COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	)	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN	)	
WATER COMPANY FOR A CERTIFICATE OF	)	**CASE NO. 2007-00134**
CONVENIENCE AND NECESSITY AUTHORIZING	)	
THE CONSTRUCTION OF KENTUCKY RIVER	)	
STATION II, ASSOCIATED FACILITIES AND	)	
TRANSMISSION MAIN	)	

NOTICE

Comes Kentucky-American Water Company ("Kentucky American Water") and gives notice of the filing of the attached rebuttal testimony.

Respectfully submitted,

A. W. TURNER, JR., GENERAL COUNSEL
KENTUCKY-AMERICAN WATER COMPANY
2300 Richmond Road
Lexington, Kentucky 40502

and

STOLL KEENON OGDEN PLLC
300 West Vine Street, Suite 2100
Lexington, Kentucky 40507-1801
Telephone: (859) 231-3000

BY: Lindsey W. Ingram III

Lindsey W. Ingram, Jr.
Lindsey W. Ingram III

Attorneys for Kentucky-American Water Company

CERTIFICATE OF SERVICE

This is to certify that the original and eight (8) copies of the foregoing have been filed with the Public Service Commission this 13th day of November, 2007, and a copy mailed to:

David E. Spenard, Esq.
Dennis G. Howard II, Esq.
Assistant Attorneys General
1024 Capital Center Drive, Suite 200
Frankfort, KY 40601-8204

David Barberie, Esq.
Leslye M. Bowman, Esq.
Lexington-Fayette Urban County Gov't.
Department of Law
200 East Main Street
Lexington, KY 40507

Tom FitzGerald, Esq.
Kentucky Resources Council, Inc.
P.O. Box 1070
Frankfort, KY 40602

David F. Boehm, Esq.
Boehm, Kurtz & Lowry
36 East Seventh Street, Suite 1510
Cincinnati, OH 45202

Damon R. Talley, Esq.
112 N. Lincoln Blvd.
P.O. Box 150
Hodgenville, KY 42748-0150

John N. Hughes, Esq.
124 W. Todd Street
Frankfort, KY 40601

John E. Selent, Esq.
Edward T. Depp, Esq.
Dinsmore & Shohl LLP
1400 PNC Plaza
500 West Jefferson St.
Louisville, KY 40202

Barbara K. Dickens, Esq.
Louisville Water Company
550 South Third Street
Louisville, KY 40202

STOLL KEENON OGDEN, PLLC

By _____

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2007-00134
REBUTTAL TESTIMONY
LINDA C. BRIDWELL

1. Q. PLEASE STATE YOUR NAME.

A. My name is Linda C. Bridwell.

2. Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to address certain issues that have been raised by Louisville Water Company in the testimony filed by their witnesses Mr. Heitzman and Dr. Wetzel, and in their responses to data requests.

3. Q. WHAT ARE THE ISSUES THAT YOU WILL BE ADDRESSING IN YOUR REBUTTAL TESTIMONY?

A. The issues I will be addressing are: (1) the use of a reasonable planning horizon in addressing Central Kentucky's water needs; (2) concerns with Mr. Heitzman's idea; (3) the adequacy of the Kentucky River at Pool 3 to provide Central Kentucky's water needs; and (4) issues raised in Mr. Rubin's testimony.

4. Q. DO YOU HAVE ANY CHANGES FROM YOUR PREVIOUSLY FILED TESTIMONY?

A. No.

5. Q. PLEASE COMMENT ON DR. WETZEL'S ANALYSIS.

A. Dr. Wetzel attached a report to his testimony comparing Mr. Hetizman's idea to the project proposed by Kentucky American Water in its application for a Certificate of Convenience and Necessity. KAW retained Gannett-Fleming Engineers to review the report by R.W. Beck, and Mr. Harold Walker has provided rebuttal testimony to address our disagreement with the financial model and its results. However, R.W. Beck utilized inappropriate assumptions in their model that produced a suspicious and unreliable result. These inappropriate assumptions were

not corrected in the revised report filed on October 29, 2007. First, in response to Item #11 of KAW's Supplemental Data Request, Dr. Wetzel indicates that all operating expenses were "detailed in Table 4 of the Linda Bridwell testimony to the PSC dated march 30, 2007. Labor costs were adjusted over time by the rate of inflation. Variable operating expenses (such as chemicals and power) were adjusted over time by both the rate of inflation and plant flow rates." However, in reviewing the information provided in the R. W. Beck report, the 2010 cost estimates used for chemical costs, treatment plant electricity, and booster pump electricity were in excess of the amount in my testimony, increased by inflation for two years. Additionally, between 2024 and 2025, the labor costs increase by $191,256, substantially more than the $21,760 that would be expected for the inflation rate, with no explanation. R. W. Beck also made the incorrect assumption that UV treatment would be constructed in 2011, which Mr. Svindland will address in his rebuttal testimony, and then compounded the error by using an inflated cost estimate. Further, R.W. Beck makes the baseless assumption that two additional employees would be required to maintain an additional raw water pump station at the Ohio River and raw water transmission line. More important than these errors, Dr. Wetzel made four significant assumptions that are incorrect and have a tremendous impact on the analysis. First, R. W. Beck assumes a purchase of water of 6.0 million gallons per day from the Louisville Water Company to match the projected optimal operations of the KRS II treatment plant. It is inappropriate to assume anything less than 12.5 million gallons per day of purchased water from the Louisville Water Company for a supply to the joint partnership of the BWSC and KAW.

6. Q. MR. HEITZMAN HAS INDICATED THAT THE MINIMUM PURCHASE REQUIRED WOULD ONLY BE 5.0 MILLION GALLONS PER DAY. WHY IS IT NECESSARY TO USE A PURCHASE AMOUNT OF 12.5 MILLION GALLONS PER DAY?

A. Although Mr. Heitzman was not clear in his testimony, in response to Item # 8c of the Bluegrass Water Supply Commission's Supplemental Data Request and Item

44 of KAW's Supplemental Data Request, he responded that a reserved production capacity requires a minimum purchase of water on a 2:1 basis. KAW and BWSC cannot simply rely on a reserve pipeline capacity and hope that the water will be available when it is needed. In two of the last five years, KAW's peak day has occurred on the same day as LWC's peak day, meaning that they would be expected to need their maximum capacity at the same time that the maximum purchase of water would be required. And while LWC has capacity now, its demand projections clearly show that they will not have available production capacity in addition to the full needs of Central Kentucky within the planning horizon.

7. Q. YOU INDICATED THERE WERE FOUR CRITICAL ASSUMPTIONS WITH WHICH YOU HAD CONCERNS. WHAT ARE THE OTHERS?

A. In addition to the incorrect assumption for reserved production capacity, R.W. Beck assumes a peak day demand deficit of 45 mgd by the year 2050, requiring construction of additional facilities in 2030. This projection has absolutely no basis on any fact that I am aware of. Dr. Wetzel did not provide any rationale for this assumption when asked in data requests, simply correcting the premise that the 45 mgd demand projection was for 2050, not 2030. I have two main concerns for this projection. First, to suggest that KAW should be looking at a 43-year planning horizon for a major capital expenditure needed today is inappropriate. 401 KAR 4:220 requires water demand forecasting and supply adequacy to be made using a 20 year planning horizon. In August 1997, the PSC ordered that KAW "shall take the necessary and appropriate measures to obtain sources of supply so that the quantity and quality of water delivered to its distribution system shall be sufficient to adequately, dependably, and safely supply the total reasonable requirements of its customers under maximum consumption through the year 2020." Clearly the PSC saw a 23-year planning horizon as appropriate at that time, and KAW has been consistent with that horizon by filing a project that meets the needs of its customers through 2030. KAW bases its demand projections on population projections by the Kentucky State Data Center, which

are currently through the 2030. The prudence of this approach is demonstrated in the demand projections filed by LWC in the AB & H Engineers document of 1967, which had a 33-year demand projection of an average day that is higher than LWC current peak day demand. Clearly the accuracy of demand projections diminishes the further into the future they are made, and to suggest facilities will be required to be constructed in 2030 or 2050 at this point is highly speculative and unreliable.

The third concern is R.W. Beck's suggestion that facilities to the Ohio River would be required in 2030 to meet the projected demands of 45 mgd, assuming that no additional water would be available from the Kentucky River at Pool 3.

8. Q. THERE IS CONSIDERABLE INFORMATION IN THIS CASE THAT BOTH THE BWSC AND KAW HAVE CONSIDERED A FUTURE TO THE OHIO RIVER, SO WHY IS THE R.W. BECK REPORT INCORRECT TO ASSUME THAT CONNECTION IN 2030?

A. There is nothing in KAW's proposal that includes a connection to the Ohio River. Mr. Svindland referenced that the site selection for the KRS II included a review of proximity to the Ohio River because that was part of the original BWSC project when it was proposed at 45 mgd. However, after working with the Division of Water and the Kentucky River Authority we are confident that the Kentucky River at Pool 3 will provide the raw water needs for Central Kentucky beyond the planning horizon. Further, the Kentucky River Authority has included in its 2008-2014 Capital Plan the costs to stabilize Dam 3 and the addition of a crest gate on Dam 3 to provide an additional 1.5 billion gallons of water storage. A copy of the section of the plan identifying that project is attached to my testimony as Exhibit A. Given the enhancements we have seen in the last eight years on the Kentucky River as a result of the Kentucky River Authority's activities, it is certainly premature to assume that any connection to Ohio River may be required.

9. Q. WHAT IS THE FOURTH CONCERN?

A. Perhaps the most important concern is that R.W. Beck assumed a pipeline from a metering point in Shelby County would be owned by an unidentified public entity. This inappropriate assumption was then compared to the KRS II project to be owned by KAW (80%) and BWSC (20%). R.W. Beck's assumption is without any factual basis and is confusing to stakeholders, elected officials and the public in general.

10. Q. WHAT IS THE RESULT OF R.W. BECK MAKING THESE ASSUMPTIONS?

A. Harold Walker has filed with his rebuttal testimony a present worth analysis that we believe to be a more accurate assessment of the overall costs and which continues to confirm the decision by the BWSC and KAW to pursue the proposed treatment plant on the Kentucky River rather than a connection to the Louisville Water Company. These cost implications are much more than a difference in opinion between financial experts, but a fundamental disagreement on the appropriate responsibility KAW has to meet the needs of its customers in the most cost effective manner. It is not clear from the report or the data responses whether R.W. Beck was instructed by LWC to utilize these assumptions or if these were simply the recommendations from R.W. Beck.

11. Q. WHAT ARE YOUR CONCERNS WITH THE PROJECT THAT MR. HEITZMAN HAS PROPOSED IN HIS REBUTTAL TESTIMONY?

A. Mr. Heitzman has an idea to install a pipeline in the Interstate 64 right of way or adjacent to that same right of way. Mr. Heitzman has chosen to ignore the fact that KAW attempted to install a pipeline in 1999 along this same route. When KAW originally proposed to construct a pipeline to the LWC, it was pursuing a route that paralleled an existing gas pipeline, cutting cross country through parts of Shelby, Franklin, and Woodford Counties. However, as opposition grew with property owners, KAW changed its route to the very same route LWC has been discussing for months.

12. Q. WHY IS THIS A CAUSE FOR CONCERN?

A. Twice KAW pursued approval to install the pipeline in the Interstate 64 right of way and twice KAW was told it would not be allowed by the Kentucky Transportation Cabinet. There is no evidence that the previous policy has changed.

13. Q. WHAT DID KAW DO AFTER IT WAS UNABLE TO ACQUIRE PERMISSION TO INSTALL A PIPELINE WITHIN THE INTERSTATE RIGHT OF WAY?

A. KAW looked at a proposed route that would generally parallel the Interstate 64 right of way, then follow US 421 to Lexington like Mr. Heitzman has suggested. The opposition from property owners and neighbors was very loud and vocal. Then, KAW adjusted the pipeline route to parallel Interstate 64 the entire way. Like Mr. Heitzman, KAW believed that there would be less opposition to the installation of a pipeline near the Interstate corridor. However, that was not the case. There are a number of homes and businesses adjacent to the Interstate 64 right of way near the Frankfort interchange which were too close to allow a pipeline installation. Bypassing those properties required a route far from the Interstate. Property owners in Woodford County convinced the Woodford County Fiscal Court to pass a resolution that would protect any "historical structure" from any efforts to install private or public utilities nearby, with a generous definition of "historical structure" designation. More importantly, the assumption that there would be less environmental impact is incorrect. Unlike the current proposed project, KAW discovered an endangered species habitat on both sides of the Interstate at one point in Frankfort County and was looking at ways to potentially mitigate the impact. Fish and Wildlife officials expressed concerns regarding the impact to mussel beds at the proposed river crossing adjacent to the Interstate right-of-way. The bottom line is that there is no reason to believe that the pipeline adjacent to the Interstate right-of-way could be constructed cheaper or faster than the proposed project; in fact it would likely take much longer from a permitting standpoint. LWC has chosen to ignore the fact that KAW had previously

attempted to pursue the very route they have proposed and met with a number of obstacles that LWC has not addressed.

14. Q. ARE THERE OTHER CONCERNS WITH THE PROPOSAL MR. HEITZMAN HAS PRESENTED?

A. Absolutely. Mr. Heitzman has proposed a phasing that does not meet the needs of KAW, and as Mr. Svindland discusses in his rebuttal testimony, has not been determined to be hydraulically possible. KAW currently has both a source of supply and treatment capacity deficit. As discussed in my testimony, our demand projections indicate a deficit of over 10 mgd in 2010, which is projected to grow to over 16 mgd by 2020. However, Mr. Heitzman has proposed a solution, which even if it could feasibly be implemented by 2010, would only supply 6 mgd to Frankfort. There are currently no facilities to connect KAW with Frankfort, and it is folly to suggest that a pipeline that is not even designed along that route could be built in that timeframe. But more importantly, Mr. Heitzman continues to offer a minimum purchase of 5.0 mgd which would provide up to 10 mgd of reserved production capacity, although the combined KAW and BWSC project is for 25 mgd facilities to meet drought concerns. He has offered to sell water through a 36-inch pipeline although he has indicated that a 24-inch pipeline is already required to meet the needs in Eastern Jefferson County. Upsizing between a 24-inch pipeline and a 36-inch pipeline does not provide an additional 25 mgd capacity in the pipeline, but a total of 25 mgd design capacity in the pipeline, which means either Central Kentucky will be left without adequate capacity, or eastern Jefferson County does not need facilities at all. Further, based on the needs of Central Kentucky there would be no capacity in the facilities to provide water to either Shelby or Spencer Counties, although both have indicated support of this facility so that they may access the pipeline. Clearly Shelby and Spencer Counties only want an emergency connection with someone else (Central Kentucky customers) paying the entire cost of that opportunity.

15. Q. DOES KAW HAVE A CURRENT CONTRACT WITH LWC?

A. In November 1998, KAW executed a contract with LWC to purchase water. Whether or not it is still a valid contract would require a legal opinion that I am not qualified to make. However, paragraph 20 of that contract clearly made it subject to PSC approval, which has never occurred.

16. **Q. MR. RUBIN HAS MADE SOME RECOMMENDATIONS IN HIS TESTIMONY REGARDING CONSERVATION. ARE YOU FAMILIAR WITH KAW'S CONSERVATION PROGRAM?**

A. Yes. In 1992 I was in charge of an extensive expansion of KAW's conservation program, which included a number of customer programs and community education. One of our previous consultants made a number of recommendations that included a residential retrofit program, commercial and industrial water use audits, and expanded leak detection efforts. KAW focused first on the residential retrofit program; however, after running a pilot program, we received few, mostly negative responses. Industrial customers, on the other hand, had already undertaken facilities audits and were not interested in additional audits. Over the years, it became clear that the most effective efforts were in community education. In 2001, KAW filed a Conservation Initiative Plan with the Public Service Commission, and initiated an evaluation of our conservation education programs to develop a comprehensive approach to encourage water conservation. The evaluation led to additional focus on community education in mixed delivery methods with a recognizable slogan. KAW has continued using the slogan, "Water. It's Worth Using Wisely." We have used other one-time promotions to keep the program fresh while reinforcing television, radio and print messages. The program has been continually reinforced with customer surveys and focus groups as well as partnerships with other entities such as Bluegrass PRIDE and other organizations to promote wise water use among all consumers.

The effectiveness of the program continues to be monitored through surveys and adjusted accordingly. The success of the effort can be seen in the reduced per customer average usage as discussed in KAW's most recent rate case. KAW

continues to find the most effective component of conservation to be education and has recently updated its community education materials although the slogan is still in place. KAW plans to continue its Conservation Initiatives and periodically evaluate them for potential changes in future years.

That said, Mr. Rubin is correct that trends have certainly changed since KAW previously had an independent consultant review its conservation program. KAW is willing to commit to retaining an independent consultant for review of its conservation program in 2008. We will also assign an employee to evaluate and implement that consultant's recommendations.

17. **Q. MR. RUBIN SPECIFICALLY INDICATES THAT THE PROGRAM SHOULD INCLUDE AN AGGRESSIVE PROGRAM TO REDUCE NON-REVENUE WATER. WHAT HAS KAW DONE TO EXPANDE ITS LEAK DETECTION EFFORTS?**

A. KAW continues to focus on aggressive leak detection and sponsors a comprehensive program that utilizes cutting edge technology. We have begun to be recognized as an expert in leak detection, being asked to assist other water utilities and customers. Over the last five years, we have conducted 86,463 manual soundings and, using new technology called permaloggers, we have conducted an additional 120,876 mobile soundings. Unaccounted-for water continues to be a challenge despite these efforts with a 14.9 % level in 2006. Over the same time period, we have added 194 miles of main. In 2001, KAW submitted a bid to the Kentucky River Authority ("KRA") to provide leak detection services on an as-needed basis to other utilities within the Kentucky River Basin, paid for by the KRA. The Kentucky Rural Water Association had previously conducted this effort. Under those efforts, KAW successfully assisted the City of Hazard, the City of Jackson, Georgetown Municipal Water and Sewer Services, and the City of Versailles with leak detection efforts. The KRA has now gone to an as-needed program and still periodically asks KAW for assistance. Additionally, KAW continues to assist utilities that periodically contact us, including a recent trip to

the City of Wilmore to assist in finding a leak near a building at Asbury College that local officials had been unable to find after two days of searching.

As part of the ongoing efforts, KAW continually reviews its program. During 2006, a trend of increasing unaccounted-for water seemed to be occurring. KAW undertook a thorough review of the program and revised it, including more aggressive system soundings. Moreover, we recently found a high service meter at the KRS to be reading incorrectly. KAW continues to look for ways to integrate improved technology into the program, including the use of permaloggers that are attached throughout the system and read every three months. These readings are much more frequent than previous sounding efforts, which may sound a zone every five years. Certainly KAW would welcome the opportunity for an independent review of the program and any cost effective recommendations for improvement as part of a conservation program evaluation.

18. **Q. MR. RUBIN ALSO RECOMMDENDED THE COMMENCEMENT OF A NEW SUPPLY AND DEMAND MANAGEMENT STUDY WHEN THE NEW PLANT PRODUCES 80% OF ITS CAPACITY. DO YOU AGREE WITH THAT CONDITION?**

A. Yes. KAW has continuous ongoing planning efforts through the development of its annual and five-year capital plans. KAW also updates its comprehensive plan every ten to fifteen years. The last update, begun in 1998, was not finalized pending the resolution of the water supply and treatment capacity deficits as the solution would potentially impact all areas of operation including the existing treatment facilities, the distribution network, and storage. Certainly KAW will need to conduct a new comprehensive plan that includes the new facilities, and then update that plan as the demands grow and capacity of the plant is utilized. Additionally, KAW needs to revise its current demand management plan once the new facilities are in place and be prepared to update it again as the plant capacity is utilized.

19. Q. DO YOU BELIEVE THAT THE KAW PROPOSAL IS THE BEST PROJECT FOR MEETING THE NEEDS OF ITS CUSTOMERS AND FOR CENTRAL KENTUCKY?

A. Absolutely. I have been involved in resolving Kentucky-American's source of supply and treatment capacity deficits for eighteen years, and have reviewed documents extending back into the early 1970s. Kentucky-American has actively pursued a long list of alternatives in seeking the most feasible, cost effective solution. I personally am aware of over 50 of these alternatives that have been reviewed to varying degrees. In 1999 KAW strongly pursued the construction of pipeline to purchase finished water from the LWC. The LFUCG asked KAW to pursue a regional solution, indicating a preference for the Kentucky River solution. In working with the BWSC, a project to construct a new treatment plant on the Kentucky River, with a back-up to the Ohio River was determined to be more cost effective and the preferred solution for the region, even after receiving four different proposals from the LWC. With the reduction of the size of the plant, the Kentucky River alone is able to provide the water needs at the new treatment plant without the back-up to the Ohio River in the planning horizon. KAW is committed to continuing its partnership with the BWSC, meeting the needs of not only its customers but all citizens of Central Kentucky with the best project.

20. Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

2008-2014 CAPITAL PLAN
PROPOSED CAPITAL PROJECT
FORM SYP-P2
PLAN VERSION - 1
1/16/2007

Branch: Executive Branch
Cabinet/Function: Finance and Administration Cabinet
Agency/Institution: KY River Authority

Project Title Lock & Dam 3 and Lock 4 Renovation
Category Construction - Protect Investment in Plant
Biennium 2008-2010
Priority **Agency** **Cabinet** **Agency Bond** 1
Location (county) Franklin
Location (ADD) Bluegrass ADD
Appropriation Unit 084J

Additional Funding? Yes
Ky River Lock & Dam 3 and Lock 4 Renovation

Brief Description/Justification:
The project is to renovate both the Lock and Dam at Dam no. 3 in Henry County, to secure the water supply for the planned new water treatment plant in Pool 3 being constructed by Ky. American Water and the Bluegrass Water Supply Commission. The lock at this location as well as Lock 4 in Frankfort are being renovated to assure continued navigation on the Kentucky River between Frankfort and the Ohio River. The amount requested is the anticipated shortage in funding construction currently authorized in the 2006-08 budget. Dependent on the timing of construction bids and the scope of the project, this request may be moved to the current budget cycle.

PROJECT BUDGET

Fund Sources	Amount	Cost Elements	Amount
General Fund		Land Acquisition	
Restricted Funds		Site Survey/Prep	
Federal Funds		Project Design	
Road Fund		Construction Cost	1,635,000
Agency Bonds	1,635,000	Mov. Equip/Furn.	
Other(Private - Cash)		Contingency	
Other(LT Financing)		Other(specify)	
Other(Local Bonds)			
Total	1,635,000	Total	1,635,000

Explanation of Project Budget
The entire project budget is $1,935,000 in design cost, $15 million in construction for Dam 3 and $5 million in construction for each of the Locks. The design is funded and underway from in the current biennium. From the total funding currently approved for this and the Dam 9 project, in the " Ky River Repair and Renovation Pool", we will be short $1,635,000 in fully funding the project estimate.

IMPACT ON OPERATING BUDGET? No

2008-2014 CAPITAL PLAN
PROPOSED CAPITAL PROJECT
FORM SYP-P2
PLAN VERSION - 1
4/16/2007

PROJECT DETAIL

Installation(Name and ID)
Facility(Name and Stars #)
Method of Procurement Lease
Fuel Type
Type of Space
Completion Date 12/2009

Existing Facility? Yes
Dam 3 was constructed in the 1880s and Locks 3 and 4 in the 1830s. They are well past their design life. The last significant maintenance on the locks was done in the 1980s.

Program Re-location? No

Phased Project? Yes
The project is currently under design and will begin construction in FY 2008-09. This request is to complete the estimated funding requirement.

Eliminate the need for other proposed projects? No

Need eliminated by other proposed project(s)? No

Additional Description/Justification
Dam 3 is located near Monterey in Owen County. A new water treatment plant is under design by the Ky. American Water Company and Bluegrass Water Supply Commission. The proposed 25 million gallon per day capacity of this plant will provide the needed expansion of water demand for the Lexington area as well as several of the cities in the Commission, including Frankfort, Georgetown and Winchester. The water will be transmitted through Owen, Franklin and Scott counites to join the Ky American System near Georgetown. To support this project and assure that a raw water supply is availble for the plant, the outdated Dam 3 needs to be replaced. Concurrent with the dam the Lock will be renovated to support recreational boating. Lock 4 in Frankfort is also being renovated for the same purpose. These components are joined in one project to achive some economies in both the design and construction efforts.

Previous CAPITAL PLANS? No

Previous BUDGET REQUESTS? No

Previous BUDGET AUTHORIZATIONS? Yes
2006-2008 Ky. River Lock and Dam Repar and Renovation

Most recent authorization undertaken? Yes

Differences between the current and most recent previous project? No

2008-2014 CAPITAL PLAN
PROPOSED CAPITAL PROJECT
FORM SYP-P2
PLAN VERSION - 1
4/16/2007

Branch: Executive Branch
Cabinet/Function: Finance and Administration Cabinet
Agency/Institution: KY River Authority

Project Title Dam 3 Crest Gate
Category Construction - Protect Investment in Plant
Biennium 2012-2014
Priority **Agency** **Cabinet** **Agency Bond** 1
Location (county) Henry
Location (ADD) KIPDA ADD
Appropriation Unit 084J

Additional Funding? No

Brief Description/Justification:
Addition of crest gate to Dam 3 to provide an additonal 1.5 billion gallons of water storage for drought mitigation. Since this structure supplies the new treatment plant supporting growth in the Bluegrass Region, it is important to have sufficient storage to keep the treatment plant on line in a major drought. The crest gate would provide a 60 day supply in these situations.

PROJECT BUDGET

Fund Sources	Amount	Cost Elements	Amount
General Fund		Land Acquisition	
Restricted Funds		Site Survey/Prep	
Federal Funds		Project Design	1,200,000
Road Fund		Construction Cost	6,800,000
Agency Bonds	8,000,000	Mov. Equip/Furn.	
Other(Private - Cash)		Contingency	
Other(LT Financing)		Other(specify)	
Other(Local Bonds)			
Total	8,000,000	Total	8,000,000

Explanation of Project Budget
Project cost based on inflated cost of crest gates proposed at Dams 9 & 10. These costs were provided by design engineers on those projects.

IMPACT ON OPERATING BUDGET? Yes

Fund Sources	Amount
Restricted Funds	132,000
Total	132,000

Explanation of Impact on Operating Budget
Personnel $32,000 Contracted Repairs $100,000. Repairs are averages.

PROJECT DETAIL
Installation(Name and ID)

2008-2014 CAPITAL PLAN
PROPOSED CAPITAL PROJECT
FORM SYP-P2
PLAN VERSION - 1
4/16/2007

Facility(Name and Stars #)
Method of Procurement Lease
Fuel Type
Type of Space
Completion Date 12/2014

Existing Facility? Yes
Adds 1.5 billion gallons of storage capacity to the current dam. Dam 3 renovation with a 50 year life will be completed in 2009.

Program Re-location? No

Phased Project? No

Eliminate the need for other proposed projects? No

Need eliminated by other proposed project(s)? No

Additional Description/Justification
The propsed additional water storage will provide and additonal 60 day supply for the proposed 25 MGD treatment plant to be supplied by this pool. This would significantly help mitigate the effects of a drought in the region and provide a backup for all the communities tied to the Ky American water distribution system.

Previous CAPITAL PLANS? No

Previous BUDGET REQUESTS? No

Previous BUDGET AUTHORIZATIONS? No

KENTUCKY-AMERICAN WATER COMPANY
CERTIFICATE OF CONVENIENCE AND NECESSITY
FOR KENTUCKY RIVER POOL 3 WATER TREATMENT PLANT
REBUTTAL TESTIMONY
RICHARD C. SVINDLAND, P.E.

1. Q. PLEASE STATE YOUR NAME.

A. My name is Richard C. Svindland.

2. Q. WHAT IS YOUR POSITION AND BUSINESS ADDRESS?

A. I am a Senior Consultant with the engineering firm Integrated Science & Engineering, Inc. (ISE). ISE's business address is 105 McIntosh Crossing, Fayetteville, GA 30214.

3. Q. HOW ARE YOU INVOLVED WITH THIS PROJECT AND HAVE YOU PROVIDED PREVIOUS TESTIMONY BEFORE THIS COMMISSION?

A. My firm is currently under contract with Kentucky American Water to provide engineering consultant support services. Specifically, I have provided written direct testimony in this case and have responded to dozens of data requests from the Commission's Staff, the Attorney General's Office, LFUCG and CAWS. I have also been called on from time to time to review items proposed by the Louisville Water Company (LWC).

4. Q. WHAT WILL YOU BE ADDRESSING IN YOUR REBUTTAL TESTIMONY?

A. My rebuttal testimony will cover four main items. First, my testimony will provide an update on the Pool 3 project schedule. Second, I will provide an update on the construction costs for the pool 3 water treatment plant based on bids received on November 7th and 8th of 2007. Third, I will discuss concerns I have with the idea as proposed by LWC in Mr. Heitzman's rebuttal testimony and lastly, I will address the assumption by LWC and R W Beck that an ultraviolet (UV) disinfection system is needed at the Pool 3 WTP.

5. Q. CAN YOU PROVIDE AN OVERALL UPDATE TO KAW'S SCHEDULE?

A. Yes, The schedule is broken down into major areas. These areas are: Design, Permitting, Land, Bidding and Construction. Updates are provided below with additional information in subsequent responses.

- Design is 100% complete.
- All permits for construction have been received except for the US Army Corps of Engineers (USACOE) 404 Permit, the PSC's Certificate of Convenience and Necessity, and the Utility Encroachment permit from the Transportation Cabinet's Districts 5 & 7.
- All land for the intake, water treatment plant and booster pump station and storage tanks are secure and several easements have been obtained for the 42-inch pipeline corridor even though many land owners have indicated they want to wait until after PSC approves the project before signing an easement with KAW.
- Bids for the WTP were received November 7, 2007. Bids for the 42-inch main were received November 8, 2007. Bids for the Booster Pump station and storage tank are due November 13, 2007.
- Construction will begin as soon as all permits and approvals are received.

6. Q. WHAT IS THE STATUS ON THE USACOE 404 PERMIT?

A. KAW has been in contact with the USACOE weekly for many weeks and has been told repetitively that our 404 permit will be approved in November 2007. As of November 9, 2007, the USACOE indicated the permit was approved and was placed in the mail.

7. Q. WHAT IS THE STATUS ON THE UTILITY ENCROACHMENT PERMIT?

A. KAW has made numerous contacts with the Transportation Cabinet (KTC) regarding its permits. KAW was informed that KTC personnel were working on

the permits and that they would be approves shortly. Please note that District 6 has already approved KAW's Utility Encroachment Permit.

8. Q. WHY WOULD PROPERTY OWNERS WAIT TO SIGN AN EASEMENT UNTIL THE PSC RULES?

A. Many property owners have indicated to KAW that they do not want to unnecessarily encumber their land should the PSC deny the Certificate Case.

9. Q. IN YOUR DIRECT TESTIMONY YOU DISCUSS THE IMPORTANCE OF THE PROJECT SCHEDULE. DOES THE SCHEDULE STILL REMAIN IMPORTANT?

A. Absolutely. It remains imperative that KAW have the needed capacity (both in terms of water treatment plant capacity and source of supply) afforded by this project as soon as possible. To help put this in perspective, on June 13, 2000, over seven years ago, KAW, in order to meet maximum hour demands on this day had both treatment plants at maximum capacity and all available pump storage facilities online.[1] There were no other facilities available to meet demand needs.

This is the same as running one's car at the redline or full RPMs. It works, but it is only a matter of time until something breaks and the desired output is lost.

During my tenure at KAW & AW, (1999 – 2007) I worked on improving reliability and providing short term capacity improvements at both of KAW's water treatment plants and increasing storage within KAW's distribution system. By completing these projects we were just able to stay ahead of maximum day demands and maximum hour demands as they increased; however, time is running out and this project is needed as soon possible to insure the continued safe and reliable delivery of water to KAW's customers.

[1] Available here means that any pump storage that had water in the tank was in service.

10. Q. WHEN WILL CONSTRUCTION COMMENCE AND WHEN WILL IT BE COMPLETED?

A. Construction will commence as soon as all required approvals have been obtained. In my direct testimony, I indicated that the construction time needed to obtain substantial completion was 900 calendar days for the Water Treatment Plant, that final completion would be done in 1080 calendar days and that KAW hoped to be substantially complete by April 2010. These numbers and dates were based on the original procedural schedule for this Case and also assumed that construction contracts would be awarded in November 2007. Due to the delays in the procedural schedule in this case, KAW postponed the receipt of bids for the water treatment plant and water mains to November 7 and 8th. Bids for the water treatment plant and mains require substantial completion by April 30, 2010 with water being produced at that time.

11. Q. WHAT IS THE COST OF CONSTRUCTION FOR THE WATER TREATMENT PLANT?

A. KAW has yet to complete the analysis for the final costs of the bids that were opened on November 7th & 8th because each bidder provided several alternates that need to be closely scrutinized before determining the final cost. It is my understanding, however, that based on preliminary bid numbers for the water treatment plant and mains that the previously filed total project cost are reasonable.

12. Q. HAVE YOU REVIEWED LWC's PROPOSED PHASE 1 AND PHASE 2 PIPELINE IDEA AS PRESENTED BY MR. HEITZMAN IN HIS REBUTTAL TESTIMONY?

A. Yes.

13. Q. DO YOU HAVE ANY CONCERNS WITH LWC's PROPOSED PROJECT?

A. Yes. I have several concerns as presented below.

1. By breaking up the project into two phases and avoiding the Kentucky River crossing in their Phase 1 project it appears that LWC believes only the Kentucky River crossing at Frankfort requires a 404 permit. This is not the case as stated below in concern 2. More importantly, however, this goes against the USACOE's permitting requirements that all projects must be submitted as a "single and complete project." What this means is that the permit for the Kentucky River Crossing must be in hand prior to starting construction on the entire project. The reason for this clause is that the USACOE does not want to be pressured into issuing a permit because portions of the project are already built.

2. In addition to item 1, I believe that LWC has also underestimated the time needed for the USACOE 404 and KY DOW 401 permits with or without the Kentucky River crossing portion. The entire project corridor must be investigated for impacts on wetlands, named waterways, perennial waterways, intermittent waterways and ephemeral waterways (collectively "Waters of the US"). When KAW started this project in March 2006, it identified the 404 permit as one of the critical paths items and started working full time on the permit in April 2006. It took 11 months to complete all the required wetland and waterways identification and impact work and in March of 2007, KAW submitted the 404 and 401 permits. The 404 permit is still under review, but based on the answer to an earlier question in this testimony, it should be received this month. Thus, the 404 permit will take at least 19 months from start to receipt. Assuming LWC starts March 1, 2008, and takes two months to finalize the route, the earliest it would expect to receive the 404 permit would be December 2009. It would be impossible to construct the Phase 1 portions of this project in 6 months as needed to meet Central Kentucky's needs.

3. Mr. Heitzman indicates that LWC and others will seek grants or low interest loans. If Federal grants or loans are obtained then the project will also need to meet all the requirements of the National Environmental Policy Act (NEPA). This would involve the USACOE performing its own Environmental Impact Statement for the project, that would likely add several years to the project. This time delay is further evidenced on the repairs to the Kentucky River locks and dams. If State grants and loans are obtained, the USACOE may invoke the NEPA requirements depending on how the State funds are secured. My concern is that depending on the funding mechanisms sought by LWC, the project could be further delayed over and above the 404 permitting times.

4. LWC has assumed that an agreement could be signed by March 1, 2008. Surely LWC understands that any such agreement signed between LWC and KAW would need to be filed and approved by the Public Service Commission. Subject to review from KAW counsel and PSC staff, I believe that KAW would likely have to submit an application for a new Certificate of Convenience and Necessity for any other project that solves its source of supply deficit. Given the application requirements to have design complete, permits in hand or applied for, and the length of this current Certificate Case, I believe LWC has again underestimated the schedule by at least another 9 months.

5. I have a great concern for the concept proposed by LWC to pump 10 MGD into the west side of Frankfort's distribution system and come out of the east side with 6 MGD. This proposal raises many issues which would need to be addressed and all of which need time to solve. Below is a brief listing of my concerns:

   a. What hydraulic modeling work has been done to show this concept can work? I have personally worked on the Lexington hydraulic

model both before this Case and as a part of this Case. Suffice it to say that, based on my experience, it is not as easy as it sounds to push 10 MGD into a box and expect 6 MGD to come out of the box without impacting something. Significantly more work will be needed before anyone should commit to this idea.

b. Will Frankfort's elevated storage tanks function properly when the hydraulic gradients in the system are changed? Will tanks overflow or not turnover, or will pressure rise significantly?

c. Will reversing the flow direction in existing pipelines cause significant startup flushing issues? How will this be addressed?

d. Has Frankfort accepted the concept?

e. Will Frankfort charge a "wheeling fee?" If so how much and who pays, KAW or LWC?

These are just of few of my concerns, but they point out that the true impact to Frankfort is not known. This impact could involve both additional cost and time to solve.

14. Q. WILL AN ULTRAVIOLET (UV) DISINFECTION SYSTEM BE NEEDED AT THE POOL 3 WTP IN 2011 AS ASSUMED BY LWC AND RW BECK IN THEIR ANALYSIS?

A. No. In August 2006, KAW started raw water sampling at the Pool 3 plant intake location to determine if cryptosporidium were present in the source water. After 15 months of monitoring, (August 2006 – October 2007) cryptosporidium has yet to be detected. Thus, to date there is no water quality driver to require that a UV disinfection system be installed as assumed by LWC and RW Beck.

