2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section describes the several alternative approaches to meeting the purpose and need discussed in Section 1.0 of this EIS. Comments received from agencies and the public on the DEIS and revision of the water needs analysis has led to the reassessment of various reservoir and non-reservoir alternatives for meeting Jackson County's projected water needs. As calculated in the revised water needs analysis presented in Section 1.2.1, Water Supply, of this FEIS, Jackson County alone is projected to need between 1.1 and 1.3 million gallons of water a day (mgd) by the year 2050, depending on the adequacy of existing water supplies in the County in 2050. The combined projected water needs of Jackson County and the surrounding region, including Clay, Owsley, and Rockcastle Counties, has been recalculated to be between 1.9 and 2.2 mgd. In addition to this need, the Jackson County Lake Committee has expressed a desire for increased opportunities for outdoor recreation for the people of Jackson and surrounding counties. For the alternatives described in the following sections to be considered reasonable for further consideration, they must meet the projected water need stated above. As a secondary requirement, the alternatives should meet the desire for additional recreational opportunities, but not meeting this desire would not eliminate an alternative from further consideration.

2.1 NON-RESERVOIR ALTERNATIVES ELIMINATED

This section evaluates alternatives for meeting the purpose and need, discussed in Section 1.0 of this FEIS, that do not entail constructing a new dam and reservoir in Jackson County. Each of these alternatives was investigated in the DEIS and found incapable of fully meeting the primary purpose and need of water supply and the secondary purpose and need of supplying lake-oriented outdoor recreation. These alternatives were, therefore, eliminated from more detailed study in the DEIS.

Revision of the projected water needs of Jackson and surrounding counties, presented in Section 1.2.1, Water Supply, of this FEIS, led to the reassessment of the ability of non-reservoir alternatives to meet the revised projected needs. Most of these non-reservoir alternatives remain eliminated from further study in this FEIS. However, two of the alternatives eliminated from further study in the DEIS, importing water from Wood Creek Lake and Lock 14 of the Kentucky River, have been reassessed and determined to be reasonable for further analysis. The rationale for this determination is presented in Section 2.1.3, Water Supply From Surrounding Counties, of this FEIS. These two alternatives are more fully discussed in Section 2.3, Alternatives To Be Assessed, Section 2.4, Proposed Action, and Section 3.0, Environmental Analysis, of this FEIS.

Additional non-reservoir alternatives in the form of pumped storage from existing water resources in Jackson County, which were not evaluated in the DEIS, were investigated for this FEIS and found incapable of meeting the primary purpose of water supply. These alternatives

are discussed in Section 2.1.5, Pumped Storage From Existing Sources in Jackson County, of this FEIS.

Each of the non-reservoir alternatives is discussed individually in the following sections. Where reassessment of an alternative has led to new or additional information leading to its elimination from further study, or its inclusion as a reasonable alternative, this information is presented. Where no changes have been made to the discussion of the alternative, or where the rationale for its elimination is the same as that presented in the DEIS, this fact is stated.

2.1.1 GROUNDWATER DEVELOPMENT

There are no changes to this section for the FEIS. Please refer to Section 2.1.1, Groundwater Development, of the DEIS for information on this alternative. This alternative remains eliminated from further study in this FEIS.

2.1.2 EXPANSION OF TYNER LAKE AND/ OR McKEE RESERVOIR

There are no changes to this section for the FEIS. Please refer to Section 2.1.2, Expansion of Tyner Lake and/or McKee Reservoir, of the DEIS for information on this alternative. This alternative remains eliminated from further study in this FEIS.

2.1.3 WATER SUPPLY FROM SURROUNDING COUNTIES

This section evaluates the potential for meeting Jackson County's projected water needs by importing surface water from one or more existing sources in surrounding counties. Only currently-available or existing surplus water sources are addressed; potential new water storage sites are not discussed in this section. A more detailed discussion of this alternative is provided in Section 2.1.3, Water Supply From Surrounding Counties, of the DEIS.

As discussed in the DEIS, several abundant sources of surface water do exist in other counties. These alternatives were eliminated from further consideration in the DEIS primarily because they were not accessible at a reasonable cost. Due to the revision of the projected water needs of Jackson and surrounding counties, presented in Section 1.2.1, Water Supply, of this FEIS, and revised cost estimates for pipelines from Wood Creek Lake and Lock 14 of the Kentucky River, these two alternatives are now considered to be reasonable for further study and are evaluated in Section 3.0, Environmental Analysis, of this FEIS. The alternatives of importing water from Buckhorn Lake and Laurel Lake remain eliminated from further study in this FEIS. The rationale for elimination from further study or inclusion as a reasonable alternative for each of these alternatives is discussed below. Please refer to Section 2.1.3, Water Supply From Surrounding Counties, of the DEIS for more information on these alternatives. For the purposes

of this analysis, the order in which these alternatives are presented in this FEIS differs from that in which they were presented in the DEIS.

Wood Creek Lake -- Laurel County

Constructing a pipeline to transport water from Wood Creek Lake to the JCWA Treatment Plant was eliminated from further study in the DEIS based on unreasonable construction and operation costs. Construction and operation costs for water transmission facilities sized to transport 3.5 mgd from Wood Creek Lake to the treatment plant were estimated for the DEIS. According to these original estimates, the total cost of construction and operation of a 3.5 mgd pipeline would be about $13,804,000 (Kenvirons, 2000).

Due to the revision of the water needs projections for Jackson County and the surrounding region, cost estimates for a pipeline designed to transport treated water from Wood Creek Lake were recalculated for this FEIS. This pipeline would connect the existing Wood Creek Water District water distribution system to the existing JCWA distribution system. Under this alternative, two new sets of cost estimates were prepared for this FEIS. One set estimates the costs of construction and operation of a pipeline capable of transporting 1.33 mgd of treated water from the Wood Creek Water District water distribution system; the other estimates the costs of a pipeline capable of transporting 2.19 mgd. The costs of purchasing this water are also included in these estimates. These cost estimates are discussed in further detail in Section 2.4.2.6, Wood Creek Lake Pipeline, of this FEIS and are presented in Appendix Q of this FEIS. Examination of these revised cost estimates indicate that water could be purchased from Wood Creek Lake for the purposes of serving Jackson County and the surrounding region at a cost comparable to the costs of constructing a dam and reservoir in the County. Therefore, this alternative is considered reasonable for further study and is evaluated in Section 3.0, Environmental Analysis, of this FEIS.

Lock 14 -- Lee County

Constructing a pipeline from Lock 14 of the Kentucky River to the JCWA Treatment Plant was eliminated from further study in the DEIS based on unreasonable costs. Construction and operation costs for water transmission facilities from Lock 14 were not estimated for the DEIS. However, since the distance of Lock 14 from the JCWA Treatment Plant was calculated to be greater than the distance of Wood Creek Lake to the JCWA Treatment Plant, costs for this alternative were projected to be greater than those for the Wood Creek Lake pipeline.

Due to both an error in calculating the distance between Lock 14 and the JCWA Treatment Plant and the revision of the water needs projections for Jackson County and the surrounding region, cost estimates for a pipeline designed to transport raw water from Lock 14 were calculated for this FEIS. The total distance that would be traveled by this pipeline was recalculated to be about 20.5 miles, compared to the approximately 25 miles stated in the DEIS. As for the Wood Creek Lake pipeline discussed above, two sets of cost estimates were prepared for this FEIS. One set estimates the costs of construction and operation of a pipeline capable of transporting 1.33 mgd of raw water from Lock 14; the other estimates the costs of a pipeline capable of transporting 2.19 mgd. The costs associated with treating this additional water at the JCWA Treatment Plant

are also included in these estimates. These cost estimates are discussed in further detail in Section 2.4.2.7, Lock 14 Pipeline, of this FEIS and are presented in Appendix Q. Examination of these cost estimates indicate that water could be obtained from Lock 14 for the purposes of serving Jackson County and the surrounding region at a cost comparable to the costs of constructing a dam and reservoir in the County. Therefore, this alternative is considered reasonable for further study and is evaluated in Section 3.0, Environmental Analysis, of this FEIS.

Buckhorn Lake -- Perry County and Leslie County

Constructing a pipeline from Buckhorn Lake to Jackson County was eliminated from further consideration in the DEIS due to administrative and legal hurdles and general uncertainty as to the time involved in implementing this alternative. An additional deterrent presented in the DEIS is the long distance from Buckhorn Lake to the JCWA Treatment Plant over which a water transmission pipeline would have to be constructed, which was calculated to be nearly 48 miles. Based on a simple comparison to the revised cost estimates for pipelines from Wood Creek Lake and Lock 14, construction and operation of a pipeline from Buckhorn Lake to Jackson County would cost well over $10 million more than either the Wood Creek Lake or Lock 14 pipelines, depending on the capacity of the pipeline constructed (1.33 mgd or 2.19 mgd). Therefore, this alternative remains eliminated from further consideration in this FEIS for the same reasons discussed in the DEIS.

Laurel Lake -- Laurel County

Constructing a pipeline from Laurel Lake to Jackson County was also eliminated from further consideration in the DEIS due to unreasonable costs. Construction and operation costs for water transmission facilities from Laurel Lake were not estimated for the DEIS. However, since the distance of Laurel Lake from the JCWA Treatment Plant was calculated to be greater than the distance of Wood Creek Lake to the JCWA Treatment Plant, costs for this alternative were projected to be greater than those for the Wood Creek Lake pipeline that were estimated for the DEIS.

The distance from Laurel Lake to the JCWA Treatment Plant over which a water transmission pipeline would have to be constructed was calculated to be nearly 35 miles. Based on a simple comparison to the revised cost estimates for pipelines from Wood Creek Lake and Lock 14, construction and operation of a pipeline from Laurel Lake to Jackson County would cost well over $6 million more than either the Wood Creek Lake or Lock 14 pipelines, depending on the capacity of the pipeline constructed (1.33 mgd or 2.19 mgd). Therefore, this alternative remains eliminated from further consideration in this FEIS for the same reasons discussed in the DEIS.

2.1.4 WATER CONSERVATION

In calculating the revised projected water needs of Jackson County and the surrounding region, the revised water needs analysis presented in Section 1.2.1, Water Supply, of this FEIS factored

in a water savings of 10 percent to account for water conservation measures. Refer to Section 1.2.1 of this FEIS for an explanation of the rationale for the 10 percent factor.

Water conservation alone is insufficient to eliminate the need to develop additional water supplies for Jackson County, if the economic development initiatives promoted by the EZ are effective. Although a water conservation program would avoid the direct environmental impacts associated with the construction of a dam and reservoir, such a program could still lead to similar long-term, cumulative effects on the environment. Water conservation would not meet the secondary purpose of the Jackson County Lake Project, that of providing lake-based recreational opportunities to meet the present and future demands of the residents of the County and surrounding areas.

2.1.5 PUMPED STORAGE FROM EXISTING SOURCES IN JACKSON COUNTY

Pumping raw water from existing sources within Jackson County to the Jackson County Water Association (JCWA) Treatment Plant was investigated in this FEIS for its potential to be a reasonable alternative for meeting the purpose and need described in Section 1.0 of this EIS. Two alternatives, pumping water from Laurel Fork and the Middle Fork of the Rockcastle River and pumping from the Indian Creek Rock Quarry, were examined and are discussed below.

Laurel Fork and the Middle Fork of the Rockcastle River

As mentioned in Section 1.2.1, Water Supply, of this FEIS, a pipeline has recently been constructed from Laurel Fork to Tyner Lake for temporary water withdrawal. Under this alternative, a permanent water withdrawal permit for Laurel Fork would be sought from the Kentucky Division of Water (KDOW), and the pipeline would be extended downstream to the Middle Fork of the Rockcastle River, to which Laurel Fork is tributary. Withdrawal of water would then be restricted to periods when flow exceeds some minimum flow specified by the KDOW, as measured by a flow gauge. The water would be pumped up to Tyner Lake for storage and treatment at the JCWA Treatment Plant. The combined withdrawal from Laurel Fork and the Middle Fork of the Rockcastle River would help meet Jackson County's projected future water needs by enabling Tyner Lake to be recharged much faster than at present.

Cost estimates for the construction of a raw water transmission main capable of transporting 3.5 mgd from Rockcastle River to the JCWA Treatment Plant were prepared by Kenvirons, Inc. for this FEIS. The total project cost, including the costs of land acquisition, administrative and legal issues, environmental and preliminary engineering, and construction, for this pipeline would be $6,757,510. The present worth of operation and maintenance of the transmission main, calculated to account for a 50-year useful life, is estimated to be $4,010,000. Therefore, the total cost of a water transmission main from the Rockcastle River would be $10,767,510 (Kenvirons, 2000b). Once the cost of the JCWA Treatment Plant expansion project and the present worth of treatment costs for the raw water obtained from the Rockcastle River have been factored in, the estimated total project cost for this water transmission main would be $18,907,510 (JCEZ, 2000).

Although the costs of this project would be comparable to the costs of the alternatives evaluated in detail in the DEIS and in this FEIS, this alternative is eliminated from further consideration for the following reasons:

1) Reduced stream flows may adversely impact endangered mussels, particularly the Federally-listed endangered Cumberland Bean Pearly Mussel (*Villosa trabalis*), whose presence has been documented in tributaries of the Rockcastle River.

2) Implementation of this alternative will not improve the ability of Jackson County to withstand multi-year droughts, when Laurel Fork and Middle Fork would have a very low flows.

3) No additional recreational opportunities for the Jackson County and the region would be provided by this alternative.

Indian Creek Rock Quarry

The use of the Indian Creek Rock Quarry to provide Jackson County with additional water supplies was discussed in Section 2.1.1, Groundwater Development, of the DEIS. It was discussed in that section because the rock quarry fills up with what appears to be a combination of ground and surface water flow associated with the alluvium of Indian Creek. This stream is a tributary of the Middle Fork of the Rockcastle River.

