FINAL ENVIRONMENTAL ASSESSMENT

COWSKIN CREEK
LOCAL FLOOD PROTECTION PROJECT
WICHITA, KANSAS

US Army Corps
Of Engineers
Tulsa District

JULY 2004

FINDING OF NO SIGNIFICANT IMPACT

In accordance with the National Environmental Policy Act of 1969, including guidelines in 33 Code of Federal Regulations, Part 230, the Tulsa District has assessed the environmental impacts of a channel improvement project to provide additional flood relief within the Cowskin Creek basin, Wichita, Kansas. The Cowskin Creek basin has a history of flooding and flood-related damage. Flooding has traditionally occurred along Cowskin Creek, Dry Creek, Calfskin Creek, North Fork of Calfskin Creek, Middle Fork of Calfskin Creek, and Westlink Tributary. This assessment was prepared in accordance with U.S. Army Corps of Engineers Regulations, Part 230, Policy and Procedures for Implementing the National Environmental Policy Act. It has been determined from the enclosed Environmental Assessment that the project will have no significant adverse effects on the natural or human environment. Therefore, an environmental impact statement will not be prepared.

2 8 JUL 2004
Date

Miroslav P. Kurka
Colonel, U.S. Army
District Engineer

Enclosure
Environmental Assessment

FINAL

Environmental Assessment for
Cowskin Creek Local Flood Protection Project
Wichita, Kansas

U.S. Army Corps of Engineers
Southwestern Division
Tulsa District

July 2004

ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the effects of a Section 205 Local Flood Protection Project to reduce flooding within the Cowskin Creek basin, Wichita, Kansas. This EA will facilitate the decision process regarding the proposed action and alternatives.

SECTION 1	*PURPOSE, NEED AND SCOPE* of the proposed action summarizes the purpose of and need for the proposed action, provides relevant background information, and describes the scope of the EA.
SECTION 2	*ALTERNATIVES* examines alternatives for implementing the proposed action.
SECTION 3	*PROPOSED ACTION* describes the recommended action.
SECTION 4	*AFFECTED ENVIRONMENT* describes the existing environmental and socioeconomic setting.
SECTION 5	*ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION* identifies the potential environmental and socioeconomic effects of implementing the proposed action and alternatives.
SECTION 6	*MITIGATION PLAN* summarizes mitigation actions required to enable a Finding of No Significant Impact for the proposed alternative.
SECTION 7	*FEDERAL, STATE, AND LOCAL AGENCY COORDINATION* provides a listing of individuals and agencies consulted during preparation of the EA.
SECTION 8	*REFERENCES* provides bibliographical information for cited sources.
SECTION 9	*APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS* provides a listing of environmental protection statutes and other environmental requirements.
SECTION 10	*LIST OF PREPARERS* identifies persons who prepared the document and their areas of expertise.
APPENDICES	*A* Coordination/Correspondence *B* Section 404 Permit *C* Fish and Wildlife Coordination Act Report *D* Cultural Resources Coordination *E* Public Comments *F* Newspaper Public Notice

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FINAL
ENVIRONMENTAL ASSESSMENT
COWSKIN CREEK LOCAL FLOOD PROTECTION PROJECT
WICHITA, KANSAS

SECTION 1.0 PURPOSE, NEED, AND SCOPE

The U.S. Army Corps of Engineers, Tulsa District, and the City of Wichita are conducting a feasibility study of Cowskin Creek under the authority of Section 205 of the Flood Control Act of 1948, (Public Law 80-858), as amended. The feasibility study began in April 2001 and is scheduled for completion in April 2004. The City of Wichita, as the local sponsor would be responsible for acquisition of the lands, easements, rights-of-way, relocations, and disposal areas that would be required for the project. Acquisitions must be completed before construction can begin. The sponsor must provide at least 35% of the total project cost, with a maximum of up to 50%. The maximum Federal share would be 65%.

A number of prior studies have addressed the flooding problems in the Cowskin Creek basin. A Flood Insurance Study (FIS) was completed in 1986 for the City of Wichita and for Sedgwick County. The purpose of the study was to investigate flood hazards in the area. The information was used to help the City implement a flood insurance program and to assist planners in floodplain management and development.

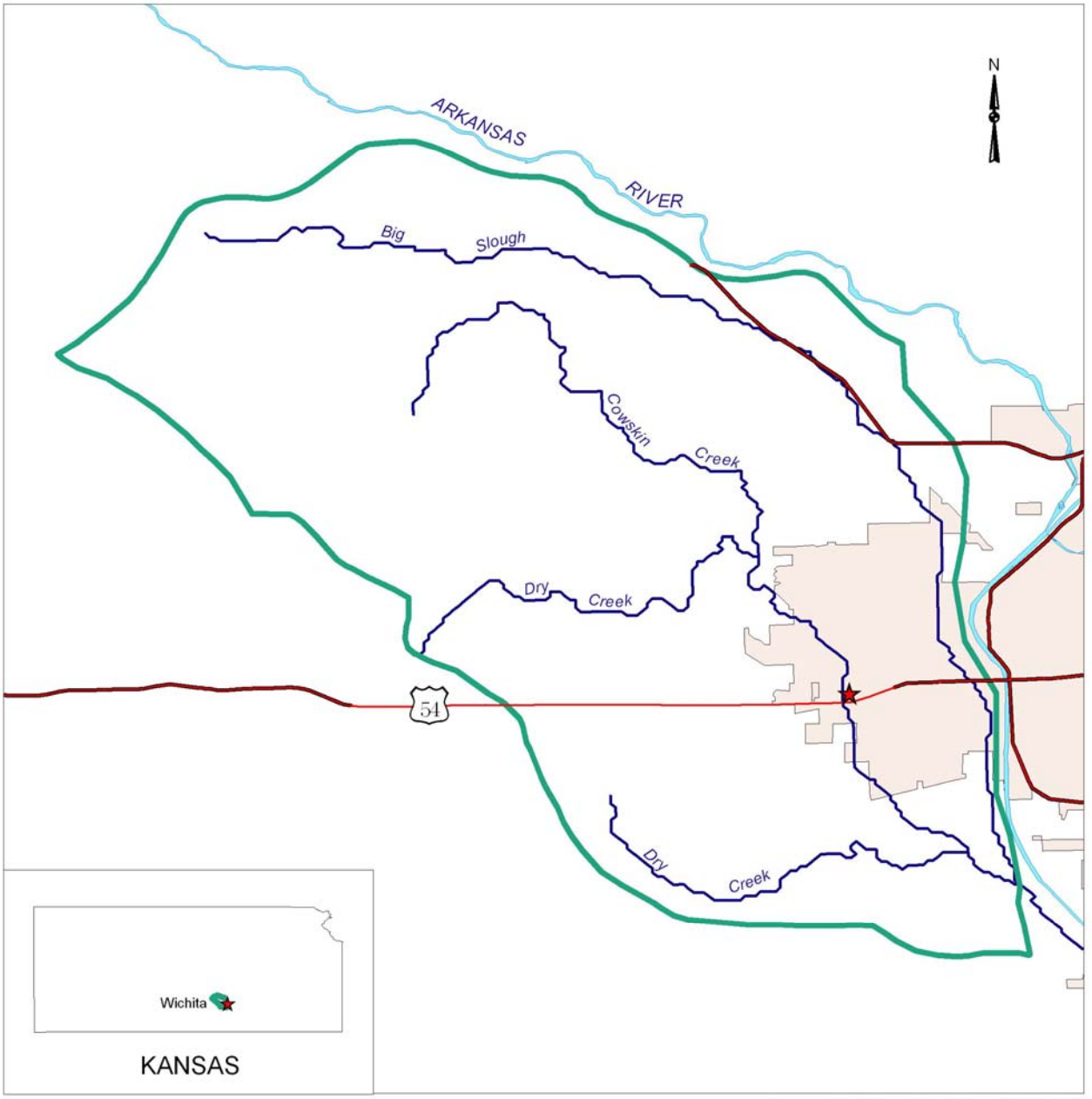
The City of Wichita initiated a restudy of the Cowskin Creek basin in 1994. The purpose of the restudy was to update the floodplain mapping to reflect changed conditions since the original FIS analysis. The study limits were extended based on the City's increased area. A revised map of the City was prepared and submitted to the Federal Emergency Management Agency who accepted the revision in June 1997. City administrators have since used the approved map for floodplain management.

The Cowskin Creek watershed covers an area of approximately 122 square miles (Figure 1.0). The study area extends upstream from Kansas Highway 42 to just southwest of the City of Colwich. Several tributaries to Cowskin Creek were also studied. These included Dry Creek from the Cowskin confluence to 167th Street West, Calfskin Creek from the Cowskin Creek confluence to Kellogg, the North Fork of Calfskin Creek from the Calfskin Creek confluence to just downstream of Central Avenue, the Middle Fork of Calfskin Creek from the North Fork Calfskin confluence to 135th Street West, and Westlink Tributary from the Cowskin Creek confluence to 21st Street North. The drainage basin is approximately 20% developed and is roughly bounded on the west by 311th Street West, on the north by 77th Street North, on the east by 71st Street West, and on the south by Kansas Highway 42. The land is primarily agricultural with small corridors of residential and commercial development.

During the past several years, severe home and street flooding has occurred at several locations adjacent to channels within the Cowskin Creek drainage basin (Photo 1.0). Most recently, rainstorms occurring on Halloween 1998 and September 27th, 1999 caused significant flood damage to several homes and commercial structures. In February 2000, administrators from the City of Wichita and the County of Sedgwick retained Black and Veatch Corporation to evaluate the drainage basin and recommend improvements to address the flooding problems along the channels. Black and Veatch used detailed topographic survey information produced by M. J. Harden Associates, Inc. These base maps were developed from aerial photographs taken in February 1994 and were provided at a scale of 1:2400 with 2-foot contour intervals. In addition to contours, the maps showed existing physical features, residential homes, and roadways.

The Corps of Engineers' Hydrologic Modeling System, HEC-HMS, computer program was used to estimate the stormwater runoff from each drainage area, and to route the flows downstream. The Corps of Engineers' River Analysis System, HEC-RAS, computer program was used to model the hydraulics of the channel and to estimate the existing and proposed water surface elevations.

Eight alternatives were considered by the Corps to alleviate flooding in the Cowskin Creek watershed. These alternatives consist of a series of natural channel improvements, detention, and diversion. The recommended



Source: ArcView StreetMap, ESRI, 2000

KEY TO FEATURES

Cowskin Creek SubBasin
Lower Project Limit
Wichita

4 0 4 Miles

Figure 1.0 Vicinity Map, Cowskin Creek Local Flood Protection Project, Wichita, Kansas

Photo 1.0 Flooding from Cowskin Creek.

alternative includes excavation and construction of a large cross-section channel between Kellogg and Maple streets that would serve as a floodway during high-flow conditions. The floodway channel would be situated east of the existing channel. The existing channel would not be disturbed and would serve as a low flow channel. A No Action alternative was also considered.