15. Q. DO YOU STILL RECOMMEND THAT THE COMMISSION APPROVE THE CERTIFICATE FOR THE POOL 3 PROJECT?

A. Yes, based upon my involvement with the project to date and my review of LWC's idea, I continue to believe that KAW has designed a cost effective

solution to its source of supply problem that will increase system reliability, solve its source of supply deficit, solve its treatment plant capacity deficit, accommodate future regulations, and allows for partnering with BWSC.

16. Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

Case No. 2007-00134

KENTUCKY-AMERICAN WATER COMPANY, INC.

BEFORE THE

KENTUCKY PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY

OF HAROLD WALKER, III

FINANCIAL ANALYSES OF THE
POOL 3 OPTION AND THE SECTION 2 OPTION

NOVEMBER 2007

Prepared by:
GANNETT FLEMING, INC.
VALUATION AND RATE DIVISION

Valley Forge, Pennsylvania

BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION

RE: KENTUCKY-AMERICAN WATER COMPANY

CASE NO. 2007-00134

REBUTTAL TESTIMONY OF HAROLD WALKER, III

INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Harold Walker, III. My business mailing address is P. O. Box 80794, Valley Forge, Pennsylvania, 19484.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Gannett Fleming, Inc. as Manager, Financial Studies of the Valuation and Rate Division.

Q. PLEASE DESCRIBE THE VALUATION AND RATE DIVISION.

A. The Valuation and Rate Division of Gannett Fleming provides consulting services to public utilities and railroads. The Gannett Fleming affiliated companies employ approximately 1,900 people in 50 offices throughout the United States and Canada.

The Valuation and Rate Division has a long history of client services encompassing valuations; depreciation studies; revenue requirement, cost allocation, cost of capital, and rate design studies; analyses of accounting systems; and acquisition and feasibility studies.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND EMPLOYMENT EXPERIENCE?

A. My educational background, business experience and qualifications are provided in Appendix A. I have over 23 years of experience of serving the public utility industry. I have submitted about 60 expert testimonies before numerous state public utility commissions primarily concerning financial issues. In addition to providing expert testimony I have also valued utility property and common stock for acquisition and divestiture, and assisted in the private placement of fixed capital securities for public utilities. I also head the GASB 34 task force for Gannett Fleming. As such, I am responsible for development of GASB 34 services, educating Gannett Fleming personnel and clients on GASB 34 and how it may affect them. Under GASB 34, the changes to governmental entities basic financial statements involve the biggest change from current practice because it introduces full accrual accounting and requires the inventorying and valuation of their capital assets.

I graduated from Pennsylvania State University in 1984 with a Bachelor of Science Degree in Finance. I have also completed the regulation and the rate-making process courses presented by the College of Business Administration and Economics Center for Public Utilities at New Mexico State University. Additionally, I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the Society of Utility and Regulatory Financial Analysts. This designation is based upon education, experience and the successful completion of a comprehensive examination. I currently serve on the Board of Directors of Society of Utility and Regulatory Financial Analysts.

Prior to joining Gannett Fleming, Inc., I was employed by AUS Consultants - Utility Services. I held various positions during my eleven years with AUS, concluding my employment there as a Vice President. In 1996, I joined the Valuation and Rate division of Gannett Fleming.

SCOPE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The Kentucky-American Water Company, Inc. ("KAW" or "the Company") asked me to review and provide testimony in response to R. W. Beck's report labeled "Comparison of the Louisville Pipeline and Pool 3 Options to Serve Central Kentucky Water Customers" sponsored by Louisville Water Company, originally dated September 2007 and a revised report dated October 2007 (collectively referred to as "R.W. Beck Report"). My testimony is supported by Exhibit HW-1, which is composed of six Schedules.

Q. WHAT PART OF THE R.W. BECK REPORT DOES YOUR REBUTTUAL CENTERED ON?

A. The majority of my testimony focuses on a present value cost comparison between the Pool 3 Option and the Section 2 Option for the period 2010 through 2030. The Pool 3 Option includes the costs associated with the construction and operation of a new intake at Pool 3 of the Kentucky River, a 25 MGD water treatment plant ("WTP"), supporting assets and 30-miles of 42-inch transmission pipeline from Pool 3 to the intersection of Kentucky State Road ("KY-")1973 and KY-922 in Fayette County. The Pool 3 Option supporting assets include a raw water pumping station, raw water main, transmission pumping station,

transmission storage of 3 MG and all land required for the project. The cost breakdown, by plant account, for the Pool 3 Option is shown on Schedule 1.

The Section 2 Option includes the costs associated with the construction and operation of 42-miles of 42-inch transmission pipeline from KY-53 in Shelby County to a point of delivery in Fayette County and supporting assets. The Section 2 Option supporting assets include two transmission pumping stations, transmission storage of 3 MG, 12,000-feet of 24-inch transmission pipeline[1] to tie into KAW's system and all land required for the project. Schedule 2 shows the cost breakdown, by plant account, for the Section 2 Option.

It should be noted that the Pool 3 Option and the Section 2 Option are collectively referred to as "the Options".

Q. IS THE SECTION 2 OPTION PRESENTED IN YOUR TESTIMONY PART OF THE WATER SUPPLY SYSTEM PROPOSED BY THE LOUISVILLE WATER COMPANY?

A. Yes. The Section 2 Option is a piece of a water supply system proposed by the Louisville Water Company ("LWC") for supplying water to central Kentucky. A description of it and some cost estimates are included in both the R.W. Beck Report and in LWC's rebuttal testimony of Mr. Heitzman.

The Section 2 Option described in Mr. Heitzman's testimony is based on a 36-inch transmission pipeline, while the R.W. Beck Report includes both a 36-inch (R.W. Beck Report Table 5-1) and a 42-inch (R.W. Beck Report Table 3-1) transmission pipeline. Further, Mr. Heitzman's testimony discusses the required two pumping stations, while the

[1] The Louisville Water Company notified KAW, 10/1/07, of their proposed termination point of their proposed Section 2 Option pipeline. An additional 12,000-feet of 24-inch pipeline will be required to tie into KAW's system based upon LWC's termination point.

R.W. Beck Report only includes one pumping station for the 42-inch (R.W. Beck Report Table 3-1) transmission pipeline and two pumping stations for the 36-inch (R.W. Beck Report Table 5-1) transmission pipeline. Neither Mr. Heitzman's testimony nor the R.W. Beck Report provide cost information for the 12,000-feet of 24-inch transmission pipeline required to tie into KAW's system. Accordingly, the Section 2 Option presented in my testimony differs in terms of the particular assets from that which is discussed in Mr. Heitzman's testimony and the R.W. Beck Report.

Q. WOULD KAW BE THE SOLE OWNER OF THE POOL 3 OPTION PRESENTED IN YOU TESTIMONY?

A. No. I assumed the Pool 3 Option will be a joint public-private ownership where the Bluegrass Water Supply Commission ("BWSC") owns 20% of the assets and KAW owns 80% of the assets. This assumption reflects that fact that both KAW and the BWSC have each decided to pursue Pool 3 of the Kentucky River as their preferred water supply source for the future. KAW and the BWSC reached this conclusion after analyzing their water supply alternatives over the past few years.

Q. DID YOU ASSUME LWC WOULD OWN THE SECTION 2 OPTION PRESENTED IN YOU TESTIMONY?

A. No. KAW informed me that in response to Item No. 1(c) of the Supplemental Data Request from BWSC, LWC stated that it has not proposed to own the Section 2 Option.

Q. WHO WOULD OWN THE SECTION 2 OPTION PRESENTED IN YOUR TESTIMONY?

A. I assumed the Section 2 Option to also be a joint public-private ownership where the BWSC owns 20% of the assets and KAW owns 80% of the assets. It should be noted that no other

investors have been found or at least identified by LWC to own the Section 2 Option. This last point concerning the lack of existing investors is particularly troublesome since LWC and the R.W. Beck Report both assume the Section 2 Option will begin to have major expenditures in 2008.

Q. ARE THERE OTHER ASSUMPTIONS USED IN YOUR ANALYSES?

A. Yes. The base assumptions ("Base Assumptions") are listed on Schedule 3. Many of the Base Assumptions are the same as those used in the R.W. Beck Report. The financial assumptions or financial inputs such as expenses and construction costs were provided by KAW. Additionally, I reviewed the assumptions and inputs with Michael A. Miller, Assistant Treasurer of KAW. It should be noted that Mr. Miller will be available for cross examination at the hearing.

Q. WHAT INFORMATION IS SHOWN ON SCHEDULE 1?

A. The cost breakdown, by plant account, for the Pool 3 Option is shown on Schedule 1. KAW's current capital cost estimates, in November 2007 dollars, for the Pool 3 Option are shown in column A.

Column B reflects the estimate of the cumulative impact of inflation on capital cost over the period, 2008-2009, that Pool 3 Option is assumed to be constructed. Column D reflects the estimate of allowance for funds used during construction ("AFUDC") to accrue on the project. Column E shows the total cost of the Pool 3 Option related capital assets and columns F and G lists the apportionment of the capital assets between KAW and BWSC.

In total, the required funding to construct the Pool 3 Option is assumed to be about $182 million. Post construction, KAW is assumed to own $146 million of the Pool 3

Option capital assets and it is assumed that BWSC will own $36 million of the capital assets.

Q. WHAT INFORMATION IS SHOWN ON SCHEDULE 2?

A. The cost breakdown, by plant account, for LWC's Section 2 Option is shown on Schedule 2. As was the case with Schedule 1, current capital cost estimates, in November 2007 dollars, for the Section 2 Option are shown in column A.

Column B reflects the estimate of the soft costs associated with contingencies, permitting, legal, and engineering. The percentage used to account for these soft costs for the Section 2 Option is based on the soft costs percentage found in the Pool 3 Option pricing. The remaining columns in Schedule 2 were calculated in the same manner as Schedule 1.

In total, about $132 million is estimated to be required to complete the Section 2 Option. After the projected is completed, it is assumed that KAW will own $106 million of the Section 2 Option capital assets and BWSC will own $26 million of the capital assets.

Q. HOW MANY OF YOUR BASE ASSUMPTIONS ARE FROM THE R.W. BECK REPORT?

A. Six out of 12, or half, of my Base Assumptions are from the R.W. Beck Report as noted on page 2 of schedule 3. I used some of the assumptions from the R.W. Beck Report because they were reasonable estimates and I wanted to minimize the differences between my present value cost analyses and those presented in the R.W. Beck Report.

Below is a summary of the six Base Assumptions which differ from R.W. Beck Report's assumptions:

Inflation

- Inflation is assumed to be 3.00% for both operating expenses and capital costs. This rate is based on the long term average rate of inflation of 3.0%.
- The R.W. Beck Report used inflation of 2.4% for most operating expenses and 3.0% for wholesale rates. The R.W. Beck Report also used 3.1% inflation for capital costs based upon the Handy Whitman Water Treatment rate of 3.0%, Handy Whitman Mains rate of 2.97% and an ENR CCI rate of 3.1%.

KAW's Tax Exempt Debt

- KAW's total tax exempt debt available for either Option is $35,000,000 based on a three year construction period. This is assumed to be industrial development bonds, which KAW would be contractually responsible for.
- The R.W. Beck Report did not assume any tax exempt debt for KAW.

LWC's Wholesale Rate Increase

- LWC's post-2016 wholesale rate increase above inflation is 2.00%. LWC's wholesale rate is $1.71 per thousand. Based upon Mr. Heitzman's testimony, this rate is held constant through 2015. In 2016 it is increased by the compounded inflation rate, which is assumed be 3% annually. After 2016, the rate is assumed to increase by a maximum of 2% above inflation (i.e., inflation + 2%).
- The R.W. Beck Report used a 3.0% annual increase in wholesale rates over their study period. The R.W. Beck Report differs from Mr. Heitzman's testimony.

BWSC's Debt Term

- BWSC's debt issue term is assumed to be 25 years. A 25 year term was used in order to have the life of the financial capital approximate the life of the underlying long lived assets. The result of combining the debt's term life with a conservative balloon payment enables the life of the financial capital to be comparable to the life of the underlying long lived assets.
- The R.W. Beck Report used a term of 20 years.

BWSC's Debt Payment Frequency

- BWSC's debt issue is assumed to have two payments annually to match the requirements of a typical municipal bond payment.
- The R.W. Beck Report used a single annual payment which would be unique for a municipal bond.

BWSC's Debt's Balloon Payment

- BWSC's debt issue's final balloon payment is 50.0%. This assumption implies that 50% of the principal is repaid prior to the final payment. The final payment is then refinanced.
- The R.W. Beck Report did not differentiate in balloon payments. Therefore, the R.W. Beck Report essentially recovered in rates, or the revenue requirement, the project's entire capital cost over 20 years. That is, they recover "return of capital" over 20-years for assets with a life of 58 years.

Q. WHAT IS THE RESULT OF YOUR PRESENT VALUE COST COMPARISON BETWEEN THE POOL 3 OPTION AND THE SECTION 2 OPTION?

A. As shown on Schedule 4, the present value cost of the Pool 3 Option is $257,401,565 and the present value cost of the Section 2 Option, shown on Schedule 5, is $311,598,084. Comparing the present value cost of the two Options indicates the Section 2 Option will cost

21% more than the Pool 3 Option in today's dollars, as shown in Table 1.

Table 1

Comparison of Present Value Cost 2010 to 2030	
Pool 3 Option	$257,401,565
Section 2 Option	311,598,084
Difference	$54,196,519
% Difference	21%

The financial models shown on Schedules 4 and 5 determine the Options' present value cost by summing their discounted annual costs over the period 2010 to 2030. The discounted annual costs were determined based on an assumed discount rate of 4.7% and the annual costs, that were discounted, represent an estimate of the annual revenue requirement. The Base Assumptions used to generate the present value cost are listed on Schedule 3.

The present value cost for the Options include the future capital costs, developed on Schedules 1 and 2, and the Options' related cost of service over 20 years starting in 2010. The operating and maintenance costs for the Pool 3 Option and the Section 2 Option were provided by KAW.

The Pool 3 Option is intended as a peaking plant through 2030. Post 2030, it may also provide capacity for future regional population growth needs. Under the peaking plant concept, the Pool 3 Option facilities would normally operate under a minimal flow condition of 6 MGD, but be available to provide up to its peak capacity under severe drought conditions. The Section 2 Option is assumed to have different usage characteristics than the Pool 3 Option because of LWC's wholesale rate requirement explained in Mr. Heitzman's testimony.

According to Mr. Heitzman's testimony, in order to secure a wholesale rate of $1.71 per thousand through 2015, the purchaser must agree to a 50 year contract. Under the proposed 50 year contract, the wholesale rate would be increased in 2016 by a cumulative inflation rate of about 30%. After 2016, the contracted wholesale rate will increase by a maximum of 2% above annual inflation (i.e., inflation + 2%), or about 5% annually. Further, the contracted wholesale rate is a take-or-pay rate reflecting a 2:1 peaking ratio. Because of the 50 year commitment required by the contract, a reserved capacity of 25 MGD is assumed for KAW and BWSC. A reserved capacity of 25 MGD reflects a daily purchase under take-or-pay of 10 MGD for KAW and 2.5 MGD for BWSC. Under the 2:1 peaking ratio, 12.5 MGD is required to be purchased to reserve 25 MGD of capacity.

Q. THE POOL 3 OPTION PRESENTED IN THE R.W. BECK REPORT INCLUDED A 2011 CAPITAL PROJECT TO DEAL WITH THE LONG-TERM 2 ENHANCED SURFACE WATER TREATMENT RULE. DID YOU INCLUDE A SIMILAR CAPITAL PROJECT IN YOUR ANALYSIS OF THE POOL 3 OPTION SHOWN ON SCHEDULE 4?

A. No. The Company informed me that, based on recent Pool 3 data, inclusion of such a project will not be necessary. Therefore, the costs of that project (i.e., UV Capital Expenditures) should be removed from all analyses of the Pool 3 Option.

In the R.W. Beck Report, the line items "UV Cost of Capital" and "R&R (UV)" represent the before tax overall rate of return on the UV capital assets and the depreciation expense for those capital assets, respectively. Since the UV Capital Expenditures should be removed from all analyses of the Pool 3 Option, the R.W. Beck Report line items "UV Cost of Capital" and "R&R (UV)" should be removed. Having erroneously included these line

items, the R.W. Beck Report overstated the present value cost of Pool 3 contained in the R.W. Beck Report by $11 million, based on a discount rate of 4.7%.

Q. ON LINE 11 OF SCHEDULE 5 YOU SHOW A LINE ENTITLED "LWC PIPELINE SECTION 1 RELATED PROPERTY PLANT & EQUIPMENT". WHY IS NO CAPITAL COST SHOWN FOR THIS PROJECT?

A. According to Mr. Heitzman's, LWC's Section 1 pipeline will be owned and operated by LWC. LWC's Section 1 pipeline includes the costs associated with the construction of 36-miles of a 36-inch transmission pipeline from I-265 in Jefferson County to a point of delivery in Shelby County and supporting assets. LWC's Section 1 supporting assets include one transmission pumping station, transmission storage of 3 MG, and all land required for the project. Mr. Heitzman's estimates the Section 1 cost to be $35 million.

LWC's Section 1 pipeline's delivery point in Shelby County is where the Section 2 Option pipeline begins. However, LWC is not going to charge wholesale customers connected to the Section 2 Option pipeline for the capital cost or the operating costs associated with LWC's Section 1 pipeline.

This last point is very important. LWC is going to invest at least $36 million and absorb annual operating costs of a couple of million dollars because they are not going to charge Section 2 Option wholesale customers any of Section 1 pipeline's expenses. Somebody is going to have to pay for Section 1 pipeline's expenses; either LWC's investors or LWC's retail customers.

Q. ON LINE 12 OF SCHEDULE 5 YOU SHOW A LINE ENTITLED "LWC'S EXPANDED TREATMENT REQUIREMENTS ARISING FROM SECTION 1 AND SECTION 2 SALES". WHY ARE THERE NO CAPITAL COST SHOWN FOR THIS

PROJECT?

A. So far, LWC has not indicated there will be additional charges as a result of their required WTP expansions. However, as shown in Table 2, LWC does not currently have the treatment capacity necessary to meet Section 2 Option's wholesale sales. Further, LWC violated their 15% treatment reserve capacity in 2005 and 2006 based on the information shown in Table 2. Nonetheless, LWC is publically committed "to maintaining a reserve capacity of 15% for all of our customers, consistent with KDOW requirements."[2]

Table 2

LWC's Treatment Capacity

	MGD Current Capacity	MGD Expanded Capacity
Production		
BE Payne WTP	60	120
Crescent Hill WTP	180	240
Total Gross Available	240	360
Less: LWC's 15% Reserve	36	54
Total Net Available	204	306

	Peak MGD	Required Capacity With Reserve
Max MGD 2005	205	236
Max MGD 2006	206	237

Source of Information: 2006 Annual Report

If LWC is not going to charge wholesale customers connected to the Section 2 Option

[2] Stated answer in response to "Q-4" from the July 10, 2007 *Louisville Water (LWC) Response to Lexington Urban County Government Questions Related to the I-64 Pipeline*, pg 1, (accessed 10/9/07), http://www.lwcky.com/LexingtonPipeline/LexPipeQA.pdf

pipeline for the capital cost or the operating costs of their required treatment capacity expansion, then someone else will be forced to absorb these expenses; either LWC's investors or LWC's retail customers.

Q. LOOKING AT SCHEDULE 5, WHAT IS THE MOST SIGNIFICANT OPERATING EXPENSE FOR THE SECTION 2 OPTION?

A. LWC's wholesale rate is the most significant operating expense for the Section 2 Option. As stated previously, the Section 2 Option analysis, shown on Schedule 5, reflects the wholesale rate and terms expressed in Mr. Heitzman's testimony. According to Mr. Heitzman, by accepting a 50 year contract: the wholesale rate will be frozen until 2016; the wholesale rate would be increased in 2016 by a cumulative inflation rate of about 30%; and after 2016 the contracted wholesale rate will increase by a maximum of 2% above annual inflation (i.e., inflation + 2%), or about 5% annually.

Interestingly, the R.W. Beck Report did not proceed from the contracted wholesale rate explained by Mr. Heitzman; rather they assumed a 3% wholesale rate increase for every year. Moreover, LWC's "2007-2021 Strategic Plan predicts that water rates will have to increase by two percentage points more than inflation to continue to provide quality water for a growing and changing community."[3]

If LWC is not going to charge wholesale customers connected to the Section 2 Option pipeline for the cost increases that will force water rates to increase by 2% more than inflation, then someone else will be forced to absorb these cost increases; either LWC's investors or LWC's retail customers.

Q. HAVE YOU COMPARED THE INFORMATION SUMMARIZED IN THE

3 *Louisville Water Company 2006 Annual Report*, pg 10.

CAPITAL COSTS TABLES IN THE R.W. BECK REPORT?

A. Yes. Tables 3-1, 3-2, 3-3, 4-1, 4-2, and 5-1 of the R.W. Beck Report all summarize capital costs for varying projects. Interesting, only Table 5-1 uses "Contingency @ 10%" while Tables 3-1, 3-2, 3-3, 4-1, and 4-2 use "Contingency @ 20%", a 10% difference in costs. Further, only Table 5-1 uses "Engineering, Legal, and Administrative @ 15%" while Tables 3-1, 3-2, 3-3, 4-1, and 4-2 use "Engineering, Legal, and Administrative @ 20%", a 5% difference in costs.

A presentation which compares the results of Table 5-1 to the results of Tables 3-1, 3-2, 3-3, 4-1, and 4-2 can only be described as truly an apples and oranges comparison. Part of the problem of the R.W. Beck Report is the report indicates no independent capital or operating cost estimates were developed for use in the comparison of water supply options. The only exception appears to be Table 5-1.

Q. DID YOU FIND OTHER ERRORS OR PROBLEMS WITH THE R.W. BECK REPORT?

A. Yes. In addition to the ones previously mentioned, a number of other errors or problems stand out. To begin with, the "capitalized interest" or AFUDC included in their analyses is calculated incorrectly based on the text of the R.W. Beck Report. The AFUDC included in their analyses only reflects a debt component and therefore, is understated by a factor of more than two (i.e., $2,000 should be at least $4,000, etc.) because they excluded an equity component.

Additionally, the R.W. Beck Report capitalizes issuance expense, making it part of rate base and thus, overstating depreciating expense in their Pool 3 analyses. Under

tradition rate making, issuance expenses are a component of the cost of capital, not the rate base.

The R.W. Beck Report also grossed up the KAW's debt component for income taxes and sales taxes, hence overstating their "KAWC Cost of Capital" in their Pool 3 analyses. In the R.W. Beck Report, the line item "KAWC Cost of Capital" represents KAW's before tax overall rate of return. The R.W. Beck Report used a before tax overall rate of return of 12.82%, based on the tax factor and the 7.75% overall rate of return found in Case No. 2004–00103. The appropriate before tax overall rate of return of is 10.78%, based on the tax factor and the 7.75% overall rate of return found in Case No. 2004–00103. Therefore, the R.W. Beck Report overstated "KAWC Cost of Capital" by about 19% in their Pool 3 analyses. This error alone overstated the present value cost of Pool 3 contained in the R.W. Beck Report by $35 million, based on a discount rate of 4.7%.

On page 3-3, Table 3-2, the R.W. Beck Report calculates the cost of a 25 MGD WTP and associated facilities for the Pool 3 Option as simply $25/20^{ths}$ or 1.2 times the cost of similar facilities with 20 MGD capacity. There are certain economies of scale to constructing a 25 MGD WTP versus a 20 MGD WTP. That is, a 20% increase in capital cost is not appropriate, and thus, the R.W. Beck Report overstates the costs for a 25 MGD WTP. Additionally, current capital cost estimates for a 25 MGD Pool 3 Option should be used in the comparison.

On page 3-3, Table 3-2, the R.W. Beck Report indicates a raw water main cost for the Pool 3 Option of $402,000, based on 1,300-feet at $300/foot, inflated to 2007. The March 2007 Gannett Fleming report indicated the raw water main length to be 0.56 mile, or 2,957 feet, not 1,300-feet.

Previously I explained why the UV Capital Expenditures in 2011 for the Pool 3 Option should not be included in the comparison. Nonetheless, the UV disinfection costs in the March 2007 Gannett Fleming report already included all percentage increases, so the inclusion of contingency (20%), permitting (5%), and engineering, legal, and administrative costs (20%) should not have been included in the UV project cost listed on page 3-3, Table 3-3, of the R.W. Beck Report.

The R.W. Beck Report used several different inflation rates in their analyses.[4] Their use of varying inflation rates indicates they gave a great deal of attention to inflation. However, throughout their analyses, their major capital projects, such as the Pool 3 Option and the Section 2 Option, were valued in 2007 dollars even though those capital assets were assumed to be constructed in 2008 and 2009. That is, the R.W. Beck Report failed to account for inflation for the years 2008 and 2009 for the Pool 3 Option and the Section 2 Option.

Finally, the R.W. Beck Report incorrectly computed depreciation, labeled as "Renewal and Replacement Fund", for the Section 2 Option analyses. This error alone understated the present value cost of the Section 2 Option contained in the R.W. Beck Report by $7 million, based on a discount rate of 4.7%, in Appendices A-2 and B-2 in the reported dated September 2007. Oddly, in the report dated October 2007, the same error only appears in Appendix A-2 and has a present value cost understatement of $7 million. In Appendix B-2 of the same report the understatement is $4 million, all based on a discount rate of 4.7%.

[4] The R.W. Beck Report used inflation of 2.4% for most operating expenses and 3.0% for wholesale rates. The R.W. Beck Report also used 3.1% inflation for capital costs based upon the Handy Whitman Water Treatment rate of 3.0%, Handy Whitman Mains rate of 2.97% and an ENR CCI rate of 3.1%.

I use the term "oddly" because the only stated revision to the report dated October 2007 was to correct for an incorrect interest rate on a municipal bond (i.e., 12.4% interest was originally used in stead of 4.7%). However, the "Renewal and Replacement Fund", in the Section 2 Option shown in Appendix B-2 was obviously modified.

Q. DO YOU HAVE ANY OTHER UNEASINESS REGARDING LWC'S PIPELINE PROJECT?

A. Yes. My trepidation regarding LWC's pipeline project is a byproduct of the large number of errors and inconsistencies that I discussed previously. Additionally, I reviewed an array of materials to prepare my testimony. I am amazed over the large change in LWC's estimated cost for the LWC pipeline project within a 3-month period. Table 3 provides a comparison of the cost estimates for Section 1and the Section 2 Option announced by LWC within the 3-month period of July 2007[5] to September 2007. In total, the projects estimated cost increased over 50% in less than 3-months.

Table 3

LWC's Pipeline Cost Escalation

	July-07	September-07 (Million of $)	$ Increase	% Increase
Section 1 Option	$25	$35	$10	40%
Section 2 Option	56	88	32	57%
LWC's Pipeline Total	$81	$123	$42	52%

[5] Stated answer in response to "Q-5" from the July 10, 2007 *Louisville Water (LWC) Response to Lexington Urban County Government Questions Related to the I-64 Pipeline*, pg 1, (accessed 10/9/07), http://www.lwcky.com/LexingtonPipeline/LexPipeQA.pdf

The large number of errors, inconsistencies and rapidly changing costs indicates the Section 2 Option should be viewed with great trepidation.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

APPENDIX A

Professional Qualifications
of
Harold Walker, III
Manager, Financial Studies
Gannett Fleming, Inc.

EDUCATION

Mr. Walker graduated from Pennsylvania State University in 1984 with a Bachelor of Science Degree in Finance. His studies concentrated on securities analysis and portfolio management with an emphasis on economics and quantitative business analysis. He has also completed the regulation and the rate-making process courses presented by the College of Business Administration and Economics Center for Public Utilities at New Mexico State University. Additionally, he has attended programs presented by The Institute of Chartered Financial Analysts (CFA).

Mr. Walker was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the Society of Utility and Regulatory Financial Analysts. This designation is based upon education, experience and the successful completion of a comprehensive examination. He is also a member of the Society of Utility and Regulatory Financial Analysts (SURFA) and has attended numerous financial forums sponsored by the Society. The SURFA forums are recognized by the Association for Investment Management and Research (AIMR) and the National Association of State Boards of Accountancy for continuing education credits.

BUSINESS EXPERIENCE

Prior to joining Gannett Fleming, Inc., Mr. Walker was employed by AUS Consultants - Utility Services. He held various positions during his eleven years with AUS, concluding his employment there as a Vice President. His duties included providing and supervising financial and economic studies on behalf of investor owned and municipally owned water, waste water, electric, natural gas distribution and transmission, oil pipeline and telephone utilities as well as resource recovery companies.

In 1996, Mr. Walker joined the Valuation and Rate division of Gannett Fleming, Inc. In his capacity as Manager, Financial Studies and for the past eighteen years, he has continuously studied rates of return requirements for regulated firms. In this regard, he supervised the preparation of rate of return studies in connection with his testimony and in the past, for other individuals. He also assisted and/or developed dividend policy studies, nuclear prudence studies, calculated fixed charge rates for avoided costs involving cogeneration projects, financial decision studies for capital budgeting purposes and developed financial models for determining future capital requirements and the effect of those requirements on investors and ratepayers, valued utility property and common stock for acquisition and divestiture, and assisted in the private placement of fixed capital securities for public utilities.

Mr. Walker was also the Publisher of C.A. Turner Utility Reports from 1988 to 1996. C.A. Turner Utility Reports is a financial publication which provides financial data and related ratios and forecasts covering the utility industry. From 1993 to 1994, he became a contributing author for the Fortnightly, a utility trade journal. His column was the Financial News column and focused mainly on the natural gas industry.

In 2004, Mr. Walker was elected to serve on the Board of Directors of SURFA. Previously, he served as an ex-officio directors as an advisor to SURFA=s existing President. In 2000, Mr. Walker was elected President of SURFA for the 2001-2002 term. Prior to that, he was elected to serve on the Board of Directors of SURFA during the period 1997-1998 and 1999-2000. Currently, he also serves on the Pennsylvania Municipal Authorities Association, Electric Deregulation Committee.

EXPERT TESTIMONY

Mr. Walker has submitted testimony before thirteen state public utility commissions including: Colorado, Connecticut, Delaware, Indiana, Michigan, Missouri, New Hampshire, New Jersey, New York, Oklahoma, Pennsylvania, Vermont and West Virginia. His testimonies covered various subjects including: appropriate capital structure and fixed capital cost rates, depreciation, fair rate of return, synchronization of interest charges for income tax purposes, valuation and cash working capital. The following tabulation provides a listing of the electric power, natural gas distribution, telephone, wastewater, and water service utility cases in which he has been involved as a witness. Additionally, he has been involved in a number of rate proceedings involving small public utilities which were resolved by Option Orders and therefore, are not listed below.

Client	Docket No.
Alpena Power Company	U-10020
Armstrong Telephone Company - Northern Division	92-0884-T-42T
Armstrong Telephone Company - Northern Division	95-0571-T-42T
Artesian Water Company, Inc.	90-10
Artesian Water Company, Inc.	06-158
Connecticut-American Water Company	99-08-32

Continued:

Client	Docket No.
Connecticut Water Company	06-07-08
Citizens Utilities Company Colorado Gas Division	-
Citizens Utilities Company Vermont Electric Division	5426
Citizens Utilities Home Water Company	R-901664
Citizens Utilities Water Company of Pennsylvania	R-901663
City of Bethlehem - Bureau of Water	R-00984375
City of Lancaster Sewer Fund	R-00005109
City of Lancaster Sewer Fund	R-00049862
City of Lancaster Water Fund	R-00984567
City of Lancaster Water Fund	R-00016114
City of Lancaster Water Fund	R-00051167
Consumers Pennsylvania Water Company Roaring Creek Division	R-00973869
Consumers Pennsylvania Water Company Shenango Valley Division	R-00973972
Country Knolls Water Works, Inc.	90-W-0458
East Resources, Inc. - West Virginia Utility	06-0445-G-42T
Elizabethtown Water Company	WR06030257
Hampton Water Works Company	DW 99-057
Indian Rock Water Company	R-911971
Indiana Natural Gas Corporation	38891
Jamaica Water Supply Company	-
Middlesex Water Company	WR-89030266J
Missouri-American Water Company	WR-2000-281
Missouri-American Water Company	SR-2000-282
Mount Holly Water Company	WR06030257
New Jersey-American Water Company	WR-89080702J
New Jersey-American Water Company	WR-90090950J
New Jersey-American Water Company	WR-03070511
New Jersey-American Water Company	WR-06030257
Newtown Artesian Water Company	R-911977
Newtown Artesian Water Company	R-00943157
Northern Indiana Fuel & Light Company	38770
Oklahoma Natural Gas Company	PUD-940000477
Pennichuck Water Works, Inc.	DW 04-048
Pennichuck Water Works, Inc.	DW 06-073
Pennsylvania Gas & Water Company (Gas)	R-891261
Pennsylvania Gas & Water Co. (Water)	R-901726
Pennsylvania Gas & Water Co. (Water)	R-911966

Continued:

Client	Docket No.
Pennsylvania Gas & Water Co. (Water)	R-22404
Pennsylvania Gas & Water Co. (Water)	R-00922482
Pennsylvania Gas & Water Co. (Water)	R-00932667
Presque Isle Harbor Water Company	U-9702
St. Louis County Water Company	WR-2000-844
United Water New Rochelle	W-95-W-1168
United Water Toms River	WR-95050219
Valley Water Systems, Inc.	06-10-07
Wilmington Suburban Water Corporation	94-149
York Water Company	R-901813
York Water Company	R-922168
York Water Company	R-943053
York Water Company	R-963619
York Water Company	R-994605
York Water Company	R-00016236

Case No. 2007-00134
Witness: H. Walker, III

KENTUCKY-AMERICAN WATER COMPANY, INC.
LEXINGTON, KENTUCKY

EXHIBIT

TO ACCOMPANY THE

REBUTTAL TESTIMONY

NOVEMBER 2007

Prepared by:
GANNETT FLEMING, INC.
VALUATION AND RATE DIVISION

Valley Forge, Pennsylvania

Kentucky American Water Company
Nov-07
Estimated Pool 3 Capital Requirements

Acct	Rate		A Construction Costs 2007 $	B Inflation @ 3.00% Over 2-yrs	C Average Capital Cost 2008-09	D KAW AFUDC @ 7.75% Over 2-yrs	E Pool 3 Total	F KAW Share @ 80%	G BWSC Share @ 20%	H KAW 2010 Rate Base Value	I KAW Annual Depreciation Accrual
306.00	2.29	Lake, River and Other Intakes	$1,161,209	$52,777	$1,213,986	$94,084	$1,308,070	$1,046,456	$261,614	$1,046,456	$23,964
		Raw Water Pumping Station									
304.20	1.94	Structure	8,012,342	364,161	8,376,503	649,179	9,025,682	7,220,546	1,805,136	7,220,546	140,079
311.20	2.45	Electric Pumping Equipment	1,393,451	63,332	1,456,783	112,901	1,569,684	1,255,747	313,937	1,255,747	30,766
309.00	1.82	Supply Mains	1,045,088	47,499	1,092,587	84,676	1,177,263	941,810	235,453	941,810	17,141
		Water Treatment Plant									
304.30	1.91	Structure	52,012,251	2,363,957	54,376,208	4,214,156	58,590,364	46,872,291	11,718,073	46,872,291	895,261
320.10	2.21	Equipment	14,596,329	663,403	15,259,732	1,182,629	16,442,361	13,153,889	3,288,472	13,153,889	290,701
311.20	2.45	Electric Pumping Equipment	4,803,504	218,319	5,021,823	389,191	5,411,014	4,328,811	1,082,203	4,328,811	106,056
331.00	1.66	Finished Water Main	69,497,188	3,158,647	72,655,835	5,630,827	78,286,662	62,629,330	15,657,332	62,629,330	1,039,647
330.10	2.25	Transmission Storage	2,302,314	104,640	2,406,954	186,539	2,593,493	2,074,794	518,699	2,074,794	46,683
		Transmission Water Pumping Station									
304.20	1.94	Structure	3,547,749	161,245	3,708,994	287,447	3,996,441	3,197,153	799,288	3,197,153	62,025
311.20	2.45	Electric Pumping Equipment	1,505,693	68,434	1,574,127	121,995	1,696,122	1,356,898	339,224	1,356,898	33,244
		Land									
303.40		Intake and Water Treatment Plant	781,364	35,513	816,877	0	816,877	653,502	163,375	653,502	0
303.30		Transmission Storage and Pumping	96,958	4,407	101,365	0	101,365	81,092	20,273	81,092	0
303.50		Finished Water Main	1,084,099	49,272	1,133,371	0	1,133,371	906,697	226,674	906,697	0
			$161,839,538	$7,355,606	$169,195,144	$12,953,624	$182,148,769	$145,719,016	$36,429,753	$145,719,016	$2,685,567

Source of Information : Company provided

Schedule 1

Kentucky American Water Company & Bluegrass Water Supply Commission
Nov-07
Estimated Public/Private Ownership - LWC "Section 2" Pipeline Gross Plant Value

Acct	Rate	Item	A Initial Capital Expenditures	B Contingencies, Permitting, Legal, Engineering @ 14.070%	C Capital Cost	D Inflation @ 3.00% Over 2-yrs	E Average Capital Cost 2008-09	F KAW AFUDC @ 7.75% Over 2-yrs	G "Section 2" 2010 Gross Plant Value	H "Section 2" KAW Share @ 80%	I "Section 2" BWSC Share @ 20%	J KAW 2010 "Section 2" Rate Base Value	K KAW Annual Depreciation Accrual
331.00	1.66	Finished Water Main - 42"	$87,076,822	$12,251,709	$99,328,531	$4,514,482	$103,843,013	$8,047,834	$111,890,847	$89,512,678	$22,378,169	$89,512,678	$1,485,910
331.00	1.66	Finished Water Main - 24"	2,407,600	338,749	2,746,349	124,822	2,871,171	222,516	3,093,687	2,474,950	618,737	2,474,950	41,084
330.10	2.25	Transmission Storage	2,018,375	283,985	2,302,360	104,642	2,407,002	186,543	2,593,545	2,074,836	518,709	2,074,836	46,684
		Transmission Water Pumping Station											
304.20	1.94	Structure	6,220,428	875,214	7,095,642	322,497	7,418,139	574,906	7,993,045	6,394,436	1,598,609	6,394,436	124,052
311.20	2.45	Electric Pumping Equipment	2,640,000	371,448	3,011,448	136,870	3,148,318	243,995	3,392,313	2,713,850	678,463	2,713,850	66,489
		Land											
303.30		Transmission Storage and Pumping	127,500	17,939	145,439	6,610	152,049	0	152,049	121,639	30,410	121,639	0
303.50		Finished Water Main	2,662,879	374,667	3,037,546	138,056	3,175,602	0	3,175,602	2,540,481	635,121	2,540,481	0
		Total	$103,153,604	$14,513,711	$117,667,315	$5,347,979	$123,015,294	$9,275,794	$132,291,088	$105,832,870	$26,458,218	$105,832,870	$1,764,219

Source of Information: Company provided

Schedule 2

Base Assumptions*

1. Inflation	3.00%
2. KAW Discount Rate	4.70%
3. KAW AFUDC Rate	7.75%
4. KAW Total Tax Exempt Debt For Options	$35,000,000
5. BWSC Discount Rate	4.70%
6. Tax Exempt LT-Debt Coupon	4.70%
7. Taxable LT-Debt Coupon	6.50%
8. Issuance Expense	1.00%
9. LWC Post-2016 Rate Increase Above Inflation	2.00%

BWSC Debt Issue

10. BWSC Debt Issue Term Years	25
11. BWSC Number of Payments Annually	2
12. BWSC Percent Final Balloon Payment	50.0%

* See the next page of this Schedule for an explaination of the assumptions.