Cost estimates for the construction of a raw water transmission main capable of transporting 2.0 mgd from the Indian Creek Rock Quarry to the JCWA Treatment Plant were prepared by Kenvirons, Inc. for this FEIS. The total project cost, including the costs of land acquisition, administrative and legal issues, environmental and preliminary engineering, and construction, for this pipeline would be $4,575,140. The present worth of operation and maintenance of the transmission main, calculated to account for a 50-year useful life, is estimated to be $2,840,000. Therefore, the total cost of a water transmission main from the Indian Creek Rock Quarry would be $7,415,140 (Kenvirons, 2000b). Although the present worth for treatment of this quantity of water at the JCWA Treatment Plant has not been calculated, it can be assumed to be about $3,000,000, based on comparisons to that for other alternatives provided in Appendix Q of this FEIS. After factoring in the cost of the JCWA Treatment Plant expansion project and the present worth of treatment costs for the raw water obtained from the Indian Creek Rock Quarry, the estimated total project cost for this water transmission main would be $14,315,140 (JCEZ, 2001).

Section 2.1.1 of the DEIS cited concerns with water quality and the adequacy of flow as the basis for rejection of this alternative. Since pumping water from the Indian Creek Rock Quarry would not provide any additional water storage for Jackson County, this alternative would also not improve the County's ability to withstand multi-year droughts. Furthermore, permanent reduction in the flow of Indian Creek may cause problems for Federally-listed threatened and endangered mussels found in downstream waters.

2.2 RESERVOIR ALTERNATIVES ELIMINATED

Section 2.2 of the DEIS provides a summary of the alternative reservoir sites that were previously evaluated in the *Jackson County Lake Project Final Alternatives Analysis*, Appendix H, of the DEIS. Three criteria were used in the analysis to determine whether each of these alternatives was to be eliminated from further study or included as a reasonable alternative in the EIS. Based on the revised water needs analysis presented in Section 1.2.1, Water Supply, of this FEIS, the first criteria listed in the DEIS has been modified for the FEIS. This criteria, the estimated yield of the potential impoundment, has been changed from 3.5 mgd in the DEIS to one of the two following yields: 1.3 mgd (the projected water needs of Jackson County only) or 2.2 mgd (the projected water needs of Jackson County and the surrounding region). Those alternatives excluded from further consideration in the DEIS due to insufficient yield have been reassessed according to the revised projected water needs. The other two criteria listed for elimination of alternatives in the DEIS remain unchanged for the purposes of this FEIS. Please refer to Section 2.2, Reservoir Alternatives Eliminated, of the DEIS for more information on these criteria.

2.2.1 LAUREL FORK AND BUZZARD BRANCH

There are no changes to this section for the FEIS. Please refer to Section 2.2.1, Laurel Fork and Buzzard Branch, of the DEIS for information on this alternative.

2.2.2 LAUREL FORK AND McCAMMON BRANCH

There are no changes to this section for the FEIS. Please refer to Section 2.2.2, Laurel Fork and McCammon Branch, of the DEIS for information on this alternative.

2.2.3 HORSE LICK CREEK

There are no changes to this section for the FEIS. Please refer to Section 2.2.3, Horse Lick Creek, of the DEIS for information on this alternative.

2.2.4 SOUTH FORK OF STATION CAMP CREEK AND ROCK LICK

There are no changes to this section for the FEIS. Please refer to Section 2.2.4, South Fork of Station Camp Creek and Rock Lick, of the DEIS for information on this alternative.

2.2.5 SOUTH FORK OF STATION CAMP CREEK AND CAVANAUGH CREEK #2

There are no changes to this section for the FEIS. Please refer to Section 2.2.5, South Fork of Station Camp Creek and Cavanaugh Creek #2, of the DEIS for information on this alternative.

2.2.6 SOUTH FORK OF STATION CAMP CREEK AND CAVANAUGH CREEK

There are no changes to this section for the FEIS. Please refer to Section 2.2.6, South Fork of Station Camp Creek and Cavanaugh Creek, of the DEIS for information on this alternative.

2.2.7 McCAMMON BRANCH

As discussed in Section 2.2.7, McCammon Branch, of the DEIS, the McCammon Branch reservoir alternative would have a sustainable yield of 3.7 mgd during average drought conditions and a yield of 2.3 mgd during worst drought conditions. One reason for the elimination of this alternative from further study in the DEIS was that it did not meet the projected water needs of Jackson and surrounding counties during worst drought conditions. Based on the revised water needs presented in Section 1.2.1, Water Supply, of this FEIS, the yield of a reservoir at the McCammon Branch site during worst drought conditions would be sufficient to meet the revised projected water needs of Jackson County and the region. However, although there are no known Endangered, Threatened, or Special Concern plants or animals that have been reported within the boundaries of the proposed McCammon Branch reservoir, there *Villosa trabalis* (Cumberland Bean Pearly Mussel) has been reported downstream of the proposed project site. In addition, waters of McCammon Branch feed into waters that the State of Kentucky has designated as an Outstanding Resource Water (ORW). For these reasons, the McCammon Branch reservoir alternative remains eliminated from further study in this FEIS.

2.2.8 MILL CREEK

As discussed in Section 2.2.8, Mill Creek, of the DEIS, the Mill Creek reservoir alternative would have a sustainable yield of 1.4 mgd during average drought conditions and a yield of 0.9 mgd during worst drought conditions. One reason for the elimination of this alternative from

further study in the DEIS was that it did not meet the projected water needs of Jackson and surrounding counties. Based on the revised water needs presented in Section 1.2.1, Water Supply, of this FEIS, the sustainable yield of a reservoir at the Mill Creek site would be sufficient to meet the projected water needs of Jackson County only, without inclusion of regional needs. However, the yield of this reservoir during worst drought conditions would be below the projected water needs of Jackson County. In addition, the presence of a protected species, the Cumberland Bean Pearly Mussel, downstream of the proposed project site would make this a difficult alternative to pursue. Therefore, this alternative remains excluded from further analysis.

2.2.9 WAR FORK AND ALCORN BRANCH

There are no changes to this section for the FEIS. Please refer to Section 2.2.9, War Fork and Alcorn Branch, of the DEIS for more information on this alternative.

2.2.10 SOUTH FORK OF STATION CAMP CREEK AND WAR FORK

There are no changes to this section for the FEIS. Please refer to Section 2.2.10, South Fork of Station Camp Creek and War Fork, of the DEIS for more information on this alternative.

2.2.11 TRAVIS CREEK

As discussed in Section 2.2.11, Travis Creek, of the DEIS, the Travis Creek reservoir alternative would have a sustainable yield of 1.1 mgd during average drought conditions and a yield of 0.7 mgd during worst drought conditions. Both of these yields remain below those required to meet the revised projected water needs of Jackson County or the region. Therefore, this alternative remains eliminated from further consideration in this FEIS.

2.3 ALTERNATIVES TO BE ASSESSED

Section 2.3 provides a brief summary of the alternatives determined to be reasonable for further consideration in the EIS. Three dam and reservoir alternatives, the War Fork and Steer Fork (3.5 mgd) site and the Sturgeon Creek, 8.5 mgd and 3.5 mgd sites, were determined to be reasonable for further analysis in the DEIS, along with the No Action alternative. These alternatives are discussed in Sections 2.3.1 through 2.3.4.

Comments received from agencies and the public on the DEIS and revision of the water needs analysis led to the reassessment of various reservoir and non-reservoir alternatives for meeting Jackson County's projected water needs. As calculated in the revised water needs analysis presented in Section 1.2.1, Water Supply, of this FEIS, Jackson County alone is projected to need between approximately 1.1 mgd and 1.3 mgd of water by the year 2050, depending on the

adequacy of existing water supplies in the County in 2050. The combined projected water needs of Jackson County and the surrounding region has been recalculated to be between approximately 1.9 and 2.2 mgd.

For the purposes of this analysis, the higher value in the ranges of water needs stated above was used in determining which alternatives to investigate fully in this FEIS. The use of these higher values represent the worst case scenario for existing water supply in Jackson County in the year 2050. The higher values assume that water from McKee Reservoir and MPS #1 in Jackson County would not be available for use by the year 2050. As discussed in Section 1.2.1, Water Supply, of this FEIS, the McKee water treatment plant is in need of upgrading, but such upgrading would not likely occur, as it would not be cost feasible. Therefore, in order for Jackson County to utilize the water from McKee Reservoir and MPS #1 in the future, a water transmission main would have to be constructed from these reservoirs to the JCWA Treatment Plant. In addition, the cost of constructing such a pipeline would have to be added to the cost of any alternative that assumes the availability of these two water resources.

Cost estimates for the construction of a raw water transmission main capable of transporting 0.27 mgd from Bill's Branch (McKee Reservoir) to Turkey Foot were prepared by Kenvirons, Inc. for this FEIS. The total cost of construction of this pipeline is estimated to be about $ 437,000 (Kenvirons, 2000b). This cost estimate does not include the 50-year present worth of operation and maintenance of the pipeline. Construction of this water transmission main would require approximately 25,500 linear feet, or about 4.7 miles, of ductile iron pipeline to be laid. This pipeline would have a diameter of six inches, and would contain six 6-inch gate valves. There would be four air release valve sites along the length of the pipeline. Construction of this water transmission main would require crossing 120 linear feet of streams, 120 linear feet of open-cut road, and 200 linear feet of bored road. As a result of the water main construction along this route, 570 linear feet of pavement would need to be replaced (Kenvirons, 2000b).

As a result of the revised water needs analysis, two additional reservoir alternatives and two non-reservoir alternatives were determined to be reasonable for further analysis in this FEIS. These alternatives include: two smaller reservoirs at the War Fork and Steer Fork dam site, one with an average yield of 1.3 mgd and the other with an average yield of 2.2 mgd; importing treated water from Wood Creek Lake to the JCWA Treatment Plant; and importing raw water from Lock 14 of the Kentucky River to Tyner Lake. Sections 2.3.5 through 2.3.8 note the rationale for considering each of these alternatives as reasonable for inclusion in this FEIS. A more detailed description of each of these alternatives is provided in Section 2.4, Proposed Action, of this FEIS.

2.3.1 WAR FORK AND STEER FORK

It should be noted that the location of the proposed War Fork and Steer Fork dam site, in relation to Turkey Foot Campground and the confluence of War Fork with Steer Fork, that was given in the DEIS was measured in air miles, not river miles. The proposed War Fork and Steer Fork dam site is located approximately 0.5 air miles southwest of Turkey Foot Campground, or about 0.3 miles southwest of Turkey Foot Road, in eastern Jackson County. The dam would be

situated on War Fork, approximately 0.5 air miles north of the confluence with Steer Fork. There are no other changes to this section for the FEIS. Refer to Section 2.3.1, War Fork and Steer Fork, of the DEIS for the rationale for considering this site as a reasonable alternative.

2.3.2 STURGEON CREEK, 8.5 mgd

There are no changes to this section for the FEIS. Refer to Section 2.3.2, Sturgeon Creek, 8.5 mgd, of the DEIS for the rationale for considering this site as a reasonable alternative.

2.3.3 STURGEON CREEK, 3.5 mgd

There are no changes to this section for the FEIS. Refer to Section 2.3.3, Sturgeon Creek, 3.5 mgd, of the DEIS for the rationale for considering this site as a reasonable alternative.

2.3.4 NO ACTION

There are no changes to this section for the FEIS. Please refer to Section 2.3.4, No Action, of the DEIS for a discussion of the No Action Alternative.

2.3.5 WAR FORK AND STEER FORK, 1.3 mgd

The proposed War Fork and Steer Fork, 1.3 mgd dam site would be situated in the same location as the dam for the War Fork and Steer Fork, 3.5 mgd alternative. The location of this proposed dam site is described in Section 2.3.1, War Fork and Steer Fork, of this FEIS. The proposed reservoir at the War Fork and Steer Fork, 1.3 mgd site would provide an average yield of 1.33 mgd, which would provide for only Jackson County's projected water needs.

The boundaries of the proposed War Fork and Steer Fork, 1.3 mgd project site, including the reservoir footprint, lie completely within the boundaries of the War Fork and Steer Fork, 3.5 mgd alternative that was evaluated in the DEIS. As noted in Section 2.3.1, War Fork and Steer Fork, of the DEIS, the area of the proposed dam and reservoir along War Fork does not have any status under the Wild and Scenic Rivers Act (WSRA) or the Kentucky ORW program.

2.3.6 WAR FORK AND STEER FORK, 2.2 mgd

The proposed War Fork and Steer Fork, 2.2 mgd dam site would be situated in the same location as the dam for the War Fork and Steer Fork, 3.5 mgd alternative. The location of this proposed dam site is described in Section 2.3.1, War Fork and Steer Fork, of this FEIS. The proposed reservoir at the War Fork and Steer Fork, 2.2 mgd site would provide an average yield of 2.19 mgd, which would provide for the projected water needs of Jackson County and the surrounding region.

The boundaries of the proposed War Fork and Steer Fork, 2.2 mgd project site, including the reservoir footprint, lie completely within the boundaries of the War Fork and Steer Fork, 3.5 mgd alternative that was evaluated in the DEIS. As noted in Section 2.3.1, War Fork and Steer Fork, of the DEIS, the area of the proposed dam and reservoir along War Fork does not have any status under the WSRA or the Kentucky ORW program.

2.3.7 WOOD CREEK LAKE PIPELINE

This alternative would consist of constructing a water transmission pipeline from the existing Wood Creek Water District 20-inch transmission main leading from Wood Creek Lake in northern Laurel County to the existing JCWA 10-inch main south of the JCWA Treatment Plant for the purposes of importing treated water. The total length of pipeline that would have to be laid is 119,500 linear feet, or 22.6 miles (Kenvirons, 2000b).