The National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190) requires all Federal agencies to address the environmental impacts of any major Federal action on the natural and human environment. Guidance for complying with the NEPA is contained in Title 40 of the Code of Federal Regulations (CFR), Parts 1500 through 1508, and in Engineering Regulation (ER) 200-2-2, *Procedures for Implementing NEPA*. The primary intent of NEPA is to ensure that environmental information is made available to public officials and citizens regarding major actions taken by Federal agencies. This environmental assessment was developed to assure that construction of the proposed project complies with the intent of NEPA.

SECTION 2.0 ALTERNATIVES

2.1 No Action Alternative

The Council on Environmental Quality (CEQ) regulations implementing the provisions of the National Environmental Policy Act of 1969 (NEPA) require Federal agencies to consider a "no action" alternative. These regulations define the "no action" alternative as the continuation of existing conditions and their effects on the environment, without implementation of, or in lieu of, a proposed action. This alternative represents the existing condition and serves as the baseline against which to compare the effects of the other alternatives. Under existing

conditions, expected average annual damages from flooding along Cowskin Creek are expected to be $276,600. It is likely that the "no action" alternative would result in damages equal to or in excess of this estimated annual cost. This alternative would retain the existing condition and would not result in any project-related environmental impacts or losses of fish and wildlife habitat.

2.2 Action Alternatives

The Corps of Engineers considered several structural plans during the preliminary screening of alternatives. Requirements for the selected plan included technical soundness, economic feasibility, and environmental acceptance. The selected plan should provide the greatest amount of protection for an area, and the benefits received from flood protection must be greater than the costs to construct and maintain the project. The selected alternative should also achieve the City's planning objectives and adequately address social, environmental, and economic impacts. The alternatives considered included channel modification, detention, diversion, and levee construction. Only a channel modification plan was determined to be economically feasible and justified a Federal interest.

Five channel modification plans were studied which included the selected plan. The selected plan was designed with a 300-foot bench and had a favorable benefit/cost ratio of 1.96. The other four channel modification plans had lower benefit/cost ratios of 1.83, 1.68, 0.05, and 0.46 and were dropped from further study.

Two detention sites were evaluated and dropped from further study because of unfavorable benefit/cost ratios. They did not meet the economic feasibility requirements for Federal interest.

Another alternative for flood reduction within the Cowskin Creek basin is through the construction of a diversion channel from Cowskin Creek to the Arkansas River. This alternative had a benefit/cost ratio of only 0.18 and was dropped from further study.

A levee plan was screened out early in the formulation process. This alternative would actually increase the average annual flood damages in the Cowskin Creek basin. Although it would provide some flood relief along portions of the Middle and North Forks of Calfskin Creek, these benefits would be overshadowed by the larger flood damages caused by the levee along Dry Creek and Cowskin Creek.

2.2.1 Alternative 1. Kellogg to Maple Channel Modification.

Alternative 1 consists of a channel modification project using three different bench widths between Kellogg Drive and Maple Street. Each would be essentially the same plan except for the bench width. The three included minimum bench widths of 100, 200, and 300 feet. The 100-foot bench plan would have a B/C ratio of 1.68, the 200-foot bench plan would have a B/C ratio of 1.83, and the 300-foot bench plan would have a B/C ratio of 1.96. Alternative 1 with a 300-foot minimum bench width is the selected plan and is discussed in SECTION 3.0, PROPOSED ACTION.

2.2.2 Alternative 2. Maize to Central Channel Modification.

Alternative two would modify the channel of Cowskin Creek from Central Avenue downstream to Maize Road. Channel modification would involve excavation along the sides of the channel to provide additional flow area and flood conveyance. This portion of Cowskin Creek has a large degree of development. The residential and commercial developments along the channel between Maize Road and Central Avenue limit the area available for excavation. Much of the excavated area would require steep slopes with structural bank stabilization as opposed to bioengineering measures. The channel invert would require re-grading to establish a uniform bed slope. The completed project would form a riparian corridor consisting of native vegetation, without the need for frequent maintenance.

Hydraulic analysis of this alternative indicates there would be a significant reduction in flood levels. Flood elevation reductions during the occurrence of the 100-year flood event were used to compute average annual flood damages with this alternative in place. The implementation costs, including construction costs and allowances for utility relocations, right-of-way, inspection, survey, and contingencies amortized over the 50-year life of the project

results in an average annual cost of $374,100. The expected annual benefit upon implementation of this alternative is approximately $17,800 for a benefit/cost ratio of 0.05. This alternative would not meet the economic feasibility requirements of a Federal project.

2.2.3 Alternative 3. Kellogg to Maple and Maize to Central Channel Modification.

Alternative three consists of the combination of alternative 1 plus alternative 2. It would modify the channel between Kellogg Drive upstream to Maple Street, which is the proposed plan, and Maize Road upstream to Central Avenue. The combined implementation costs, including construction costs and allowances for utility relocation, right-of-way, inspection, survey, and contingencies for this alternative amortized over the 50-year life of the project results in an average annual cost of $637,100. The expected annual benefit upon implementation of this alternative is approximately $294,900. The combination of these two alternatives provides for more widespread improvements along Cowskin Creek. However, because the benefit/cost ratio of alternative 2 is only 0.05, the combined benefit/cost ratio of alternative 1 and alternative 2 is 0.46 which is below the economic feasibility requirement for a Federal project.

2.2.4 Alternative 4. Dry Creek Detention Basin.

Alternative four would be an upstream detention structure designed to minimize the overflow from Dry Creek into the North Fork of Calfskin Creek. This alternative would provide a detention structure within the Dry Creek basin. The runoff from the Dry Creek basin overflows into the North Fork of Calfskin Creek basin during major flood events. This alternative would provide a detention structure with sufficient storage capacity to prevent such basin overflows from occurring within the 500-year frequency. This is an off-channel detention basin that will draw water from Dry Creek upstream of the diversion points. It is roughly bounded by 151st Street West on the east, 167th Street West on the west, 21st Street North on the north, and 13th Street North on the south. The excavated site would cover a land area of approximately 270 acres and have a maximum storage capacity of approximately 4,000 acre-feet.

The structure would function as an off-channel detention basin that would collect and detain flood flows in the Dry Creek basin, upstream of the historical basin overflows into the North Fork of Calfskin Creek. Construction of the detention site would require excavation to achieve the required storage capacity, an embankment structure of compacted earthen fill material, and both principal and emergency spillway structures. The primary outlet structure for this detention site, a double 12' x 5' RCB (reinforced concrete box), was designed to reduce the peak runoff for the 5-year and 100-year frequency storms. An emergency spillway 50 feet in width and 3.0 feet in height would need to be constructed. The emergency spillway could be either a grass-lined channel or a concrete-lined channel. This alternative would provide reductions in flood levels below the structure and throughout many portions of the Cowskin Creek basin. It would prevent the historical overflow from Dry Creek into the North Fork of Calfskin Creek.

The implementation costs, including construction costs and allowances for utility relocations, right-of-way, inspection, survey, and contingencies for this alternative amortized over the 50-year life of the project results in an average annual cost of $1,115,300. The expected annual benefit upon implementation of the alternative is approximately $124,500 for a benefit/cost ratio of 0.11. This alternative would not meet the economic feasibility requirements of a Federal project.

2.2.5 Alternative 5. Cowskin Creek Diversion South of the City of Maize.

Alternative five would provide for flood reduction within the Cowskin Creek basin through the construction of a diversion channel from Cowskin Creek to the Arkansas River. A diversion channel beginning at Cowskin Creek, downstream of 37th Street North and southwest of the City of Maize, would convey major flood events out of Cowskin Creek and discharge into the Arkansas River approximately six miles to the east. Minor flood events (less than 2-year events) would remain in the Cowskin Creek channel.

The diversion channel would consist of a rectangular–shaped concrete channel approximately 10 feet deep and ranging in width between 150 and 230 feet. The channel alignment would cross seven existing roadways and

one railroad. The channel alignment also crosses five existing stream channels, and construction measures would be necessary at each crossing to maintain existing flow pattern.

The implementation costs, including construction costs and allowances for utility relocations, right-of-way, inspection, survey, and contingencies for this alternative amortized over the 50-year life of the project results in an average annual cost of $1,650,500. The expected annual benefit upon implementation of the alternative is approximately $304,600 for a benefit/cost ratio of 0.18. This alternative would not meet the economic feasibility requirements of a Federal project.

2.2.6 Alternative 6. Dry Creek Levee.

Alternative six considered the construction of a Dry Creek Levee on the east and south sides of Dry Creek to prevent the overflow of floodwater from Dry Creek into the North Fork of Calfskin Creek. The runoff from the Dry Creek basin overflows into the North Fork of Calfskin Creek basin during major flood events. Restoration of the basin divide could be accomplished by the construction of a levee along the right bank of Dry Creek. This option would also involve the raising of some County roadway embankments to function as levees. The levee would be constructed from earthen embankment material to an elevation sufficient to confine Dry Creek runoff to the Dry Creek basin for flood events up to the 500-year recurrence interval. The levee would restore the basin divide and re-establish the flow patterns that were utilized in developing the regulatory floodplain mapping.

This alternative would provide flood relief for North Fork of Calfskin, Middle Fork of Calfskin, and Calfskin Creeks. However, it greatly increases water surface elevations in Dry Creek and Cowskin Creek. Based on peak discharges contained in the hydraulic analysis of this alternative, the Dry Creek Levee would increase peak flow rates along Dry Creek, and would raise peak flow rates along Cowskin Creek, downstream of the Dry Creek confluence. Thus the benefits of the levee are overshadowed by the larger flood damages caused by the levee along Dry Creek and Cowskin Creek.

The implementation costs, including construction costs and allowances for utility relocations, right-of-way, inspection, survey, and contingencies for this alternative amortized over the 50-year life of the project results in an average annual cost of $65,300. There would be no annual benefit realized from this alternative. This alternative would actually increase the average annual flood damages in the Cowskin Creek basin by an estimated $485,000. This alternative would not meet the economic feasibility requirements of a Federal project.

2.2.7 Alternative 7. Dry Creek Detention Site "B".

Alternative seven would be an upstream detention structure similar to alternative four designed to minimize the effect of overflow from Dry Creek into the North Fork of Calfskin Creek. This alternative would provide a detention structure within the North Fork of Calfskin Creek basin. The selection of this site was based on finding as large an area of land as possible within the North Fork Calfskin drainage basin that could be used to construct a detention basin without displacing homes or other structures. Detention Site B is roughly bounded by 135th Street West on the east, 151st Street West on the west, 13th Street North on the north, and Central Avenue on the south. The excavated site would cover approximately 200 acres and have a maximum storage capacity of approximately 832 acre-feet.

This detention site would be constructed to capture the flow from two separate streams. Each of these streams has been found to carry overflow from Dry Creek during high-frequency storms. The detention basin would have two primary outlet structures, one for each exiting stream. Each primary outlet structure would consist of a quadruple 11' x 6' RCB, along with an overflow weir 75 feet in length and 2 feet in height. These two outlet structures would be designed to reduce the peak runoff for the 5-year and 100-year frequency storms. An emergency spillway 600 feet in width and 6.1 feet in height would be constructed to sufficiently pass 40 percent of the Probable Maximum Precipitation (PMP). The emergency spillway would be either a grass-lined channel or a concrete-lined channel. If the channel is grass-lined it would approximately 3550 feet in length with a height of 6.4 feet. The dam would be constructed of compacted fill.

