possible.

It is recommended that the outflow from the proposed dam be taken from multiple depths within the reservoir in order to control the temperature of the outflow. It is also recommended that the water flowing out of the dam be aerated to increase DO, thus increasing the viability of downstream trout fishery.

## 3.2.7 CULTURAL RESOURCES

Cultural resources are sites, buildings, structures, or objects that may have significant archaeological and historic values, or properties that may play a significant traditional role in a community's historical rooted beliefs, customs, and practices. Thus, cultural resources encompass a wide range of sites and buildings, from prehistoric Indian campsites to Army buildings constructed in the recent past, as well as traditional cultural properties still used today.

**Cultural Resources:** Sites, buildings, structures, or objects that may have significant archaeological and historic values, or properties that may play a significant traditional role in a community's historical rooted beliefs, customs, and practices.

Sections 106 and 110 of the National Historic Preservation Act (NHPA, P.L. 89-655) provides the framework for Federal review and protection of cultural resources, and to ensure that they are considered during Federal project planning and execution. The implementing regulations for the Section 106 process (36 CFR Part 800) have been developed by the Advisory Council on Historic Preservation (ACHP). The Secretary of the Interior maintains a National Register of Historic Places (NRHP) and sets forth significance criteria (36 CFR Part 60) for inclusion in the register. Cultural resources may be considered "historic properties" for the purpose of consideration by a Federal undertaking if they meet NRHP criteria. The implementing regulations define an undertaking as "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a Federal agency." Historic properties may be those that are formally placed in the NRHP by the Secretary of the Interior, those that meet the criteria and are determined eligible for inclusion, and those that are yet undiscovered but may meet eligibility criteria.

### 3.2.7.1 Affected Environment

#### Dam and Reservoir

Archaeologists conducted a survey of approximately 25 percent of the proposed War Fork and Steer Fork and the Sturgeon Creek dam and reservoir sites (Bradbury et al., 1999). The investigations were designed to: (1) identify historic properties within the portion surveyed; (2) allow for predictions of relative impacts that the proposed reservoir project would have on historic properties in these areas; and (3) determine the potential for significant historic properties to be located in the project areas. Section 3.2.7.1 describes the methodologies used at all project sites to identify areas that may contain historic properties. Sections 3.2.7.1.1 through 3.2.7.1.3 discuss the affected environment on a site-specific basis. All data on the project sites derives from *An Archaeological Survey of Portions of War Fork/Steer Fork and Sturgeon Creek in Jackson County, Kentucky* (Bradbury et al., 1999), provided in this EIS as Appendix K. As all of the proposed dam and reservoir areas have been occupied since the Paleo-Indian period, a wide variety of site types, both historic and prehistoric, could potentially be located on them.

Prior to initiating the field survey, a search was made of the NRHP, the Kentucky Heritage Council, the Office of State Archeology, and U.S. Forest Service (USFS) records (Bradbury et al., 1999). These records searches revealed that no previously-recorded sites were situated in any of the project areas.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed reservoir site would follow mostly alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW) to the JCWA Treatment Plant at Tyner Lake. Residential mailboxes are the only structures permitted to be located within a KDOT ROW (Jewell, 1999d). Widths of KDOT ROW were obtained for all major highways potentially affected by this project. The width of the ROW includes the width of the highway, shoulders, if present, and land running adjacent to the roadways on either side. Highways in Kentucky are approximately 20 feet wide, with little, if any, shoulder space (Jewell, 1999d). Sections 3.2.7.1.1 through 3.2.7.1.3 describe the proposed routes for the water transmission main, including KDOT ROW widths, on a site-specific basis.

### **3.2.7.1.1 War Fork and Steer Fork**

#### **Dam and Reservoir**

Available maps of the War Fork and Steer Fork project area were examined to identify sites that might contain historic properties. None of these maps depicted historic properties within this project area (Bradbury et al., 1999).

Of the approximately 162 surface acres up to maximum flood elevation of the proposed reservoir at War Fork and Steer Fork, 57 acres (35.2 percent) were surveyed. Maps of the surveyed portion are provided in Appendix K. Shovel testing and pedestrian survey methods were used as site-discovery techniques during the survey.

Two basic topographic zones exist in this project area: valley bottoms and side slopes. The survey targeted a representative sample of both these zones. The valley bottoms are narrow, relatively flat areas situated adjacent to War Fork and Steer Fork creeks. Side slopes are situated adjacent to the valley bottoms and are steep. Numerous geological overhangs were observed on the side slopes; however, most exhibit extensive and intensive roof fall on the floor (Bradbury et al., 1999).

The remains of an old road, a linear depression with dirt mounded on either side, are present in several portions of the project area along the east bank of War Fork creek. During the early 1900s, the Turkeyfoot Railroad operated a logging operation in this area. There are no indications that the old road was associated with the Turkeyfoot Railroad. A primitive road is depicted on the 1937 Jackson County Highway and Transportation map, which may correspond to the old road (Bradbury et al., 1999).

### **Raw Water Transmission Main**

The raw water transmission main leading from the pump station at the proposed War Fork and Steer Fork reservoir would run approximately 9.5 miles to the JCWA Treatment Plant. All but approximately one mile would follow alongside existing roadways in KDOT or County ROW. The transmission main would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road. The main would run southwest along Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the transmission main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water (Kenvirons, 1999d).

Only two major highways would be affected along the proposed water transmission main route from the proposed War Fork and Steer Fork reservoir site. These are KY 587 and KY 1071. The KDOT ROW width for KY 587 is 50 feet; that for KY 1071 is 40 feet (Jewell, 1999d).

#### **3.2.7.1.2 Sturgeon Creek, 8.5 mgd**

### **Dam and Reservoir**

Available maps of the Sturgeon Creek, 8.5 mgd project area were examined to identify sites that might contain historic properties. Two historic structures were depicted within the boundaries of this project area (Bradbury et al., 1999).

Of the approximately 740 surface acres up to maximum flood elevation of the proposed Sturgeon Creek, 8.5 mgd reservoir, 121 acres (16.4 percent) were surveyed. All surveyed acres were also within the boundaries of the proposed Sturgeon Creek, 3.5 mgd reservoir site, up to maximum flood elevation. Maps of the surveyed portion are provided in Appendix K.

Topography in the project area consists of a relatively-wide bottomland associated with Sturgeon Creek and portions of the adjacent side slope. Bottomland areas are composed of floodplain and terrace areas, and exhibit little relief. No overhangs were observed in the surveyed area. Field methods used to identify sites consisted of pedestrian survey, shovel testing, and surface collection. In addition, auger testing was used for alluvial deposits (Bradbury et al., 1999).

### **Raw Water Transmission Main**

The raw water transmission main leading from the pump station at the proposed Sturgeon Creek, 8.5 mgd reservoir would follow mostly alongside existing roadways in KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

Only two major highways would be affected along the proposed water transmission main route from the proposed Sturgeon Creek, 8.5 mgd reservoir site. These are KY 30 and US 421. The KDOT ROW width for KY 30 is 50 feet; the width for US 421 is 60 feet (Jewell, 1999d).

### 3.2.7.1.3 Sturgeon Creek, 3.5 mgd

#### Dam and Reservoir

Available maps of the Sturgeon Creek, 3.5 mgd project area were examined to identify sites that might contain historic properties. Two historic structures were depicted within the boundaries of this project area (Bradbury et al., 1999).

Of the approximately 440 surface acres up to maximum flood elevation of the proposed Sturgeon Creek, 8.5 mgd reservoir, 121 acres (27.5 percent) were surveyed. Maps of the surveyed portion are provided in Appendix K. As mentioned in Section 3.2.7.1.2, all surveyed acres along Sturgeon Creek were common to both the 3.5 mgd and 8.5 mgd proposed Sturgeon Creek reservoirs. Therefore, all information regarding the topography and field methods used is the same as that presented in Section 3.2.7.1.2.

#### Raw Water Transmission Main

The raw water transmission main leading from the pump station at the proposed Sturgeon Creek, 3.5 mgd reservoir would follow mostly alongside existing roadways in KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run northwest alongside an unnamed road, turning southwest and intersecting Mummie-Grassy Creek Road. The main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

Only two major highways would be affected along the proposed water transmission main route from the proposed Sturgeon Creek, 3.5 mgd reservoir site. These are KY 30 and US 421. The KDOT ROW width for KY 30 is 50 feet; the width for US 421 is 60 feet (Jewell, 1999d).

## 3.2.7.2 Environmental Consequences

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on cultural resources from activities associated with the creation of a dam and reservoir and construction of a raw water transmission main leading from the reservoir are:

- Adversely affect cultural resources from the site preparation, construction, operations, and connected actions.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

#### Dam and Reservoir

The potential impacts on cultural resources were derived from surveying portions of the dam and reservoir sites to determine whether any such resources exist in these areas. Inundating any area

that contains cultural resources would constitute an adverse effect on those resources. As the presence of, and thus, effects on these resources are site-specific, potential impacts of this project on cultural resources are described by site in Sections 3.2.7.2.1 through 3.2.7.2.3.

An archaeological site consists of a spatial cluster of cultural features, items, or both, and can be either prehistoric or historic. Isolated finds are locations where few artifacts were recovered, but which could not be defined as an archaeological site using the criteria defined by the Kentucky Heritage Council. A non-site locality is a site, which consists of a spatial cluster of cultural features, items, or both, but is not of sufficient age (50 years or older) to be considered an archaeological site.

The current survey was somewhat biased; it targeted prehistoric sites to a greater extent than historic sites (Bradbury et al., 1999). This was partly due to the fact that people were currently living in the houses within the two Sturgeon Creek project areas. Permission was not given to excavate in yard areas, so assessing the effect of the project on historic sites was difficult. Therefore, there remains a low probability that historic sites could be documented in the project areas. In addition, this survey was designed to investigate only a portion of each proposed project area. Once a final location for the proposed dam and reservoir is determined, the remaining areas within the final project site would need to be surveyed.

The proposed reservoir is an undertaking as defined by 36 CFR 800, Protection of Historic Properties. Inundating an area that contains historic properties would constitute an adverse effect on those properties. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

As stated previously, the archaeological survey conducted for this EIS was a preliminary survey. It was conducted to identify historic properties within the surveyed portions of the proposed project areas and to determine the potential for significant historic properties to be located within the proposed project areas. In the event that a site discovered during the survey is considered potentially eligible for inclusion in the NRHP, Phase II testing would be recommended for that site. Phase II testing is a more in-depth evaluation of identified cultural resources. It should consist of the excavation of selected one-meter-square units of areas that revealed cultural materials during the preliminary survey. The excavation would determine the possibility of intact, sub-plowzone deposits and/or features. In some cases, as with Jackson County, a backhoe may be needed to excavate several units to determine the possibility of intact cultural materials within the more deeply-buried strata and to assess the geomorphology of the site area.

Additional archaeological work beyond the Phase II level would depend on the results of the Phase II excavations. If no intact buried deposits and/or features were identified, no additional work would be recommended. If such deposits were encountered, then additional work would be recommended prior to destroying the site. This additional work would consist of the hand excavation of one-meter-square units and/or the excavation of features. Determining what this work would entail is not possible until Phase II excavations are completed.

If the procedures implementing Section 106 of the NHPA, and other relevant Federal statutes are followed correctly, then the adverse effects on cultural resources can be mitigated. If the procedures are not followed, significant environmental consequences could occur. If potential historical properties are discovered during construction of the dam and reservoir, construction would halt and the Kentucky State Historic Preservation Officer (SHPO) would be contacted. Construction would not continue until proper investigation of the artifacts have been conducted.

### **Raw Water Transmission Main**

A cultural resources survey has not been completed on the proposed routes for the raw water transmission main leading from the proposed reservoir sites. Therefore, it is currently unknown whether cultural resources, including historic properties, exist along these routes.

The proposed raw water transmission main is an undertaking as defined by 36 CFR 800, Protection of Historic Properties. Excavating and constructing on an area that contains historic properties would constitute an adverse effect on those properties. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

As stated previously, a cultural resources survey has not been completed for the proposed routes for the raw water transmission main leading from the proposed reservoir sites. However, since the land alongside existing roadways has been previously-disturbed, and much of the length of the proposed routes would be alongside existing roadways, the potential for these areas to contain significant cultural resources is very low. In addition, since the only structures allowed within the KDOT ROW are residential mailboxes (Jewell, 1999d), this further reduces the potential for adverse effects on cultural resources due to the construction of the water main.

Once a final route for the water transmission main is determined, surveys for cultural resources may need to be conducted along the route. Surveys may also need to be conducted for areas of equipment and material layout, if these areas are outside of the immediate construction zone or the KDOT or County ROW. If potential historical properties are discovered during construction of the transmission main, construction would halt and the Kentucky SHPO would be contacted. Construction would not continue until proper investigation of the artifacts have been conducted.

If the procedures implementing Section 106 of the NHPA, and other relevant Federal statutes are followed correctly, then the effects on cultural resources can be mitigated. If the procedures are not followed, significant environmental consequences could occur.

#### **3.2.7.2.1 War Fork and Steer Fork**

##### **Dam and Reservoir**

One non-site locality (identified as #1 in the survey) was discovered within the proposed War Fork and Steer Fork

**Non-site Locality:** A site that consists of a spatial cluster of cultural features, items, or both, but is not of sufficient age (50 years or older) to be considered an archaeological site.

project area (Bradbury et al., 1999). However, cultural material recovered from this location were not of sufficient age (50 years or greater) to be considered an archaeological site.

**Archaeological Site:** A prehistoric or historic site that consists of a spatial cluster of cultural features, items, or both.

As a result of the survey, no archaeological sites were documented in the proposed War Fork and Steer Fork project area (Bradbury et al., 1999). No sites eligible for, or already included in the NRHP were identified in the surveyed portion of the project area. Of the numerous geological overhangs observed on the side slopes within the War Fork and Steer Fork project area, none were found to contain cultural material. There is a potential, although the probability is considered low, that overhangs situated in portions of the project area not sampled contain archaeological sites (Bradbury et al., 1999).

The results of the survey suggest that if the proposed reservoir were constructed on the War Fork and Steer Fork project site, there would be little, if any, adverse effect on historic properties. If this site is chosen as the final location for the proposed reservoir, the remaining areas within the project site may need to be surveyed. However, under the new regulations of the ACHP (36 CFR Part 800), it may be possible to argue that no further investigations or identification efforts are necessary for this site (Bradbury et al., 1999). Such a determination would need to be negotiated between the consultation parties, particularly the USFS and the Kentucky SHPO.

### **Raw Water Transmission Main**

All but approximately one mile of the proposed route for the raw water transmission main leading from the War Fork and Steer Fork reservoir site would run alongside existing roads. As this one mile area may not be previously-disturbed, there is greater potential for significant cultural resources to be located in this area of the proposed route. The remaining length of the proposed route would run alongside existing roadways, and therefore, would have a low probability of adversely impacting cultural resources.

### **3.2.7.2.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

The cultural resource inventory of the Sturgeon Creek, 8.5 mgd project area resulted in the discovery of eight previously-unrecorded archaeological sites, six isolated finds, and one non-site locality, all of which contained prehistoric material (Bradbury et al., 1999). Details on these sites, isolated finds, and non-site localities are provided in Appendix K.



**Figure 3.2.7-1. General site photograph of the potentially significant archeological site (15Ja473) discovered on the Sturgeon Creek project sites.**

*Source: Bradbury et al., 1999.*

Of the eight archaeological sites discovered, only one site (identified as 15Ja473 in the survey) was considered potentially eligible for the NRHP (Bradbury et al., 1999). **Figure 3.2.7-1** provides a general picture of this site. The remaining sites (15Ja474 through 480) were not considered significant, or potentially eligible, due to their limited research potential. The lack of research potential is reflected by one or more of the following: (1) the scarcity and low diversity of artifacts; (2) the lack of features or midden deposits, which would provide subsistence and radiometric data; and (3) the poor archaeological and geologic context of the sites. Most of these sites are situated on terrace areas where continued plowing, erosion, and deflation of the soils has caused mixing of the various components represented. Additional archaeological work would not produce significant information beyond that which has been collected (Bradbury et al., 1999). Therefore, no further archaeological work is recommended for these seven sites.

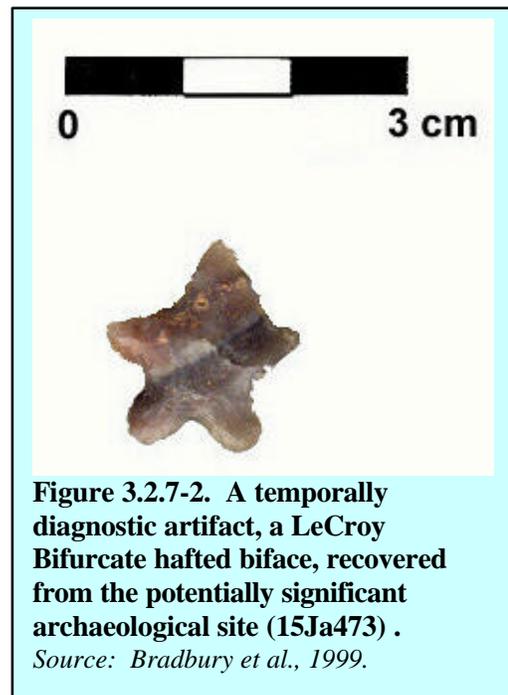
The single potentially-significant site does have the possibility of containing features, midden deposits, and/or intact cultural bearing soils, which could provide important information concerning prehistoric ways of life in this region of Kentucky (Bradbury et al., 1999). **Figure 3.2.7-2** shows a temporally diagnostic artifact, a LeCroy Bifurcate hafted biface, discovered at the site. The site cannot be considered eligible for the NRHP until the nature, extent, and integrity of the cultural remains can be assessed. Therefore, Phase II testing is recommended for site 15Ja473.

Two of the isolated finds (cataloged as #6 and #7 in the survey) were identified in areas on the floodplain of Sturgeon Creek that were thought to have a high potential for buried archaeological remains (Bradbury et al., 1999). Bucket auger testing at these isolated finds indicated the possibility of buried archaeological deposits. Such deposits are likely to be located in other floodplain areas within the project area. If such buried sites are identified in this project area, it is likely that they will be eligible for inclusion on the NRHP, due to their undisturbed nature. Because of this potential, it is recommended that a sub-surface reconnaissance survey be conducted of such areas. Sub-surface reconnaissance surveys are discussed in further detail in Section 3.2.7.3.

**Isolated Finds:** Locations where few artifacts were recovered, but which could not be defined as an archaeological site using the criteria defined by the Kentucky Heritage Council.

The non-site locality (identified as #2 in the survey) was examined in more detail, due to its potential for consideration as an archaeological site. However, artifacts recovered were not of sufficient age (50 years or greater) to list the site as a historic farmstead (Bradbury et al., 1999).

While the archival search identified only one potential historic site in the proposed Sturgeon Creek, 8.5 mgd project area, there is the potential, although low, that additional historic sites



**Figure 3.2.7-2. A temporally diagnostic artifact, a LeCroy Bifurcate hafted biface, recovered from the potentially significant archaeological site (15Ja473) .**  
*Source: Bradbury et al., 1999.*

could be located in project area (Bradbury et al., 1999). The archival search indicated that people first settled in this area around the time of the Civil War. It is possible that historic sites associated with these early settlers could be present in the project area.

The results of the survey suggest that, unlike the War Fork and Steer Fork alternative, the Sturgeon Creek, 8.5 mgd project site has the potential to contain significant historic properties (Bradbury et al., 1999). Due to the presence of sediments on the floodplain at this site, which represent low-energy depositional conditions, there is a high probability that sites located here would contain undisturbed, intact cultural deposits. Although sites identified on terrace areas in this project area would have low potential to be eligible for inclusion on the NRHP, if buried sites are discovered, it is likely that these would be eligible for inclusion.

If the Sturgeon Creek, 8.5 mgd project site is chosen as the final location for the proposed reservoir, the remaining areas within the project site would need to be surveyed. Completion of historic property identification efforts at this project site would require considerable time and money (Bradbury et al., 1999). In addition, some of the archaeological sites located in this area would need additional work to determine their significance, and some may require some level of data recovery to mitigate adverse effects.

### **Raw Water Transmission Main**

The entire length of the proposed route for the raw water transmission main leading from the Sturgeon Creek, 8.5 mgd reservoir site would be alongside existing roadways. Therefore, there is a low probability that cultural resources would be discovered along this route.

### **3.2.7.2.3 Sturgeon Creek, 3.5 mgd**

#### **Dam and Reservoir**

As mentioned in Section 3.2.7.1.2, all surveyed acres along Sturgeon Creek were common to both the 3.5 mgd and 8.5 mgd proposed Sturgeon Creek reservoirs, up to maximum flood elevation. Therefore, all information regarding the archaeological sites, isolated finds, and non-site localities discovered by the survey is the same as that presented in Section 3.2.7.2.2. The probability of finding additional archaeological sites in the Sturgeon Creek, 3.5 mgd project area is also the same; however, fewer additional sites would be expected due to the smaller project area.

As mentioned in Section 3.2.7.2.2, the results of the survey suggest that, unlike the War Fork and Steer Fork alternative, the Sturgeon Creek, 3.5 mgd project site has the potential to contain significant historic properties (Bradbury et al., 1999). Although sites identified on terrace areas in this project area would have low potential to be eligible for inclusion on the NRHP, if buried sites are discovered, it is likely that these would be eligible for inclusion.

If the Sturgeon Creek, 3.5 mgd project site is chosen as the final location for the proposed reservoir, the remaining areas within the project site would need to be surveyed. Completion of historic property identification efforts at this project site would require considerable time and

money (Bradbury et al., 1999). In addition, some of the archaeological sites located in this area would need additional work to determine their significance, and some may require some level of data recovery to mitigate adverse effects.

**Raw Water Transmission Main**

The entire length of the proposed route for the raw water transmission main leading from the Sturgeon Creek, 3.5 mgd reservoir site would be alongside existing roadways. Therefore, there is a low probability that cultural resources would be discovered along this route.

**3.2.7.2.4 No Action**

Under the No Change alternative, in which nothing is done to meet the projected water and recreation needs of Jackson County, no impacts to cultural resources are anticipated. The continuation of current conditions in Jackson County would not cause any additional effects to cultural resources.

Under the No Action alternative, a dam and reservoir would not be constructed to meet the projected water needs of Jackson County. However, as Jackson County has a documented need for water, the No Action alternative assumes that certain activities would occur to increase the current water supply, although in insufficient quantities to meet the projected need. These activities may include drilling additional water wells throughout the County, constructing water transmission lines from existing resources within Jackson County to the JCWA Treatment Plant, or instituting a water conservation program in the County. Each of these activities would require some level of surveying for cultural resources in the areas of the construction. Adverse effects on cultural resources would depend on their presence in the project areas. However, given the smaller scale of these construction activities, in addition to the location-independent aspects of some, should adverse effects be foreseeable, they would be easily mitigated.

**3.2.7.2.5 Summary of Impacts**

The following tables lists the impacts on cultural resources resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

<b>Table 3.2.7-1. Summary of Impacts on Cultural Resources</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>Adversely affect cultural resources from the site preparation, construction, operations, and connected actions associated with a dam, reservoir, and raw water transmission main.</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>Adversely affect cultural resources from the site preparation, construction, operations, and connected actions associated with a dam, reservoir, and raw</li> </ul>	<ul style="list-style-type: none"> <li>Potential to be Moderately Significant to Very Significant</li> </ul>

	water transmission main.	
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>Adversely affect cultural resources from the site preparation, construction, operations, and connected actions associated with a dam, reservoir, and raw water transmission main.</li> </ul>	<ul style="list-style-type: none"> <li>Potential to be Moderately Significant to Very Significant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>Adversely affect cultural resources from the activities associated with the No Action alternative.</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant</li> </ul>

### 3.2.7.3 Mitigation

If the procedures implementing Section 106 of the NHPA and other relevant Federal statutes are followed correctly, then adverse effects on cultural resources can be mitigated.

The single potentially significant archaeological site (15Ja473) discovered on both proposed Sturgeon Creek dam and reservoir areas cannot be considered eligible for the NRHP until the nature, extent, and integrity of the cultural remains can be assessed. Therefore, it is recommended that Phase II testing be completed at this site.

Due to the potential for buried archaeological deposits on the floodplain of Sturgeon Creek, and the potential that these deposits could be eligible for inclusion on the NRHP, it is recommended that a sub-surface reconnaissance survey be conducted to identify such deposits on this floodplain. This survey should be conducted as a two-stage process done in conjunction with a geomorphologist. The first step would be a geomorphological analysis of the various landforms to identify those areas that have the potential for buried archaeological remains. The second stage would be a buried site reconnaissance of such landforms.

It is recommended that some level of surveying for cultural resources be conducted along the proposed route of the raw water transmission main, once a final route has been determined.

## 3.2.8 LAND USE

### 3.2.8.1 Affected Environment

A planning infrastructure including both current and long-term visions of land use within Jackson County does not exist. No regulating ordinances of land uses, development, or building exist in the County. There is no move within the leadership of the County to institute such regulations, as much of the citizenry opposes government regulation regarding land uses and property rights (Sloan, 2000). No plans exist for the industrial parks, relying only upon the provision of infrastructure as the incentive not to develop industry in other parts of the County (Hayes, 2000b). Without a system of classifying land uses or tracking building uses and construction, it is difficult to develop an exact and accurate snapshot of current or future land uses within the County. Thus, much of the information in this section was derived from in-house calculations and assumptions, aerial photographs, and interviews with members of the community.

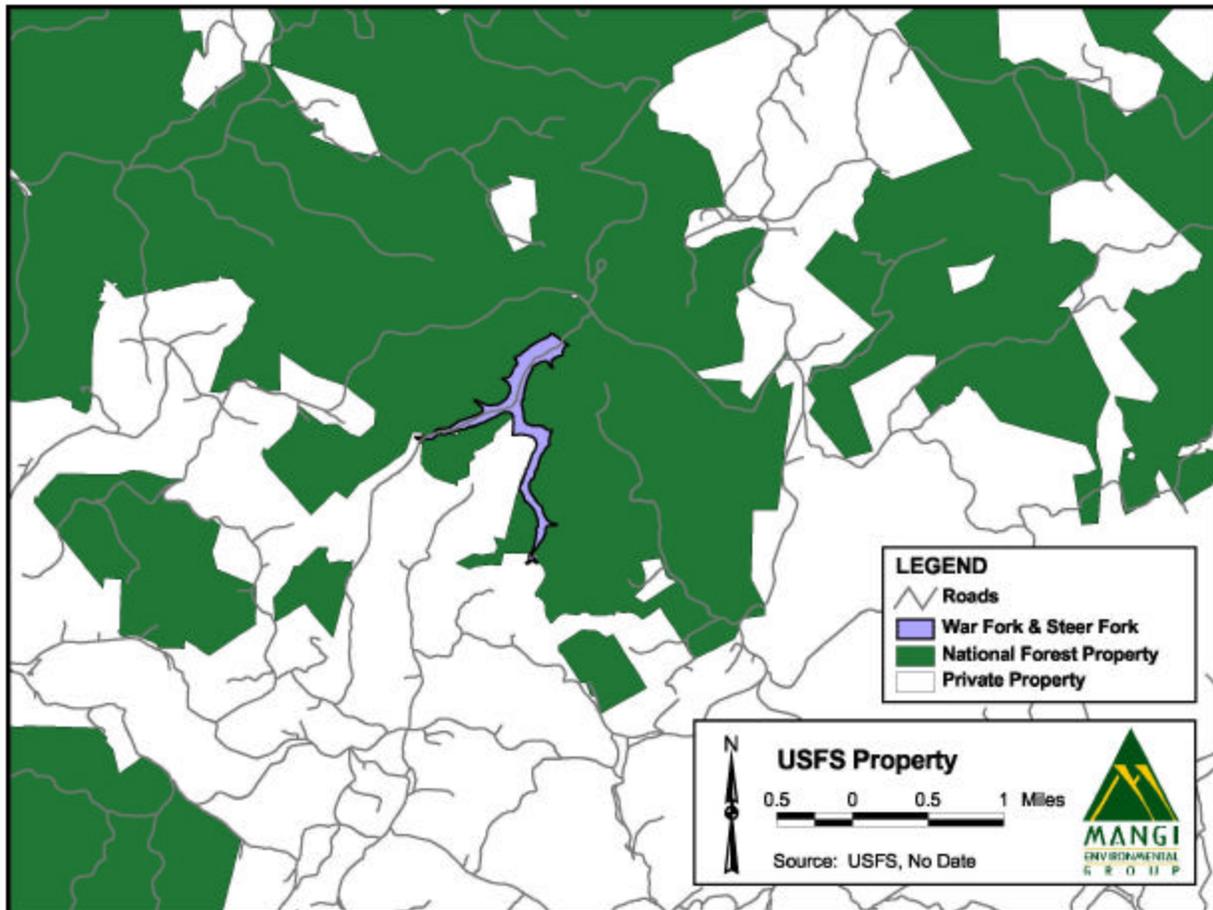
#### 3.2.8.1.1 War Fork and Steer Fork

##### Dam and Reservoir

The land surrounding the proposed War Fork and Steer Fork project site consists primarily of undeveloped, rural forest. The U.S. Forest Service (USFS) administers and manages nearly all of the land slated for inundation under the proposed action, and a moderate infrastructure exists that serves those parcels (USFS, 1993). The surface area of the proposed reservoir at this site, up to normal pool level, would be about 116 acres, approximately 109 of which are part of the Daniel Boone National Forest (DBNF) and 7 are privately-owned. A 300-foot buffer around the reservoir at normal pool would increase the surface area by about 211 acres, totaling 327 acres for the reservoir and buffer area. Approximately 174 acres within the buffer area are currently managed by the USFS; about 37 acres are privately-owned. At maximum flood elevation, the surface area of the proposed reservoir would be about 162 acres, approximately 136 of which are managed by the USFS and 26 are privately-owned. The total acreage for a reservoir at maximum flood level at this site, with a 300-foot buffer extending from normal pool level, would be approximately 337 acres of land. Of this total, the USFS manages about 283 acres. **Table 3.2.8-1** summarizes these land ownership characteristics.

<b>Table 3.2.8-1. Land Ownership Within the War Fork and Steer Fork Project Area</b>		
<b>Characteristic</b>	<b>USFS-Managed Land (acres)</b>	<b>Private Land (acres)</b>
Normal Pool Level	109	7
Maximum Flood Level	136	26
300-foot Buffer Zone	174	37
Total of Maximum Flood + Buffer Zone	283	63

Residential uses do not appear to be present in the normal pool area of the proposed reservoir at War Fork and Steer Fork. In the surrounding vicinity of the proposed reservoir site, scattered rural residential and agricultural uses appear to exist (USGS, 1995). Extending out from the reservoir site, rural residential uses continue, eventually reaching the county seat of McKee. An additional 18 to 20 acres would be required for construction staging, new road construction, and material layout area at the War Fork and Steer Fork site (Kenvirons, 1999c). Of these additional acres, the new road needed to access the project site would require three to five acres to be constructed. This acreage can be added to the total area affected by inundation to arrive at the total affected area of land for the project at this site.



**Figure 3.2.8-1. Land Use of the Daniel Boone National Forest (DBNF) at the War Fork and Steer Fork Site**

The land within the normal pool area of the proposed reservoir is predominantly National Forest, as shown in **Figure 3.2.8-1**. This land is managed by the USFS with an emphasis on wildlife habitat and timber management. The USFS does not employ a classification of ‘prime forestland’ within the boundaries of the DBNF (Strojan, 1999c). Thus, the percentage of land classified in this category is not available. The private holdings within this area are undeveloped and open. Within the proposed reservoir maximum flood and buffer areas, rural residential and forested areas exist as the predominant land uses. No homes exist within the normal pool,

maximum flood, and buffer areas. In addition, a small amount of Prime Farmland soils, about 27.5 acres, exist within the proposed impoundment area, located in the river bottom of the War Fork stream. This acreage constitutes 0.2 percent of county-wide Prime Farmland as classified by the NRCS.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed War Fork and Steer Fork reservoir would run approximately 9.5 miles to the JCWA Treatment Plant. All but approximately one mile would follow alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW). The transmission main would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road. The main would run southwest along Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the water main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water (Kenvirons, 1999d).

### **3.2.8.1.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

The surface area of the reservoir at the Sturgeon Creek, 8.5 mgd site, up to normal pool elevation, would be approximately 467 acres. The total acreage for a reservoir at maximum flood level at this site, with a 300-foot buffer extending from normal pool, would be about 1,119 acres. The area required for staging and material layout would be approximately 15 acres, as at the War Fork and Steer Fork site, and an additional 800 linear feet would be needed for access road construction.

The Sturgeon Creek, 8.5 mgd project site includes residential, institutional, agricultural, and forest land uses. Based on information from digital aerial photographs, commercial or service-oriented uses do not appear to exist with the immediate project area (USGS, 1995). However, without a permitting system for tracking home occupations, commercial enterprises could be present within the area without any such outward physical appearance. The residential plots appear to be large lots, consisting of at least five acres each. Accompanying the residences appear to be structures associated with the agricultural operations present throughout much of the area. Also present are institutional uses, including a church. All lands within the Sturgeon Creek, 8.5 mgd project area are privately-owned, requiring fee-title purchase or easements for acquisition.