Wood Creek Lake has a surface area of approximately 680 acres at the normal pool level of 1,020 feet above MSL. The storage capacity of this lake at normal pool level is 24,4000 acre-feet (Kenvirons, 2000c). The Wood Creek Water District Treatment Plant currently has the capacity to treat 4.61 mgd. Plans are currently underway to upgrade the treatment plant to a capacity of 9.22 mgd. The Wood Creek Water District currently withdraws and treats an approximate average of 4 mgd from Wood Creek Lake (Williams, 2000e). The maximum sustainable withdrawal from Wood Creek Lake is estimated to be 18 mgd. However, in order to sustain usage of the existing recreational facilities that surround Wood Creek Lake, such as fixed boat docks and boat ramps, the maximum recommended withdrawal from Wood Creek Lake is estimated to be 10 mgd (Williams, 2000e).

Under this alternative, two pipeline capacities are investigated in this FEIS. A pipeline capable of transporting 1.33 mgd from Wood Creek Lake to the JCWA Treatment Plant is examined in this FEIS for the purposes of supplying Jackson County only with water. A second pipeline, capable of transporting 2.19 mgd to the JCWA Treatment Plant, is evaluated for the purposes of supplying Jackson County and the surrounding region with water.

This alternative was eliminated from further consideration in the DEIS primarily because importing water from Wood Creek Lake was not accessible at a reasonable cost. Due to the revision of the projected water needs of Jackson and surrounding counties, presented in Section 1.2.1, Water Supply, of this FEIS, and revised cost estimates for a pipeline from Wood Creek Lake, this alternative is now considered to be reasonable for further study. Please refer to Section 2.1.3, Water Supply From Surrounding Counties, of this FEIS for a further explanation.

2.3.8 LOCK 14 PIPELINE

This alternative would consist of constructing a water transmission pipeline from the existing Lock 14 of the Kentucky River at Heidelberg (Lee County) to Tyner Lake, for the purposes of importing raw water to be treated at the JCWA Treatment Plant. The total length of pipeline that would have to be laid is 108,000 linear feet, or 20.5 miles (Kenvirons, 2000b).

Under this alternative, two pipeline capacities are investigated in this FEIS. A pipeline capable of transporting 1.33 mgd from Lock 14 of the Kentucky River to the JCWA Treatment Plant is examined in this FEIS for the purposes of supplying Jackson County only with water. A second pipeline, capable of transporting 2.19 mgd to the JCWA Treatment Plant, is evaluated for the purposes of supplying Jackson County and the surrounding region with water.

This alternative was eliminated from further consideration in the DEIS primarily because importing water from Lock 14 was not accessible at a reasonable cost. Due to the revision of the projected water needs of Jackson and surrounding counties, presented in Section 1.2.1, Water Supply, of this FEIS, and revised cost estimates for a pipeline from Lock 14, this alternative is now considered to be reasonable for further study. Please refer to Section 2.1.3, Water Supply From Surrounding Counties, of this FEIS for a further explanation.

2.4 PROPOSED ACTION

In the DEIS, three alternatives were proposed for meeting the purpose and need described in Section 1.2, Purpose and Need For Action, of the EIS. All three of these alternatives consisted of the construction of a roller-compacted concrete (RCC) dam to create a reservoir, and the construction of a raw water transmission main from the proposed reservoir to the Jackson County Water Association (JCWA) Treatment Plant.

Comments received from agencies and the public on the DEIS and revision of the water needs analysis led to the reassessment of various reservoir and non-reservoir alternatives for meeting Jackson County's projected water needs. As a result of this reassessment, two types of alternatives are now considered to be reasonable for further analysis. In addition to the construction of a dam and reservoir, the construction of a water transmission pipeline from existing surface water resources in neighboring counties for the purposes of importing water to supply Jackson County and the region is examined in this FEIS.

Section 2.4, Proposed Action, of the DEIS is organized in the following manner. Section 2.4.1 discusses actions pertaining to the site preparation, construction, operation, and connected actions associated with the proposed dam and reservoir at each alternative site. Section 2.4.2 considers actions regarding the construction and operation of the proposed water transmission main leading from each proposed reservoir site to the JCWA Treatment Plant. This same format is used in the FEIS for the description of the additional alternatives. Two additional dam and reservoir alternatives are investigated in this FEIS: War Fork and Steer Fork, 1.3 mgd and War Fork and Steer Fork, 2.2 mgd. Actions pertaining to the proposed dam and reservoir at each of these sites are discussed in Section 2.4.1, Dam and Reservoir, of this FEIS. Actions associated with the raw water transmission main leading from each of these reservoir sites are discussed in Section 2.4.2, Water Transmission Main Construction, of this FEIS. In addition to these two alternatives, two pipeline alternatives are evaluated in this FEIS. Since these pipeline alternatives do not involve the construction of a reservoir, they are discussed only in Section 2.4.2 of this FEIS.

As discussed in Section 1.1, Environmental Impact Statement, of this FEIS, this FEIS incorporates the Jackson County Lake Project DEIS by reference, and contains only new information obtained and additional analyses conducted since the publication of the DEIS. This FEIS is organized according to the same section numbers and headings as presented in the DEIS. Where there is additional information for a section of the DEIS, or where additional analyses have been made, this information is presented in the text of the FEIS, under the appropriate section heading. Where a section contains no additional information for the FEIS, this fact is stated under that section heading. In all sections of the FEIS, the information contained in the DEIS is incorporated by reference. Additional section numbers and headings have been added to the text of the FEIS where such sections did not exist in the DEIS, particularly for the evaluation of alternatives.

2.4.1 DAM AND RESERVOIR

Since the proposed project would result in a discharge of dredge or fill material into the waters of the Commonwealth of Kentucky, a Section 401 (Clean Water Act(CWA)) Water Quality Certification would have to be obtained from the Kentucky Division of Water (KDOW) for the U.S. Corps of Engineers (USACE). In addition, a Section 404 (CWA) permit would have to be obtained from the USACE prior to the implementation of the proposed project.

There are no other changes to this section for the FEIS. Refer to Section 2.4.1, Dam and Reservoir, of the DEIS for a general discussion of this component of the proposed action.

As in the DEIS, the following sections provide the details of this action for each alternative dam and reservoir site considered. Activities associated with the site preparation, construction, and operation of the dam and reservoir, and connected actions that are consistent regardless of the specific site under consideration are discussed first. Site-specific details are discussed in sections following the general discussion.

2.4.1.1 Site Description

As in the DEIS, this section identifies the location of each alternative site under consideration and provides a description of the characteristics of the dam and reservoir at each site, including estimated site-specific project costs. Revised cost estimates for the War Fork and Steer Fork, 3.5 mgd site and the Sturgeon Creek, 3.5 mgd and 8.5 mgd sites were prepared for this FEIS by Kenvirons, Incorporated. Revised line item cost estimates for these sites are provided in this FEIS as Appendix Q. Dam and reservoir site statistics and line item cost estimates for the War Fork and Steer Fork, 1.3 mgd and 2.2 mgd project sites were also prepared by Kenvirons, Inc. for this FEIS, and are also provided in Appendix Q. More detailed explanations of the various types of costs associated with the project are provided in Appendix S of this FEIS.

The present worth analysis of operation, maintenance, and replacement costs conducted for this FEIS evaluated the operation, maintenance, and replacement costs for each year of the useful life of each alternative, or 50 years. These future costs were related back to the present using an interest factor, or discount rate, of five percent. Discount rates are discussed in detail in the text

box on the following page. The present worth of the annual operation, maintenance, and replacement costs were then totalized. The totalized present worth value represents the amount of money that would be placed in an interest-bearing account in order to pay for an alternative's operation, maintenance, and replacement costs during the 50-year lifetime of the alternative. The total present worth value calculated for each alternative was then added to the alternative's development cost in order to adequately compare the costs of each alternative (JCEZ, 2000).

A review of present worth analysis conducted for each alternative revealed that an inaccurate discount rate (five percent) was used in the calculations. The discount rate used for the analysis must comply with the Office of Management and Budget's Circular A-94 (Deal, 2001). The 30-year real discount rate is currently 4.2 percent, and is updated annually, typically at the beginning of each year (OMB, 2000). A real discount rate is used to adjust benefits or costs to eliminate the effect of expected inflation (OMB, 1992). Use of this somewhat lower rate would result in slightly higher present worth costs for operation, maintenance, and replacement, and thus slightly higher total project costs, than are presented in Sections 2.4.1.1.1 through 2.4.1.1.5 and Sections 2.4.2.6 and 2.4.2.7 below. However, application of this lower discount rate across all alternatives would not change the relative ranking of alternatives by cost.

Discount Rates and Discounting

The procedure used to convert periodic benefit and costs into a present worth is known as discounting. A discount rate is used to convert future benefits or costs into a present worth by discounting each periodic benefit or cost using an appropriate yield rate (Appraisal Institute, 1996). This rate is variable, depending on market and institutional attitudes towards risk and return on capital during the investment holding period. Discounting can be done using formulas and factors obtained from published financial tables, using a calculator, or using a computer program. In evaluating Federal programs whose benefits and costs are distributed over time, Office of Management and Budget's Circular A-94 provides specific guidance on the discount rates to be used.

The concept of present worth explicitly incorporates the time value of money. The present worth of a benefit or cost declines as the time period over which the discounting is done lengthens and as the discount rate increases. For example, at a discount rate of 10%, the present worth of $1.10 to be received one year from now is $1.00. The present worth of $1.10 to be received 5 years from now is $0.68. If the discount rate is increased from 10% to 20% the present worth of $1.10 to be received one year from now is $0.92., while the present worth of $1.10 to be received 5 years from now is $0.44.

The results of a reservoir sizing analysis for each of the proposed alternative dam and reservoir sites are also provided in Appendix S of this FEIS. As in the DEIS, study area elevations of the reservoir are based on both normal pool elevations and on potential maximum flood level elevations, which are about 20 feet above normal pool elevations.

2.4.1.1.1 War Fork and Steer Fork

It should be noted that the location of the proposed War Fork and Steer Fork dam site, in relation to Turkey Foot Campground and the confluence of War Fork with Steer Fork, that was given in the DEIS was measured in air miles, not river miles. The proposed War Fork and Steer Fork dam site is located approximately 0.5 air miles southwest of Turkey Foot Campground, or about

0.3 miles southwest of Turkey Foot Road, in eastern Jackson County. The dam would be situated on War Fork, approximately 0.5 air miles north of the confluence with Steer Fork.

The revised cost estimates for the proposed War Fork and Steer Fork (3.5 mgd) project site were based on the following parameters: a dam with an approximate height of 95 feet; a reservoir with a normal pool elevation of 980 feet above mean sea level (MSL) and a normal pool surface area of 111 acres; a maximum flood elevation of 1,000 feet above MSL; and a total surface area of 337 acres for a reservoir at maximum flood level at this site, with a 300-foot buffer extending from normal pool level. Of these 337 acres, 283 are currently managed by the U.S. Forest Service (USFS); the remaining 54 acres are privately-owned (Kenvirons, 2000b).

According to the revised cost estimates, the estimated cost of land acquisition for the War Fork and Steer Fork, 3.5 mgd project site would be about $271,000 (Kenvirons, 2000b). This acquisition cost includes only the costs of acquisition of the privately-owned land within the project area. The estimated total construction cost for the RCC dam and the reservoir at the War Fork and Steer Fork site would be approximately $5,809,000. The estimated construction cost for the raw water transmission main leading from the reservoir at this site to the JCWA Treatment Plant would be $2,936,000. The total project cost for the War Fork and Steer Fork, 3.5 mgd alternative is estimated to be about $10,600,000 (Kenvirons, 2000b). This total project cost includes costs of land acquisition, utility relocations, administrative and legal issues, environmental and preliminary engineering, site work, and the construction costs for the dam, reservoir, and the raw water transmission main. Costs of constructing the recreation facilities and associated infrastructure for these facilities at this site are not included in these estimates.

The present worth of operation and maintenance of the raw water transmission main was revised for this FEIS to account for a 50-year useful life of the facility. The DEIS presented a present worth based on a 20 year analysis. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $1,624,000. Therefore, the total cost of the project at the War Fork and Steer Fork, 3.5 mgd site, including the 50-year operation and maintenance costs of the water transmission facilities, would be $12,224,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs. As discussed in Section 2.4.1.1 above, the total present worth of operation and maintenance, as well as the total cost of the project at the War Fork and Steer Fork, 3.5 mgd site, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

In order to compare project costs across all alternatives, the cost of the JCWA Treatment Plant expansion project and the present worth of treating raw water from the proposed War Fork and Steer Fork, 3.5 mgd reservoir would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $20,364,000 (JCEZ, 2000).

There are no other changes to this section for the FEIS. Refer to Section 2.4.1.1.1, War Fork and Steer Fork, of the DEIS for a more detailed description of this project site.

2.4.1.1.2 Sturgeon Creek, 8.5 mgd

The revised cost estimates for the proposed Sturgeon Creek, 8.5 mgd project site were based on the following parameters: a dam with an approximate height of 85 feet; a reservoir with a normal pool elevation of 989 feet above MSL and a normal pool surface area of 467 acres; a maximum flood elevation of 1,010 feet above MSL and a maximum flood surface area of 740 acres; and a total surface area of 1,119 acres for a reservoir at maximum flood level at this site, with a 300-foot buffer extending from normal pool level (Kenvirons, 2000b).

According to the revised cost estimates, the estimated cost of acquisition for the Sturgeon Creek, 8.5 mgd project site would be about $5,069,000 (Kenvirons, 2000b). This acquisition cost includes the costs of land acquisition within the buffer and maximum flood areas of the project, including acquisition of all existing structures within the project area. The estimated total construction cost for the RCC dam and the reservoir at the Sturgeon Creek, 8.5 mgd site would be approximately $7,168,000. The estimated construction cost for the raw water transmission main leading from the reservoir at this site to the JCWA Treatment Plant, and the construction cost of a 5.0 mgd transmission main leading from the reservoir to the City of Manchester's Water Treatment Plant, would be $9,519,000. The total project cost for the Sturgeon Creek, 8.5 mgd alternative is estimated to be about $25,790,000 (Kenvirons, 2000b). This total project cost includes costs of land acquisition, utility, residential, and cemetery relocations, administrative and legal issues, environmental and preliminary engineering, site work, and the construction costs for the dam, reservoir, and the raw water transmission main. Costs of constructing the recreation facilities and associated infrastructure for these facilities at this site are not included in these estimates.