Description of the Base Assumptions

1. Inflation is 3.00% for both operating expenses and capital costs. The RW Beck Report used 2.4% for most operating expenses, 3.0% for wholesale rates and 3.1% for capital costs.

2. KAW Discount Rate is 4.70%, or identical to the one used for BWSC and the discount rate used in the RW Beck Report.

3. KAW AFUDC Rate is 7.75% based on the overall rate of return from the Commission's 2004 decision. The RW Beck Report also used 7.75%.

4. KAW Total Tax Exempt Debt for Options is $35,000,000 based on a three year construction period. This is assumed to be industrial development bonds, which KAW would be contractually responsible for.

5. BWSC Discount Rate is 4.70% or identical to the one used for KAW and the discount rate used in the RW Beck Report.

6. Tax Exempt LT-Debt Coupon is 4.70%. All tax exempt debt issued by LWC, BWSC and KAW has the same coupon rate, 4.7%. The RW Beck Report also used a municipal coupon rate of 4.7%.

7. Taxable LT-Debt Coupon is 6.50%. This the coupon rate assumed on new KAW taxable debt. The RW Beck Report also used a KAW coupon rate of 6.5%.

8. Issuance Expense is 1.00% for all new debt issued by KAW and BWSC. The RW Beck Report also used issuance expense of 1.0%.

9. LWC Post-2016 Rate Increase Above Inflation is 2.00%. LWC's wholesale rate is $1.71 per thousand. This rate is held constant through 2015. In 2016 it is increased by the compounded inflation rate, which is assumed be 3% annually. After 2016, the rate will increase by a maximum of 2% above inflation (i.e., CPI + 2%).

10. BWSC Debt Issue Term Years is 25. The RW Beck Report used a term of 20 years.

11. BWSC Debt Issue Number of Payments Annually is 2.

12. BWSC Debt Issue Percent Final Balloon Payment 50.0%. This implies that 50% of the principal is repaid prior to the final payment. The final payment is then refinanced.

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
POOL THREE OPTION SHARE

Ln #		Basis %	Note	2007	2008	2009	2010	2011	2012
	Capital Expenditures								
1	***KAW Pool 3 Related Rate Base***								
2	Gross Property Plant & Equipment		(1)				$145,719,016	$145,719,016	$145,719,016
3	Accumulated Depreciation		(1)				0	(2,685,567)	(5,371,134)
4	***Net Property Plant & Equipment***						$145,719,016	$143,033,449	$140,347,882
5	**BWSC Pool 3 Related Property Plant & Equipment**								
6	Gross Property Plant & Equipment		(1)				$36,429,753	$36,429,753	$36,429,753
7	BWSC Issuance Expense	1.00%					364,298	364,298	364,298
8	**Total BWSC Pool 3 Related Debt Capital**						36,794,051	36,794,051	36,794,051
9	BWSC Cumulative Principal Repayment						(398,656)	(816,269)	(1,253,741)
10	BWSC Ending Amount Outstanding						$36,395,395	$35,977,782	$35,540,310
	Annual Operating Expenses								
11	**Labor Costs**								
12	Supervisor - Salary	3.0%		$55,000	$56,650	$58,350	$60,100	$56,650	$58,350
13	Benefits/Overhead/Taxes	3.0%		35,750	36,823	37,928	39,066	36,823	37,928
14	Operators	3.0%		174,720	179,961	185,360	190,921	179,961	185,360
15	Benefits/Overhead/Taxes	3.0%		113,568	116,975	120,484	124,099	116,975	120,484
16	Maintenance/Relief Operator	3.0%		87,360	89,981	92,681	95,461	89,981	92,681
17	Benefits/Overhead/Taxes	3.0%		56,784	58,488	60,243	62,050	58,488	60,243
18	Water Quality Supervision	3.0%		4,800	4,944	5,092	5,245	4,944	5,092
19	Maintenance Supervision	3.0%		4,800	4,944	5,092	5,245	4,944	5,092
20	Administrative support/supervision	3.0%		9,840	10,135	10,439	10,752	10,135	10,439
	Labor Costs Total			542,622	558,901	575,669	592,939	558,901	575,669
21	**Power Costs**								
22	Treatment Plant/Raw Water Pump Station								
23	Annual costs at 6 mgd	3.0%		478,772	493,135	507,929	523,167	493,135	507,929
24	Booster Station								
25	Annual costs at 6 mgd	3.0%		109,388	112,670	116,050	119,531	112,670	116,050
26	**Power Costs Total**			588,159	605,805	623,979	642,698	605,805	623,979
27	**General Maintenance**								
28	Transmission Mains								
29	Valve Operations/Signs & Markers/Transportation	3.0%		60,000	61,800	63,654	65,564	61,800	63,654
30	Plant/Booster Station								
31	Repair Parts, Grounds and Sampling	3.0%		300,000	309,000	318,270	327,818	309,000	318,270
32	**General Maintenance Total**			360,000	370,800	381,924	393,382	370,800	381,924
33	**Total Labor, Power & Maintenace**			1,490,781	1,535,506	1,581,572	1,629,019	1,535,506	1,581,572
34	**Property Insurance**	3.0%	(2)				273,224	276,234	279,116
35	**KAW Gross Receipt Tax**	0.0%	(3)				30,695	30,163	29,839
36	**Chemical Costs**	3.0%		153,300	157,899	162,636	167,515	157,899	162,636
37	**Security Monitoring**	3.0%		300,000	309,000	318,270	327,818	309,000	318,270
38	**KRA Withdrawal Fee**	$0.05					109,500	109,500	109,500
39	**Depreciation**		(1)				2,685,567	2,685,567	2,685,567
40	**Property Taxes**	3.0%	(4)				1,034,316	1,045,940	1,057,332
41	**Income Taxes & Sales Taxes**		(5)				4,254,995	4,176,577	4,098,158
42	**Total Annual Operating Expenses**						10,512,649	10,326,386	10,321,990
43	**KAW - Income Before Interest Charges**		(6)				11,147,505	10,942,059	10,736,613
44	**BWSC - Annual Debt Service**		(7)				2,123,347	2,123,347	2,123,347
45	**KAW & BWSC Pool 3 Related Revenue Requirement**						$23,783,501	$23,391,792	$23,181,950
46	**Discounted Value**						$20,251,743	$19,024,070	$18,007,077
47	**Total Discounted Cost**	**$257,401,565**	(8)						
48	**Discount Rate**	**4.700%**	(9)						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
POOL THREE OPTION SHARE

Ln #		Basis %	2013	2014	2015	2016	2017	2018
	Capital Expenditures							
1	**KAW Pool 3 Related Rate Base**							
2	Gross Property Plant & Equipment		$145,719,016	$145,719,016	$145,719,016	$145,719,016	$145,719,016	$145,719,016
3	Accumulated Depreciation		(8,056,701)	(10,742,268)	(13,427,835)	(16,113,402)	(18,798,969)	(21,484,536)
4	**Net Property Plant & Equipment**		$137,662,315	$134,976,748	$132,291,181	$129,605,614	$126,920,047	$124,234,480
5	**BWSC Pool 3 Related Property Plant & Equipment**							
6	Gross Property Plant & Equipment		$36,429,753	$36,429,753	$36,429,753	$36,429,753	$36,429,753	$36,429,753
7	BWSC Issuance Expense	1 00%	364,298	364,298	364,298	364,298	364,298	364,298
8	**Total BWSC Pool 3 Related Debt Capital**		36,794,051	36,794,051	36,794,051	36,794,051	36,794,051	36,794,051
9	BWSC Cumulative Principal Repayment		(1,712,015)	(2,192,081)	(2,694,976)	(3,221,784)	(3,773,643)	(4,351,745)
10	BWSC Ending Amount Outstanding		$35,082,036	$34,601,970	$34,099,075	$33,572,267	$33,020,408	$32,442,306
	Annual Operating Expenses							
11	**Labor Costs**							
12	Supervisor - Salary	3.0%	$60,100	$61,903	$63,760	$65,673	$67,643	$69,672
13	Benefits/Overhead/Taxes	3 0%	39,066	40,238	41,445	42,689	43,970	45,289
14	Operators	3.0%	190,921	196,649	202,549	208,625	214,884	221,330
15	Benefits/Overhead/Taxes	3.0%	124,099	127,822	131,657	135,607	139,676	143,866
16	Maintenance/Relief Operator	3 0%	95,461	98,325	101,275	104,314	107,444	110,668
17	Benefits/Overhead/Taxes	3.0%	62,050	63,911	65,828	67,803	69,837	71,932
18	Water Quality Supervision	3.0%	5,245	5,402	5,564	5,731	5,903	6,080
19	Maintenance Supervision	3 0%	5,245	5,402	5,564	5,731	5,903	6,080
20	Administrative support/supervision	3.0%	10,752	11,075	11,407	11,749	12,101	12,464
	Labor Costs Total		592,939	610,727	629,049	647,922	667,361	687,381
21	**Power Costs**							
22	*Treatment Plant/Raw Water Pump Station*							
23	Annual costs at 6 mgd	3 0%	523,167	538,862	555,028	571,679	588,829	606,494
24	Booster Station							
25	*Annual costs at 6 mgd*	3.0%	119,531	123,117	126,811	130,615	134,534	138,570
26	**Power Costs Total**		642,698	661,979	681,839	702,294	723,363	745,064
27	**General Maintenance**							
28	Transmission Mains							
29	Valve Operations/Signs & Markers/Transportation	3 0%	65,564	67,531	69,557	71,643	73,792	76,006
30	Plant/Booster Station							
31	Repair Parts, Grounds and Sampling	3 0%	327,818	337,653	347,783	358,217	368,963	380,032
32	**General Maintenance Total**		393,382	405,184	417,340	429,860	442,755	456,038
33	**Total Labor, Power & Maintenace**		1,629,019	1,677,890	1,728,228	1,780,076	1,833,479	1,888,483
34	**Property Insurance**	3.0%	282,036	284,801	287,568	290,155	292,709	295,057
35	**KAW Gross Receipt Tax**	0.0%	29,517	29,197	28,878	28,561	28,246	27,932
36	**Chemical Costs**	3.0%	167,515	172,540	177,716	183,047	188,538	194,194
37	**Security Monitoring**	3.0%	327,818	337,653	347,783	358,217	368,963	380,032
38	**KRA Withdrawal Fee**	$0 05	109,500	109,500	109,500	109,500	109,500	109,500
39	**Depreciation**		2,685,567	2,685,567	2,685,567	2,685,567	2,685,567	2,685,567
40	**Property Taxes**	3.0%	1,068,465	1,079,315	1,089,853	1,100,052	1,109,884	1,119,315
41	**Income Taxes & Sales Taxes**		4,019,740	3,941,321	3,862,902	3,784,484	3,706,065	3,627,647
42	**Total Annual Operating Expenses**		10,319,177	10,317,784	10,317,995	10,319,659	10,322,951	10,327,727
43	**KAW - Income Before Interest Charges**		10,531,167	10,325,721	10,120,275	9,914,829	9,709,384	9,503,938
44	**BWSC - Annual Debt Service**		2,123,347	2,123,347	2,123,347	2,123,347	2,123,347	2,123,347
45	**KAW & BWSC Pool 3 Related Revenue Requirement**		$22,973,691	$22,766,852	$22,561,617	$22,357,835	$22,155,682	$21,955,012
46	**Discounted Value**		$17,044,228	$16,132,545	$15,269,451	$14,452,277	$13,678,704	$12,946,335
47	**Total Discounted Cost**	**$257,401,565**						
48	**Discount Rate**	**4.700%**						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
POOL THREE OPTION SHARE

Ln #		Basis %	2019	2020	2021	2022	2023	2024
	Capital Expenditures							
1	**KAW Pool 3 Related Rate Base**							
2	Gross Property Plant & Equipment		$145,719,016	$145,719,016	$145,719,016	$145,719,016	$145,719,016	$145,719,016
3	*Accumulated Depreciation*		(24,170,103)	(26,855,670)	(29,541,237)	(32,226,804)	(34,912,371)	(37,597,938)
4	**Net Property Plant & Equipment**		$121,548,913	$118,863,346	$116,177,779	$113,492,212	$110,806,645	$108,121,078
5	**BWSC Pool 3 Related Property Plant & Equipment**							
6	Gross Property Plant & Equipment		$36,429,753	$36,429,753	$36,429,753	$36,429,753	$36,429,753	$36,429,753
7	BWSC Issuance Expense	1.00%	364,298	364,298	364,298	364,298	364,298	364,298
8	**Total BWSC Pool 3 Related Debt Capital**		36,794,051	36,794,051	36,794,051	36,794,051	36,794,051	36,794,051
9	BWSC Cumulative Principal Repayment		(4,957,336)	(5,591,725)	(6,256,280)	(6,952,436)	(7,681,697)	(8,445,635)
10	BWSC Ending Amount Outstanding		$31,836,715	$31,202,326	$30,537,771	$29,841,615	$29,112,354	$28,348,416
	Annual Operating Expenses							
11	**Labor Costs**							
12	Supervisor - Salary	3.0%	$71,762	$73,915	$76,133	$78,417	$80,770	$83,193
13	Benefits/Overhead/Taxes	3.0%	46,648	48,048	49,489	50,974	52,503	54,078
14	Operators	3.0%	227,970	234,809	241,853	249,108	256,582	264,280
15	Benefits/Overhead/Taxes	3.0%	148,182	152,627	157,206	161,922	166,780	171,784
16	Maintenance/Relief Operator	3.0%	113,988	117,408	120,930	124,558	128,294	132,143
17	Benefits/Overhead/Taxes	3.0%	74,090	76,313	78,603	80,961	83,390	85,891
18	Water Quality Supervision	3.0%	6,262	6,450	6,644	6,843	7,048	7,259
19	Maintenance Supervision	3.0%	6,262	6,450	6,644	6,843	7,048	7,259
20	Administrative support/supervision	3.0%	12,838	13,223	13,620	14,029	14,450	14,884
	Labor Costs Total		708,002	729,243	751,122	773,655	796,865	820,771
21	***Power Costs***							
22	Treatment Plant/Raw Water Pump Station							
23	Annual costs at 6 mgd	3.0%	624,689	643,430	662,733	682,615	703,094	724,187
24	Booster Station							
25	Annual costs at 6 mgd	3.0%	142,727	147,008	151,418	155,960	160,639	165,458
26	**Power Costs Total**		767,416	790,438	814,151	838,575	863,733	889,645
27	**General Maintenance**							
28	Transmission Mains							
29	Valve Operations/Signs & *Markers/Transportation*	3.0%	78,286	80,635	83,054	85,545	88,111	90,755
30	Plant/Booster Station							
31	Repair Parts, Grounds and Sampling	3.0%	391,433	403,176	415,271	427,729	440,560	453,776
32	**General Maintenance Total**		469,719	483,811	498,325	513,274	528,671	544,531
33	**Total Labor, Power & Maintenace**		1,945,137	2,003,492	2,063,598	2,125,504	2,189,269	2,254,947
34	**Property Insurance**	3.0%	297,339	299,536	301,481	303,308	304,995	306,524
35	**KAW Gross Receipt Tax**	0.0%	27,620	27,310	27,002	26,695	26,390	26,087
36	**Chemical Costs**	3.0%	200,020	206,021	212,202	218,568	225,125	231,879
37	**Security Monitoring**	3.0%	391,433	403,176	415,271	427,729	440,560	453,776
38	**KRA Withdrawal Fee**	$0.05	109,500	109,500	109,500	109,500	109,500	109,500
39	**Depreciation**		2,685,567	2,685,567	2,685,567	2,685,567	2,685,567	2,685,567
40	**Property Taxes**	3.0%	1,128,312	1,136,842	1,144,868	1,152,353	1,159,257	1,165,537
41	**Income Taxes & Sales Taxes**		3,549,228	3,470,810	3,392,391	3,313,973	3,235,554	3,157,135
42	**Total Annual Operating Expenses**		10,334,156	10,342,254	10,351,880	10,363,197	10,376,217	10,390,952
43	**KAW - Income Before Interest Charges**		9,298,492	9,093,046	8,887,600	8,682,154	8,476,708	8,271,262
44	***BWSC - Annual Debt Service***		2,123,347	2,123,347	2,123,347	2,123,347	2,123,347	2,123,347
45	**KAW & BWSC Pool 3 Related Revenue Requirement**		$21,755,995	$21,558,647	$21,362,827	$21,168,698	$20,976,272	$20,785,561
46	**Discounted Value**		$12,253,085	$11,596,884	$10,975,690	$10,387,728	$9,831,235	$9,304,538
47	**Total Discounted Cost**	**$257,401,565**						
48	**Discount Rate**	**4.700%**						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
POOL THREE OPTION SHARE

Ln #		Basis %	2025	2026	2027	2028	2029	2030
	Capital Expenditures							
1.	**KAW Pool 3 Related Rate Base**							
2.	Gross Property Plant & Equipment		$145,719,016	$145,719,016	$145,719,016	$145,719,016	$145,719,016	$145,719,016
3.	Accumulated Depreciation		(40,283,505)	(42,969,072)	(45,654,639)	(48,340,206)	(51,025,773)	(53,711,340)
4.	**Net Property Plant & Equipment**		$105,435,511	$102,749,944	$100,064,377	$97,378,810	$94,693,243	$92,007,676
5.	**BWSC Pool 3 Related Property Plant & Equipment**							
6.	Gross Property Plant & Equipment		$36,429,753	$36,429,753	$36,429,753	$36,429,753	$36,429,753	$36,429,753
7.	BWSC Issuance Expense	1.00%	364,298	364,298	364,298	364,298	364,298	364,298
8.	**Total BWSC Pool 3 Related Debt Capital**		36,794,051	36,794,051	36,794,051	36,794,051	36,794,051	36,794,051
9.	BWSC Cumulative Principal Repayment		(9,245,900)	(10,084,219)	(10,962,403)	(11,882,346)	(12,846,034)	(13,855,548)
10.	BWSC Ending Amount Outstanding		$27,548,151	$26,709,832	$25,831,648	$24,911,705	$23,948,017	$22,938,503
	Annual Operating Expenses							
11.	**Labor Costs**							
12.	Supervisor - Salary	3.0%	$85,689	$88,259	$90,907	$93,635	$96,444	$99,338
13.	Benefits/Overhead/Taxes	3.0%	55,700	57,371	59,092	60,865	62,691	64,572
14.	Operators	3.0%	272,209	280,375	288,786	297,450	306,374	315,565
15.	Benefits/Overhead/Taxes	3.0%	176,938	182,246	187,714	193,345	199,145	205,119
16.	Maintenance/Relief Operator	3.0%	136,107	140,191	144,397	148,729	153,190	157,786
17.	Benefits/Overhead/Taxes	3.0%	88,467	91,121	93,855	96,670	99,570	102,557
18.	Water Quality Supervision	3.0%	7,477	7,701	7,932	8,170	8,415	8,667
19.	Maintenance Supervision	3.0%	7,477	7,701	7,932	8,170	8,415	8,667
20.	Administrative support/supervision	3.0%	15,331	15,791	16,265	16,753	17,256	17,774
	Labor Costs Total		845,395	870,756	896,880	923,787	951,500	980,045
21.	**Power Costs**							
22.	Treatment Plant/Raw Water Pump Station							
23.	Annual costs at 6 mgd	3.0%	745,912	768,289	791,338	815,078	839,530	864,716
24.	Booster Station							
25.	Annual costs at 6 mgd	3.0%	170,422	175,535	180,801	186,225	191,811	197,565
26.	**Power Costs Total**		916,334	943,824	972,139	1,001,303	1,031,341	1,062,281
27.	**General Maintenance**							
28.	Transmission Mains							
29.	Valve Operations/Signs & Markers/Transportation	3.0%	93,478	96,282	99,171	102,146	105,210	108,366
30.	Plant/Booster Station							
31.	Repair Parts, Grounds and Sampling	3.0%	467,390	481,411	495,853	510,728	526,049	541,830
32.	**General Maintenance Total**		560,868	577,693	595,024	612,874	631,259	650,196
33.	**Total Labor, Power & Maintenace**		2,322,597	2,392,273	2,464,043	2,537,964	2,614,100	2,692,522
34.	**Property Insurance**	3.0%	307,871	309,020	309,950	310,639	311,186	311,446
35.	**KAW Gross Receipt Tax**	0.0%	25,785	25,486	25,188	24,892	24,597	24,305
36.	**Chemical Costs**	3.0%	238,835	246,000	253,380	260,981	268,811	276,876
37.	**Security Monitoring**	3.0%	467,390	481,411	495,853	510,728	526,049	541,830
38.	**KRA Withdrawal Fee**	$0.05	109,500	109,500	109,500	109,500	109,500	109,500
39.	**Depreciation**		2,685,567	2,685,567	2,685,567	2,685,567	2,685,567	2,685,567
40.	**Property Taxes**	3.0%	1,171,152	1,176,053	1,180,195	1,183,528	1,185,997	1,187,550
41.	**Income Taxes & Sales Taxes**		3,078,717	3,000,298	2,921,880	2,843,461	2,765,043	2,686,624
42.	**Total Annual Operating Expenses**		10,407,414	10,425,608	10,445,556	10,467,260	10,490,850	10,516,220
43.	**KAW - Income Before Interest Charges**		8,065,817	7,860,371	7,654,925	7,449,479	7,244,033	7,038,587
44.	**BWSC - Annual Debt Service**		2,123,347	2,123,347	2,123,347	2,123,347	2,123,347	2,123,347
45.	**KAW & BWSC Pool 3 Related Revenue Requirement**		$20,596,578	$20,409,326	$20,223,828	$20,040,086	$19,858,230	$19,678,154
46.	**Discounted Value**		$8,806,056	$8,334,285	$7,887,809	$7,465,277	$7,065,456	$6,687,093
47.	***Total Discounted Cost***	**$257,401,565**						
48.	**Discount Rate**	**4.700%**						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
POOL THREE OPTION SHARE

Notes: (1) From Schedule 1.

(2) Property insurance is based on 0.15% of net property, plant & equipment.

(3) KAW's gross receipt tax based on 0.1454% of net revenue.

(4) Property taxes are based on KAW's net original cost of capital assets.

(5) Income taxes & sales taxes are based on the gross up factor found in Case No. 2004 - 00103

(6) KAW's income before interest charges is based on their pro forma overall rate of return multiplied by their Pool 3 net capital assets. Their pro forma overall rate of return is based on their overall rate of return determined in Case No. 2004 - 00103 adjusted for the capital requirements of Pool 3. Their Pool 3 capital assets are assumed to be financed with 60% long term debt and 40% common equity. See page 1 of Schedule 6 for the development.

(7) BWSC's annual debt service is based on their total capital requirements shown on line 8 and the assumptions listed on Schedule 3.

(8) The total discounted cost for Pool 3 is the sum of the discounted revenue requirement show on line 46.

(9) The discount rate is based upon the rate used in the R.W. Beck Report.

Source of information: Company provided and the R.W. Beck Report.

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
PUBLIC/PRIVATE OWNERSHIP - LWC "SECTION 2" PIPELINE OPTION

Ln #		Basis %	Notes	2007	2008	2009	2010	2011	2012
	Capital Expenditures								
1	**KAW Share of Ownership of LWC Pipeline "Section 2" Related Rate Base**								
2	Gross Property Plant & Equipment		(1)				$105,832,870	$105,832,870	$105,832,870
3	Accumulated Depreciation		(1)				0	(1,764,219)	(3,528,438)
4	**Net Property Plant & Equipment**						$105,832,870	$104,068,651	$102,304,432
5	**BWSC Share of Ownership of LWC Pipeline "Section 2" Related Property Plant & Equipment**								
6	Gross Property Plant & Equipment		(1)				$26,458,218	$26,458,218	$26,458,218
7	BWSC Issuance Expense	1.00%					264,582	264,582	264,582
8	**Total BWSC Share of Ownership of LWC Pipeline "Section 2" Related Debt Capital**						26,722,800	26,722,800	26,722,800
9	BWSC Cumulative Principal Repayment						(398,656)	(816,269)	(1,253,741)
10	BWSC Ending Amount Outstanding						$26,324,144	$25,906,531	$25,469,059
11	**LWC Pipeline "Section 1" Related Property Plant & Equipment**						$0	$0	$0
12	**LWC Expanded Treatment Requirements Arising from "Section 1" and "Section 2" Sales**						$0	$0	$0
13	**Grand Total Section 1 and Section 2 Related Capital Requirements**						$132,157,014	$129,975,182	$127,773,491
14	***KAW & BWSC "Section 2" Related - Annual Operating Expenses***								
15	**Labor Costs**								
16	Supervisor - Salary	3.0%		$0	$0	$0	$0	$0	$0
17	Benefits/Overhead/Taxes	3.0%		0	0	0	0	0	0
18	Operators	3.0%		0	0	0	0	0	0
19	Benefits/Overhead/Taxes	3.0%		0	0	0	0	0	0
20	Maintenance/Relief Operator	3.0%		0	0	0	0	0	0
21	Benefits/Overhead/Taxes	3.0%		0	0	0	0	0	0
22	Water Quality Supervision	3.0%		0	0	0	0	0	0
23	Maintenance Supervision	3.0%		0	0	0	0	0	0
24	Administrative support/supervision	3.0%		0	0	0	0	0	0
25	**Labor Costs Total**			$0	$0	$0	$0	$0	$0
26	**Power Costs**								
27	Booster Stations								
28	Annual costs at 12.5 mgd	3.0%		$328,548	$338,404	$348,556	$359,013	$369,783	$380,876
29	**Power Costs Total**			$328,548	$338,404	$348,556	$359,013	$369,783	$380,876
30	**General Maintenance**								
31	Transmission Mains								
32	Valve Operations/Signs & Markers/Transportation	3.0%		$85,000	$87,550	$90,177	$92,882	$95,668	$98,538
33	Booster Stations								
34	Repair Parts, Grounds and Maintenance	3.0%		0	0	0	0	0	0
35	**General Maintenance Total**			$85,000	$87,550	$90,177	$92,882	$95,668	$98,538
36	**Meter Charges**								
37	Annual costs at 20 mgd capacity - KAW	3.0%	(2)	$33,900	$34,917	$35,965	$37,044	$38,155	$39,300
38	Annual costs at 5 mgd capacity - BWSC	3.0%	(2)	8,475	8,729	8,991	9,261	9,539	9,825
39	**Meter Charges Total**			$42,375	$43,646	$44,956	$46,305	$47,694	$49,125
40	**Wholesale Water Charges**	3.0%							
41	20 mgd capacity & 10 mgd take-or-pay - KAW		(3)	$6,241,500	$6,241,500	$6,241,500	$6,241,500	$6,241,500	$6,241,500
42	5 mgd capacity & 2.5 mgd take-or-pay - BWSC		(3)	1,560,375	1,560,375	1,560,375	1,560,375	1,560,375	1,560,375
43	**Wholesale Water Charges Total**			$7,801,875	$7,801,875	$7,801,875	$7,801,875	$7,801,875	$7,801,875
44	**Total Labor, Power, Maintenance, Meter & Wholesale Charges**			$8,257,798	$8,271,475	$8,285,564	$8,300,075	$8,315,020	$8,330,414
45	**Property Insurance**	3.0%	(4)	0	0	0	198,437	200,983	203,458
46	**KAW Gross Receipt Tax**	0.0%	(5)	0	0	0	29,979	29,739	29,499
47	**Chemical Costs**	3.0%		0	0	0	0	0	0
48	**Security Monitoring**	3.0%		0	0	0	0	0	0
49	**KRA Withdrawal Fee**						0	0	0
50	**Depreciation**		(1)				1,764,219	1,764,219	1,764,219
51	**Property Taxes**	3.0%	(6)				890,911	902,366	913,704
52	**Income Taxes & Other Taxes**		(7)				3,280,057	3,225,379	3,170,701
53	**Total Annual Operating Expenses**						14,463,678	14,437,706	14,411,995
54	**KAW - Income Before Interest Charges**		(8)				8,043,298	7,909,217	7,775,137
55	**BWSC - Annual Debt Service**		(9)				1,542,145	1,542,145	1,542,145
56	**KAW & BSWC Ownership of Pipeline "Section 2" Related Revenue Requirement**						$24,049,121	$23,889,068	$23,729,277
57	**Discounted Value**						$20,477,919	$19,428,494	$18,432,225
58	**Total Discounted Cost**	**$311,598,084**	(10)						
59	**Discount Rate**	**4.700%**	(11)						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
PUBLIC/PRIVATE OWNERSHIP - LWC "SECTION 2" PIPELINE OPTION

Ln #		Basis %	2013	2014	2015	2016	2017	2018
	Capital Expenditures							
1	**KAW Share of Ownership of LWC Pipeline "Section 2" Related Rate Base**							
2	Gross Property Plant & Equipment		$105,832,870	$105,832,870	$105,832,870	$105,832,870	$105,832,870	$105,832,870
3	*Accumulated Depreciation*		(5,292,657)	(7,056,876)	(8,821,095)	(10,585,314)	(12,349,533)	(14,113,752)
4	**Net Property Plant & Equipment**		$100,540,213	$98,775,994	$97,011,775	$95,247,556	$93,483,337	$91,719,118
5	**BWSC Share of Ownership of LWC Pipeline "Section 2" Related Property Plant & Eq**							
6	Gross Property Plant & Equipment		$26,458,218	$26,458,218	$26,458,218	$26,458,218	$26,458,218	$26,458,218
7	BWSC Issuance Expense	1.00%	264,582	264,582	264,582	264,582	264,582	264,582
8	**Total BWSC Share of Ownership of LWC Pipeline "Section 2" Related Debt Cap**		26,722,800	26,722,800	26,722,800	26,722,800	26,722,800	26,722,800
9	BWSC Cumulative Principal Repayment		(1,712,015)	(2,192,081)	(2,694,976)	(3,221,784)	(3,773,643)	(4,351,745)
10	BWSC Ending Amount Outstanding		$25,010,785	$24,530,718	$24,027,824	$23,501,016	$22,949,156	$22,371,055
11	**LWC Pipeline "Section 1" Related Property Plant & Equipment**		$0	$0	$0	$0	$0	$0
12	**LWC Expanded Treatment Requirements Arising from "Section 1" and "Section 2" Sal**		$0	$0	$0	$0	$0	$0
13	**Grand Total Section 1 and Section 2 Related Capital Requirements**		$125,550,998	$123,306,712	$121,039,599	$118,748,572	$116,432,493	$114,090,173
14	**KAW & BWSC "Section 2" Related - Annual Operating Expenses**							
15	**Labor Costs**							
16	Supervisor - Salary	3.0%	$0	$0	$0	$0	$0	$0
17	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
18	Operators	3.0%	0	0	0	0	0	0
19	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
20	Maintenance/Relief Operator	3.0%	0	0	0	0	0	0
21	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
22	Water Quality Supervision	3.0%	0	0	0	0	0	0
23	Maintenance Supervision	3.0%	0	0	0	0	0	0
24	Administrative support/supervision	3.0%	0	0	0	0	0	0
25	**Labor Costs Total**		$0	$0	$0	$0	$0	$0
26	**Power Costs**							
27	Booster Stations							
28	Annual costs at 12.5 mgd	3.0%	$392,302	$404,071	$416,193	$428,679	$441,539	$454,785
29	**Power Costs Total**		$392,302	$404,071	$416,193	$428,679	$441,539	$454,785
30	**General Maintenance**							
31	Transmission Mains							
32	Valve Operations/Signs & Markers/Transportation	3.0%	$101,494	$104,539	$107,675	$110,905	$114,232	$117,659
33	Booster Stations							
34	Repair Parts, Grounds and Maintenance	3.0%	0	0	0	0	0	0
35	**General Maintenance Total**		$101,494	$104,539	$107,675	$110,905	$114,232	$117,659
36	**Meter Charges**							
37	Annual costs at 20 mgd capacity - KAW	3.0%	$40,479	$41,693	$42,944	$44,232	$45,559	$46,926
38	Annual costs at 5 mgd capacity - BWSC	3.0%	10,120	10,424	10,737	11,059	11,391	11,733
39	**Meter Charges Total**		$50,599	$52,117	$53,681	$55,291	$56,950	$58,659
40	**Wholesale Water Charges**	3.0%						
41	20 mgd capacity & 10 mgd take-or-pay - KAW		$6,241,500	$6,241,500	$6,241,500	$8,143,741	$8,550,928	$8,978,474
42	5 mgd capacity & 2.5 mgd take-or-pay - BWSC		1,560,375	1,560,375	1,560,375	2,035,935	2,137,732	2,244,619
43	**Wholesale Water Charges Total**		$7,801,875	$7,801,875	$7,801,875	$10,179,676	$10,688,660	$11,223,093
44	**Total Labor, Power, Maintenance, Meter & Wholesale Charges**		$8,346,270	$8,362,602	$8,379,424	$10,774,551	$11,301,381	$11,854,196
45	**Property Insurance**	3.0%	205,982	208,417	210,879	213,235	215,596	217,833
46	**KAW Gross Receipt Tax**	0.0%	29,259	29,020	28,781	31,308	31,661	32,045
47	**Chemical Costs**	3.0%	0	0	0	0	0	0
48	**Security Monitoring**	3.0%	0	0	0	0	0	0
49	**KRA Withdrawal Fee**		0	0	0	0	0	0
50	**Depreciation**		1,764,219	1,764,219	1,764,219	1,764,219	1,764,219	1,764,219
51	**Property Taxes**	3.0%	924,912	935,968	946,858	957,557	968,047	978,303
52	**Income Taxes & Other Taxes**		3,116,023	3,061,345	3,006,667	2,951,988	2,897,311	2,842,632
53	**Total Annual Operating Expenses**		14,386,665	14,361,571	14,336,828	16,692,858	17,178,215	17,689,228
54	**KAW - Income Before Interest Charges**		7,641,056	7,506,976	7,372,895	7,238,814	7,104,734	6,970,653
55	**BWSC - Annual Debt Service**		1,542,145	1,542,145	1,542,145	1,542,145	1,542,145	1,542,145
56	**KAW & BSWC Ownership of Pipeline "Section 2" Related Revenue Requirement**		$23,569,866	$23,410,692	$23,251,868	$25,473,817	$25,825,094	$26,202,026
57	**Discounted Value**		$17,486,532	$16,588,768	$15,736,605	$16,466,472	$15,944,164	$15,450,696
58	**Total Discounted Cost**	**$311,598,084**						
59	**Discount Rate**	**4.700%**						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
PUBLIC/PRIVATE OWNERSHIP - LWC "SECTION 2" PIPELINE OPTION