Extending outwards from the proposed reservoir site, a continued pattern of scattered, large-lot development exists, reaching the community of Mummie to the west of the project site. Forest stands are interspersed throughout the area and lie on private parcels. Approximately 670 acres of farmland are present in the Sturgeon Creek, 8.5 mgd project site. This comprises about 1.6 percent of the total farmland in Jackson County.

Of the estimated 1,119 acres required for a reservoir at maximum flood level at the Sturgeon Creek, 8.5 mgd site, with a 300-foot buffer area extending from the normal pool level,

approximately 345 acres, or 31 percent, are classified by the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) as Prime Farmland. This represents about 2.6 percent of the total Prime Farmland in Jackson County. None of the forested land lies within a National Forest and none is classified as Prime Farmland.

Another type of important farmland that occurs within the Sturgeon Creek, 8.5 mgd project area is Farmland of Statewide Importance (Gibson, 2000). Soils of Statewide Importance are of a lesser quality than Prime Farmland soils; they tend to be on steeper slopes and have less depth to bedrock. The text box below provides further information on this type of farmland.

**Prime Farmland**

These soils are best suited for producing food, feed, forage, fiber, and oilseed crops, and favorable for economic production of sustained high yields of crops. The USDA categorizes farmland as “Prime” by its soil type and characteristics.

Two soils of Statewide Importance in Kentucky occur within in the Sturgeon Creek project area. These are Gilpin soils with a C slope (GnC) and Allegheny

**Farmland of Statewide Importance**

This type of farmland is considered to be of statewide importance for the production of food, feed, forage, fiber, and oilseed crops. Generally, these lands include those that are almost Prime Farmland and that economically produce high yields of crops when treated and managed properly. Criteria for defining and delineating this land vary by state and are determined by the appropriate State agencies.

Source: USDA, 1983.

variant silt loams (AvD) with 6 to 12 percent slopes (Gibson, 2000). Although AvD soil units include soils with 6 to 20 percent slopes, only those with 6 to 12 percent slopes are considered soils of Statewide Importance. However, all AvD soils are mapped as a single unit on soil maps, regardless of slope (Gibson, 2000). Therefore, estimates of AvD soil acreages given here include all AvD soils in the project area, and should be taken as maximum potential amounts of Statewide Importance AvD soils present in the project area. These soils are discussed in greater detail in Section 3.2.1 of this EIS.

Approximately 8 acres of GnC and 28 acres of AvD occur within the maximum extents of the Sturgeon Creek, 8.5 mgd project area, representing a combined

total of about 36 acres, or 3 percent, of the project area. Thus, the combined total acreage of Prime Farmland and Farmland of Statewide Importance in the proposed Sturgeon Creek, 8.5 mgd project area is 381 acres, or 34 percent of the project area.

Agricultural uses in the vicinity of the Sturgeon Creek, 8.5 mgd project site are varied, including crops, vegetables, and animal operations. Crops consist primarily of tobacco, grains, and hay, while animal operations consist of beef, dairy cattle, and horses. Limited water resources prevent extensive application of irrigation throughout the entire county (Henderson, 1999).

A reservoir at the proposed Sturgeon Creek, 8.5 mgd site would inundate numerous residential properties. Approximately 14 homes would be inundated by the reservoir at its normal pool level, and about 50 homes would be affected by the maximum flood level and buffer purchases (Schmitt, 1999f).

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 8.5 mgd reservoir would follow alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

#### **3.2.8.1.3 Sturgeon Creek, 3.5 mgd**

##### **Dam and Reservoir**

Land within the boundaries of the proposed Sturgeon Creek, 3.5 mgd project site is entirely privately-owned. The surface area of the reservoir at the Sturgeon Creek, 3.5 mgd site, up to normal pool elevation, would be approximately 264 acres. The total acreage for a reservoir at maximum flood level at this site, with a 300-foot buffer extending from normal pool, would be about 643 acres.

Land uses in the project area include residential and agricultural. Since the boundaries of the Sturgeon Creek, 3.5 mgd project site lie largely within the Sturgeon Creek, 8.5 mgd project site, many of the land use characteristics are similar to those mentioned in Section 3.2.8.1.2. The primary difference between the land uses on the two Sturgeon Creek sites is that those on the Sturgeon Creek, 3.5 mgd site are on a smaller scale, due to the smaller project area.

Approximately 8 homes would be inundated by the proposed Sturgeon Creek, 3.5 mgd reservoir at its normal pool elevation, and about 30 homes would be affected by the maximum flood elevation and buffer purchases (Schmitt, 1999f). Approximately 450 acres of farmland are present in the Sturgeon Creek, 3.5 mgd project site. This comprises 1.1 percent of the total farmland in Jackson County.

Of the estimated 643 acres required for a reservoir at maximum flood level at the Sturgeon Creek, 3.5 mgd site, with a 300-foot buffer area extending from the normal pool level, approximately 254 acres, or 39 percent, are classified by the USDA, NRCS as Prime Farmland. This represents about 2 percent of the total Prime Farmland in Jackson County. None of the forested land lies within a National Forest and none is classified as Prime Farmland.

Two soils of Statewide Importance in Kentucky occur within in the Sturgeon Creek, 3.5 mgd project area (Gibson, 2000). These are GnC soils and AvD soils with 6 to 20 percent slopes, discussed in Section 3.2.8.1.2 above. Approximately 4 acres of GnC and 13 acres of AvD occur within the maximum extents of the Sturgeon Creek, 3.5 mgd project area, representing a combined total of about 17 acres, or 3 percent, of the project area. Thus, the combined total acreage of Prime Farmland and Farmland of Statewide Importance in the proposed Sturgeon Creek, 3.5 mgd project area is 270 acres, or 42 percent of the project area.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir would follow alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The main would run northwest alongside an unnamed road, turning southwest and intersecting Mummie-Grassy Creek Road. The main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

### **3.2.8.2 Environmental Consequences**

Impacts on land use were derived from evaluating features of the proposed action that would change current land uses and/or land ownerships within the project areas and by determining the effects current and potential future land uses may have on the operations at the reservoir.

All factors relating to the modification of land use or change in land ownership should be included for a complete analysis of land use. While many of these factors are similar across alternatives, some are unique. Factors and impacts common to all alternative project sites are discussed in Section 3.2.8.2; those that are site-specific are discussed in Sections 3.2.8.2.1 through 3.2.8.2.3.

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on land use from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main are:

- Permanent direct displacement or alteration of existing land uses;
- Permanent land use changes resulting from economic or socioeconomic forces;
- Temporary effects on localized land uses;
- Adverse effects of current land uses on environmental conditions in or surrounding the reservoir; and
- Conflicts involving land ownership or easements.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

#### **Dam and Reservoir**

Easements and/or eminent domain would be used to acquire land within the buffer zone and reservoir impoundment at each of the proposed project sites once a final project location has been determined. When an easement is obtained, it is added to the title of the property, and it travels with the title through ownership transfers, forever restricting its use. Easements can be bought, donated, or negotiated on a specific piece of property. They are usually valid for an indefinite period of time; however, certain easements protecting natural environmental features have been valid for a specific

**Easement:** The right of a person, government agency, or public utility company to use or restrict public or private land owned by another for a specific purpose.

timeframe, such as 30 years. It is most common for easements to be valid *in perpetuity*, and the entity holding it determines the period of time most suiting its goals. The owner of the easement would make provisions for monitoring and enforcement of its terms (Callies et al., 1994).

In cases in which landowners agree to voluntarily work with the acquiring entity in Jackson County, restrictive easements would be acquired on these lands. (Please Note: The current landowner would still retain all rights of ownership, except the right to develop the land.) The easements would be tailored to each individual parcel; however, all of the agreements would require full conservation of resources and restrict all development. Existing developments, such as homes, barns, and sheds, would require relocation. In cases in which residential units are relocated, the land use categorization would change from residential to open space. If current landowners do not wish to sell easements on the land in the buffer area, eminent domain would be used to purchase the lands.

**Eminent Domain:** A power reserved by a government agency, usually at the State or local level, to use its legislatively-granted police power to condemn a piece of property for the public use.

Eminent domain is a power reserved by a government agency, usually at the state or local level, to use their legislatively-granted police power to condemn a piece of property for the 'public use'. 'Public use' can include anything furthering the health, safety, and welfare of the general public. In condemning the property, the entity must provide 'just compensation' for the

property, or paying the market value of the land or structure at the time of condemnation. It is required that the exercise of the eminent domain power be rationally related to a conceivable public purpose (Callies et al., 1994).

After eminent domain is used by an entity, the land would be in full ownership of that group. The purchased lands would then have restrictive conservation easements placed on their titles.

### 3.2.8.2.1 War Fork and Steer Fork

#### Dam and Reservoir

The proposed action would have moderate consequences for land use in the War Fork and Steer Fork project area. The use of the proposed impoundment area would change from a natural forest to a recreation and water supply reservoir. Previously present flora and fauna habitat would be replaced by those unique to an aquatic regime. The changes in land use due to the project are straightforward; however, the associated biotic changes are more complex. These changes are discussed in Sections 3.2.2 and 3.2.4 of this EIS.

Residential uses within the proposed 300-foot buffer zone at the War Fork and Steer Fork project site would convert to open space to preserve water quality of the reservoir. Lands from which residences would be cleared would remain undeveloped through restrictive easements and permitted use agreements. Existing residential and agricultural uses outside the buffer would likely remain, with a potential for increased residential development. The area could be an attractive development option for those seeking to build on property with views of the new reservoir. Due to the large amount of USFS holdings around War Fork, this potential area for development would be limited to a small number of possible building sites.

The environmental impacts of developing the reservoir would be minimized through the use of such a buffer. Restricting uses to open-space related ones would prevent human-induced impacts relating to building, construction, and presence of sanitary waste facilities, such as septic tanks. Terrestrial flora and fauna habitat would be encouraged in these open space areas, allowing them to remain and potentially increase due to the lack of human settlement. These ecological and human impacts of the buffer are further discussed in Sections 3.2.4 and 3.2.11, respectively, of this EIS.

Also of significance in the War Fork region would be the land exchange with the USFS, which would be required for the project to proceed at the War Fork and Steer Fork site. Approximately 283 acres of the land within the maximum flood level and buffer zone of the proposed reservoir at this site are part of the DBNF (USGS, 1995). The USFS currently manages approximately 109 acres within the 116-acre normal pool area. The USFS would need to obtain from Jackson County an area of land equal in value to the land needed for the project (Purkey, 1999). In cooperation with the DBNF, the Jackson County EZ Community would acquire fee-simple title to one or more parcels of suitable private land at least equal in value to the land the USFS is relinquishing to the project. The Jackson County EZ Community could acquire land by using outright purchases or accepting donations. The land Jackson County exchanges with USFS could lie in any County or jurisdiction as long as the USFS agrees it fits their Land Adjustment Criteria, as stipulated in the *Daniel Boone National Forest Land and Resource Management Plan* (Strojan, 2000b). These five criteria for land adjustments are listed in the text box below.

#### USFS Criteria for Land Adjustments

1. Most of the land exchange base is scattered, isolated, and inefficient to manage, but it is needed for exchange to provide or protect public resources in areas where ownership can be consolidated through the land exchange process.
2. Opportunity is offered to reduce or eliminate management costs in boundary line location, right-of-way acquisition and access development, trespass, title claims, special use administration, and resource management.
3. Land has become non-National Forest in character or is unsuitable for continued National Forest administration due to past or existing land uses, encumbrances, and surrounding or adjacent land use and deed constraints.
4. Land is suitable and needed for community expansion and development. Private development of the land would not unreasonably conflict with Forest land management objectives and administration of National Forest resources.
5. Opportunity is offered to achieve needed resource and land management objectives through land exchange.

Source: DBNF, 1999.

Still undecided is whether Jackson County would have to acquire land to exchange for all 283 acres, which includes the buffer zone and maximum flood-affected areas, or just the 116 acres within the normal pool. The USFS may choose to exchange only the acreage within the normal pool area, while retaining title to areas within the buffer zone. By maintaining title in the buffer areas, the USFS could manage them with the goal of protecting aesthetics and water quality (Strojan, 2000a).

The USFS acquires private parcels within the proclamation boundary of the National Forest and contiguous to existing USFS lands in a land exchange (Strojan, 1999b). The agency also prefers lands containing sensitive species and equivalent habitat types and values for management and protection. Identification of specific parcels is not necessary this early in the process. Parcel identification would commence if the War Fork and Steer Fork site were selected as the final location for the project.

Required as part of an exchange, the USFS would prepare an Environmental Assessment (EA) under NEPA. This EA could then be “tiered” or built on to this EIS as a foundation. In conjunction with the EA, the USFS or a third party would conduct a Biological Evaluation to assess the impact of the exchange on Threatened, Endangered, and sensitive species (Bennett, 1999). Simultaneously, formal consultation would be carried out with the U.S. Fish and Wildlife Service.

A land exchange in the War Fork area would result in altered land uses of both forest and private lands. The land previously held by the USFS would be inundated by the reservoir, resulting in various ecological impacts throughout the normal pool area. The land classification would change; however, the use would remain a natural state. Recreation uses around the lake would be localized, probably remaining categorized as open space.

Former privately-owned land could undergo the most change in use, transforming from agricultural or residential land to natural open space. Some parcels purchased and exchanged may already be categorized as forest or other open space. In this case, the type of open space would change, not necessarily the use of the land. Changes from residential or agricultural uses to forested land would be ecologically significant. Formerly cropped land would require tree planting if a forested use is preferred by the USFS. Flora and fauna would change from species adapted to open fields to those requiring a closed-forested ecosystem. The change from residential to forested land would require the relocation of homes to alternate sites.

Through a land exchange, the amount of open space within the county would most likely be increased. The former USFS land would remain categorized as open space, while the former private land would probably transition to open space to be managed in a manner similar to adjacent Federal land holdings. Most likely, the effects would not significantly impact the overall land use patterns of the County. Without a comprehensive plan, it is hard to predict where these units might move or what their long-term effects would be.

### **Raw Water Transmission Main**

Land adjacent to the roadways may be disturbed during construction of the raw water transmission main and temporary effects on land use would occur due to this action. For example, residents would still retain access to their parcels, only it may be more difficult due to construction in the ROW adjacent to their property. Rural residential and agricultural land may be affected by construction, but those uses would remain during and after project completion. The last mile of the line that passes through agricultural and forested land would not contribute to changes in long-term land use. Construction would have only temporary effects.

### **3.2.8.2.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

The impoundment of the reservoir at the Sturgeon Creek, 8.5 mgd site would result in significant changes in land use. The inundation of residential and agricultural lands could present potentially significant ecological issues. However, the presence of pesticides, animal waste, and human effluent on lands flooded by the proposed reservoir would not be significant. Modifications in land use could also increase development throughout the area, resulting in potential long-term negative effects.

The reservoir created by dam construction at the Sturgeon Creek, 8.5 mgd site would flood areas previously used for farming and residential activities. Previously-active agricultural operations would be flooded, enabling any remaining pesticides in the soils to leach into the new water supply. Crops farmed within the Sturgeon Creek area include traditionally high-pesticide use ones, such as tobacco and grain. However, pesticide usage is reportedly below the national average in this area due to cost (Henderson, 1999). Definitive numbers on pesticide usage and bioaccumulation for each farm are not available, and nearly 270 acres within the Sturgeon Creek, 8.5 mgd project site are cropped in these uses. Although the large volume of water in the proposed new reservoir would most likely dilute any harmful substances, it is difficult to determine the impacts of these substances without knowing specific concentrations of the materials at the time of impoundment. While pesticide leaching is possible, it is not likely to cause major water quality problems in the proposed reservoir, as discussed in Section 3.2.11.2.2 of this EIS.

In addition to pesticide leaching, animal waste could potentially contaminate water supplies; however, it is not anticipated to be a major impact due to the absence of any confined animal feeding operations or waste lagoons. Cattle reside in the proposed impoundment area at the Sturgeon Creek, 8.5 mgd site, with beef cattle being the largest constituent at 375 head. A small number of dairy cattle, 60 head, are also present, while no hog operations are in the area (Gibson, 1999). The grazing of cattle throughout the project area does not result in a significant potential of nutrient loading in the water supply. Thus, problems typically associated with high nutrient levels, such as nitrogen and phosphorus, would most likely not be significant. Section 3.2.2.2.2 of this EIS provides a more detailed discussion of impacts on water quality at this site.

Lands outside the buffer zone would be prime areas for residential development. Residential and agricultural uses would likely remain in the area; however, the density of these uses could increase over time as people seeking lake-front property develop parcels in the vicinity. An attractive development option, Jackson County's lack of planning and building controls make it a likely place to see increased residential uses after construction of a reservoir. Most likely, this development would continue on medium size lots, greater than two acres in size. If the rural setting were preserved alongside the new development, other new uses, such as commercial services, would not likely begin to appear. These prime locations for development exist in areas currently used for both agricultural and residential activities.

### **Raw Water Transmission Main**

Land with rural residential and agricultural uses adjacent to the roadways may be disturbed during construction of the raw water transmission main, and temporary effects on land use would occur due to this action. For example, residents would still retain access to their parcels, only it may be more difficult due to construction in the ROW adjacent to their property. As at the War Fork and Steer Fork site, this temporary action would not result in changed land uses.

#### **3.2.8.2.3 Sturgeon Creek, 3.5 mgd**

### **Dam and Reservoir**

The consequences of impounding a reservoir at the Sturgeon Creek, 3.5 mgd project site would be very similar to those listed in Section 3.2.8.2.2 for the Sturgeon Creek, 8.5 mgd site. Changes in land use, relocation of residential units, possible pesticide leaching, and water quality problems would all be factors at this site. However, due to the decreased number of acres affected, impacts should be less severe. The number of homes relocated for inundation would be less, as would the number of active agricultural operations. The potential for lake-view development would be lower due to the decreased amount of shoreline at the Sturgeon Creek, 3.5 mgd site. However, the development could still pose possible increases in residential density that are difficult to predict at this stage. The combination of these factors would result in less severe outcomes than those listed for the Sturgeon Creek, 8.5 mgd site.

### **Raw Water Transmission Main**

The impacts on land use along the route of the raw water transmission main from the proposed Sturgeon Creek, 3.5 mgd reservoir would be no different from mentioned in Section 3.2.8.2.2. In addition, the smaller scope of this alternative route would result in a lower number of residential and agricultural lands being temporarily affected.

#### **3.2.8.2.4 No Action**

Under the No Change alternative, in which nothing is done to meet the projected water and recreation needs in Jackson County, current land use trends in Jackson County, and particularly areas surrounding the proposed reservoir sites, would most likely continue. Patterns of

agricultural and residential use would continue, resulting in increased clearing of lands and habitat disturbance.

If the proposed reservoir is not constructed, future land use would most likely remain forested at the War Fork and Steer Fork site. Managed by the USFS under applicable forest management plans, the region would not suffer many detrimental effects. Both terrestrial and aquatic habitats for flora and fauna would remain undisturbed by large-scale residential use as long as the land remained under the management of the USFS. Only a sale of these parcels to private landowners would potentially result in the appearance of different land use patterns.

Continuation of current land use trends in the Sturgeon Creek area would result in the further division of land, preventing the continuity of uses. The continued sprawling of large-lot rural estates throughout the region, accompanied by clearing for agriculture in many cases, would result in a checkerboard landscape. Large-lot development is currently indirectly encouraged by the State use-value taxation program, where lots over 10 acres receive tax breaks (Rose, 2000). If light or heavy industry were to locate in the area in the future, residential and agricultural areas could be threatened by accompanying nuisances and disturbances such as traffic, noise, or odor. If industrial development located outside the EZ-designated parks, the potential for these nuisances would increase. Without any large-scale plans to guide the development of the area, haphazard property development could result in conflict between uses.

Under the No Action alternative, certain activities would be undertaken to increase the current water supply in Jackson County. These activities may include drilling additional water wells throughout the County, constructing water transmission lines from existing resources within the County, such as intermittent streams, to the JCWA Treatment Plant, or instituting a water conservation program in Jackson County. The use of wells to provide water for Jackson County would have localized land use impacts. Individual wells would probably not hamper specific uses on chosen parcels. The impact of regional wells would depend largely on size and location. Selected land uses could be altered to accommodate the presence of a regional well. Transmission lines extending from nearby water sources would be located underground, providing little alteration of the existing land uses. Construction impacts would temporarily disturb any adjacent residential or commercial businesses, but it would not hamper the uses in the long-term. Conservation of water by the public would have minimal, if any, effect on land uses within the region. If streams were to run at normal flow throughout the year, excess precipitation may cause increased flooding levels, possibly affecting uses adjacent to the watercourses. However, it is unlikely that any permanent use would change.

### **3.2.8.2.5 Summary of Impacts**

The following table lists the potential impacts on land use resulting from the site preparation, construction, operation, and connected actions associated with the dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

<b>Table 3.2.8-2. Summary of Impacts on Land Use</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>• Permanent direct displacement or alteration of existing land uses;</li> <li>• Permanent land use changes resulting from economic or socioeconomic forces;</li> <li>• Temporary effects on localized land uses;</li> <li>• Adverse effects of current land uses on environmental conditions in or surrounding the reservoir; and</li> <li>• Conflicts involving land ownership or easements.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>
<b>Sturgeon Creek, 8.5mgd</b>	<ul style="list-style-type: none"> <li>• Permanent direct displacement or alteration of existing land uses;</li> <li>• Permanent land use changes resulting from economic or socioeconomic forces;</li> <li>• Temporary effects on localized land uses;</li> <li>• Adverse effects of current land uses on environmental conditions in or surrounding the reservoir; and</li> <li>• Conflicts involving land ownership or easements.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately Significant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Permanent direct displacement or alteration of existing land uses;</li> <li>• Permanent land use changes resulting from economic or socioeconomic forces;</li> <li>• Temporary effects on localized land uses;</li> <li>• Adverse effects of current land uses on environmental conditions in or surrounding the reservoir; and</li> <li>• Conflicts involving land ownership or easements.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately Significant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Affect current land uses from construction activities associated with the No Action alternative;</li> <li>• Potential land use change if USFS sells holdings in War Fork area; and</li> <li>• Continued pattern of unplanned development in Sturgeon area, causing eventual land use conflicts between residential and agricultural or industrial uses.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>

In some cases, impacts on land use are incremental. Although given the same impact ratings at each of the alternative sites, there are differences between impacts at each site. Some impacts on land use would be greater at the Sturgeon Creek, 8.5 mgd site, due to the larger project area and

larger amount of reservoir shoreline for residential development. These differences are discussed in Sections 3.2.8.2.1 through 3.2.8.2.3. These variations, however, would not change the impact ratings listed in the above table.

### **3.2.8.3 Mitigation**

Several environmental impacts would result from the conversions in land use associated with the impoundment of the proposed reservoir. Many are broad in scope, such as general replacement of terrestrial habitat with aquatic species. Some are more specific, such as those surrounding water quality issues. Mitigation measures surrounding terrestrial and aquatic ecosystems are discussed in Sections 3.2.2 and 3.2.4 of this EIS.

Impacts on the water quality of the proposed reservoir from current land use could be minimized by allowing agricultural land to lie fallow for a period of time before inundation and by ensuring proper clean-up of residential septic systems during removal. If agricultural land is allowed to lie fallow, pesticides present in surface soils can dissipate through, or biologically degrade in, the soil. Proper clean-up of sanitary waste systems would eliminate surface waste seepage and allow for the dilution of subsurface waste into the soil, where it would likely biodegrade.

## 3.2.9 TRANSPORTATION

Roadway evaluations focus on capacity, which reflects the ability of the network to serve the traffic demand and volume. The capacity of a roadway depends mainly on the street width, number of lanes, intersection control, and other physical factors. Traffic volumes typically are reported, depending on the project and database available, as the daily number of vehicular movements (e.g., passenger vehicles and trucks) in both directions on a segment of roadway, averaged over a full calendar year (average annual daily traffic (AADT)), or averaged over a period less than a year (average daily traffic (ADT)), and the number of vehicular movements on a road segment during the evening (p.m.) peak hour. These values are useful indicators in determining the extent to which the roadway segment is used and in assessing the potential for congestion and other problems.

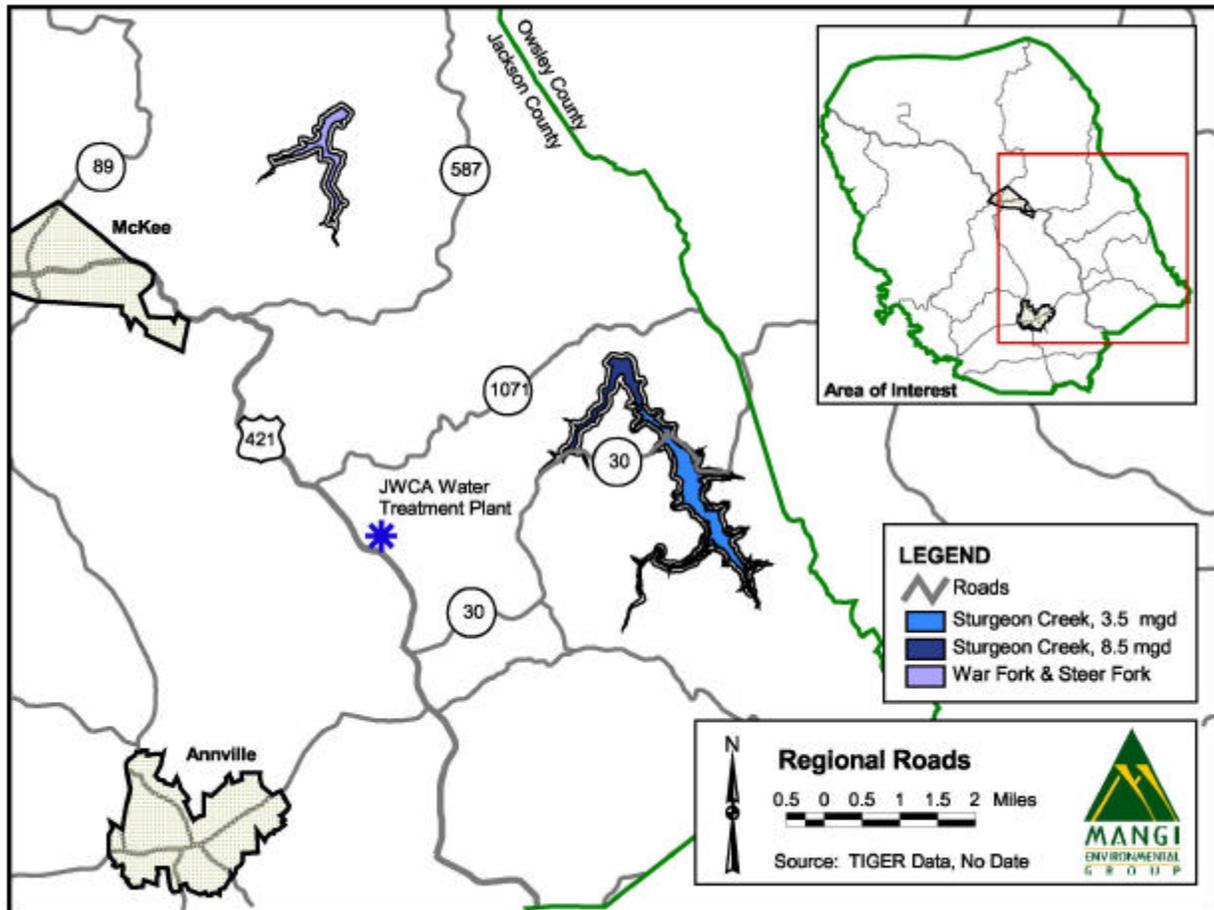
The performance of a roadway segment is generally expressed in terms of level of service (LOS). The LOS scale ranges from A to F with each level defined by a range of volume to capacity ratios. LOS A, B, and C are considered good operating conditions. The motorist experiences minor to tolerable delays. LOS D represents below average conditions. LOS E corresponds to the maximum capacity of the roadway. LOS F represents a jammed situation. **Table 3.2.9-1** presents descriptions of the LOS designations and their associated volume/capacity (V/C) ratios based on a two-lane, rolling terrain, 80 percent No Passing Zone classification of the roadways. Highways analyzed here that are within Jackson County and the surrounding region fall under this classification (Jewell, 1999b). These levels are based on the *Highway Capacity Manual (HCM)* (TRB, 1994).

<b>Table 3.1.9-1. Highway Level of Service (LOS) Designation Criteria</b> (based on two-lane, rolling terrain, 80% No Passing Zone classification)		
		<b>Criteria (volume as a percent of capacity)</b>
<b>LOS</b>	<b>Description</b>	<b>Rural</b>
A	Free flow with users unaffected by the presence of other users of the roadway.	0 – 4 %
B	Stable flow, but presence of the users in traffic stream becomes noticeable.	5 – 15 %
C	Stable flow, but operation of single users becomes affected by interactions with others in traffic stream.	16 – 30 %
D	High density, but stable flow; speed and freedom of movement are severely restricted; poor levels of comfort and convenience.	31 – 46 %
E	Unstable flow; operating conditions at capacity with reduced speeds, maneuvering difficulty, and extremely poor levels of comfort and convenience.	47 – 90 %
F	Forced or breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic.	> 90 %

Source: TRB, 1994.

### 3.2.9.1 Affected Environment

Transportation within Jackson County is largely provided by local roads, including scattered State highways and one Federal highway. The major road network surrounding the alternative project sites is shown in **Figure 3.2.9-1**. US 421 provides access to the County from the main interstate in Kentucky, I-75. Running diagonally from the Northwest corner to the Southeast, US 421 is the primary means of access in and out of the County. It is the most utilized road, carrying much of the population of Jackson County to work in the northern neighboring counties.



**Figure 3.2.9-1. Major Road Network Surrounding the Alternative Project Sites**

A segment of US 421 that lies on the border of Jackson, Madison, and Rockcastle counties has recently been improved by a \$14 million Federally-funded project. Known as the Big Hill project, this segment of US 421 was straightened and leveled through the mountainous region to improve access between Richmond in Madison County and McKee in Jackson County. Figure 3.2.9-2 shows the location of the Big Hill project, and the surrounding vicinity. The LOS before construction was at D or E; post-construction levels are designed for LOS B. Climbing 800 feet of elevation in two miles, this area had steep grades and a high percentage of large trucks traveling the highway. This improved corridor is estimated to hold about 6,300 vehicles a day

by the year 2020. Vehicles would be able to more easily access McKee and surrounding areas, such as the proposed reservoir sites (Barnett, 1999).

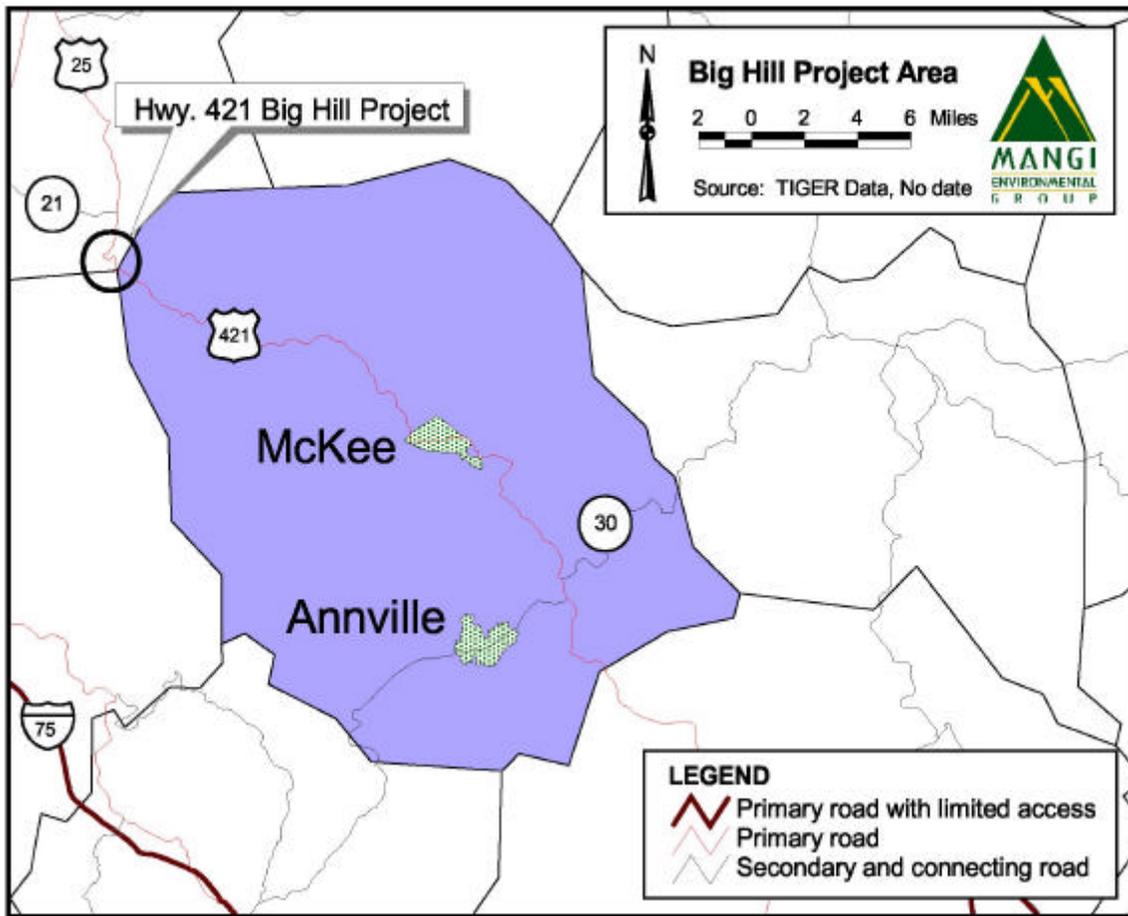


Figure 3.2.9-2. The Vicinity of the Big Hill Project on US 421

Other highways within Jackson County provide access to neighboring jurisdictions while also carrying much of the intra-county traffic. Both State highways and local roads in the County cover rolling terrain and often have narrow shoulders. Some local roads are gravel, while the major highways are paved (Sloan, 1999). Existing LOS ratings on the roads are high, with increased capacity possible without sacrificing considerable service. **Table 3.2.9-2** lists the existing LOS on one segment of all State and Federal highways within Jackson County that would be affected by the proposed action.