The present worth of operation and maintenance of the raw water transmission main was revised for this FEIS to account for a 50-year useful life of the facility. The DEIS presented a present worth based on a 20 year analysis. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $3,952,000. Therefore, the total cost of the project at the Sturgeon Creek, 8.5 mgd site, including the 50-year operation and maintenance costs of the water transmission facilities, would be $29,742,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs. As discussed in Section 2.4.1.1 above, the total present worth of operation and maintenance, as well as the total cost of the project at the Sturgeon Creek, 8.5 mgd site, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

In order to compare project costs across all alternatives, the cost of the JCWA Treatment Plant expansion project and the present worth of treating raw water from the proposed Sturgeon Creek, 8.5 mgd reservoir would have to be incorporated to determine the total project costs. Although the cost of expanding the JCWA Treatment Plant would be the same across alternatives, the present worth for treating raw water was not calculated for this alternative.

There are no other changes to this section for the FEIS. Refer to Section 2.4.1.1.2, Sturgeon Creek, 8.5 mgd, of the DEIS for a more detailed description of this project site.

2.4.1.1.3 Sturgeon Creek, 3.5 mgd

The revised cost estimates for the proposed Sturgeon Creek, 3.5 mgd project site were based on the following parameters: a dam with an approximate height of 65 feet; a reservoir with a normal pool elevation of 980 feet above MSL and a normal pool surface area of 264 acres; a maximum flood elevation of 1,000 feet above MSL and a maximum flood surface area of 440 acres; and a total surface area of 643 acres for a reservoir at maximum flood level at this site, with a 300-foot buffer extending from normal pool level (Kenvirons, 2000b).

According to the revised cost estimates, the estimated cost of acquisition for the Sturgeon Creek, 3.5 mgd project site would be about $3,159,000 (Kenvirons, 2000b). This acquisition cost includes the costs of land acquisition within the buffer and maximum flood areas of the project, including acquisition of all existing structures within the project area. The estimated total construction cost for the RCC dam and the reservoir at the Sturgeon Creek, 3.5 mgd site would be approximately $4,198,000. The estimated construction cost for the raw water transmission main leading from the reservoir at this site to the JCWA Treatment Plant would be $2,063,000. The total project cost for the Sturgeon Creek, 3.5 mgd alternative is estimated to be about $11,991,000 (Kenvirons, 2000b). This total project cost includes costs of land acquisition, utility, residential, and cemetery relocations, administrative and legal issues, environmental and preliminary engineering, site work, and the construction costs for the dam, reservoir, and the raw water transmission main. Costs of constructing the recreation facilities and associated infrastructure for these facilities at this site are not included in these estimates.

The present worth of operation and maintenance of the raw water transmission main was revised for this FEIS to account for a 50-year useful life of the facility. The DEIS presented a present worth based on a 20 year analysis. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $1,295,000. Therefore, the total cost of the project at the Sturgeon Creek, 3.5 mgd site, including the 50-year operation and maintenance costs of the water transmission facilities, would be $13,286,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs. As discussed in Section 2.4.1.1 above, the total present worth of operation and maintenance, as well as the total cost of the project at the Sturgeon Creek, 3.5 mgd site, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

In order to compare project costs across all alternatives, the cost of the JCWA Treatment Plant expansion project and the present worth of treating raw water from the proposed Sturgeon Creek, 3.5 mgd reservoir would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $21,426,000 (JCEZ, 2000).

There are no other changes to this section for the FEIS. Refer to Section 2.4.1.1.3, Sturgeon Creek, 3.5 mgd, of the DEIS for a more detailed description of this project site.

2.4.1.1.4 War Fork and Steer Fork, 1.3 mgd

The proposed War Fork and Steer Fork, 1.3 mgd dam site is located approximately 0.5 air miles southwest of Turkey Foot Campground, or about 0.3 miles southwest of Turkey Foot Road, in eastern Jackson County. The dam at this site would be situated on War Fork, approximately 0.5 air miles north of the confluence with Steer Fork. The proposed dam at the War Fork and Steer Fork, 1.3 mgd site would be situated in the same location as the proposed dam at the War Fork and Steer Fork, 3.5 mgd site that was evaluated in the DEIS. In addition, the boundaries of the proposed War Fork and Steer Fork, 1.3 mgd site lie completely within those of the War Fork and Steer Fork, 3.5 mgd site.

The dam at the proposed War Fork and Steer Fork, 1.3 mgd project site would have an approximate height of 61 feet. At a normal pool elevation of 946 feet above MSL, the surface area of the impoundment would be approximately 65 acres, with a storage capacity of 1,728 acre-feet (0.563 billion gallons (BG)). The drainage area for this reservoir would be 10.85 square miles. The estimated maximum lake level fluctuation of a reservoir at the War Fork and Steer Fork, 1.3 mgd site would be about 19 feet. This reservoir would provide an average yield of 1.33 mgd (Kenvirons, 2000b).

A sediment accumulation pool would be provided in the reservoir. Based on the average sediment accumulation rate of 0.74 acre-feet per square mile of drainage area per year for central and eastern Kentucky, it is anticipated that sediment would be deposited at a rate of approximately 8.0 acre-feet/year in the War Fork and Steer Fork, 1.3 mgd reservoir (Kenvirons, 1999c). Over a projected useful lifetime of 50 years, 396 acre-feet of sediment is anticipated to accumulate in the reservoir (Kenvirons, 1999a), or about 23 percent of the total volume.

Nearly all of the 65 acres up to normal pool level of the proposed War Fork and Steer Fork, 1.3 mgd reservoir are located within the Daniel Boone National Forest (DBNF) and are currently managed by the USFS. A very small amount of land within the boundaries of the normal pool level of the proposed reservoir may be privately-owned.

The potential maximum flood level of the proposed War Fork and Steer Fork, 1.3 mgd reservoir would lie at an approximate elevation of 966 feet above MSL. 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 215 acres of land. Of these 215 acres, 192 acres are currently managed by the USFS; the remaining 23 acres are privately-owned (Kenvirons, 2000b).

The estimated cost of land acquisition for the War Fork and Steer Fork, 1.3 mgd project site would be about $247,000 (Kenvirons, 2000b). This acquisition cost includes only the costs of acquisition of the privately-owned land within the project area. The estimated total construction cost for the RCC dam and the reservoir at the War Fork and Steer Fork, 1.3 mgd site would be approximately $3,060,000. The estimated construction cost for the raw water transmission main leading from the reservoir at this site to the JCWA Treatment Plant would be $2,096,000. The total project cost for the War Fork and Steer Fork, 1.3 mgd alternative is estimated to be about $6,762,000 (Kenvirons, 2000b). This total project cost includes costs of land acquisition, utility relocations, administrative and legal issues, environmental and preliminary engineering, site

work, and the construction costs for the dam, reservoir, and the raw water transmission main. Costs of constructing the recreation facilities and associated infrastructure for these facilities at this site are not included in these estimates.

The present worth of operation and maintenance of the raw water transmission main leading from the War Fork and Steer Fork, 1.3 mgd reservoir was calculated for this FEIS to account for a 50-year useful life of the facility. The total present worth of operation and maintenance of the water main for 50 years would be approximately $1,022,000. Therefore, the total cost of the project at the War Fork and Steer Fork, 1.3 mgd site, including the 50-year operation and maintenance costs of the water transmission facilities, would be $7,804,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs. As discussed in Section 2.4.1.1 above, the total present worth of operation and maintenance, as well as the total cost of the project at the War Fork and Steer Fork, 1.3 mgd site, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

In order to compare project costs across all alternatives, the cost of the JCWA Treatment Plant expansion project and the present worth of treating raw water from the proposed War Fork and Steer Fork, 1.3 mgd reservoir would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $14,188,000 (JCEZ, 2000).

2.4.1.1.5 War Fork and Steer Fork, 2.2 mgd

The proposed War Fork and Steer Fork, 2.2 mgd dam site is located approximately 0.5 air miles southwest of Turkey Foot Campground, or about 0.3 miles southwest of Turkey Foot Road, in eastern Jackson County. The dam at this site would be situated on War Fork, approximately 0.5 air miles north of the confluence with Steer Fork. The proposed dam at the War Fork and Steer Fork, 2.2 mgd site would be situated in the same location as the proposed dam at the War Fork and Steer Fork, 3.5 mgd site that was evaluated in the DEIS. In addition, the boundaries of the proposed War Fork and Steer Fork, 2.2 mgd site lie completely within those of the War Fork and Steer Fork, 3.5 mgd site.

The dam at the proposed War Fork and Steer Fork, 2.2 mgd project site would have an approximate height of 75 feet. At a normal pool elevation of 960 feet above MSL, the surface area of the impoundment would be approximately 88 acres, with a storage capacity of 2,780 acre-feet (0.906 BG). The drainage area for this reservoir would be 10.85 square miles**.** The estimated maximum lake level fluctuation of a reservoir at the War Fork and Steer Fork, 2.2 mgd site would be about 26 feet. This reservoir would provide an average yield of 2.19 mgd (Kenvirons, 2000b).

A sediment accumulation pool would be provided in the reservoir. Based on the average sediment accumulation rate of 0.74 acre-feet per square mile of drainage area per year for central and eastern Kentucky, it is anticipated that sediment would be deposited at a rate of approximately 8.0 acre-feet/year in the War Fork and Steer Fork, 2.2 mgd reservoir (Kenvirons,

1999c). Over a projected useful lifetime of 50 years, 396 acre-feet of sediment is anticipated to accumulate in the reservoir (Kenvirons, 1999a), or about 14 percent of the total volume.

Nearly all of the 88 acres up to normal pool level of the proposed War Fork and Steer Fork, 2.2 mgd reservoir are located within the DBNF and are currently managed by the USFS. A very small amount of land within the boundaries of the normal pool level of the proposed reservoir may be privately-owned.

The potential maximum flood level of the proposed War Fork and Steer Fork, 2.2 mgd reservoir would lie at an approximate elevation of 980 feet above MSL. 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 275 acres of land. Of these 275 acres, 244 acres are currently managed by the USFS; the remaining 31 acres are privately-owned (Kenvirons, 2000b).

The estimated cost of acquisition for the War Fork and Steer Fork, 2.2 mgd project site would be approximately $253,000 (Kenvirons, 2000b). This acquisition cost includes only the costs of acquisition of the privately-owned land within the project area. The estimated total construction cost for the RCC dam and the reservoir at the War Fork and Steer Fork, 2.2 mgd site would be approximately $4,239,000. The estimated construction cost for the raw water transmission main leading from the reservoir at this site to the JCWA Treatment Plant would be $2,354,000. The total project cost for the War Fork and Steer Fork, 2.2 mgd alternative is estimated to be about $8,294,000 (Kenvirons, 2000b). This total project cost includes costs of land acquisition, utility relocations, administrative and legal issues, environmental and preliminary engineering, site work, and the construction costs for the dam, reservoir, and the raw water transmission main. Costs of constructing the recreation facilities and associated infrastructure for these facilities at this site are not included in these estimates.

The present worth of operation and maintenance of the raw water transmission main leading from the War Fork and Steer Fork, 2.2 mgd reservoir was calculated for this FEIS to account for a 50-year useful life of the facility. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $1,337,000. Therefore, the total cost of the project at the War Fork and Steer Fork, 2.2 mgd site, including the 50-year operation and maintenance costs of the water transmission facilities, would be $9,631,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs. As discussed in Section 2.4.1.1 above, the total present worth of operation and maintenance, as well as the total cost of the project at the War Fork and Steer Fork, 2.2 mgd site, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

In order to compare project costs across all alternatives, the cost of the JCWA Treatment Plant expansion project and the present worth of treating raw water from the proposed War Fork and Steer Fork, 2.2 mgd reservoir would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $16,723,000 (JCEZ, 2000).

2.4.1.2 Site Preparation

It should be noted that Kentucky regulations allow two other methods for disposal of construction/demolition debris, in addition to the method of hauling the debris to an off-site permitted facility that was discussed in Section 2.4.1.2, Site Preparation, of the DEIS. 401 Kentucky Administrative Regulations (KAR) 47:150, Section 1, Subsection 5, allows onsite disposal, or burial, of demolition debris which contain no asbestos. Disposal by this method must occur in the immediate vicinity of the project site. Under this regulation, a permit-by-rule is automatically granted, provided that no environmental performance standards, as outlined in 401 KAR 47:030, are violated. In addition to this method of disposal, the construction contractor could acquire a permit for a less than one-acre construction/demolition debris landfill near the project site. 401 KAR 48:320 and Kentucky Revised Statute (KRS) 224.40-120 allow construction/demolition debris to be landfilled under a permit-by-rule, provided certain citing requirements, operating conditions, and financial assurances are met.

There are no other changes to this section for the FEIS. All information presented in Section 2.4.1.2, Site Preparation, of the DEIS also applies to the proposed War Fork and Steer Fork, 1.3 mgd and 2.2 mgd project sites discussed in this FEIS, except where noted. Refer to this section of the DEIS for a detailed discussion of the activities associated with site preparation for the proposed dam and reservoir.

2.4.1.2.1 War Fork and Steer Fork

Since the publication of the DEIS, additional options to the land exchange with the USFS for a project at the proposed War Fork and Steer Fork, 3.5 mgd project site have arisen. These options are discussed in Section 2.4.1.5.1, War Fork and Steer Fork, of this FEIS. There are no other changes or additions to this section for the FEIS. Refer to Section 2.4.1.2.1, War Fork and Steer Fork, of the DEIS for site-specific information on site preparation for this alternative.