Ln #		Basis %	2019	2020	2021	2022	2023	2024
	Capital Expenditures							
1	**KAW Share of Ownership of LWC Pipeline "Section 2" Related Rate Base**							
2	Gross Property Plant & Equipment		$105,832,870	$105,832,870	$105,832,870	$105,832,870	$105,832,870	$105,832,870
3	Accumulated Depreciation		(15,877,971)	(17,642,190)	(19,406,409)	(21,170,628)	(22,934,847)	(24,699,066)
4	**Net Property Plant & Equipment**		$89,954,899	$88,190,680	$86,426,461	$84,662,242	$82,898,023	$81,133,804
5	**BWSC Share of Ownership of LWC Pipeline "Section 2" Related Property Plant & Eq**							
6	Gross Property Plant & Equipment		$26,458,218	$26,458,218	$26,458,218	$26,458,218	$26,458,218	$26,458,218
7	BWSC Issuance Expense	1.00%	264,582	264,582	264,582	264,582	264,582	264,582
8	**Total BWSC Share of Ownership of LWC Pipeline "Section 2" Related Debt Cap**		26,722,800	26,722,800	26,722,800	26,722,800	26,722,800	26,722,800
9	BWSC Cumulative Principal Repayment		(4,957,336)	(5,591,725)	(6,256,280)	(6,952,436)	(7,681,697)	(8,445,635)
10	BWSC Ending Amount Outstanding		$21,765,464	$21,131,075	$20,466,520	$19,770,363	$19,041,103	$18,277,165
11	**LWC Pipeline "Section 1" Related Property Plant & Equipment**		$0	$0	$0	$0	$0	$0
12	**LWC Expanded Treatment Requirements Arising from "Section 1" and "Section 2" Sal**		$0	$0	$0	$0	$0	$0
13	**Grand Total Section 1 and Section 2 Related Capital Requirements**		$111,720,363	$109,321,755	$106,892,981	$104,432,605	$101,939,126	$99,410,969
14	**KAW & BWSC "Section 2" Related - Annual Operating Expenses**							
15	**Labor Costs**							
16	Supervisor - Salary	3.0%	$0	$0	$0	$0	$0	$0
17	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
18	Operators	3.0%	0	0	0	0	0	0
19	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
20	Maintenance/Relief Operator	3.0%	0	0	0	0	0	0
21	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
22	Water Quality Supervision	3.0%	0	0	0	0	0	0
23	Maintenance Supervision	3.0%	0	0	0	0	0	0
24	Administrative support/supervision	3.0%	0	0	0	0	0	0
25	**Labor Costs Total**		$0	$0	$0	$0	$0	$0
26	**Power Costs**							
27	Booster Stations							
28	Annual costs at 12.5 mgd	3.0%	$468,429	$482,482	$496,956	$511,865	$527,221	$543,038
29	**Power Costs Total**		$468,429	$482,482	$496,956	$511,865	$527,221	$543,038
30	**General Maintenance**							
31	Transmission Mains							
32	Valve Operations/Signs & Markers/Transportation	3.0%	$121,189	$124,825	$128,570	$132,427	$136,400	$140,492
33	Booster Stations							
34	Repair Parts, Grounds and Maintenance	3.0%	0	0	0	0	0	0
35	**General Maintenance Total**		$121,189	$124,825	$128,570	$132,427	$136,400	$140,492
36	**Meter Charges**							
37	Annual costs at 20 mgd capacity - KAW	3.0%	$48,334	$49,784	$51,278	$52,816	$54,400	$56,032
38	Annual costs at 5 mgd capacity - BWSC	3.0%	12,085	12,448	12,821	13,206	13,602	14,010
39	**Meter Charges Total**		$60,419	$62,232	$64,099	$66,022	$68,002	$70,042
40	**Wholesale Water Charges**	3.0%						
41	20 mgd capacity & 10 mgd take-or-pay - KAW		$9,427,398	$9,898,768	$10,393,706	$10,913,391	$11,459,061	$12,032,014
42	5 mgd capacity & 2.5 mgd take-or-pay - BWSC		2,356,850	2,474,693	2,598,428	2,728,349	2,864,766	3,008,004
43	**Wholesale Water Charges Total**		$11,784,248	$12,373,461	$12,992,134	$13,641,740	$14,323,827	$15,040,018
44	**Total Labor, Power, Maintenance, Meter & Wholesale Charges**		$12,434,285	$13,043,000	$13,681,759	$14,352,054	$15,055,450	$15,793,590
45	**Property Insurance**	3.0%	220,052	222,240	224,277	226,260	228,177	230,014
46	**KAW Gross Receipt Tax**	0.0%	32,460	32,908	33,390	33,908	34,465	35,061
47	**Chemical Costs**	3.0%	0	0	0	0	0	0
48	**Security Monitoring**	3.0%	0	0	0	0	0	0
49	**KRA Withdrawal Fee**		0	0	0	0	0	0
50	**Depreciation**		1,764,219	1,764,219	1,764,219	1,764,219	1,764,219	1,764,219
51	**Property Taxes**	3.0%	988,305	998,025	1,007,440	1,016,521	1,025,240	1,033,568
52	**Income Taxes & Other Taxes**		2,787,954	2,733,276	2,678,598	2,623,920	2,569,242	2,514,564
53	**Total Annual Operating Expenses**		18,227,275	18,793,668	19,389,683	20,016,882	20,676,793	21,371,016
54	**KAW - Income Before Interest Charges**		6,836,572	6,702,492	6,568,411	6,434,330	6,300,250	6,166,169
55	**BWSC - Annual Debt Service**		1,542,145	1,542,145	1,542,145	1,542,145	1,542,145	1,542,145
56	**KAW & BSWC Ownership of Pipeline "Section 2" Related Revenue Requirement**		$26,605,992	$27,038,305	$27,500,239	$27,993,357	$28,519,188	$29,079,330
57	**Discounted Value**		$14,984,627	$14,544,516	$14,128,940	$13,736,668	$13,366,476	$13,017,197
58	**Total Discounted Cost**	**$311,598,084**						
59	**Discount Rate**	**4.700%**						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
PUBLIC/PRIVATE OWNERSHIP - LWC "SECTION 2" PIPELINE OPTION

Ln #		Basis %	2025	2026	2027	2028	2029	2030
	Capital Expenditures							
1	**KAW Share of Ownership of LWC Pipeline "Section 2" Related Rate Base**							
2	Gross Property Plant & Equipment		$105,832,870	$105,832,870	$105,832,870	$105,832,870	$105,832,870	$105,832,870
3	Accumulated Depreciation		(26,463,285)	(28,227,504)	(29,991,723)	(31,755,942)	(33,520,161)	(35,284,380)
4	**Net Property Plant & Equipment**		$79,369,585	$77,605,366	$75,841,147	$74,076,928	$72,312,709	$70,548,490
5	**BWSC Share of Ownership of LWC Pipeline "Section 2" Related Property Plant & Eq**							
6	Gross Property Plant & Equipment		$26,458,218	$26,458,218	$26,458,218	$26,458,218	$26,458,218	$26,458,218
7	BWSC Issuance Expense	1.00%	264,582	264,582	264,582	264,582	264,582	264,582
8	**Total BWSC Share of Ownership of LWC Pipeline "Section 2" Related Debt Cap**		26,722,800	26,722,800	26,722,800	26,722,800	26,722,800	26,722,800
9	BWSC Cumulative Principal Repayment		(9,245,900)	(10,084,219)	(10,962,403)	(11,882,346)	(12,846,034)	(13,855,548)
10	BWSC Ending Amount Outstanding		$17,476,900	$16,638,581	$15,760,397	$14,840,454	$13,876,766	$12,867,252
11	**LWC Pipeline "Section 1" Related Property Plant & Equipment**		$0	$0	$0	$0	$0	$0
12	***LWC Expanded Treatment Requirements Arising from* "Section 1" and "Section 2" Sal**		$0	$0	$0	$0	$0	$0
13	**Grand Total Section 1 and Section 2 Related Capital Requirements**		$96,846,485	$94,243,947	$91,601,544	$88,917,382	$86,189,475	$83,415,742
14	**KAW & BWSC "Section 2" Related - Annual Operating Expenses**							
15	**Labor Costs**							
16	Supervisor - Salary	3.0%	$0	$0	$0	$0	$0	$0
17	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
18	Operators	3.0%	0	0	0	0	0	0
19	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
20	Maintenance/Relief Operator	3.0%	0	0	0	0	0	0
21	Benefits/Overhead/Taxes	3.0%	0	0	0	0	0	0
22	Water Quality Supervision	3.0%	0	0	0	0	0	0
23	Maintenance Supervision	3.0%	0	0	0	0	0	0
24	Administrative support/supervision	3.0%	0	0	0	0	0	0
25	**Labor Costs Total**		$0	$0	$0	$0	$0	$0
26	**Power Costs**							
27	Booster Stations							
28	Annual costs at 12.5 mgd	3.0%	$559,329	$576,109	$593,392	$611,194	$629,530	$648,416
29	**Power Costs Total**		$559,329	$576,109	$593,392	$611,194	$629,530	$648,416
30	**General Maintenance**							
31	Transmission Mains							
32	Valve Operations/Signs & Markers/Transportation	3.0%	$144,707	$149,048	$153,519	$158,125	$162,869	$167,755
33	Booster Stations							
34	Repair Parts, Grounds and Maintenance	3.0%	0	0	0	0	0	0
35	**General Maintenance Total**		$144,707	$149,048	$153,519	$158,125	$162,869	$167,755
36	**Meter Charges**							
37	Annual costs at 20 mgd capacity - KAW	3.0%	$57,713	$59,444	$61,227	$63,064	$64,956	$66,905
38	Annual costs at 5 mgd capacity - BWSC	3.0%	14,430	14,863	15,309	15,768	16,241	16,728
39	**Meter Charges Total**		$72,143	$74,307	$76,536	$78,832	$81,197	$83,633
40	**Wholesale Water Charges**	3.0%						
41	20 mgd capacity & 10 mgd take-or-pay - KAW		$12,633,615	$13,265,296	$13,928,561	$14,624,989	$15,356,238	$16,124,050
42	5 mgd capacity & 2.5 mgd take-or-pay - BWSC		3,158,404	3,316,324	3,482,140	3,656,247	3,839,059	4,031,012
43	**Wholesale Water Charges Total**		$15,792,019	$16,581,620	$17,410,701	$18,281,236	$19,195,297	$20,155,062
44	**Total Labor, Power, Maintenance, Meter & Wholesale Charges**		$16,568,198	$17,381,084	$18,234,148	$19,129,387	$20,068,893	$21,054,866
45	**Property Insurance**	3.0%	231,759	233,398	234,918	236,305	237,638	238,807
46	***KAW Gross Receipt Tax***	0.0%	35,699	36,381	37,109	37,885	38,712	39,592
47	**Chemical Costs**	3.0%	0	0	0	0	0	0
48	**Security Monitoring**	3.0%	0	0	0	0	0	0
49	***KRA Withdrawal Fee***		0	0	0	0	0	0
50	**Depreciation**		1,764,219	1,764,219	1,764,219	1,764,219	1,764,219	1,764,219
51	**Property Taxes**	3.0%	1,041,472	1,048,921	1,055,880	1,062,311	1,068,179	1,073,442
52	***Income Taxes & Other Taxes***		2,459,885	2,405,208	2,350,529	2,295,852	2,241,173	2,186,495
53	**Total Annual Operating Expenses**		22,101,232	22,869,211	23,676,803	24,525,959	25,418,814	26,357,421
54	***KAW - Income Before Interest Charges***		6,032,088	5,898,008	5,763,927	5,629,847	5,495,766	5,361,685
55	**BWSC - Annual Debt Service**		1,542,145	1,542,145	1,542,145	1,542,145	1,542,145	1,542,145
56	***KAW & BSWC Ownership of Pipeline* "Section 2" Related Revenue Requirement**		$29,675,465	$30,309,364	$30,982,875	$31,697,951	$32,456,725	$33,261,251
57	**Discounted Value**		$12,687,730	$12,377,032	$12,084,112	$11,808,032	$11,547,936	$11,302,944
58	**Total Discounted Cost**	**$311,598,084**						
59	**Discount Rate**	**4.700%**						

Comment: See the last page of this schedule for notes

WATER SUPPLY OPTION ANALYSIS
KENTUCKY AMERICAN WATER COMPANY &
BLUEGRASS WATER SUPPLY COMMISSION
PUBLIC/PRIVATE OWNERSHIP - LWC "SECTION 2" PIPELINE OPTION

Notes: (1) From Schedule 2.
(2) Annualized meter costs are based upon the rates presented in Mr. Heitzman's testimony
(3) Wholesale rate is fixed until 2016 based upon the rates presented in Mr. Heitzman's testimony. In 2016, they increase by the cumulative inflation factor. Post-2016, maximum increase is 2% above inflation.
(4) Property insurance is based on 0.15% of net property, plant & equipment.
(5) KAW's gross receipt tax based on 0.1454% of net revenue
(6) Property taxes are based on KAW's net original cost of capital assets
(7) Income taxes & sales taxes are based on the gross up factor found in Case No. 2004 - 00103
(8) KAW's income before interest charges is based on their pro forma overall rate of return multiplied by their Section 2 net capital assets. Their pro forma overall rate of return is based on their overall rate of return determined in Case No. 2004 - 00103 adjusted for the capital requirements of Section 2. Their Section 2 capital assets are assumed to be financed with 60% long term debt and 40% common equity. See page 2 of Schedule 6 for the development.
(9) BWSC's annual debt service is based on their total capital requirements shown on line 8 and the assumptions listed on Schedule 3.
(10) The total discounted cost for Section 2 is the sum of the discounted revenue requirement show on line 57.
(11) The discount rate is based upon the rate used in the R.W. Beck Report.

Source of information: Company provided and the R.W. Beck Report.

Kentucky American Water Company
Estimated Cost of Capital Reflecting Pool 3 Capital Requirements

Case No. 2004 - 00103

Cost of Capital Per Oder	Original Cost Rate Base Amount *	Rate Base Related Ratios	Cost Rates	Weighted Cost
Long-Term Debt	$102,703,805	51.388%	6.33%	3.25%
Short-Term Debt	7,334,844	3.670%	2.70%	0.10%
Preferred Stock	7,556,688	3.781%	7.72%	0.29%
Common Equity	82,210,211	41.134%	9.99%	4.11%
TOTALS	$199,859,510	100.00%		7.75%

* - Current 2007 estimated value

KAW Related Pool 3 Financing

KAW Pool 3 Financing	KAW Pool 3 Rate Base Amount	Rate Base Related Ratios	Cost Rates Adjusted for Issuance Expense @ 1.00%
Tax Exempt LT-Debt	$35,000,000	24.019%	4.7475%
Taxable LT-Debt	52,431,410	35.981%	6.5657%
Preferred Stock	0	0.000%	
Common Equity	58,287,606	40.000%	
TOTALS	$145,719,016	100.00%	

Overall Rate of Return Post-KAW Related Pool 3 Financings

Components	Capitalization	Ratios	Cost Rates	Weighted Cost	Pre-Tax Weighted Cost @ 40.780%
Tax Exempt LT-Debt	$35,000,000	10.130%	4.7475%	0.48%	0.480%
Taxable LT-Debt	52,431,410	15.174%	6.5657%	1.00%	1.000%
Long-Term Debt	102,703,805	29.724%	6.3300%	1.88%	1.880%
Short-Term Debt	7,334,844	2.123%	2.7000%	0.06%	0.060%
Preferred Stock	7,556,688	2.187%	7.7200%	0.17%	0.290%
Common Equity	140,497,817	40.662%	9.9917%	4.06%	6.860%
Total Capitalization	$345,524,564	100.000%		7.65%	10.570%

Case No. 2004 - 00103
Per Order

ROR Gross Up Factor	1.68851120
Effective Tax Rate (Income & Sales)	40.78%

Kentucky American Water Company
Estimated Cost of Capital With Public/Private Ownership - LWC "Section 2" Capital Requirements

Case No. 2004 - 00103

Cost of Capital Per Oder	Original Cost Rate Base Amount *	Rate Base Related Ratios	Cost Rates	Weighted Cost
Long-Term Debt	$102,703,805	51.388%	6.33%	3.25%
Short-Term Debt	7,334,844	3.670%	2.70%	0.10%
Preferred Stock	7,556,688	3.781%	7.72%	0.29%
Common Equity	82,210,211	41.134%	9.99%	4.11%
TOTALS	$199,859,510	100.00%		7.75%

* - Current 2007 estimated value

KAW Related Public/Private Ownership - LWC "Section 2" Financing

KAW Pool 3 Financing	KAW Pool 3 Rate Base Amount	Rate Base Related Ratios	Cost Rates Adjusted for Issuance Expense @ 1.00%
Tax Exempt LT-Debt	$35,000,000	33.071%	4.7475%
Taxable LT-Debt	28,499,722	26.929%	6.5657%
Preferred Stock	0	0.000%	
Common Equity	42,333,148	40.000%	
TOTALS	$105,832,870	100.00%	

Overall Rate of Return Post-KAW Related Public/Private Ownership - LWC "Section 2" Financings

Components	Capitalization	Ratios	Cost Rates	Weighted Cost	Pre-Tax Weighted Cost @ 40.780%
Tax Exempt LT-Debt	$35,000,000	11.451%	4.7475%	0.54%	0.540%
Taxable LT-Debt	28,499,722	9.325%	6.5657%	0.61%	0.610%
Long-Term Debt	102,703,805	33.603%	6.3300%	2.13%	2.130%
Short-Term Debt	7,334,844	2.400%	2.7000%	0.06%	0.060%
Preferred Stock	7,556,688	2.472%	7.7200%	0.19%	0.320%
Common Equity	124,543,359	40.749%	9.9917%	4.07%	6.870%
Total Capitalization	$305,638,418	100.000%		7.60%	10.530%

	Case No. 2004 - 00103 Per Order
ROR Gross Up Factor	1.68851120
Effective Tax Rate (Income & Sales)	40.78%

KENTUCKY-AMERICAN WATER COMPANY
CERTIFICATE OF CONVENIENCE AND NECESSITY
FOR KENTUCKY RIVER POOL 3 WATER TREATMENT PLANT
REBUTTAL TESTIMONY
CYRILLE R. WHITSON, CWD, PWS

1. **Q. PLEASE STATE YOUR NAME.**

   A. My name is Cy R. Whitson

2. **Q. WHAT IS YOUR POSITION AND BUSINESS ADDRESS?**

   A. My position title is Senior Environmental Scientist. My employer is Gannett Fleming, Inc. (GF) and we are headquartered at 207 Senate Avenue, Camp Hill, PA 17011.

3. **Q. HOW ARE YOU INVOLVED WITH THIS PROJECT?**

   A. Gannett Fleming has provided Kentucky American Water with engineering and environmental support on this project. My involvement is focused on permitting the proposed project under the Section 401 Water Quality Certification (WQC) and Section 404 processes.

4. **Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND ARE YOU A LICENSED PROFESSIONAL ENGINEER?**

   A. I received a Bachelor of Science in Biology from Albright College in 1983. I received a Master of Science in Watershed Science and Hydrology from Utah State University in 1987. I am a Professional Wetland Scientist registered with the Society of Wetland Scientists, and a Professional Wetland Delineator certified by both the U.S. Army Corps of Engineers and the Commowealth of Virginia. My resume is attached.

5. **Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY BEFORE THIS COMMISSION?**

A. I have not previously provided testimony to the Kentucky Public Service Commission (PSC).

6. Q. WHAT WILL YOU BE ADDRESSING IN YOUR TESTIMONY?

A. My testimony and the attached survey report address the topic of protected species.

GF was contracted by KAW to assist with permitting the project under the Section 401 Water Quality Certification (WQC) process that is managed by the Kentucky Division Of Water (KDOW), and the Section 404 process that is managed by the U.S. Army Corps of Engineers (USACE). We scheduled and attended a pre-application meeting with these agencies in June 2006. Based on the input that we received from the KDOW and USACE, GF performed initial coordination with the KY State Nature Preserve Commission (KSNPC) to determine if there were any protected species known to occur within the project limits. The KDOW and USACE did not request any field surveys for protected species. However, we performed research and field surveys to satisfy the KAW goal of avoiding impacts to protected species. For example, potential adverse environmental consequences of the project alternatives were evaluated by tallying the number of stream crossings each alternative would have in waterbodies with a known population of threatened or endangered species. This approach was discussed with the Kentucky Division of Water at the project's June 2006 pre-application meeting. The alternatives were then ranked based on this evaluation during the completion of the 404(b)(1) Alternatives Analysis.

To avoid and minimize potential impacts to protected species KAW requested that we perform a survey. Surveying a 30-mile project area for all of the threatened and endangered terrestrial species in Kentucky was determined to be impractical, so we developed a protocol that allowed us to focus our surveys on species most likely to be found in the project area, and in habitats of the project area that were most likely to harbor threatened and endangered terrestrial species. Protected plants, birds, and mammals of the project study area were determined through

review of the current KSNPC county reports of threatened and endangered species. From this review, 19 threatened and endangered plant species, six bird species, and two bat species were identified from the four counties of the project study area. From this list of 27 species, threatened and endangered species with known extant populations in the four counties of the project study area were then identified. This resulted in a list of 17 plant species, one bird species, and one bat species.

Habitats of these 19 threatened and endangered species were researched prior to the investigations using regionally specific sources. The project study area contains several different habitats including steep hillsides, fields and pastures, floodplain forests and mowed highway right-of-way. Habitats that were potentially suitable to the 19 threatened and endangered species, and located in counties with known occurrences of the 19 threatened and endangered species, were evaluated within a 50-foot wide area along the proposed pipeline alignment.

The threatened and endangered plants survey focused on habitats of the 17 listed plant species known to occur in the four counties of the project study area. However, all plant species encountered during the surveys were documented, and their status was determined through review of the Kentucky State Nature Preserve Commission's statewide Rare Plants Database. The surveys were performed on-foot by two biologists. The surveys were performed during the flowering periods of the 17 species with known distributions in the four counties of the project study area, with the first survey being performed from May 14 – 17, and the second survey being performed July 17 – 19, 2007.

The threatened and endangered plants surveys were conducted using a modified timed-meander survey technique within each of the habitat segments. Unlike a timed meander survey where search stops after a set amount of time wherein no new species are noted, the surveys were modified to continue until the entire habitat was surveyed. These modifications ensured a complete evaluation of the

habitats suitable to the endangered and threatened plant species of the project study area, and were done in a manner that is repeatable.

Surveys were conducted only in habitats determined as suitable for the threatened and endangered plant species of the project study area. Suitable habitats were determined based on expert references specific to Kentucky. A total of 12 segments, each possessing habitat(s) suitable to at least one of the 17 known threatened and endangered plant species known from the four counties of the project study area, were investigated.

Surveys were not conducted in habitats determined to be unsuitable for the threatened and endangered plant species of the project study area. Unsuitable habitats were determined based on expert references specific to Kentucky and onsite field observations. Habitats were considered unsuitable for a variety of reasons including frequent disturbance or location within a county not known for a specific species.

Color photographs were taken of each surveyed habitat to document site conditions at the times of the surveys. Additional information on the habitats and life history characteristics of the two federally-listed species, Braun's rockcress (*Arabis perstellata*) and running buffalo clover (*Trifolium stoloniferum*), was obtained from NatureServe and the U.S. Fish and Wildlife Service.

The threatened and endangered bird survey focused on one listed bird species, the yellow-crowned night heron (*Nytcanassa violacea*), known to occur in one county of the project study area. The nesting period for the yellow-crowned night heron in Kentucky begins in early May. Two surveys were performed by two biologists during the nesting season in 2007, with the first survey being performed from May 14 – 17, and the second survey being performed July 17 – 19, 2007.

Within the project area, The Kentucky Breeding Bird Atlas (BBA) maps show yellow-crowned night herons with confirmed breeding in northwestern Fayette County. This was reported on the legend as only "one individual or pair observed in block". Surveys were conducted only in habitats determined as suitable for yellow-crowned night heron within the portion of the project study area located in Fayette County, but a windshield survey for suitable yellow-crowned night herons was conducted in the rest of the project area. Suitable habitats were determined based on expert references specific to Kentucky.

The threatened and endangered mammal survey focused on one listed bat species, the gray bat (*Myotis grisescens*), which is known to occur in one county in the project study area. The survey was performed on-foot by two biologists. The survey was performed during the active (or post hibernation) period of the targeted species. The active period for the gray bat in Kentucky begins in late March or early April for females and mid-April to mid-May for adult males and juveniles. The survey was performed from May 14 – 17.

Gray bat colonies are restricted entirely to caves or cave-like habitats. During summer the bats are highly selective for caves providing specific temperature and roost conditions. Usually these caves are all located within a kilometer of a river or reservoir.

Within the project area, the KSNPC indicates that the gray bat is known to occur in Franklin County. The survey for suitable cave habitat within or immediately adjacent to the project study area was conducted only in Franklin County, but a windshield survey was conducted for suitable gray bat habitat in the remainder of the project area. Potential suitable habitats were evaluated based on expert references specific to Kentucky.

The results of our surveys indicated that no threatened or endangered species were located in the project study area. A total of 246 plant species were identified and

none of these were listed by the Kentucky State Nature Preserves Commission as endangered, threatened, or species of concern. A large percentage of these species (33%, n=82) are non-native/exotic. Non-native/exotic species were found in each of the surveyed segments, suggesting that the habitats of the project study area have been disturbed in the past, even those few locations where the proposed pipeline is located beyond the highway right-of-way. In addition, no suitable habitats for the yellow-crowned night heron or gray bat were identified within the project study area. The permitting agencies, KDOW and USACE, did not require or request this work. It was performed at the request of KAW using protocols developed to allow for a thorough and repeatable survey to ensure that impacts to threatened and endangered are avoided and/or minimized to the greatest extent possible.

7. **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

A. Yes.

Name and 255 Title:
Cyrille R. Whitson, CWD, PWS
Project Manager and Senior Environmental Scientist

Years Experience with Firm:
18

Years Experience with Other Firms:
3

Education:
B.S., Biological Sciences, Albright College, 1983
M.S., Watershed Science and Hydrology, Utah State University, 1986
Wetlands Identification and Delineation, 3-day short course, 1989
Hazardous Waste Cleanup Operations, 40-hour course, 1991
Wetland Evaluation Technique (WET) Version 2.0, 4-day short course, 1992
Wetland Mitigation Design, 4-day short course, 1993
Hydrogeomorphic Classification System (HGM), 2-day short course, 1995
Design of Natural Stream Channels, 4-day short course, 1998

Registrations:
Certified Wetland Delineator (CWD), U.S. Army Corps of Engineers, Baltimore District, No. WDCP94MD0310145B (1994)
Professional Wetland Scientist (PWS), Society of Wetland Scientists, No. 1358 (2002)
Certified Professional Wetland Delineator (CPWD), Virginia, No. 3402-000045 (2006)

Current Responsibilities:
Project Manager and Senior Environmental Scientist responsible for managing the Natural Resources Group within the Environmental Planning and Management Section. Directs and performs terrestrial and aquatic ecological studies and wetlands-related projects. Responsibilities include management and performance for wetland delineations and mitigation design; state and federal protected species investigations and agency consultations; aquatic habitat improvement plans; aquatic assessments and stream restoration designs; and coordination of permitting requirements for a variety of clients in the eastern United States. Experienced in developing and presenting training materials and coursework for environmental permitting and construction compliance issues.

Summary of Projects:
Environmental Compliance Training, PA, *Pennsylvania Department of Transportation (PennDOT), Central Office*. Subject Matter Expert responsible for developing and delivering training materials for an 8-hour environmental compliance course for PennDOT personnel statewide. Delivered the materials using PowerPoint and detailed workbooks to more than 240 construction, environmental, and project management personnel throughout the state in 2005 and 2006. The course was developed in conjunction with education specialists at the Dering Consulting Group. The need for the course was identified in a Position Analysis Workbook that was developed by PennDOT construction and inspection personnel in 2004. The course was focused on PADEP Chapter 102 and 105 permitting and U.S. Army Corps of Engineers Section 404 authorizations and compliance during construction activities.

Kentucky River Intake, Water Treatment Plant, and Transmission Main Project, Lexington, KY, *Kentucky American Water (KAW)*. Environmental Manager responsible for development and execution of scope, budget, and schedule for the environmental clearances for this $160M capital improvement

project by KAW. The project included development of a new raw water intake on the Kentucky River Pool No. 3, a raw water pump station, a 20 mgd treatment plant, a 33-mile finished water transmission main, and a tank/booster station. Environmental issues included agency coordination, field surveys, and report preparation for aquatic resources, wetlands, protected species, prehistoric archaeology, historic structures, and floodplains. Developed alternatives analyses and permit application materials for the U.S. Army Corps of Engineers Section 404 permit and the Kentucky Department of Environmental Protection - Division of Water Section 401 Water Quality Certification.

Gilboa Dam Reconstruction Project, Schoharie County, NY, *New York City Department of Environmental Protection.* Senior Environmental Scientist responsible for execution of natural resources technical studies at the Gilboa Dam and Schoharie Reservoir. The first project involved dredge and disposal of 5,000 cubic yards of sediments from within the reservoir. The second project involved the reconstruction of the masonry and cyclopean concrete dam which was constructed in the mid-1920's. The Gilboa Dam and Schoharie Reservoir are key components of the City of New York (west of Hudson) water supply system. Technical studies included surveys for wetlands, vegetation, reptiles and amphibians, bats and other small mammals, fish, mussels, and macro invertebrates. Coordinated the development of permit applications to the New York State Department of Environmental Conservation and the U.S. Army Corps of Engineers, New York District.

Wyoming Valley Inflatable Dam Project, Luzerne County, PA, *Luzerne County Flood Protection Authority.* Project Manager for the preliminary design and technical studies required to support state and federal permit applications for the construction of a seasonal inflatable weir on the North Branch Susquehanna River at Wilkes-Barre. The permit application packages followed the Feasibility Study developed by the firm in 2000, and included technical reports for wetlands and Waters of the U.S., riparian vegetation, subsurface floodplain hydrology, fish, mussels, prehistoric archaeology, water quality, sediment and bedload evaluation, and Section 404(b)(1) Alternatives Analysis. The proposed project would form a seasonal pool up to 400 acres within the banks of the river and would have minimal impacts on aquatic resources. The project would provide an economic incentive for improving the overall water quality of the North Branch. A one-day technical workshop was organized with state and federal agencies to describe the key elements of project operation and how the weir could be constructed and operated to avoid and minimize environmental impacts.

Environmental Open-End Contract, PA, *Pennsylvania Department of Transportation (PennDOT), Engineering District 3-0.* Project Manager responsible for obtaining and managing this five-year contract to provide on-call environmental services to PennDOT in District 3-0. Services included wetlands delineation and monitoring, wetland mitigation site deer browse study, PADEP Chapter 105 and U.S. Army Corps of Engineers Section 404 permitting, 404(b)(1) analyses for impact avoidance and minimization, stream assessments, miscellaneous NEPA assistance, noise and air investigations, cultural resources, and plans review. The contract, work orders, and invoicing were developed in the PennDOT ECMS system.

Environmental Assessment and Slocum Road Feasibility Study, Cherry Point U.S. Marine Corps Air Station, Cherry Point, NC, *U.S. Army Corps of Engineers, Norfolk District.* Discipline Manager responsible for the development of an environmental assessment document that addressed two potential alternative options for improving the vehicle traffic access at the marine air station. The project goal was to develop modifications to the existing roadway network to avoid the blast arcs of ordnance magazines. The environmental assessment was developed to evaluate potential impacts on vegetation, wildlife and habitat, protected species, water quality, wetlands, noise receptors, and cultural resources on the station.

Reconstruction of Pennsylvania Turnpike MP123 to 129, Somerset County, PA, *New Enterprise Stone & Lime Company, Inc. and Pennsylvania Turnpike Commission.* Discipline Manager responsible

for the development of PADEP Chapter 105 and USACE Section 404 Joint Permit Application and supporting materials. This mainline reconstruction project involved the relocation of three lanes of westbound turnpike at two locations where the westbound lanes and eastbound lanes were bifurcated. The project was developed to improve roadway geometrics improve traveler safety. The permit application was supported by field studies for Indiana bat summer roosting habitat and for eastern timber rattlesnake summer foraging habitat.

Cocolamus Creek Bridge Replacement Project, Juniata County, PA, *Pennsylvania Department of Transportation, Engineering District 2-0.* Project Manager responsible for managing the environmental tasks associated with this bridge replacement project over Cocolamus Creek. Our staff scientists performed wetlands and waterways delineation and obtained a jurisdictional determination from the United States Army Corps of Engineers. We developed avoidance and minimization measures for potential archaeological areas and wetlands and waterways. We coordinated with state and federal agencies to minimize the permitting requirements and coordinated the pre-application meeting to assure efficient permit issuance.

Coal Run Bridge Replacement Project, Clearfield County, PA, *Pennsylvania Department of Transportation, Engineering District 2-0.* Project Manager responsible for the environmental components of the project for the firm including the Waters of the U.S. delineation and jurisdictional determination, the conceptual wetland mitigation design, the final wetland mitigation design, and Chapter 105/Section 404 permitting. The firm coordinated directly with the District and with Pittsburgh Engineers, the firm that designed the replacement structure over Coal Run.

I-66 Corridor Studies, Somerset to London, Pulaski and Laurel Counties, KY, *Kentucky Transportation Cabinet (KTC).* In support of HMB Consultants, served as Environmental Manager responsible for development and management of technical studies in support of an Environmental Impact Statement. The technical studies included bat surveys, cave and cliff-line surveys, stream assessments, karst features and fauna inventories, and Waters of the U.S. identifications and delineations. The project corridor was approximately 30 miles in length, and we investigated three alternative alignments within the corridor. Coordinated the work of a subconsultant for the karst fauna inventory. Coordinated with regulatory agency personnel for a jurisdictional determination for Waters of the U.S.

West Shore Regional Treatment Facility and Pipelines, York and Cumberland Counties, PA, *Pennsylvania American Water.* Environmental Manager for this multi-phase project. Performed wetlands and waterways investigations, jurisdictional determinations, avoidance and minimization measures, extensive agency coordination including Environmental Review Committee meetings, cultural resource investigations, and Chapter 105/Section 404 permitting. Our architectural historian performed an evaluation of a log structure, and we performed Phase I and Phase II archaeological testing at the treatment plant site and along the raw and finished water pipelines. The project consisted of the raw water intake and pumping station along the Yellow Breeches Creek, approximately four miles of raw and finished water pipelines, and a water treatment plant.

Wetland Mitigation Site Design, Lancaster County, PA, *Acme Distribution Center, Albertson's, Inc.* Environmental Manager for the remedial design, agency coordination, and construction of the wetland mitigation site located along the floodplain of Muddy Creek. The original wetland design was intended to provide 1.7 acres of compensatory replacement but was only achieving 1.43 acres. The firm was asked to provide design services for the remainder or 0.27 acres. Our team performed site reconnaissance and monitoring, agency coordination, design services, and construction observation. Gannett Fleming Project Development Corporation (GFPDC) was the Contractor for construction, and the site work was completed in three days. We will continue to provide monitoring to assure compliance with United States Army Corps of Engineers and PADEP permits.

Aquatic Assessments in the Yellow Breeches Watershed, York and Cumberland Counties, PA, *Yellow Breeches Watershed Association.* Environmental Manager responsible for the execution of the USEPA Rapid Bioassessment Protocols at 33 stations throughout the watershed. The Yellow Breeches and 15 tributaries were evaluated for physical, chemical, and biological parameters. The firm performed a family-level identification of macroinvertebrates and calculated six metrics to determine the current status of the watershed health. We performed the habitat evaluations and the collection and analysis of water quality samples at each station. Parameters included biochemical oxygen demand, ammonia, nitrate, TKN, phosphorus, fecal coliforms, sulfate and suspended solids. We coordinated with another engineering firm, HRG, during preparation of the summary technical report for the aquatic assessment.

Westgate Service Plaza Evaluation, Milepost 12 to 40, Beaver County, PA, *Pennsylvania Turnpike Commission (PTC).* Environmental Manager responsible for the development of a comprehensive evaluation of potential site locations for a new dual-access service plaza on the turnpike mainline. The firm evaluated multiple site locations using engineering and environmental criteria based on a Design Guide developed by the PTC for statewide service plaza siting and development efforts. Produced Geographic Information System-based mapping to evaluate potential environmental feature impacts and site comparisons. Presented findings to state and federal resource agencies.

Chambers Lake Water Quality Study, Chester County, PA, *Chester County Water Resources Authority.* Environmental Manager responsible for the development and performance of a multi-year assessment of water quality in Chambers Lake, inflow tributaries, and outflow. Initiated a watershed assessment to determine key potential point and non-point sources of water quality degradation. Sampled for key parameters including chlorophyll a, algal species, total phosphorus, nitrate, dissolved oxygen, total suspended solids, sediment transport, and others constituents that affect lake health. The preliminary phase of lake assessment produced a Trophic State Index (TSI), which is a numerical "score" of lake eutrophic condition. The firm coordinated the study with Hibernia Park personnel and local watershed interests.

Jackson County Lake Project Feasibility Study, Jackson County, KY, *Jackson County Empowerment Zone (JCEZ) and Jackson County Water Authority.* Environmental Manager responsible for tasks associated with the completion of technical studies and permitting requirements for construction of this proposed new 115-acre water supply and recreation lake. The JCEZ produced an Environmental Impact Statement with the USDA-Rural Utilities Service in 2001. The firm provided supplementary engineering and environmental technical support for endangered species surveys, water quality monitoring, cultural resources clearance, Section 404(b)(1) Alternatives Analyses, stream mitigation plans, and agency coordination. Performed the Section 404 permitting and Section 401 Water Quality Certification after detailed coordination with the regulatory agencies in 2003. The Section 404(b)(1) Alternatives Analysis involved a detailed description of the stream mitigation approach. The stream mitigation plans used multiple components, including direct restoration of degraded stream reaches, monetary compensation to purchase degraded lands for preservation and enhancement, and function offsets using assessment protocols developed by the United States Army Corps of Engineers, Louisville District.