The implementation costs, including construction costs and allowances for utility relocations, right-of-way, inspection, survey, and contingencies for this alternative amortized over the 50-year life of the project results in an

average annual cost of $841,500. The expected annual benefit upon implementation of the alternative is approximately $124,500 for a benefit/cost ratio of 0.15. This alternative would not meet the economic feasibility requirements of a Federal project.

SECTION 3.0 PROPOSED ACTION

Alternative one with a minimum 300-foot bench width is the selected plan. It would consist of an overflow channel cut from the east bank of Cowskin Creek between Kellogg Drive and Maple Street (Figure 3.0). The bench layout would vary in width from the channel to accommodate channel bends while maintaining a minimum bench width of 300 feet. It would increase the conveyance capacity of the floodplain and generally decrease flood elevations for a given storm event. The overflow bench would have a one vertical to three horizontal bank slope. The existing hydraulic conditions and availability of space within this reach would allow construction of a channel that could be stabilized by vegetation.

The existing streambed would be retained as a low-flow channel under this alternative. The excavated bench would be located along the east bank of Cowskin Creek and would be planted with a mixture of native and erosion resistant vegetation. During heavy rainfall events, the low flow channel would overflow into the excavated channel. Existing vegetation within the limits of the new channel would be removed during construction. The majority of the excavated area would be through agricultural land (Photo 3.0). Due to relatively low velocities of flow throughout this channel reach, the stream bank slopes would not require stabilization with geotechnical structural material.

The proposed plan would have potential environmental impacts, both adverse and beneficial. Construction would have temporary adverse impacts to the biological resources along portions of the excavated area by removing and disturbing vegetation and habitat and by displacing local fauna. It may require modifying the low water crossing near Station 478+95, which could alter existing aquatic habitat in the channel just upstream. Construction would also temporarily impact water quality but should, in the long term, improve water quality by controlling storm water runoff. The acquisition of private land for this alternative would also have socioeconomic impacts. Land that is available for agriculture or that could possibly be used for future development would be removed from production and/or development.

It would reduce flood levels within the improvement area. It is expected that flood levels both upstream and downstream of the improvement area will remain unchanged.

This plan was selected because it would provide increased flood protection along Cowskin Creek between Kellogg Drive and Maple Street. It would have a favorable benefit/cost ratio of 1.96, which meets the requirement of a Federal interest. The hydraulic performance of the system would be improved with construction of this alternative. The City has several bridge removal and/or replacement projects in various stages of planning and design within the Cowskin Creek drainage basin and expects to complete the projects regardless of any Federal plan. These are: 1) Removal of the railroad bridge over Cowskin Creek south of Kellogg; 2) Replacement of the Kellogg bridge and eastbound and westbound frontage roads over Cowskin Creek; 3) Replacement of 119th Street West bridge over Calfskin Creek; 4) Replacement of the Maple Street bridge over the North Fork of Calfskin Creek; and 5) Replacement of three bridges on 13th Street North over Dry Creek. The proposed plan, together with the bridge replacements, is expected to reduce annual flood-related damages by over 244 million dollars with a 75% probability that this figure would be exceeded by another 180 million dollars. It also would provide more favorable hydrological conditions for the bridge projects being completed by the City of Wichita. The local sponsor supports this plan.

The modified channel would be grass-lined with three horizontal on one vertical side slopes. The bottom elevation of the new channel would vary from about elevation 1308 feet NGVD at the upper end of the project to about elevation 1302 feet NGVD at the lower end. It would follow the existing creek channel but the width of the excavated channel would vary from a minimum of 300 feet to about 400 feet near the confluence of Calfskin Creek. The width of the area required for the side slope would vary dependent upon the elevation of the existing ground along the channel alignment. The U.S. Fish and Wildlife Service and the Kansas Department of Wildlife and Parks

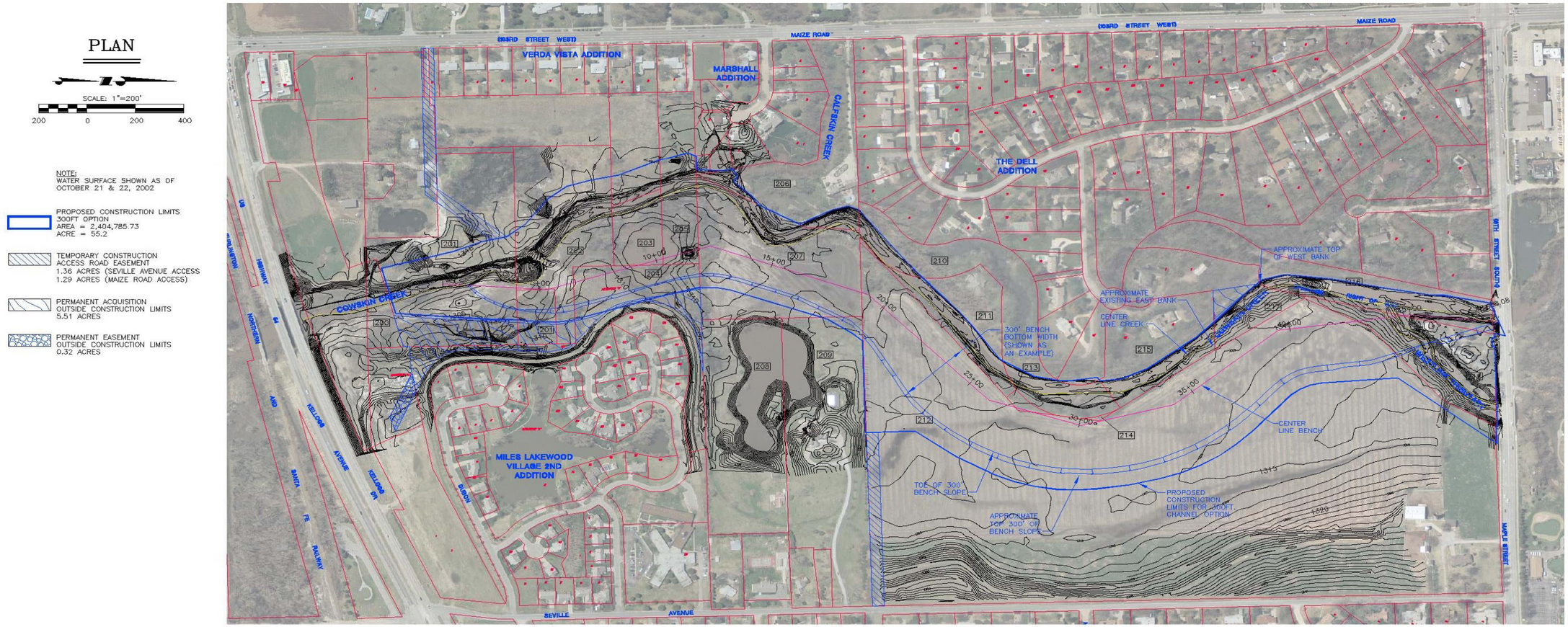


Figure 3.0. General Plan for the Cowskin Creek Project.

Photo 3.0 Agricultural land adjacent to channel.

expressed concerns over the loss of spotted skunk habitat along the excavated area. The mitigation plan (SECTION 6.0) provides measures developed to alleviate losses.

SECTION 4.0 AFFECTED ENVIRONMENT

4.1 Location

The Cowskin Creek drainage basin is located in Sedgwick County in south central Kansas. Cowskin Creek is a right bank tributary of the Wichita-Valley Center Floodway, entering the floodway between 47th Street South and West 55th Street South. Above the Kansas Highway 42 bridge, the Cowskin Creek drainage basin encompasses approximately 122 square miles.

Included within the basin are the communities of Andale, Colwich, and Goddard, and also portions of Wichita and Maize. The major drainage courses within the basin are Cowskin Creek and its four tributaries: Dry Creek, Calfskin Creek, North Fork Calfskin Creek, and Middle Fork Calfskin Creek. Cowskin Creek generally runs in a north-south direction. These drainages are moderately sinuous, with a fairly low slope gradient. The upper and middle reaches of Cowskin Creek basin are predominantly agricultural, while the lower reaches drain through residential and commercial developments. Much of the floodplain area is under private ownership with minimal public access. Topography in the floodplain is relatively flat. The flat terrain is the principal cause of the problem and results in reduced drainage capability and increased flooding.

4.2 Climate

Wichita's elevation is just over 1,300 feet above sea level. Wichita is located in the Central Great Plains where masses of warm moist air from the Gulf of Mexico collide with cold dry air from the Arctic region. Wichita has a distinct four-season climate and a wide range of weather year round. The climate is mild with brief periods of

extreme temperatures. The average annual daily low is 45 degrees F; the average annual daily high is 67.4 degrees F; and the average annual daily temperature is 56.2 degrees F. The average summer temperature is 78.9 °F, and the average daily maximum is 90.1 °F. The average winter temperature is 33.3 °F, and the average daily minimum is 23 °F.

Wichita averages about 225 days of sunshine annually. Wichita Mid-Continent Airport operates under VFR (Visual Flight Rules) conditions about 91% of the time. The prevailing wind is southerly and averages about 9 miles per hour.

Summers are usually warm and moderated by steady wind and relatively low humidity. Temperatures above 90 degrees occur an average of 63 days per year. Winters are usually mild with short periods of very cold weather. Temperatures below zero occur about 2 days per year. Spring is the most varied season and is the period of heaviest rainfall due to severe thunderstorms and occasional tornadoes. The prevailing winds are from the north in February and from the south the remainder of the year.

Rainfall averages about 29 inches per year, with 70% occurring during the April-September growing season. Snow flurries are common, but snowfall is light, averaging 15 inches per year from December through March. Occurrence of more than 1 inch of snow, ice or sleet happens on average about 5 times per year. Occurrence of more than 3 inches happens about twice per year. Snow seldom covers the ground for a period greater than three days.

Kansas ranks sixth among states in average number of tornados per year (Texas, Oklahoma, and Florida top the list.) Kansas weather is generally benign. The likelihood of experiencing a tornado on a given section of land in Sedgwick County based on area and frequency over the last 40 years is estimated to be once in every 1,460 years. Civil defense systems are in place to ensure adequate warning in case of severe weather.

4.3 Social and Economic Conditions

4.3.1 Study Area

The project alternatives will have the most direct impact on persons living and working in the western portions of the City of Wichita and portions of Sedgwick County, Kansas. This area is considered the social area within which the primary impacts of the proposed project will occur.

4.3.2 Population

The U.S. Bureau of Census estimates that Sedgwick County had a population of 453,400 in 2000, a 12% increase from the 1990 Census count of 404,600. The area surrounding the project is medium density urban area in the City of Wichita and rural estates and pastureland in areas outside the incorporated area.