2.4.1.2.2 Sturgeon Creek, 8.5 mgd

According to the new cost estimates prepared for the Sturgeon Creek, 8.5 mgd alternative, presented in Appendix Q of this FEIS, there are 44 houses, 6 trailers, 33 barns, 53 small outbuildings, and 10 detached garages currently present at this site (Kenvirons, 2000b). These numbers vary slightly from those presented in Section 2.4.1.2.2 of the DEIS. There are no other changes to this section for the FEIS. Refer to Section 2.4.1.2.2, Sturgeon Creek, 8.5 mgd, of the DEIS for site-specific information on site preparation for this alternative.

2.4.1.2.3 Sturgeon Creek, 3.5 mgd

There are no changes to this section for the FEIS. Refer to Section 2.4.1.2.3, Sturgeon Creek, 3.5 mgd, of the DEIS for site-specific information on site preparation for this alternative.

2.4.1.2.4 War Fork and Steer Fork, 1.3 mgd

The estimated amount of land required for a dam and reservoir, up to maximum flood level elevation, and for a 300-foot buffer zone extending from normal pool elevation of the proposed reservoir at the War Fork and Steer Fork, 1.3 mgd project site would be 215 acres. Implementation of the project at this site would involve either a land exchange with the USFS for land within the DBNF, issuance of a Special Use Permit by the USFS, or a combination of these two actions. The land exchange and Special Use Permit options are discussed in detail in Section 2.4.1.5 of this FEIS. Approximately 65 acres of this land, or the area up to the normal pool elevation of the reservoir, would be cleared of trees (Kenvirons, 2000b).

There are currently no households living on the proposed War Fork and Steer Fork, 1.3 mgd project site that would require relocation (Schmitt, 1999f). In addition, there are no barns, trailers, or other structures present on this site (Kenvirons, 2000b).

Based on an estimated RCC fill volume of 41,000 cubic yards (cu. yd.), an estimated volume of 3,100 cu. yd. of conventional concrete, and an estimated volume of 1,800 cu. yd. of concrete for the upstream and spillway pre-cast panels for the dam at the War Fork and Steer Fork, 1.3 mgd site (Kenvirons, 2000b), the approximate number of truckloads of each raw material that would be needed for the dam are: 450 truckloads of cement; 1,030 truckloads of sand; and 2,230 truckloads of gravel. The War Fork and Steer Fork, 1.3 mgd 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, or about 0.7 miles, in length (Kenvirons, 2000b). This road may later be used for permanent access to the dam.

The average workforce that would be needed for the duration of the site preparation and construction activities associated with a dam at War Fork and Steer Fork, 1.3 mgd project site would be less than or equal to the average workforce needed for a dam at the War Fork and Steer Fork, 3.5 mgd project site (15 to 25 workers) described in the DEIS.

2.4.1.2.5 War Fork and Steer Fork, 2.2 mgd

The estimated amount of land required for a dam and reservoir, up to maximum flood level elevation, and for a 300-foot buffer zone extending from normal pool elevation of the proposed reservoir at the War Fork and Steer Fork, 2.2 mgd site would be 275 acres. Implementation of the project at this site would involve either a land exchange with the USFS for land within the DBNF, issuance of a Special Use Permit by the USFS, or a combination of these two actions. The land exchange and Special Use Permit options are discussed in detail in Section 2.4.1.5 of this FEIS. Approximately 88 acres of this land, or the area up to the normal pool elevation of the reservoir, would be cleared of trees (Kenvirons, 2000b).

There are currently no households living on the proposed War Fork and Steer Fork, 2.2 mgd project site that would require relocation (Schmitt, 1999f). In addition, there are no barns, trailers, or other structures present on this site (Kenvirons, 2000b).

Based on an estimated RCC fill volume of 61,000 cu. yd., an estimated volume of 4,600 cu. yd. of conventional concrete, and an estimated volume of 2,330 cu. yd. of concrete for the upstream and spillway pre-cast panels for the dam at the War Fork and Steer Fork, 2.2 mgd site (Kenvirons, 2000b), the approximate number of truckloads of each raw material that would be needed for the dam are: 660 truckloads of cement; 1,510 truckloads of sand; and 3,270 truckloads of gravel. The War Fork and Steer Fork, 2.2 mgd 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, or about 0.7 miles, in length (Kenvirons, 2000b). This road may later be used for permanent access to the dam.

The average workforce that would be needed for the duration of the site preparation and construction activities associated with a dam at War Fork and Steer Fork, 2.2 mgd project site would be less than or equal to the average workforce needed for a dam at the War Fork and Steer Fork, 3.5 mgd project site (15 to 25 workers) described in the DEIS.

2.4.1.3 Facility Construction

Prior to the onset of dam construction, a Dam Construction Permit and a Floodplain Construction Permit would have to be obtained from the KDOW, Floodplain Management Section (KDEP, 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).

Section 2.4.1.3, Facility Construction, of the DEIS notes that, during impoundment, downstream flows would be reduced to the minimum average flow that occurs for seven consecutive days with a recurrence interval of ten years (7Q10), plus any permitted downstream withdrawals. This is not necessarily correct. According to the KDOW, during impoundment, as well as in operation, the outflow from the dam must equal the inflow into the reservoir during low-flow periods (Kuryla, 2000). The flow would not be reduced to the 7Q10 unless the natural flow is equal to the 7Q10. The 7Q10 would be a rare occurrence; required outflows would be higher than the 7Q10 during most of the low-flow season (summer and fall months).

It was noted in Section 2.4.1.3, Facility Construction, of the DEIS that the boat dock constructed at the proposed reservoir would be composed of decking situated over foam flotation boats. It is more likely, however, that the boat dock decking would be situated over plastic barrels or metal pontoons, which would reduce floating debris caused by foam flotation devices (Kuryla, 2000).

As noted in the DEIS, the proposed camping area near the reservoir would have a centrally-located toilet facility for use by all campsite visitors. The KDOW would prefer such a restroom facility to be of the no discharge type, such as a composting or incinerating toilet (Kuryla, 2000).

There are no other changes to this section for the FEIS. All information presented in Section 2.4.1.3, Facility Construction, of the DEIS also applies to the proposed War Fork and Steer Fork, 1.3 mgd and 2.2 mgd project sites discussed in this FEIS, except where noted. Refer to this

section of the DEIS for a detailed discussion of the activities associated with construction of the proposed dam and reservoir.

2.4.1.3.1 War Fork and Steer Fork

Because the outflow from the dam must equal the inflow into the proposed reservoir during low-flow periods, impoundment of the War Fork and Steer Fork reservoir would take somewhat more time than the five months predicted in the DEIS.

There are no other changes to this section for the FEIS. Refer to section 2.4.1.3.1, War Fork and Steer Fork, of the DEIS for details on facility construction at this project site.

2.4.1.3.2 Sturgeon Creek, 8.5 mgd

Because the outflow from the dam must equal the inflow into the proposed reservoir during low-flow periods, impoundment of the Sturgeon Creek, 8.5 mgd reservoir would take somewhat more time than the 6.5 months predicted in the DEIS.

There are no other changes to this section for the FEIS. Refer to section 2.4.1.3.2, Sturgeon Creek, 8.5 mgd, of the DEIS for details on facility construction at this project site.

2.4.1.3.3 Sturgeon Creek, 3.5 mgd

Because the outflow from the dam must equal the inflow into the proposed reservoir during low-flow periods, impoundment of the Sturgeon Creek, 3.5 mgd reservoir would take somewhat more time than the 3.5 months predicted in the DEIS.

There are no other changes to this section for the FEIS. Refer to section 2.4.1.3.3, Sturgeon Creek, 3.5 mgd, of the DEIS for details on facility construction at this project site.

2.4.1.3.4 War Fork and Steer Fork, 1.3 mgd

Construction of the dam at the proposed War Fork and Steer Fork, 1.3 mgd site would require approximately 11,000 cu. yd. of earth to be excavated (Kenvirons, 2000b). Estimates of the volumes of materials needed for dam construction are given in Section 2.4.1.2.4 of this FEIS. The intensive dam construction phase, the pouring of the RCC fill, would likely last a shorter amount of time at the War Fork and Steer Fork, 1.3 mgd site than the 8 to 17 weeks described for the War Fork and Steer Fork, 3.5 mgd site in the DEIS.

The pump station for this reservoir would contain three pumps, each with a required estimated horsepower of 200.

Based on the minimum downstream flow requirement for War Fork, which is estimated at 0.03 cubic feet per second (cfs), the War Fork and Steer Fork, 1.3 mgd reservoir would take approximately two months to fill. However, because the outflow from the dam must equal the inflow into the proposed reservoir during low-flow periods, impoundment of the reservoir would

take somewhat more time than this estimate. Impounding of the reservoir would flood one road at this site. This road is a USFS gravel road running along Steer Fork.

The exact quantities of recreation facilities, including the number of picnic tables, campsites, and parking spaces, planned around the War Fork and Steer Fork, 1.3 mgd reservoir are unknown at this time. However, the quantities are projected to be fewer than or equal to those described for the War Fork and Steer Fork, 3.5 mgd reservoir discussed in Section 2.4.1.3.1 of the DEIS.

2.4.1.3.5 War Fork and Steer Fork, 2.2 mgd

Construction of the dam at the proposed War Fork and Steer Fork, 2.2 mgd site would require approximately 14,000 cu. yd. of earth to be excavated (Kenvirons, 2000b). Estimates of the volumes of materials needed for dam construction are given in Section 2.4.1.2.5 of this FEIS. The intensive dam construction phase, the pouring of the RCC fill, would likely last a shorter amount of time at the War Fork and Steer Fork, 2.2 mgd site than the 8 to 17 weeks described for the War Fork and Steer Fork, 3.5 mgd site in the DEIS.

The pump station for this reservoir would contain three pumps, each with a required estimated horsepower of 300.

Based on the minimum downstream flow requirement for War Fork, which is estimated at 0.03 cubic feet per second (cfs), the War Fork and Steer Fork, 2.2 mgd reservoir would take approximately three months to fill. However, because the outflow from the dam must equal the inflow into the proposed reservoir during low-flow periods, impoundment of the reservoir would take somewhat more time than this estimate. Impounding of the reservoir would flood one road at this site. This road is a USFS gravel road running along Steer Fork.

The exact quantities of recreation facilities, including the number of picnic tables, campsites, and parking spaces, planned around the War Fork and Steer Fork, 2.2 mgd reservoir are unknown at this time. However, the quantities are projected to be slightly fewer than or equal to those described for the War Fork and Steer Fork, 3.5 mgd reservoir discussed in Section 2.4.1.3.1 of the DEIS.

2.4.1.4 Facility Operation

Section 2.4.1.4, Facility Operation, of the DEIS stated that the proposed recreation facilities associated with the reservoir would be owned and managed by the Jackson County Fiscal Court. This is not necessarily correct. Should a dam and reservoir be chosen as the action to be taken, and one of the War Fork and Steer Fork dam and reservoir sites is chosen as the final project location, ownership and management of the recreation facilities associated with the reservoir may either be the responsibility of the Jackson County Fiscal Court or the USFS.

There are no other changes to this section for the FEIS. All information presented in Section 2.4.1.4, Facility Operation, of the DEIS also applies to the proposed War Fork and Steer Fork, 1.3 mgd and 2.2 mgd project sites discussed in this FEIS, except where noted. Refer to this

section of the DEIS for a detailed discussion of the activities associated with operation of the proposed dam and reservoir.

2.4.1.5 Connected Actions

Refer to Section 2.4.1.5, Connected Actions, of the DEIS for a description of actions that would occur as an indirect effect or result of the construction of a dam to create a reservoir. As stated in the DEIS, potential connected actions include a land exchange with the USFS, cleaning up open dumps in the area, plugging existing water and/or oil wells, and relocation of roads. An additional potential connection action not mentioned in the DEIS is the issuance of a Special Use Permit (SUP) by the USFS for the land affected by the dam and reservoir at the proposed War Fork and Steer Fork project sites. Site-specific aspects of these connected actions are discussed in Sections 2.4.1.5.1 through 2.4.1.5.5 of this FEIS.

2.4.1.5.1 War Fork and Steer Fork

The discussion of the land exchange with the USFS presented in Section 2.4.1.5.1, War Fork and Steer Fork, of the DEIS only presents one option for exchange. Since publication of the DEIS, other options to the land exchange have arisen. The USFS may maintain management of the land under the proposed reservoir and within the proposed buffer zone surrounding the reservoir. Under this option, the Jackson County EZ Community would need to acquire the portion of the buffer zone that is currently privately-owned. Via a land exchange with the USFS, the Jackson County EZ Community could exchange an equal portion of this newly-acquired land for the land taken up by the proposed dam and appurtenant structures. The remainder of the privately-held portion of the buffer zone may be donated to the USFS, for their management. Under this option, an SUP would be acquired by the Jackson County EZ Community for the proposed reservoir, and potentially for the associated recreation facilities. An environmental assessment (EA) would have to be conducted by the USFS to determine the impacts of the proposal prior to issuance of the SUP. A separate NEPA analysis would also have to be prepared by the USFS on any land exchange necessary for this alternative. This EA would evaluate the environmental impacts of the various options for the land exchange.

A final option may not require a land exchange at all. Although the Jackson County EZ Community would still have to acquire the portion of the buffer zone that is currently privately-owned, an SUP to construct, operate, and maintain a dam and reservoir could be obtained from the USFS. As stated above, an EA would have to be conducted prior to USFS issuance of the SUP.

2.4.1.5.2 Sturgeon Creek, 8.5 mgd

There are no changes to this section for the FEIS. Refer to Section 2.4.1.5.2, Sturgeon Creek, 8.5 mgd, of the DEIS for a discussion of the connected actions associated with this alternative.

2.4.1.5.3 Sturgeon Creek, 3.5 mgd

There are no changes to this section for the FEIS. Refer to Section 2.4.1.5.3, Sturgeon Creek, 3.5 mgd, of the DEIS for a discussion of the connected actions associated with this alternative.