Environmental Assessment for Pumped-Storage Options, Amelia County, VA, *Appomattox River Water Authority (ARWA).* Environmental Manager responsible for completion of a comprehensive screening level analysis of environmental features and potential impacts for three pumped-storage alternatives. The study focused on natural and cultural resources including wetlands, wildlife habitats, streams and aquatic habitats, protected species, archaeological records, and historic structures. The firm performed field reconnaissance, agency coordination, and review of available databases and literature to produce an inventory of resources in the three project areas. The potential reservoir sites had pool areas ranging from approximately 620 to 1480 acres. Our summary report provided comparisons of potential

impacts and mitigation measures for each alternative. The firm also performed safe yield analyses, 404(b)(1) Alternative Analyses, and preliminary designs for the ARWA project.

Southern Beltway PA 60 to U.S. 22 Wetland Mitigation Design, Findlay Township, PA, *Pennsylvania Turnpike Commission (PTC).* Senior Environmental Scientist responsible for providing post environmental impact statement (EIS) services under this agreement. Our work under our agreement to prepare the EIS for the PA 60 to US 22 Southern Beltway Project was extended to include evaluation of areas outside of the right-of-way defined for the EIS, preparation of the conceptual wetland mitigation design, and preparation of the terrestrial mitigation plan for the project. Throughout this phase of the project, our firm continued to provide coordination activities with the PTC and the environmental resource agencies.

S.R. 0015, Section C41, Lycoming County, PA, *Pennsylvania Department of Transportation, District 3-0.* Environmental Manager responsible for tasks associated with preliminary engineering within the eight-mile corridor between Trout Run and Jackson Corners. Directed studies and documentation for wetlands, streams, wildlife habitat, cultural resources, economic and social resources, and noise; attended public meetings and worked with resource agencies. Coordinated the development of the Environmental Overview to serve as documentation of the existing natural, cultural, and social resources in the project area. Developed and coordinated materials for use in the early stages of the NEPA environmental assessment.

George B. Stevenson Dam Feasibility Study, Cameron County, PA, *Susquehanna River Basin Commission.* Environmental Manager responsible for tasks associated with documenting the potential effects of increasing the existing height of the G.B. Stevenson Dam. The dam is located in Sinnemahoning State Park and impounds a 142-acre reservoir that is operated for flood control and low-flow augmentation by the U.S. Army Corps of Engineers and the Pennsylvania Department of Conservation and Natural Resources. The feasibility study included a wetlands delineation, vernal pool inventory, wildlife habitat description, shallow groundwater evaluation using recording piezometers, social and economic resource evaluation, and meetings with the public and resource agencies.

Susquehanna River Bridge, Dauphin and York Counties, PA, *Pennsylvania Turnpike Commission.* Environmental Manager responsible for studies involving protected species, wetlands, fish passage, hazardous waste, cultural resources, and noise impacts as part of the preliminary and final design of the new six-lane turnpike bridge over the Susquehanna River. Presented environmental resources information at agency coordination meetings and public meetings. Our firm performed the environmental analyses and engineering design for the roadway approaches on the east and west sides of the bridge and coordinated with several subconsultants to complete the design ahead of the initial schedule.

Comprehensive Water Resources Plan for the Lower Susquehanna River Basin, PA, *U.S. Army Corps of Engineers.* Environmental Manager responsible for Phase 1 development of a study to inventory existing data, identify data gaps, and receive input from regional experts. Performed an analysis to determine the key elements for further study in Phase 2 of the plan development. Attended Capital Region Water Board meetings and public meetings to integrate information for the Phase 1 study.

Natural Resources Investigations and Permitting, Chesterfield County, VA, *Appomattox River Water Authority (ARWA).* Environmental Manager responsible for completion of environmental studies required to obtain the Virginia Marine Resources Commission (VMRC) and U.S. Army Corps of Engineers (USACE) permits. The VMRC and USACE permits were required to construct major improvements to the ARWA water intake, raw and finished water conveyance, and water treatment facilities. Our firm delineated wetlands, identified and mapped waterways, and performed substantial coordination with natural resource agencies in Virginia.

Moores Bridges Water Treatment Plant, Norfolk, VA, *City of Norfolk.* Senior Environmental Scientist responsible for performing field reconnaissance for wetlands on the treatment plant site. Coordinated with design engineers to avoid wetland impacts.

Forest Park Water Treatment Plant Expansion and Improvements, Chalfont, PA, *North Penn and North Wales Water Authorities.* Senior Environmental Scientist responsible for performing the wetland delineation and mitigation plan development. Coordinated with state and federal regulatory agencies to obtain approvals for mitigation site design and monitoring.

S.R. 0030, Section 010, Lancaster County, PA, *Pennsylvania Department of Transportation, District 8-0.* Project Manager for environmental tasks associated with wetlands, streams, and habitats during the final design of highway widening and geometry improvements. Coordinated field efforts, permitting, and mitigation options for wetlands and streams.

S.R. 0030, Sections 07A, 07B, and 07C, Bedford County, PA, *Pennsylvania Department of Transportation, District 9-0.* Project Manager for environmental tasks associated with wetlands, streams, and habitats during the final design of highway widening and geometry improvements. Coordinated field efforts, permitting, and mitigation options for wetlands and streams.

S.R. 0309 Improvement Project, Montgomery County, PA, *Pennsylvania Department of Transportation, District 6-0.* Project Manager for environmental tasks associated with wetland and stream mitigation measures. The project involved approximately four acres of wetland replacement and 1,200 LF of stream restoration. Developed concept-level mitigation plans and directed wetland and stream mitigation designers during preliminary and final design phases. Directed development of the final plans, specifications, and cost estimates for the mitigation design elements.

Rockville Bypass (Intercounty Connector), Montgomery County, MD, *Maryland State Highway Administration.* Environmental Manager responsible for coordinating and directing our firm's biologists and a subcontractor to perform a Bog Turtle (*Clemmys muhlenbergi*) survey within project limits located in Rock Creek State Park, Rockville, Maryland. The bog turtle is a federally endangered species that requires specific habitat elements, including continuous spring flow, soft mud substrate, and herbaceous vegetation.

P.R. 208, Aguas Buenas Bypass, Puerto Rico, *Puerto Rico Highway and Transportation Authority.* Environmental Manager responsible for coordinating natural resources studies for a five-mile bypass alignment around the town of Aguas Buenas. Determined jurisdictional limits of wetlands and streams for purposes of impact analysis, 404(b)(1) analysis, and permitting. Coordinated discussions with a subcontractor to perform habitat and presence/absence evaluation for the Puerto Rican boa and the plain pigeon, two federally listed species indigenous to Puerto Rico.

S.R. 6015, Sections D53 and D52, Tioga County, PA, *Pennsylvania Department of Transportation, District 3-0.* Lead Environmental Scientist responsible for conducting aquatic surveys, wetland mitigation, and stream restoration for the 11.6-mile relocation of S.R. 0015. Developed concept, preliminary, and final designs for 22 acres of wetland mitigation and more than one mile of stream restoration with habitat improvement. Coordinated with permitting agencies during the planning and design phases of this work. Coordinated Section 404/Chapter 105 permitting activities for the project.

Goose Creek Aquatic Survey, Chester County, PA, *Glace Associates/West Goshen Sewer Authority.* Project Manager for the design, performance, and report preparation of a study to determine the existing conditions of Goose Creek in Chester County. The stream's watershed was composed of 80 percent urban

impervious surfaces, resulting in poor water quality and highly variable flow conditions. The aquatic study involved water chemistry, macroinvertebrate survey using U.S. EPA rapid bioassessment protocols, and an instream habitat evaluation at five stations. The results indicated that the treated effluent discharged from the West Goshen plant had a beneficial effect on the instream conditions of Goose Creek.

Sawkill Creek Aquatic Habitat/Stream Restoration Plan, Pike County, PA, *U.S. Army Corps of Engineers (USACE).* Lead Environmental Scientist responsible for the completion of two concept plans for the restoration of Sawkill Creek, a tributary to the Delaware River in the Delaware Water Gap National Recreation Area. One plan involved the removal of a dam, which had blocked fish passage to the Sawkill and its tributaries. The concept plans covered a 2,000-foot reach of the lower Sawkill and included plan drawings with typical details, preliminary cost estimates, and a brief summary report. Coordinated with agencies including Pennsylvania Fish and Boat Commission, Pike County Conservation District, National Park Service, and the USACE.

Deer Creek Aquatic Habitat Restoration Plan, Allegheny County, PA, *G. Zamias.* Discipline Manager for the planning, production, and construction oversight of a two-mile stream restoration effort at Deer Creek. Conducted agency coordination with PADEP and the Pennsylvania Fish and Boat Commission (PFBC) to determine goals and specific requirements for the restoration plans. Developed design drawings, details, specifications, and cost estimates. Performed stream classification and used materials that are considered bioengineering tools. Rock deflectors and plant material were key elements used to protect erosive banks and provide riparian buffers.

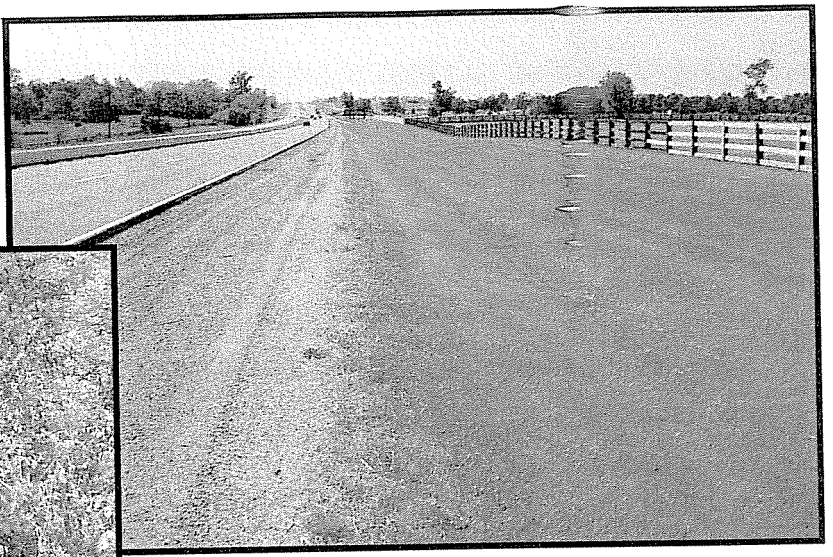
Chambersburg Borough Revitalization, Franklin County, PA, *Borough of Chambersburg.* Discipline Manager responsible for the Section 404/Chapter 105 permitting for the downtown revitalization project. Coordinated with PADEP to determine the appropriate studies needed to support the joint permit application. Directed the production of the permit application and supporting documentation. This project involved improvements to an area centering around the confluence of the Conococheague Creek and Falling Springs Branch Creek.

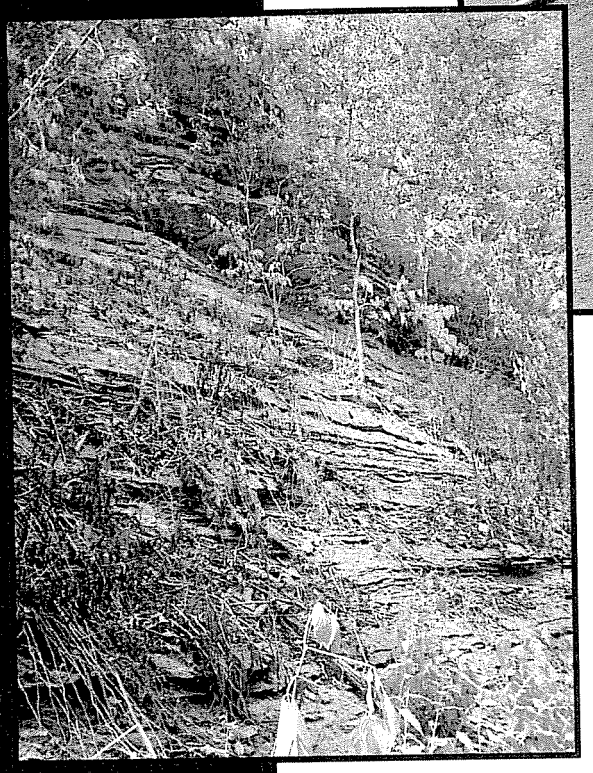
S.R. 0322, Section B02, "Missing Link," Mifflin County, PA, *Pennsylvania Department of Transportation (PennDOT), District 2-0.* Project Manager for environmental tasks including agency coordination, permit applications, wetlands and stream restoration replacement site selection and design, and weekly construction monitoring of the new 5.6-mile highway and mitigation sites. Manager for environmental monitoring of highway construction and wetland mitigation/stream restoration components. Designed and developed plans, specifications and cost estimates for a 17-acre mitigation package, including restoration of approximately 11 acres of existing, degraded wetlands and creation of new wetlands in an abandoned agricultural setting. Developed plans and specifications for 3,200 LF of stream restoration at Tea Creek, a tributary to Kishacoquillas Creek that had been highly degraded by a dairy operation. Performed Level II fluvial geomorphological classification (Rosgen) with longitudinal and cross-section surveys and macroinvertebrate sampling. This project won the Environmental Award from the Pennsylvania Quality Initiative (PQI) in March 2000.

Gettysburg 16-inch Water Transmission Main and 8-Inch Fire Suppression Line, Adams County, PA, *Gettysburg Municipal Authority.* Manager for environmental studies on projects to construct a 16-inch water transmission line and an 8-inch fire suppression line for the Eisenhower Farm in Gettysburg. Responsibilities included performing wetlands delineations and stream surveys over approximately 11,000 LF of new pipeline and securing a jurisdictional determination from the U.S. Army Corps of Engineers. Developed joint permit applications and supporting documentation for the projects. Coordinated with the Pennsylvania Game Commission regarding a threatened species, the Loggerhead Shrike.

Mid-Atlantic States' Biological Resources Database Development, Elkins, WV, *U.S. EPA Region 3.* Lead Natural Scientist for the development of a database used by the EPA and state resource agencies to track and model the aquatic resources in Virginia, West Virginia, Maryland, Pennsylvania, and Delaware. The database includes water quality, invertebrates, fish, and sampling station data and is linked to a geographic information system (GIS)-based module to map and query the data. Acted as the link between the EPA biologists and our firm's software programmers. Conducted interviews with representatives of state resource agencies to determine the data records and potential uses of an integrated database. Training seminars were held in the Mid-Atlantic states.

Hillside Water Transmission Main, Luzerne County, PA, *Pennsylvania American Water.* Manager for the natural environmental work performed for the design of a 20-inch raw water pipeline covering approximately three miles. The project included wetland and stream identification and delineation, global positioning system (GPS) survey of wetland and stream boundaries, and permit application preparation. Coordinated with resource agencies including the U.S. Army Corps of Engineers and PADEP.





THREATENED AND ENDANGERED SPECIES SURVEY REPORT

Pool No. 3 Intake and Transmission Main Project

Fayette, Franklin, Owen and Scott Counties, Kentucky

Prepared for

Kentucky American Water

Prepared by

Gannett Fleming

August 2007

Threatened and Endangered Species Survey Report

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POOL NO. 3 INTAKE AND TRANSMISSION MAIN PROJECT

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

PROJECT BACKGROUND

The need for additional source of supply and/or water treatment capacity to meet future demands has long been recognized by Kentucky American Water (KAW). In November 1993, the Kentucky Public Service Commission (PSC) established a case to investigate the sources of supply and future water demands of KAW customers. In their Order of August 21, 1997, PSC directed KAW to "take the necessary and appropriate measures to obtain sources of supply so that the quantity and quality of water delivered to its distribution system shall be sufficient to adequately, dependably, and safely supply the total reasonable requirements of its customers under maximum consumption through the year 2020". In 1998, KAW began final planning and design of an Ohio River supply project, which would include bulk purchase of treated water from the Louisville Water Company and transmission of the water to the KAW system through a large-diameter main; however, this project met with significant public opposition and work was eventually halted.

The Bluegrass Water Supply Consortium (BWSC) was formed in 1999 to identify and implement a regional solution to the area's water supply deficiencies. A report in February 2004 documented a conceptual network of treated water pipelines, construction of a new water treatment plant to treat water from the Kentucky River Pool 3, and a supplemental raw water supply pipeline from the Ohio River as the solution to the regional water supply deficiencies. KAW supports a regional solution to the water supply problem, actively participating and providing resources to the BWSC. Under regulatory and customer pressure, KAW committed to present its plan to the PSC by Spring 2007, announcing it would build a treatment plant and transmission line for adequate water supply by 2010. KAW is continuing to work with the BWSC on a partnership for the new facilities.

PROJECT DESCRIPTION

Kentucky American Water proposes to construct a raw water intake, water treatment plant and a transmission main pipeline to provide drinking water from the Kentucky River to the KAW Central Division distribution system which includes Lexington-Fayette County and parts of six surrounding counties. (Figure 1). The proposed pumping and treatment facilities are designed with an initial treatment capacity of 20 million gallons per day (mgd) or 25 mgd with a 5 mgd increment for BWSC, and a hydraulic capacity of 30 mgd. The facilities are configured so that future treatment expansion to 30 mgd is possible.

The proposed project includes 30.6 miles of 42-inch finished water transmission main from the new plant site to the Lexington Distribution System. The transmission main route generally follows the established transportation corridors of US 127, KY 2919, KY 1707, KY1262, US 460 and KY 1973.

PURPOSE

The purpose of this report is to describe surveys for specific threatened and endangered species performed within the Pool No. 3 Intake and Transmission Main Project study area by Gannett Fleming, Inc (GF). Investigations of a 30-mile long, 50-foot wide area along the proposed pipeline alignment were performed from May 14-17 and July 17-19, 2007. This report was prepared, in part, to satisfy the requirements of the U.S. Army Corps of Engineers (USACE), which has the responsibility to maintain compliance with the Endangered Species Act when issuing permits under the purview of Section 404 of the Clean Water Act (33 U.S.C. 1344).

STUDY AREA DESCRIPTION

The Pool No. 3 Intake is located in northern Franklin County. The water treatment plant is located immediately across the Owen County line. The transmission main crosses through Franklin and Scott counties before intersecting with the existing transmission mains in Fayette County near Lexington.

Situated primarily within the Kentucky River, Elkhorn Creek and Rocky Branch watersheds, the northern half of the study area between the communities of Swallowfield and Switzer consists of steep, upland forested slopes and floodplain forest communities. Between Switzer and Georgetown, the southern half of the study area is gently rolling hills dominated by rural residential, cropland and pasture. The majority of the study area between Switzer and Georgetown consists of mowed lawns, mowed highway right-of-way, and pastures grazed by cows and horses.

The project study area is located within the Bluegrass Section of the Western Mesophytic Forest Region (Braun 1967). Forests within the Bluegrass Section consist of American beech (*Fagus grandifolia*), white oak (*Quercus alba*), sugar maple (*Acer saccharum*), black walnut (*Juglans nigra*), black oak (*Quercus velutina*), white ash (*Fraxinus americana*), shagbark hickory (*Carya ovata*) and slippery elm (*Ulmus rubra*).

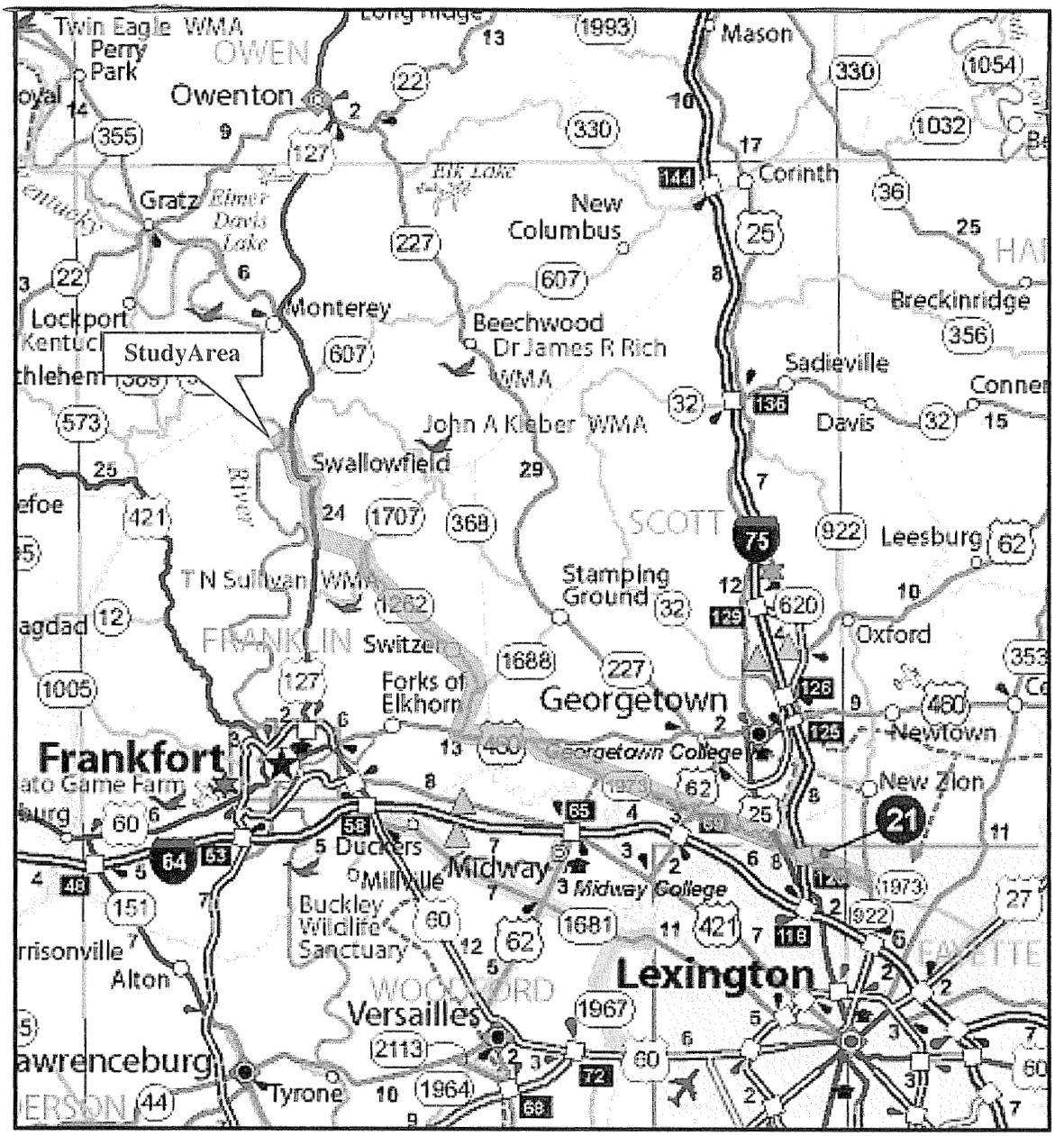

Figure 1 – Project Study Area Location Map
Source: Kentucky Transportation Cabinet, 2006.
Scale: 1 inch equals approximately 5 miles

METHODS

Threatened and endangered aquatic species, including mussels and fishes, were evaluated in the project's *404(b)(1) Alternatives Analysis* (KAW 2007). Threatened and endangered plants, birds, and mammals of the project study area were determined through review of the Kentucky State Nature Preserve Commission's county reports of threatened and endangered species (KSNPC 2006a, 2006b, 2006c, 2006d). From this review, 19 threatened and endangered plant species, six bird species, and two bat species were identified from the four counties of the project study area. Threatened and

endangered species with known extant populations in the four counties of the project study area were then identified from the list of 27 species generated as described above. That is, species with historic occurrences (not confirmed in more than 20 years), species with unconfirmed occurrences, and species known to be extirpated in the four counties were removed from the list of potential endangered and threatened species. This exercise yielded the list of threatened and endangered species used to guide the survey, and included 17 plant species, one bird species, and one bat species. Table 1 lists all of the species used to guide the surveys using the methodologies described above. A description of each of these species, including their listing status, diagnostic characters, habitat preferences, and other life history characteristics, is included in Appendix A.

PROJECT STUDY AREA AND HABITATS EVALUATED

The 30-mile long project study area contains several different habitats including steep wooded hillsides, fields and pastures, floodplain forests and mowed highway right-of-way. Suitable habitats located in counties with known occurrences of threatened and endangered species were evaluated within a 50-foot wide area along the proposed pipeline alignment. Although a proposed alignment for the pipeline was determined prior to the survey, both sides of the roadways along which the pipeline will be located were investigated for threatened and endangered plant species, and potential nesting or roosting habitat for the one bird and one bat species of concern.

THREATENED AND ENDANGERED PLANTS SURVEY

The threatened and endangered plants survey focused on habitats of the 17 listed plant species known to occur in the four counties of the project study area. However, all plant species encountered during the surveys were documented, and their status was determined through review of the Kentucky State Nature Preserve Commission's statewide *Rare Plants Database* (KSNPC 2007). The surveys were performed on-foot by two qualified biologists. The surveys were performed during the flowering periods of the 17 species with known distributions in the four counties of the project study area, with the first survey being performed from May 14 – 17, and the second survey being performed July 17 – 19, 2007.

The threatened and endangered plants surveys were conducted following modifications to the timed-meander survey technique (Goff et al. 1982). The modifications to this technique were slight, and were associated with the linear nature of the project. Due to the narrow, linear project study area, the timed-meander surveys were modified into timed-linear surveys of the proposed pipeline alignment. This was accomplished by each biologist being responsible for approximately one-half of a 50-foot wide area along the proposed pipeline alignment. For each habitat segment described above, plant species were recorded following the protocols described by Goff et al. (1982). Unlike a timed-meander survey where surveys stop after a set amount of time where no new species are noted, the surveys were modified to continue until the entire habitat was surveyed. These modifications ensured a complete evaluation of the habitats suitable to the endangered and threatened plant species of the project study area, and were done in a manner that is repeatable.

TABLE 1. Threatened and Endangered Plants, Birds, and Mammals Used to Guide the Surveys

COMMON NAME	SCIENTIFIC NAME	STATUS (State/Fed)	COUNTY OCCURENCES			
			FAYETTE	FRANKLIN	OWEN	SCOTT
Red buckeye	*Aesculus pavia*	Threatened / None		H - 1	H - 1	
Braun's rockcress	*Arabis perstellata*	Threatened / Endangered		E - 34	E - 4	
Globe bladderpod	*Lesquerrella globosa*	Endangered / Candidate	H - 2	E - 6		F - 1
Grape honeysuckle	*Lonicera prolifera*	Endangered / None		E - 1	E - 1	
Hispid false mallow	*Malvastrum hispidum*	Threatened / None	E - 1			
Stemless evening primrose	*Oenothera triloba*	Threatened / None		E - 1		
Hairy false gromwell	*Onosmodium hispidissimum*	Threatened / None	E - 1			
Western false gromwell	*Onosmodium occidentale*	Endangered / None		E - 1		
Eastern yampah	*Perideridia americana*	Threatened / None		E - 3		
Mock orange	*Philadelphus inodorus*	Threatened / None		E - 1		
Nodding rattlesnake root	*Prenanthes crepidinea*	Threatened / None	E - 1			
Water stitchwort	*Sagina fontinalis*	Threatened / None	E - 1	E - 1		
Purple oat	*Schizachne purpurascens*	Threatened / None	E - 1			
Buffalo clover	*Trifolium reflexa*	Endangered / None	H - 1			
Running buffalo clover	*Trifolium stoloniferum*	Threatened / Endangered	E - 4 / H -1			
Wood's bunchflower	*Veratrum woodii*	Threatened / None		E - 3	E - 1	
Softleaf arrow-wood	*Viburnum molle*	Threatened / None	E - 1	E - 1		
Downy arrow-wood	*Viburnum rafinesquianum*	Threatened / None	E - 1 / H - 1			
Walter's violet	*Viola walteri*	Threatened / None	E - 1			
Spotted sandpiper	*Actitis macularia*	Endangered / None		H - 1		
Bachman's sparrow	*Aimophila aestivalis*	Endangered / Management Concern			X - 1	
Lark sparrow	*Chondestes grammacus*	Threatened / None			H - 3	H - 1
Common moorhen	*Gallinula chloropus*	Threatened / None		X - 1		
Yellow-crowned night heron	*Nytcanassa violacea*	Threatened / None	E - 1 / H -2			
Vesper sparrow	*Pooecetes gramineus*	Endangered / None		H - 1	H - 1	H - 2
Gray bat	*Myotis grisescens*	Threatened / Endangered		E - 1		
Indiana bat	*Myotis sodalis*	Endangered / Endangered	H - 1			

Where: E = known to occur in county - number of occurrences, H = historic (>20 yrs) occurrence in county - number of historic occurrences, F = reported but never confirmed from county, assumed absent - number of unconfirmed reports, X = known to be extirpated from the county – number of known extirpations, Shaded = excluded from the survey

Surveys were conducted only in habitats determined as suitable for the threatened and endangered plant species of the project study area. Suitable habitats were determined based on expert references specific to Kentucky (KSNPC 2007, Jones 2005). A total of 12 segments, each possessing habitat(s) suitable to at least one of the 17 known threatened and endangered plant species known from the four counties of the project study area, were investigated (Table 2 and Appendix C).

TABLE 2. Segments of the Threatened and Endangered Plants Survey

STUDY AREA SEGMENT	DESCRIPTION	TARGETED SPECIES
0	Alluvial terrace, wetland	Eastern Yampah Wood's Bunchflower
1	Steep, rocky, forested slope	Braun's Rockcress Globe Bladderpod Grape Honeysuckle Mock Orange Softleaf Arrow-wood
2	Highway rock cuts	Stemless Evening Primrose Western False Gromwell
3	Road along rocky, forested slope, with one wet rock face	Braun's Rockcress Globe Bladderpod Grape Honeysuckle Mock Orange Softleaf Arrow-wood Water Stitchwort
4	Steep, rocky, forested slope	Braun's Rockcress Globe Bladderpod Grape Honeysuckle Mock Orange Softleaf Arrow-wood
5	Low grounds, alluvial floodplain, agriculture	Eastern Yampah Wood's Bunchflower
6	Road along rocky, forested slope	Braun's Rockcress Globe Bladderpod Grape Honeysuckle Mock Orange Softleaf Arrow-wood
7	Road along rocky, forested slope	Braun's Rockcress Globe Bladderpod Grape Honeysuckle Mock Orange Softleaf Arrow-wood
8	Alluvial terrace, floodplain forest	Eastern Yampah Wood's Bunchflower
9	Alluvial terrace, floodplain forest	Eastern Yampah Wood's Bunchflower
10	Road along dry fields and meadows with a few alluvial crossings and dry woodlots	Hispid False Mallow Hairy False Gromwell Nodding Rattlesnake Root Running Buffalo Clover Downy Arrow-wood
11	Highway rock cuts	Stemless Evening Primrose Western False Gromwell

Surveys were not conducted in habitats determined to be unsuitable for the threatened and endangered plant species of the project study area. Unsuitable habitats were determined based on expert references specific to Kentucky (KSNPC 2007, Jones 2005) and onsite field observations. Habitats were considered unsuitable for a variety of reasons including frequent disturbance, such as mowing and grazing, or location within a county not known for a specific species.

Color photographs were taken of each surveyed habitat to document site conditions at the times of the surveys. The identification of encountered species was aided through the use of several different taxonomic texts and field guides (Jones 2005, Straughsbaugh and Core 1970, Britton and Brown 1970, Newcomb 1977). Additional information on the habitats and life history characteristics of the two federally-listed species, Braun's rockcress (*Arabis perstellata*) and running buffalo clover (*Trifolium stoloniferum*), was obtained from NatureServe (2006) and the U.S. Fish and Wildlife Service (2005 and 1997).

ENDANGERED AND THREATENED BIRD SURVEY

The endangered and threatened bird survey focused on one listed bird species, the yellow-crowned night heron (*Nytcanassa violacea*), known to occur in one county of the project study area. The survey was performed on-foot by two qualified biologists. The survey was performed during the nesting period of the targeted species. The nesting period for the yellow-crowned night heron in Kentucky begins in early May (Palmer-Ball, 1996). Two surveys were performed during the nesting season in 2007, with the first survey being performed from May 14 – 17, and the second survey being performed July 17 – 19, 2007.

Within the project area, The Kentucky Breeding Bird Atlas (BBA) maps show yellow-crowned night herons with confirmed breeding in northwestern Fayette County. This was reported on the legend as only "one individual or pair observed in block". Surveys were conducted only in habitats determined as suitable for yellow-crowned night heron within the portion of the project study area located in Fayette County. Suitable habitats were determined based on expert references specific to Kentucky (Palmer-Ball, 1996). Color photographs were taken of each surveyed habitat to document site conditions at the time of the survey.

ENDANGERED AND THREATENED MAMMAL SURVEY

The endangered and threatened mammal survey focused on one listed bat species, the gray bat, known to occur in one county in the project study area. The survey was performed on-foot by two qualified biologists. The survey was performed during the active (or post hibernation) period of the targeted species. The active period for the gray bat in Kentucky begins in late March or early April for females and mid-April to mid-May for adult males and juveniles (USFWS, 1982). The survey was performed from May 14 – 17.

Gray bat colonies are restricted entirely to caves or cave-like habitats. During summer the bats are highly selective for caves providing specific temperature and roost conditions. Usually these caves are all located within a kilometer of a river or reservoir (USFWS, 1982).

Within the project area, the KSNPC indicates that the gray bat is known to occur in Franklin County. The survey for suitable cave habitat within or immediately adjacent to the project study area was conducted only in Franklin County. Suitable habitats were determined based on expert references specific to Kentucky (USFWS, 1982). Color photographs were taken of each surveyed habitat to document site conditions at the time of the survey.

RESULTS

No threatened or endangered species were found during the surveys. A total of 246 plant species were identified and none of these were listed by the Kentucky State Nature Preserves Commission as endangered, threatened, or species of concern (Table 3). A large percentage of these species (33%, n=82) are recognized as non-native/exotic by Jones (2005). Non-native/exotic species were found in each of the surveyed segments, suggesting that the habitats of the project study area have been disturbed in the past, even those few locations where the proposed pipeline is located beyond the highway right-of-way. In addition, no suitable habitats for the yellow-crowned night heron or gray bat were identified within the project study area.

Some plant species were identifiable only to Genera because they were not observed during their flowering period or while in seed (Table 3). Seven of these Genera (*Carex, Hieracium, Pycanthemum, Trillium, Solidago, Symphyotrichum,* and *Viola*) have species in Kentucky that are listed by the Kentucky State Nature Preserves Commission as endangered, threatened, or species of concern. Review of Kentucky-specific resources (KSNPC 2007, Jones 2005) and data collected during the field surveys, confirms that none of these unidentifiable specimens were listed species, as described below.

There are 17 *Carex* (sedges), eight *Solidago* (goldenrods) and four *Symphyotrichum* [(*Aster*) asters] species in Kentucky with protected status, but none of these are known from the four counties of the project study area (KSNPC 2007). The *Carex* that were observed and not identifiable to species during the surveys were growing in wetlands. Several of the listed *Carex* species are found in wetland habitats, but none of these are typically found in wetland habitats associated with the project study area, and none are known from the four counties of the project study area. *Solidago* and *Aster* species were noted from eight of the twelve segments. Species from these Genera flower in late summer and the fall, therefore, identification to species was problematic and would have been based solely on vegetative characteristics. Based on the habitats of the project study area (disturbed highway right-of-way and wooded slopes), and based on the fact that the listed *Solidago* and *Symphyotrichum* species are not known from the four counties of the project study area, it is assumed that all of the specimens observed during the surveys were common and widespread species.

Hieracium longipilum (hairy hawkweed) is listed as threatened in Kentucky and its closest known population to the project study area is in Hardin County (KSNPC 2007). With the exception of the flower, *H. longipilum* is very similar to the more common *H. gronovii* (beaked hawkweed). *H. longipilum* tends to be found in undisturbed fields and meadows with sandy soils, while *H. gronovii* tends to occur in open disturbed areas like roadsides (Jones 2005). Based on these habitat preferences and the project location, the unidentified *Hieracium* is assumed to be the common *H. gronovii.*

Pycanthemum albescens (whiteleaf mountainmint) is listed as endangered in Kentucky and is known in the Commonwealth only from Calloway County along the Tennessee border (KSNPC 2007). The specimen observed along Segment 10 was observed post-flower, but had vegetative characteristics representative of *P. incanum* (hoary mountainmint). However, only one specimen was found and positive identification could not be made. This specimen was determined not to be *P. albescens* based on the location of the project study area, and is assumed to be *P. incanum.*

There are three *Trillium* species in Kentucky with special protection status (KSNPC 2007). *T. nivale* (snow trillium) is listed as endangered in Kentucky and its closest known population to the project study area is in Jessamine County (KSNPC 2007). *T. pusillum* (least trillium) is listed as endangered in Kentucky and its closest known population to the project study area is in Casey County (KSNPC 2007). *T. undulatum* (painted trillium) is listed as threatened in Kentucky and its closest known population to the project study area is in Letcher County (KSNPC 2007). The *Trillum* observed on the steep slope of Segment 1 is not believed to be any of these three protected species, and is assumed to be *T. sulcatum* (sulcate trillium). This assumption is based on the fact that the observed specimen was much too large and had incorrect leaf morphology to be *T. nivale*, was growing in the wrong habitat and had incorrect leaf morphology to be *H. pusillum*, and was found in the wrong region of the state to be *H. undulatum* (Jones 2005).