ADTs used as estimated volumes on the highways throughout the County are measured on one road segment. Segments were chosen to represent the most likely location of the highest volume of traffic for a given highway and proposed project site. One segment was chosen to avoid increasing the margin of error expected from averaging many segments with very different traffic characteristics.

**Table 3.2.9-2. Existing Levels of Service (LOS) and Estimated Traffic Volumes For Road Segments Potentially Affected by the Proposed Action**

Roadway	Segment	Estimated ADT (1999)	Peak Hour Volume (p.m.)	LOS
US 421	Begley Road to KY 1071	3,747	375	C
KY 1071	Blackwater Road to Mummie-Grassy Creek Road	438	44	A
KY 89	New School Road to Bradshaw-Macedonia Road	1,038	104	B
KY 587	US 421 to Huff School Road	1,426	143	B
KY 30	KY 1709 to Herd-Elias Road	435	44	A

The estimated Average Daily Traffic (ADT) was computed using an assumption of two percent compounded annual growth from the last counted year. For many of the State highways within the alternative proposed project areas, the last actual count was in 1995. Thus, the existing numbers are extrapolations from the 1995 figure to 1999. The evening (p.m.) peak hour volume was assumed a standard ten percent of ADT, and the LOS ratings are based upon the *HCM* (TRB, 1994). The LOS rating, or volume-capacity ratio, was computed using a standard assumed capacity of a rural, two-lane, paved road of 18,000 ADT. This is the standard used for LOS calculations in North Carolina, where road conditions and classifications are very similar to those in Jackson County (McCalip, 1999).

**Table 3.2.9-2** details the current LOS ratings on the major highways around the alternative project sites. Currently, all major highways analyzed have acceptable LOS ratings according to the threshold of LOS D established in the *ITE Transportation Planning Handbook* (ITE, 1999). Highways are designed to hold considerable volumes, and the roads in this part of Jackson County do not tend towards volumes that would push a road over LOS D and towards a LOS E. At these levels, as mentioned above, traffic is at a near standstill and completely congested. **Table 3.2.9-3** outlines the approximate volumes needed for these particular segments to fall to a LOS D or E.

**Table 3.2.9-3. Approximate Magnitude of Volume Needed to Equal or Exceed LOS D For Road Segments Potentially Affected by the Proposed Action**

Roadway	Segment	Estimated ADT (1999)	Magnitude Needed to Reach LOS D	Magnitude Needed to Exceed LOS D
US 421	Begley Road to KY 1071	3,747	1.5 x	2 x
KY 1071	Blackwater Road to Mummie-Grassy Creek Road	438	13 x	19 x
KY 89	New School Road to Bradshaw-Macedonia Road	1,038	6 x	8 x
KY 587	US 421 to Huff School Road	1,426	4 x	6 x
KY 30	KY 1709 to Herd-Elias Road	435	13 x	19 x

**Table 3.2.9-3** shows, for example, that the average daily traffic on KY 1071 would have to increase 19-fold before exceeding the acceptable LOS. Thus, dramatically increased traffic volumes can be handled by many of the current roads. While the volumes used in the ADT calculation are spread throughout the day, approximately 10 percent of that volume travels in the p.m. peak hour. The volume/capacity ratio would remain the same with the p.m. peak calculation as with the ADT, resulting in similar magnitude ratings for the peak as for the entire day. 10 percent of the volume would correspond with 10 percent of the daily capacity to result in the same proportion of traffic.

### **Dam and Reservoir**

The primary proposed recreation facilities would be between 20 and 50 acres for all alternative project sites. Anticipated traffic volumes from recreation users were calculated for each alternative reservoir site and for the high and low ends of the size continuum for the recreation facilities. The traffic calculations were obtained using the county and regional park traffic generators from the ITE *Trip Generation Manual*.

### **Raw Water Transmission Main**

The proposed raw water transmission main would run mostly alongside existing roadways within the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW) to the JCWA Treatment Plant at Tyner Lake.

## **3.2.9.1.1 War Fork and Steer Fork**

### **Dam and Reservoir**

The land surrounding the proposed War Fork and Steer Fork project site consists primarily of undeveloped, rural forest. The U.S. Forest Service (USFS) manages nearly all of the land within the proposed project area, and a moderate infrastructure exists that serves those parcels (USFS, 1993). Approximately 116 acres of USFS and private land lies within the normal pool level of the proposed reservoir. A 300-foot buffer area surrounding the normal pool level of the reservoir would increase the project area by about 211 acres, totaling 327 acres for the reservoir, up to normal pool level, and the buffer zone. At maximum flood level, the surface area of the reservoir would be about 162 acres, with 153 acres contained within the buffer zone. Therefore, the total acreage for a reservoir at maximum flood level at the War Fork and Steer Fork site, with a 300-foot buffer extending from normal pool level, would be about 337 acres of land.

Two State and one Federal highways provide access to the War Fork area. KY 587 and KY 89 both provide direct access to neighboring counties to the north and south of Jackson County. US 421 is a main thoroughfare, providing access to the major north-south freeway through Kentucky, leading to Lexington and into Tennessee. US 421 can also be used as a west-south route, as it provides service to neighboring counties not utilizing the freeway system. USFS roads are unimproved and gravel in some cases, while local roads are paved with curvy and slow conditions. Various minor gravel access roads to existing USFS sites would also be inundated.

According to USFS records of roads within the War Fork region, County road #3109 would have segments inundated by the proposed reservoir. Currently, #3109 is single-lane and unimproved (USFS, 1993). This road allows the USFS to access their parcels for research and maintenance purposes. This road would be inundated only on specific reaches of its length, part of which is County-maintained. The road is classified under the USFS classification system for its LOS, and it has a LOS D. The USFS defines a LOS D of having a slow flow, easily blocked by any activity and requiring backing up to pass (USFS, 1986). The road is designed for a single use, can be difficult to negotiate, and has intermittent volumes of traffic.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed War Fork and Steer Fork reservoir would run approximately 9.5 miles to the JCWA Treatment Plant. All but approximately one mile would follow alongside existing roadways in the KDOT or County ROW. The transmission main would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road. The main would run southwest along Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the transmission main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water (Kenvirons, 1999d).

### **3.2.9.1.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

The acreage required for a reservoir, up to normal pool elevation, at the proposed Sturgeon Creek, 8.5 mgd project site would be approximately 467 acres. A 300-foot buffer area surrounding the normal pool level of the reservoir would increase the project area by about 592 acres, totaling 1,059 acres for the reservoir, up to normal pool level, and the buffer zone. At maximum flood level, the surface area of the reservoir would be approximately 740 acres, with 680 acres contained within the buffer zone. Therefore, the total acreage for a reservoir at maximum flood level at the Sturgeon Creek, 8.5 mgd site, with a 300-foot buffer extending from normal pool level, would be approximately 1,119 acres of land.

This region is surrounded by three State and one Federal highway, containing numerous private and local roads. US 421 provides north-south access to the Sturgeon region, allowing direct access from neighboring counties. KY 1071 and KY 30 are both east-west thoroughfares through the region, providing access to the Sturgeon region from counties to the east of Jackson County. Many local roads are paved and curvy, resulting in slow speeds throughout this area. The roads are narrow and, in many cases, unlined, creating hazardous passing conditions.

Several local roads would be inundated by the proposed reservoir at the Sturgeon Creek, 8.5 mgd site. These roads include the following: KY 30, Herd-Elias Road, C. Wilson Road, three unnamed roads adjacent to Sturgeon Creek, Creech Road, Lynch Road, Mummie-Grassy Creek Road, Maulden-Owsley County Line Road, Wilfreds Fork Road, and Gregory Road. These roads would be either completely or partially flooded by the proposed reservoir.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 8.5 mgd reservoir would follow alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

#### **3.2.9.1.3 Sturgeon Creek, 3.5 mgd**

##### **Dam and Reservoir**

The surface area of the proposed reservoir at the proposed Sturgeon Creek, 3.5 mgd site, up to normal pool elevation, would be approximately 264 acres. A 300-foot buffer area surrounding the normal pool level of the reservoir would increase the project area by about 322 acres, totaling 586 acres for the reservoir, up to normal pool, and the buffer zone. At maximum flood level, the surface area of the reservoir would be about 440 acres, with 384 acres contained within the buffer zone. Therefore, the total acreage for a reservoir up to maximum flood level at this site, with a 300-foot buffer extending from normal pool level, would be about 643 acres of land.

State and Federal highways and local roads would be affected by the project at the Sturgeon Creek, 3.5 mgd site. KY 30 would cross the proposed reservoir and serve as a primary east-west connector for access to the site, as at the Sturgeon Creek, 8.5 mgd site. US 421 and KY 587 would provide access from the north and south.

Local roads would be inundated by this reservoir. These roads include: KY 30, Creech Road, Herd-Elias Road, C. Wilson Road, Maulden-Owsley County Line Road, Lynch Cemetery Road, and three unnamed roads adjacent to Sturgeon Creek.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir would follow alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The main would run northwest alongside an unnamed road, turning southwest and intersecting Mummie-Grassy Creek Road. The main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

## **3.2.9.2 Environmental Consequences**

Impacts on transportation and traffic were derived from evaluating features of the proposed action that would affect these issues, from investigating the current status of roads and traffic in the project area, and from predicting changes to current conditions as a result of the project.

Section 3.2.9.2 discusses impacts common to all alternative project sites; Sections 3.2.9.2.1 through 3.2.9.2.3 discuss impacts on a site-specific basis.

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on transportation and traffic from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main are:

- Change in level of service (LOS) of existing roads;
- Create traffic congestion from construction vehicles;
- Increase risk of vehicular accidents on public roads due to construction-related traffic and to recreation traffic; and
- Change of roadway structure due to relocation of highways.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

Transportation and traffic impacts are often discussed by comparing the current and anticipated future LOS ratings for the surrounding roadways of a project site. Trips are distributed according to their origin points. For this analysis, trip generation rates were based upon population statistics for Jackson County and its regional neighbors. Based on Census estimates from 1992, the percentage of population within the geographic regions (North, South, East, West) was calculated. This number aids in understanding where trips are most likely to originate, aiding in projecting the traffic on possible routes to the proposed project sites.

### **Dam and Reservoir**

The impacts forecasted for the construction and operation phase would be independent of each other. The operational impacts would be concentrated on the time when construction is complete and the reservoir is fully operational for recreational purposes. For transportation purposes, this is assumed to be the year 2005. Construction impacts are forecasted for the year 2003.

Construction impacts are assumed to be limited to the hauling phase for construction materials. This is assumed as a 90-day period with hauling occurring for five days a week during this period. Thus, an estimate of 60 days was used in distributing the trips over the construction period. Estimated ADT ratings for each affected road segment at each proposed project site were calculated by adding the 1999 ADT estimates to the number of truck hauling trips per day to the site. Due to range of estimates of materials needed for construction at each site, and the associated range of truck trips required, a range of ADTs is provided in the tables describing construction traffic at each site.

The impoundment of the reservoir at each site would require the relocation of several local roads and, in certain cases, major highways. These roads would be relocated before the impoundment begins, allowing traffic to continue flowing. KDOT would relocate those roads which traffic must continue to use for transportation purposes within the County (Jewell, 1999a).

**Table 3.2.9-4** highlights the range of recreation facility sizes and the associated traffic volumes generated by these areas. These traffic volumes are figured using the most accurate generation rates for either regional or county parks. The different generation rate used both for the War Fork and Steer Fork and Sturgeon Creek, 3.5 mgd sites would result in a different pattern of volume peaks than that for Sturgeon Creek, 8.5 mgd site. A county park designation was used for the War Fork and Steer Fork and the Sturgeon Creek, 3.5 mgd sites, which shows the greatest propensity for high volumes on Saturdays. A regional park designation was used for the Sturgeon Creek, 8.5 mgd site, which displays a peak usage on Sundays. The peak volumes on Saturdays and Sundays are assumed to be distributed on various highways throughout the region, as people visiting the reservoir would come from various places and use multiple different highways.

**Trip Generation**

A trip is defined as a single, one-way movement from an origin to a destination. Each trip has two trip ends. Vehicle trips are measured in terms of vehicles generated by a unit of land use, while person trips are measured in terms of people generated by a unit of land use (ITE, 1999). This analysis deals in terms of vehicle trips.

<b>Table 3.2.9-4. Anticipated Traffic Generation at the Proposed Recreation Facilities by Location and Size (Number of Trips)</b>						
<b>Location</b>	<b>20-acre Facility</b>			<b>50-acre Facility</b>		
	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
War Fork and Steer Fork	45.6	242.8	82.6	114	607	206.5
Sturgeon Creek, 8.5 mgd	91.4	113	128.8	228.5	282.5	322
Sturgeon Creek, 3.5 mgd	45.6	242.8	82.6	114	607	206.5

When comparing the estimates for parking at the proposed recreation facilities to the anticipated traffic volumes generated by the proposed reservoir, discrepancies arise. Traffic generation rates estimate volumes based upon facility size in acres, as shown above in **Table 3.2.9-4**. These volumes fluctuate according to the day of travel and are also affected by the type of facility designated (e.g., county or regional park). However, parking facilities and traffic volumes are not forecast using the same standard. Traffic is estimated by the generation rate based on acreage of the location. However, parking facilities do not correspond with the acreage of the proposed location. An increase in acreage of a proposed location does not necessarily equal more parking like it would more traffic. Instead, parking standards fit the specific recreation facility size. Changes in the facility size can result in a more scattered distribution over the entire location rather than only an increased density in services. Thus, the parking assumptions generated for the recreation facilities are standard for the size of the facility while differing for the sizes of the proposed reservoir.

The roads used to access the construction site would have to be assessed prior to the beginning of construction to ensure the load-bearing characteristics of these roads, and any bridges or culverts, would be adequate for use by heavy equipment.

**Raw Water Transmission Main**

During construction of the water transmission main, the lane adjacent to the construction activities would be closed, and traffic would be diverted around the closed lane into the one free lane (Williams, 1999e). Both lanes would not be closed, thus preventing the need to detour traffic onto local roads.

Traffic accident rates would likely not increase significantly from the construction of the raw water transmission main along any of the proposed routes. Flagging and lane closures would slow traffic around the construction sites, causing some unaware motorists to possibly cause accidents near the slow-downs. The increased presence of construction equipment on the road and in the ROW would be separated from flowing traffic by the flagmen. Thus, incidents of collisions with vehicles should not be a significant problem.

**3.2.9.2.1 War Fork and Steer Fork**

**Dam and Reservoir**

The transportation network in the immediate War Fork area is relatively small, comprised of USFS, State, and County roads. State highways border the area on the east, while County and USFS roads bisect the proposed reservoir and form the northern border to the region. LOS changes and relocation of roads would be minimal due to the construction of a dam and reservoir at this site, with the primary concern on load-bearing stresses on the roads.

Increased numbers of construction-related truck trips for the hauling of construction materials would affect the LOS on the roadways within the War Fork area. Construction-related traffic would not pose a significant impact to this region, as many of the highways surrounding the site are not the proposed hauling routes for construction materials. As shown in **Table 3.2.9-5**, LOS levels would be minimally affected, still allowing relatively unimpeded flow of traffic around the proposed War Fork and Steer Fork project site.

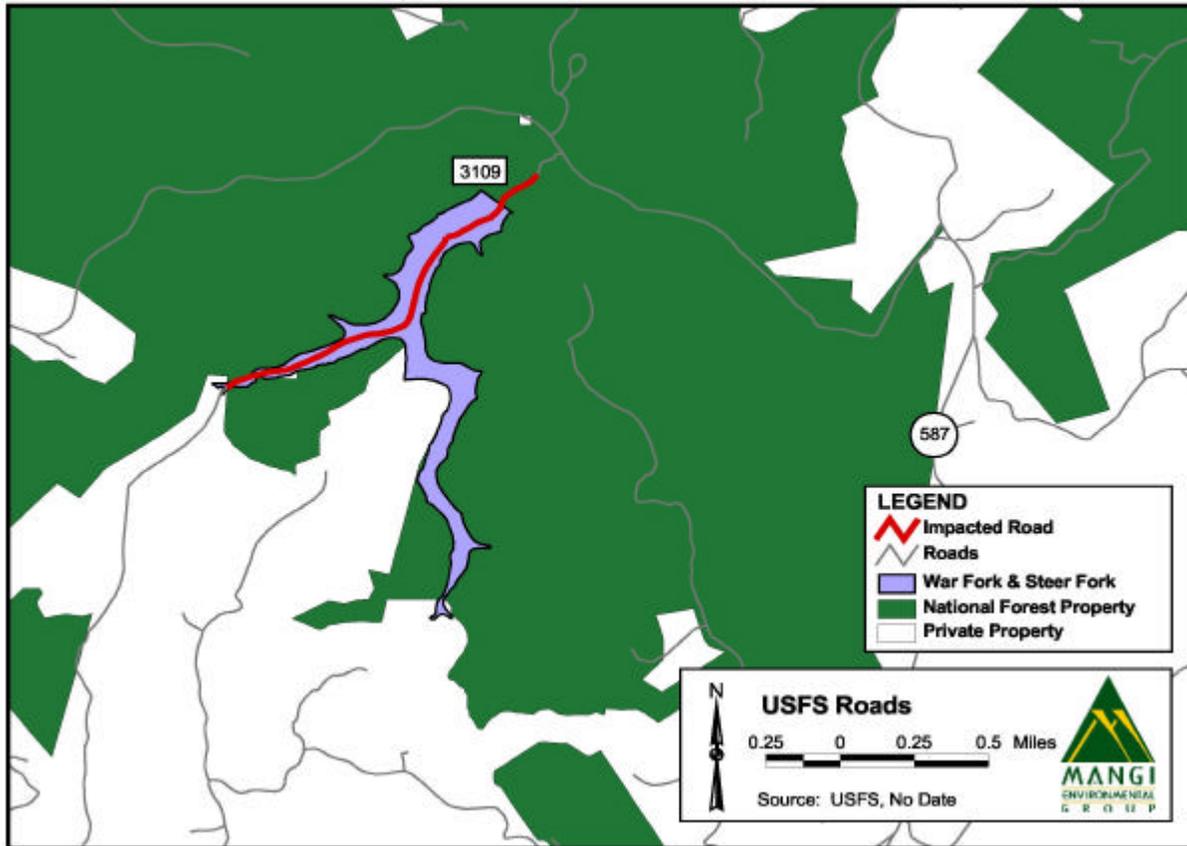
<b>Table 3.2.9-5. Anticipated Road Network Levels of Service (LOS) and Traffic Volumes Due to Construction at the Proposed War Fork and Steer Fork Site</b>					
<b>Roadway</b>	<b>Segment</b>	<b>Anticipated ADT Range (2003)</b>	<b>Peak Hour Volume (p.m.)</b>	<b>LOS</b>	<b>Current LOS</b>
KY 89	New School Road to Bradshaw-Macedonia Road	1,133 - 1,143	113 - 114	B	B
US 421	Begley Road to KY 1071	3,803 - 3,865	380 - 387	C	C
KY 587	US 421 to Huff School Road	1,554 - 1,565	155 - 157	B	B

The LOS ratings on the major roads surrounding the site may be affected slightly by the hauling of construction materials. However, it is difficult to ascertain the exact impact of increased

numbers of trucks on the curvy and narrow highways. Although the traffic volumes would not significantly increase, the presence of more trucks would slow traffic. The anticipated range of total truck trips needed for hauling at this site would be 4,030 to 8,430 trips. Using the low end of the range, the best-case scenario would predict approximately 50 to 60 truck trips per day on roads such as US 421. This is merely a predicted volume, not addressing the feasibility of the number of trucks needed to make these trips. If hauling were performed by one truck returning to the site rather than multiple trucks completing the trips, slow traffic might be more easily avoided. One truck repeating its trip throughout the day would result in a lower percentage of heavy-vehicles in the traffic flow than if multiple trucks caravan or make multiple trips at the same times throughout the day. The percentage of heavy vehicles in traffic helps determine the overall LOS of the roadway segment due to slowed conditions. Using the high end of the range of total truck trips needed, the worst-case scenario would predict over 110 trips per day to the project site. This would also result in slow traffic, perhaps more significantly. As with the best-case scenario above, the manner in which the trips are distributed would affect the LOS ratings.

The risk of traffic accidents on the roads surrounding the proposed War Fork and Steer Fork site depends upon several factors, including the existing number of heavy vehicles using each road segment, LOS, and additional construction-related traffic generated. Within the War Fork region, the percentage of heavy vehicles currently using the road network averages nine percent (Jewell, 1999b). Factoring in the truck trips needed for hauling materials for construction would increase the number of trucks on the roadways significantly. However, this increased presence of trucks on the road would not necessarily translate to higher accident rates with other vehicles. As stated above, the LOS would remain good to excellent on the highways around the proposed War Fork and Steer Fork project site after the additional construction truck trips have been factored in. As long as drivers on the highways respect the speed and following distance for other vehicles carrying loads, accident rates should not increase.

One USFS road, #3109, on the War Fork and Steer Fork project site would be inundated by the proposed reservoir. The specific portion of #3109 that would be affected consists of a stretch classified as improved and County-maintained. This portion is at the southern end of the road, and it comes to a terminus within USFS land. This road is shown in **Figure 3.2.9-3**. Flooding this road would not cut off or impede traffic on any other roads. Various minor gravel access roads would be inundated, and the roads still serving USFS parcels after inundation would need to be replaced (Strojan, 1999a). It is difficult to know at this time which lands would be held by the USFS after the dam and reservoir construction and the associated land exchange occur with Jackson County. Details on this land exchange are provided in Section 3.2.8.2.1 of this EIS. If the land for the reservoir were acquired, and former USFS service roads began servicing private parcels, maintenance and construction responsibilities would then be turned over to the County or State. USFS would not divest themselves of ownership; however, the other aspects would then be handed off if private parcels were to gain access. According to the USFS, this is a common practice (Strojan, 1999a).



**Figure 3.2.9-3. USFS Road #3109 Within War Fork and Steer Fork Alternative Area**

As shown in **Table 3.2.9-2** in Section 3.2.9.1, the LOS ratings for the State highways in the War Fork region is currently adequate. The highways sustain a LOS allowing traffic to flow relatively unimpeded on the narrow and curvy roads of the area. Under the proposed action, recreational traffic at the proposed reservoir at the War Fork and Steer Fork site would also be accommodated at a reasonable LOS on these State highways, regardless of the size of the recreational facilities. **Table 3.2.9-6** gives the anticipated traffic volumes around the proposed War Fork and Steer Fork reservoir for the potential range of sizes for the recreational facilities. These highways would serve as the primary means of accessing the local roads near the proposed reservoir for the population inside and outside of Jackson County. The State highways would allow people from neighboring counties within the region to easily access the site. The proposed dam site would be accessed using Turkey Foot Road and a newly- constructed road adjacent to the proposed reservoir (Kenvirons, 1999c). It is assumed that this road would also be used to access the primary recreational facilities.

**Table 3.2.9-6. Anticipated Road Network Levels of Service (LOS) and Traffic Volumes at the Proposed Recreational Facilities at the War Fork and Steer Fork Site**

Facility Size	Roadway	Segment	Estimated Weekday ADT (2005)	Peak Hour Volume (p.m.)	LOS
20 Acres	KY 89	New School Road to Bradshaw-Macedonia Road	1,179	118	B
	US 421	Begley Road to KY 1071	3,909	391	C
	KY 587	US 421 to Huff School Road	1,616	162	B
50 Acres	KY 89	New School Road to Bradshaw-Macedonia Road	1,193	119	B
	US 421	Begley Road to KY 1071	3,942	394	C
	KY 587	US 421 to Huff School Road	1,630	163	B

The traffic generated by the proposed recreation facilities at the War Fork and Steer Fork site would not result in a decreased LOS for the roads within Jackson County. Expected traffic volumes on both weekdays and weekends would not be great enough to cause significant changes or slows in traffic movement. Volumes on weekend days would differ little from those anticipated during the week. On weekend days, also, peak hour traffic traditionally present during the week would not occur. Thus, the lack of peak hour traffic on Saturdays and Sundays would prevent any slowing from additional recreational traffic.

Parking facilities would be located on-site for the visitors of the proposed reservoir. Approximately 80 parking spots for visitors would be provided at the War Fork and Steer Fork site (JCEC, 1999). These spots would be distributed between parking at boat ramps, campsites, picnic sites, and swimming/natural areas. This estimate may change as recreation facility specifications are developed and finalized.

**Raw Water Transmission Main**

As shown in **Table 3.2.9-2** in Section 3.2.9.1, the roads affected by the construction of the water transmission main leading from the proposed War Fork and Steer Fork reservoir, have a moderate volume of traffic and good LOS rating. The construction process would slow traffic on all affected roads, with the most notable impact on the State highways, KY 89 and KY 587. Local ADTs would be affected, lowering the LOS ratings of the impacted stretch of road during construction. However, LOS ratings would not significantly decrease, resulting in unchanged total volumes of vehicles on the highways in the vicinity of the proposed construction site.

### 3.2.9.2.2 Sturgeon Creek, 8.5 mgd

#### Dam and Reservoir

The road network around the proposed Sturgeon Creek, 8.5 mgd project site is composed much like the area surrounding the other alternative sites. Several State highways and one Federal highway lead to the proposed project site, providing access from areas throughout the County and region. Local roads also would provide access; however, the condition of some roads may prohibit the use of these roadways for major traffic volumes. The majority of the traffic is forecast to travel on the major highways in the County. Thus, local roads would handle only localized traffic.

The traffic volumes generated by construction-related hauling trips would not detrimentally affect the LOS of the major roads near the proposed Sturgeon Creek, 8.5 mgd site. It is assumed that the trips would be reasonably well-distributed on the highways surrounding the proposed reservoir site. Materials for construction would originate in various cities and states in the region (Kenvirons, 1999c). Transport of the materials to the project site would require the utilization of multiple highways. As the anticipated number of total truck trips needed for hauling at this site would be about 7,680 trips, only about 128 truck trips per day would be added throughout the network. **Table 3.2.9-7** shows the increased anticipated traffic volumes due to construction activities at the Sturgeon Creek, 8.5 mgd site. The little amount of additional traffic would counteract the slowing factor of trucks on the major highways. Much of the construction activity would probably affect the evening (p.m.) rush, as the standard time for the morning (a.m.) rush (7 to 9 a.m.) may not coincide with the arrival of trucks with materials. Trucks would most likely reach the construction site later due to the long distances from the material sites.

<b>Table 3.2.9-7. Anticipated Road Network Levels of Service (LOS) and Traffic Volumes Due to Construction at the Proposed Sturgeon Creek, 8.5 mgd Site</b>					
<b>Roadway</b>	<b>Segment</b>	<b>Anticipated ADT (2003)</b>	<b>Peak Hour Volume (p.m.)</b>	<b>LOS</b>	<b>Current LOS</b>
US 421	Begley Road to KY 1071	3,780	378	C	C
KY 30	KY 1709 to Herd-Elias Road	548	55	A	A
KY 1071	Blackwater Road to Mummie-Grassy Creek Road	602	60	A	A
KY 587	US 421 to Huff School Road	1,562	157	B	B

During construction, hauling would slow traffic around the staging area as trucks enter and exit the site. The movement of heavy equipment out of the staging area to other areas during construction would require lane flagging, slowing traffic only in the immediate vicinity. This would not have any significant effect on the LOS ratings of the highways.

The local roads of the area should not experience any direct effects from the hauling trucks. However, traffic normally traveling the highways may use the local roads as detours if trucks slow traffic somewhat significantly. This local use of detouring during the construction period would depend largely upon the location at which the slowdown occurs and its proximity to faster, alternate local routes.

Vehicle accident rates would not significantly differ from those mentioned in Section 3.2.9.2.1. The number of construction-related truck trips would approximately equal the worse-case scenario at the proposed War Fork and Steer Fork site, and conditions would be similar in respect to the other factors determining causes of traffic accidents.

The LOS ratings for the highways surrounding the proposed reservoir at the Sturgeon Creek, 8.5 mgd site should not significantly decrease with the additional traffic generated by recreation users of the proposed reservoir. The number of trips generated by the different-sized recreational facilities would affect individual road segments differently. **Table 3.2.9-8** gives the anticipated recreational traffic volumes around the proposed Sturgeon Creek, 8.5 mgd reservoir for the potential range of sizes for the recreational facilities. The primary segments chosen for analysis here represent some of the largest volume counts on roads affected by the alternative project sites.

<b>Table 3.2.9-8. Anticipated Road Network Levels of Service (LOS) and Traffic Volumes at the Proposed Recreational Facilities at the Sturgeon Creek, 8.5 mgd Site</b>					
<b>Facility Size</b>	<b>Roadway</b>	<b>Segment</b>	<b>Estimated Weekday ADT (2005)</b>	<b>Peak Hour Volume (p.m.)</b>	<b>LOS</b>
20 Acres	US 421	Begley Road to KY 1071	3,934	393	C
	KY 30	KY 1709 to Herd-Elias Road	499	50	A
	KY 1071	Blackwater Road to Mummie-Grassy Creek Road	501	50	A
	KY 587	US 421 to Huff School Road	1,625	163	B
50 Acres	US 421	Begley Road to KY 1071	3,986	399	C
	KY 30	KY 1709 to Herd-Elias Road	513	51	A
	KY 1071	Blackwater Road to Mummie-Grassy Creek Road	514	51	A
	KY 587	US 421 to Huff School Road	1,654	165	B

During peak morning hours (7 to 9 a.m.) or peak evening hours (4 to 6 p.m.), LOS ratings would be adequate, as defined by having an LOS above D. The p.m. peak hour volume would most

likely represent the time many visitors to the reservoir would begin their return trip. Many visitors to the recreation areas would most likely not be counted in the traffic volume during the a.m. peak hour.

Parking facilities would be located on-site for the visitors of the proposed reservoir. There would be a total of approximately 120 parking spaces for visitors of the reservoir at the Sturgeon Creek, 8.5 mgd site. These parking spaces would be distributed between parking at the boat area, campground, picnic area, and swimming/natural areas. This estimate may change as recreation facility specifications are developed and finalized.

The major highways around this site lie primarily to the north and west of the project site. However, KY 30 currently runs through the proposed Sturgeon Creek, 8.5 mgd reservoir area. Several options exist for the realignment of this road due to its proposed inundation. In 1994, the KDOT, Division of Highways performed a preliminary study of a new study corridor for this road. The purpose of the study was to identify a hypothetical direct route through the County, thus providing better east-west access (KDOT, 1994).

A more fully-detailed route selection and assessment project for the relocation of KY 30 is scheduled to begin in 2001. The route selection process will assess the environmental feasibility of several routes, which have not yet been selected. As part of the preliminary engineering phase beginning in 2001, an Environmental Assessment (EA) would be conducted on various alternative routes for the highway. The routes assessed under this process may or may not include the hypothetical corridor from the 1994 study. If the Sturgeon Creek, 8.5 mgd site were selected as the final location of the proposed reservoir, the Division of Highways would coordinate the placement of the newly aligned KY 30 through the Sturgeon area. KDOT acknowledges the coordination needed for the realignment and reservoir construction while noting that the complexity of performing the projects concurrently would be significant (Jewell, 1999a).

### **Raw Water Transmission Main**

The construction of the raw water transmission main along the proposed route from the Sturgeon Creek, 8.5 mgd reservoir would affect traffic most significantly where larger volumes are present on nearby State highways. KY 30 and US 421 would be affected most during construction when they are restricted to one lane. US 421 would probably be affected most, where the baseline LOS is level C. Closing this road to one lane would reduce the LOS in the vicinity of the project, allowing it to rebound away from the site in either direction.

Local roads along the proposed route of the transmission main would be affected similarly to the highways above. However, the lower traffic volumes on these roads would result in a less significant backup around the construction sites.

### 3.2.9.2.3 Sturgeon Creek, 3.5 mgd

#### Dam and Reservoir

The road network surrounding the proposed Sturgeon Creek, 3.5 mgd site is identical to that surrounding the Sturgeon Creek, 8.5 mgd site described in Section 3.2.9.2.2. The traffic volumes anticipated from construction and recreation activities would be similar, but the smaller size of the reservoir at this site would result in smaller forecasted rates. Construction-related traffic volumes would not significantly contribute to decreased LOS ratings at the Sturgeon Creek, 3.5 mgd site. The proposed Sturgeon Creek, 3.5 mgd dam site would be accessed using either KY 30, Gregory Road, an unnamed road adjacent to Blackwater Creek and Sturgeon Creek, or by using the planned realignment of KY 30 (Kenvirons, 1999c). **Table 3.2.9-9** shows the increased anticipated traffic volumes due to construction activities at the Sturgeon Creek, 3.5 mgd site.