2.4.1.5.4 War Fork and Steer Fork, 1.3 mgd

Nearly all of the 65 acres of land up to the normal pool level of the proposed War Fork and Steer Fork, 1.3 mgd reservoir currently belong to the DBNF. Of the approximately 215 acres up to maximum flood level of the reservoir at this site, with a 300-foot buffer zone extending from the normal pool level, 192 acres are currently managed by the USFS and 23 acres are privately-owned (Kenvirons, 2000b). A land exchange with the USFS would be necessary before the project could proceed at this site. Refer for Section 2.4.1.5.1, War Fork and Steer Fork, of this FEIS for information on this land exchange.

The Jackson County Area Solid Waste Management Plan lists no illegal dumps on the proposed War Fork and Steer Fork, 1.3 mgd dam and reservoir site, including the buffer area (JCETF, 1997).

Since there are no known residences or other buildings on the proposed War Fork and Steer Fork, 1.3 mgd project site, there are no water wells at this site that would need to be plugged and abandoned. In addition, U.S. Geological Survey (USGS) maps do not indicate that any oil wells are present in or around this project site (USGS, No date).

2.4.1.5.5 War Fork and Steer Fork, 2.2 mgd

Nearly all of the 88 acres of land up to the normal pool level of the proposed War Fork and Steer Fork, 2.2 mgd reservoir currently belong to the DBNF. Of the approximately 275 acres up to maximum flood level of the reservoir at this site, with a 300-foot buffer zone extending from the normal pool level, 244 acres are currently managed by the USFS and 31 acres are privately-owned (Kenvirons, 2000b). A land exchange with the USFS would be necessary before the project could proceed at this site. Refer for Section 2.4.1.5.1, War Fork and Steer Fork, of this FEIS for information on this land exchange.

The Jackson County Area Solid Waste Management Plan lists no illegal dumps on the proposed War Fork and Steer Fork, 2.2 mgd dam and reservoir site, including the buffer area (JCETF, 1997).

Since there are no known residences or other buildings on the proposed War Fork and Steer Fork, 2.2 mgd project site, there are no water wells at this site that would need to be plugged and abandoned. In addition, USGS maps do not indicate that any oil wells are present in or around this project site (USGS, No date).

2.4.2 WATER TRANSMISSION MAIN CONSTRUCTION

Section 2.4.2 of the DEIS considers actions regarding the construction and operation of the proposed water transmission main leading from each proposed reservoir site evaluated in the DEIS to the JCWA Treatment Plant. Two additional dam and reservoir alternatives are investigated in this FEIS: War Fork and Steer Fork, 1.3 mgd and War Fork and Steer Fork, 2.2 mgd. Section 2.4.2 of this FEIS discusses actions associated with the site preparation, construction, and operation of the raw water transmission main leading from each of these proposed reservoir sites. In addition to these two alternatives, the construction of a water transmission pipeline from existing surface water resources in neighboring counties for the purposes of importing water to supply Jackson County and the region is examined in this FEIS. Since these pipeline alternatives do not involve the construction of a reservoir, they are discussed only in this section of the FEIS.

Revised cost estimates and site statistics for each of the water transmission main alternatives were prepared for this FEIS by Kenvirons, Incorporated. Revised line item cost estimates for these alternatives are provided in this FEIS as Appendix Q. A more detailed discussion of the costs associated with this project are provided in Appendix S of this FEIS. As discussed in Section 2.4.1.1 above, the total present worth of operation and maintenance, as well as the total cost of the project for each alternative, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth. Refer to Section 2.4.1.1 of this FEIS for a discussion on discount rates.

There are no changes to this section for the FEIS. Refer to Section 2.4.2, Water Transmission Main Construction, of the DEIS for a general discussion of activities associated with the construction and operation of the water transmission main for all alternatives. The following sections, Sections 2.4.2.1 through 2.4.2.7, provide the details of this action that are specific to the alternatives under consideration.

2.4.2.1 War Fork and Steer Fork

The raw water transmission main leading from the proposed War Fork and Steer Fork, 3.5 mgd reservoir was reestimated for this FEIS to be approximately 47,000 linear feet, or about 8.9 miles, in length. In addition, two roads along which the water transmission main would follow, F.S. Road 3109 and Turkey Foot Road (F.S. 4), are National Forest jurisdiction roads. These were noted to be County roads throughout the DEIS. As National Forest jurisdiction roads, the USFS has jurisdiction and maintenance responsibilities for the roads. Rights-of-way (ROW) along these roads for construction and operation of the raw water transmission main leading from the proposed War Fork and Steer Fork, 3.5 mgd reservoir would be required in the form of a Special Use Permit (SUP) from the USFS. This change applies to all areas in the DEIS where ROW for these roads are referenced. In addition, for the portion of the proposed water main route that would not travel alongside existing roadways, ROW easements would likely need to be obtained from adjoining private landowners.

There are no other changes to this section for the FEIS. Refer to Section 2.4.2.1, War Fork and Steer Fork, for a site-specific discussion of the raw water transmission main leading from the proposed War Fork and Steer Fork, 3.5 mgd reservoir to the JCWA Treatment Plant.

2.4.2.2 Sturgeon Creek, 8.5 mgd

There are no changes to this section for the FEIS. Refer to Section 2.4.2.2, Sturgeon Creek, 8.5 mgd, for a site-specific discussion of the raw water transmission main leading from the proposed Sturgeon Creek, 8.5 mgd reservoir to the JCWA Treatment Plant.

2.4.2.3 Sturgeon Creek, 3.5 mgd

There are no changes to this section for the FEIS. Refer to Section 2.4.2.3, Sturgeon Creek, 3.5 mgd, for a site-specific discussion of the raw water transmission main leading from the proposed Sturgeon Creek, 3.5 mgd reservoir to the JCWA Treatment Plant.

2.4.2.4 War Fork and Steer Fork, 1.3 mgd

The raw water transmission main leading from the pump station at the proposed War Fork and Steer Fork, 1.3 mgd reservoir would run approximately 8.9 miles to the JCWA Treatment Plant at Tyner Lake. All but approximately one mile would follow alongside existing roadways, mostly in the Kentucky Department of Transportation (KDOT) or County rights-of-way (ROW) for these roadways. The transmission main would run northeast alongside F.S. Road 3109 to Turkey Foot Road East, then would follow State Highway 587 (KY 587) South to Privett Road. The main would run southwest along Privett Road to State Highway 1071 (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). Since the location of the dam is the same for all of the War Fork and Steer Fork alternatives, this route is the same route proposed for the raw water transmission main leading from the War Fork and Steer Fork alternative discussed in the DEIS.

Two roads along which the water transmission main would follow, F.S. Road 3109 and Turkey Foot Road (F.S. 4), are National Forest jurisdiction roads. As such, the USFS has jurisdiction and maintenance responsibilities for the roads. ROW along these roads for construction and operation of the raw water transmission main leading from the proposed War Fork and Steer Fork, 1.3 mgd reservoir would be required in the form of an SUP from the USFS. In addition, for the portion of the proposed water main route that would not travel alongside existing roadways, ROW easements would likely need to be obtained from adjoining private landowners.

The project would require approximately 47,000 linear feet, or about 8.9 miles, of ductile iron pipe for the proposed route from the War Fork and Steer Fork, 1.3 mgd reservoir. The water main would have a diameter of 12 inches, and would contain 10 12-inch gate valves. There would be 5 air release valve sites along the length of the pipeline. The raw water transmission

main leading from the proposed War Fork and Steer Fork, 1.3 mgd reservoir would operate 24 hours a day, and have a design flowrate of 924 gallons per minute (gpm) (Kenvirons, 2000b).

Construction of a raw water transmission main along the proposed route from the War Fork and Steer Fork, 1.3 mgd reservoir site to the water treatment plant would require crossing 60 linear feet of streams, 240 linear feet of open-cut road, and 160 linear feet of bored road. As a result of the water main construction, 1,500 linear feet (0.3 miles) of pavement would need to be replaced (Kenvirons, 2000b).

2.4.2.5 War Fork and Steer Fork, 2.2 mgd

Since the location of the dam is the same for all of the War Fork and Steer Fork alternatives, the proposed route of the raw water transmission main leading from the War Fork and Steer Fork, 1.3 mgd reservoir site is the same as that described in Section 2.4.2.4, War Fork and Steer Fork, 1.3 mgd above.

The project would require approximately 47,000 linear feet, or about 8.9 miles, of ductile iron pipe for the proposed route from the War Fork and Steer Fork, 2.2 mgd reservoir. The water main would have a diameter of 14 inches, and would contain 10 14-inch gate valves. There would be 5 air release valve sites along the length of the pipeline. The raw water transmission main leading from the proposed War Fork and Steer Fork, 2.2 mgd reservoir would operate 24 hours a day, and have a design flowrate of 1,521 gpm (Kenvirons, 2000b).

Construction of a raw water transmission main along the proposed route from the War Fork and Steer Fork, 2.2 mgd reservoir site to the water treatment plant would require crossing 60 linear feet of streams, 240 linear feet of open-cut road, and 160 linear feet of bored road. As a result of the water main construction, 1,500 linear feet (0.3 miles) of pavement would need to be replaced (Kenvirons, 2000b).

2.4.2.6 Wood Creek Lake Pipeline

Wood Creek Lake in northern Laurel County has a surface area of approximately 680 acres at the normal pool level of 1,020 feet above MSL. The storage capacity of this lake at normal pool level is 24,400 acre-feet (Kenvirons, 2000c). The drainage area of the lake is about 15,000 acres. Up to 1,030 feet above MSL is owned by the Wood Creek Water District and is restricted from private development; all land above this elevation is privately-owned. The dam at Wood Creek Lake is owned and operated by KDOT, since Interstate I-75 passes over the top of the dam (Napier, 2000).

A yield analysis was conducted for Wood Creek Lake to project potential yields of the reservoir under critical drought conditions and average conditions, assuming various withdrawals from the reservoir. The analysis was based on historical stream flow data at the South Fork of the Kentucky River gauging station operated by the USGS. This gauging station was used since it was active during the 1930 drought and the drainage area is approximately the same as that of

Wood Creek Lake (Kenvirons, 2000c). The results of the analysis are discussed briefly below and are provided as Appendix R of this EIS.

The Wood Creek Water District Treatment Plant currently has the capacity to treat 4.61 mgd. Plans are currently underway to upgrade the treatment plant to a capacity of 9.22 mgd. The Wood Creek Water District currently withdraws and treats an approximate average of 4.00 mgd from Wood Creek Lake (Williams, 2000e). This average withdrawal results in a reservoir drawdown of one foot in an average year; a reservoir drawdown of three feet is projected for a critical drought year. The resulting surface area of Wood Creek Lake in an average year is 667 acres. During a critical drought year, the surface area of the lake would be 637 acres. Withdrawing 4.00 mgd from the lake depletes its storage capacity by 939 acre-feet in an average year. The resulting average-year storage capacity of Wood Creek Lake is 23,461 acre-feet (Kenvirons, 2000c).

The maximum sustainable withdrawal from Wood Creek Lake is estimated to be 18.00 mgd. In an average year, such a withdrawal would result in a lake-level fluctuation of 22 feet and a surface area of 376 acres. The resulting average-year storage capacity of the lake would be 12,221 acre-feet. During critical drought years, such a withdrawal would result in a lake level fluctuation of 108 feet and a surface area of 20 acres. The resulting critical-year storage capacity of the lake would be 146 acre-feet (Kenvirons, 2000c).

In order to sustain usage of the existing recreational facilities that surround Wood Creek Lake, such as fixed boat docks and boat ramps, the maximum recommended withdrawal from Wood Creek Lake is estimated to be 10.00 mgd (Williams, 2000e). In an average year, such a withdrawal would result in a lake-level fluctuation of 4 feet and a surface area of 616 acres. The resulting average-year storage capacity of the lake would be 20,565 acre-feet. During critical drought years, such a withdrawal would result in a lake level fluctuation of 12 feet and a surface area of 506 acres. The resulting critical-year storage capacity of the lake would be 16,422 acre-feet (Kenvirons, 2000c).

Under the Wood Creek Lake Pipeline alternative, a water transmission pipeline would be constructed from the existing Wood Creek Water District 20-inch transmission main leading from Wood Creek Lake in northern Laurel County to the JCWA 10-inch main located south of the JCWA Treatment Plant for the purposes of importing treated water. The total distance that would be traveled by this pipeline is 119,500 linear feet, or 22.6 miles (Kenvirons, 2000b).

The water transmission pipeline would be constructed from the existing Wood Creek Water District 20-inch transmission main on Filter Plant Road, just east of Wood Creek Lake. The entire length of the pipeline would follow alongside existing roadways in the KDOT or County ROW. The transmission pipeline would continue northeast on Filter Plant Road, turning southeast alongside US 25. The pipeline would follow alongside US 25 to Dean Hundley Road. The transmission main would run northeast alongside Dean Hundley Road to Hurley Road. The main would continue northeast on Hurley Road to KY 490, following KY 490 north to KY 30. The transmission main would run northeast alongside KY 30 to US 421, where it would veer north and connect to the existing JCWA 10-inch transmission main.

Under this alternative, two pipeline capacities are investigated in this FEIS. A pipeline capable of transporting 1.33 mgd from Wood Creek Lake to the JCWA distribution system is examined in this FEIS for the purposes of supplying Jackson County only with water. A second pipeline, capable of transporting 2.19 mgd to the JCWA distribution system, is evaluated for the purposes of supplying Jackson County and the surrounding region with water.

Regardless of the capacity of the pipeline constructed under this alternative, the project would require approximately 119,500 linear feet, or about 22.6 miles, of ductile iron pipe for the proposed route from the Wood Creek Water District distribution system. Construction of this water transmission main would require crossing 1,060 linear feet of streams, 2,160 linear feet of open-cut road, and 820 linear feet of bored road. As a result of the water main construction along this route, 3,800 linear feet (about 0.7 miles) of pavement would need to be replaced (Kenvirons, 2000b).