The unknown *Viola* specimens observed along Segments 0, 1, 5, 9, and 10 were not found in suitable habitats, and did not have vegetative characteristics of the listed species *V. walterri. V. walteri* is known from Fayette County, and is found in upland forests with thin canopies (KSNPC 2007). None of the unknown violets were found in these settings. The specimens encountered that were not in flower were determined not to be *V. walteri* based on their setting (habitat and location) and vegetative characteristics.

The timed-meander surveys of the habitats most likely to contain threatened and endangered species were exhaustive (Figures 2a-2c). Species efforts curves generated from the timed-meander survey data show that each segment was surveyed until no new species were recorded, for both the May and July surveys. The increase in the number of species from the May survey to the July survey, for each segment, is largely explained by the emergence and withering of herbaceous species.

TABLE 3. Plants of the Project Study Area

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Acalypha rhomboidea	Three-seeded Mercury			X									
Acer negundo	Box Elder	X	X	X	X	X	X	X	X	X	X	X	X
Acer platanoides	Norwary Maple									X			
Acer rubrum	Red Maple		X						X		X	X	
Acer saccharinum	Silver Maple	X								X	X	X	
Acer saccharum	Sugar Maple		X	X	X	X	X	X	X			X	
Achillea millefolium	Yarrow								X			X	X
Aesculus glabra	Ohio Buckeye		X	X	X	X		X	X			X	
Agrostis gigantea	Redtop										X	X	
Alliaria petiolata	Garlic Mustard	X	X	X	X	X	X	X	X	X	X	X	X
Allium canadense	Wild Onion	X		X	X		X		X	X	X	X	X
Amaranthus hybridus	Smooth Amaranth									X			
Ambrosia artemisiifolia	Common Ragweed	X	X	X	X			X	X	X	X	X	X
Ambrosia trifida	Giant Ragweed	X	X	X	X	X	X	X	X	X	X	X	X
Amphicarpaea bracteata	American Hogpeanut	X	X										
Andropogon gerardii	Big Bluestem											X	
Anemonella thalictroides	Rue Anemone		X	X	X				X				
Apocynum cannabinum	Hemp Dogbane						X		X			X	
Aquilegia canadensis	Columbine				X								
Arabis laevigata var. laevigata	Smooth Rockcress		X										
Arctium minus	Common Burdock			X	X			X	X		X	X	X
Arisaema dracontium	Green Dragon				X				X				
Arisaema triphyllum	Jack-in-the-Pulpit			X									
Asarum canadense	Ginger		X	X					X	X			
Asclepias syriaca	Common Milkweed			X			X		X		X	X	X
Asimina triloba	Pawpaw				X								
Barbarea vulgaris	Yellow Rocket								X		X		
Bidens sp.	Beggar Ticks								X	X			X

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Boehmmeria cylindrica	False Nettle								X				
Bromus japonicus	Japanese Chess								X			X	
Bromus tectorum	Downy Chess		X	X			X	X				X	X
Campanulatrum americanum	Tall Bell Flower		X		X								
Camassia scilloides	Wild Hyacinth					X			X				
Campsis radicans	Trumpet Creeper		X	X	X		X	X	X				
Carduus nutans	Musk Thistle			X				X	X		X	X	X
Carex festucacea	Sedge			X	X	X	X				X	X	X
Carex frankii	Sedge								X			X	
Carex oligocarpa	Sedge		X					X		X	X		
Carex sp.	Sedge	X				X							
Carex tribuloides	Sedge								X	X	X		
Carex vulpinoidea	Fox Sedge						X				X		X
Carpinus caroliniana	American Hornbeam								X				
Carya ovata	Shagbark Hickory		X			X	X		X				
Catalpa sp.	Catalpa		X									X	X
Cerastium sp.	Mouse-eared Chickweed		X									X	
Cercis canadensis	Redbud		X	X	X			X	X			X	
Chamaecrista fasciculata	Partridge Pea											X	
Chaenorrhinum minus	Lesser Toadflax							X				X	
Chicorium intybus	Chickory		X	X				X	X	X		X	X
Chrysanthemum leucanthemum	Ox-eye Daisy			X	X		X		X	X		X	X
Chrysopsis mariana	Shaggy Golden-aster											X	
Cinna arundinacea	Stout Woodreed Grass	X		X		X				X			
Cirsium arvense	Canada Thistle				X						X		X
Cirsium sp.	Thistle			X				X			X		X
Clematis viorna	Vacevine							X					
Conium maculatum	Poison Hemlock			X	X		X	X	X	X	X	X	X
Convolvulus arvensis	Field Bindweed				X		X	X	X				
Cornus drummondii	Rough-leaved Dogwood		X	X	X			X	X				

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Coronilla varia	Crown Vetch			X			X		X			X	X
Crataegus sp.	Hawthorne		X										
Cunila origanoides	Stone Mint						X						
Cyperus strigosus	Straw-color Flatsedge							X	X			X	
Dactylis glomerata	Orchard Grass			X	X		X	X	X	X	X	X	X
Daucus carota	Wild Carrot	X		X				X	X	X	X	X	X
Delphinium tricorne	Dwarf Larkspur		X			X							
Dianthus armeria	Deptford Pink												X
Digitaria sp.	Crab Grass				X				X			X	
Dioscorea villosa	Wild Yam Root		X						X				
Dipsacus fullonum	Teasel			X				X	X		X	X	X
Duchesnea indica	Indian Strawberry			X	X	X			X	X	X		
Echinochloa crus-galli	Common Barnyard Grass							X				X	
Echinochloa muricata	Rough Barnyard Grass									X			
Elaeagnus umbellata	Autumn Olive				X								
Eleocharis ovata	Ovate Spikerush											X	
Elymus hystrix	Bottle-brush Grass		X	X	X			X	X				
Elymus virginicus	Virginia Wild Rye	X	X	X	X	X	X	X	X	X	X	X	X
Elytrigia repens	Quack Grass								X				
Erigeron anuus	Annual Fleabane			X			X		X		X	X	X
Erigeron philadelphicus	Common Fleabane	X	X	X	X			X	X	X	X	X	X
Euonymus fortunei	Climbing Euonymus											X	
Eupatorium fistulosum	Hollow-stemmed Joe-pye Weed											X	
Eupatorium perfoliatum	Boneset									X			
Festuca pratensis	Meadow Fescue			X			X	X	X	X	X	X	X
Festuca rubra	Red Fescue						X					X	
Fraxinus americana	White Ash		X	X		X			X				
Galium aparine	Cleavers	X	X	X	X		X			X	X	X	
Galium mollugo	Wild Madder											X	
Geranium carolinianum	Carolina Cranesbill						X						X

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Geranium maculatum	Wild Geranium						X		X				
Geum canadense	White Avens		X	X	X			X	X	X	X	X	X
Geum vernum	Spring Avens								X				
Glechoma hederacea	Ground Ivy	X		X	X	X	X	X		X	X	X	
Glycine max	Soybean						X						
Hackelia virgiana	Stickseed		X										
Helianthus stromosus	Rough-leaved Sunflower								X				
Hemerocallis fulva	Daylily					X			X				
Hexastylis arifolia	Little Brown Jugs		X										
Hibiscus syriacus	Rose-of-Sharon							X					
Hieracium sp.	Hawkweed						X		X	X			X
Holcus lanatus	Velvet Grass			X			X						X
Hordeum pusillum	Little Barley											X	
Humulus lupulus	Common Hop	X	X				X					X	
Hydrangea arborescens	Wild Hydrangea								X				
Hydrophyllum appendiculatum	Appendaged Water-leaf	X	X	X	X	X	X	X	X	X	X		
Hydrophyllum macrophyllum	Large-leaved Waterleaf		X						X				
Impatiens capensis	Jewelweed	X		X	X			X	X	X	X	X	
Ipomoea coccinea	Hedge Bindweed									X	X	X	
Ipomoea purpurea	Common Morning-glory								X	X			
Jeffersonia diphylla	Twin-leaf		X										
Juglans nigra	Black Walnut		X	X	X	X	X	X	X	X	X	X	
Juncus tenuis	Path Rush								X			X	X
Juniperus virginiana	Eastern Red Cedar		X	X	X	X		X	X		X		X
Lactuca serriola	Prickly Lettuce			X			X	X	X	X	X		X
Lamium purpureum	Red Dead Nettle				X	X							
Laportea canadensis	Wood Nettle	X	X	X		X			X	X	X		
Leersia oryzoides	Rice Cutgrass									X			
Ligustrum sp.	Privet		X	X	X	X	X	X	X	X	X	X	X
Lindera benzoin	Spicebush	X	X						X				

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Liquidambar styraciflua	Sweetgum		X										
Liriodendron tulipifera	Yellow Poplar			X								X	
Lolium perenne	Perennial Rye Grass		X									X	
Lonicera japonica	Japanese Honeysuckle		X	X	X	X		X	X	X	X	X	
Lonicera tartarica	Tartarian Honeysuckle				X						X	X	X
Lotus corniculatus	Birds-foot Trefoil											X	
Lycopus americanus	American Bugleweed					X							
Lysimachia nummularia	Moneywort	X					X			X			
Maclura pomifera	Osage Orange							X	X				
Magnolia acuminata	Cucumber Magnolia		X						X				
Medicago lupulina	Black Medick		X	X					X			X	X
Medicago sativa	Alfalfa			X									
Melilotus alba	White Sweet Clover			X								X	X
Melilotus officinalis	Yellow Sweet Clover			X				X	X			X	X
Microstegium vimineum	Stiltgrass	X	X	X	X			X	X				
Mirabilis nyctaginea	Heartleaf Four-O'Clock											X	
Morus rubra	Mulberry			X	X				X	X	X	X	
Oenothera biennis	Common Evening-primrose												X
Osmorhiza longistylis	Long-styled Sweet Cicely		X										
Oxalis sp.	Wood Sorrel		X	X	X	X	X	X	X	X	X	X	X
Pachysandra sp.	Ornamental Pachysandra				X					X		X	
Packera obovata	Round-leaved Ragwort		X										
Panicum sp.	Panic Grass		X	X		X			X		X	X	X
Parthenocissus quinquefolia	Virginia Creeper	X	X	X	X	X		X	X	X	X	X	
Penstemon canescens	Ashy Beardtongue			X	X				X				
Penstemon hirsutus	Hairy Beardtongue								X				
Phacelia bipinnatifida	Forest Phacelia									X			
Phalaris arundinacea	Reed Canarygrass									X	X		
Phlox divaricata	Forest Phlox								X				
Phleum pratense	Timothy Grass		X	X					X			X	

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Phytolacca americana	Pokeweed					X					X	X	
Physalis sp.	Ground-cherry						X						
Picea abies	Norway Spruce									X			
Picea pungens	Blue Spruce									X			
Pilea pumila	Clearweed	X							X				
Pinus strobus	White Pine											X	
Plantago lanceolata	English Plantain			X	X		X	X	X			X	X
Plantago major	Common Plantain			X	X		X	X	X			X	X
Platanus occidentalis	American Sycamore	X		X			X	X	X	X	X	X	X
Poa compressa	Canada Blue Grass												X
Polygonatum biflorum	Smooth Solomon's Seal		X	X		X		X	X				
Polygonum erectum	Erect Knotweed								X				
Polygonum hydropiper	Water Pepper						X			X			
Polygonum hydropiperoides	False Water Pepper	X								X		X	
Polygonum persicaria	Lady's Thumb	X			X			X	X	X			
Polygonum virginianum	Jumpseed	X	X							X			
Polystichum acrostichoides	Christmas Fern										X		
Populus deltoides	Eastern Cottonwood			X									
Potentilla recta	Sulfur Cinquefoil			X	X				X		X		X
Potentilla norvegica	Strawberry-weed											X	
Potentilla simplex	Old-field Cinquefoil						X						
Prunella vulgaris	Heal-all			X									
Prunus avium	Sweet Cherry										X		
Prunus serotina	Black Cherry						X			X	X	X	X
Ptelea trifoliata	Common Hop-tree								X				
Pycanthemum sp.	Mountainmint											X	
Quercus alba	White Oak								X		X	X	
Quercus coccinea	Scarlet Oak											X	
Quercus montana	Chestnut Oak		X	X	X	X		X	X	X	X		
Quercus rubra	Northern Red Oak		X	X	X	X	X	X	X	X	X	X	

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Quercus velutina	Black Oak								X		X		
Ranunculus bulbosus	Bulbous Buttercup											X	X
Ranunculus sp.	Buttercup								X				
Rhus aromatica	Fragrant Sumac							X					
Rhus glabra	Smooth Sumac			X	X								
Ribes cynosbati	Prickly Gooseberry				X								
Robinia pseudoacacia	Black Locust		X	X	X	X	X	X	X	X	X	X	X
Rosa multiflora	Multiflora Rose		X	X	X			X	X		X	X	X
Rubus allegheniensis	Blackberry			X	X			X	X		X	X	X
Rubus occidentalis	Raspberry										X		
Rudbeckia hirta	Black-eyed Susan											X	
Rumex acetosella	Sheep Sorrel											X	
Rumex crispus	Curly Dock			X	X		X	X	X		X	X	X
Rumex obtusifolius	Bitterdock								X				
Salvia lyrata	Wild Sage			X	X				X			X	
Salix fragilis	Crack Willow			X									
Salix nigra	Black Willow	X		X							X	X	X
Sambacus canadensis	Common Elderberry				X				X		X		
Saponaria officinalis	Bouncing Bet			X				X				X	
Sassafras albidum	Sassafras								X				
Scirpus atrovirens	Black Bulrush								X				
Sedum ternatum	Three-leaved Stonecrop		X						X			X	
Setaria pumila	Yellow Foxtail			X								X	
Setaria verticillata	Bristly Foxtail			X					X		X		X
Silene latifolia	White Campion											X	
Sisyrinchium angustifolium	Narrowleaf Blue-eyed Grass								X				
Smilax bona-nox	Catbrier				X			X	X				
Smilax rotundifolia	Common Greenbrier			X	X	X		X	X				
Solanum carolinense	Horse-nettle							X	X			X	
Solanum dulcamara	Climbing Nightshade						X			X		X	

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Solidago sp.	Goldenrod	X		X			X		X	X	X		X
Sonchus sp.	Sow Thistle											X	
Sorghum halapense	Johnson Grass			X			X	X	X		X	X	X
Stachys tenuifolia	Smooth Hedge-nettle									X	X		
Staphylia trifolia	Bladdernut		X										
Stellaria media	Common Chickweed		X			X							
Symphyotrichum (Aster) sp.	Aster					X			X				X
Taraxacum officinale	Common Dandelion			X	X		X	X	X	X		X	X
Tephrosia virginiana	Virginia Goat's Rue											X	
Thlaspi arvense	Field Pennycress		X	X			X	X	X			X	X
Tilia americana	Basswood						X						
Toxicodendron radicans	Poison Ivy	X		X	X	X	X	X	X	X	X	X	X
Tradescantia virginiana	Spiderwort					X		X	X				
Tragopogon pratensis	Showy Goat's Beard		X						X			X	
Trifolium aureum	Palmate Hop Clover						X						X
Trifolium campestre	Pinnate Hop Clover								X				
Trifolium hybridum	Alsike Clover		X									X	
Trifolium pratense	Red Clover		X	X			X		X	X		X	X
Trifolium repens	White Clover			X			X		X			X	X
Trillium sp.	Trillium		X						X				
Tussilago farfara	Coltsfoot								X	X	X		
Typha latifolia	Broad-leaf Cattail			X									
Ulmus americana	American Elm		X	X	X	X	X	X	X	X	X	X	X
Ulmus rubra	Slippery Elm	X		X	X	X		X	X	X	X	X	X
Valerianella sp.	Corn Salad						X		X				
Verbascum blattaria	Moth Mullein								X			X	X
Verbascum thapsus	Common Mullein			X				X	X			X	X
Verbena utricifolia	White Vervain	X		X				X	X	X		X	
Verbesina sp.	Wingstem	X		X	X		X	X	X	X	X		X
Veronia gigantea	Tall Ironweed	X		X			X				X		

SCIENTIFIC NAME	COMMON NAME	SEGMENT PRESENCE											
		0	1	2	3	4	5	6	7	8	9	10	11
Veronica serpyllifolia	Thyme-leaved Speedwell										X	X	
Viburnum rufidulum	Rusty Black Haw		X					X	X				
Vicia villosa	Hairy Vetch						X		X			X	X
Viola rafinesquii	Field Violet											X	
Viola sororia	Common Blue Violet									X		X	
Viola sp.	Violet	X	X				X				X	X	
Vitis vulpina	Frost Grape		X	X	X	X	X	X	X	X	X	X	
Zea mays	Corn						X						
Total number of species = 246	Number of Species	35	71	95	67	40	64	71	131	69	75	118	71

Notes:

1. Nomenclature follows Jones, R.L. 2005. Plant Life of Kentucky: an illustrated guide to the vascular flora. The University Press of Kentucky. 834 pp.
2. Non-native species per Jones (2005)
3. None of the species identified have special protection status based on Kentucky State Nature Preserve Commission's Rare Plant Database (2007).

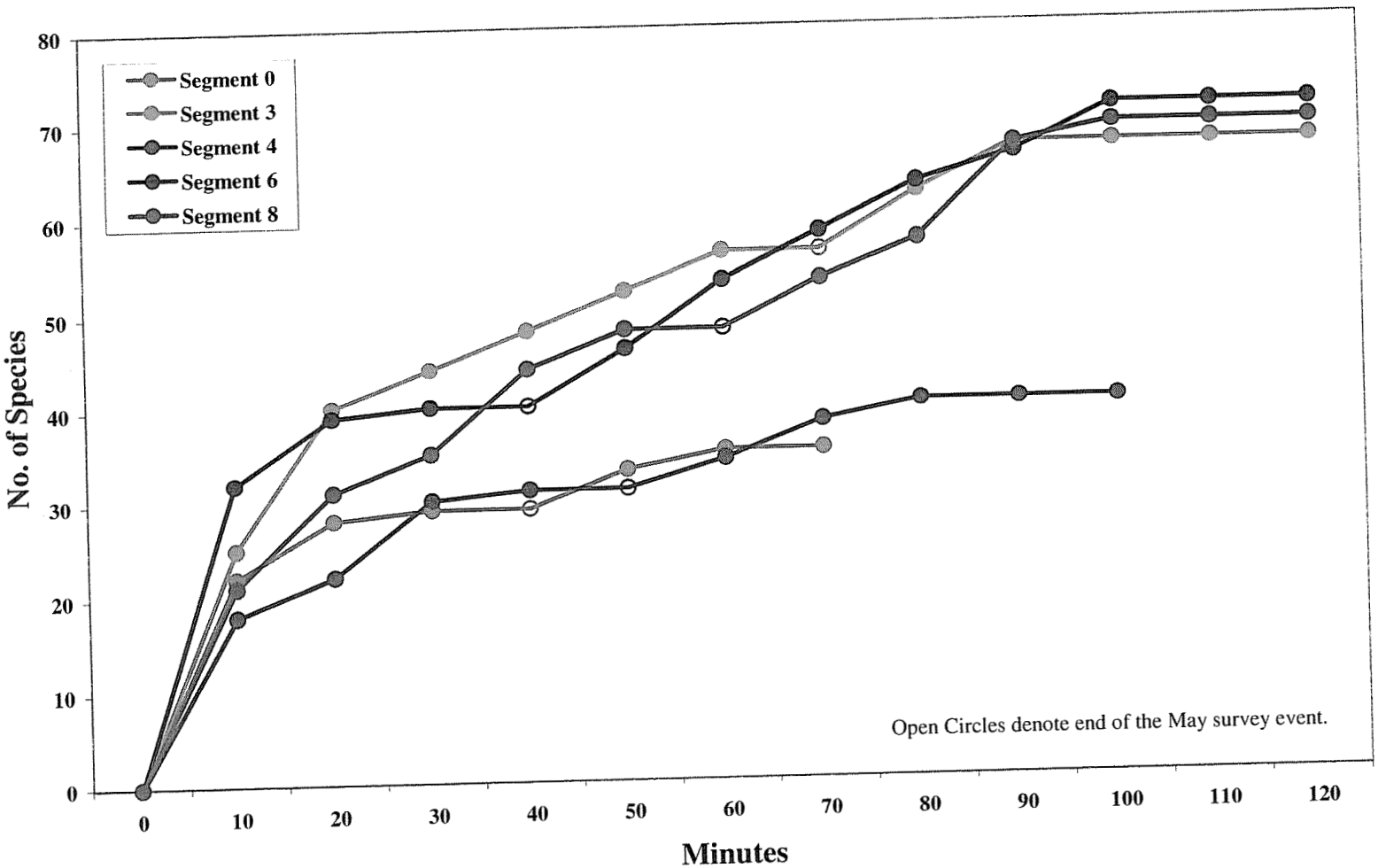

Figure 2a. Species Effort Curves

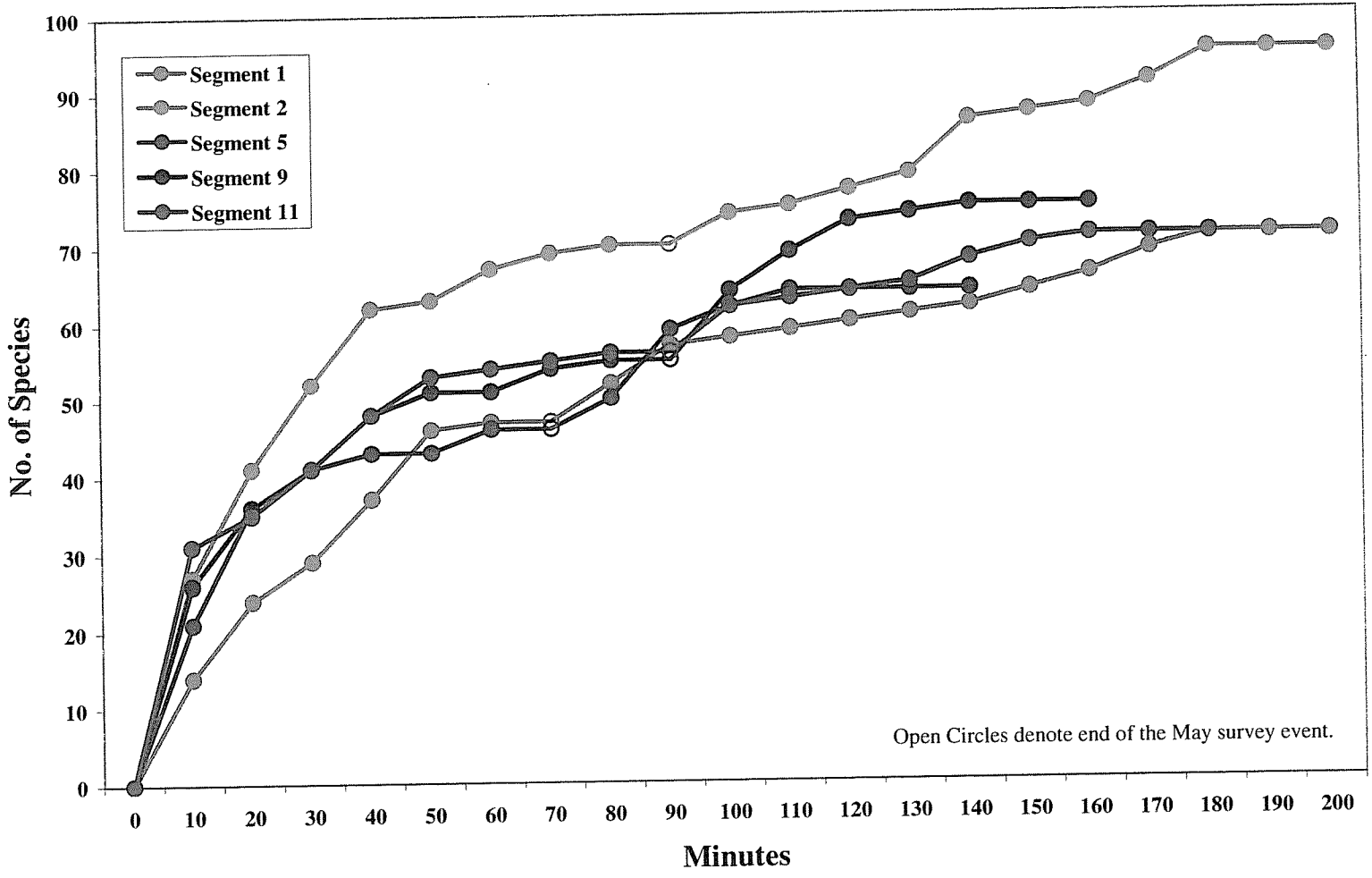

Figure 2b. Species Effort Curves

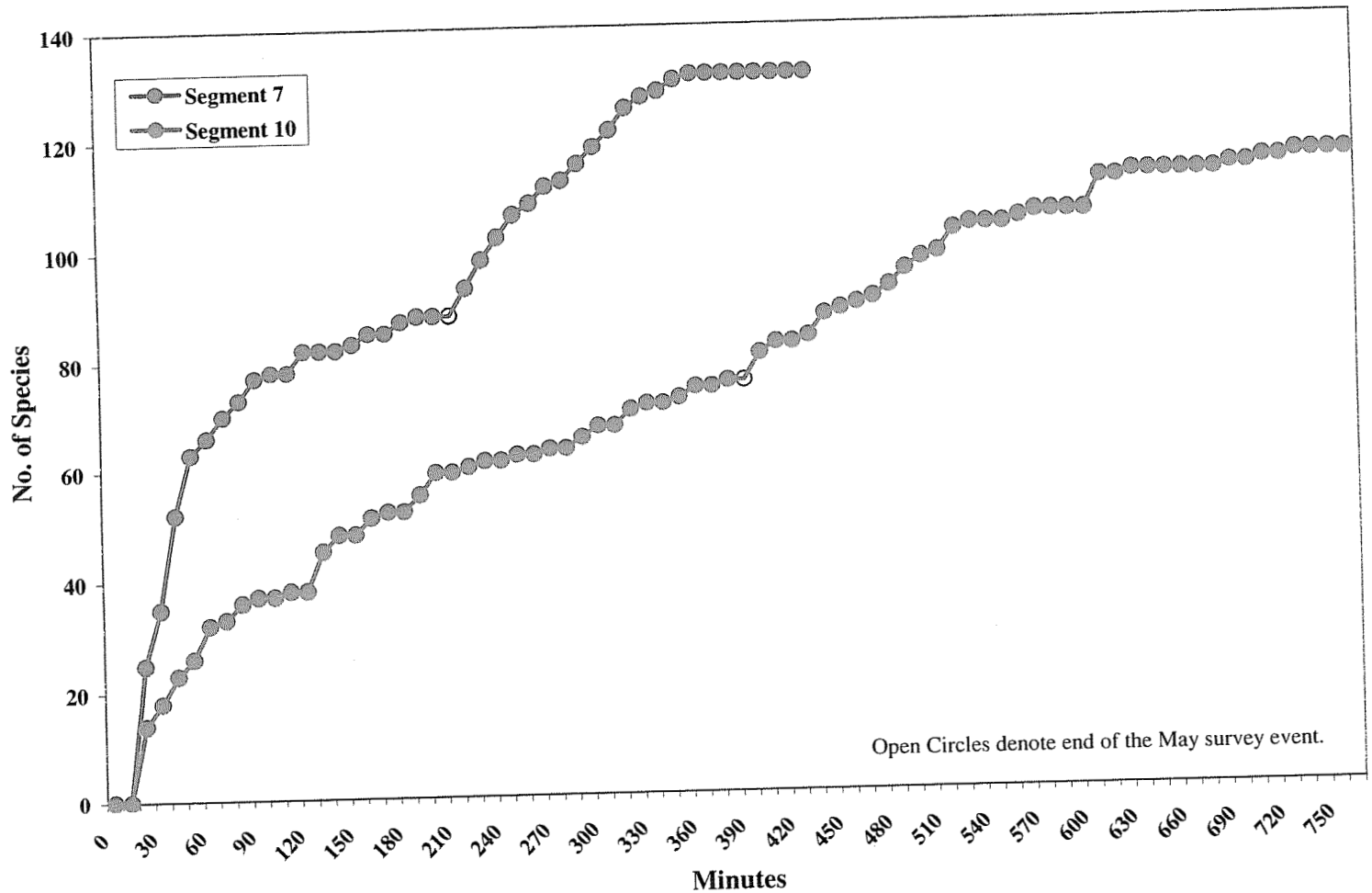

Figure 2c. Species Effort Curves

SUMMARY

This report was prepared, in part, to satisfy the requirements of the U.S. Army Corps of Engineers, which has the responsibility to maintain compliance with the Endangered Species Act when issuing permits under the purview of Section 404 of the Clean Water Act (33 U.S.C. 1344). Investigations of a 30-mile long, 50-foot wide area along the proposed pipeline alignment were performed from May 14-17 and July 17-19, 2007. The proposed project includes 30.6 miles of 42-inch finished water transmission main from the new plant site in Owen County to the Lexington Distribution System. The transmission main route generally follows the established transportation corridors of US 127, KY 2919, KY 1707, KY1262, US 460 and KY 1973 through Franklin, Scott and Fayette Counties.

Threatened and endangered aquatic species, including mussels and fishes, were evaluated in the project's *404(b)(1) Alternatives Analysis* (KAW 2007). An excerpt of the 404(b)(1) Alternatives Analysis is included as Appendix D of this report. Threatened and endangered plants, birds, and mammals of the project study area were determined through review of the Kentucky State Nature Preserve Commission's county reports of threatened and endangered species (KSNPC 2006a, 2006b, 2006c, 2006d). From this review, 19 threatened and endangered plant species, six bird species, and two bat species were identified from the four counties of the project study area. Threatened and endangered species with known extant populations in the four counties of the project study area were then identified from the list of 27 species generated as described above. That is, species with historic occurrences (not confirmed in more than 20 years), species with unconfirmed occurrences, and species known to be extirpated in the four counties were removed from the list of potential endangered and threatened species. This exercise yielded the list of threatened and endangered species used to guide the survey, and included 17 plant species, one bird species, and one bat species. A description of each of these species, including their listing status, diagnostic characters, habitat preferences, and other life history characteristics, is included in Appendix A.

The 30-mile long project study area contains several different habitats including steep wooded hillsides, fields and pastures, floodplain forests and mowed highway right-of-way. Suitable habitats located in counties with known occurrences of threatened and endangered species were evaluated within a 50-foot wide area along the proposed pipeline alignment. Although a proposed alignment for the pipeline was determined prior to the survey, both sides of the roadways along which the pipeline will be located were investigated for threatened and endangered plant species, and potential nesting or roosting habitat for the one bird and one bat species of concern.

No threatened or endangered species were found during the surveys. A total of 246 plant species were identified and none of these were listed by the Kentucky State Nature Preserves Commission as endangered, threatened, or species of concern (Table 3). A large percentage of these species (33%, n=82) are recognized as non-native/exotic by Jones (2005). In addition, no suitable habitats for the yellow-crowned night heron or gray bat were identified within the project study area.

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CONTRIBUTORS

Steven Smith, Environmental Scientist
38-Hour U.S. Army Corps of Engineers Wetland Delineator Certification Training Program
Professional Experience: 7 years
Education: B.S., Geoenvironmental Studies, Shippensburg University

Joseph Wilson, Senior Environmental Scientist
Certified Ecologist, Ecological Society of America
Professional Wetland Scientist (No. 00001333), Society of Wetland Scientists
Professional Experience: 13 years
Education: B.S., Biology, Indiana University of Pennsylvania
M.S., Biology, Shippensburg University

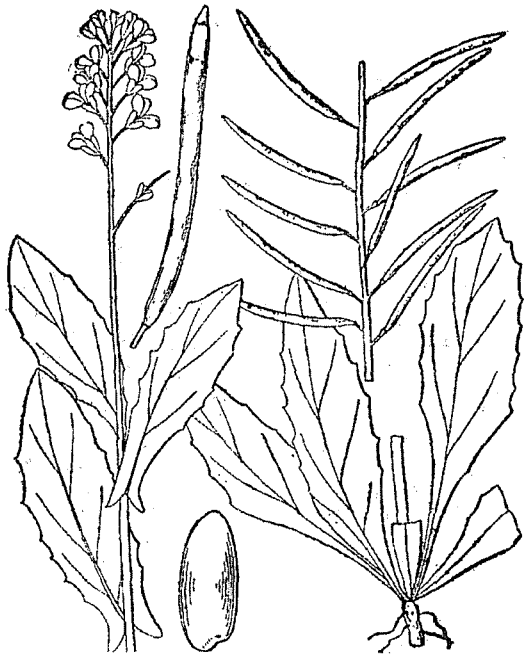
Cy Whitson, Environmental Project Manager
Professional Wetlands Scientist (No. 00001358), Society of Wetland Scientists
Certified Wetland Delineator, Baltimore District, USCOE; No. WDCP94MD0310145B
Professional Experience: 19 years
Education: B.S., Biology, Albright College
M.S., Watershed Science and Hydrology, Utah State University

APPENDIX A

THREATENED AND ENDANGERED SPECIES PROFILES

Arabis perstellata *(Boecherra perstellata)*
Braun's Rockcress

Status: KY – threatened FED – endangered
Distribution: Franklin, Owen
Description: Decumbent, spreading perennial herb with round, fuzzy-grayish stem (2-20 inches) arising from basal rosette. Stem hairs are star-like under magnification (10x). Lower leaves 1.5-6 inches long, obovate to oblanceolate, slightly toothed. Upper leaves similar but smaller. Numerous white or lavender, small, cross-shaped, four-part, flowers in a raceme with sepals slightly shorter than petals. Fruit a long pod with tiny reddish-brown flattened seeds.
Character: Fuzzy-grayish stem with star-like hairs.
Flowering: April – May
Habitat: Mesic, shady, north-facing wooded slopes or in ravines. Limestone soils often with outcrop. Typically found at bases of large trees. Associated with wild ginger, sugar maple, chinquapin oak, blue ash, Ohio buckeye, and Kentucky coffeetree.
Note: Most populations consist of only a few individuals



Images courtesy KSNPC 2007

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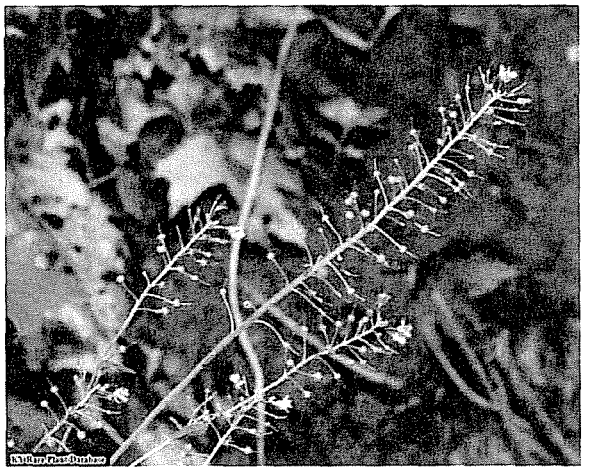
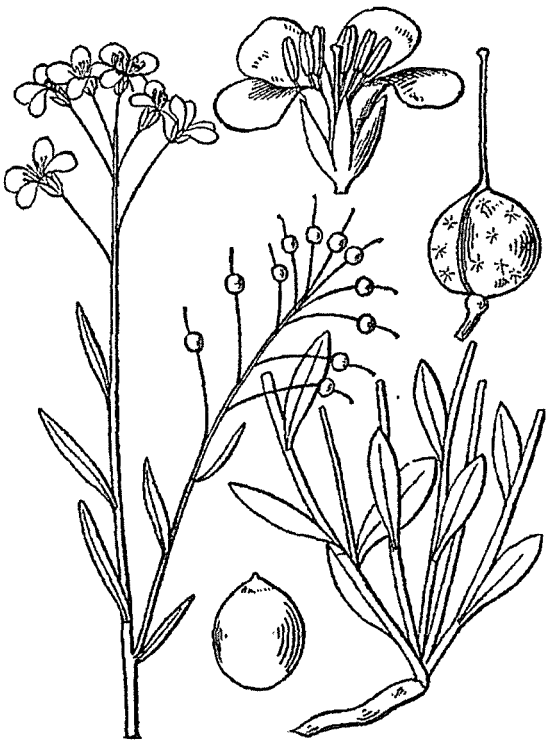
Lesquerrella globosa *(Vesicaria globosa, V. shortii)*
Globe Bladderpod, Lesquereux's Mustard, Short's Bladderpod

Status: KY – endangered FED – candidate
Distribution: Franklin
Description: Erect perennial or biennial herb with slender, leafy stems (12-20 inches) arising from the base. Leaves densely hairy, grayish green, simple, and alternate. Stem leaves oblong to oblanceolate (0.5-1.25 inches), basal leaves similar but larger. Flowers bright yellow to yellow-orange, cross-shaped, four-part, and in a raceme of up to 50 flowers. Fruit a globe-shaped capsule containing one or two seeds.
Character: Combination of leaves, flowers, fruit and habitat.
Flowering: April – May
Habitat: Dry, open limestone ledges on river bluffs, talus, and shale at cliff bases. Usually south to west facing and associated with a large stream or river.
Note: Known to colonize highway rock cuts, especially when established in nearby more natural habitats.