Wichita is the county seat of Sedgwick County. It is the largest city in Kansas, with a population of 344,284 in the 2000 census. The Kansas Turnpike and Interstate I-35 are the two major highways that link the city with a large trade area that encompasses a population of approximately 1.2 million people within a 100-mile radius. Wichita's population growth has been steady for the past two decades. The majority of recent growth has occurred along the far west/northwest and east/northeast peripheries of the city, and in the unincorporated portions of Sedgwick County.

As of March 1999, the city's total land area was 136.7 square miles. The majority of annexation activity over the last several years is in response to property owner requests associated with new developments and water and sewer service requests in the new growth areas. According to the 2000 Census, the median age of residents in the City of Wichita was 33.4 compared to 35.2 for the State of Kansas. Seven percent of the 2000 population in the state was Hispanic or Latino, the single largest non-white racial group.

Area Population City of Wichita, Sedgwick County, State of Kansas Census 1970-2000				
Area	1970	1980	1990	2000
City of Wichita	276,554	279,838	304,001	344,284
Sedgwick County, KS	349,219	368,704	404,613	453,426
State of Kansas	2,247,823	2,369,039	2,481,349	2,691,750

Population Characteristics City of Wichita, Sedgwick County, State of Kansas Census 2000			
	City of Wichita	Sedgwick County	State of Kansas
Population	344,284	452,869	2,688,418
Median Age (years)	33.4	33.6	35.2
Race			
Single-Race classification	333,622	440,166	2,631,922
White	258,900	359,489	2,313,944
Black or African American	39,325	41,367	154,198
Amer. Indian or Native Alaskan	3,986	5,041	24,936
Asian or Pacific Islander	13,845	15,402	48,119
Other	17,566	18,867	90,725
Two or more Races Classified	10,662	12,703	56,496
Hispanic or Latino	33,112	36,397	188,252
Not Hispanic or Latino	311,172	416,472	2,500,166

4.3.3 Employment and Income

Wichita was incorporated in 1870. In 1872, extension of the Santa Fe Railway into Wichita was the original stimulus to the city's economic development. The city's early growth paralleled the expanding agricultural productivity of the Central Plains States, and by 1900, the city was a regional center for the processing of agricultural products and the distribution of farm equipment. The discovery of oil in 1914 broadened the economic base by attracting numerous services, distributive enterprises and metalworking industries. Wichita has been a leading producer of general aviation and commercial aircraft from the earliest days of the aircraft industry. McConnell Air Force Base was activated in 1951 and has remained an important factor in the community.

Wichita's employment includes a broad mix of business types, with a strong base of relatively high paying manufacturing jobs. Wichita's major employers include the Boeing Co., Raytheon Aircraft Co., Cessna Aircraft Co., Coleman Co. Inc., Nations Bank, Bombardier Aerospace Learjet, Via Christi Regional Medical Center, Wesley Medical Center, Koch Industries and Southwestern Bell Telephone. Many small and mid-sized companies also provide a wide variety of goods and services to regional and national markets.

The 2000 per capita income (PCI) for residents in the City of Wichita was $20,692. Sedgwick County PCI was $20,907 in the same year. This compares with $20,506 PCI for the State of Kansas and $21,587 for the entire United States.

Employment by Industry
City of Wichita and Sedgwick County
2000

	City of Wichita	Sedgwick County
Employed Persons	**165,868**	**219,098**
Agriculture, forestry, and fisheries	**806**	**1,732**
Construction	**9,738**	**13,113**
Manufacturing employment	**39,074**	**53,710**
Wholesale trade	**5,242**	**7,105**
Retail trade	**19,578**	**25,069**
Transportation warehousing & public utilities	**6,278**	**8,579**
Information	**3,909**	**4,765**
Finance, Insurance and real estate	**9,225**	**11,963**
Professional, scientific, management, administrative, and waste mgmt.	**12,699**	**15,842**
Educational, health and social svc..	**32,571**	**43,014**
Arts, entertainment, recreation, accommodation and food svc.	**13,656**	**16,628**
Other services (except public admin.)	**7,609**	**10,307**
Public administration	**5,483**	**7,271**
US Census Bureau, 2000, Profile of Selected Economic Characteristics.		

In 2000, 25 percent of the 219,000 jobs in Sedgwick County were in manufacturing industries and 20 percent was in educational, health, and social service industries. Manufacturing accounted for 53,700 jobs, while educational, health, and social services contributed 43,000 total jobs.

Wichita's unemployment rate averaged 3.6 percent for the year in 2000, slightly below the U.S. average of 3.7 percent. Wichita's unemployment rate has been lower than the national average since 1995. Recent increases in unemployment from economic impacts to the manufacturing sector have increased area unemployment.

4.3.4 Social Ecology

The social area of Wichita and Sedgwick County is primarily an urban metropolitan area that is the center of regional growth. The economy of Wichita is diverse with many national and international companies and has become a center of commerce within the region.

4.4 Natural Resources

4.4.1 Terrestrial

The Cowskin Creek drainage basin is located in the Wellington-McPherson Lowlands of the Central Great Plains ecoregion. The project lies within the floodplain of the Arkansas River and drains an area that has a flat lowland topography with very little relief. The floodplain in this area is either highly urbanized or has been developed into farmland. About six acres of floodplain vegetation provides habitat along Cowskin Creek (Photo

4.4.1). The general location of the project is within the Arkansas River Lowlands section of the Central Lowland Physiographic Province (Schoewe, 1949).

Loess and river valley deposits support extensive cropland agriculture of winter wheat and grain sorghum. Shale, gypsum and salt that formed from ancient Permian seas underlie the area. Salt is commercially mined from the Hutchinson salt member. The northern area contains the alluvial Equus beds, an important aquifer. Once a grassland, dominated by mixed grass prairie with scattered low trees and shrubs, much of this region is now in cropland, with the eastern boundary of the region marking the eastern limit of the major winter wheat growing area of the United States. Subsurface salt deposits and leaching contribute to the high salinity found in some streams.

Riparian forest occupies a narrow corridor along the project area and comprises only a small percentage of the cover type. Major species include plains cottonwood (*Populus occidentalis*), black willow (*Salix nigra*), common hackberry (*Celtis occidentalis*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), Osage orange (*Maclura pommifera*), and bur oak (*Quercus macrocarpa*). Pecan (*Carya illinoensis*), honey locust (*Gleditsia triacanthos*), red cedar (*Juniperus virginiana*), box elder (*Acer negundo*), and mulberry (*Morus rubra*) are present to a lesser degree.

Woody shrubs or smaller trees in the area include buckbrush (*Symphoricarpos orbiculatus*), green briar (*Smilax spp*), poison ivy (*Rhus radicans*), buttonbush (*Cephalanthus occidentalis*), grape (*Vitis sp.*), sumac (*Rhus sp.*), and Virginia creeper (*Parthenocissus quinquefolia*). Other plant species found along Cowskin Creek include dewberry (*Rubus spp*), giant ragweed (*Ambrosia trifida*), sunflower (*Helianthus sp.*), Illinois bundleflower (*Desmanthus illinoensis*), black-eyed Susan (*Rudbeckia hirta*), Johnson-grass (*Sorghum halepense*), cocklebur (*Xanthium strumarium*), curly dock (*Rumex crispus*), brome (*Bromus spp*), Canada wild rye (*Elymus canadensis*), sedge (Cyperaceae), smartweed (*Polygonum sp*), purpletop (*Tridens sp.*), water primrose (*Jussiaea sp.*), and spike-rush (*Eleocharis sp.*). Other grass species in the project area include Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), Bermuda grass (*Cynodon dactylon*), and fescue (*Festuca sp.*).

Photo 4.4.1 Habitat along Cowskin Creek.

4.4.2 Soils

Soils in the project area are of the Elandco-Canadian Association. These soils are deep, nearly level, well drained soils that have loamy subsoil (U.S. Natural Resource Conservation Service). Two soils occur along the proposed project. They include Elandco silt loam and Elandco silt loam, occasionally flooded. Both are classified as prime farmland. A significant part of the project is located on agricultural land (Station 484+50 – Station 515+00).

Elandco silt loam is a nearly level, well drained, soil on low terraces. Flooding is rare. Typically the surface layer is dark grayish brown and about 40 inches thick. The underlying material also is dark grayish brown and is about 60 inches thick. The main concern of management of this soil in urban areas is flooding. If protected against flooding, this soil is suitable for building site development. The soil is listed as 'prime farmland' by the US Department of Agriculture and is well suited to trees, shrubs, flowers, and lawn grasses and to all garden and agricultural crops commonly grown in the area.

Elandco silt loam, occasionally flooded is a nearly level, well-drained soil on flood plains. Typically the surface layer is dark grayish brown, very friable silt loam about 40 inches thick. The underlying material to a depth of 60 inches is dark grayish brown silt loam. Natural fertility and organic matter content are high. The main concern of management of this soil is flooding and it has a poor potential for building site development. This soil also is listed as 'prime farmland' by the US Department of Agriculture and is well suited to trees, shrubs, flowers, and grasses and to all garden and agricultural crops commonly grown in the area. The main hazard to agricultural and urban uses in this soil type is occasional flooding.

4.4.3 Prime Farmland

Soil that is prime or unique farmland as defined in the Farmland Protection Policy Act is classified as prime farmland. According to the U.S. Department of Agriculture, it is soil that is best suited for producing food, feed, forage, fiber, and oilseed crops. Both Elandco silt loam and Elandco silt loam, occasionally flooded soils listed above are classified as prime farmland.

4.4.4 Wild and Scenic Rivers

There are no streams within the project area that are classified as wild and scenic pursuant to the Federal Wild and Scenic Rivers Act, Public Law 90-542.

4.4.5 Aquatic and Wetlands

Cowskin Creek is a perennial, warm water stream with a small, relatively shallow channel and low gradient. This section of Cowskin Creek has been modified greatly during the last 50 years. The stream was channelized in the mid-fifties and again during the period between 1961 and 1982. Banks are steep in most areas with a drop of 4 to 6 feet. The creek is essentially a series of pools. The stream bottom predominantly is from the soil type in the area and bottom sediment is primarily silt. The water appearance is muddy and almost stagnant. No wetlands outside the existing channel would be affected by this project although there are wetlands in the project area. These wetlands are the oxbows of the original Cowskin Creek channel that existed prior to channelization. They are on the west side of Cowskin Creek and the current project alignment is along the east side of the creek. Construction would impact only the east side of the creek.

In 1995, the Kansas Natural Resource Council and the Sierra Club filed a complaint against the EPA, compelling it to enforce Section 303(d) of the Clean Water Act by establishing Total Maximum Daily Loads (TMDLs) for specified parameters. Kansas intervened in the litigation, since the state had lead responsibility for identifying the waters requiring TMDLs and establishing the TMDLs. TMDL parameters established for Cowskin Creek include Chlordane, Fecal Coliform Bacteria, and Nutrients/Biochemical Oxygen Demand (BOD). Designated uses for water in Cowskin Creek include: Primary Contact Recreation; Secondary Contact Recreation; Expected Aquatic Life Support; Domestic Water Supply; Food Procurement; Ground Water Recharge; Industrial Water Supply Use; Irrigation Use; and Livestock Watering Use.