<b>Table 3.2.9-9. Anticipated Road Network Levels of Service (LOS) and Traffic Volumes Due to Construction at the Proposed Sturgeon Creek, 3.5 mgd Site</b>					
<b>Roadway</b>	<b>Segment</b>	<b>Estimated ADT Range (2003)</b>	<b>Peak Hour Volume (p.m.)</b>	<b>LOS</b>	<b>Current LOS</b>
US 421	Begley Road to KY 1071	3,755 – 3,761	376	C	C
KY 30	KY 1709 to Herd-Elias Road	492 - 509	49 - 51	A	A
KY 587	US 421 to Huff School Road	1,548 - 1,551	155	B	B

A lower number of construction-related truck trips are predicted for the Sturgeon Creek, 3.5 mgd project site than for the other alternatives. This lower number would most likely result in less potential impact on transportation and traffic. The anticipated range of total truck trips needed for hauling at this site would be 1,700 to 3,170 trips. Using the high end of the range, the worst-case scenario would predict approximately 50 truck trips per day to this site, spread throughout the County’s highways. However, this lower number of truck trips would not contribute to a causal relationship between traffic and accident rates. Traffic accident rates would not significantly differ from those described in the for the other alternatives.

As with the Sturgeon Creek, 8.5 mgd site, the traffic anticipated to be generated by recreation at the Sturgeon Creek, 3.5 mgd site would not result in a decrease in LOS. **Table 3.2.9-10** gives the anticipated traffic volumes around the proposed Sturgeon Creek, 3.5 mgd reservoir for the potential range of sizes for the recreational facilities.

<b>Table 3.2.9-10. Anticipated Road Network Levels of Service (LOS) and Traffic Volumes at the Proposed Recreational Facilities at the Sturgeon Creek, 3.5 mgd Site</b>					
<b>Facility Size</b>	<b>Roadway</b>	<b>Segment</b>	<b>Estimated Weekday ADT (2005)</b>	<b>Peak Hour Volume (p.m.)</b>	<b>LOS</b>
20 Acres	US 421	Begley Road to KY 1071	3,909	391	C
	KY 30	KY 1709 to Herd-Elias Road	500	50	A
	KY 1071	Blackwater Road to Mummie-Grassy Creek Road	503	50	A
	KY 587	US 421 to Huff School Road	1,616	162	B
50 Acres	US 421	Begley Road to KY 1071	3,942	394	C
	KY 30	KY 1709 to Herd-Elias Road	501	50	A
	KY 1071	Blackwater Road to Mummie-Grassy Creek Road	503	50	A
	KY 587	US 421 to Huff School Road	1,630	163	B

Parking facilities would be located on-site for the visitors of the proposed reservoir. Approximately 80 parking spots for visitors would be provided at the Sturgeon Creek, 3.5 mgd site (JCEC, 1999). These spots would be distributed between parking at boat ramps, campsites, picnic sites, and swimming/natural areas. This estimate may change as recreation facility specifications are developed and finalized.

A reservoir at the Sturgeon Creek, 3.5 mgd site would flood the existing KY 30 at one location. However, as discussed in Section 3.2.9.2.2, a proposal to relocate KY 30 has been under consideration for years (Jewell, 1999a). The position of the proposed dam at the Sturgeon Creek, 3.5 mgd site would be at approximately the same location as the corridor for the new KY 30 proposed by the 1994 Corridor Study. Although future EAs on the relocation of KY 30 may or may not include this corridor, if this corridor is chosen, a dam and reservoir at the Sturgeon Creek, 3.5 mgd site may not require an additional relocation of KY 30. Close coordination with the Kentucky Division of Highways would be necessary for this project site. KDOT would take this dam site into consideration, if chosen as the final location for the project, when selecting their alternate route possibilities for relocation.

**Raw Water Transmission Main**

Since the proposed route of the raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir would have a similar route as that from the Sturgeon Creek, 8.5 mgd reservoir, construction of the water transmission main would have similar impacts as those

discussed in Section 3.2.9.2.2. Little significant impact would be expected on LOS ratings throughout the immediate area. One-lane closure of local roads along the route of the transmission main would be minimal, slowing traffic around the flagman alone. KY 30 and US 421 are the only roads that may suffer any considerable slowing and decreased LOS around the actual construction site. Currently, US 421 is a level C roadway, falling well within this category. KY 30 has a LOS of A, having virtually uninterrupted traffic flow. In these areas, a closure of one lane during construction would only stop traffic within the immediate vicinity of construction, allowing traffic to return to its previous LOS.

### 3.2.9.2.4 No Action

Under the No Change alternative, in which nothing is done to meet the projected water and recreation needs of Jackson County, the roads within the proposed project areas, and Jackson County as a whole, would maintain their current LOS ratings. Roads within the proposed War Fork and Steer Fork site would continue to have an adequate LOS, providing unimpeded flow throughout the area. Road #3109 would continue to be used by the USFS, as long as adjacent parcels continued to be managed by the USFS. Improvements on these two roads would not likely occur due to a continued lack of large-scale demand.

Under the No Action alternative, certain activities would occur to increase the current water supply of Jackson County, although in insufficient quantities to meet the projected need. These activities may include drilling additional water wells throughout the County, constructing water transmission lines from existing resources in Jackson County, such as intermittent streams, to the JCWA Treatment Plant, or instituting a water conservation program in the County. The use of individual or regional wells to provide water would have minimal effects on transportation, merely slowing traffic while the well-drilling equipment traveled from site to site. If transmission lines were to be placed under the KDOT ROW, this would impact traffic volumes on busier State highways. Roads such as US 421 would experience traffic back-ups, but only temporarily near the construction sites. Water conservation as an alternate means of water supply would have little, if any, impact on transportation routes, as normal flowing watercourses would stay in their banks. If, in the case of a flood past normal elevations, water rose past its banks or over bridges, transportation routes could be severed.

### 3.2.9.2.5 Summary of Impacts

The following table lists the potential impacts on transportation resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

<b>Table 3.2.9-11. Summary of Impacts on Transportation</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>• Change in level of service (LOS) of existing roads;</li> <li>• Create traffic congestion from construction vehicles;</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> </ul>

	<ul style="list-style-type: none"> <li>• Increase risk of vehicular accidents on public roads due to construction-related traffic and to recreation traffic; and</li> <li>• Change of roadway structure due to highway relocations.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>• Change in LOS of existing roads;</li> <li>• Create traffic congestion from construction vehicles;</li> <li>• Increase risk of vehicular accidents on public roads due to construction-related traffic and to recreation traffic; and</li> <li>• Change of roadway structure due to highway relocations.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Change in LOS of existing roads;</li> <li>• Create traffic congestion from construction vehicles;</li> <li>• Increase risk of vehicular accidents on public roads due to construction-related traffic and to recreation traffic; and</li> <li>• Change of roadway structure due to highway relocations.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Traffic slows around potential well-drilling and construction main sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> </ul>

In some cases, potential impacts on transportation are incremental. Although certain impacts have been given the same rating at all alternative project sites, these impacts would be greater at some sites than at others. These differences are discussed in Sections 3.2.9.2.1 through 3.2.9.2.3. The differences, however, would not change the impact ratings given in the above table.

### 3.2.9.3 Mitigation

To minimize the impacts on transportation due to road relocations, it is recommended that replacement roads or segments be constructed prior to the completion of reservoir impoundment. Decreased LOS ratings on highways affected by the project may be mitigated by improving the standard of local roads to act as alternate routes for increased volumes of traffic. Publicizing these alternative improved routes in tourism literature and education outreach within Jackson County and the surrounding region may alleviate congestion on major roads. In addition, increasing signage at curves and bridges to alert drivers of difficult driving conditions or inadequate infrastructure for loads may further mitigate impacts to public safety on the highways.

To mitigate decreased LOS ratings on roads affected by the construction of the raw water transmission main, it is recommended that traffic be detoured onto local roads around the construction sites to avoid slows at the sites. It is also recommended that construction activities be suspended during peak traffic hours on selected routes to avoid potential congestion.

## 3.2.10 WASTE MANAGEMENT

### 3.2.10.1 Affected Environment

Section 3.2.10.1 discusses the aspects of waste generation and management common to all alternative affected project areas. Specifically, this section addresses existing waste management practices common to all of the project sites and in Jackson County as a whole, the existing waste disposal capacity in the vicinity of the project sites, and waste generation and management at the Jackson County Water Association (JCWA) Treatment Plant. Aspects of the affected environment that are site-specific are discussed in Sections 3.2.10.1.1 through 3.2.10.1.3.

Jackson County has an Area Solid Waste Management Plan, prepared in accordance with Kentucky Revised Statute (KRS) 224.43-340, covering the years 1998-2002 (JCETF, 1997). This plan was approved by the Kentucky Division of Waste Management (KDWM), and is implemented by the Jackson County Fiscal Court. It addresses collection and disposal of solid wastes, clean-up of open dumps, recycling and reduction of solid waste, enforcement of waste management, and siting of existing and proposed waste-related facilities. Also contained within the document is a county-wide list of identified open, or illegal, dumps. Ongoing efforts are being made by the Jackson County Environmental Task Force (JCETF), U.S. Forest Service (USFS), private citizens, and most organized groups in the county to locate, stop, and clean-up these dumps (JCETF, 1997).

Permits and licenses are required to construct, operate, and maintain contained solid waste landfills and construction/demolition debris landfills in the State of Kentucky (KDWP, Webpage). Transfer stations for solid wastes are required to register with the KDWM as permit-by-rule facilities and to follow the provisions set forth in 401 Kentucky Administrative Regulation (KAR) 47:110. There are currently no permitted landfills in Jackson County (JCETF, 1997). Jackson County has a transfer station only, located at East Ridgeway Road, McKee, Kentucky, 40447. Solid waste from the County is transported out of the County to two permitted solid waste facilities in adjacent counties. These are the Blue Ridge Recycling and Disposal Facility, located in Estill County, and the Laurel Ridge Landfill Inc., located in Laurel County. **Table 3.2.10-1** lists these landfills, along with their permit numbers and addresses.

<b>Table 3.2.10-1. Solid Waste Disposal Facilities Serving Jackson County, Kentucky</b>			
<b>County</b>	<b>Permit/ID Number</b>	<b>Facility Name and Address</b>	<b>Facility Type</b>
Estill	033-00004	Blue Ridge Recycling and Disposal Facility 2700 Winchester Road Irvine, KY 40601	Contained Solid Waste Landfill
Laurel	063-00003	Laurel Ridge Landfill, Inc. 552 Hopper Road Lily, KY 40740	Contained Solid Waste Landfill and Construction/Demolition Debris Landfill

Source: KSWP, Webpage.

The KDWM lists no other permitted solid waste or construction/demolition debris landfills in any of the five other counties (Clay, Lee, Madison, Owsley, and Rockcastle) surrounding Jackson (KSWP, Webpage).

The contained landfill at the Blue Ridge Recycling and Disposal Facility is permitted to accept all waste streams, with the exception of hazardous wastes (Crouch, 1999). This landfill receives approximately 1,300 tons of solid waste from Jackson County annually, which represents about 0.1 percent of the total amount of waste received by the landfill each year. Due to a recent redesign of the landfill structure, the current capacity of the landfill is approximately 20 years (Crouch, 1999). The Blue Ridge Recycling and Disposal Facility recycles all white goods, which are large appliances primarily made of metal, and provides recycling drop-off facilities for community use.

**Contained Landfill:** A solid waste site or facility that may accept for disposal all non-hazardous waste, including residential, commercial, institutional, industrial, and municipal waste; household hazardous wastes; limited-quantity generator hazardous waste; and non-hazardous spill cleanup residue.

**Construction/Demolition Debris**

**Landfill:** A solid waste site or facility that may accept for the disposal of solid waste resulting from construction, remodeling, repair, and demolition of structures and roads, and for the disposal of uncontaminated solid waste consisting of vegetation from land clearing, utility line maintenance, and seasonal storm-related cleanup.

Laurel Ridge Landfill, Inc. consists of two permitted landfills: a contained solid waste landfill and a construction/demolition debris landfill (Barbush, 1999). The facility receives approximately 2,000 to 3,000 tons of solid waste annually from Jackson County, which represents about 1 percent of the total waste received by the facility each year. The current capacity of the facility is approximately 20 years (Barbush, 1999).

Jackson County currently operates under a Universal, or Voluntary, solid waste collection system (JCETF, 1997). In August 1999, the Jackson County Fiscal Court passed an ordinance to implement a Mandatory solid waste collection system beginning in July 2000 (Spivey, 1999). Under the Mandatory collection program, all residences would be required to dispose of their trash once weekly. Due to public conflict over the passage of this ordinance, a sign-on period for Mandatory collection that would allow residents the option of transporting their own waste to the transfer station is being reviewed (Spivey, 1999).

Jackson County does not have a central garbage collection company. Several small, private haulers make door-to-door residential pick-ups, delivering the garbage to the transfer station (Belcher, 1999). At the transfer station, solid waste is dumped into roll-off garbage trailers with capacities of 20 to 30 cubic yards. When a trailer is full, an operator takes it to either Blue Ridge or Laurel Ridge Landfill, depending on the cost of disposal (Spivey, 1999). One or two larger garbage haulers do not utilize the transfer station and transport waste directly to the landfills (Belcher, 1999).

The Jackson County Transfer Station also provides a recycling collection service for the County. Materials collected include: No. 1 and 2 plastics, aluminum cans, metals, used oil, white goods, cardboard, tires, and newspapers (Spivey, 1999). Recyclables are transported by transfer station staff to the appropriate recycling facilities in surrounding counties (JCETF, 1997).

The JCWA Treatment Plant has a Spill Plan for Hazardous Materials (JCWA, 1999). This plan addresses chemical-specific procedures for cleaning up spills and lists recommended and/or required personal protective gear to be worn by personnel during clean-up activities. All JCWA employees have been or will be trained in proper spill containment and treatment procedures. Spills are required to be reported to the local fire department, which may assist in clean-up, if necessary.

The following hazardous materials are stored and used on the premises of the JCWA Treatment Plant: aluminum sulfate, or dry alum; chlorine gas; hydrofluosilicic acid; potassium permanganate; sodium carbonate, or soda ash; calcium hydroxide, or hydrated lime; and powdered activated carbon (JCWA, 1999). The treatment plant currently uses a water treatment method that includes coagulation, flocculation, and pre- and post-chlorination (Powell, 1999a). This method involves adding coagulating chemicals to the water, which cause non-settleable solid particles to clump together, forming floc. The pieces of floc then clump together, forming larger particles, which settle out as sludge. Chlorine is added to the water twice during the process to destroy any pathogenic organisms in the water and to prevent bacteriological growths from forming. The JCWA Treatment Plant is considering a move to replace the current treatment process with a dissolved air flotation (DAF) method (Powell, 1999a). In this method, floc particles are mixed with very small air bubbles, which adhere to the suspended matter and float them to the top of the solution, where they are skimmed off. Depending on whether funding for this new method is obtained, replacement of the current treatment process with the DAF method could take approximately two years (Powell, 1999c).

Currently, waste sludge from the JCWA Treatment Plant accumulates in a settling pond, approximately 0.2 of an acre in size, adjacent to the treatment plant (Powell, 1999b).

**Figure 3.2.10-1** provides a picture of this settling pond. During rains, the pond overflows into a small, intermittent creek nearby. The JCWA recently purchased a 35-acre farm approximately 3 to 3.5 miles away from the treatment plant for future sludge disposal by landfarming (Powell, 1999c).

JCWA would need to obtain a Special Waste Landfarming Permit from the KDWM before the farm can be used as a sludge disposal site, as required by KRS 224.40-305. JCWA plans to begin the permit process after the expansion of the treatment plant from a capacity of 1.0 mgd to a capacity of 3.0 mgd is complete.



### 3.2.10.1.1 War Fork and Steer Fork

#### Dam and Reservoir

There are currently no households living on the proposed War Fork and Steer Fork dam and reservoir site (Schmitt, 1999f). In addition, there are no barns, trailers, or other structures, such as petroleum storage tanks or water wells, present on this site. Therefore, no solid, sanitary, or other wastes are known to be generated at this site.

The Jackson County Area Solid Waste Management Plan lists no illegal dumps on the proposed War Fork and Steer Fork dam and reservoir site (JCETF, 1997). However, there may be unknown open dumps in this area. USGS maps indicate that no oil wells are present in or around this project site. This site is neither listed in the U.S. Environmental Protection Agency's (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database nor on the National Priorities List (NPL), and has apparently not been assigned an EPA hazardous waste identification number (USEPA, 1999). CERCLIS and the NPL are described in the text box.

#### **EPA's CERCLIS and the NPL**

The EPA's Superfund program was created as a result of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This act, amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. Among other things, these acts established authority for the government to respond to releases of hazardous substances, pollutants, or contaminants. Appendix D of this EIS contains further information on these acts.

The EPA maintains two hazardous waste site lists. CERCLIS contains information on hazardous waste sites, site inspection, preliminary assessments, and remedial status of the sites. The NPL contains a list of hazardous waste sites that have been determined by a hazard ranking score to pose a serious threat to human health and/or the environment.

#### Raw Water Transmission Main

The raw water transmission main leading from the proposed War Fork and Steer Fork reservoir site would follow mostly alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW) to the JCWA Treatment Plant at Tyner Lake. The transmission main would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road (Kenvirons, 1999d). The main would run southwest along Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the transmission main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water. There are no wastes currently generated along this route.

### 3.2.10.1.2 Sturgeon Creek, 8.5 mgd

#### Dam and Reservoir

There are approximately 50 households currently living on the proposed Sturgeon Creek, 8.5 mgd dam and reservoir site (Schmitt, 1999f). Residential properties on this site consist of trailers or houses, which are primarily made of brick, farm-related and other buildings, and associated

**Septic Tank:** A water-tight covered receptacle that receives and processes the sewage discharged from a building through liquid separation or biological digestion. The effluent from the receptacle is discharged for disposal through the soil; settled solids are pumped out regularly for treatment.

infrastructure. There are 43 houses, 6 trailers, 35 barns, and 66 small outbuildings or detached garages currently present at this site. Wastes currently generated at this site include sanitary wastewater and household-type solid wastes from these residents, as well as agricultural wastes from farms at this site. Most or all of the residences at this site utilize underground septic tank systems for the treatment and disposal of sanitary wastewater (Schmitt, 1999b).

It is possible that some properties on this site contain aboveground or underground unregulated storage tanks for motor fuel, heating oil, or other petroleum products. Since much of the land at the Sturgeon Creek, 8.5 mgd project site is used for agricultural purposes, it is also possible that pesticide containers or tanks are present at the site. This site is neither listed in the EPA's CERCLIS database nor on the NPL, and has apparently not been assigned an EPA hazardous waste identification number (USEPA, 1999).

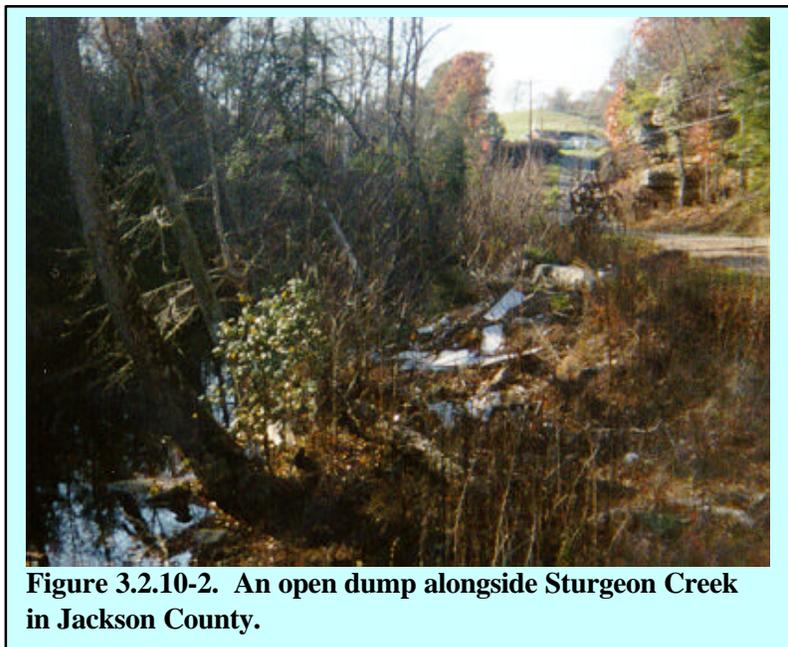
The Jackson County Area Solid Waste Management Plan lists four open dump sites on or very near the proposed Sturgeon Creek, 8.5 mgd dam and reservoir site (JCETF, 1997).

**Figure 3.2.10-2** provides a picture of an open dump taken alongside Sturgeon Creek.

These open dumps have been scheduled for clean-up under the PRIDE program of Eastern Kentucky. **Table 3.2.10-2** lists the locations and scheduled clean-up dates for these open dumps. If necessary, the dates for clean-up could be pushed forward (Guess, 1999).

USGS maps indicate the presence of oil wells in two locations in the proposed Sturgeon Creek, 8.5 mgd project area. One location is along Blackwater Creek, approximately 0.8 miles from the proposed dam at this site. The other location is along Sturgeon Creek, approximately two miles from the proposed dam site.

Several roads are located on the proposed Sturgeon Creek, 8.5 mgd dam and reservoir site and would be flooded during the impoundment of the reservoir (Kenvirons, 1999c). Relocation plans for one of these roads, KY 30, is currently in the preliminary stages, but the new route for the relocated portion is unknown (Jewell, 1999a).



**Figure 3.2.10-2. An open dump alongside Sturgeon Creek in Jackson County.**

<b>Table 3.2.10-2. Location and Scheduled Clean-Up of Open Dumps at the Sturgeon Creek, 8.5 mgd Dam and Reservoir Site</b>	
<b>Open Dump Location</b>	<b>Scheduled Clean-Up</b>
Creech Road: Left onto Creech Road from Highway 30 East; dump is 0.25 miles on left	June 2002
Blackwater #1: Left onto Cart Wright Road from Highway 30 East; dump is 0.25 miles on right	June 2000
Blackwater #2: 0.5 miles from Blackwater #1	July 2000
Blackwater #3: 0.5 miles from Blackwater #2	August 2000

Sources: Guess, 1999; JCETF, 1997.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 8.5 mgd reservoir site would follow mostly alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road (Kenvirons, 1999e). The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant. There are no wastes currently generated along this route.

#### **3.2.10.1.3 Sturgeon Creek, 3.5 mgd**

##### **Dam and Reservoir**

There are approximately 30 households currently living on the proposed Sturgeon Creek, 3.5 mgd project site (Schmitt, 1999f). Residential properties on this site consist of trailers or houses, which are primarily made of brick, farm-related and other buildings, and associated infrastructure. There are 27 houses, 4 trailers, 25 barns, and an unknown number of small outbuildings and detached garages currently present at this site. Wastes currently generated at this site include sanitary wastewater and household-type solid wastes from these residents, as well as agricultural wastes from farms at this site. Most or all of the residences at this site utilize underground septic tank systems for the treatment and disposal of sanitary wastewater (Schmitt, 1999b).

It is possible that some properties on this site contain aboveground or underground unregulated storage tanks for motor fuel, heating oil, or other petroleum products. Since much of the land at the Sturgeon Creek, 3.5 mgd project site is used for agricultural purposes, it is also possible that pesticide containers or tanks are present at the site. This site is neither listed in the EPA's CERCLIS database nor on the NPL, and has apparently not been assigned an EPA hazardous waste identification number (USEPA, 1999).

The Jackson County Area Solid Waste Management Plan lists four open dump sites on or very near the proposed Sturgeon Creek, 3.5 mgd dam and reservoir site (JCETF, 1997). These open dumps are the same ones located on the proposed Sturgeon Creek, 8.5 mgd dam and reservoir site, and are discussed in Section 3.2.10.1.2.

USGS maps indicate the presence of oil wells in one location in the proposed Sturgeon Creek, 3.5 mgd project area. These wells are located along Sturgeon Creek, approximately 0.7 miles from the proposed dam site.

Several roads are located on the proposed Sturgeon Creek, 3.5 mgd dam and reservoir site and would be flooded during the impoundment of the reservoir (Kenvirons, 1999c). Relocation plans for one of these roads, KY 30, is currently in the preliminary stages, but the new route for the relocated portion is unknown (Jewell, 1999a).

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir site would follow mostly alongside existing roadways in the KDOT or County ROW to the JCWA Treatment Plant. The transmission main would run northwest alongside an unnamed road, turning southwest and intersecting Mummie-Grassy Creek Road. The main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. It would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e). There are no wastes currently generated along this route.

## **3.2.10.2 Environmental Consequences**

The potential impacts to waste management were derived from evaluating the features of the proposed action that could generate waste, by identifying the types and anticipated quantities of waste that would be generated by this project, and through consideration of the existing waste management practices in Jackson County and the current capacity for waste in the surrounding area. Impacts common to all project sites are discussed in Section 3.2.10.2; those that are site-specific are discussed in Sections 3.2.10.2.1 through 3.2.10.2.3.

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on waste management from the site preparation, construction, operations, and connected actions associated with a dam, reservoir, and raw water transmission main are:

- Generation and disposal of sanitary waste from workers;
- Exceed the existing infrastructure capacity from generation of sanitary waste;
- Generation and disposal of construction and solid waste;
- Exceed the existing infrastructure capacity from generation of solid waste;
- Generation and disposal of hazardous waste;
- Accidental hazardous material or POL spills during storage or handling of materials;
- Accidental spills during removal of storage or septic tanks;
- Accidental spill during operations at the water treatment plant; and
- Generation and disposal of sludge from operations at the water treatment plant.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

The construction contractor would be required to collect and arrange for the off-site disposal of solid wastes in accordance with the approved Jackson County Solid Waste Management Plan, as well as existing laws and regulations. The anticipated quantities of solid waste resulting from site preparation and construction activities are unknown; however, two permitted solid waste landfills are located in adjacent counties and accept waste from Jackson County. These would provide sufficient capacity to accommodate solid wastes generated by construction activities.

All vehicles used to transport wastes would be enclosed or adequately-covered to prevent spills during transit (Smith, 1999). The Jackson County Transfer Station is not equipped to handle such quantities of wastes and would not be used for hauling during their disposal (Spivey, 1999).

Contractors would be responsible for providing adequate portable on-site sanitary facilities in accordance with Occupational Safety and Health Administration (OSHA) requirements. Portable sanitary facilities would be maintained by a licensed septic tank operator (Sheehan, 1999), and sanitary waste would be transported and disposed of in compliance with KRS 211.970 through 211.982 Septic Tank Servicing.

No substantial quantities of hazardous wastes are expected to be generated by construction activities. Petroleum products (POLs) for the fueling and maintenance of vehicles and equipment, such as gasoline, motor fuel, and oils, and explosives for blasting activities at the dam site are the only hazardous materials anticipated to be handled on-site in large quantities. The exact quantities of these materials that would be used for this project are unknown. Explosives and POLs would be stored, transported, and disposed of in accordance with all applicable laws and regulations.

In the event of an accidental POL or hazardous material spill of any quantity, the person responsible for the release would be required by law to characterize the extent of the release and to take necessary actions to correct the effects of the spill on the environment under the provisions set forth in KRS 224.01-400 (18) to (21) and 224.01-405 (Berry, 1999). These corrective actions would minimize and control any harmful effects of a spill to human health and safety, and to the environment. If the amount of POL product or hazardous material spilled is in excess of the reportable quantity (25 gallons within a 24-hour period for a fuel, oil, or lubricant; 75 gallons within a 24-hour period for diesel fuel; or any quantity of pollutant or contaminant which may present a substantial danger to public health or welfare), the spill must be reported immediately to Kentucky's 24-hour Environmental Response telephone number (KDEP, Webpage). In addition to these measures, the development of Spill Prevention, Control, and Countermeasures (SPCC) Plans for those areas in which hazardous materials and/or POL products would be handled or stored would minimize the potential to cause an adverse environmental effect from an accidental spill. Section 3.2.10.3 discusses SPCC plans in further detail.

**Hazardous Materials:** Solid or liquid materials that may cause or contribute to death or serious illness by virtue of their physical and chemical properties, or pose a hazard to the environment or to human health when they are improperly managed, disposed of, treated, stored, or transported.

### Dam and Reservoir

Site preparation and construction activities associated with a dam and reservoir at all three project sites would generate a variety of new waste streams, including additional sanitary waste water, solid wastes, construction/demolition debris, POLs (petroleum, oils, and lubricants), and excavated material.

Construction/demolition debris anticipated to be generated in large quantities from the site preparation and construction activities associated with a dam, reservoir, and connected actions include cleared vegetation, excavated rock and soil, raw materials for the roller-compacted concrete (RCC) fill, such as sand, gravel, and cement, and demolition debris from demolition of existing residences and other structures located at the sites. Cleared vegetation, such as trees and brush, would be burned on-site in accordance with the measures outlined in 401 KAR 63:005 Open Burning. If unsuitable for any construction use, excavated rock and soil would be stored, or permanently disposed of, in the reservoir's pool area. Preferably, this material would be reused on-site as backfill or topsoil material, or for landscaping (Kenvirons, 1999c). Other construction wastes may be disposed of or recycled at either the Blue Ridge Recycling and Disposal Facility in Estill County, or at the Laurel Ridge Landfill in Laurel County. Although the landfill at Blue Ridge has a cap of 900 tons per day of receivable waste, there is a clause on its permit, which allows for the landfill to exceed this cap when a special project, such as the Jackson County Lake Project, is occurring (Crouts, 1999). Currently, both landfills have a capacity of approximately 20 years remaining, which would provide sufficient capacity to accommodate construction/demolition wastes generated by this project.

Residents currently living in the dam construction zone, reservoir area, and buffer zone would be relocated, and their homes and other structures on their properties removed or demolished, prior to the onset of construction activities (JCEC, 1999). Residents would be given the options of relocating their homes to a new area, being reimbursed for their houses at a fair market value, or selling their structures for scrap metal or relocation purposes at a public auction (Schmitt, 1999c; Kenvirons, 1999c). Structures remaining on the site after a predetermined period of time would be gutted to remove any hazardous materials, such as asbestos, if present. Asbestos removal and disposal would be performed by contractors certified by the Kentucky Division of Air Quality (DAQ), and would follow procedures specified in DAQ regulations and 401 KAR 58:025 (KDAQ, Webpage). All asbestos-containing waste would be disposed of in a landfill approved by the KDWM for asbestos disposal.

In order to minimize the risk of a hazardous material or POL spill during construction activities, fuel storage and equipment maintenance activities would be confined to areas specifically designed for those purposes (Kenvirons, 1999c). These areas would be equipped with spill clean-up kits and protective gear, and would have trained personnel available on-site to handle accidental spills (JCEC, 1999).

Any blasting required for the construction of the dam would be conducted by a licensed blaster (Schneider, 1999). Prior to purchasing blasting materials, the construction contractor would need to obtain a Permit to Purchase or Possess Explosives from the Kentucky Division of Explosives and Blasting. Blasting materials would be transported, stored, and handled in

accordance with the provisions outlined in 805 KAR Chapter 4. If deemed necessary, the blasting operations would be routinely inspected by Explosives and Blasting Inspectors to ensure compliance with all laws and regulations governing the use of explosives.

Any oil wells in the project areas would need to be plugged, and the surrounding areas properly remediated, prior to impoundment of the reservoir. Oil wells would be plugged in accordance with existing laws and regulations. Any contaminated soils in the vicinity of the wells would be removed and disposed of at a permitted waste disposal facility.

After construction of the proposed recreational facilities is complete, no hazardous materials or POLs would be stored in these areas (JCEC, 1999). Unrestricted fueling of boats would not be permitted around the reservoir or in the recreation areas. The recreational facilities would be equipped with sanitary and solid waste disposal facilities. Sanitary waste facilities would be in the form of storage or septic tanks, and would be constructed in accordance with 902 KAR 10:081 through 10:085. All septic tanks would be located outside of the buffer zone surrounding the reservoir. Sanitary waste facilities would be operated and maintained by Jackson County Fiscal Court in accordance with existing laws and regulations (JCEC, 1999). Trash bins and/or dumpsters would be provided at picnic areas and campgrounds for the disposal of solid waste from recreational users. Solid wastes would be managed by Jackson County Fiscal Court in accordance with the Jackson County Area Solid Waste Management Plan.

Accidental hazardous material spills at the JCWA Treatment Plant would be contained and cleaned up by trained employees in accordance with the JCWA Spill Plan for Hazardous Materials (JCWA, 1999), discussed in detail in Section 3.2.10.1. Spills would be reported to the local fire department, which may assist in clean-up, if necessary. Adherence to these procedures would minimize the risk of adverse impacts due to accidental spills at the plant.

The additional volume of water that would be treated at the JCWA Treatment Plant due to the creation of the reservoir would increase the amount of sludge generated from the treatment process. To accommodate for this increased sludge, the JCWA has purchased a 35-acre farm for sludge disposal by landfarming, and plans to obtain a Special Waste Landfarming Permit from the KDWM after the expansion of the treatment plant is complete. Once that permit is obtained, the sludge disposal farm would be operated in accordance with 401 KAR 45:100 Landfarming and Composting of Special Waste.

### **Raw Water Transmission Main**

Construction activities associated with a raw water transmission main leading from any of the proposed reservoir sites would generate a variety of new waste streams, including additional sanitary wastewater, solid wastes, construction/demolition debris, and POLs.