Images courtesy KSNPC 2007

Sources:

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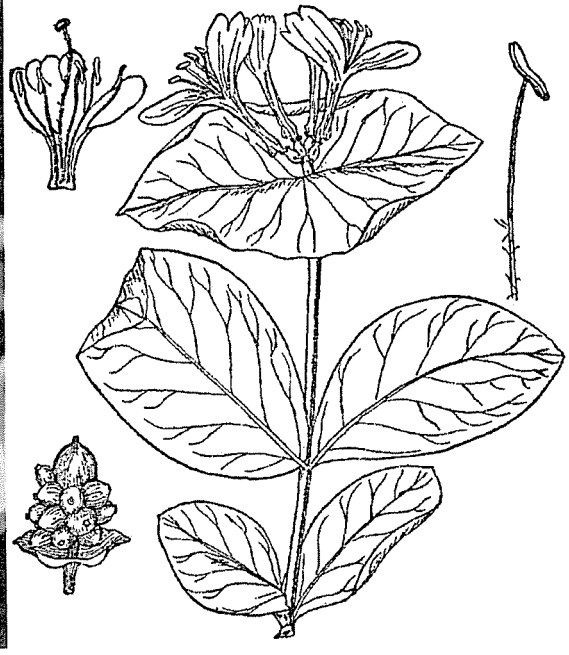
Lonicera prolifera (*L. reticulata, L. sullivantii*)

Grape Honeysuckle, Sullivant's Honeysuckle

Status: KY – endangered FED – none
Distribution: Franklin, Owen
Description: Climbing or trailing woody vine with a glabrous stem (3-10 feet) and upper leaves that are merged at their bases forming a disc. Lower leaves (1.5-3 inches) are oval to obovate and commonly pubescent beneath. Tube-like, pale-yellow flowers (~0.5 inches) that bulge at the base. Fruits yellow.
Character: Bulge at base of flower, disc-like upper leaves
Flowering: April – June
Habitat: Rocky woods and banks
Note: Very similar to other vine-like honeysuckles



Images courtesy of USEPA 2007and KSNPC 2007

Sources:

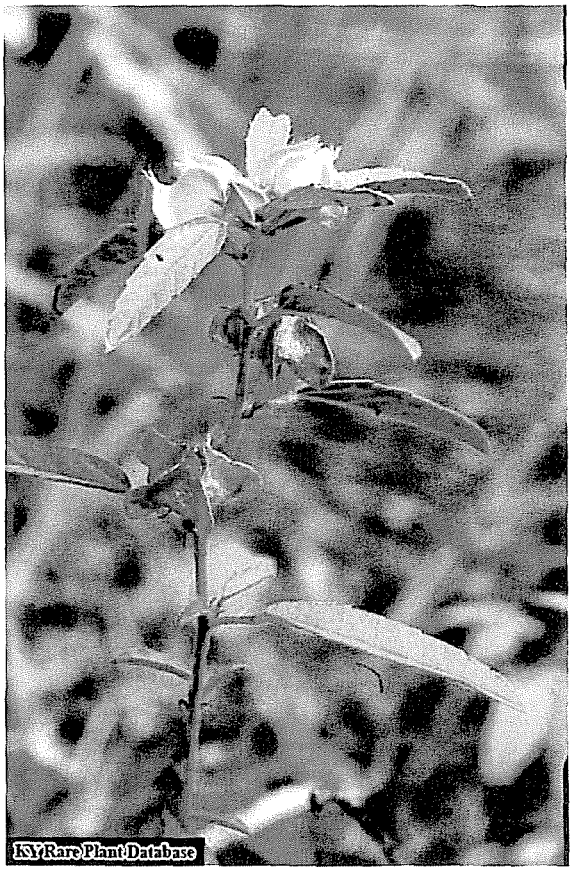
Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

USEPA 2007. Green Landscaping with Native Plants. Available http://www.epa.gov/greenacres/plants/images. (Accessed May 1, 2007)

Malvastrum hispidum *(M. angustrum, Sida hispida, Sphaeralcea angusta)*
Hispid False Mallow, Yellow False Mallow

Status: KY – *threatened* FED – *none*
Distribution: Fayette
Description: Erect, slender, short (6-12 inches) annual, covered with short, pubescent hairs. Leaves (~.075-1 inch long) oblong to lanceolate, petioled, acute, dentate, and with some teeth. Flowers (~0.5 inches wide) yellow, solitary in the axils of upper leaves, and short peduncled. Seed brownish, 5-winged, and ascending.
Character: Leaves unlike other *Malvastrum*, sepals form the 5-wings of the seed
Flowering: July - August
Habitat: Dry open places, prairies, glades, bluffs, alluvial openings, and old fields
Note: Seeds present August through October



Images courtesy KSNPC 2007

Sources:

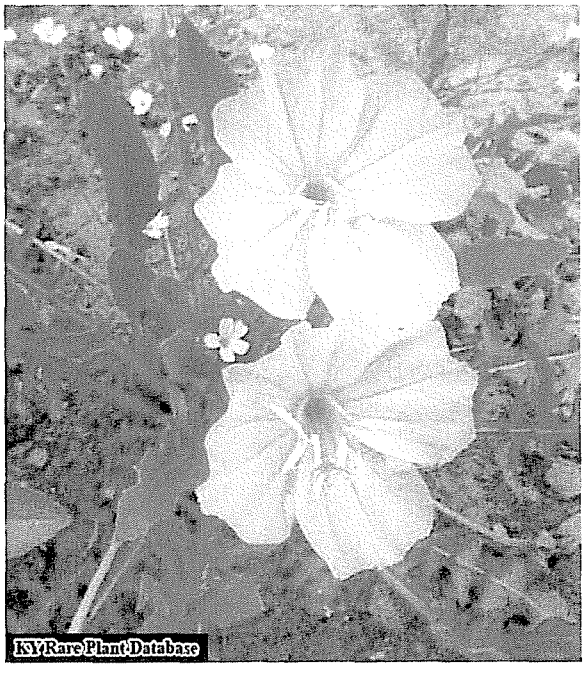
Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

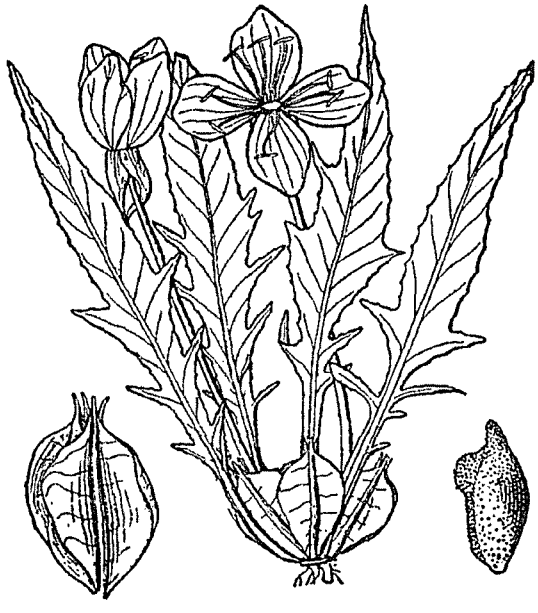
KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Oenothera triloba *(O. hamata, Lavauxia triloba, L watsonii)*

Stemless Evening Primrose, Three-lobed Primrose

Status: KY – threatened FED – none
Distribution: Franklin
Description: Short (~1 foot), perennial herb. Leaves petioled and arising from the base, pinnatifid, sometimes ciliate, oblong to lanceolate, acute at the apex, and large (0.25-1 foot). Flowers white or pink and large (1-2.5 inches wide), long (2-4 inches) and slender tube exceeding the ovary. Capsule ovoid, 4-winged, and veined. Seed densely tuberculate.
Character: Stemless, flower at height of leaves, capsule 4-winged
Flowering: May - July
Habitat: Dry woods, barrens, old fields, particularly rocky openings
Note: Often found around rock outcrops in fields





Images courtesy KSNPC 2007

Sources:

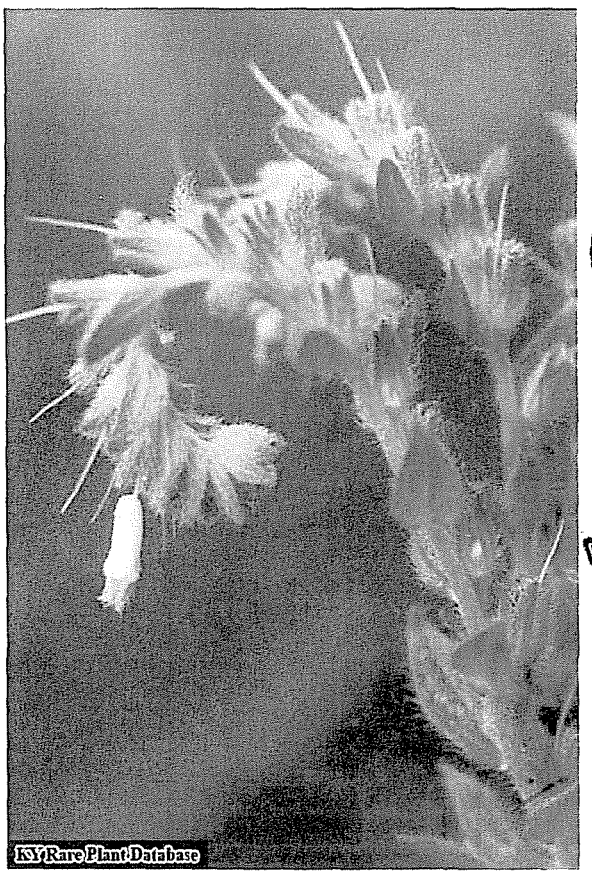
Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Onosmodium hispidissimum *(Lithospermum carolinianum)*

Hairy False Gromwell, Shaggy False Gromwell, Softhair Marbleseed

Status: KY – threatened FED – none
Distribution: Fayette
Description: Hairy, spreading, much branched, and often tall (1-4 feet) herb. Leaves alternate, lanceolate or oblong, acuminate at the apex, narrowed at the base, 5 to 9-ribbed, and long (2-4.5 inches). Flowers numerous and crowded, on short (<0.25 inch) pedicles, yellowish-white, pubescent, and small (.05-0.75 inches long). Seed base constricted.
Character: Densely hairy, leaves up to 1.5 inches wide, style extending well beyond petals and sepals
Flowering: June - July
Habitat: Dry open areas, barrens, old fields, particularly rocky openings
Note: Flower clusters somewhat coiled



Images courtesy KSNPC 2007

Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Onosmodium occidentale (O. molle)

Western False Gromwell, Soft-Hairy False Gromwell, Western Marbleseed

Status: KY – endangered FED – none
Distribution: Franklin
Description: Erect, hairy, tall (1-3.5 feet) herb. Leaves (2-3 inches long) alternate, lanceolate, acuminate, hairy on the sides, and strongly veined. Bracts similar to leaves but much smaller. Flowers dull yellowish-white, tubular, small (<1 inch), style long and exerted. Seed without constriction at base, smooth.
Character: Leaves to 0.75 inches wide, seed without collar
Flowering: June - July
Habitat: Sandy, gravelly, or rocky open areas, fields and glades
Note: Could be confused with *O. hispidissimum*, see Character for differences

Images courtesy KSNPC 2007

Sources:

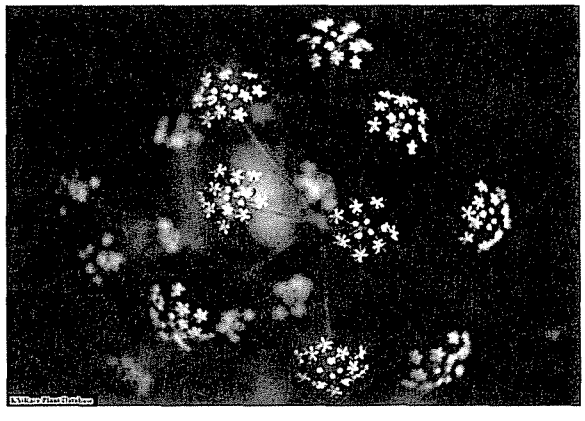
Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

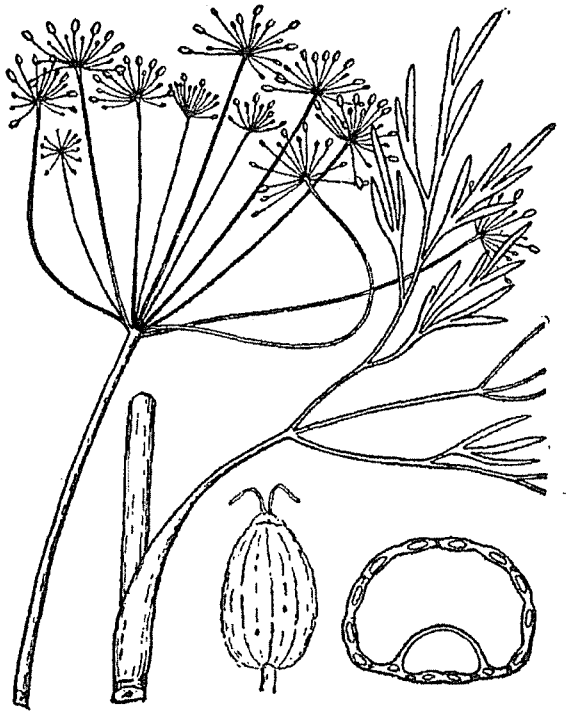
KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Perideridia americana *(Eulophus americana)*

Eastern Yampah, Eastern Eulophus

Status: KY – threatened FED – none
Distribution: Franklin
Description: Erect, perennial herb with stem (3-5 feet) arising from deep tuberous roots. Leaves alternate, pinnately compound, and filiform with upper on a short petiole. Lower and basal leaves similar to upper leaves but bigger and on a long petiole. Flowers white or pink and in a terminal umbel (3-4 inches). Fruit flattened and oblong (0.25 inch).
Character: Compound filiform leaves
Flowering: May – June
Habitat: Low grounds, prairies, and rich woods
Note: Delicate plant, when in woods found in clearings





Images courtesy of KSNPC 2007

Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Philadelphus inodorus

Mock Orange, Scentless Syringa

Status: KY – threatened FED – none
Distribution: Franklin
Description: Woody shrub (6-8 feet) with exfoliating bark, and opposite, ovate, acuminate leaves (2-5 inches) that are rounded or narrowed at the base, 3-nerved, and entire or with minute teeth. Flowers at the end of short branches, white, inodorous, small (1-2 inches wide), solitary or in groups of two or three, and with hairy sepals.
Character: Exfoliating bark and hairy sepals
Flowering: May – July
Habitat: Limestone bluffs, rocky slopes, streambanks, and rich woods
Note: Looks a bit like flowering dogwood, except for bark, serrate leaves petals

Images courtesy of KSNPC 2007

Sources:

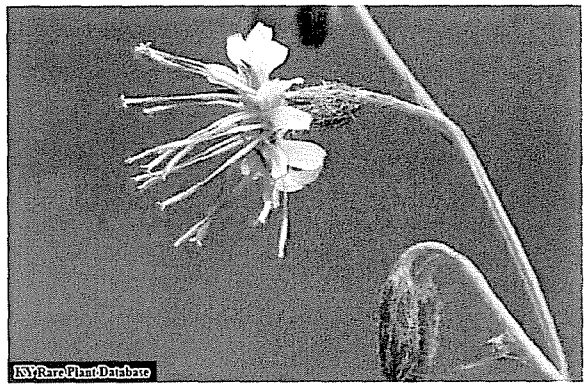
Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Prenanthes crepidinea *(Nabalus crepidineus)*

Nodding Rattlesnake Root, Corymbed Rattlesnake Root

Status: KY – threatened FED – none
Distribution: Fayette
Description: Erect, very tall (5-9 feet), perennial herb, with stem hairless below and often slightly hairy above. Leaves alternate, thin and long (<10 inches), deltoid, and dentate lobed on winged petioles, with upper much smaller than lower and basal. Flowers numerous (20-35), cream colored, short peduncled, corymbose, small (<0.5 inch wide), involucre oblong, hairy, dark green or purplish. Seeds smooth and linear oblong.
Character: Flowers 20-35 and drooping, plant tall, stem milky inside
Flowering: August - September
Habitat: Alluvial forests and thickets, calcareous
Note: Stem leaves well recognizable, basal leaves often lacking or miniscule



Images courtesy KSNPC 2007

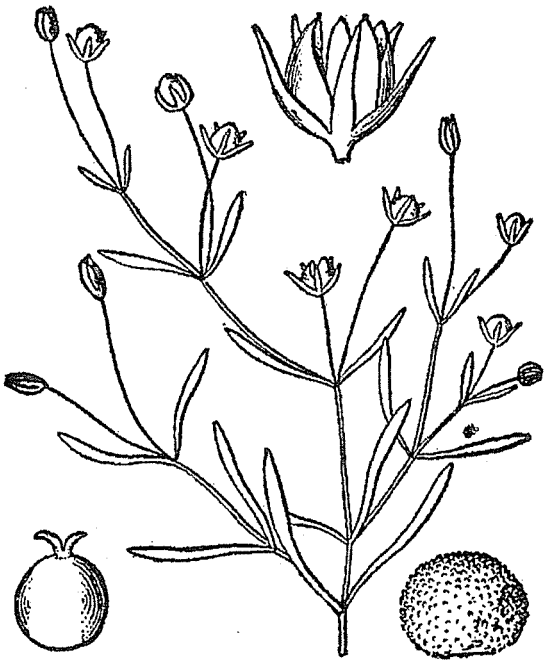
Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Sagina fontinalis *(Alsine fontinalis, Stellaria fontinalis)*
Water Stitchwort, American Water Starwort

Status: KY – threatened FED – none
Distribution: Fayette, Franklin
Description: Annual herb with a slender, weak stem (4-12 inches) that is diffuse with branches. Leaves opposite, linear-spatulate (0.5-1 inch), with the upper sessile and the lower short petioled. Flowers cymose, white, small and 5-part. Fruit a 3-parted egg-shaped capsule. Seeds reddish-brown and rough.
Character: Exfoliating bark and hairy sepals
Flowering: April – June
Habitat: Permanently wet limestone cliffs and ledges in full or partial sun
Note: Often grows in dense mats known as "green hair"



Images courtesy of KSNPC 2007

Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Schizachne purpurascens *(Avena torreyi, A. striata, Trisetum purpurascens)*
Purple Oat, False Melic

Status: KY – threatened FED – none
Distribution: Fayette
Description: Grass with slender, smooth culms (1-2 feet) with sheaths shorter than the internodes and a ligule present. Blades erect (1-6 inches) and narrow (0.25 inch wide), smooth beneath and rough above. Small, lax panicle (2.5-5 inches), with spikelets 3-6 flowered, bearded callus, glumes purple at the base, and lemmas obviously veined, awns as long as or longer than scales.
Character: Bearded callus, glumes purple at base
Flowering: May – June
Habitat: Dry outcrops along limestone cliffs of rivers and streams
Note: Will require laboratory examination for positive identification

Images courtesy of NYFlora.org and KSNPC 2007

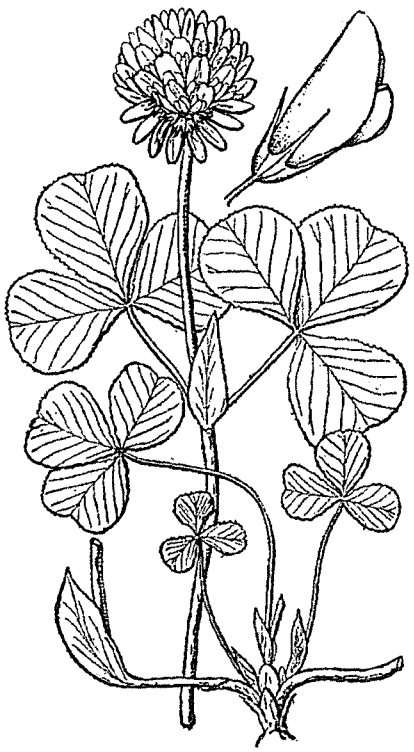
Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Trifolium stoloniferum
Running Buffalo Clover

Status: KY – threatened FED – endangered
Distribution: Fayette
Description: A perennial herb with ascending flowering stems (4-20 inches) that send out long basal runners. Flowering stem with two large (1-1.75 inches) obovate leaves near summit. Runners with similar but smaller leaves. Flowers white, tinged with purple, subglobose, and small (1-1.5 inches diameter).
Character: Flowering stems with pair of large leaves, creeping runners at base
Flowering: April - August
Habitat: Mesic woodlands in partial to full sunlight, periodic disturbance from grazing, mowing, etc.
Note: Studies show seeds need to be digested by herbivores to be viable



Images courtesy of KSNPC 2007

Sources:

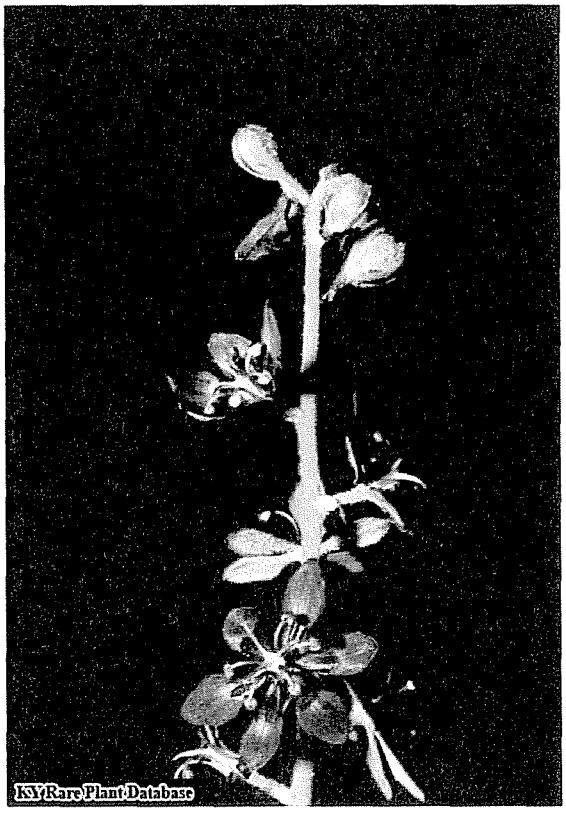
Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Veratrum woodii

Wood's Bunchflower, Wood's False Hellebore

Status: KY – threatened FED – none
Distribution: Franklin, Owen
Description: Tall (2-5 feet) perennial herb with short, erect, poisonous roots and a slender stem. Leaves mostly basal, oblong to oblanceolate, long (≤1 foot), wide (2-4 inches), strongly veined, and narrowed into a sheathing petiole. Flowers in an open and long (1-2 feet) panicle on a pubescent rachis, purple/maroon, small (0.5-0.75 inch wide). Capsule size of flower but few seeded.
Character: Purple/maroon flowers, large plant with distinguishable leaves
Flowering: July - August
Habitat: Rich dry or mesic woods
Note: Stem may be slightly to entirely pubescent



Images courtesy KSNPC 2007

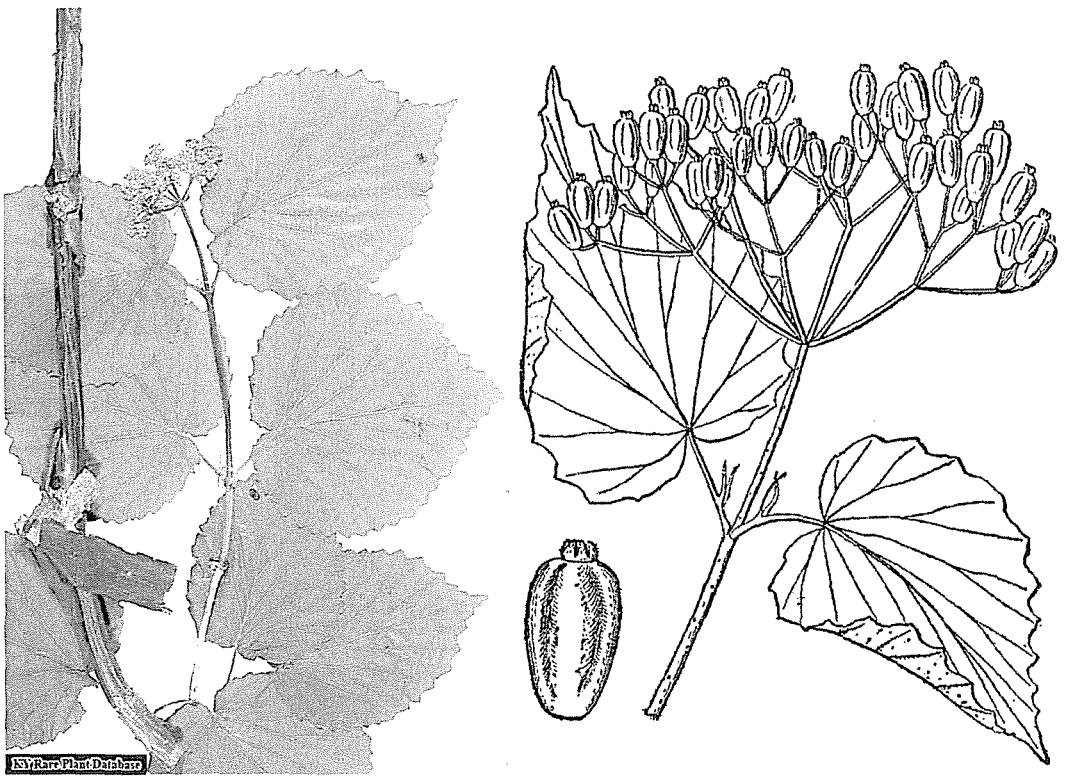
Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007)

Viburnum molle *(V. demetrionis, V. ozarkense)*
Soft-leaf Arrow-wood, Missouri Arrow-wood

Status: KY – threatened FED – *none*
Distribution: Fayette
Description: A tall (12 feet) shrub with grayish-black exfoliating bark. Leaves (3-5 inches long) opposite, broadly ovate to orbicular, short-acuminate at the apex and truncate at the base, dentate, smooth above and soft pubescent beneath. Petioles (~1 inch) with long (~0.5 inch) stipules. Flowers white and in terminal cyme. Seed broad with two noticeable grooves when dry.
Character: ≥12 teeth per leaf half, lower leaf veins converge on petiole, bark exfoliating
Flowering: May
Habitat: Rocky, dry, to somewhat dry woods, usually at mid-slope
Note: Easily confused with Southern Arrow-wood



Images courtesy of KSNPC 2007

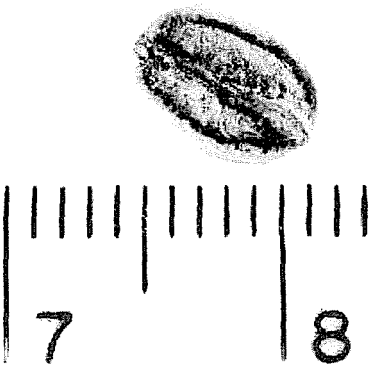
Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007).

Viburnum rafinesquianum
Downy Arrow-wood

Status: KY – threatened FED – none
Distribution: Fayette
Description: A short (6 feet) shrub with smooth or sparsely hairy stems. Leaves opposite, ovate to lanceolate, short-petioled and coarsely serrate with 9-11 teeth per side, petiole and lower leaf surface densely pubescent. Flowers white and in terminal cymes. Fruit bluish-black, seed flattened and groved on both sides.
Character: Short to no petiole, leaves with 9-11 teeth per side, leaf veins reach margin
Flowering: April - May
Habitat: Dry, calcareous woods
Note: Easily confused with Southern Arrow-wood



Images courtesy of Duke University and USDA Plants Database

Sources:

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007).

Rhoads, A.F. and T.A. Block. 2000. The Plants of Pennsylvania. University of Pennsylvania Press, Philadelphia, PA.

Viola walteri *(V. canina, V. muhlenbergii, V. multicaulis)*

Walter's Violet, Prostrate Blue Violet

Status: KY – threatened FED – none
Distribution: Fayette
Description: A low (~4 inches), upright or creeping perennial herb, and densely pubescent. Stemmed or as basal leaves only. Leaves crenulate and rounded, purplish beneath, at least on veins. Bristly stipules arising from base. Flowers on peduncle arising from axis of basal leaves, blue-violet, and with bearded lateral petals.
Character: Leaves purplish beneath at least on veins, pubescent throughout, bearded lateral petals
Flowering: April – May
Habitat: Dry to mesic upland forests with thin canopies
Note: Easily confused with other violets

Images courtesy of KSNPC 2007

Sources:

Britton, N.L. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Dover Publications, NY.

KSNPC 2007. Rare Plant Database. Available http://eppcapps.ky.gov/nprareplants. (Accessed May 1, 2007).

Nytcanassa violacea
Yellow-Crowned Night Heron

Status: KY – threatened FED – none
Distribution: Fayette
Description: A stocky heron with a straight, stout, all-dark bill; breeding adult has bluffy-white crown, black face with white cheek patch, gray underparts and long white head plumes. Juvenile has dusky underparts with fine white streaks and spots, and dark-streaked underparts. Average length 61 cm, wingspan 107 cm. Call is a high-pitched "quak," often uttered in series.
Character: A stocky heron that roosts during the day in trees or marshes.
Habitat: In or near forested swamps, ponds, streams, and other shallow water bodies in or near forested areas. Do not nest in dense colonies. Nests in mid-story (ranging from 10 to 20 meters) of a mature forest frequently including sycamore, cottonwood, and black walnut, sometimes in or near residential areas.
Note: More strictly nocturnal than the Black-crowned Night Heron.

Image courtesy FLDEP 2007

Sources:

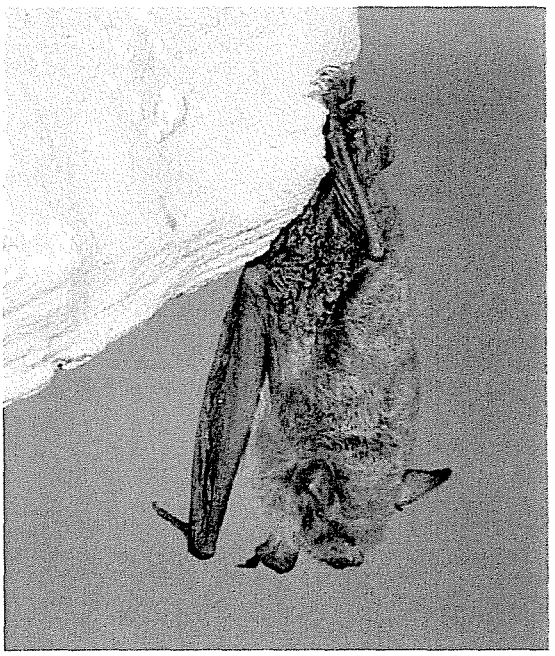
Florida Department of Environmental Protection. 2007. Project Greenshores Bird Monitoring Report. http://www.dep.state.fl.us/northwest/Ecosys/section/ycnhmir2.jpg. (Accessed: May 10, 2007).

Palmer-Ball, B. 1996. The Kentucky Breeding Bird Atlas. University Press of Kentucky. Lexington, KY. 372 pp.

NatureServe 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 10, 2007).

Myotis grisescens
Gray Bat

Status: KY – threatened FED – endangered
Distribution: Franklin
Description: A small bat with unicolored dorsal fur (gray after the mid-summer molt, at other times sometimes chestnut brown or russet); paler below with hairs darker basally. The wing membrane (gray) connects to the foot at the ankle; calcar is unkeeled. Total length 80-105 mm, mass 7-16 grams (usually 8-10 g).
Character: The active period for the gray bat in Kentucky begins in late March or early April for females and mid-April to mid-May for adult males and juveniles (USFWS, 1982).
Habitat: Gray bat colonies are restricted entirely to caves or cave-like habitats. During summer the bats are highly selective for caves providing specific temperature and roost conditions. Usually these caves are all located within a kilometer of a river or reservoir.
Note: A small gray bat that roosts almost exclusively in caves year-round.



Images courtesy USDOT 2007

Sources:

NatureServe 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 10, 2007).

U.S. Fish and Wildlife Service (USFWS). 1982. Gray Bat Recovery Plan. Prepared by the U.S. Fish and Wildlife Service in cooperation with the Gray Bat Recovery Team. Atlanta, Georgia. 91 pp.

U.S. Department of Transportation – Federal Highway Administration. 2007. Washington D.C. http://www.fhwa.dot.gov/environment/wildlifeprotection/index.cfm?fuseaction=home.viewArticle&articleID=24 (Accessed: May 10, 2007).