A fish tissue monitoring and survey program was implemented by the Kansas Department of Health and Environment (KDHE) to analyze fish tissue samples for chlordane in order to define water body segments impacted by contamination and provide long term monitoring on segments with past or present fish consumption advisories. Bottom feeding fishes are sampled because of their feeding or dwelling preferences near the streambed where chlordane remains in the sediments. Fish tissue samples were collected in 1990-1998. Graphs of the data indicate an increasing trend in the Cowskin Creek watershed. The average concentration of chlordane in the fish tissue samples collected at the Mid-Continent Airport monitoring site during that period was 0.029 mg/kg. The water quality standard for Food Procurement is 0.00048 μg/L (KAR 28-16-28e(c)(4)(A)). Chlordane is a substance that can bioaccumulate in tissue through bioconcentration or biomagnification and is limited in surface waters to concentrations that result in no harm to human consumers. The fish consumption advisory level for chlordane is 0.02 mg/kg.

Fecal Coliform Bacteria loading capacity varies as a function of the flow present in the creek and is not fixed at a single value. Load curves were established for Primary and Secondary Contact Recreation to derive a load duration curve of colonies of bacteria per day. Flow was calculated by using data collected from 1987 to 1999 at the USGS Station (07145700) at Slate Creek. Twenty three percent of samples were over the criteria and standards were exceeded in all three seasons. The percent of samples collected during 2000 that exceeded the bacteria standard was 26% during spring, 16% during summer, and 22% during winter. The water quality standard for Secondary Contact Recreation is 2000 colonies per 100 ml (KAR 28-16-28e(c)(7)(C)).

The nutrient/ oxygen demand impairment was determined by analyzing three main parameters: Macroinvertebrate Biotic Index (MBI); percent Ephemeroptera, Plecoptera, and Trichoptera Taxa Count (%EPT); and Biochemical Oxygen Demand (BOD). The MBI rates the nutrient and oxygen demanding pollution tolerance of large taxonomic groups. Higher values indicate greater pollution tolerances. Fifty percent of the surveys (1980-1999) produced MBI values indicative of impaired aquatic life support. The EPT index is the proportion of aquatic taxa present within a stream belonging to pollution intolerant orders (mayflies, stoneflies, and caddis flies). Higher percentages of total taxa comprising these three groups indicate less pollutant stress and better water quality. When aquatic life is partially impaired, the percentage of EPT ranges from 12-54%. Percent EPT under current conditions (1980-1999) was 43%. Normal background levels for BOD are 3-4 mg/L. The historical average (1980-1999) of BOD in Cowskin is slightly above normal at 4.69 mg/L.

4.4.6 Fish and Wildlife

Most streams with riparian corridors contain a rich diversity of fish and wildlife species because of the abundance of food, vegetative cover, and water found there. The diversity and abundance of wildlife in the Cowskin Creek area is limited by the proximity of the creek to an urban area and by farming operations that utilize all available land to the edge of the creek bank. A small amount of floodplain forest remains within the study reach along Cowskin Creek. The following four subsections provide a listing of fish and wildlife species that could occur in the Cowskin Creek project area.

4.4.6.1 Fish

Habitat quality in the creek is degraded by excessive amounts of silt and nutrients from storm water runoff from streets, parking lots, gardens and lawns, and agricultural areas. The quality of aquatic habitat is further degraded by a lack of substrate diversity and from chemicals generated during agricultural operations in the watershed. In-stream aquatic substrate is primarily silt or silt laden woody debris. The stream forms a series of pools and cover consists primarily of fallen trees, logs, and rocks. Bank vegetation forms a canopy over the stream and provides shade in some areas (Photo 4.4.6.1.).

Photo 4.4.6.1 Bank canopy provides shade.

As is typical of low quality streams, species diversity is low in Cowskin Creek, with many individuals of a few species. Dominant aquatic animals include animals that are able to tolerate the polluted waters such as crayfish, beetles, shiners, minnows, sunfish, yellow and black bullheads, and carp. There are several good pools along this stretch that provide some fishing for sunfish, catfish, and carp.

Several factors are present in this section of Cowskin Creek that limit its quality as fish habitat. A significant percentage of the bottom is silt with a minimal variation of substrate in the channel. Much of the drainage basin is agricultural and nutrient loading was indicated in samples collected upstream of the project by the City of Wichita, Sewage Treatment Division. They found the benthic community lacking in the area sampled and fish species diversity and density low.

The Kansas Department of Health and Environment and the Kansas Department of Wildlife and Parks reports that a fish and wildlife advisory exists for Cowskin Creek within the City of Wichita and downstream to the confluence with the Arkansas River southeast of the City of Belle Plaine (Sedgwick and Sumner Counties). These agencies recommend that consumption of bottom-feeding and bottom-dwelling fish (carp, blue catfish, channel catfish, flathead catfish, freshwater drum, bullhead, sturgeon, buffalo, carpsucker, and other sucker species) from Cowskin Creek be limited. The advisory recommends a limitation of one 5-ounce meal per month, or twelve 5-ounce meals per year, on the consumption of the above fish due to the insecticide chlordane in fish tissue.

4.4.6.2 Amphibians and Reptiles

Numerous species of amphibians and reptiles are found in south central Kansas. Common species of amphibians that could occur in the project area include Woodhouse's toad (*Bufo woodhousei*), Great Plains toad (*Bufo cognatus*), plains leopard frog (*Rana blairi*), western chorus frog (*Pseudacris triseriata*), Blanchard's cricket frog (*Acris crepitans*), and bullfrog (*Rana catesbeiana*). Common species of reptiles that could occur in the project area include the northern water snake (*Nerodia sipedon*), snapping turtle (*Chelydra serpentina*), and western painted turtle (*Chrysemys picta*).

4.4.6.3 Birds

Birds that are most likely to occur in the area include mourning dove, great horned owl, barred owl, red-tailed hawk, wood duck, redheaded woodpecker, hairy woodpecker, downy woodpecker, great blue heron, blue jay, Carolina chickadee, European starling, English sparrow, warblers, flycatchers, native sparrows, red-winged blackbird, brown-headed cowbird, and cardinal. Neotropical migrants utilize the bottomland forests along the creek during spring migration.

4.4.6.4 Mammals

Mammals most likely to occur in the project area include species that are tolerant of urban activity. Typical species include fox squirrel (*Sciurus niger*), pocket gopher (*Geomys bursarius*), raccoon (*Procyon lotor*), opossum (*Didelphis marsupialis*), mink (*Mustela vison*), striped skunk (*Mephitis mephitis*), spotted skunk (*Spilogale putorius*), cottontail rabbit (*Sylvilagus floridanus*), several species of rodents, and several species of bats.

4.5 Threatened and Endangered Species

The U.S. Fish and Wildlife Service reports that there is no record of occurrence of any Federally listed threatened or endangered species based on a review of the proposed project area.

State-listed threatened and endangered species known or likely to occur in the project area includes the state-listed eastern spotted skunk. The Kansas Department of Wildlife and Parks has designated the Cowskin Creek drainage basin as critical habitat for the eastern spotted skunk.

Spotted skunks are smaller and more weasel-like in body shape than the more familiar striped skunk. The spotted skunks' strips are broken in pattern, giving it a 'spotted' appearance. Spotted skunks may occur in suitable habitat anywhere in the state. They seem to prefer forest edges and upland prairie grasslands, especially where rock outcrops and shrub clumps are present. In western counties, it relies heavily on riparian corridors where woody shrubs and woodland edges are present. Woody fencerows, odd areas, and abandoned farm buildings are also important habitat for spotted skunks.

4.6 Cultural Resources

In accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended), in 2001 consultation was initiated with the Kansas State Historic Preservation Office (SHPO) and the Wichita and Affiliated Tribes of Oklahoma (Appendix D). The Wichita and Affiliated Tribes did not provide any comment on the project.

In July 2003, 4G Consulting performed a literature review and field reconnaissance at the request of the Tulsa District. No historic properties were identified. The project methodology is outlined in the 4G Consulting report of investigations (Appendix D). In a September 8, 2003 letter to the Kansas SHPO, Tulsa District established an agency position of “no historic properties affected” for the Cowskin Creek project. The Kansas SHPO agreed in a return letter dated October 3, 2003. Section 106 coordination is therefore complete for the project.

4.7 Air Quality

The U.S. Environmental Protection Agency (EPA) published a Conformity Rule on November 30, 1993, requiring all Federal actions to conform to appropriate State Implementation Plans (SIP’s) that were established to improve ambient air quality. At this time, the Conformity Rule only applies to Federal actions in non-attainment areas. A non-attainment area is an area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act (CAA).

The project area is within the City of Wichita and is predominately urban. The Wichita-Sedgwick County Health Department monitors air quality in Wichita and the surrounding area for both criteria pollutants and air toxins. National Ambient Air Quality Standards exist for six pollutants: carbon monoxide, ozone, particulate matter smaller than 10μm, sulfur dioxide, nitrogen oxides, and lead. These "criteria pollutants" are the only ones for which

standards have been established. The EPA assigns designations, based on an area's meeting, or "attaining" these standards. The Wichita-Sedgwick County area is designated "In Attainment" for criteria pollutants and air toxins.

A conformity determination based on air emission analysis is required for each proposed Federal action within a non-attainment area. Since this geographical region is in attainment and meets the National Air Quality Standards for the criteria pollutants designated in the CAA, a conformity determination is not required.

4.8 Hazardous, Toxic, and Radiological Waste

HDR Engineering, Inc., was contracted to conduct a Hazardous, Toxic and Radioactive Waste (HTRW) survey for the Cowskin Creek project. They concluded that the potential for discovery and significant problems related to HTRW during project construction or operation is low.

No developments are present within 200-300 feet along either side of the creek, which the exception of three bridges. The land is densely covered with grass, shrubs, and trees. Numerous residential structures are present beyond, on either side of the creek. Neither current nor historic uses appear to present significant environmental concerns. No sites of environmental concern were identified on any of the Federal or state environmental databases searched. A review of historical aerial photographs reveal that the area has remained largely unchanged since 1938, with the exception of residential development, new bridge construction, and roadway improvements. Three sites located within the HTRW search boundaries were identified in the database search: Johnson's General Store, at 10318 Maple Street (Underground Storage Tank (UST)); Universal Quick Mart, 20611 W. Harry (UST); and Millers Cleaners, 323 S. Maize Road (Resource Conservation and Recovery Act (RCRA)). Based on the information provided regarding the nature of listing and regulatory status, as well as their proximity to Cowskin Creek, these three sites do not appear likely to result in a significant environmental impact to any portion of the project area affected by future construction activities. The Wichita-Sedgwick County Health Department provided information on historical activities for the area through record reviews and specialized knowledge from divisions within the department. Records indicate that limited dumping took place on private land during the 1970's and 1980's on the west side of Cowskin Creek, north of Kellogg. During the 1990's, considerable quantities of concrete were dumped on the east side of Cowskin Creek. Both areas appear to have been cleaned up, as HDR Engineering observed no evidence during the site reconnaissance. Given the historic time frames and the nature of the materials, it is unlikely that these past incidents have resulted in a significant environmental impact to the area. A site reconnaissance was conducted on October 8, 9, and 10, 2001. No evidence of dumping was observed, with the exception of some lawn debris such as tree limbs and grass clippings. A 55-gallon drum was washed up on the east bank. None of these materials appeared to represent a threat of significant environmental impact to the site.