Construction/demolition debris anticipated to be generated from construction activities associated with a raw water transmission main include possible cleared vegetation and pavement from existing roadways, the quantities of which vary by site and are provided, where known, in Sections 3.2.10.2.1 through 3.2.10.2.3. If any vegetation, such as trees and brush, is cleared, it would be burned on-site in accordance with the measures outlined in 401 KAR 63:005 Open

Burning. Any material excavated during digging of the trench would be used to backfill the trenches before the close of each working day (Williams, 1999b). Therefore, no excavated material would be removed from the construction site for disposal. Other construction wastes may be disposed of or recycled at either the Blue Ridge Recycling and Disposal Facility in Estill County, or at the Laurel Ridge Landfill in Laurel County. Currently, both landfills have a capacity of approximately 20 years remaining, which would provide sufficient capacity to accommodate construction/demolition wastes generated by this project.

Fuel storage and equipment maintenance activities would be confined to areas specifically designed for those purposes (Williams, 1999e). A fuel storage tank may be present on-site, the size of which is currently unknown. The fuel storage tank would be situated on top of a plastic liner covered by a layer of dirt or gravel. The plastic liner would reduce the potential for any spilled material to contaminate the soils in the surrounding area, and would aid in clean-up of an accidental spill. All refueling activities would occur over the plastic liner (Williams, 1999e).

Once the construction of the raw water transmission main is completed, no hazardous materials or POLs would be needed for operation of the main, and would not be handled or stored along the route. Operation of the water main would generate no wastes.

### **3.2.10.2.1 War Fork and Steer Fork**

#### **Dam and Reservoir**

Based on the most recent cost estimate information, approximately 118 acres of land would need to be cleared of vegetation for a reservoir with a normal pool elevation of 982 feet above MSL at the proposed War Fork and Steer Fork site (Kenvirons, 1999a). An additional three to five acres would need to be cleared for a new access road leading to this site. Based on visual analysis of USGS Digital Orthographs, approximately 95 percent of this land is forested; the remaining area consists of grassy clearings (USGS, 1995). Approximately 13,000 to 16,800 cubic yards of foundation would need to be excavated during construction of the dam (Sexton, 1999a; Kenvirons, 1999a). Demolition debris from site preparation and construction activities at this site would be minimal, due to no known structures being present on the site.

#### **Raw Water Transmission Main**

Approximately 50,000 linear feet, or about 9.5 miles, of pipe would be required for the proposed route of the water transmission main from the War Fork and Steer Fork reservoir to the treatment plant (Kenvirons, 1999a). Approximately 1,500 linear feet (0.3 miles) of pavement from existing roads would be disturbed, and would be replaced upon completion of construction.

### **3.2.10.2.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

Based on the most recent cost estimate information, approximately 475 acres, 40 percent of which are wooded, of land would need to be cleared of trees for a reservoir with a normal pool

elevation of 989 feet above MSL at the proposed Sturgeon Creek, 8.5 mgd site (Kenvirons, 1999b). Less than one acre of additional land may need to be cleared for a new access road leading to the base of the dam (Kenvirons, 1999c). Approximately 21,900 cubic yards of earth would need to be excavated for the dam's foundation (Kenvirons, 1999b).

As stated in Section 3.2.10.1.2, there are approximately 50 households currently living on the proposed Sturgeon Creek, 8.5 mgd project site (Kenvirons, 1999b). Residential properties on this site consist of trailers or houses, which are primarily made of brick and are served by septic tanks, farm-related and other buildings, and associated infrastructure (Schmitt, 1999f). All of these structures would require removal or demolition prior to the onset of construction activities. The quantity of demolition debris to be generated by these activities is unknown; however, a much larger quantity of demolition debris would be generated at this site than at the War Fork and Steer Fork project site.

Residential septic tanks on the properties in the proposed Sturgeon Creek, 8.5 mgd project area would also require closure. The contents of the septic tanks would be pumped out and disposed of by a licensed septic tank operator (Sheehan, 1999). Once the tanks are emptied, the top of the tank would be collapsed, and the tank would be filled in with soil and rock.

It is possible that residences or properties on the Sturgeon Creek, 8.5 mgd site contain petroleum storage tanks not regulated under 401 KAR Chapter 42 Underground Storage Tanks. Although registration and Notice of Intent to Close these tanks is not required, if such tanks are present on the site, it is recommended that they be closed according to the instructions outlined in the Closure Application for Petroleum Releases and Exempt Petroleum Tank Systems (Form 7097C) set forth by the KDWM, Superfund Branch, Petroleum Cleanup Section (KDWM, 1998). Accidental releases of petroleum products during removal of exempt tanks would be remediated in accordance with KRS 224.01-400 (18) to (21) and KRS 224.01-405, as discussed in Section 3.2.10.2.

Since much of the land at the Sturgeon Creek, 8.5 mgd project site is currently used for agricultural purposes, it is also possible that pesticide containers or tanks are present at the site and would require removal if abandoned by the current owner. To reduce the potential for adverse environmental impacts from agricultural pesticides, the Kentucky Department of Agriculture (KDA), Division of Pesticides offers two programs for pesticide disposal (KDA, Webpage). Under the Pesticides Collection and Disposal Program, trained KDA employees go on-site to collect, transport, and properly dispose of pesticides. The Rinse and Return Program provides an avenue for individuals to voluntarily bring their empty, rinsed pesticide containers to a local County-wide collection site for disposal and recycling.

A reservoir at the Sturgeon Creek, 8.5 mgd site would flood the existing KY 30 in two locations. Although several corridors would be investigated for the relocated portion of KY 30, and one such corridor has already been studied, if the Sturgeon Creek, 8.5 mgd site is chosen for this project, KY 30 would need to be relocated to accommodate the reservoir. This could be accomplished by building a bridge over the reservoir, by building a bridge over the dam, or by relocating KY 30 around the reservoir. Since there are two portions of KY 30 that would be flooded by a reservoir at this site, a much larger segment of KY 30 would need to be relocated

than at the Sturgeon Creek, 3.5 mgd site. Relocation of this larger section would generate a large quantity of construction waste and demolition debris from pavement removal from the existing KY 30. These construction wastes may be disposed of or recycled at either the Blue Ridge Recycling and Disposal Facility in Estill County, or at the Laurel Ridge Landfill in Laurel County, which would provide sufficient capacity to accommodate these wastes.

### **Raw Water Transmission Main**

Approximately 40,000 linear feet, or about 7.6 miles, of pipe would be required for the proposed route of the water transmission main from the Sturgeon Creek, 8.5 mgd reservoir to the treatment plant (Kenvirons, 1999b). Approximately 1,200 linear feet (0.2 miles) of pavement from existing roads would be disturbed, and would be replaced upon completion of construction.

### **3.2.10.2.3 Sturgeon Creek, 3.5 mgd**

#### **Dam and Reservoir**

Based on the most recent cost estimate information, approximately 275 acres of land would need to be cleared of trees for a reservoir with a normal pool elevation of 980 feet above MSL at the Sturgeon Creek, 3.5 mgd site (Kenvirons, 1999b). No additional land would need to be cleared for a new access road (Kenvirons, 1999c). Approximately 9,000 to 12,100 cubic yards of earth would need to be excavated for the dam's foundation (Sexton, 1999a; Kenvirons, 1999b).

As stated in Section 3.2.10.1.3, there are approximately 30 households currently living on the proposed Sturgeon Creek, 3.5 mgd project site (Schmitt, 1999f). Residential properties on this site consist of trailers or houses, which are primarily made of brick and are served by septic tanks, farm-related and other buildings, and associated infrastructure. All of these structures would require removal or demolition prior to the onset of construction activities. The quantity of demolition debris to be generated by these activities is unknown; however, the quantity of demolition debris generated at this site would be larger than that at the War Fork and Steer Fork project site, but smaller than that at the Sturgeon Creek, 8.5 mgd site.

Residential septic tanks on the properties in the Sturgeon Creek, 3.5 mgd project area would also require closure. The contents of the septic tanks would be pumped out and disposed of by a licensed septic tank operator (Sheehan, 1999). Once the tanks are emptied, the top of the tank would be collapsed, and the tank would be filled in with soil and rock.

It is possible that residences or properties on the proposed Sturgeon Creek, 3.5 mgd project site contain petroleum storage tanks not regulated under 401 KAR Chapter 42 Underground Storage Tanks. It is recommended that these tanks, if present, be closed as discussed in Section 3.2.10.2.2. Accidental releases of petroleum products during removal of exempt tanks would be remediated in accordance with KRS 224.01-400 (18) to (21) and KRS 224.01-405, as discussed in Section 3.2.10.2.

Since much of the land at the Sturgeon Creek, 3.5 mgd site is used for agricultural purposes, it is also possible that pesticide containers or tanks are present at the site and would require removal

if abandoned by the current owner. Section 3.2.10.2.2 discusses the options available in Kentucky for environmentally-safe pesticide disposal.

A reservoir at the Sturgeon Creek, 3.5 mgd site would flood the existing KY 30 in one location. Although several corridors would be investigated in future Environmental Assessments (EAs) for the relocated portion of KY 30, a 1994 Corridor Study established one such corridor, which may or may not be included in future EAs (Jewell, 1999a). The position of the dam at the Sturgeon Creek, 3.5 mgd site would be at the same location as this proposed corridor. If this dam and reservoir site is chosen, an additional relocation of KY 30 may not be necessary. Since only one portion of KY 30 would be flooded by a reservoir at this site, a much smaller segment of KY 30 would need to be relocated than at the Sturgeon Creek, 8.5 mgd site. Relocation of this smaller segment would generate a smaller quantity of construction waste and demolition debris from pavement removal from the existing KY 30. These construction wastes may be disposed of or recycled at either the Blue Ridge Recycling and Disposal Facility in Estill County, or at the Laurel Ridge Landfill in Laurel County, which would provide sufficient capacity to accommodate these wastes.

### **Raw Water Transmission Main**

Approximately 30,000 linear feet, or about 5.7 miles, of pipe would be required for the route of the water transmission main from the proposed Sturgeon Creek, 3.5 mgd reservoir to the treatment plant (Kenvirons, 1999b). Approximately 900 linear feet (0.2 miles) of pavement from existing roads would be disturbed, and would be replaced upon completion of construction.

#### **3.2.10.2.4 No Action**

Under the No Change alternative, in which nothing is done to meet the projected water needs of Jackson County, waste generation would be limited to solid wastes and sanitary wastewater currently being produced at the alternative sites. Existing disposal needs and practices would continue within the County. Therefore, the No Change alternative would not impact waste management practices.

Under the No Action alternative, the dam, reservoir, and the raw water transmission main leading from the reservoir would be constructed to meet the projected water needs of Jackson County. However, as Jackson County has a documented need for water, the No Action alternative assumes that certain activities would occur to increase the current water supply, although in insufficient quantities to meet the projected need. These activities may include drilling additional water wells throughout the County, constructing water transmission lines from existing resources in Jackson County, such as intermittent streams, to the JCWA Treatment Plant, or instituting a water conservation program in the County. The construction activities associated with the No Action alternative would generate additional waste streams, including solid, sanitary, and construction wastes; however, the quantities of these wastes would be less than those generated by the proposed action. Impacts on waste management associated with the No Action alternative would be rated as insignificant according to the criteria listed in Appendix C of this EIS.

### 3.2.10.2.5 Summary of Impacts

The following table lists the potential impacts on waste management resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

<b>Table 3.2.10-3. Summary of Impacts on Waste Management</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>• Increase solid waste, sanitary waste, and construction/demolition waste;</li> <li>• Increase potential for POL spills during storage and handling, and during operations at the JCWA Treatment Plant; and</li> <li>• Increase sludge from operations at the JCWA Treatment Plant.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>• Increase solid waste, sanitary waste, and construction/demolition waste;</li> <li>• Increase potential for POL spills during storage and handling, and during operations at the JCWA Treatment Plant; and</li> <li>• Increase sludge from operations at the JCWA Treatment Plant.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Increase solid waste, sanitary waste, and construction/demolition waste;</li> <li>• Increase potential for POL spills during storage and handling, and during operations at the JCWA Treatment Plant; and</li> <li>• Increase sludge from operations at the JCWA Treatment Plant.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Increase solid, sanitary, and construction/demolition waste from construction activities associated with the No Action alternative; and</li> <li>• Increase risk of POL spills during construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> </ul>

In comparing the relative significance of the potential impacts on waste management of all three reservoir alternatives, the Sturgeon Creek, 8.5 mgd site would have the greatest impact, followed by the Sturgeon Creek, 3.5 mgd site, and then the War Fork and Steer Fork site. Even though the summary table above shows all of the sites as having identical impact ratings, the impacts on waste management at the Sturgeon Creek, 8.5 mgd site would be relatively greater due to the increased quantity of demolition debris and construction waste resulting from a larger reservoir at that site. Minimal construction or demolition waste would be expected from the project at the War Fork and Steer Fork site, due, in part, to no known structures being present in the project

area. All impacts on waste management, however, would still be insignificant, regardless of the size of the reservoir or site chosen for the project.

### **3.2.10.3 Mitigation**

To reduce the potential to cause an adverse environmental impact from a hazardous material or POL spill during site preparation or construction activities, the study team recommends that Spill Prevention, Control, and Countermeasures (SPCC) Plans be developed for those areas in which hazardous materials and/or POL products would be handled or stored. SPCC plans would provide guidelines for appropriate handling and containment of materials, as well as a contingency plan in the event of an accident.

In the event that unregulated petroleum storage tanks are present in the area of the proposed dam and reservoir, it is recommended that they be closed according to the instructions outlined in the Closure Application for Petroleum Releases and Exempt Petroleum Tank Systems (Form 7097C) set forth by the KDWM, Superfund Branch, Petroleum Cleanup Section (KDWM, 1998).

## **3.2.11 HUMAN HEALTH AND SAFETY**

### **3.2.11.1 Affected Environment**

Section 3.2.11.1 discusses the aspects of human health and safety common to all alternative proposed project areas. The majority of the affected environment, as it relates to human health and safety, is site-specific. These site-specific aspects are discussed in Sections 3.2.11.1.1 through 3.2.11.1.3.

#### **Dam and Reservoir**

The JCWA Treatment Plant has on-site Material Safety Data Sheets for each hazardous material used or stored at the plant (Cates, 1999a). The data sheets provide information on the properties of the chemicals, procedures for handling the chemicals and accidental spills, and necessary first-aid treatment in the event that a person comes into direct contact with a chemical. The JCWA also has a Spill Plan for Hazardous Materials, updated every two years, which addresses chemical-specific procedures for cleaning up spills and lists recommended and/or required personal protective gear to be worn by personnel during clean-up activities (JCWA, 1999). All JCWA employees have been or will be trained in proper spill containment and treatment procedures. In addition, JCWA holds monthly safety meetings, which not only address safety issues related to the hazardous materials present at the plant, but also review fire and electrical safety issues and provide on-hands training (Cates, 1999a).

#### **Raw Water Transmission Main**

Jackson County is a predominantly rural and agricultural area. The raw water transmission main leading from the proposed reservoir site would follow mostly alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County right-of-way (ROW) to the JCWA Treatment Plant. Residential mailboxes are the only structures permitted to be located within a KDOT ROW (Jewell, 1999d). Widths of KDOT ROWs were obtained for all major highways potentially affected by this project, and are presented on a site-specific basis in Sections 3.2.11.1.1 through 3.2.11.1.3. The width of the ROW includes the width of the highway, shoulders, if present, and land running adjacent to the roadways on either side. Highways in Kentucky are approximately 20 feet wide, with little, if any, shoulder space (Jewell, 1999d).

Average daily traffic (ADT) rates from the last counted year, 1995, were obtained for the State of Kentucky and U.S. Highways along which the water transmission main would travel from each proposed reservoir site. ADT rates were not available for County and local roadways; however, these rates are anticipated to be lower than those for the State and U.S. Highways. The segments along these highways from which the counts were taken were those anticipated to be the primary areas of traffic approaching the proposed construction activities. Projected ADT rates for 1999 were calculated under the assumption of a 2 percent compounded annual growth from 1995. Peak evening hourly rates were calculated as ten percent of the ADT (Jewell, 1999b), and represent the maximum number of vehicles anticipated to be on the road at any given time.

### **3.2.11.1.1 War Fork and Steer Fork**

#### **Dam and Reservoir**

There no households currently living on the proposed War Fork and Steer Fork project site (Schmitt, 1999f). A workforce of approximately 15 to 25 workers would be required for site preparation and construction of a dam and reservoir at this site (Kenvirons, 1999c).

The land immediately downstream of the proposed dam at War Fork and Steer Fork is owned by the USFS, and contains no private residences. Only two facilities are located downstream of the proposed dam at this site. These are the Turkey Foot Campground, located approximately 0.25 miles downstream, and a portion of the Sheltoewe Trace Trail, which is accessible from Turkey Foot Campground (Allen, 1999).

Approximately half of the land comprising the watershed for the proposed War Fork and Steer Fork reservoir consists of forested USFS land; the other half is primarily pastureland (Henderson, 1999). Very little, if any, pesticide use occurs on these land types.

#### **Raw Water Transmission Main**

Only two major highways would be affected along the proposed water transmission main route from the proposed War Fork and Steer Fork reservoir site. These are KY 587 and KY 1071. The KDOT ROW width for KY 587 is 50 feet; that for KY 1071 is 40 feet (Jewell, 1999d).

The projected 1999 ADT rate for the segment of KY 587 from US 421 to Huff School Road is approximately 1,426 vehicles per day. During peak evening traffic hours, about 143 vehicles per hour are estimated to travel on KY 587. The segment of KY 1071 from US 421 to Blackwater Road has a projected 1999 ADT rate of approximately 438 vehicles per day. The peak evening rate for this highway is estimated at about 44 vehicles per hour.

### **3.2.11.1.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

There are approximately 50 households currently living on the proposed Sturgeon Creek, 8.5 mgd project site (Schmitt, 1999f). A workforce of approximately 20 to 30 workers would be required for site preparation and construction of a dam and reservoir at this site (Kenvirons, 1999c).

The land immediately downstream of the proposed Sturgeon Creek, 8.5 mgd dam site is privately-owned by residents of Jackson County. Residential properties downstream of the dam consist of the same types of structures found within the reservoir area, including trailers, homes, farm-related and other structures, and associated infrastructure. The majority of the downstream residents live along Grassy Creek, which merges with Sturgeon Creek approximately 0.5 miles downstream of the dam. Since the slope of the valley downstream of this site is much steeper

than upstream segments of Sturgeon Creek, the majority of these residents live more than 50 feet above the surface of the stream.

As much of the watershed for the proposed Sturgeon Creek, 8.5 mgd reservoir consists of agricultural cropland (Henderson, 1999), various pesticides are currently used in the watershed. The following chemicals were used in the greatest quantities on tobacco crops, the main crop cultivated along Sturgeon Creek, in Jackson and the surrounding counties in 1998: mefenoxam, a fungicide; maleic hydrazide, a growth regulator; methyl bromide, a fumigant; pendimethalin, a herbicide; and acephate, an insecticide (Collins, 1999b). Simazine, a herbicide, was the primary chemical used on corn crops.

### **Raw Water Transmission Main**

Only two major highways would be affected along the water transmission main route from the proposed Sturgeon Creek, 8.5 mgd reservoir site. These are KY 30 and US 421. The KDOT ROW width for KY 30 is 50 feet; the width for US 421 is 60 feet (Jewell, 1999d).

The projected 1999 ADT rate for the segment of US 421 from Begley Road to KY 1071 is approximately 3,747 vehicles per day. During peak evening traffic hours, about 375 vehicles per hour are estimated to travel on US 421. The segment of KY 30 from KY 1709 to Herd-Elias Road has a projected 1999 ADT rate of approximately 435 vehicles per day. The peak evening rate for this highway is estimated at about 44 vehicles per hour.

### **3.2.11.1.3 Sturgeon Creek, 3.5 mgd**

#### **Dam and Reservoir**

There are approximately 30 households currently living on the proposed Sturgeon Creek, 3.5 mgd project site (Schmitt, 1999f). A workforce of approximately 15 to 25 workers would be required for site preparation and construction of a dam and reservoir at this site (Kenvirons, 1999c).

The land immediately downstream of the proposed Sturgeon Creek, 3.5 mgd dam site is privately-owned by residents of Jackson County. Residential properties downstream of the dam consist of the same types of structures found within the reservoir area, including trailers, homes, farm-related and other structures, and associated infrastructure. The portion of the valley immediately downstream of this site is much wider, with much more gradual slopes, than the segment of the valley downstream of the Sturgeon Creek, 8.5 mgd site. Therefore, the majority of the residents at this site live closer to the surface of the stream.

As much of the watershed for the proposed Sturgeon Creek, 3.5 mgd reservoir consists of agricultural cropland (Henderson, 1999), various pesticides are currently used in the watershed. Section 3.2.11.1.2 lists the pesticides most widely-used in this area.

### **Raw Water Transmission Main**

Only two major highways would be affected along the water transmission main route from the proposed Sturgeon Creek, 3.5 mgd reservoir site. These are KY 30 and US 421. The KDOT ROW width for KY 30 is 50 feet; the width for US 421 is 60 feet (Jewell, 1999d).

The segments of KY 30 and US 421 affected by the construction of the water main from the Sturgeon Creek, 3.5 mgd reservoir site are the same as those affected by the water main from the Sturgeon Creek, 8.5 mgd reservoir site. The projected 1999 ADT rates for these segments, along with the peak evening traffic rates, are presented in Section 3.2.11.1.2.

## **3.2.11.2 Environmental Consequences**

The potential impacts on human health and safety were determined by evaluating features of the proposed action that could threaten public health and safety and by examining safety and health protection measures that would be in place during the various phases of the projects. Impacts common to the War Fork and Steer Fork and the Sturgeon Creek sites are discussed in Section 3.2.11.2; site-specific impacts are discussed in Sections 3.2.11.2.1 through 3.2.11.2.3.

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on human health and safety from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main are:

- Affect public health and safety from construction activities;
- Harm to human health and safety due to a hazardous material or POL spill during storage and handling of materials, and during the removal of storage/septic tanks;
- Degrade human health and safety due to exposure to hazardous materials during clean-up of illegal dumps;
- Harm to human health and safety by degrading air quality with air emissions and fugitive dust generated by construction equipment;
- Harm to human health and safety from a degradation of water quality due to increased soil erosion or surface water runoff, pesticide/herbicide use in the watershed, upstream sediment loading or leaching of minerals and metals in the reservoir area, or during creek crossings;
- Harm to human health and safety due to recreation-related accidents;
- Harm to recreational users due to retained vegetation in the impoundment area;
- Harm to human health and safety due to dam failure and subsequent downstream flooding;
- Harm to human health and safety from an increase in waterborne and/or vector-borne diseases due to increasing breeding areas for mosquitoes and other insects; and
- Degrade human health and safety by causing psychological distress during the relocation of residents on the project site.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

### Dam and Reservoir

During the site preparation and construction of the dam and reservoir, safety measures would be in place to protect the public from dangers at the sites. Gates would be erected around the construction areas and signs would be posted to warn the public that the site is a construction zone (Kenvirons, 1999c). The public would also be restricted from using the access roads to the construction site. All visitors would be required to be accompanied by an authorized representative of the construction contractor prior to entering the site.

Residents currently living in the dam construction zone, reservoir pool area, and buffer zone would be relocated, and their homes and other structures on their properties removed or demolished, prior to the onset of construction activities (JCEC, 1999). Affected residents may experience psychological distress as a result of relocating from their properties or from losing their homes. Giving residents the options of relocating their homes to a new area, being reimbursed for their houses at a fair market value, or selling their structures for scrap metal or relocation purposes at a public auction (Schmitt, 1999c; Kenvirons, 1999c) may reduce some of the potential distress. Impacts associated with these residential relocations are discussed in Section 3.2.12 of this EIS.

Structures remaining on the site after a predetermined period of time would be gutted to remove any hazardous materials, such as asbestos, if present (Kenvirons, 1999c). Asbestos removal and disposal would be performed by contractors certified by the Kentucky DAQ, and would follow procedures specified in DAQ regulations and 401 KAR 58:025 (KDAQ, Webpage). In addition, all asbestos-containing waste would be disposed of in a landfill approved by the KDWM for asbestos disposal. If these measures are followed, risks to human health and safety from asbestos exposure would be minimal.

In order to minimize the risk of accidental POL or hazardous material spills during site preparation and construction activities, fuel storage and equipment maintenance activities would be confined to areas specifically designed for those purposes (Kenvirons, 1999c). These areas would be equipped with spill clean-up kits and protective gear, and would have trained personnel available on-site to handle accidental spills (JCEC, 1999). Accidental spills could also occur during the removal of petroleum or pesticide storage tanks and septic tanks from existing residences at the dam and reservoir sites. In the event of an accidental spill of any quantity, the person responsible for the release would be required by law to characterize the extent of the release and to take necessary actions to correct the effects of the spill on the environment under the provisions set forth in KRS 224.01-400 (18) to (21) and 224.01-405 (Berry, 1999). These corrective actions would minimize and control any harmful effects of a spill to human health and safety, and to the environment. As discussed in Section 3.2.10.2, if the amount of POL product or hazardous material spilled is in excess of the reportable quantity, the spill must be reported immediately to Kentucky's 24-hour Environmental Response telephone number (KDEP, Webpage). In addition to these measures, the development of SPCC plans for the areas in which hazardous materials or POL products would be handled or stored would minimize the potential to cause an adverse impact on human health and safety from an accidental spill. Section 3.2.11.3 discusses these plans in more detail.

Any blasting required for the construction of the dam would be conducted by an experienced and licensed blaster (Schneider, 1999). Blasting operations would be conducted in accordance with the provisions outlined in 805 KAR Chapter 4. In addition, blasting operations in Kentucky are routinely inspected by Explosives and Blasting Inspectors to ensure compliance with all laws and regulations governing the use of explosives. Therefore, adverse impacts to human health and safety due to blasting operations would be minimal.

Any materials, such as trees and shrubs that would be burned during the construction process would follow the provisions outlined in 401 KAR 63:005 Open Burning. In addition, land within 150 feet of the fire may be cleared of vegetation and an air curtain destructor may be used in the open pit (Kenvirons, 1999c).

Adverse impacts to human health and safety due to fugitive dust generated during site preparation and construction activities would be minimized by the use of the dust control measures outlined in the *Kentucky Best Management Practices for Construction Activities* (BMPs) (KNREPC, 1994). Such temporary dust control measures may include spraying the area with water or calcium chloride (Kenvirons, 1999c).

Temporary soil erosion control measures, as outlined in Kentucky's BMPs, would be in place during the site preparation and construction activities to protect water quality. These measures may include temporary vegetative covers, silt fences, straw bale barriers, and topsoil stockpiling (Kenvirons, 1999c). Upon completion of construction activities, stockpiled topsoil may be spread, fertilized, and seeded to establish permanent grass cover. This measure would provide long-term soil erosion control surrounding the reservoir, thus protecting the quality of water in the reservoir and minimizing the potential for an adverse impact to human health and safety.

The existence of the proposed 300-foot horizontal buffer zone around the reservoir would also serve to protect human health and safety by protecting water quality of the reservoir. Development and certain land use, including livestock and agricultural pesticide use, within the buffer area would be restricted, reducing the risk of contamination of the water quality of the reservoir. In addition, no septic tanks for the recreational areas would be permitted inside the buffer zone (JCEC, 1999). Although design and use plans for the buffer area have not yet been created, actions such as preserving or restoring the upland and wetland plant communities within the buffer zone would reduce surface water runoff rates, water loss through evapotranspiration, and soil erosion, thus protecting the water quality of the reservoir.

The potential for a degradation in water quality due to upstream sediment loading or leaching of minerals and metals into the reservoir would be minimized by the provision of a sedimentation pool within the reservoir. The size of the sedimentation pool would be determined by the estimated sedimentation rate of the reservoir, and would accommodate sediment for the useful life of the dam structure (Kenvirons, 1999c).

Water quality of the reservoir would be tested regularly and monitored for chemicals and contaminants, including organisms responsible for waterborne diseases (JCEC, 1999). If the water quality of the reservoir is found to be unsuitable for recreation due to high levels of contamination, the Kentucky Division of Water (KDOW), in conjunction with the Department

for Health Services, may issue a Swimming Advisory to advise users to avoid swimming and other recreational contact with waters at the site (KDOW, 1999). Recreational users would be notified via signs posted around the reservoir (JCEC, 1999). In the event that bacterial- or coliform-contaminated water is transported to the JCWA Treatment Plant, it would be treated and purified by the chlorination process (Skaggs, 1999), greatly reducing any threat to human health and safety from drinking contaminated water.

There have been no reported infestations of mosquitoes or other disease-carrying insects around lakes in the region of either proposed reservoir (Buhlig, 1999). The only reported cases have been located in the western region of Kentucky, along Kentucky Lake. Typically, steep lake shores that allow for fish activities along the banks, such as those that would be present at all of the alternative reservoir sites, prevent such infestations. Therefore, mosquitoes or other insect disease vectors are not anticipated to pose a problem at the proposed reservoir.

In the event that an infestation of mosquitoes or other disease-carrying insects occurs at the reservoir, the KDA, Division of Pest and Weed, would be notified through the local health department, the Jackson County Judge Executive, the manager of the proposed reservoir, or residents residing in the area (Buhlig, 1999). The Division of Pest and Weed operates a Mosquito Control Program, which could be used to eliminate the problem. Under this program, insecticide spray planes are used in large, inaccessible areas to control infestations; for more crowded outdoor areas, such as parks and recreation facilities, ultra-low volume fogging machines are applied (KDA, Webpage). All methods used for mosquito abatement under this program are low-hazard to humans and the environment. Applied insecticides are registered for use by the EPA, and biodegrade rapidly, posing no lasting threat to human health or the environment.

Several permits would need to be obtained, and various measures would be in place, during all stages of the dam construction and operation to ensure its structural stability and safety. Geotechnical work would need to be performed at the dam site, once a final location is selected, to determine the suitability of the existing strata for the proposed structure and to identify which, if any, foundation treatments are required (Kenvirons, 1999c). Currently, no site-specific geotechnical work has been done at the proposed sites.

The proposed dam would be designed structurally and hydraulically to handle the probable maximum precipitation flood event (Kenvirons, 1999c). Ice loads would be evaluated during the design of the dam to ensure stability against the forces imposed by wintertime ice formation. Prior to the onset of dam construction, a Dam Construction Permit and a Floodplain Construction Permit would need to be obtained from the KDOW, Flood Management Section (KDOW, Webpage). During these permitting processes, plans for the proposed construction and design of the dam would be checked for adherence to Engineering Memorandum No. 5, Design Criteria for Dams and Associated Structures (401 KAR 4:030). This regulation establishes minimum safety criteria and hazard classifications for dams and associated structures, and outlines specific design needs for each classification (KDOW, 1998b). By using these design criteria, the potential for a catastrophic failure of the dam would be minimized.

As required by 401 KAR 4:030, a structure, or hazard, classification would need to be assigned to the proposed dam (see text box at the right). In determining the classification, consideration would need to be given to the damage that may occur to existing and future developments downstream of the dam resulting from a catastrophic failure in the structure. Other considerations are outlined in the regulation. A preliminary structure classification has been determined by the contracted engineer for the proposed dam at each of the alternative sites. These classifications, along with the reasons for them, are given in Sections 3.2.11.2.1 through 3.2.11.2.3. It is important to note that these classifications might change as more specific locations and details for each alternative site are determined.

To ensure the safety and stability of the dam structure during all stages of construction and operation, seepage through the embankment, foundation, and abutments would be controlled (Kenvirons, 1999c). For an RCC dam, seepage is typically controlled through proper foundation preparation and by ensuring a watertight structure (Parrott et al., No date). Proper foundation preparation should include grouting, or the pumping of concrete into subsurface cracks in the rock. In the past, nuclear density testing equipment has been used after pouring and compacting each lift in the dam structure to determine whether proper compaction is being obtained. In addition, electrical detectors can be used to assure that no holes are present in the PVC membrane. These methods have been recognized as the most effective in preventing seepage through an RCC dam (Parrot et al., No date).

Once a construction permit has been issued by the KDOW, Flood Management Section, and construction of the dam has begun, construction inspections would be performed periodically by the Dam Safety and Floodplain Compliance (DSFC) Section during the critical stages of work to ensure compliance with the approved dam design specifications (KDOW, 1998b). A final inspection would be conducted upon completion of construction. If all work is satisfactory and complies with State regulations, an approval to impound water behind the dam may be granted by the KDOW. The dam would continue to be inspected periodically by the DSFC Section for the duration of its useful lifetime. Such inspections would include visual analysis and review of plans, specifications, and design data (KDNREP, 1980). If inspections reveal deficiencies in the dam, which may pose a threat to life or property, KRS 151.297 requires the dam to be rendered safe, and safety deficiencies corrected, if it is to remain in service. With these measures in place, potential risk to human health and safety due to a dam failure would be minimized.

Although the potential for a catastrophic dam failure would be extremely low, in the worst case, downstream areas would suffer severe flooding. At this time, no procedures or plans have been prepared in the event of a catastrophic dam failure (Kenvirons, 1999c). However, as with any

**Structure, or Hazard, Classifications  
(401 KAR 4:030)**

Structure classifications are ratings for structures based on potential loss of human life and damage to property in the event of a sudden breach of the structure. There are three types of categories of classification:

1. Class (A): Low Hazard,
2. Class (B): Moderate Hazard, and
3. Class (C): High Hazard.

In determining a classification, consideration must be given to a variety of factors, outlined in the regulation. A structure classification is not, however, determined by the criteria selected for design of the structure.

emergency situation, existing emergency services in the community would respond to minimize the threat to downstream residents if a dam failure were to occur.