APPENDIX B

COLOR PHOTOGRAPHS

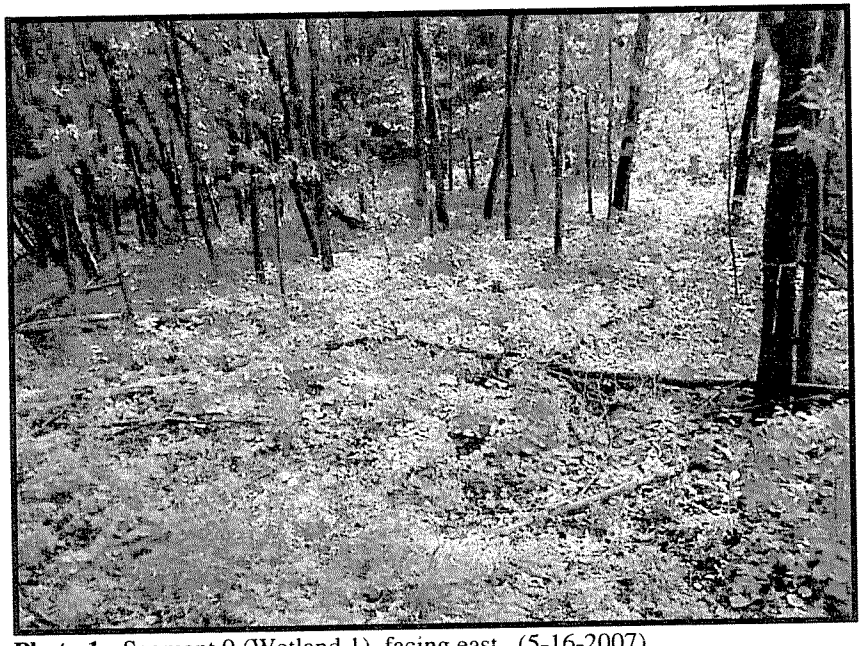


Photo 1: Segment 0 (Wetland 1), facing east. (5-16-2007)

Photo 2: Segment 1, standing upslope of the proposed pump station, facing northeast toward the proposed treatment plant location. (7-18-2007)

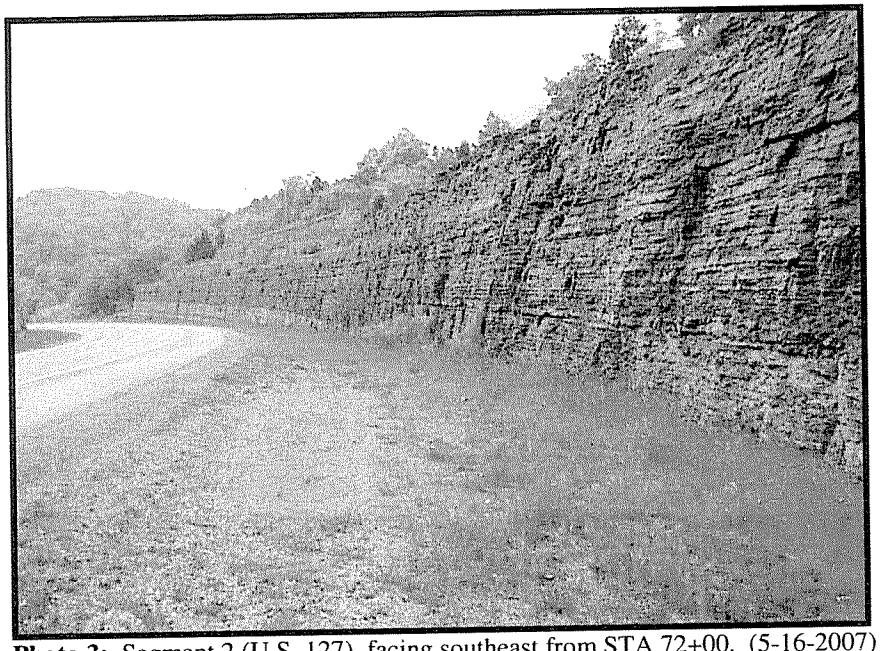


Photo 3: Segment 2 (U.S. 127), facing southeast from STA 72+00. (5-16-2007)

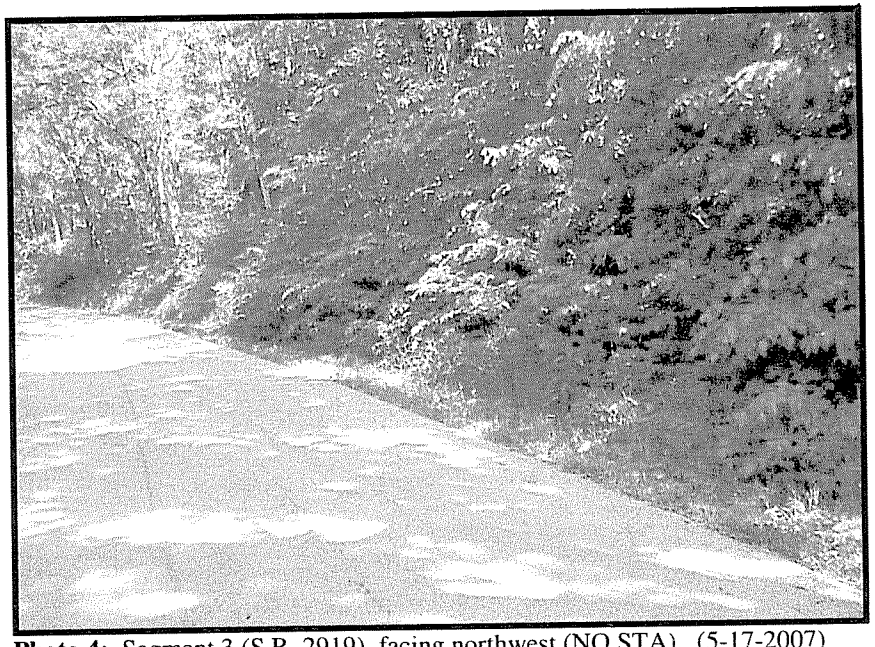


Photo 4: Segment 3 (S.R. 2919), facing northwest (NO STA). (5-17-2007)

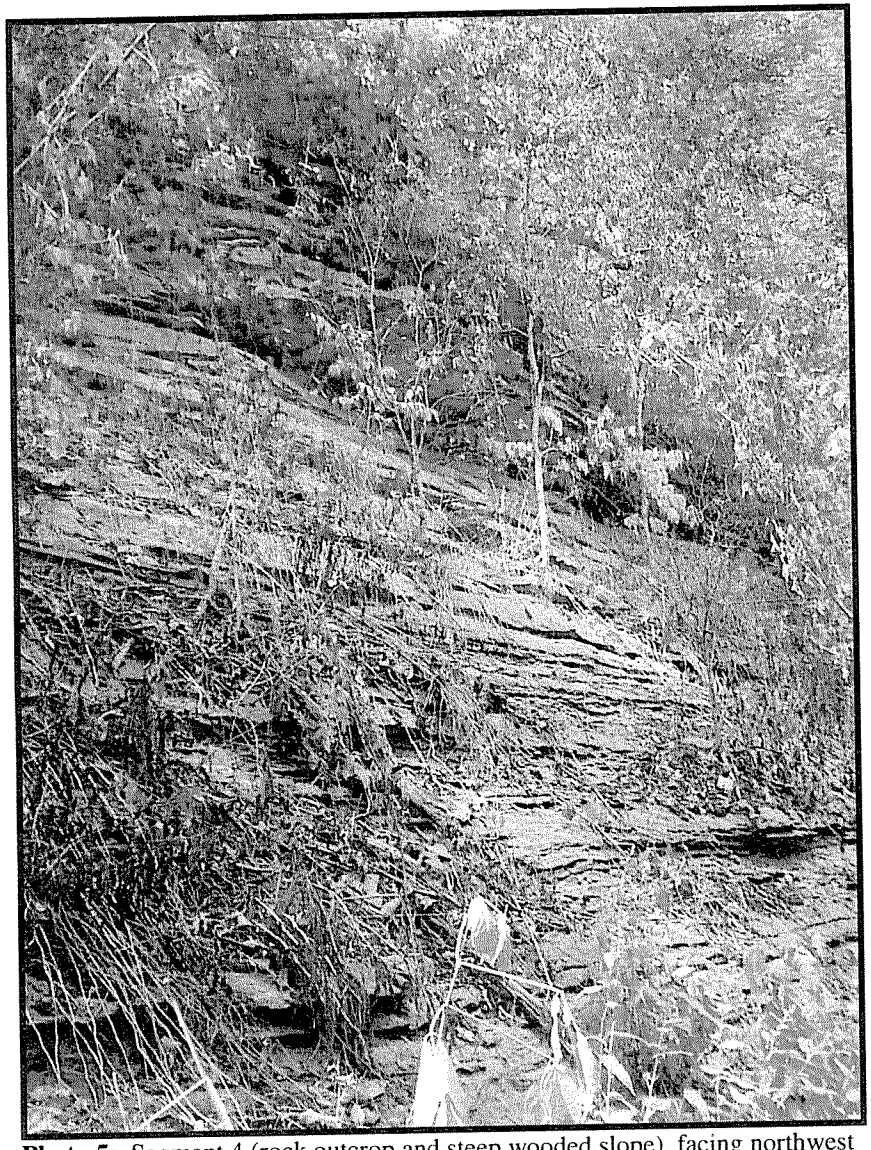


Photo 5: Segment 4 (rock outcrop and steep wooded slope), facing northwest from STA 221+50. (7-18-2007)

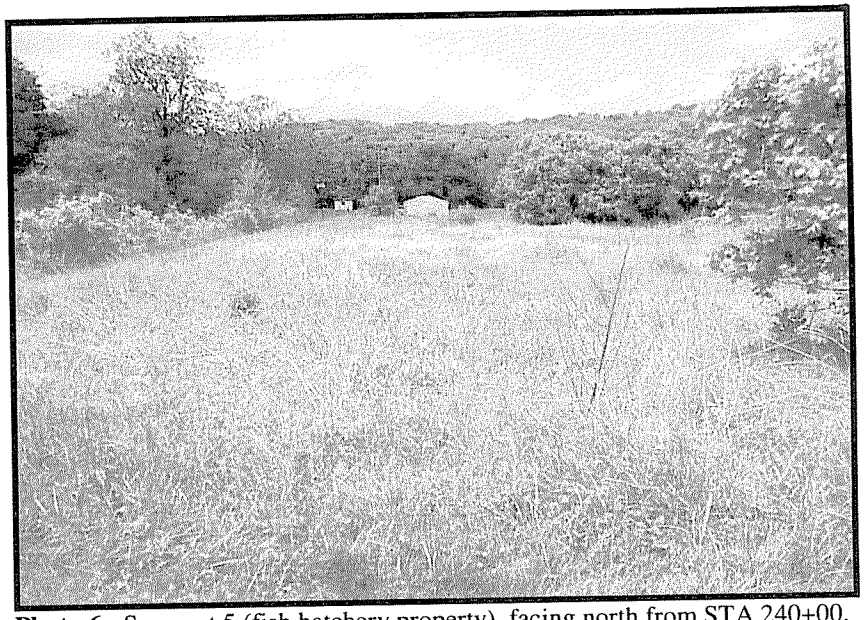


Photo 6: Segment 5 (fish hatchery property), facing north from STA 240+00. (5-16-2007)

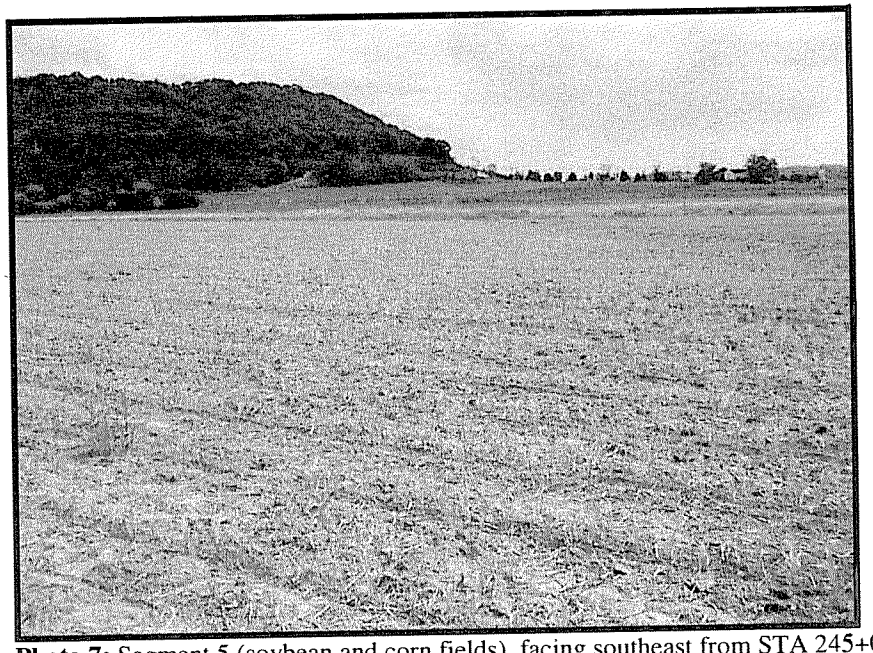


Photo 7: Segment 5 (soybean and corn fields), facing southeast from STA 245+00. (5-16-2007)

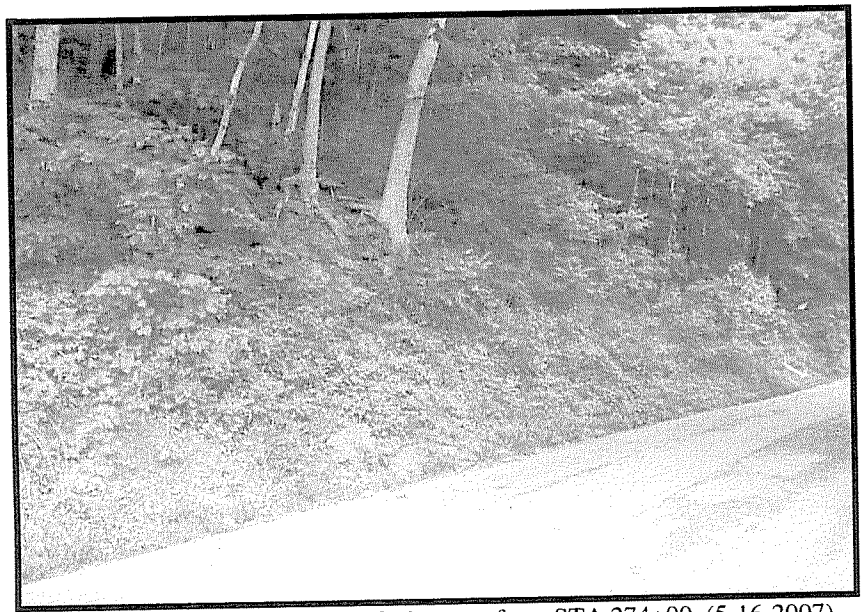


Photo 8: Segment 6 (S.R. 2919), facing east from STA 274+00. (5-16-2007)

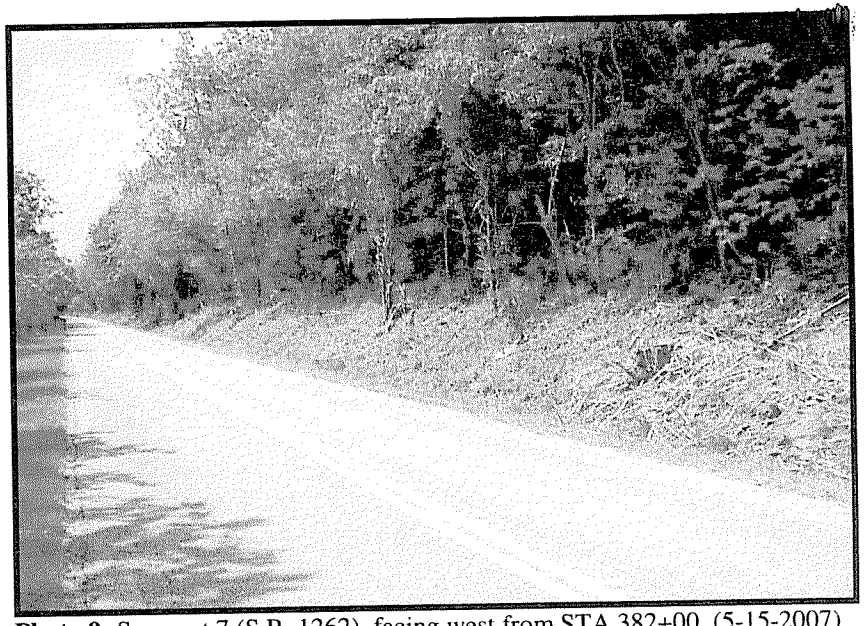


Photo 9: Segment 7 (S.R. 1262), facing west from STA 382+00. (5-15-2007)

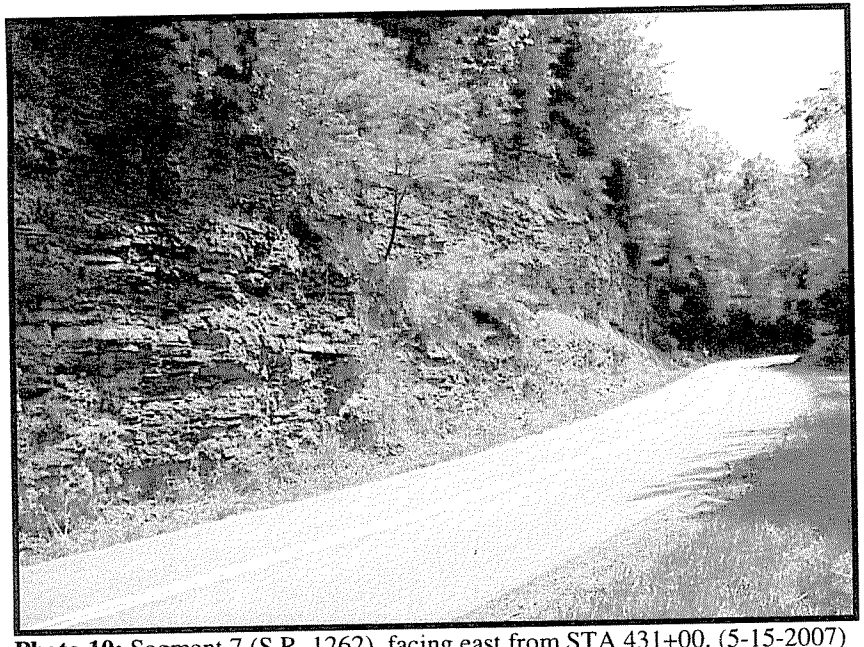


Photo 10: Segment 7 (S.R. 1262), facing east from STA 431+00. (5-15-2007)

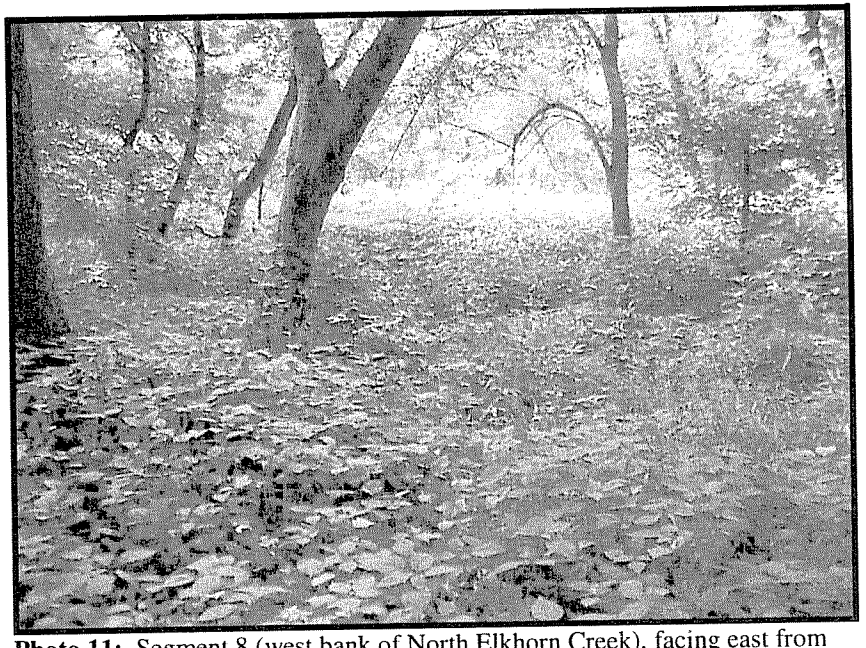


Photo 11: Segment 8 (west bank of North Elkhorn Creek), facing east from STA 584+50. (7-19-2007)

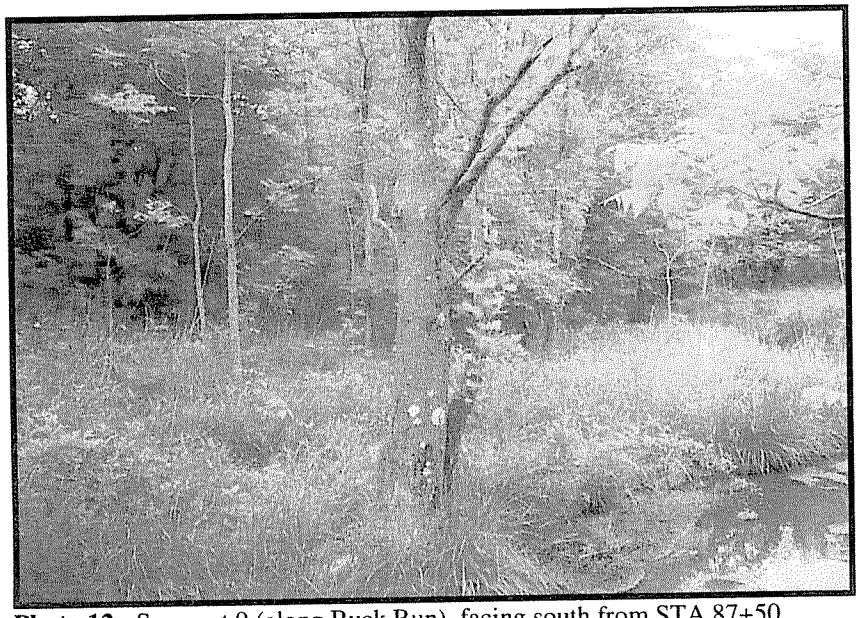


Photo 12: Segment 9 (along Buck Run), facing south from STA 87+50. (7-19-2007)

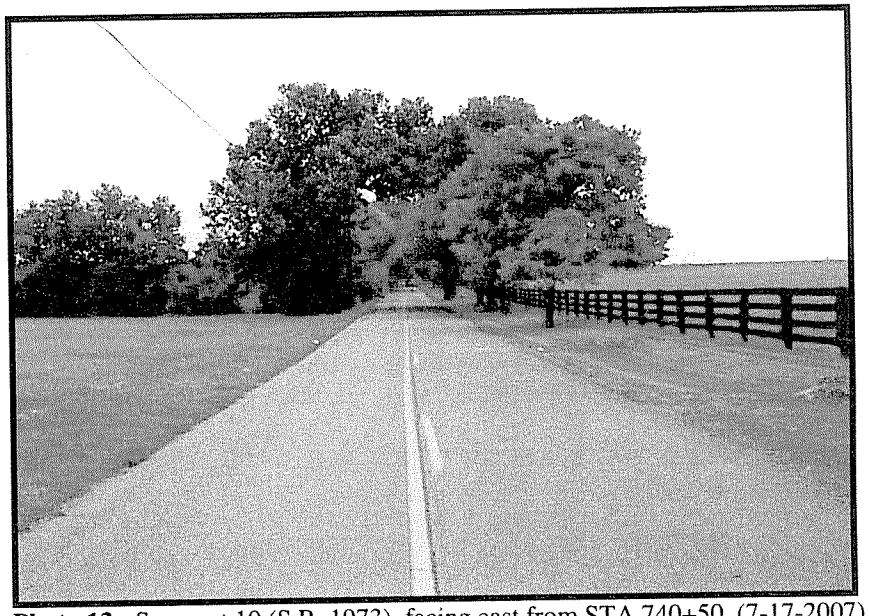


Photo 13: Segment 10 (S.R. 1973), facing east from STA 740+50. (7-17-2007)

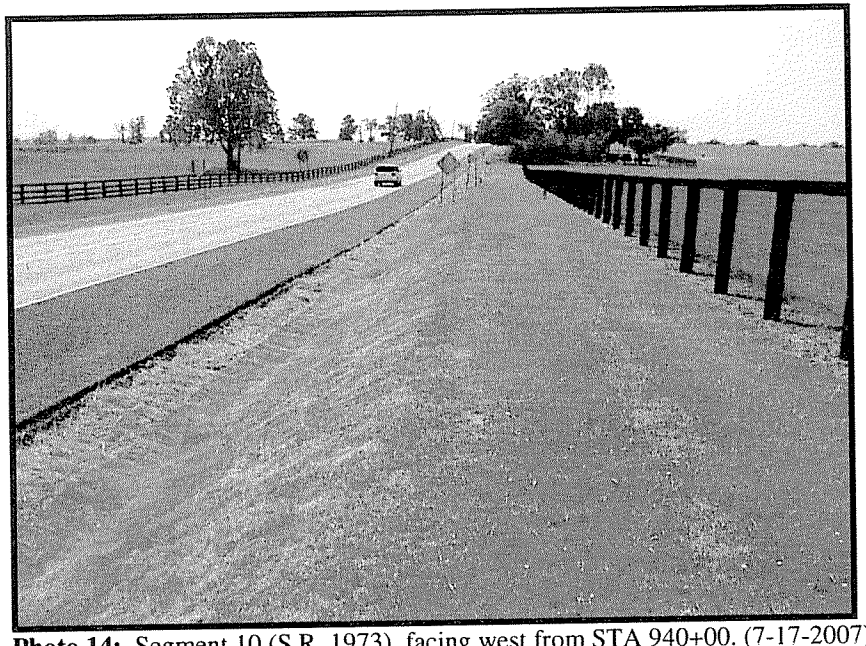


Photo 14: Segment 10 (S.R. 1973), facing west from STA 940+00. (7-17-2007)

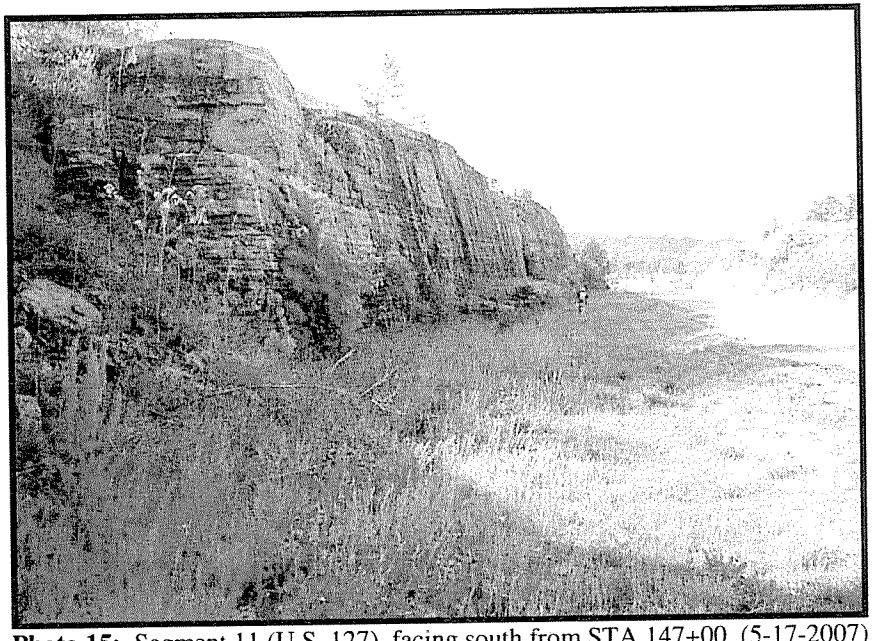
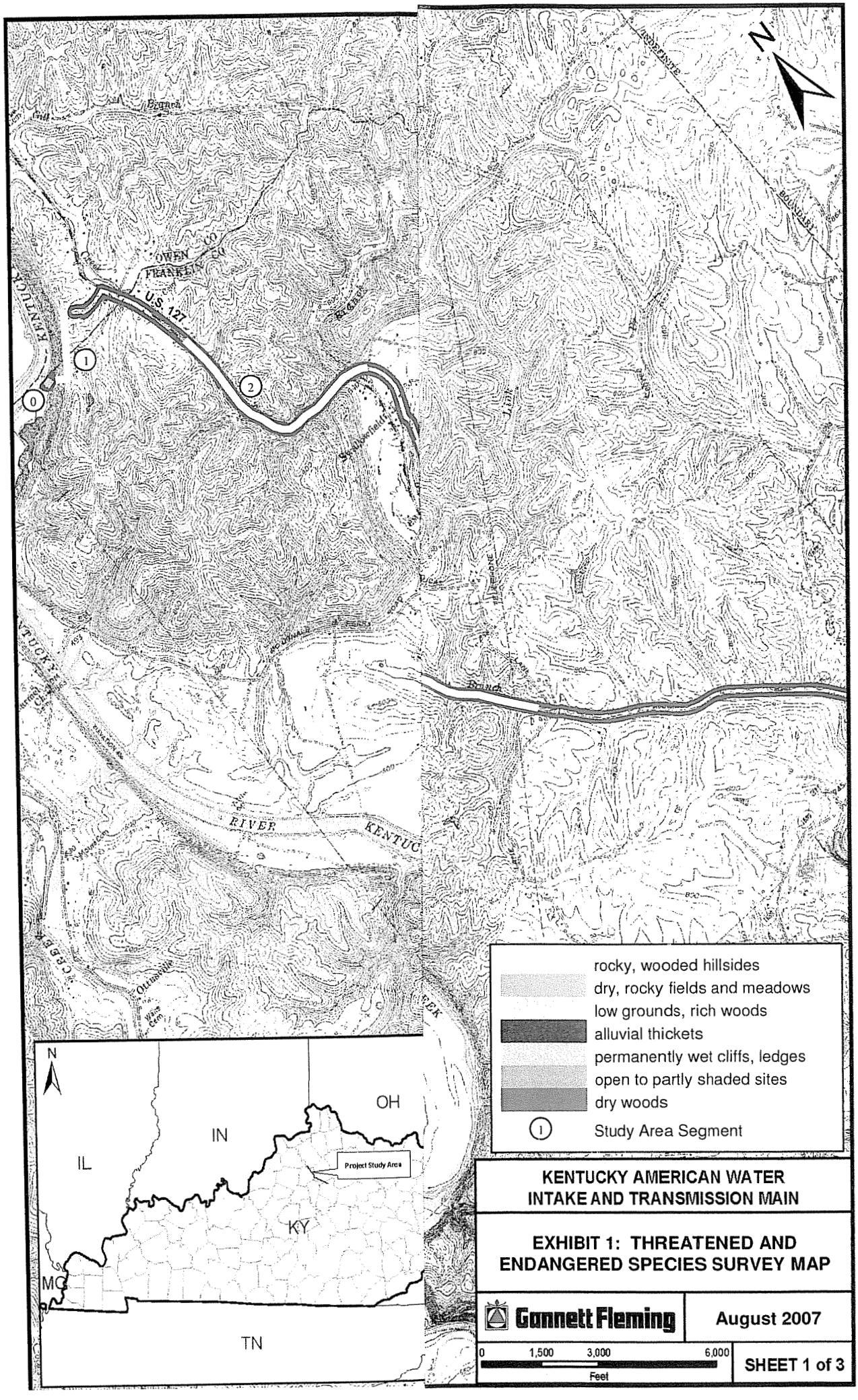


Photo 15: Segment 11 (U.S. 127), facing south from STA 147+00. (5-17-2007)

APPENDIX C

THREATENED AND ENDANGERED SPECIES SURVEY LOCATION MAPS



KENTUCKY AMERICAN WATER INTAKE AND TRANSMISSION MAIN

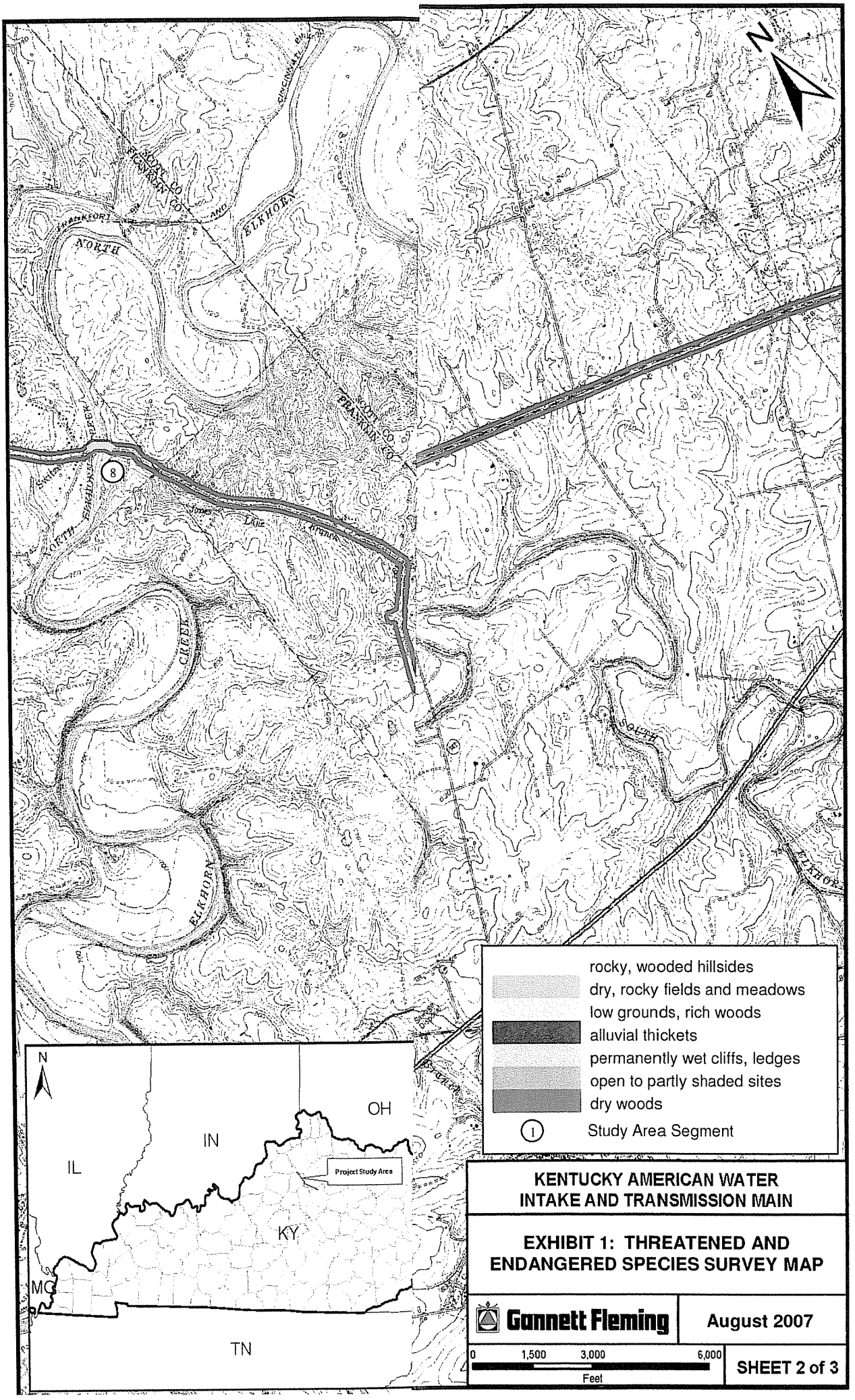
EXHIBIT 1: THREATENED AND ENDANGERED SPECIES SURVEY MAP

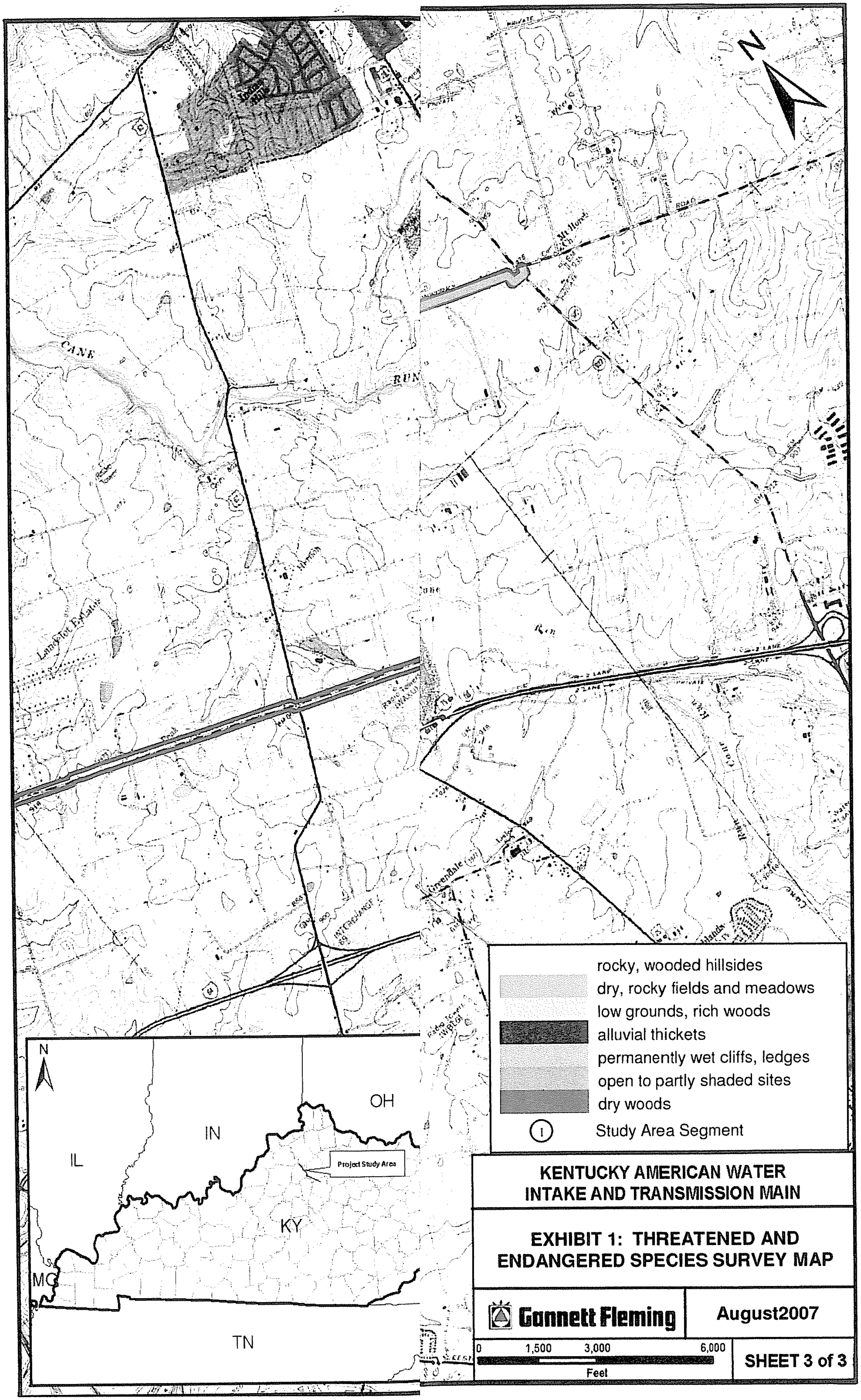
Gannett Fleming

August 2007

0 1,500 3,000 6,000 Feet

SHEET 1 of 3


N
rocky, wooded hillsides
dry, rocky fields and meadows
low grounds, rich woods
alluvial thickets
permanently wet cliffs, ledges
open to partly shaded sites
dry woods
1 Study Area Segment
N
OH
IN
IL
KY
MO
TN
Project Study Area
KENTUCKY AMERICAN WATER
INTAKE AND TRANSMISSION MAIN
EXHIBIT 1: THREATENED AND
ENDANGERED SPECIES SURVEY MAP
Gannett Fleming
August 2007
0 1,500 3,000 6,000
Feet
SHEET 2 of 3



KENTUCKY AMERICAN WATER
INTAKE AND TRANSMISSION MAIN

EXHIBIT 1: THREATENED AND ENDANGERED SPECIES SURVEY MAP

Gannett Fleming | August2007

0 1,500 3,000 6,000 Feet

SHEET 3 of 3

APPENDIX D

EXCERPT FROM THE 404(B)(1) ALTERNATIVES ANALYSIS (MARCH 2007)

Excerpt from Page 14 of the *404(b)(1) Alternatives Analysis* (March 2007)

3.3 Other Environmental Consequences

3.3.1 Threatened and Endangered Species

The KSNPC recognizes three mussels and two fish with special protection status that may be associated with the project alternatives (Appendix B). The listed mussels include the elktoe (*Alasmidonta marginata*), northern riffleshell (*Epioblasma torulosa rangiana*), and salamander mussel (*Simpsonaias ambigua*); while the listed fish include the burbot (*Lota lota*) and horneyhead chubb (*Nocomis biguttatus*). The elktoe and salamander mussel are threatened species in Kentucky, while the northern riffleshell is an endangered species in Kentucky and is listed as endangered at the federal-level by the U.S. Fish and Wildlife Service. The burbot and horneyhead chubb are considered species of special concern.

The elktoe has known populations in Elkhorn Creek, North Elkhorn Creek, South Elkhorn, Benson Creek, Flat Creek, and the Kentucky River in both Franklin and Scott Counties. The northern riffleshell is known from one location in Elkhorn Creek approximately 0.9 miles upstream of the confluence with the Kentucky River in Franklin County. The salamander mussel has known populations in the Kentucky River, Elkhorn Creek, North Elkhorn Creek, Flat Creek, and Cedar Creek in Franklin, Owen, and Henry Counties. The burbot and horneyhead chubb are not threatened or endangered species, and, therefore, are only mentioned in this analysis.

The number of times a project alternative crosses a stream with a known population of threatened and/or endangered mussels is summarized in Table 4 located at the end of Section 3.0. Based on this analysis, Alternatives G, H, I, and J have the least potential to impact threatened and endangered species as these alternatives only cross one stream with a known population of threatened and endangered species. Alternatives B and D have the greatest potential to impact threatened and endangered species as these alternatives make six stream crossings where threatened and/or endangered mussel species are known to occur.