SECTION 5.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

A summary of environmental impacts is presented in Table 5.0, Impact Assessment Matrix.

5.1 Social and Economic Impacts

5.1.1 Future Without-Project Conditions

5.1.1.1 Population

Under the without-project conditions, population trends of the past decade will likely continue with higher than average rates of population growth and lower than average ages within the City of Wichita. This trend continues the in-migration of the working age population as the opportunities in the City of Wichita and surrounding metropolitan areas draw from the available labor force in the region. Job opportunities in the City of Wichita and the demand for residential lands will be linked to future population dynamics in the area. In the absence of flood control improvements, slower urban development in the western area of the City of Wichita will experience reduced population growth and urban densities. The flooding along Cowskin Creek will continue to disrupt the lives of those conducting business, going to school and residing in flood prone areas. The health and safety of these individuals will continue to be at risk.

Table 5.0
Impact Assessment Matrix

Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
A. Social Effects							
1. Noise Levels				x			
2. Aesthetic Values					x		
3. Recreational Opportunities				x			
4. Transportation			x				
5. Public Health and Safety		x					
6. Community Cohesion (Sense of Unity)			x				
7. Community Growth and Development			x				
8. Business and Home Relocations				x			
9. Existing/Potential Land Use			x				
10. Controversy				x			
B. Economic Effects							
1. Property Values			x				
2. Tax Revenues			x				
3. Public Facilities and Services			x				
4. Regional Growth				x			
5. Employment				x			
6. Business Activity			x				
7. Farmland/Food Supply					x		
8. Flooding Effects	x						
C. Natural Resource Effects							
1. Air Quality				x			
2. Terrestrial Habitat					x		
3. Wetlands				x			
4. Aquatic Habitat			x				
5. Habitat Diversity and Interspersion			x				
6. Biological Productivity			x				
7. Surface Water Quality				x			
8. Water Supply				x			
9. Groundwater				x			
10. Soils				x			
11. Threatened and Endangered Species					x		
D. Cultural Resources							
1. Historic Architectural Values				x			
2. Pre-Historic & Historic Archeological Values				x			

5.1.1.2 Employment

The unemployment rate will remain similar to the state level. Manufacturing and education, health, and social services will remain an important part of the industrial segment of the economy, and management and retail trade are expected to continue their importance as part of the Sedgwick County economy. Floodwaters will continue to pose a threat to business, as traffic access is restricted to the area in addition to operational interruptions that occur from flooding. Flooding will continue to disrupt residential and business activities in the areas adjacent to Wichita. Overall employment in the metropolitan area will not likely be increased in the absence of a flood control project on Cowskin Creek; however, growth in the flood prone areas will be increased.

5.1.1.3 Income

Income of persons living in the area is expected to remain similar to the state and national averages. Flooding will continue to reduce the income of those living and working in areas subject to inundation by Cowskin Creek as flood insurance or flood related costs reduce disposable income. Aggregate income for the metropolitan area of Wichita will not be significantly affected by the flood problems of Cowskin Creek.

5.1.1.4 Social Ecology

Land use for the Wichita area will continue to be a mixture of low, moderate and high-income residential properties, commercial development, and industrial lands. Demand for new residential developments will increase the transition of available unimproved lands into residential areas although at a pace that will be slower than in the surrounding flood-free metropolitan areas. The Wichita area will continue to be a center for retail businesses, service and educational facilities.

5.1.2 Future With-Project Conditions

5.1.2.1 Population

The flood control project will have a direct impact on the number of people living in the study area in general and along Cowskin Creek in particular. Population trends for the metropolitan area of the past decade will continue at high rates of growth, as people will move to the Wichita area with its employment opportunities supported by the large manufacturing sector. Construction from the flood control project may temporarily increase noise and traffic along Cowskin Creek and will affect persons living in and those commuting through the project area. A small amount of additional lands may be required for the enlarged channel project. Acquisition of these lands, including up to 5 houses, may displace some residents although greater flood protection will reduce the threat to health and safety of the population living in and commuting through the areas currently subject to flooding. Additional residential construction in flood-protected areas will stimulate population growth in the area in future decades.

5.1.2.2 Employment

The project construction may slightly increase job opportunities in the area until construction is complete. Long-term area employment will increase slightly in response to additional residential construction, commercial employment, and the increased retail trade in the Cowskin Creek area. The overall aggregate employment rate of the Wichita metropolitan area will not be significantly affected.

5.1.2.3 Income

Short-term construction related employment would increase area incomes, as expenditures for materials and labor will be made during the flood control project construction. Long-term increases in income within the Cowskin Creek area will be realized as construction of residential and commercial property takes place in response to reduced flood hazards within the area.

5.1.2.4 Social Ecology

Although land use for the Wichita metropolitan area will continue to be a mixture of residential properties, commercial development, and industrial lands, increased quality urban growth will occur in the absence of the flood hazard. The Wichita community will develop a more diverse population profile with increases in area employment from residential and commercial growth. Demand for new residential developments in the flood-free areas will increase the transition of developable lands into residential areas at a pace that will be slightly ahead of surrounding areas. The Wichita area will continue to be a center for retail businesses, service and educational facilities. Additional business growth will follow increased population growth. The safety of Cowskin Creek area residents will be improved from flood reduction measures.

5.2 Natural Resource Impacts

5.2.1 Terrestrial

Essentially all of the original flood plain vegetation has been eliminated from the project area and replaced by urban and agricultural land. The total project area is approximately 47.5 acres. All vegetation along the east bank of Cowskin Creek within the construction zone would be removed. This includes 7 acres of riparian forest and 5.9 acres of mixed grass/open scrub savannah habitat along the stream and at the lower end of the project. It includes a 1.5-acre wetland area near the south end of the project that is vegetated predominately with smartweed and water tolerant grasses. Only a few riparian species remain along Cowskin Creek and these are limited to a few scattered trees in the narrow corridor along the bank of Cowskin Creek and a five-acre block of timber at the lower end of the project just upstream of Kellogg Avenue. The mature tree species along the creek channel are listed in section 4.4.1. About 15 acres of cropland provide limited seasonal cover and is of lesser quality as wildlife habitat but it furnishes an important food source during certain periods of the year.

Wildlife habitat remaining in the project area is limited to streamside habitat in a narrow corridor along the east bank of Cowskin Creek. Since the surrounding area is developed or farmed all the way to the channel, very little habitat exists outside this corridor. Wildlife species utilizing this habitat would be displaced. Mitigation to offset project losses is furnished in Section 6.0.

5.2.2 Prime Farmland

Two soil types are transected by the project and approximately 15 acres would be affected. These are Elandco silt loam and Elandco silt loam, occasionally flooded. Both are listed as prime farmland and are farmed along most of the east bank of Cowskin Creek (Photo 5.2.2). Excavation of the channel would have a negative impact on these soils. Farmland along Cowskin Creek would continue to flood, but on a less severe basis. Under with-project conditions floodwater would recede from the farmland at a faster rate because of the improved drainage and 'storage' provided by the enlarged channel. Cropping patterns would not change significantly with the project.

5.2.3 Aquatic and Wetlands

Activities associated with construction of the Cowskin Creek project would have a minor sedimentation impact on Cowskin Creek. Water quality should return to pre-project condition after construction. A low water crossing located at Station 478+95 may be altered by the project. Aquatic habitat existing above the crossing may be impacted if the crossing is altered. The loss of woody vegetation along the east bank will reduce shade and root structure habitat. Aquatic losses will be lessened by the design of the channel. The existing channel will be retained to serve as a low flow channel and will carry most flows. High flows will spread into the bench channel when they reach a design magnitude and function to reduce the severity of overbank flooding.

5.2.4 Wildlife

Impacts would occur to those species of wildlife residing in the project area that are dependent upon the very narrow corridor of habitat along the east bank of Cowskin Creek. Species observed in the project area include whitetail deer, small game, furbearers, rodents, and native sparrows. The eastern spotted skunk is of particular concern to the

Photo 5.2.2 Farmland along east bank of Cowskin Creek.

Kansas Department of Wildlife and Parks who has designated all suitable habitats within the Cowskin Creek drainage basin as critical habitat. Impacts would be reduced through mitigation efforts (Section 6.0).

5.3 Wetlands and Water Quality Permits

The project is located in the Cowskin Creek flood plain and involves excavation along the east bank of Cowskin Creek to increase the streams carrying capacity during heavy rain events. The bottom elevation of this new construction would not disturb the existing channel and would remain above the Ordinary High Water Mark of Cowskin Creek. The U.S. Army Corps of Engineers, Tulsa District has determined that a permit pursuant to Section 404 of the Clean Water Act is not required (Appendix B).

5.4 Threatened and Endangered Species

The U.S. Fish and Wildlife Service reports that there is no record of occurrence of any Federally listed threatened or endangered species based on a review of the proposed project area.

State-listed threatened and endangered species known or likely to occur in the project area includes the threatened eastern spotted skunk. The Kansas Department of Wildlife and Parks has designated all suitable habitats in the Cowskin Creek drainage basin in Sedgwick County as critical habitat for the eastern spotted skunk.

Spotted skunks may occur in suitable habitat anywhere in the state. They seem to prefer forest edges and upland prairie grasslands, especially where rock outcrops and shrub clumps are present. In western counties, it relies heavily on riparian corridors where woody shrubs and woodland edges are present. Woody fencerows, odd areas, and abandoned farm buildings are also important habitat for spotted skunks.

Spotted skunk habitat for the Cowskin project consists of a narrow bank of native vegetation along to the banks of the creek plus several acres in a larger block at the south end of the project. Mitigation for habitat loss is discussed in Section 6.0.

5.5 Cultural Resources

As outlined in section 4.6, Section 106 coordination (National Historic Preservation Act of 1966, as amended) is complete. The proposed project will have no effect on historic properties.

5.6 Water Quality

There would be a temporary increase in siltation during construction. Water quality should return to pre-project conditions following construction. The proposed project should not have a permanent impact on the quality of surface or groundwater.

5.7 Air Quality

Construction activity would have a minor temporary impact on air quality caused by heavy equipment operation and from fugitive dust (particulate) emissions in and around the project site. Construction contractors will comply with all appropriate Federal air quality regulations to limit the dispersal of particulate matter. A temporary increase in exhaust emissions would be expected during construction.

5.8 Noise

There would be an increase in noise from heavy equipment during construction, but this would be temporary and last only during the construction period.

5.9 Cumulative Impacts

No cumulative impacts are anticipated to occur as a result of the proposed project.