After construction of the proposed recreational facilities is complete, no hazardous materials or POLs would be stored in these areas (JCEC, 1999). Unrestricted fueling of boats would not be permitted around the reservoir or in the recreation areas. With these restrictions in place, the risk to human health and safety due to a hazardous material or POL spill during operations at the recreation facilities would be minimal. Should the use of motor boats be permitted on the reservoir, it is recommended that the boat ramp or dock be positioned far away from the water intake structure in order to avoid accidental fuel spills entering the intake (Skaggs, 1999). In addition, in the event of accidental oil or fuel spills on the surface of the reservoir, it is recommended that the water intake structure have multi-level portals so that water from deeper in the reservoir could be admitted. Should oil and fuel residues remain in the raw water transported to the JCWA Treatment Plant, they would be removed by the powdered activated carbon process (Skaggs, 1999).

The placement of the water intake structure in the reservoir may pose a safety hazard to recreational users. While the size and location of the intake structure have not yet been determined, it is recommended that a fence be placed on top of the structure to warn recreational users of its presence and to prevent users from potential injury. Although final designs for the recreation areas are not complete, should vegetation be left in the reservoir for aquatic habitat, it is recommended that the retained vegetation be located as to maximize the safety of recreational users. Section 3.2.11.3 discusses methods associated with retaining vegetation in the reservoir that would maximize public safety.

No lifeguard would be present at lake (JCEC, 1999). Signs would be posted in the recreation areas warning visitors of potential dangers at the lake and campground. Visitors would partake in recreation activities at their own risk. Phones may be available at the recreation facilities (JCEC, 1999), and could be used in the event of an emergency.

The JCWA provides numerous safety measures to ensure that accidental hazardous material spills at the treatment plant are properly contained and cleaned-up, and would not pose a threat to human health and safety, or to the environment. Material Safety Data Sheets, discussed in detail in Section 3.2.11.1, are available on-site for each hazardous material used or stored at the plant (Cates, 1999a). In the event of an accidental spill at the plant, it would be cleaned up in accordance with the JCWA Spill Plan for Hazardous Materials (JCWA, 1999). All JCWA employees have been or will be trained in proper spill containment and treatment procedures.

### **Raw Water Transmission Main**

To protect the public from dangers in the construction zone, orange fencing would be placed around any open trench during construction (Williams, 1999e). There would also be signs at the construction site and in surrounding areas warning the public that the site is a construction zone and that there are men working. In addition to these measures, any excavated trenches would be refilled with excavated soil immediately following the placement of the pipe in the trench

(Williams, 1999b). No trenches would be left exposed overnight; excavated trenches would be required to be refilled by the close of work for the day.

During construction alongside roadways, the lane adjacent to the construction activities would be closed, and traffic would be diverted around the construction zone into the one free lane (Williams, 1999e). Closing the adjacent lane would provide a safety buffer between the construction zone and the public traveling on the road. In addition, given the low ADT and peak hour traffic rates of all affected major roadways along the proposed routes of the water transmission main, the probability of an adverse impact to public safety due to construction activities would be very low.

Fuel storage and equipment maintenance activities would be confined to areas specifically designed for those purposes (Williams, 1999e). As discussed in detail in Section 3.2.10.2 of this EIS, a fuel storage tank of unknown size may be present on-site. All refueling activities would occur over the plastic liner.

Although the potential for a POL spill is low, in the event of an accidental spill of any quantity, the person responsible for the release would be required by law to characterize the extent of the release and to take necessary actions to correct the effects of the spill under the provisions set forth in KRS 224.01-400 (18) to (21) and 224.01-405 (Berry, 1999). These corrective actions would minimize and control any harmful effects of a spill to human health and safety, and to the environment. As discussed in Section 3.2.10.2 of this EIS, if the amount of POL product spilled is in excess of the reportable quantity, the spill must be reported immediately to Kentucky's 24-hour Environmental Response telephone number (KDEP, Webpage). Although SPCC plans are typically not used during water main construction activities (Williams, 1999e), the development of an SPCC plan for those areas in which POL products would be handled or stored would further minimize the potential to cause an adverse impact on human health and safety from an accidental spill. Section 3.2.11.3 discusses SPCC plans in further detail.

Any burning of materials, such as trees and shrubs, that might occur during the construction process would follow the provisions outlined in 401 KAR 63:005 Open Burning. Adverse impacts to human health and safety due to fugitive dust generated from construction activities would be minimized by the use of dust control measures outlined in the Kentucky BMPs (KNREPC, 1994). Appropriate temporary soil erosion control measures, as also outlined in the BMPs, would be in place during the construction activities to protect water quality.

During stream crossings, adverse impacts to human health and safety from a degradation in water quality due to sediment problems would be minimized by the use of silt bales as water filters (Williams, 1999e). Streams would be crossed during periods of low flow or no flow of the stream, further reducing the potential for sediment problems.

### 3.2.11.2.1 War Fork and Steer Fork

#### Dam and Reservoir

Since pesticide use on the watershed feeding the proposed War Fork and Steer Fork reservoir is negligible, the potential for soil contamination due to pesticides is minimal. Therefore, an adverse impact on water quality of the reservoir due to current pesticide use in the watershed is not expected to occur. In addition, the existence of a 300-foot buffer zone around the proposed reservoir would restrict land use in this area, including future pesticide use. Thus, no impacts to human health and safety due to pesticide use at this site are anticipated.

The proposed dam at the War Fork and Steer Fork site has been preliminarily assigned a Class B (Moderate Hazard) classification by the engineer (Purkey, 2000a). A Class B structure classification was assigned to the proposed dam at this site because failure of this dam would result in a failure to supply residents with water from the reservoir at this site (Purkey, 2000a). In addition, since Turkey Foot Campground and the Sheltoewe Trail are the only downstream facilities at this site, failure of the dam would be expected to cause damage to these structures only, with a very low probability of loss of human life.

#### **Class (B): Moderate Hazard Classification**

According to Engineering Memorandum No. 5, Class B structures are those located such that failure of the structure might cause significant damage to property and to project operation, but loss of human life is not anticipated. Failures of Class B structures may cause interruption of service of relatively important public utilities or damage isolated homes.

#### Raw Water Transmission Main

Approximately 50,000 linear feet, or about 9.5 miles, of pipe would be required for the route of the water transmission main from the proposed War Fork and Steer Fork reservoir to the JCWA Treatment Plant (Kenvirons, 1999a). Most of this length would run alongside roadways in the County. Approximately 60 linear feet of streams would need to be crossed during the construction.

### 3.2.11.2.2 Sturgeon Creek, 8.5 mgd

#### Dam and Reservoir

Since the open dumps at the proposed Sturgeon Creek, 8.5 mgd site, listed in **Table 3.2.10-2** in Section 3.2.10.1.2 of this EIS, are scheduled to be cleaned up under the PRIDE Program of Eastern Kentucky and not by the Kentucky Superfund Program, it is assumed that these dumps do not consist of large quantities of hazardous wastes. Rather, these dumps most likely contain predominantly municipal solid wastes and scrap metal. Should these dumps become suspect for containing hazardous wastes, they would be evaluated and cleaned up under the Kentucky Superfund Program in order to reduce risks to human health and safety and to the environment (Pratt, 1996). In addition, 401 KAR 100:050 Remedial Options Guidance, Site Characterization Guidance, and Risk Assessment Guidance offers a health and safety plan for workers involved in cleaning up contaminated or hazardous waste sites.

Pesticide and chemical use on crops in the watershed for the Sturgeon Creek, 8.5 mgd reservoir could contaminate local soils, and as a result, potentially degrade the water quality of a reservoir within the watershed. Growth regulators, typically used twice per growing season, are not known to have significant effects on human health, and do not come into contact with soils (Collins, 1999a). The herbicide pendimethalin is also used twice per growing season, but does have some direct contact with the ground. However, this chemical, as well as the other common pesticides and growth hormones used on crops in the county, are not persistent in the environment. These chemicals have short half-lives and tend to break down quickly (Collins, 1999a). Therefore, the potential for contamination of a reservoir due to current pesticide use on its underlying soils would be minimal. In addition, the existence of a 300-foot buffer zone around the proposed reservoir would restrict land use in this area, including future pesticide use. Thus, no impacts to human health and safety due to pesticide use at this site are anticipated.

The proposed dam at the Sturgeon Creek, 8.5 mgd site has been preliminarily assigned a Class C (High Hazard) classification by the engineer (Purkey, 2000a). As discussed in Section 3.2.11.1.2, the land immediately downstream of the proposed Sturgeon Creek, 8.5 mgd dam site is privately-owned by residents of Jackson County. Many residents live in this area, and their properties contain various types of structures, including homes, farm-related buildings, and associated infrastructure (Schmitt, 1999b). Due to the presence of these residences downstream of the dam, it was thought that a sudden breach in the dam could result in potential loss of life of one or more of these residents, and would cause damage to the structures in the area. Although the majority of these residents live at a higher elevation in the valley than is expected to be affected by surging waters resulting from a sudden dam failure, this may not apply to all residents and their properties.

**Class (C): High Hazard  
Classification**

According to Engineering Memorandum No. 5, Class C structures are those located such that failure of the dam might cause loss of life; serious damage to homes, industrial, or commercial buildings; or severe damage to important public utilities, major highways, or railroads.

**Raw Water Transmission Main**

Approximately 40,000 linear feet, or about 7.6 miles, of pipe would be required for the route of the water transmission main from the proposed Sturgeon Creek, 8.5 mgd reservoir site to the JCWA Treatment Plant (Kenvirons, 1999b). Most of this length would run alongside roadways in the county. Approximately 300 linear feet of streams would need to be crossed during the construction.

**3.2.11.2.3 Sturgeon Creek, 3.5 mgd**

**Dam and Reservoir**

As discussed in Section 3.2.11.2.2, it is assumed that the open dumps present on the proposed Sturgeon Creek, 3.5 mgd site do not consist of large quantities of hazardous wastes. Rather, these dumps most likely contain predominantly municipal solid wastes and scrap metal. Should these dumps become suspect for containing hazardous wastes, they would be evaluated and

cleaned up under the Kentucky Superfund Program in order to reduce risks to human health and safety and to the environment (Pratt, 1996). In addition, 401 KAR 100:050 Remedial Options Guidance, Site Characterization Guidance, and Risk Assessment Guidance offers a health and safety plan for workers involved in cleaning up contaminated or hazardous waste sites.

Pesticide and chemical use on crops in the watershed for the proposed Sturgeon Creek, 3.5 mgd reservoir could contaminate local soils, and as a result, potentially degrade the water quality of a reservoir within the watershed. Growth regulators, typically used twice per growing season, are not known to have significant effects on human health, and do not come into contact with soils (Collins, 1999a). The herbicide pendimethalin is also used twice per growing season, but does have some direct contact with the ground. However, this chemical, as well as the other common pesticides and growth hormones used on crops in the county, are not persistent in the environment. These chemicals have short half-lives and tend to break down quickly (Collins, 1999a). Therefore, the potential for contamination of a reservoir due to current pesticide use on its underlying soils would be minimal. In addition, the existence of a 300-foot buffer zone around the proposed reservoir would restrict land use in this area, including future pesticide use. Thus, no impacts to human health and safety due to pesticide use at this site are anticipated.

The proposed dam at the Sturgeon Creek, 3.5 mgd site has been preliminarily assigned a Class C (High Hazard) classification by the engineer (Purkey, 2000a). This classification is described in the text box in Section 3.2.11.2.2. As discussed in Section 3.2.11.1.3, the land immediately downstream of the proposed Sturgeon Creek, 3.5 mgd dam site is privately-owned by residents of Jackson County. Many residents live in this area, and their properties contain various types of structures, including homes, farm-related buildings, and associated infrastructure (Schmitt, 1999b). Due to the presence of these residences downstream of the dam, it was thought that a sudden breach in the dam could result in potential loss of life of one or more of these residents, and would cause damage to the structures in the area.

### **Raw Water Transmission Main**

Approximately 30,000 linear feet, or about 5.7 miles, of pipe would be required for the route of the water transmission main from the proposed Sturgeon Creek, 3.5 mgd reservoir site to the JCWA Treatment Plant (Kenvirons, 1999b). Most of this length would run alongside roadways in the county. Approximately 90 linear feet of streams would need to be crossed during the construction.

#### **3.2.11.2.4 No Action**

Under the No Change alternative, nothing would be done to meet the projected water and recreation needs of Jackson County. If nothing is done to meet the projected water needs, a water shortage would result throughout Jackson County in the near future, resulting in a significant adverse impact on human health and safety.

Under the No Action alternative, certain activities would be undertaken to increase the current water supply in Jackson County, although in insufficient quantities to meet the projected need. These activities may include drilling additional water wells throughout the County, constructing

water transmission lines from existing resources in Jackson County, such as intermittent streams, to the JCWA Treatment Plant, or instituting a water conservation program in the County. As the proposed project would not be constructed under the No Action alternative, residents would not be relocated, and any adverse effects on human health and safety from the site preparation, construction, operation, or connected actions associated with a dam and reservoir would not occur. However, given the current water supply in Jackson County, if any of the activities associated with the No Action alternative were to be undertaken, there would be a water shortage in the County in the future. In addition, residents would increasingly rely on well water, much of which is contaminated throughout the County, for their water needs, which could lead to sickness and hospitalizations. Therefore, the No Action alternative would result in a moderately significant adverse impact to human health and safety.

### 3.2.11.2.5 Summary of Impacts

The following table lists the potential impacts on human health and safety resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each alternative project site, including the No Action alternative.

<b>Table 3.2.11-1. Summary of Impacts on Human Health and Safety</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>• Degrade human health and safety from the risk of POL or hazardous material spills during storage and handling;</li> <li>• Affect public health from construction activities;</li> <li>• Affect human health and safety by degrading water quality during construction and operations;</li> <li>• Affect human health and safety by degrading air quality during construction;</li> <li>• Harm to recreational users of the reservoir; and</li> <li>• Degrade human health and safety due to a potential dam failure.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>• Degrade human health and safety from the risk of POL or hazardous material spills during storage and handling;</li> <li>• Affect public health from construction activities;</li> <li>• Affect human health and safety by degrading water quality during construction and operations;</li> <li>• Affect human health and safety by degrading air quality during construction;</li> <li>• Harm to recreational users of the reservoir; and</li> <li>• Degrade human health and safety due to a potential dam failure.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Degrade human health and safety from the risk of POL or hazardous material spills during</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> </ul>

	<p>storage and handling;</p> <ul style="list-style-type: none"> <li>• Affect public health from construction activities;</li> <li>• Affect human health and safety by degrading water quality during construction and operations;</li> <li>• Affect human health and safety by degrading air quality during construction;</li> <li>• Harm to recreational users of the reservoir; and</li> <li>• Degrade human health and safety due to a potential dam failure.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Degrade human health and safety from insufficient water supply.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately Significant to Significant</li> </ul>

### 3.2.11.3 Mitigation

To reduce the potential for an adverse impact on human health and safety from a hazardous material and/or POL spill during site preparation and construction activities, the study team recommends the development of SPCC plans for the areas in which these materials would be handled or stored. SPCC plans would provide guidelines for appropriate handling and containment of materials, as well as a contingency plan in the event of an accident.

To ensure the structural safety of the dam, the study team recommends that nuclear density testing equipment be used after the pouring and compacting of each lift in the dam structure to determine whether proper compaction is being obtained. In addition, electrical detectors are recommended to be used to assure that no holes are present in the PVC membrane.

To minimize the potential for an adverse impact to human health and safety from retained vegetation in the reservoir, the study team recommends that the retained vegetation be located as to maximize the safety of recreational users. This may be accomplished by retaining vegetation at a depth of water that would not impact boating or swimming activities, by placing buoys in the areas where vegetation is retained to warn users of its presence, or by leaving vegetation in areas where water level is low enough to allow for clear visual detection of the vegetation.

Should the use of motor boats be permitted on the reservoir, it is recommended that the boat ramp or dock be positioned far away from the water intake structure in order to avoid accidental fuel spills entering the intake (Skaggs, 1999). In addition, it is recommended that the water intake structure have multi-level portals so that water from deeper in the reservoir could be admitted in the event of accidental oil or fuel spills on the surface.

## 3.2.12 SOCIOECONOMICS

The purpose of this assessment is to describe the social setting in which the reservoir project would be implemented, isolate those elements of the social environment that may be affected, and describe the extent and magnitude of any anticipated effect or change. As with any natural resource development, the construction of a new reservoir can be expected to bring about major changes in the local community (Burdge and Johnson, 1977).

A socioeconomic impact becomes significant when the change is of sufficient magnitude or duration that there is a potential to alter the economic or social structure of a community, or the characteristic ways in which community members interact. Among others, these impacts may include alteration or change in the:

- employment and income of local residents;
- value and use of natural resources;
- built environment;
- demographic composition of the community;
- residential patterns of community members;
- availability and cost of social services and resources;
- community setting and character; or
- aesthetic and cultural values the community.

A community's response to potential changes is based on its previous history, the prevailing local culture, and the extent and magnitude of the changes that occur. The potential for impact is evaluated in terms of the community's ability to accommodate the change, and to adapt to meet its future needs. There are many aspects of a community, and changes in communities have many components. Among others, these include:

- source;
- duration;
- probability;
- geographic extent; and
- type of change.

The analysis identifies two major sources of project-induced impact in the affected community. The first is the effect of construction-related activity on the community immediately surrounding the proposed project site. The second is focused on the more indirect effects of the completed project on the structure and patterns of social life within the larger social community of Jackson County and the surrounding region.

The analysis also looked at both short-term and long-term effects. Short-term effects include the direct and indirect effects that result from changes in employment and increased spending in the local region due to project-related activity. Other short-term consequences may be linked to the physical effects of construction, operations, or associated transportation requirements. Longer-term effects may result from the acquisition of land for the project and the subsequent relocation

of residents, as well as changes in economic or social activity of the community as a whole. These effects may be either temporary or permanent, and would result in either positive or negative changes in the social environment.

The geographic frame of reference, or “context” of this analysis, has three distinct levels:

1. The neighborhood immediately surrounding the proposed project sites;
2. The community represented by the geographic boundaries of Jackson County; and
3. The regional community represented by Jackson County and its seven surrounding counties.

Three primary types of socioeconomic impacts are analyzed:

1. Effects on business and the local economy;
2. Effects on infrastructure and community resources; and
3. Effects on community structure and social patterns.

#### **Infrastructure and the Built Environment**

Infrastructure includes all public services and capital facilities, such as water, sewer, and electricity, needed for the growth of a community. The built environment encompasses all public or private structures other than infrastructure.

Business and the local economy includes the potential effect on employment and income in the community, as well as changes in the value and quantity of natural capital (land and natural resources) available to the community that may serve as a source of investment or raw material input to production. Effects on infrastructure and community resources relate to elements of the built environment; community infrastructure, such as utilities, energy, waste treatment, and transportation; services, such as police, fire, hospitals, and social assistance; and resources, including cultural, educational, recreational, and aesthetic. Community structure is a function of the demographic composition of the community and the

characteristic patterns of interaction and attachment to the community that may exist among residents. These variable areas are described in greater detail in Appendix M of this EIS.

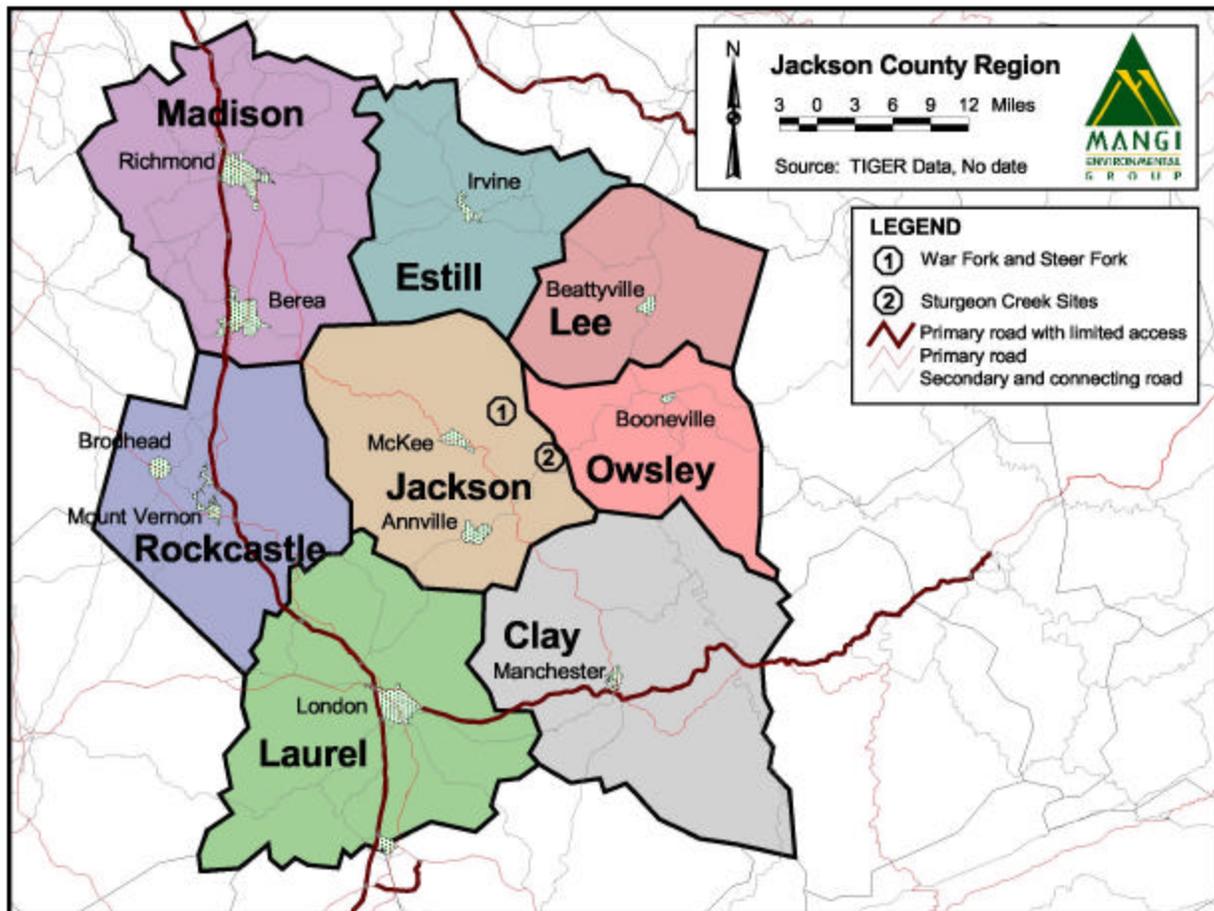
Wherever possible, potential impacts are quantified to provide a general description of the affected element. However, many of the potential impacts identified in this analysis cannot be directly measured. Where quantitative or measurable description is unavailable or inappropriate, assessment of impacts is based on qualitative description.

### **3.2.12.1 Affected Environment**

The affected environment for socioeconomic impacts is represented by the three levels described above: regional level, county level, and the community surrounding the proposed project sites. Section 3.2.12.1 provides a general discussion including all levels of analysis, from the immediate neighborhood to the entire region. Aspects of the affected socioeconomic environment that are specific to each proposed alternative project site are discussed in Sections 3.2.12.1.1 through 3.2.12.1.3.

*The Regional Level*

The regional level is composed of Jackson County and its seven adjacent counties (Clay, Estill, Laurel, Lee, Madison, Owsley, and Rockcastle). A map representing this eight-county region in relation to the three proposed dam and reservoir sites is presented in **Figure 3.2.12-1**. At the regional level, project-related impacts are expected to be primarily indirect and connected with the long-term operation of the proposed dam and reservoir. Limited effects would be anticipated from the construction activities associated with the proposed dam and raw water transmission main. Described below is an overview of the population and community statistics for Jackson County and the surrounding region. These provide a sense of how the area is growing and what its primary community traits are.



**Figure 3.2.12-1. Affected Socioeconomic Environment at the Regional Level**

With a base of 176,523 people, the regional population is primarily rural. Madison County, where less than half of the population is rural, is the only exception. As a whole, the region has grown modestly in recent decades. This is reflected by a nearly 10 percent increase in population from 1990 to 1996, and a 5 to 10 percent growth in new housing from 1980 to 1990. Residents of the region tend to stay in their homes for an extended time, forming social networks and connections that contribute to community stability. Approximately 37.2 percent of the

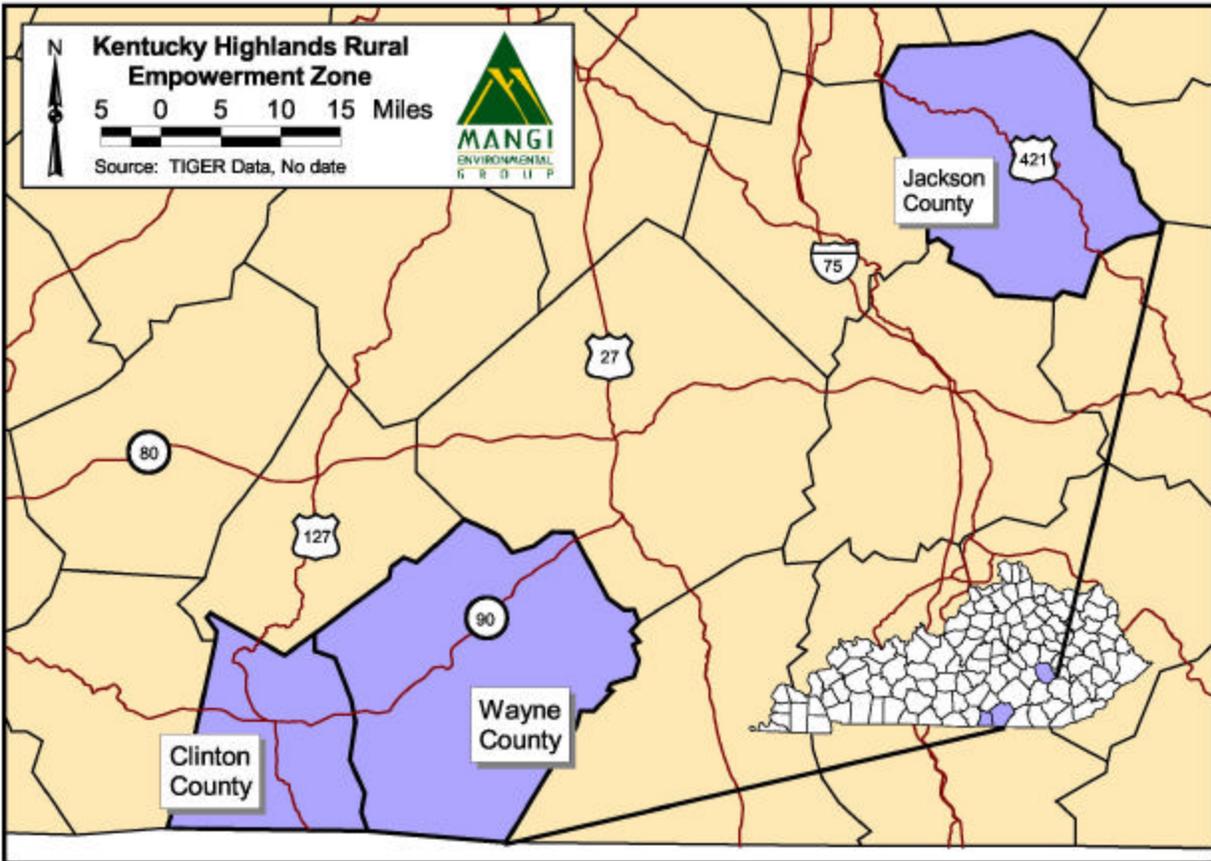
regional householders have lived in the same house for more than ten years (USBC, 1994). The increases in population and housing translate into more required connections to a public or private water supply. Currently, nearly 78 percent of all housing units in the region are connected to either a public or private water supply. However, that figure drops to only half of all residents when considering Jackson County by itself. More detailed statistics about the region's population, households, and housing units is provided in **Table M-1** in Appendix M of this EIS.

*The County Level: Jackson County*

Within the region, Jackson County represents the second level of the affected socioeconomic environment. It is the community most likely to experience the direct, as well as indirect, effects of the proposed action. With an estimated population of 12,832 (USBC, 1996), the County has experienced a growth rate similar to that of the region, approximately 7.5 percent during the past ten years. Jackson County is a predominately rural/agricultural community composed primarily of multiple, smaller communities (JCEC, Webpage). The largest city within the County is McKee, the County seat, with an estimated 1995 population of 975 residents. The social environment of Jackson County places a strong value on local cooperation, a small-town environment, and a sense of identity and attachment to the local area (JCEC, Webpage). Summary statistics about population, households, and housing units in Jackson County are provided as part of the regional summary presented in **Table M-1** in Appendix M of this EIS. The information in the table provides a picture of the different factors contributing to a community's social and economic health.

Jackson County is part of the Kentucky Highlands Empowerment Zone (EZ/EC). Located in southeastern Kentucky, the three counties that make up this Empowerment Zone are Jackson County, Wayne County, and Clinton County. **Figure 3.2.12-2** shows these three counties. With a total estimated combined population of 40,804 (USBC, 1996), these counties have limited development opportunities due to limited infrastructure, geographic isolation, and a shortage of business investment capital (EZEC, No date).

Jackson County has been designated as a Rural Empowerment Community within the EZ/EC. The proposed dam and reservoir project represents a significant benchmark for the EZ/EC program. Other important goals of the EZ/EC include business development and workforce enhancement, expansion of tourism, and development of additional investment financing (USDA, No date). The proposed project would be located within Jackson County, and the remaining two counties in the EZ/EC are not expected to benefit directly or indirectly from any additional employment or income generated by the project, as well as increased availability of water resources and recreational opportunities (Hayes, 2000b). The construction of the reservoir would meet one goal of the EZ in water provision, and other goals of the organization could then be pursued.



**Figure 3.2.12-2. Counties Within the Kentucky Highlands Empowerment Zone**

*The Communities Immediately Surrounding the Proposed Project Sites*

The residences and neighborhoods immediately adjacent to the actual project sites represent a third, distinct level of social community that may experience impacts from the proposed action. The direct physical changes resulting from the proposed action are most likely to be experienced at this level. Other direct and indirect effects on the local community may also be experienced as a result of the land acquisition required for the project. For each alternative proposed project site, community-level statistics provide the same overview of the area as given for the region and Jackson County.

**Raw Water Transmission Main**

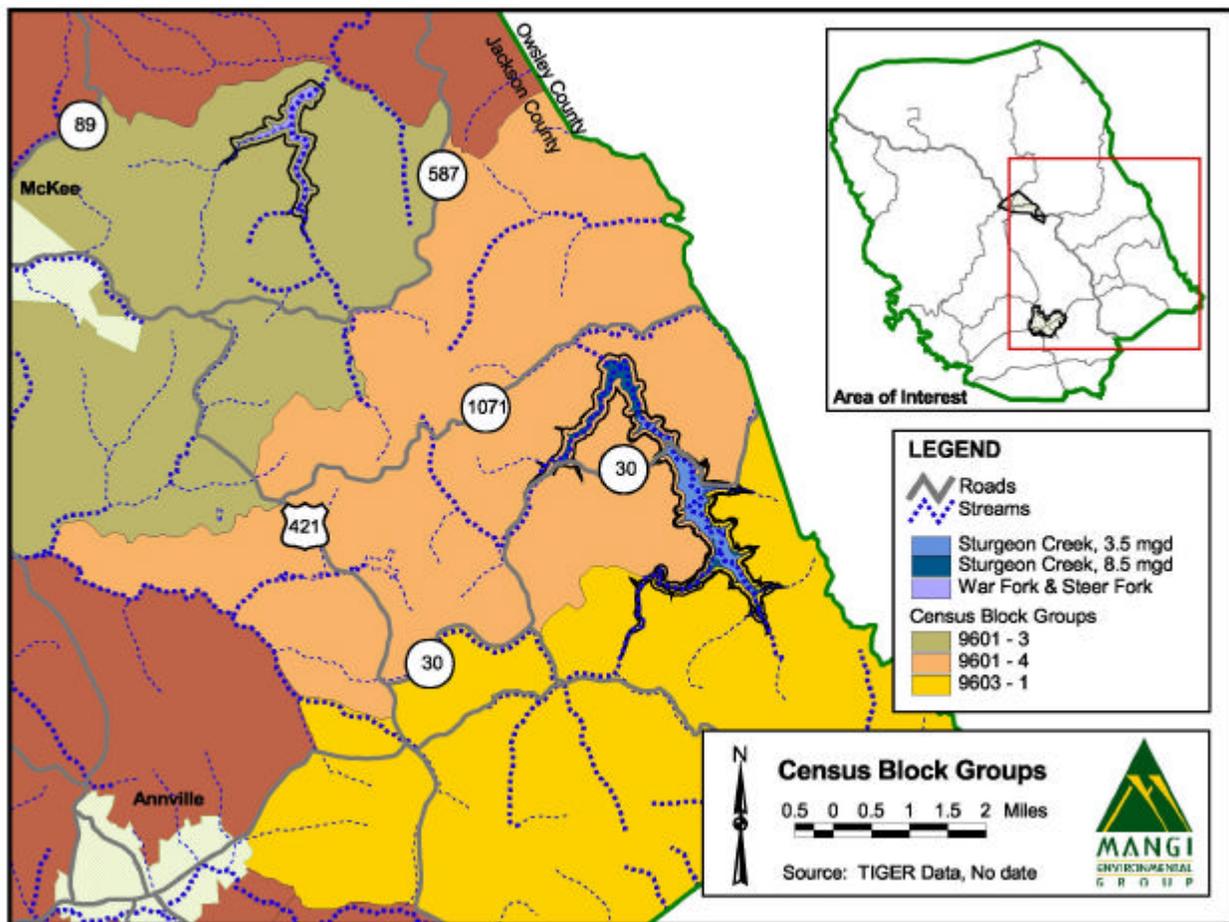
The raw water transmission main leading from the proposed reservoir at each alternative proposed project site would follow mostly alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW) to the JCWA Treatment Plant at Tyner Lake.