A water main capable of transporting 1.3 mgd from Wood Creek Lake would have a diameter of 12 inches, and would contain 23 12-inch gate valves. There would be 12 air release valve sites along the length of the pipeline. The Wood Creek Lake, 1.3 mgd water transmission main would operate 20 hours a day, and have a design flowrate of 1,108 gpm (Kenvirons, 2000b).

A water main capable of transporting 2.2 mgd from Wood Creek Lake would have a diameter of 14 inches, and would contain 23 14-inch gate valves. There would be 12 air release valve sites along the length of the pipeline. The Wood Creek Lake, 2.2 mgd water transmission main would operate 20 hours a day, and have a design flowrate of 1,825 gpm (Kenvirons, 2000b).

Cost estimates for the Wood Creek Lake, 1.33 mgd and 2.19 mgd pipeline alternatives were prepared by Kenvirons, Inc. for this FEIS. These line item cost estimates are presented in Appendix Q of this FEIS. The estimated cost of land acquisition (four acres) for the Wood Creek Lake pipeline, independent of capacity, would be about $27,000 (Kenvirons, 2000b). This acquisition cost includes the costs of title searches, surveys, and appraisals.

The estimated construction cost for a water transmission main capable of transporting 1.33 mgd from Wood Creek Lake would be $6,339,000. The total project cost for the Wood Creek Lake, 1.33 mgd pipeline is estimated to be about $7,636,000. This total project cost includes costs of land acquisition, administrative and legal issues, environmental and preliminary engineering, and the construction costs for the water transmission main. The present worth of operation and maintenance of the Wood Creek Lake, 1.33 mgd water transmission main was calculated for this FEIS to account for a 50-year useful life. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $1,816,000. Therefore, the total cost of the Wood Creek Lake, 1.33 mgd pipeline, including the 50-year operation and maintenance costs, would be $9,452,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs.

In order to compare project costs across all alternatives, the present worth of purchasing potable water from the Wood Creek Water District would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $16,213,000 for the Wood Creek Lake,

1.3 mgd pipeline alternative (JCEZ, 2000). As discussed above, the total present worth of operation and maintenance, as well as the total cost of the Wood Creek Lake, 1.33 mgd water transmission pipeline, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

The estimated construction cost for a water transmission main capable of transporting 2.19 mgd from Wood Creek Lake would be $7,639,000. The total project cost for the Wood Creek Lake, 2.19 mgd pipeline is estimated to be about $9,016,000. This total project cost includes costs of land acquisition, administrative and legal issues, environmental and preliminary engineering, and the construction costs for the water transmission main. The present worth of operation and maintenance of the Wood Creek Lake, 2.19 mgd water transmission main was calculated for this FEIS to account for a 50-year useful life. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $2,425,000. Therefore, the total cost of the Wood Creek Lake, 2.19 mgd pipeline, including the 50-year operation and maintenance costs, would be $11,441,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs.

In order to compare project costs across all alternatives, the present worth of purchasing potable water from the Wood Creek Water District would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $20,183,000 for the Wood Creek Lake, 2.2 mgd pipeline alternative (JCEZ, 2000). As discussed above, the total present worth of operation and maintenance, as well as the total cost of the Wood Creek Lake, 2.2 mgd water transmission pipeline, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

2.4.2.3 Lock 14 Pipeline

This alternative would consist of constructing a water transmission pipeline from the existing Lock 14 of the Kentucky River at Heidelberg (Lee County) to Tyner Lake, for the purposes of importing raw water to be treated at the JCWA Treatment Plant. The total distance that would be traveled by this pipeline is 108,000 linear feet, or 20.5 miles (Kenvirons, 2000b).

From Lock 14 at Heidelberg, the raw water transmission main would run south alongside KY 399 towards Brandenburg Cemetery to Sturgeon Creek Road. The main would then run westward alongside Sturgeon Creek Road towards Cressmont, veering south alongside Hale Ridge-Arvel Road towards Arvel. The transmission main would run westward alongside Hale Ridge-Arvel Road to KY 587. The pipeline would run southward along KY 587 towards New Zion until Privett Road. The main would run south alongside Privett Road to KY 1071, continuing in a southwestern direction. From this point, the water transmission main could take one of two routes. One route would be to continue southwest on KY 1071 to US 421, where it would travel southeast to the JCWA Treatment Plant. Another option for the route of this main would be to veer off KY 1071 alongside Peters Road, traveling south-southeast on Peters Road for approximately 3,000 feet, then traveling cross-country to the JCWA Treatment Plant (Kenvirons, 2000c).

Under this alternative, two pipeline capacities are investigated in this FEIS. A pipeline capable of transporting 1.33 mgd from Lock 14 of the Kentucky River to the JCWA Treatment Plant is examined in this FEIS for the purposes of supplying Jackson County only with water. A second pipeline, capable of transporting 2.19 mgd to the JCWA Treatment Plant, is evaluated for the purposes of supplying Jackson County and the surrounding region with water.

Due to its age, approximately 80 years, the dam at Lock 14 is in need of repair. The USACE is currently repairing the dam, and repairs are projected to be complete in Summer 2001. Once repairs are complete, the dam at Lock 14 would have a useful life of about 20 to 25 years (Morse, 2001).

Lock 14 of the Kentucky River is currently being used as a water supply source by Beattyville in Lee County. Beattyville Water Works currently withdraws from 0.2 to 0.4 mgd from the lock (Morse, 2001).

The elevation of the Kentucky River at Heidelberg is 626 feet above MSL (Caldwell, 1999b). A withdrawal of 1.33 mgd from Lock 14 would represent approximately six percent of the 7Q10 for the Kentucky River. The 7Q10 is defined as the minimum average flow over a seven-day period, with a recurrence interval of ten years. A withdrawal of 2.19 mgd from this location would represent about ten percent of the 7Q10 for the river (Caldwell, 2000).

Regardless of the capacity of the pipeline constructed under this alternative, the project would require approximately 108,000 linear feet, or about 20.5 miles, of ductile iron pipe for the proposed route from Lock 14 of the Kentucky River. Construction of this water transmission main would require crossing 150 linear feet of streams, 480 linear feet of open-cut road, and 200 linear feet of bored road. As a result of the water main construction along this route, 3,450 linear feet (about 0.65 miles) of pavement would need to be replaced (Kenvirons, 2000b).

A water main capable of transporting 1.3 mgd from Lock 14 would have a diameter of 12 inches, and would contain 21 12-inch gate valves. There would be 18 air release valve sites along the length of the pipeline. The Lock 14, 1.3 mgd water transmission main would operate 24 hours a day, and have a design flowrate of 924 gpm (Kenvirons, 2000b).

A water main capable of transporting 2.2 mgd from Lock 14 would have a diameter of 14 inches, and would contain 21 14-inch gate valves. There would be 18 air release valve sites along the length of the pipeline. The Lock 14, 2.2 mgd water transmission main would operate 24 hours a day, and have a design flowrate of 1,521 gpm (Kenvirons, 2000b).

Cost estimates for the Lock 14, 1.33 mgd and 2.19 mgd pipeline alternatives were prepared by Kenvirons, Inc. for this FEIS. These line item cost estimates are presented in Appendix Q of this FEIS. The estimated cost of land acquisition (two acres) for the Lock 14 pipeline, independent of capacity, would be about $14,000 (Kenvirons, 2000b). This acquisition cost includes the costs of title searches, surveys, and appraisals.

The estimated construction cost for a water transmission main capable of transporting 1.33 mgd from Lock 14 would be $5,686,000. The total project cost for the Lock 14, 1.33 mgd pipeline is

estimated to be about $6,928,000. This total project cost includes costs of land acquisition, administrative and legal issues, environmental and preliminary engineering, and the construction costs for the water transmission main. The present worth of operation and maintenance of the Lock 14, 1.33 mgd water transmission pipeline was calculated for this FEIS to account for a 50-year useful life. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $2,036,000. Therefore, the total cost of the Lock 14, 1.33 mgd pipeline, including the 50-year operation and maintenance costs, would be $8,964,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs.

In order to compare project costs across all alternatives, the cost of the JCWA Treatment Plant expansion project and the present worth of treating raw water from the proposed Lock 14, 1.3 mgd pipeline alternative would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $15,368,000 for the Lock 14, 1.3 mgd pipeline (JCEZ, 2000). As discussed above, the total present worth of operation and maintenance, as well as the total cost of the Lock 14, 1.33 mgd water transmission pipeline, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

The estimated construction cost for a water transmission main capable of transporting 2.19 mgd from Lock 14 would be $6,283,000. The total project cost for the Lock 14, 2.19 mgd pipeline is estimated to be about $7,563,000. This total project cost includes costs of land acquisition, administrative and legal issues, environmental and preliminary engineering, and the construction costs for the water transmission main. The present worth of operation and maintenance of the Lock 14, 2.19 mgd water transmission main was calculated for this FEIS to account for a 50-year useful life. The revised total present worth of operation and maintenance of the water main for 50 years would be approximately $2,658,000. Therefore, the total cost of the Lock 14, 2.19 mgd pipeline, including the 50-year operation and maintenance costs, would be $10,221,000 (Kenvirons, 2000b). Refer to Appendix Q of this FEIS for a further breakdown of these costs.

In order to compare project costs across all alternatives, the cost of the JCWA Treatment Plant expansion project and the present worth of treating raw water from the proposed Lock 14, 2.2 mgd pipeline alternative would have to be incorporated to determine the total project costs. These costs are discussed in detail in Appendices Q and S of this FEIS. Incorporating these costs results in a total project cost of $17,313,000 for the Lock 14, 2.2 mgd pipeline (JCEZ, 2000). As discussed above, the total present worth of operation and maintenance, as well as the total cost of the Wood Creek Lake, 2.2 mgd water transmission pipeline, would be somewhat higher than the costs presented here, due to the use of a lower discount rate (4.2 percent verses 5 percent) in calculating the total present worth.

2.5 COMPARISON OF IMPACTS OF ALTERNATIVES

Table 2.5-1, Comparison of Potential Impacts of Alternatives, in Section 2.5 of the DEIS provides a comparison of the potential impacts of the proposed action at the War Fork and Steer

Fork, 3.5 mgd and the Sturgeon Creek, 8.5 mgd and 3.5 mgd project sites, as well as the No Action alternative. The following changes or additions have been made to the impacts presented in Table 2.5-1, or to the ratings of these impacts, for this FEIS:

Surface and Groundwater Resources:

- All proposed dam and reservoir alternatives investigated in the DEIS would result in an adverse, moderately significant permanent conversion of waters of the United States from a flowing to a standing condition.
- The rating for the reduction in flows downstream of the proposed War Fork and Steer Fork, 3.5 mgd reservoir was changed from insignificant to moderately significant in this FEIS.

Socioeconomics:

- All proposed dam and reservoir alternatives investigated in the DEIS would result in moderately significant increases in residential water user rates.

There are no other changes or additions to this table for the FEIS.

Table 2.5-2 compares the potential environmental impacts which are anticipated to result from implementation of each of the alternatives investigated in this FEIS. The criteria used to determine the significance of impacts are provided in Appendix C of this EIS. As in the DEIS, potential impacts are grouped in the table according to environmental resource area or component. A reference is provided as to which section of this FEIS contains the detailed discussion of those potential impacts.

Table 2.5-2. Comparison of Potential Impacts of Reassessed Alternatives				
Environmental Resource/ Component	**ALTERNATIVES**			
	War Fork and Steer Fork, 1.3 mgd	**War Fork and Steer Fork, 2.2 mgd**	**Wood Creek Lake Pipeline**	**Lock 14 Pipeline**
Geology/Soils (Section 3.2.1)	• Adverse, moderately significant increase in soil erosion, both short-term during construction and long-term during operations at the reservoir • Adverse, but insignificant, degradation of soil quality from the risk of chemical/ POL spills during storage/ handling • Adverse, moderately significant loss of Prime Farmland • Insignificant risk of fracturing bedrock during potential blasting or due to the weight of the dam • Adverse, but insignificant, degradation of wetlands	• Adverse, moderately significant increase in soil erosion, both short-term during construction and long-term during operations at the reservoir • Adverse, but insignificant, degradation of soil quality from the risk of chemical/ POL spills during storage/ handling • Adverse, moderately significant loss of Prime Farmland • Insignificant risk of fracturing bedrock during potential blasting or due to the weight of the dam • Adverse, but insignificant, degradation of wetlands	• Adverse, moderately significant short-term increase in soil erosion and runoff at stream crossings and during construction • Adverse, but insignificant, degradation of soil quality from the risk of chemical/ POL spills storage/ handling • Insignificant loss of Prime Farmland	• Adverse, moderately significant short-term increase in soil erosion and runoff at stream crossings and during construction • Adverse, but insignificant, degradation of soil quality from the risk of chemical/ POL spills storage/ handling • Insignificant loss of Prime Farmland
Surface and Groundwater Resources (Section 3.2.2)	• Adverse, moderately significant temporary degradation of water quality downstream due to sedimentation & turbidity during construction • Adverse, but insignificant, temporary degradation of downstream water quality	• Adverse, moderately significant temporary degradation of water quality downstream due to sedimentation & turbidity during construction • Adverse, but insignificant, temporary degradation of downstream water quality	• Adverse, moderately significant temporary degradation of water quality from turbidity, sedimentation, & POL/ chemical spills during stream crossings • Insignificant permanent loss of exiting wetlands	• Adverse, moderately significant temporary degradation of water quality from turbidity, sedimentation, and POL/ chemical spills during stream crossings • Insignificant permanent loss of exiting wetlands

	due to POL/chemical spills during storage/handling • Adverse, moderately significant reduction of dissolved oxygen (DO) & elevation of summer water temperatures downstream • Positive, moderately significant creation of surface water • Adverse, moderately significant conversion of waters of the U.S. from a flowing to a standing condition • Positive, but insignificant, creation of new wetlands along shorelines & inflowing streams • Adverse, moderately significant short-term reduction in downstream flows on Wild and Scenic Study River segment during impoundment • Insignificant long-term reductions in downstream flows due to withdrawals from reservoir • Adverse, but insignificant, long-term effects of surrounding land uses & lake-based recreation on reservoir water quality	due to POL/chemical spills during storage/handling • Adverse, moderately significant reduction of DO & elevation of summer water temperatures downstream • Positive, moderately significant creation of surface water • Adverse, moderately significant conversion of waters of the U.S. from a flowing to a standing condition • Positive, but insignificant, creation of new wetlands along shorelines & inflowing streams • Adverse, moderately significant short-term reduction in downstream flows on Wild and Scenic Study River segment during impoundment • Moderately significant long-term reductions in downstream flows due to withdrawals from reservoir • Adverse, but insignificant, long-term effects of surrounding land uses & lake-based recreation on reservoir water quality		