SECTION 6.0 MITIGATION PLAN

Project related impacts were identified during project formulation and data gathering for the Environmental Assessment, and coordination planning with the US Fish and Wildlife Service (Appendix C). Mitigation was developed to avoid or offset losses.

The preferred alternative involves working only the east bank of Cowskin Creek and would require the removal of habitat only on that side of the stream. The natural stream channel would not be filled and existing riparian habitat on the west bank would be retained. Flows would continue to follow the existing channel except during periods of flooding when floodwater would enter the excavated channel. Mitigation for the loss of the streambank vegetation, associated wetlands, and riparian/bottomland hardwood habitat consists of planting a native grass/forb mix, creating an excavated wetland, and planting native tree species. The mitigation plan design is illustrated in Figure 6.0.

A native grass/forb mix will be planted at a seeding rate of 18 pounds per acre on 31.2 acres of open area disturbed during construction (Approximately 565 pounds of seed mix). The mix consists of sideoats grama (150 pounds), blue grama (150 pounds), buffalo grass (55 pounds), sand lovegrass (50 pounds), western wheatgrass (50 pounds), Illinois bundleflower (50 pounds), and partridge pea (60 pounds). Lime and fertilizer will be applied per soil tests for that mix on a well-prepared seedbed. The mixture will be planted with a grass or pasture drill equipped with an agitator in the seedbox to provide equal distribution of seed. Seeding depth will be shallow per specifications and the area will be mulched.

An excavated wetland will be created at the site of an existing 1.5-acre wetland that will be removed during construction/excavation of the overflow bench. The top one and one-half feet of topsoil from the existing wetland will be removed and stockpiled for later re-application after construction of the excavated wetland. The reconstructed

wetland will be 2.3 acres and will replace the existing wetland at a 1.5:1 ratio. The final grade through most of the reconstructed wetland after the re-application of the stockpiled topsoil will be at least 1.5 feet below the point at which the general grade resumes at the downstream end. The overburden will be re-applied over the wetland at a nominal depth of one foot. After re-application of the topsoil is complete the wetland will be reseeded with a wetland seed mix at a rate of 20 pounds per acre.

Fourteen acres of trees will be planted to replace 7 acres of riparian timber removed by the project for a replacement ratio of 2:1. Tree species will consist of bare root seedlings of black walnut, bur oak, cottonwood, hackberry, and pecan. Species will be mixed as they are planted. The grass mix discussed above will be applied to the tree planting area prior to planting the seedlings. Trees will be planted on the west bank in a 1500 foot long strip near the lower end of the project and on the east bank in a 5000 foot long strip along the east side of the overflow bench (Figure 6.0).

The removal of existing riparian trees and brush will be minimized.

SECTION 7.0 FEDERAL, STATE, AND LOCAL AGENCY COORDINATION

The draft environmental assessment (EA) was coordinated with the following agencies having legislative and administrative responsibilities for environmental protection. A copy of the correspondence from those agencies that provided comments and planning assistance for preparation of the draft EA are in the appendices. The mailing list for the 30-day public review period for this EA is in Appendix A.

U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Natural Resources Conservation Service
Kansas Department of Health and Environment
Kansas Water Board
Kansas Department of Wildlife and Parks
Kansas State Historical Society
Wichita and Affiliated Tribes

SECTION 8.0 REFERENCES

Bailey, R.G. 1980. *Ecoregions of the United States*. Miscellaneous Publication No. 1391. USDA, Forest Service, Washington, DC.

Omernik, J.M. 1987. *Ecoregions of the Conterminous United States*. Ann. Assoc. Amer. Geogr. 77(1): 118-125.

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Soil Conservation Service. 1981. *Prime Farmland, Soil Survey Map Units, Kansas*. U.S. Department of Agriculture (USDA), Salina, Kansas. 34p.

Soil Conservation Service. 1979. *Soil Survey of Sedgwick County, Kansas*. USDA, Manhattan, Kansas. 126p.

U.S. Bureau of Census. 2001. *2000 Census of Population and Housing, STF3*. www.census.gov/

Figure 6.0. Mitigation Plan for the Cowskin Creek Project.

Table 9.0

Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements

Policies	Compliance of Alternatives
Federal	
Archeological and Historic Preservation Act, 1974, as amended, 16 U.S.C. 469, et seq.	All plans in full compliance
Clean Air Act, as amended, 42 U.S.C. 7609, et seq.	All plans in full compliance
Clean Water Act, 1977, as amended (Federal Water Pollution Control Act, 33 U.S.C. 1251, et seq.	All plans in full compliance
Endangered Species Act, 1973, as amended, 16 U.S.C. 1531, et seq.	All plans in full compliance
Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1-12, et seq.	All plans in full compliance
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq.	All plans in full compliance
Land and Water Conservation Fund Act, 1965, as amended, 16 U.S.C. 4601, et seq.	All plans in full compliance
National Historic Preservation Act, 1966, as amended, 16 U.S.C. 470a, et seq.	All plans in full compliance
National Environmental Policy Act, as amended, 42 U.S.C. 4321, et seq.	All plans in full compliance
Native American Graves Protection and Repatriation Act, 1990, 25 U.S.C. 3001-13, et seq.	All plans in full compliance
Rivers and Harbors Act, 33 U.S.C. 401, et seq.	N/A
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	N/A
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq.	N/A
Water Resources Planning Act, 1965	N/A
Floodplain Management (E.O. 11988)	All plans in full compliance
Protection of Wetlands (E.O. 11990)	All plans in full compliance
Environmental Justice (E.O. 12898)	All plans in full compliance
Farmland Protection Policy Act, 7 U.S.C. 4201, et seq	All plans in full compliance
Protection of Children From Environmental Health Risks and Safety Risks (E.O. 13045)	All plans in full compliance

Note: Full compliance - Having met all requirements of the statutes, Executive Orders, or other environmental requirements for the current stage of planning.

SECTION 10.0 LIST OF PREPARERS

This EA has been prepared to assess the Cowskin Creek Local Flood Protection Project, Wichita, Kansas. The following personnel contributed to the preparation of this document.

David L. Combs - Chief, Environmental Analysis and Compliance Branch; Biologist; 10 years Oklahoma Department of Wildlife Conservation, 17 years U.S. Army Engineer Districts, Tulsa and Chicago.

Jerry C. Sturdy - Biologist; 3 years U.S. Fish and Wildlife Service; 8 years U.S. Army Garrison, Fort Chaffee, Arkansas; 22 years U.S. Army Engineer Districts, Tulsa and Fort Worth.

Kenneth L. Shingleton, Jr. - Archaeologist; 7 years U.S. Army Engineer District, St. Louis; 3 years U.S. Army Engineer District, Tulsa.

Vicky L. Weatherly - GIS Specialist; 8 years U.S. Army Engineer District, Tulsa.

Edwin J. Rossman, Ph.D. - Sociologist; 2 years University of North Texas; 21 years U. S. Army Engineer District, Tulsa.

Craig Wells - Economist; 30 years U.S. Army Engineer Districts, Tulsa and Little Rock.

James R. Sullivan – Economist; 29 years U.S. Army Engineer District, Tulsa.

APPENDIX A

COORDINATION/CORRESPONDENCE

Mailing List for Cowskin Creek Local Flood Protection Project Draft EA

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Senator Nancey Harrington
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DEPARTMENT OF ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

February 15, 2001

Planning, Environmental, and Regulatory Division
Environmental Analysis and Compliance Branch

Mr. William H. Gill
State Supervisor
U.S. Fish and Wildlife Service
315 Houston, Suite E
Manhattan, KS 66502

Dear Mr. Gill:

The Tulsa District, U.S. Army Corps of Engineers is preparing an Environmental Assessment addressing the Cowskin Creek local flood protection project in Wichita, Kansas. The proposed project consists of channelization along 2 portions of Cowskin Creek from Kellogg to Maple and Maize to Central and the construction of a flood detention pond in Sec 14, T27S, R2W within the North Fork of the Calfskin Creek basin at a location downstream of the Dry Creek diversion. The project may require removal of vegetation along Cowskin Creek and excavation and construction of an earthen embankment for the detention pond.

In accordance with Section 7 of the Endangered Species Act of 1973, as amended, the Tulsa District is requesting an official updated list of Federally endangered or threatened species of concern for the above- mentioned location in Kansas.

Sincerely,

David L. Combs
Chief, Environmental Analysis and
Compliance Branch

DEPARTMENT OF ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

February 15, 2001

Planning, Environmental, and Regulatory Division
Environmental Analysis and Compliance Branch

Mr. Chris Mammolitti
Kansas Department of Wildlife and Parks
Environmental Services Section
512 SE 25th Avenue
Pratt, KS 67124

Dear Mr. Mammolitti:

The Tulsa District, U.S. Army Corps of Engineers is preparing an Environmental Assessment addressing the Cowskin Creek local flood protection project in Wichita, Kansas. The proposed project consists of channelization along 2 portions of Cowskin Creek from Kellogg to Maple and Maize to Central and the construction of a flood detention pond in Sec 14, T27S, R2W within the North Fork of the Calfskin Creek basin at a location downstream of the Dry Creek diversion. The project may require removal of vegetation along Cowskin Creek and excavation and construction of an earthen embankment for the detention pond.

The Tulsa District is requesting an official updated list of endangered or threatened species of concern for the above-mentioned location in Kansas.

Sincerely,

David L. Combs
Chief, Environmental Analysis and
Compliance Branch

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Field Office
315 Houston Street, Suite E
Manhattan, Kansas 66502-6172

March 13, 2001

David L. Combs
Environmental Analysis and Compliance
Tulsa District, Corps of Engineers
1645 South 101st East Avenue
Tulsa, Oklahoma 74128-4609

Dear Mr. Combs:

This is in response to your letter of February 15, 2001, describing an environmental assessment for the proposed Cowskin Creek local flood protection project in Wichita, Sedgwick County, Kansas. You requested an official updated list of federally-listed threatened and endangered species in this area. Based on our review of the proposed action area, we have no records of occurrence of any listed or proposed species.

Thank you for this opportunity to comment on the proposal. If you have additional comments or questions, please direct them to me or Dan Mulhern of this office.

Sincerely,

William H. Gill

William H. Gill
Field Supervisor

cc: KDWP, Pratt, KS (Environmental Services)

WHG/dwm

STATE OF KANSAS
DEPARTMENT OF WILDLIFE & PARKS
Operations Office
512 SE 25th Ave.
Pratt, KS 67124-8174
Phone: (620) 672-5911 FAX: (620) 672-6020

March 19, 2001

Mr. David L. Combes, Chief
COE, Environmental Analysis and Compliance Branch
1645 South 101st East Avenue
Tulsa, OK 74128-4609

Ref: D1.0500
Sedgwick
Track: 20010093

RE: T&E List for Cowskin Cr. flood protection project

Dear Mr. Combes:

This will acknowledge receipt on February 22, 2001 of your request for an updated list of endangered or threatened species of concern for the Cowskin Creek local flood protection project in Wichita, KS. The proposed project consists of channelization along two portions of Cowskin Creek from Kellogg to Maple and Maize to Central and construction of a flood detention pond in SEC 14, T27S, R2W, within the North Fork of the Calfskin Creek basin at a location downstream of the Dry Creek diversion. Vegetation removal along Cowskin Creek might be required including the excavation and construction of an earthen embankment for the detention pond.