### 3.2.12.1.1 War Fork and Steer Fork

#### Dam and Reservoir

The proposed War Fork and Steer Fork dam would be located in eastern Jackson County, approximately 0.5 miles southwest of Turkey Foot. The total acreage required for a reservoir up to normal flood level, with a 300-foot buffer extending from the normal pool level, at this site would be approximately 327 acres of land.

The affected community would be the area defined by Census Block Group 9601-3, which entirely contains the proposed War Fork and Steer Fork project site. The geographic area of the affected socioeconomic environment at the War Fork and Steer Fork site is shown in **Figure 3.2.12-3**.



**Figure 3.2.12-3. Affected Socioeconomic Environment for the Proposed War Fork and Steer Fork and Sturgeon Creek Project Sites**

The proposed dam and reservoir would be located in a relatively low-density area of Jackson County. The proposed project area, at present, is predominately forestland with some cropland

and pasture located to the southwest. Approximately 87 percent of the required land is managed by the U.S. Forest Service (USFS). The remaining land is in private ownership.

The total population of residents in the affected community around the War Fork and Steer Fork project site is 1,635 (USBC, 1992). Minority populations represent less than 0.2 percent of the total population. In 1990, the community was made up of 639 households. Median household income in 1989 was \$8,863, while per capita income was \$6,380 (USBC, 1992), substantially lower than that for Jackson County as a whole which was \$7,097. Approximately half of the total community population was living at or below poverty in 1990. The median value of all housing in this community was \$25,100 in 1990. Of the 691 total housing units in the War Fork area, 607 use either a public system or private company as a source of water.

The percentage of homes in this area on a water supply, nearly 88 percent, is higher than the County's average of approximately 50 percent. The residential pattern is somewhat stable, with 33 percent of all householders having lived in the same house for 10 years or more, and 51 percent for five years or more. Culturally important structures within the immediate vicinity of the War Fork and Steer Fork project site include three churches and a school.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed War Fork and Steer Fork reservoir would run approximately 9.5 miles to the JCWA Treatment Plant. All but approximately one mile would follow alongside existing roadways in the KDOT or County ROW. The transmission main would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road. The main would run southwest along Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the transmission main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water (Kenvirons, 1999d).

Socioeconomic effects of the construction of the water transmission main from the proposed War Fork and Steer Fork reservoir would not be expected to extend significantly beyond the ROW. In addition to relatively unpopulated areas, the affected ROW also includes less densely-populated areas and two churches, which may be considered important to the culture of the community.

#### **Census Information**

Identifying characteristics of a community by census block groups provides detailed information at the local community level, such as the area around the alternative project sites. Census data is compiled once every 10 years, and only population can accurately be projected until the next census is performed. Census statistics other than population are created from a subset of the national data and cannot be accurately projected into the later years of a decade. Much of the data used in the site descriptions presented here and analyses is from 1990. Data from the 2000 census will not be available until 2002.

### 3.2.12.1.2 Sturgeon Creek, 8.5 mgd

#### Dam and Reservoir

The proposed Sturgeon Creek, 8.5 mgd dam would be located in eastern Jackson County, near the boundary between Jackson and Owsley Counties. The dam would be situated approximately 1.5 miles northeast of the community of Mummie. The total acreage required for a reservoir up to normal flood level at this site, with a 300-foot buffer extending from the normal pool level, would be approximately 1,059 acres of land. The socioeconomic environment that may be potentially affected includes properties and structures located within the proposed impoundment area, immediately adjacent to the buffer zone, and in the surrounding neighboring community.

To characterize the surrounding socioeconomic environment, the community contained within Census Block Groups 9601-4 and 9603-1, both of which contain and border the proposed Sturgeon Creek, 8.5 mgd project site, have been identified as the affected community. The geographic area of the affected socioeconomic environment at the Sturgeon Creek, 8.5 mgd project site is shown in **Figure 3.2.12-3**.

The proposed Sturgeon Creek, 8.5 mgd dam and reservoir would be located in a portion of Jackson County that is predominately low-density residential and agricultural. Much of this area is considered prime agricultural land and is used primarily for tobacco, corn, and some pasture activity (Henderson, 1999). The approximate area of this farmland in the Sturgeon area, 670 acres, constitutes 1.6 percent of all farmland in Jackson County. Approximately 50 homes and their associated structures, including barns and other outbuildings, are currently located within the proposed Sturgeon Creek, 8.5 mgd project site (Schmitt, 1999f).

The total population of residents in the affected community around the Sturgeon Creek, 8.5 mgd project site is 2,225 (USBC, 1992). The population of the Sturgeon area is concentrated primarily in the northern section of the affected community. Minority populations, comprised almost exclusively of persons identified as Native American, represent approximately 0.1 percent of the total population. In 1990, the community was made up of 795 households. Median household income in 1989 was noticeably higher than that for Jackson County as a whole (\$7,097), ranging from \$12,077 for those residents in the more northern portion of the affected community (Census Block Group 9601-4) to \$14,531 for those at the southern end (Census Block Group 9603-1). However, per capita income averaged for the community as a whole was \$6,451. This was slightly lower than that for Jackson County in 1989, and reflects the substantially lower per capita income level found in Block Group 9601-4 (USBC, 1992). Of the total community population, 35.7 percent were living at or below the poverty level in 1990. The median value of all housing this area in 1990 was \$36,300.

**Median Household Income** is the income level that divides the income distribution of all households in a given area, in this case, census block groups, into two equal groups, half of the households having incomes above the median, half having incomes below the median.

**Per Capita Income** is the average income computed for every person in a given area, excluding patients or inmates in institutional quarters. Per capita income is derived by dividing the total income of every person in a given area by the total population within that area.

53 percent of the 885 housing units within this area use either a public system or private company as a source of water. This is approximately the same percentage as found in Jackson County as a whole. The residential pattern demonstrates a strong tendency toward stability, with 67 percent of all household residents having lived in the same house for five years or more, and 46 percent for ten years or more. Culturally important structures within the immediate vicinity of the Sturgeon Creek, 8.5 mgd project site include two cemeteries and a school.

### **Raw Water Transmission Main**

The raw water transmission main leading from proposed Sturgeon Creek, 8.5 mgd reservoir would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

Socioeconomic effects of the construction of the raw water transmission main would not be expected to extend significantly beyond the ROW. The existing ROW along this route lies entirely within the community described above for the proposed Sturgeon Creek, 8.5 mgd dam and reservoir.

### **3.2.12.1.3 Sturgeon Creek, 3.5 mgd**

#### **Dam and Reservoir**

As the Sturgeon Creek, 3.5 mgd project site lies completely within the Sturgeon Creek, 8.5 mgd site, the affected socioeconomic environment at the Sturgeon Creek, 3.5 mgd site is the same as that discussed in Section 3.2.12.1.2. The socioeconomic environment that would be potentially affected includes properties and structures located within the impoundment area, immediately adjacent to the buffer zone, and in the surrounding neighboring community. The geographic area of the affected socioeconomic environment at the Sturgeon Creek, 3.5 mgd project site is shown in **Figure 3.2.12-3**.

The total acreage required for a reservoir up to normal flood level, with a 300-foot buffer extending from the normal pool level, at the Sturgeon Creek, 3.5 mgd project site would be approximately 586 acres of land. The proposed dam and reservoir would be located in a portion of Jackson County that is predominately low-density residential and agricultural land. The agricultural land in the Sturgeon 3.5 site comprises 450 acres, approximately 1.1 percent of all farmland in Jackson County. The land required for the proposed reservoir and buffer zone is entirely privately-owned. Approximately 30 homes and their associated structures, including barns and other outbuildings, are located within the proposed Sturgeon Creek, 3.5 mgd project site (Schmitt, 1999f). The statistical summary for the affected socioeconomic environment for the Sturgeon Creek, 3.5 mgd project site is the same as that presented in Section 3.2.12.1.2. The Census block groups used for the Sturgeon Creek, 8.5 mgd alternative are also applicable to the Sturgeon Creek, 3.5 mgd alternative, thus remaining the level of analysis and data collection for this analysis.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir would run northwest alongside an unnamed road, turning southwest and intersecting Mummie-Grassy Creek Road. The main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e).

The socioeconomic affected environment for the construction of a raw water transmission main leading from this reservoir site would be similar to that defined for the Sturgeon Creek, 8.5 mgd alternative presented in Section 3.2.12.1.2.

## **3.2.12.2 Environmental Consequences**

Socioeconomic impacts are the result of changes in the structure and patterns of the social life of community residents, and the manner in which social resources, such as physical, natural, and human resources, are defined and utilized. Significant socioeconomic effects occur when people's lives are noticeably altered by a project. Effects can include residential relocations, job gains or losses, land use changes, population changes, business gains or losses, and changes in public services.

This section discusses impacts common to all alternative project sites. Sections 3.2.12.2.1 through 3.2.12.2.3 discuss socioeconomic impacts that are site-specific. The impacts of the dam, reservoir, and water transmission main are combined for the environmental consequences analysis, recognizing the dependent nature of the two projects. To assess the entire impact of providing water to the community, both elements must be considered together.

As shown in the environmental diagram, **Figure 3.1-1**, the potential impacts on socioeconomics from the construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main are:

- Increased income and employment during construction;
- Increased income and employment resulting from increased development potential associated with the completed project;
- Increased revenues to the County tax base;
- Disrupted community structure and social relations due to residential relocations from the project area;
- Physically-altered community setting due to changes in land use and demographic structure resulting from the project;
- Increased land value around the proposed reservoir; and
- Potential for community conflict over beneficial and adverse consequences of the project.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

### Dam and Reservoir

Construction activities and land acquisition associated with the proposed project may cause changes in the employment, income, and tax revenue base of the community, as new business and job opportunities are created and land is removed from the productive tax base. Capital expenditures for project-related materials, employment, and land acquisition, as well as the physical alteration of the community setting, are also important sources of potential change. Money spent for such project costs such as those mentioned above circulates through the local economy and benefits individual landowners. Direct payments for land to landowners stimulate local spending and investment as citizens purchase other lands in the County.

#### Calculating Project Input into the Economy

Each dollar that enters an area's economy tends to enable the person or business receiving it to increase his own spending on local goods or services. The recipients of this spending, in turn, can increase their spending. Each new dollar brought into a community's economy produces somewhat more than \$1 in spending. An economic study by Holland (1994) found that throughout this area of the country, and for an employment base similar in size to the study region, this spending multiplier effect is about 2.2. That is, every \$1 generates about \$2.20 of spending. This estimated multiplier was applied to the direct project costs to estimate the overall economic impact. The resulting figure was then divided by the total population for an estimate of the average income increase per person.

The cost estimates for the proposed dam and reservoir project presented in Sections 3.2.12.2.1 through 3.2.12.2.3 are probably understatements because they do not include the cost of conservation easements, or other form of acquisition, in the proposed 300-foot buffer zone surrounding the reservoir. Estimates for the 300-foot buffer zone are not presently available. Additionally, the information regarding provision of materials for the raw water transmission main is unavailable. Because of this, the distribution of estimated site-specific project costs for the raw water transmission main are assumed to be proportioned like the dam and reservoir costs within Jackson County.

#### Valuing Natural Resources

Because of the need to acquire extensive acreage for the proposed dam and reservoir, it is reasonable to assume that some natural capital assets may be lost as a result. Natural capital assets do not necessarily have easily defined dollar amounts. A change in the quantity or condition of the land from its former use may result in a decrease in agricultural production, timber value, or in the reduction of residential land, thus affecting the local economy. However, the impacts from these land use changes on the economy of the region or of Jackson County would be minimal, as the percentage of affected land would be small compared to the total amount in the affected community.

**Natural Capital Assets:**  
Environmental resources representing the useful materials that are the raw input or consumable products of human production, such as land, soil, minerals, water, and wetlands.

Residential Relocation and Disruption of Community

In addition to a direct physical impact on the natural environment, a substantial impact can be anticipated for those individuals affected by the loss of a property or home (Ludtke and Burdge, 1970). Residential relocation would result in the significant disruption of existing neighborhoods and potentially the demographics of the affected area. Relocations may also change the patterns of interaction and the structure of important residential support networks (Burdge, 1987).

The proposed project may also impair or disrupt the local community through changes in the built environment, infrastructure, or other resources important to the local community. Changes to the built environment may result from the demolition or relocation of structures currently located in the proposed project area. These changes, either beneficial or adverse, could substantially alter the perception of the quality of life available in the community once the project is completed. However, as noted later in this section, impacts on community services and resources would largely depend upon existing levels at the time of construction and operation.

Recreation Facilities and Associated Impacts

The proposed recreational facilities to be developed around the reservoir may represent an attractive feature of the community, serving to assist further residential development and provide an additional source of income and employment to the community through the use of the resource by outside visitors to Jackson County. The number of jobs created by the reservoir would be insignificant at each alternative site, as facilities and recreation opportunities provided would most likely be self-serve. Exact calculations of employment generated by each alternative would require more detailed information on exact features of the recreation areas.

Impacts on Community Services

Temporary requirements during project construction and increased demand resulting from recreational uses of the proposed reservoir over the longer-term may affect the requirements for and availability of basic services such as shopping, food, and entertainment. Social services, such as hospitals and medical facilities, public assistance entities, educational, or social support services may also be affected. The degree of impact would depend on the facilities existing at the time of operation and the number of visitors and new residents entering Jackson County. The level of service, service viability, and level of satisfaction of local residents may be directly affected (Hollis et al., 1999).

The potential for increased recreational use of the lake by both residents and tourists can be expected to correspondingly increase demand for local police, fire, emergency health, and other infrastructure-related services in the region (Burdge, 1987). Stresses on transportation would not be significant, as the current transportation network can handle the additional traffic from construction workers and trucks hauling materials. Section 3.2.9.1 of this EIS discusses the existing transportation network in the County. Traffic volumes would not be significantly affected; however, emergency services could be temporarily slowed if encountering a specific truck near a project site. The significance of stresses on other services such as police, fire, and

emergency health would depend on existing service levels at the time of operation and existing local budgetary allocations for such activities. Infrastructure impacts are of concern since the cost and quality of public services has an influence on residents' sense of well-being and satisfaction with the community (Burdge, 1995).

The significance of the stress caused on these services would depend largely on the nature of the development in the upcoming years. If residential development outruns commercial and industrial development, services would be in more demand and the current tax base would have difficulty with long-term provision. Increased industry and commercial ventures would provide greater benefit to the tax base than would increased residential development. The median costs for providing community services for commercial and industrial uses is \$0.28 per dollar of tax revenue raised. Residential uses require \$1.15 per dollar for required services (AFT-FIC, 1999). Thus, the development of industrial and commercial uses is a method of increasing a local tax base without draining it through the requirement for providing services.

Impacts of Potential New Development on Economy

Any properties adjacent to the project site may be subject to increased value and subsequent development pressure due to the enhanced quality associated with lakefront property. Several types of impacts due to new development are possible.

**Assessments (Tax):** The determination of an individual property's tax to be collected based on the estimated tax rate.

Increased assessments on residential property, creation of new jobs from construction, and increased County revenues from taxation are all potential impacts. The significance would vary between the impacts. The creation of jobs from development-associated construction would be insignificant,

as would the effect on the local economy from new spending.

Impacts of future lakefront development would vary between the alternatives. Even with the highest level of potential development occurring around a project site, impacts would be potentially insignificant to the economy of the County and region. It is difficult to predict a specific number of new homes; however, general assumptions of lot frontage around the different sites can lead to an estimate of potential lots. New homes would be constructed over a period of years and would not require a significant number of new jobs, even under the worst-case scenario of buildout. People owning the homes could be current residents of the County, or they could be residents of other counties moving into Jackson County. Whether they are full-time residents throughout the year, or only seasonal, the number of new residents generated by the potential development would not be expected to significantly impact the local economy.

The changes in property values of newly created lakefront property, however, would be significant, as land once considered rural farmland becomes lakefront property. Tax assessments on the newly formed lakefront parcels would likely significantly increase (Rose, 2000). These increases would be rated as significant for the Sturgeon Creek and War Fork and Steer Fork project sites. Each site has different development potential; however, that difference would not affect the location-induced increase in property values. Whether 10 percent or 90 percent of the lakefront land is developable, assessments would still increase due to the benefit of being lakefront property. Newly assessed lakefront property would generate new revenues for Jackson

County. The generation of higher assessments for the individual properties translates into new tax revenues for the County. Any tax revenues on land removed from the tax base due to inundation from the proposed reservoir would be surpassed by increased assessments on the newly formed lakefront property (Rose, 2000). Currently, the highest assessed values of residential land in the County, nearly \$15,000 per acre, are lakefront properties around Tyner Lake. Thus, the trend for higher values within Jackson County already leans towards increased assessments with frontage on a lake (Rose, 2000).

The impact of property taxes on the tax base in Jackson County would not be significantly beneficial if predicted industrial and economic development were to occur. Although these uses contribute to a more balanced tax base, the small number of acres predicted for new industrial and economic development is not a significant percentage of the total land in the County. The amount of development of new industrial land by the year 2050, 321.87 acres, equals only 0.2 percent of the total taxable land in Jackson County (MEG, 1999c).

#### Potential Regional Economic Development

In addition to enhanced recreational opportunities and a potable water supply, the long-term effect of a new reservoir could be expected to increase the desirability of the local community both as a place to live and as a vehicle for economic investment. Both of these are supportive of the EZ/EC goals and would be considered advantageous to the local community. However, some increased demand on infrastructure would be experienced as a result of any subsequent development or use of recreational resources afforded by the reservoir.

The impact of business development induced by the proposed reservoir could be potentially significant. The reservoir is a necessary piece of the puzzle for economic development in the region; however, it is not sufficient by itself to significantly improve the current situation. According to Bartik (1991), evidence supports that the “provision of local public services has a strong positive effect on regional business growth,” and that education and infrastructure are the public services having the largest positive effect on this growth.

Since the inception of the EZ in 1995, over 1,100 jobs have been created in Jackson County and are directly attributable to the presence of the EZ. Unemployment has fallen in the County from 12.4 percent in 1990 to 2.9 percent at the end of 1999. Approximately 125 additional jobs are expected to be created in the County this year (Hayes, 2000b). Within the Cumberland Valley region, unemployment stood at 4.9 percent at the end of 1999 (KYDES, 1999). In addition to monitoring unemployment rates, poverty rates are also a defining issue within Empowerment Zones.

For EZ eligibility, an area must meet several criteria. These criteria state that poverty rates for each census tract equal or exceed 20 percent, the area is limited to 1,000 square miles or less, and that the population of the area not exceed 30,000 people (JCEC, Webpage). Once the results from the current census are released in 2002, it will be possible to assess whether Jackson County would still fit these defining criteria if applying today. Another set of criteria defining economic distress are those used in the State of Kentucky under the Kentucky Rural Economic Development Act (KREDA) program. Under KREDA, funds are available for projects to

expand industry and opportunity in counties. Eligibility is based upon the unemployment rate of a county (KCED, 1996). Although Jackson County has been involved in the program in the past years, it will no longer meet eligibility beginning this year (Hayes, 2000b). This could be interpreted as a positive sign of economic progress within the area.

Transportation projects such as the Big Hill Project on US 421, discussed in Section 3.2.9.1 of this EIS, will improve access to the County; however, the improvement of this road and others like it is not the key to transportation infrastructure improvements. Location to major arterials, such as freeways, is a crucial component for industrial location. The County cannot change its location in relation to the interstate; however, other transportation options exist to improve high-volume access to the County. In regards to water, some businesses are currently not able to utilize their entire building space due to the lack of adequate water supplies for fire protection purposes. Attracting future industry to an area where business cannot fully utilize their investments would be difficult.

**Tools for Rural Economic  
Development**

Economic development in rural areas can be achieved using various methods of investing in a community. The Jackson County EZ incorporates many of these strategies in their program plans to attract business. Tax incentives attract industry to locate in an area, while venture capital and a business incubator network provide needed start-up capital investments for business. Job-force training is necessary to provide the workforce for these new industries, and adequate infrastructure, such as water, sewer, and roads must be constructed to allow the businesses and industry to create an economic base for the community.

Different types of infrastructure currently serve the industrial parks in Jackson County. Annville Industrial Park is served by a package treatment plant, Clover Bottom Industrial Park by grinder pumps and septic fields, and the McKee Industrial Park by a sewer. Sewers exist in McKee, available to potential commercial or other business ventures within the city limits. Currently, the primary inhibitor to growth of industry in Jackson County is the provision of utilities such as water and sewer. An incentive for industry to locate in the existing industrial parks rather than other locations in the County is the availability, or potential of, such infrastructure (Hayes, 2000b).

The jobs created by construction, recreation, and potential industry and commercial ventures may increase the population of Jackson County as a whole. This analysis specifically addresses jobs created by construction of the proposed dam, reservoir, and raw water transmission main. However, without detailed

information on specific industries or ventures targeted, a definitive judgment on the significance of job creation in relation to population growth would be premature.

**Raw Water Transmission Main**

Impacts to the socioeconomic environment associated with the construction of the raw water transmission main from the proposed reservoir to the JWCA Treatment Plant are expected to be insignificant. Since the water main would run mostly alongside existing roadways in the KDOT or County ROW, no major changes to the socioeconomic conditions, such as acquisition of additional land for the project or permanent disruption of neighborhood settings along the route, would be anticipated.

Some temporary disruption of traffic and local neighborhood activity may be anticipated during construction. These would be the typical “nuisance” characteristics associated with any highway construction project, including noise, dust, and impeded traffic flow. However, these disruptions would be of relatively short duration in any single area of the proposed route and would not be expected to represent a major impact to any neighborhood. Because the completed water main would be located underground, no long-term impairment of the socioeconomic setting of the affected community would be anticipated.

### **3.2.12.2.1 War Fork and Steer Fork**

The proposed War Fork and Steer Fork project site would be located in a relatively unpopulated area of Jackson County. Associated impacts on surrounding communities resulting from activities that are required during construction would be insignificant. Since there are no households currently living on the War Fork and Steer Fork project site that would need to be relocated (Schmitt, 1999f), the potential for disruption of the local community or social services would be insignificant. Withdrawal of land from the economic base would not represent a significant change in the value and quantity of available land in the community because a majority of the land is publicly-owned and not currently part of the taxable land base of the County.

Construction of the dam, reservoir, and water main at the War Fork and Steer Fork project site can be expected to have an insignificant effect on the regional economy. Of the total estimated project cost of \$9,418,000 (Kenvirons, 1999a), it is assumed that at least \$3,107,940, or 33 percent, would be spent for materials and supplies purchased outside the region, such as cement, sand, and gravel. Using a conservative estimate, it can be assumed that the remaining portion of the contract cost of \$6,310,060, or 67 percent, would be spent within the eight-county region. Although the contractors for the proposed dam have not yet been designated, it is reasonable to assume that the regional economy is sufficiently large to be able to provide a large portion of the labor and management for the project, as well as the bulk of the remaining project materials. Approximately 40 jobs would be created during construction at the War Fork and Steer Fork site, and the skill levels of the positions required are available within the County and the region (JCEC, 1999). Spending by construction workers associated with the project would also be an insignificant increase to the economy, totaling an average of \$301,200 per year. The total multiplied project input to the regional economy would be equivalent to \$20,719,600. This would result in an estimated increase of \$107.00 in the per capita income of the region, a 1.5 percent increase. This increase represents the average per person amount by which the economy would benefit from this project in a year. The amount is insignificant as a percentage of the per capita income for the County and region.

Acquisition of the approximately 327 acres of land required for the normal pool level of the proposed reservoir, with a 300-foot buffer extending from the normal pool, at the War Fork and Steer Fork site would represent an insignificant impact to local community. The total land area required represents less than 0.2 percent of the total land area of Jackson County. Since the land currently designated for this project site is predominately publicly-owned, the immediate impact on the local community would be minimal. 44 acres of the land required are private and taxable, representing only 0.02 percent of the total taxable land in Jackson County. However, the

proposed acquisition of this land through an exchange with the USFS may represent a potential for impact on the community. This exchange would require Jackson County to identify and provide at least an equivalent acreage from other County-owned or private land located within the County. While an offer of equivalent acreage would be seriously considered, one of equal value is preferred by the USFS (Strojan, 1999b). The required land exchange with the USFS at the War Fork and Steer Fork project site is discussed in detail in Section 3.2.8.2.1 of this EIS.

Although it may reasonably be assumed that any land offered in exchange to the USFS would not require the relocation of residential populations, some opposition to the land exchange may be anticipated from local stakeholders. The actual impact of the land exchange is difficult to anticipate until the equivalent land for exchange has been identified. The selection of land would be optional and subject to negotiation between the County and the USFS. However, the creation of an acceptable exchange would still be expected to create community concern over the loss of natural resource opportunities associated with the existing National Forest.

Since the area surrounding the proposed War Fork and Steer Fork site is relatively unpopulated, minimal disruption of local community activity during construction may be anticipated. As mentioned in Section 3.2.12.2, impacts on services and infrastructure at the sites would be insignificant. As with any large-scale resource development project, the most significant impact of the proposed dam and reservoir at the War Fork and Steer Fork site would be associated with the potential alteration of the local setting and the loss of any associated resources or current uses of the site.

### **3.2.12.2.2 Sturgeon Creek, 8.5 mgd**

The location of the proposed dam at the Sturgeon Creek, 8.5 mgd site is in close proximity to the small community of Mummie and lies in an area that is characterized by low-density rural population and agricultural land. Impacts to surrounding populations resulting from construction activities would be insignificant in this area. Temporary and insignificant impacts would affect the local community around the project site and along transportation routes from the transportation of materials and equipment to the project site during the construction phases. Significant impacts on community life are anticipated during construction and operation of the proposed reservoir.

Approximately 1,059 acres of land would need to be acquired from private sources for a reservoir, up to normal pool level, with a 300-foot buffer zone extending from the normal pool, at the Sturgeon Creek, 8.5 mgd site. The total estimated cost of construction for the dam, reservoir, and water main would be \$12,400,000 (Kenvirons, 1999b). Of the total estimated cost, it is assumed that at least \$4,588,000, or 37 percent, would be spent on materials and supplies purchased outside the region, such as cement, sand, and gravel. Based on the most conservative estimate, it can, therefore, be assumed that the remaining portion of the contract cost of \$7,812,000, or 63 percent, would be spent within the eight-county region. Although the contractors for the proposed dam have not been designated, it is reasonable to assume that the regional economy is sufficiently large to be able to provide a large portion of the labor and management required for the project, as well as the bulk of the remaining project materials. Approximately 48 jobs would be created during construction at the Sturgeon Creek, 8.5 mgd site,

insignificant to the total County workforce. The skill levels of the positions required are available within the County and the region (JCEC, 1999). Spending by construction workers associated with the project would also be an insignificant increase to the economy, totaling an average of \$361,440 per year.

**Capital:** Capital refers to all nonhuman resources, such as machinery, equipment, and buildings, used to produce goods and services either directly or indirectly. Also known as investment goods.

In addition to the initial cost of project construction, the local community would experience a capital infusion associated with the purchase of fee title or easement rights to the land required for the proposed dam and reservoir. Payments for private land would provide landowners with new sources of capital, which could be used for improvements of their private residences or purchases of new land. Through these different uses of capital, the money would eventually circulate through the local and regional economy. An additional input of \$4,935,000 for land survey and appraisal, land acquisition, and residential relocation would be anticipated (Kenvirons, 1999b). Using the most conservative estimate for the acquisition inputs, the money would circulate primarily through the eight-county region. Adding the multiplied acquisition and construction cost totals would result in a total project input of \$38,137,000. This would result in an estimated increase of \$197.00 in the per capita income of the region, a 2.8 percent increase. This increase represents the average per person amount by which the economy would benefit from this project in a year. This amount would be insignificant as a percentage of the per capita income for the County and region.

The total acreage required for inundation represents only 0.65 percent of the total taxable land and less than 0.5 percent of the total land area of Jackson County. The purchase of land for the Sturgeon Creek, 8.5 mgd project site can be expected to present potentially adverse effects on the local community in the form of an inflationary pressure on existing land prices. As stated in Section 3.2.12.2, the tax base would not be adversely impacted. Due to agricultural land taken out of production, new assessments would compensate for any lost revenue (see text box on use values). The agricultural land removed comprises approximately 2.6 percent of Prime Farmland in the County, and is not a significant impact on agriculture in the area.

#### Use-Value Land Assessments

A deferred assessment program, also referred to as use-value, taxes land at its agricultural value instead of its market value. The use-value is often a small percentage of market value. In Kentucky, parcels greater than ten acres that have open land, agriculture, or forests, are taxed at use value. Parcels smaller than ten acres are taxed at full market value.

The requirement to relocate residents who currently live on the land presents a significant adverse impact on the local community. At the Sturgeon Creek, 8.5 mgd project site, an estimated 50 households, including 35 barns and 66 assorted outbuildings, would be potentially affected. Given the average of 2.71 persons per household prevalent in Jackson County, relocation of these existing households would potentially affect an estimated 135 individuals.

Relocation of residents can disrupt social networks on which local families, both those relocated and those that remain in the area, rely for social and economic support. Changes to the demand and availability of community services and resources associated with the construction of the proposed dam would also be expected. Particularly in rural and agricultural areas, relocation

may also have the effect of reducing the economic and cultural diversity of the community as smaller, more marginal farms are eliminated, concentrating ownership in fewer, larger holdings (Burdge, 1987). Changes in the local region can also make acquisition of land for establishing a new farm more difficult.

The alteration of the community setting represents a second source of potentially significant impact associated with the construction of a dam and reservoir at the Sturgeon Creek, 8.5 mgd site. A potential for conflict between local stakeholders who are unwilling to leave their property, for ancestral or other reasons of attachment, those who oppose the project or do not perceive its benefits, and those who are project proponents is possible. This potential for conflict may cause disruption of community life and may form permanent cleavages within the community as a whole.

### **3.2.12.2.3 Sturgeon Creek, 3.5 mgd**

The proposed reservoir at the Sturgeon Creek, 3.5 mgd site would be expected to have impacts similar to those identified for the Sturgeon Creek, 8.5 mgd alternative. However, the reduced size of the proposed reservoir, up to normal pool level, would require the withdrawal of only about 586 acres from the economic base. The total acreage required for inundation represents only 0.35 percent of the total taxable land and less than 0.26 percent of the total land area of Jackson County. This smaller withdrawal would be expected to have a correspondingly smaller effect on the communities both adjacent to the project site and in the greater Jackson County area as a whole. Although fewer households would be involved, and the total cost of residential relocation would be reduced, similar impacts on the character of the community and to local residential support networks could be anticipated, as discussed in Section 3.2.12.2.2. Similarly, withdrawal of the required land from the economic base would not result in a noticeable change in the value and quantity of available land in the community and would not detrimentally impact local resources in the form of lost revenue from the tax base.

The total estimated cost of construction for the dam, reservoir, and water main would be \$7,400,000 for the Sturgeon Creek, 3.5 mgd alternative (Kenvirons, 1999b). Of the total estimated cost, it is assumed that at least \$2,368,000, or 32 percent, would be spent on materials and supplies purchased outside the region, such as cement, sand, and gravel. Based on the most conservative estimate, it can, therefore, be assumed that the remaining portion of the contract cost of \$5,032,000, or 68 percent, would be spent within the eight-county region. Although the contractors for the proposed dam have not been designated, it is reasonable to assume that the regional economy is sufficiently large to be able to provide a large portion of the labor and management required for the project, as well as the bulk of the remaining project materials. Approximately 35 jobs would be created during construction at this site, insignificant to the total county workforce. The skill levels of the positions required are available within the county and the region (JCEC, 1999). Spending by construction workers associated with the project would also be an insignificant increase to the economy, totaling an average of \$263,550 per year.

In addition to the initial cost of project construction, the local community would experience a capital infusion associated with the purchase of fee title or easement rights to the land required for the proposed dam and reservoir. Payments for private land would provide landowners with

new sources of capital, which could be used for improvements of their private residences or purchases of new land. Through these different uses of capital, the money would eventually circulate through the local and regional economy. An additional input of \$2,856,000 for land survey and appraisal, land acquisition, and residential relocation would also be anticipated (Kenvirons, 1999b). Using the most conservative estimate for the acquisition inputs, the money would circulate primarily through the eight-county region. Adding the multiplied acquisition and construction cost totals would result in a total project input of \$22,563,200. This would result in an estimated increase of \$117.00 in the per capita income of the region, a 1.6 percent increase. This increase represents the average per person amount by which the economy would benefit from this project in a year. This amount would be insignificant as a percentage of the per capita income for the County and region.

Approximately 30 households would be affected, including an estimated 81 individuals. Although the relative size of the potential relocation effort would be reduced for the Sturgeon Creek, 3.5 mgd alternative, the qualitative impacts on the locally affected community and the maintenance of residential networks would be similar to that for the Sturgeon Creek, 8.5 mgd alternative, discussed in Section 3.2.12.2.2. However, the reduction in the size of the affected population would be expected to diminish the intensity of the impact on the larger social community of Jackson County.