Air Quality (Section 3.2.3)	• Adverse, but insignificant degradation of air quality from fugitive dust, clearing & grading, vehicle maintenance & operation, debris burning, & chemical/POL spills	• Adverse, but insignificant degradation of air quality from fugitive dust, clearing & grading, vehicle maintenance & operation, debris burning, & chemical/POL spills	• Adverse, but insignificant degradation of air quality from fugitive dust, clearing &grading, vehicle maintenance & operation, & chemical/POL spills	• Adverse, but insignificant degradation of air quality from fugitive dust, clearing & grading, vehicle maintenance & operation, & chemical/POL spills
Biological Resources (Section 3.2.4)	• Adverse, but insignificant, temporary wildlife displacement during construction • Adverse, but insignificant elimination of potential habitats for Federally-listed Threatened & Endangered species from removal of vegetation • Adverse, but insignificant, short-term harm to wildlife & vegetation from degraded air quality & risk of POL/chemical spills • Moderately significant short-term harm to downstream aquatic biota from degraded water quality & reduced flow • Moderately significant adverse impact on terrestrial plants & wildlife due to permanent elimination of habitat • Positive increase in reservoir fish species & waterfowl	• Adverse, but insignificant, temporary wildlife displacement during construction • Adverse, but insignificant elimination of potential habitats for Federally-listed Threatened & Endangered species from removal of vegetation • Adverse, but insignificant, short-term harm to wildlife & vegetation from degraded air quality & risk of POL/chemical spills • Moderately significant short-term harm to downstream aquatic biota from degraded water quality & reduced flow • Moderately significant adverse impact on terrestrial plants & wildlife due to permanent elimination of habitat • Positive increase in reservoir fish species & waterfowl	• Adverse, but insignificant, temporary wildlife displacement during construction • Adverse, but insignificant, short-term harm to wildlife & vegetation from degraded air quality & risk of POL/chemical spills • Adverse, but insignificant short-term harm to aquatic biota from degraded water quality at stream crossings • Adverse, but insignificant impact to terrestrial plants & wildlife due to permanent elimination of habitat	• Adverse, but insignificant, temporary wildlife displacement during construction • Adverse, but insignificant, short-term harm to wildlife & vegetation from degraded air quality & risk of POL/chemical spills • Adverse, but insignificant short-term harm to aquatic biota from degraded water quality at stream crossings • Adverse, but insignificant impact to terrestrial plants & wildlife due to permanent elimination of habitat

	• Moderately significant long-term effects on downstream aquatic biota & riparian vegetation from reduced DO & water flows, & changes in water temperature • Moderately significant adverse impact on small terrestrial & aquatic mammals, amphibians, & reptiles from permanent blockage of migration by the reservoir	• Moderately significant long-term effects on downstream aquatic biota & riparian vegetation from reduced DO & water flows, & changes in water temperature • Moderately significant adverse impact on small terrestrial & aquatic mammals, amphibians, & reptiles from permanent blockage of migration by the reservoir		
Noise (Section 3.2.5)	• Adverse, but insignificant displacement/disturbance of wildlife during construction, potential blasting, and operations • Adverse, but insignificant disruption of nearby residents due to noise during construction, potential blasting, and operations	• Adverse, but insignificant displacement/disturbance of wildlife during construction, potential blasting, and operations • Adverse, but insignificant disruption of nearby residents due to noise during construction, potential blasting, and operations	• Adverse, but insignificant displacement/disturbance of wildlife during construction, potential blasting, and operations • Adverse, but insignificant disruption of nearby residents due to noise during construction, potential blasting, and operations	• Adverse, but insignificant displacement/disturbance of wildlife during construction, potential blasting, and operations • Adverse, but insignificant disruption of nearby residents due to noise during construction, potential blasting, and operations
Recreation (Section 3.2.6)	• Adverse, moderately significant short- & long-term reduction of recreational opportunities within the project area and downstream • Positive, very significant increase in recreational opportunities provided by the reservoir	• Adverse, moderately significant short- & long-term reduction of recreational opportunities within the project area and downstream • Positive, very significant increase in recreational opportunities provided by the reservoir	• Adverse, but insignificant, reduction of recreational opportunities along pipeline route • Adverse, moderately significant impact on existing recreational uses of Wood Creek Lake • Very significant continued recreation needs within	• Adverse, but insignificant, reduction in recreational opportunities along pipeline route • Very significant continued recreation needs within Jackson County and the surrounding region

			Jackson County and the surrounding region	
Cultural Resources (Section 3.2.7)	• Potential to adversely affect cultural resources would be insignificant	• Potential to adversely affect cultural resources would be insignificant	• Potential to adversely affect cultural resources would be insignificant	• Potential to adversely affect cultural resources would be insignificant
Land Use (Section 3.2.8)	• Moderately significant permanent alteration of existing land uses in the project area • Insignificant permanent changes in land use from socioeconomic forces • Insignificant temporary effects on localized land uses • Adverse, but insignificant, effects of current land uses on environmental conditions in & around the proposed reservoir • Adverse, moderately significant impact due to conflicts involving land ownership or easements	• Moderately significant permanent alteration of existing land uses in the project area • Insignificant permanent changes in land use from socioeconomic forces • Insignificant temporary effects on localized land uses • Adverse, but insignificant, effects of current land uses on environmental conditions in & around the proposed reservoir • Adverse, moderately significant impact due to conflicts involving land ownership or easements	• Insignificant permanent alteration of existing land uses in the project area • Insignificant permanent changes in land use from socioeconomic forces • Insignificant temporary effects on localized land uses	• Insignificant permanent alteration of existing land uses in the project area • Insignificant permanent changes in land use from socioeconomic forces • Insignificant temporary effects on localized land uses
Transportation (Section 3.2.9)	• Adverse, but insignificant, changes to LOS ratings of existing roads • Adverse, but insignificant, traffic congestion due to construction vehicles & construction zones • Insignificant increased risk of vehicular accidents due to construction- or	• Adverse, but insignificant, changes to LOS ratings of existing roads • Adverse, but insignificant, traffic congestion due to construction vehicles & construction zones • Insignificant increased risk of vehicular accidents due to construction- or	• Adverse, but insignificant, changes to LOS ratings of existing roads • Adverse, but insignificant, traffic congestion due to construction vehicles & construction zones • Insignificant increased risk of vehicular accidents due to construction- or	• Adverse, but insignificant, changes to LOS ratings of existing roads • Adverse, but insignificant, traffic congestion due to construction vehicles & construction zones • Insignificant increased risk of vehicular accidents due to construction- or

	recreation-related traffic • Insignificant changes to roadway structure due to road relocations	recreation-related traffic • Insignificant changes to roadway structure due to road relocations	recreation-related traffic	recreation-related traffic
Waste Management (Section 3.2.10)	• Adverse, but insignificant, increase in solid & sanitary waste, and construction/demolition debris • Adverse, but insignificant, increase in the risk of POL/chemical spills during project construction and during operations at the JCWA Treatment Plant • Insignificant impact from the increase in sludge waste during operations at the JCWA Treatment Plant	• Adverse, but insignificant, increase in solid & sanitary waste, and construction/demolition debris • Adverse, but insignificant, increase in the risk of POL/chemical spills during project construction and during operations at the JCWA Treatment Plant • Insignificant impact from the increase in sludge waste during operations at the JCWA Treatment Plant	• Adverse, but insignificant, increase in solid & sanitary waste, and construction/demolition debris • Adverse, but insignificant, increase in the risk of POL/chemical spills during project construction	• Adverse, but insignificant, increase in solid & sanitary waste, and construction/demolition debris • Adverse, but insignificant, increase in the risk of POL/chemical spills during project construction and during operations at the JCWA Treatment Plant • Insignificant impact from the increase in sludge waste during operations at the JCWA Treatment Plant
Human Health and Safety (Section 3.2.11)	• Adverse, but insignificant, harm to human health & safety from potential POL/chemical spills during storage/handling • Adverse, but insignificant, impact to public health during construction • Adverse, but insignificant, temporary degradation of air & water quality during construction • Insignificant potential harm to recreational users of the proposed reservoir • Adverse, but insignificant,	• Adverse, but insignificant, harm to human health & safety from potential POL/chemical spills during storage/handling • Adverse, but insignificant, impact to public health during construction • Adverse, but insignificant, temporary degradation of air & water quality during construction • Insignificant potential harm to recreational users of the proposed reservoir • Adverse, but insignificant	• Adverse, but insignificant, harm to human health & safety from potential POL/chemical spills during storage/handling • Adverse, but insignificant, impact to public health during construction • Adverse, but insignificant, temporary degradation of air & water quality during construction	• Adverse, but insignificant, harm to human health & safety from potential POL/chemical spills during storage/handling • Adverse, but insignificant, impact to public health during construction • Adverse, but insignificant, temporary degradation of air & water quality during construction

	impact on human health & safety in the event of a dam failure	impact on human health & safety in the event of a dam failure		
Socioeconomics (Section 3.2.12)	• Positive, but insignificant, increase in income & employment in the region due to the project • Insignificant physical alteration of the community from changes in demographics & land use due to the project • Insignificant change in the character of the community adjacent to the proposed reservoir • Insignificant impact on the economy due to removal of private land from the County tax base • Moderately significant increase in property assessments on new lakefront land • Insignificant increase in County tax base from increased industrial & commercial development • Moderately significant increase in business development induced by the proposed reservoir • Moderately significant change in property values in the vicinity of the	• Positive, but insignificant, increase in income & employment in the region due to the project • Insignificant physical alteration of the community from changes in demographics & land use due to the project • Insignificant change in the character of the community adjacent to the proposed reservoir • Insignificant impact on the economy due to removal of private land from the County tax base • Moderately significant increase in property assessments on new lakefront land • Insignificant increase in County tax base from increased industrial & commercial development • Moderately significant increase in business development induced by the proposed reservoir • Moderately significant change in property values in the vicinity of the	• Positive, but insignificant, increase in income & employment in the region due to the project • Insignificant physical alteration of the community from changes in demographics & land use due to the project • Insignificant impact on the economy due to removal of private land from the County tax base • Insignificant increase in County tax base from increased industrial & commercial development • Moderately significant increase in business development induced by the additional water supply • Insignificant increase in the need for community services to support increased population growth & business activity • Adverse, moderately significant increase in water user rates. • Moderately significant potential to disrupt social relations within the	• Positive, but insignificant, increase in income & employment in the region due to the project • Insignificant physical alteration of the community from changes in demographics & land use due to the project • Insignificant impact on the economy due to removal of private land from the County tax base • Insignificant increase in County tax base from increased industrial & commercial development • Moderately significant increase in business development induced by the additional water supply • Insignificant increase in the need for community services to support increased population growth & business activity • Adverse, moderately significant increase in water user rates. • Moderately significant potential to disrupt social relations within the County

	proposed reservoir • Insignificant increase in the need for community services to support increased population growth & business activity • Adverse, moderately significant increase in water user rates.	proposed reservoir • Insignificant increase in the need for community services to support increased population growth & business activity • Adverse, moderately significant increase in water user rates.	County and/or to impede other goals of the EZ/EC from not creating the reservoir	and/or to impede other goals of the EZ/EC from not creating the reservoir
Environmental Justice (Section 3.2.13)	• Insignificant potential to disproportionately affect minority or low-income groups from adverse impacts associated with the proposed action • Very significant benefit to residents from improving health & economic conditions	• Insignificant potential to disproportionately affect minority or low-income groups from adverse impacts associated with the proposed action • Very significant benefit to residents from improving health & economic conditions	• Insignificant potential to disproportionately affect minority or low-income groups from adverse impacts associated with the proposed action • Very significant benefit to residents from improving health & economic conditions	• Insignificant potential to disproportionately affect minority or low-income groups from adverse impacts associated with the proposed action • Very significant benefit to residents from improving health & economic conditions
Aesthetics (Section 3.2.14)	• Adverse, very significant temporary degradation of the visual quality of the area during construction • Adverse, moderately significant long-term impact on visual quality of the area due to the appearance of the proposed dam • Positive, moderately significant long-term impact on visual quality due to the appearance of the proposed reservoir	• Adverse, very significant temporary degradation of the visual quality of the area during construction • Adverse, moderately significant long-term impact on visual quality of the area due to the appearance of the proposed dam • Positive, moderately significant long-term impact on visual quality due to the appearance of the proposed reservoir	• Adverse, moderately significant temporary degradation of the visual quality of the area during construction • Adverse, insignificant long-term impact on visual quality over the lifetime of the project	• Adverse, moderately significant temporary degradation of the visual quality of the area during construction • Adverse, insignificant long-term impact on visual quality over the lifetime of the project

2.6 PREFERRED ALTERNATIVE

In the DEIS, both the Rural Utilities Service (RUS) and the Jackson County Empowerment Zone (EZ) asserted that their preferred alternative for meeting the purpose and need stated in Section 1.2 of this FEIS and the DEIS was the War Fork and Steer Fork, 3.5 mgd dam and reservoir alternative. After comparing project costs for the alternatives considered in this EIS, user rates impacts, and future growth prospects of Jackson County and the surrounding region, and evaluating other relevant information with regard to the reasonable alternatives considered in the EIS, RUS has identified the War Fork and Steer Fork, 3.5 mgd dam and reservoir alternative as their preferred alternative. The Jackson County EZ concurs.