#### **3.2.12.2.4 No Action**

Under both the No Change alternative and the No Action alternative, a dam and reservoir would not be constructed to meet the projected water and recreation needs of Jackson County. The most direct and immediate effect of these alternatives would be the absence of a reliable and safe drinking water supply for Jackson County, even if other activities, such as drilling additional water wells throughout the County, constructing water transmission lines from existing resources within the County, or instituting a water conservation program, were undertaken under the No Action alternative. Associated indirect effects would result from the continuing impediment to the potential growth of industry and employment, as well as the residential development of the community. Although not the primary purpose of the project, the recreational amenities associated with the proposed reservoir would also be lost to the community. In the case of the Sturgeon Creek, 8.5 mgd alternative, the County could also lose additional revenue that might be realized from the sale of water resources to other communities in the region.

The proposed Jackson County Lake Project also represents an integral component of the EZ/EC program (USDA, No date). Considered a benchmark activity of the program, the absence of the reservoir would represent a potential impediment to other development goals of the EZ/EC, including new business development and expansion of tourism in the region.

#### **3.2.12.2.5 Summary of Impacts**

The following table lists the potential impacts on socioeconomics resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

**Table 3.2.12-3. Summary of Impacts on Socioeconomics**

Alternative	Impacts	Rating of Impacts
<p><b>War Fork and Steer Fork</b></p>	<ul style="list-style-type: none"> <li>• Increased income and employment during construction or as a result of increased development potential associated with the completed project;</li> <li>• Physically alter the community from changes in land use and demographic structure due to the project;</li> <li>• Change in the character of the community adjacent to the proposed reservoir;</li> <li>• Removal of private land from the County tax base;</li> <li>• Increase in property assessments on new lakefront land;</li> <li>• Increase in County tax base from increased industrial and commercial development;</li> <li>• Increased business development induced by the proposed reservoir;</li> <li>• Change in property values in vicinity of the proposed reservoir; and</li> <li>• Increased need for community services to support increased population growth and business activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> </ul>
<p><b>Sturgeon Creek, 8.5 mgd</b></p>	<ul style="list-style-type: none"> <li>• Increase income and employment during construction or as a result of increased development potential associated with the completed project;</li> <li>• Disrupt the community structure and social relations due to the relocation of residents from the project area;</li> <li>• Physically alter the community from changes in land use and demographic structure due to the project;</li> <li>• Removal of private land from the County tax base;</li> <li>• Increase in property assessments on new lakefront land;</li> <li>• Increase in County tax base from increased industrial and commercial development;</li> <li>• Increased business development induced by the proposed reservoir;</li> <li>• Change in property values in vicinity of the proposed reservoir; and</li> <li>• Increased need for community services to support</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Very Significant</li> <li>• Very Significant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> </ul>

	increased population growth and business activity.	
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>• Increase income and employment during construction or as a result of increased development potential associated with the completed project;</li> <li>• Disrupt the community structure and social relations due to the relocation of residents from the project area;</li> <li>• Physically alter the community from changes in land use and demographic structure due to the project;</li> <li>• Removal of private land from the County tax base;</li> <li>• Increase in property assessments on new lakefront land;</li> <li>• Increase in County tax base from increased industrial and commercial development;</li> <li>• Increased business development induced by the proposed reservoir;</li> <li>• Change in property values in vicinity of the proposed reservoir; and</li> <li>• Increased need for community services to support increased population growth and business activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> <li>• Moderately Significant</li> <li>• Moderately Significant</li> <li>• Insignificant</li> </ul>
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Continued impediment to growth of industry, employment, and residential development in Jackson County; and</li> <li>• Potential impediment to other development goals of the EZ/EC.</li> </ul>	<ul style="list-style-type: none"> <li>• Very Significant</li> <li>• Moderately Significant</li> </ul>

In some cases, socioeconomic impacts are incremental. Although given the same impact ratings at each alternative site, there are differences between impacts at each site. Some socioeconomic impacts would be greater at the Sturgeon Creek, 8.5 mgd site, due to the larger project area and larger amount of privately-owned reservoir shoreline available for residential development. These differences are discussed in detail in Sections 3.2.12.2.1 through 3.2.12.2.3. These variations, however, would not change the impact ratings listed in the above table.

### 3.2.12.3 Mitigation

Several strategies may be adopted to mitigate or alleviate some of the more adverse impacts on the local population resulting from the proposed action. Ludtke and Burdge (1970) have noted that people’s apprehension, and consequently, their willingness to accept change are affected by the extent to which the interests of the general population are served by a project, the level of

knowledge that people have of the proposed project and its consequences, and the extent to which people identify with their places of residence.

By including local residents in an extensive public information program for the proposed project, including both information on and participation in the decision-making process, project proponents may assist the community in adapting to the resulting changes. Such a program would provide an information base that would ensure that all local residents affected by the project have a clear understanding of what is being proposed and how the proposal would likely affect them individually and in the context of their lives within the community. By participating in the decision-making process, local residents would also become a part of the program and have the opportunity to work out difficult or contentious issues before the onset of construction. This would serve to minimize later surprises, which may have a more devastating effect if they are not anticipated.

The potential adverse impact associated with the relocation of residents currently living on the project site may also be diminished with extensive assistance programs. These programs can be both financial, to cover the costs of relocation and any significant losses, and socially supportive, by assisting them in finding suitable homes in the nearby community. Vacancy rates in the vicinity of the project sites are running at approximately 8 to 9 percent, so that relocation may not require current residents to move a significant distance from their present residence. Relocation of existing structures to adjacent or nearby land outside the reservoir normal pool and maximum flood levels is also an important option for the continued maintenance of community structure. To the extent that residents can be relocated in the near vicinity to their previous homes, existing social networks may be less stressed.

With the introduction of a new resource in the form of a stable water supply and the potential for increased recreational opportunities associated with the proposed reservoir, there is an associated pressure to develop the newly-acquired value of surrounding real estate, especially to create waterfront property. Introduction of an extensive planning and zoning process for County land would ensure that any subsequent development is in accordance with existing community values and is located in those places where it would support, rather than detract, from the community environment. Public participation in this process would ensure that important aspects of the quality of life valued by local residents are maintained and respected by any new development.

## 3.2.13 ENVIRONMENTAL JUSTICE

According to Executive Order 12898, each Federal agency must conduct its programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that they do not exclude persons or populations from participation in, deny persons or populations the benefits of, or subject persons or populations to discrimination under, such programs, policies, and activities, due to their race, color, national origin, or income level. Agencies must ensure that disproportionately adverse effects to human health or the environment are not being imposed on minority or low-income populations by Federal actions.

The establishment of the EZ in Jackson County demonstrates that this area is characterized by high unemployment and low income. According to the most recent U.S. Census Bureau poverty estimates, using population estimates as of July 1996, 34.8 percent of persons in Jackson County were living at or below the national poverty level (USBC, 1999). When compared regionally to the seven surrounding counties, Jackson County appears to have an approximately average percentage of persons living in poverty, with the regional range being 18.5 percent (Madison County estimate) to 46.6 percent (Owsley County estimate). According to the most recent unemployment estimates, as of October 1997, 7.4 percent of persons in Jackson County were unemployed (JCEC, Webpage). Although this percentage is decreasing due to EZ initiatives, this estimate represents the second-highest in the region, and is considerably higher than the Kentucky state unemployment rate, 5.4 percent, for that year (BLS, 1999). To improve its economic status, Jackson County needs an influx of industry and jobs. It was to provide this type of economic benefit that the Federal Government established the EZ.

### U.S. Census Bureau Poverty Definition

The Census Bureau uses a set of money income thresholds that vary by family size and composition to detect who is poor. If a family's total income is less than that family's threshold, then that family, and every individual in it, is considered poor. Poverty thresholds do not vary geographically, but are updated annually for inflation with the Consumer Price Index. The official definition of poverty counts money income before taxes and excludes capital gains and noncash benefits, such as public housing, Medicaid, and food stamps.

As evidenced by 1997 population estimates of Jackson County sorted by race/nationality, Jackson County has a very small minority population (0.59 percent of total) relative to the size of its total population (12,830 people) (HPI, 1999). When compared to 1997 population estimates by for the seven counties surrounding Jackson (Lee, 1.1 percent; Estill, 0.39 percent; Madison, 6.5 percent; Rockcastle, 0.76 percent; Clay, 2.3 percent; Owsley, 0.74 percent; and Laurel, 1.7 percent), Jackson County has the second lowest percentage of minorities in the region.

To help ensure that environmental justice concerns are identified and considered during the planning of a project, input must be obtained from minority and low income groups that may be affected by a project. For the proposed project, every meeting of the Board of Directors for the EZ, the Infrastructure Subcommittee, and the Lake Committee has been open to the public (Purkey, 1999). Each meeting has been advertised in the local newspaper, sometimes for weeks prior to the meeting, and public involvement has been encouraged. In 1996, the Lake Committee

held three public meetings at three different locations within Jackson County to gather public input and concerns. To ensure that the public is fully aware of the project and its status, articles are regularly submitted to the local newspaper.

The study team considered whether there would be adverse environmental impacts that would be imposed on minority or low-income groups present in the project areas to a disproportionately greater extent than on other groups. Adverse impacts that would result from the proposed action are as discussed in Sections 3.2.1 through 3.2.12, and Section 3.2.14 of this EIS. Due to the very low percentage of minorities compared to the total population in Jackson County, these adverse impacts would not disproportionately affect residents based on race or national origin.

To determine whether the residential relocations from the Sturgeon Creek project sites would adversely and disproportionately affect low income or minority groups, the study team reviewed the most recent available U.S. Census block group data for these sites. Both of the Sturgeon Creek project sites lie within the same two block groups. These are 1990 Census Block Groups 9601-4 and 9603-1 (USBC, 1992). The total population within these block groups, as of the 1990 Census, was 2,225. Minority populations represented only about 0.1 percent of the total population. Given this small percentage of minorities compared to the number of households that would be relocated from each of the Sturgeon Creek project sites (approximately 50 households from the Sturgeon Creek, 8.5 mgd site, and about 30 households from the Sturgeon Creek, 3.5 mgd site), residential relocation due to the project could not represent a disproportionate adverse impact on minority groups. In addition, data from the Census block groups show that approximately 35.7 percent of the total population within these block groups were living at or below poverty level in 1990 (USBC, 1992). Since this percentage was less than the poverty level for Jackson County in 1990 (38.2 percent), residential relocation could also not represent a disproportionate adverse impact on low income populations.

Rather, the dam and reservoir project is expected to have a significant beneficial economic impact on Jackson County, and potentially on the surrounding region. Due to the documented need for drinking water in Jackson County, further industrial or commercial development in the area would be difficult, if not impossible. The creation of a reservoir would provide a sufficient water supply for new industries to develop in the area and existing local industries to expand. Such industries, along with the construction, operation, and maintenance activities associated with the dam and reservoir, would provide employment opportunities within the region, leading to a decrease in unemployment and poverty levels. In addition, the recreational aspect of the reservoir could increase tourism in Jackson County, possibly creating a demand for increased infrastructure and spin-off businesses in the area, and further decreasing unemployment.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, directs Federal agencies to “identify and assess environmental health risks and safety risks that may disproportionately affect children.” Executive Order 13045 requires Federal agencies to address any disproportionate risks to children that may result from their policies, programs, activities, and standards. Based on a review of relevant data to date, none of the proposed alternatives for the dam, reservoir, and raw water transmission main would result in environmental health or safety risks that would disproportionately affect children. Safety

measures, discussed in Section 3.2.11.2 of this EIS, would prevent children from entering any of the construction sites.

### 3.2.13.1 No Action

As discussed in Section 1.2.1 of this EIS, the existing public water supply in Jackson County is insufficient to meet projected local and regional needs. Under the No Change alternative, nothing would be done to meet these water needs. Without an additional water source, there would not be an adequate water supply to support increased population or economic growth in the County. It is possible that existing local industries could shut down or be forced to relocate out of the County due to a water shortage. The No Change alternative could be detrimental to Jackson County by potentially producing an increase in unemployment and poverty levels, and resulting in an adverse impact to a low-income community. In addition, as discussed in Section 3.2.11.2.4 of this EIS, there are adverse health effects associated with an insufficient water supply. Therefore, the No Change alternative would result in a significant adverse impact on environmental justice.

Under the No Action alternative, certain activities would occur to increase the current water supply in Jackson County, although in insufficient quantities to meet the projected need. These activities may include drilling additional water wells throughout the County, constructing water transmission lines from existing resources in Jackson County, such as intermittent streams, to the JCWA Treatment Plant, or instituting a water conservation program in the County. However, even if these activities are undertaken, the projected water needs for Jackson County would not be met. This could worsen economic conditions within Jackson County, and could lead to the adverse health effects discussed above for the No Change alternative.

### 3.2.13.2 Summary of Impacts

The following tables lists the potential impacts on environmental justice resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and water transmission main for each alternative project site, including the No Action alternative.

<b>Alternative</b>	<b>Impact</b>	<b>Rating of Impact</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>• Disproportionately affect minority or low-income groups from adverse impacts associated with the proposed action; and</li> <li>• Benefit residents by improving health and economic conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Very Significant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>• Disproportionately affect minority or low-income groups from adverse impacts associated with the proposed action; and</li> <li>• Benefit residents by improving health and economic conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Very Significant</li> </ul>

<p><b>Sturgeon Creek, 3.5 mgd</b></p>	<ul style="list-style-type: none"> <li>• Disproportionately affect minority or low-income groups from adverse impacts associated with the proposed action; and</li> <li>• Benefit residents by improving health and economic conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> <li>• Very Significant</li> </ul>
<p><b>No Action</b></p>	<ul style="list-style-type: none"> <li>• Disproportionately affect minority or low-income groups from an economic degradation; and</li> <li>• Disproportionately affect minority or low-income groups from adverse health impacts due to an insufficient water supply.</li> </ul>	<ul style="list-style-type: none"> <li>• Very Significant</li> <li>• Very Significant</li> </ul>

### 3.2.13.3 Mitigation

The construction, operation, and connected actions associated with a dam and reservoir and with a raw water transmission main would not cause significant adverse impacts to Environmental Justice. Therefore, no mitigation measures are proposed.

## 3.2.14 AESTHETICS

### 3.2.14.1 Affected Environment

The evaluation of aesthetics, or visual quality, includes consideration of the physical appearance of a given area and the potential viewers of that area.

#### Dam and Reservoir

All three proposed dam and reservoir sites lie within the eastern portion of Jackson County, Kentucky. Since the physical appearance of an area is specific to that area, the affected environment, as it relates to aesthetics, is discussed in Sections 3.2.14.1.1 through 3.2.14.1.3 on a site-specific basis.

#### Raw Water Transmission Main

All proposed routes for the raw water transmission main leading from the proposed reservoir to the JCWA Treatment Plant at Tyner Lake would primarily follow alongside existing roadways in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW). The transmission main would mainly run underground alongside these roadways.

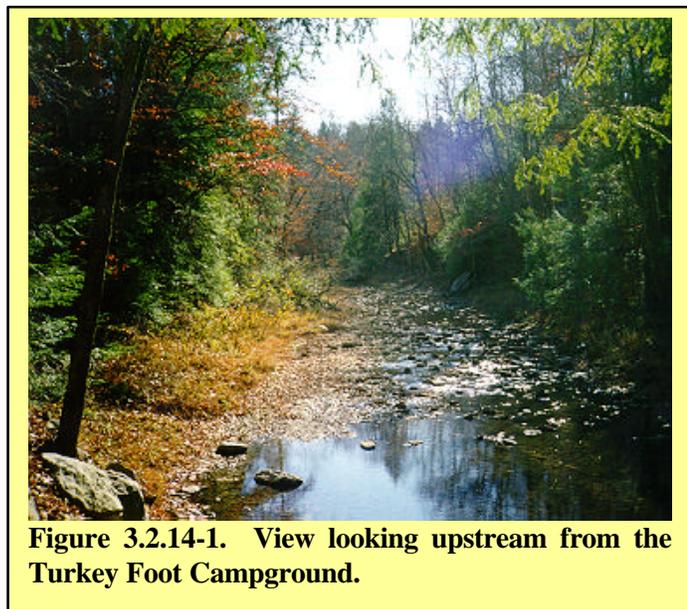
#### 3.2.14.1.1 War Fork and Steer Fork

##### Dam and Reservoir

The War Fork and Steer Fork project site lies at the edge of the Daniel Boone National Forest (DBNF), and the proposed dam site and most of the proposed reservoir area is on U.S. Forest Service (USFS) land. Of the approximately 116 acres up to normal pool level of the proposed reservoir at this site, about 109 acres (93.5 percent) is currently managed by the USFS.

The area around the proposed War Fork and Steer Fork reservoir is rolling terrain with narrow valleys and ridgetops and steep hillsides. The area is primarily forested, with a mixture of deciduous and coniferous trees. Some adjacent ridgetops are cleared and used for agricultural purposes. The Turkey Foot Campground exists approximately 0.5 miles downstream of the proposed War Fork and Steer Fork dam site.

**Figures 3.2.14-1 and 3.2.14-2** show the area in and around the Turkey Foot Campground. The



**Figure 3.2.14-1. View looking upstream from the Turkey Foot Campground.**



**Figure 3.2.14-2. View of the swimming area at the Turkey Foot Campground.**

area of the proposed reservoir has few viewers, but users of the Turkey Foot Campground and Turkey Foot Road view the area just downstream of the proposed dam site.

### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed War Fork and Steer Fork reservoir would run northeast alongside County Road 3109 to Turkey Foot Road East, then would follow KY 587 South to Privett Road. The main would run southwest alongside Privett Road to KY 1071, continuing in the southwestern direction to Peters Road South. From this road, the transmission main would feed into an unnamed tributary of Flat Lick Creek, which supplies Tyner Lake with water (Kenvirons, 1999d). The primary viewers along this route are those people

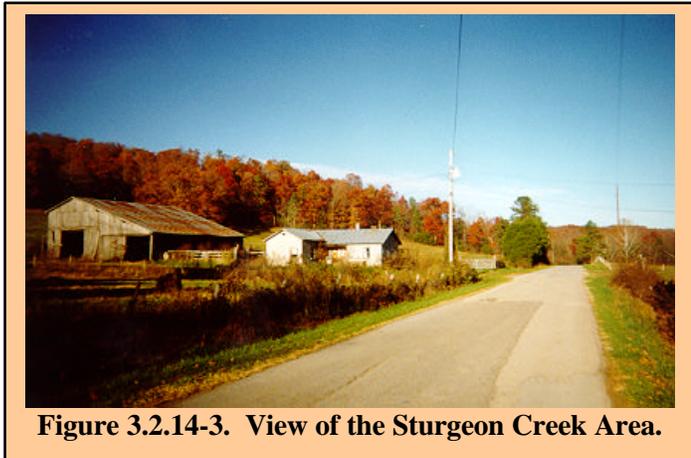
traveling on the affected roads and residents living along these roads.

### **3.2.14.1.2 Sturgeon Creek, 8.5 mgd**

#### **Dam and Reservoir**

The proposed Sturgeon Creek, 8.5 mgd reservoir would cover an estimated 767 acres at the normal pool elevation of 990 feet above MSL. The proposed dam would be located approximately 1.5 miles northeast of the community of Mummie.

The area around the proposed Sturgeon Creek, 8.5 mgd reservoir is rolling terrain with narrow valleys and ridgetops and steep hillsides. The area contains a mixture of cleared agricultural land and forest. Development in the area includes a mixture of houses, barns, and outbuildings. **Figures 3.2.14-3** and **3.2.14-4** are images of the Sturgeon Creek, 8.5 mgd project area. Area residents, as well as those passing through on KY 30 and KY 1071, would view the construction zones and the proposed dam and reservoir.



**Figure 3.2.14-3. View of the Sturgeon Creek Area.**

#### **Raw Water Transmission Main**

The raw water transmission main leading from the proposed Sturgeon Creek, 8.5 mgd reservoir would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US

421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e). The primary viewers along this route are those people traveling on the affected roads and residents living along these roads.

### 3.2.14.1.3 Sturgeon Creek, 3.5 mgd

#### Dam and Reservoir

The proposed reservoir at the Sturgeon Creek, 3.5 mgd site would cover an estimated 264 acres at the normal pool elevation of 980 feet above MSL. The proposed dam would be located approximately 1.5 miles east-northeast of the community of Mummie.

The boundaries of the Sturgeon Creek, 3.5 mgd project site lie within those of the Sturgeon Creek, 8.5 mgd project site.

Therefore, the physical appearance of the area surrounding the Sturgeon Creek, 3.5 mgd project site and its potential viewers are similar to those discussed in Section 3.2.14.1.2.



Figure 3.2.14-4. View of the Sturgeon Creek Area.

#### Raw Water Transmission Main

The raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir would run northwest alongside an unnamed road, turning southwest and intersecting Mummie-Grassy Creek Road. The main would run southwest alongside Mummie-Grassy Creek Road to KY 30, continuing southwest to Oak Grove Church Road. The main would run southwest along Oak Grove Church Road to US 421, turning northwest to Beulah Lake Road, which runs northeast to the treatment plant (Kenvirons, 1999e). The primary viewers along this route are those people traveling on the affected roads and residents living along these roads.

## 3.2.14.2 Environmental Consequences

Potential impacts on aesthetics were determined through evaluation of the appearance of the area surrounding the proposed project sites, though determination of the area's potential viewers, and through consideration of the types of activities that would occur under the proposed action, duration of these activities, and the sizes of the affected areas. Section 3.2.14.2 discusses the impacts on aesthetics common to all alternative project sites. Sections 3.2.14.2.1 through 3.2.14.2.3 discuss site-specific impacts.

As identified in the environmental diagram, **Figure 3.1-1**, the potential impacts on aesthetics from the site preparation, construction, operations, and connected actions associated with the dam, reservoir, and raw water transmission main are:

- Temporarily degrade the visual quality of the surrounding area during construction activities;
- Affect visual quality of the area due to the appearance of the completed dam; and
- Affect visual quality of the area due to the appearance of the completed reservoir.

In evaluating the potential significance of impacts, the study team used the criteria listed in Appendix C.

### **Dam and Reservoir**

Under the proposed action, certain activities would temporarily alter the visual quality of the project area. At each alternative project site, an area no larger than five acres would be cleared and graded to serve as a staging area (Kenvirons, 1999c). The proposed dam site, staging area, and a materials storage area no larger than ten acres would be cleared of woody vegetation. The topsoil from the proposed dam site, staging area, and materials storage area would be removed and stockpiled. These site preparation, construction, and materials storage activities would be dominant in the landscape for most viewers for the duration of construction, resulting in a temporary, but very significant adverse impact on aesthetics. Following construction, most of these sites would be revegetated, except for the access road, and potentially, the area around the pump house. Revegetation would alleviate much of the impact from these construction activities; however, the visual quality of the project site would remain impacted until the revegetated areas matured to pre-construction conditions.

Large construction equipment would be visible from surrounding roads, to drivers on those roads, and to recreational users of adjacent facilities. The construction equipment would most likely be present from the onset of site preparation activities and throughout the duration of construction, or approximately 1.5 years. After construction is complete, however, the construction equipment would be removed from the project site.

Any vegetation, such as trees and brush, cleared during site preparation and construction activities would be burned on-site (Kenvirons, 1999c). The burning would probably occur intermittently throughout the construction period, and would generate a large amount of visible smoke. However, this smoke would only be visible temporarily. Smoke generated as a result of burning activities would be visible to nearby residents, recreational users, and drivers traveling along roads in the surrounding area.

Even with controls in place during construction activities, some sediment would be washed into the streambed. Fine, suspended sediments cause turbidity, or opaque water, which is aesthetically displeasing. Turbidity could have a negative impact on stream viewers, especially recreational users. When sediments later settle out in slower-moving water, they accumulate as mud on the stream bottom and banks. This could cause an adverse impact aesthetically.

The proposed dam would be constructed of roller-compacted concrete (RCC) and pre-cast concrete panels. The dam would be similar in appearance, but larger than the RCC dam built in Winchester, Kentucky. **Figure 3.2.14-5** provides a picture of this Winchester Dam. In addition, a one-story, approximately 30-foot by 30-foot pump house would be constructed on the project site at an elevation below the normal pool elevation of the reservoir (Williams, 1999d). An



**Figure 3.2.14-5. View of the RCC dam in Winchester, Kentucky.**

approximately 15-foot by 15-foot water intake structure would be built within the reservoir, extending from the bottom of reservoir to about 10 feet above the normal pool elevation (JCEC, 1999). The proposed dam, once completed, would be highly visible from downstream vantage points. The appearance of the dam might limit

enjoyment for potential viewers, which could impact downstream recreational uses for the lifetime of the project. The pump house and water intake structure, however, due to their small size and location, would not significantly impact the visual quality of the area.

The physical appearance of the reservoir, when completed, could have a positive impact on the visual quality of the surrounding area. Recreational and casual viewers typically view water within the landscape positively. In addition, areas with good visual access to water are often sought after for residential development.

### **Raw Water Transmission Main**

As the majority of the proposed routes for the raw water transmission main would follow alongside existing roadways in the ROW, and the disturbance due to construction would be short-term, the impacts on area aesthetics would be limited. The appearance of the construction equipment and activities would temporarily impair the visual quality of the area and would be visible to passersby on the affected roadways. However, the construction areas would be revegetated upon completion of construction. Although the visual quality of the area would remain somewhat lower until the vegetation matured to pre-construction conditions, this impact would be minimal due to the pre-disturbed nature of the roadside and ROW. Therefore, the proposed water transmission main would have neither permanent nor significant impacts on the visual quality of the area.

#### **3.2.14.2.1 War Fork and Steer Fork**

The proposed dam at the War Fork and Steer Fork site would be between 87 and 107 feet tall, and between 760 and 790 feet long (Kenvirons, 1999a; Basanta, 2000). A dam at the proposed

War Fork and Steer Fork site may be visible to users of Turkey Foot Road and Turkey Foot Campground, especially at the entrance to the campground. **Figure 3.2.14-6** shows the view towards the proposed dam site at the entrance to the Turkey Foot Campground. The dam would probably not be visible from the campground itself. The proposed dam would be located about 0.25 miles upstream from Turkey Foot Road, and therefore, would not be dominant in the landscape to users of this road.

During the approximately 1.5-year construction period, the construction areas for the proposed dam and associated facilities would be dominant in the landscape for local viewers. The impact of these activities on aesthetics would be very significant. After construction, the dam and associated facilities at the War Fork and Steer Fork site would attract some attention, but not be dominant for local viewers for the lifetime of the project.

The proposed reservoir at the War Fork and Steer Fork site would mostly be surrounded by forested USFS property, and as such would not be visible to many viewers. However, some hilltop adjacent to this site is privately-owned and cleared, but is agricultural and has few users. For these few viewers, the proposed reservoir would be dominant over the lifetime of the project, resulting in a moderately significant, but positive, impact on aesthetics.



**Figure 3.2.14-6. View from the entrance of Turkey Foot Campground upstream to the proposed War Fork and Steer Fork dam site.**

### 3.2.14.2.2 Sturgeon Creek, 8.5 mgd

The proposed dam at the Sturgeon Creek, 8.5 mgd project site would be between 84 and 100 feet tall, and between 825 and 850 feet long (Kenvirons, 1999b; USGS, No date). The proposed dam at this site may be visible for drivers on KY 1071, which currently has an estimated average daily traffic (ADT) rate of 438 vehicles per day. The proposed dam would be located about 0.5 miles upstream from KY 1071, and as such would not be dominant in the landscape to users of this road.

During the approximately 1.5-year construction period, the construction zones for the proposed dam and associated facilities would be dominant in the landscape for local viewers. The impact of these zones on the visual quality of the area would be very significant. After construction, the dam and associated facilities at the Sturgeon Creek, 8.5 mgd site would attract attention, but not be dominant for local users for the lifetime of the project.

As the appearance of the proposed dam at the Sturgeon Creek, 8.5 mgd site would not clash with the appearance of the agricultural development of the surrounding area, it should not limit enjoyment from downstream vantage points, and therefore, not impact the visual quality or recreational uses of this area.

The proposed reservoir at the Sturgeon Creek, 8.5 mgd site would be highly visible to area residents. The Sturgeon Creek valley is developed for agricultural and residential uses, and would have many vantage points. The proposed reservoir would also be very visible to users of local roads, especially KY 30. KY 30 currently has an estimated ADT rate of 435 vehicles per day. While KY 30 may be relocated, one option may be to build a bridge over the proposed reservoir, thus directing traffic on KY 30 over the reservoir. The reservoir would be dominant in the landscape to users of KY 30 road for the lifetime of the project, and impact a great number of viewers. The impact of the completed proposed reservoir on the visual quality of the area would be very significant, but positive. As noted earlier, recreational and casual viewers tend to view water in the landscape positively. In addition, areas with good visual access to water are often sought after for residential development.

### **3.2.14.2.3 Sturgeon Creek, 3.5 mgd**

The proposed dam at the Sturgeon Creek, 3.5 mgd project site would be between 64 and 67 feet tall, and between 500 and 600 feet long (Kenvirons, 1999b; Basanta, 2000). The proposed dam at this site should not be visible for drivers on KY 1071. The proposed dam would be located about 1.25 miles upstream from KY 1071, and as such would not be dominant in the landscape to users of this road.

During the approximately 1.5-year construction period, the construction zones for the proposed dam and associated facilities would be dominant in the landscape for local viewers. The impact of these zones on the visual quality of the area would be very significant. After construction, the dam and associated facilities at the Sturgeon Creek, 3.5 mgd site would attract attention, but not be dominant for local users for the lifetime of the project.

As the appearance of the proposed dam at the Sturgeon Creek, 3.5 mgd site would not clash with the appearance of the agricultural development of the surrounding area, it should not limit enjoyment from downstream vantage points, and therefore, not significantly impact the visual quality or recreational uses of this area.

The proposed reservoir at the Sturgeon Creek, 3.5 mgd site would be highly visible to area residents. The Sturgeon Creek valley is developed for agricultural and residential uses, and would have many vantage points. The proposed reservoir would also be very visible to users of local roads, especially KY 30. While KY 30 may be relocated, one option may be to build a bridge over the proposed reservoir, thus directing traffic on KY 30 over the reservoir. The reservoir would be dominant in the landscape to users of KY 30 for the lifetime of the project, and impact a great number of viewers. The impact of the proposed reservoir on the visual quality of the area would be very significant, but positive.

### 3.2.14.2.4 No Action

The No Change alternative, in which nothing is done to meet the projected water and recreation needs of Jackson County, would result in no changes to the visual quality, or appearance, of the area.

Under both the No Change alternative and the No Action alternative, the proposed dam and reservoir would not be constructed to meet the projected water and recreational needs of Jackson County and the surrounding area. Degradation of visual quality due to these construction activities would not occur. While the aesthetics of the area would not be directly affected by the absence of the reservoir, the positive impacts due to its presence would not occur.

Under the No Action alternative, certain activities would be undertaken to increase the current water supply in Jackson County, although in insufficient quantities to meet the projected need. These activities may include drilling water wells throughout the County, constructing water transmission lines from existing sources within Jackson County to the JCWA Treatment Plant, or instituting a water conservation program in the County. Construction activities associated with some of these options could have temporary adverse impacts to the visual quality of the area, but none of sufficient duration or extent to be considered significant.

### 3.2.14.2.5 Summary of Impacts

The following table lists the potential impacts on aesthetics resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

<b>Table 3.2.14-1. Summary of Impacts on Aesthetics</b>		
<b>Alternative</b>	<b>Impacts</b>	<b>Rating of Impacts</b>
<b>War Fork and Steer Fork</b>	<ul style="list-style-type: none"> <li>Temporarily degrade the visual quality of the area during construction;</li> <li>Affect visual quality over project lifetime due to the appearance of the dam; and</li> <li>Positively affect visual quality due to the appearance of the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>Very Significant</li> <li>Moderately Significant</li> <li>Moderately Significant</li> </ul>
<b>Sturgeon Creek, 8.5 mgd</b>	<ul style="list-style-type: none"> <li>Temporarily degrade the visual quality of the area during construction;</li> <li>Affect visual quality over project lifetime due to the appearance of the dam; and</li> <li>Positively affect visual quality due to the appearance of the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>Very Significant</li> <li>Insignificant</li> <li>Very Significant</li> </ul>
<b>Sturgeon Creek, 3.5 mgd</b>	<ul style="list-style-type: none"> <li>Temporarily degrade the visual quality of the area during construction;</li> <li>Affect visual quality over project lifetime due to the appearance of the dam; and</li> <li>Positively affect visual quality due to the</li> </ul>	<ul style="list-style-type: none"> <li>Very Significant</li> <li>Insignificant</li> <li>Very Significant</li> </ul>

	appearance of the reservoir.	
<b>No Action</b>	<ul style="list-style-type: none"> <li>• Degrade visual quality due to potential construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Insignificant</li> </ul>

### 3.2.14.3 Mitigation

To minimize the impacts on visual quality resulting from site preparation and construction activities, it is recommended that a buffer strip of trees be left between the construction areas and adjacent land uses, especially at the War Fork and Steer Fork project site. This buffer strip would block some of the physical appearance of construction from potential viewers surrounding the construction zone. This buffer strip should be of maximum width, or at least 100 feet, wherever possible.