Enclosed are a list of threatened and endangered species known or likely to occur in and lists of species in need of conservation known to currently occur in Sedgwick Co., KS. We note that the state-listed threatened eastern spotted skunk (*Spilogale putorius interrupta*) is known to currently occur in Sedgwick Co., and critical habitat has been designated as all suitable habitats within the Cowskin Creek and Big Slough drainage basins located in Sedgwick Co. The skunk could be affected by activities in the proposed project including riparian vegetation removal. Cowskin Creek is tributary to the Arkansas River which has been designated as critical habitat for the state-listed threatened Arkansas darter (*Etheostoma cragini*) and endangered Arkansas River shiner (*Notropis girardi*).

If you have any questions or comments, please contact me. Thank you for the opportunity to provide these comments.

Sincerely,

Chris D. Hase

Chris D. Hase, Aquatic Ecologist
Environmental Services Section

Enclosures

xc: KDWP Reg. 4 Sup., Swan

DEPARTMENT OF ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

October 3, 2002

Planning, Environmental, and Regulatory Division

William H. Gill, State Supervisor
U. S. Fish and Wildlife Service
315 Houston, Suite E
Manhattan, KS 66502

Attention: Mr. Dewey Caster

Dear Mr. Gill:

Enclosed is a copy of the Preliminary Design Report for channel modifications between Kellogg and Maple Street for the Cowskin Creek Section 205 Project, Wichita, Kansas. The report describes the recommended channel alternative for the project which will be the recommended alternative in the Environmental Assessment. The proposed project consists of channelization along one bank of Cowskin Creek from Kellogg upstream to Maple. The project would require removal of vegetation and excavation along the east bank of Cowskin Creek as described in the enclosed report. This information is being furnished to assist you in preparing the Fish and Wildlife Coordination Act Report for this project. This information also is being provided to Mr. Chris Mammolitti, Kansas Department of Wildlife and Parks, Pratt, Kansas.

If you have any questions or require additional information please contact Mr. Jerry Sturdy at 918-669-4397.

Sincerely,

Louis E. Vogle, Jr.

for Larry D. Hogue, P.E.
Chief, Planning, Environmental,
and Regulatory Division

Enclosure

DEPARTMENT OF ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

October 3, 2002

Planning, Environmental, and Regulatory Division

OCT 2002

Chris Mammolitti
Kansas Department of Wildlife and Parks
Environmental Services Section
512 SE 25th Ave.
Pratt, KS 67124

Dear Mr. Mammolitti:

Enclosed is a copy of the Preliminary Design Report for channel modifications between Kellogg and Maple Street for the Cowskin Creek Section 205 Project, Wichita, Kansas. The report describes the recommended channel alternative for the project which will be the recommended alternative in the Environmental Assessment. The proposed project consists of channelization along one bank of Cowskin Creek from Kellogg upstream to Maple. The project would require removal of vegetation and excavation along the east bank of Cowskin Creek as described in the enclosed report. This report is being furnished to assist you in addressing your concerns regarding species of special interest that might be affected by the project. This information also is being provided to Mr. Dewey Caster, U. S. Fish and Wildlife Service, Manhattan, Kansas to assist him in preparing the Fish and Wildlife Coordination Act report for this office.

If you have any questions or require additional information please contact Mr. Jerry Sturdy at 918-669-4397.

Sincerely,

Louis E. Vogele, Jr.

for Larry D. Hogue, P.E.
Chief, Planning, Environmental,
and Regulatory Division

Enclosure

STATE OF KANSAS
DEPARTMENT OF WILDLIFE & PARKS
Operations Office
512 SE 25th Ave.
Pratt, KS 67124-8174
Phone: (620) 672-5911 FAX: (620) 672-6020

31 October 2002

Mr. Larry D. Hogue, Chief
COE, Planning, Environmental, and Regulatory Division
1645 South 101st East Avenue
Tulsa, OK 74128-4609

Ref: D1.0500
Sedgwick
Track: 20010093

RE: Preliminary Design Report for Cowskin Creek Flood Project

Dear Mr. Hogue:

This will acknowledge receipt on 7 October 2002 of the Preliminary Design Report for the Cowskin Creek flood project. The proposed project includes channelization along Cowskin Creek from Kellogg to Maple and berm modifications on the berm labeled as Alternative 1 in the attachment. The project is in the W ½ of Section 29 and the SW ¼ of Section 20, T27S, R1W, Sedgwick County, Kansas. The project purpose is to reduce the risk of flood damage to structures along Cowskin and Calfskin creeks.

As the project is currently proposed, we consider it an impact level 2, meaning the project could cause significant negative effects to terrestrial or aquatic wildlife or their habitats. As you know, the project is in an area designated as critical habitats for the state-threatened eastern spotted skunk. In Sedgwick County, the skunk relies heavily on riparian vegetation for its habitats. The project includes removing riparian vegetation. Critical habitats are protected in Kansas Statute Annotated 32-963 and Kansas Administrative Regulation 115-15-3 under the Kansas Nongame and Endangered Species Conservation Act (K.S.A. 32-957 to 963, 32-1009 to 1012, and 32-1033). These statutes and regulations require special Department action permits for projects affecting critical habitats for state-listed threatened or endangered species.

The report includes potential mitigation for unavoidable loss or disturbance of these habitats. We note that the Corps' previous threatened and endangered species information request included plans for a detention structure in Section 14. We would like to know whether a detention structure or similar structure has been considered on the crop land in the east half of Section 29 where the currently proposed project will be. More specifically, we would like to know whether a detention structure could be constructed in the aforementioned area or similar area. This type of situation would require little if any riparian habitat removal or disturbance. This would allow more riparian habitats to be left in place, thus preserving habitats for the skunk and many other species of wildlife that rely on these types of habitats in Kansas.

Our first approach to project reviews is to consider all possible alternatives that avoid or reduce negative effects to natural resources. Being unfamiliar with the Preliminary Watershed Master Plan for the Cowskin Creek watershed, we are concerned that this project approach would work

to help reduce flooding in these local areas, but might increase flood levels downstream. Mitigation can help replace these lost habitat values, but will set riparian habitats within the current project area back in terms of the current stage of natural succession and could set other areas back if problems are merely transferred downstream and addressed in piecemeal fashion. Thus, we encourage the Corps to ensure that all possible alternatives are considered during this early phase when project plans can more easily be revised. Alternatives to consider include detention structures and wetlands that could hold or absorb waters during these higher flows and release them slowly in a way that meets the same goals set forth in the current project proposal without or with reduced channelization of Cowskin Creek.

This project as it is currently designed will require a Department of Wildlife and Parks Action Permit. We will need to conduct habitat assessments to assign habitat values to calculate habitat units for any mitigation requirements. If you have any questions or comments, please contact me. Thank you for the opportunity to provide these comments.

Sincerely,

Chris Hase

Chris Hase, Aquatic Ecologist
Environmental Services Section

xc: KDWP Reg. 4 F&W Sup., Swan
USFWS, Gill

AFFIDAVIT

STATE OF KANSAS \
- SS.
County of Sedgwick /

Milt Mounts, of lawful age, being first duly sworn, deposeth and saith: That he is Record Clerk of The Wichita Eagle, a daily newspaper published in the City of Wichita, County of Sedgwick, State of Kansas, and having a general paid circulation on a daily basis in said County, which said newspaper has been continuously and uninterruptedly published in said County for more than one year prior to the first publication of the notice hereinafter mentioned, and which said newspaper has been entered as second class mail matter at the United States Post Office in Wichita, Kansas, and which said newspaper is not a trade, religious or fraternal publication and that a notice of a true copy is hereto attached was published in the regular and entire Morning issue of said The Wichita Eagle for

__2____ consecutive issues - weeks, that the first publication of said notice was

made as aforesaid on the__23nd__day, of

May_____A.D. __2002__, with

subsequent publications being made on the following dates:

May 30, 2002

And affiant further says that _____ he has personal knowledge of the statements above set forth and that they are true.

Subscribed and sworn to before me this

22nd Day of May ,2002

Norma J. Hoch

Notary Public Sedgwick County, Kansas

NORMA J. HOCH
NOTARY PUBLIC
STATE OF KANSAS
My Appt. Exp. 8-12-02

My Appointment Expires August 12th, 2002

Printer's Fee **$336.00**

Published in The Wichita Eagle
May 23 & 30, 2002 (#1628411)

Announcing

PUBLIC MEETING
as related to the
Wichita, Kansas, Cowskin Creek Feasibility Study
in compliance with
Section 205 of the 1948 Flood Control Act

The U.S. Army Corps of Engineers and City of Wichita will co-host a public meeting to inform the public about the Corps' Cowskin Creek flood control feasibility study and to solicit comments and questions. The meeting will consist of presentations by the City on the overall progress of flood protection measures in the Cowskin Creek Basin, and by the Corps of Engineers on the Section 205 project. The meeting will begin at 7:00 p.m., and will be held at the following location:

Wichita, Kansas, Public Meeting
Sedgwick County Extension Education Center
4-H Hall
7001 West 21st Street North
Wichita, KS
Wednesday, June 5, 2002
Time: 7:00 p.m.

The Corps of Engineers Feasibility study investigates the flood problems of the Cowskin Creek Basin area, evaluates a variety of alternatives developed by the City to reduce future flooding, identifies other concerns or needs of the project area, and formulates a recommended plan of action or non-action per the Continuing Authorities Program, Section 205 guidelines. The Corps evaluation includes consideration of environmental impacts that may occur as a result of each alternative. The environmental impact evaluation is done in compliance with the National Environmental Policy Act (NEPA). The first step in the NEPA process is the scoping activity involving input from the public about potential alternatives and related impacts. As part of the scoping activity, the Corps requests that the public; interested parties; and Federal, State, and local agencies identify environmental issues related to the project alternatives. Comments and questions can be forwarded to:

Mr. Stephen L. Nolen
ATTN: CESWT-PE-E
U.S. Army Corps of Engineers, Tulsa District
1645 S. 101st East Avenue
Tulsa, OK 74128-4629
Phone: 918-669-7660 **e-mail: Stephen L. Nolen@usace.army.mil**

APPENDIX B

SECTION 404 PERMIT

CESWT-PE-R (1145) 18 November 2002

MEMORANDUM FOR CESWT-PE-P, ATTN: Richard Thomas

Subject: Cowskin Creek Section 205 Project, Identification Number 12539

1. This is in regard to the U.S. Army Corps of Engineers proposed Section 205 project for the City of Wichita, Kansas. The project would be located on Cowskin Creek, in the Western 1/2 of Section 29, Township 27 South, Range 1 West, Sedgewick County, Kansas.

2. The City of Wichita has developed plans to make improvements on Cowskin Creek that would alleviate flooding. The intended design is excavation along the east side of Cowskin Creek to increase its carrying capacity. The bottom elevation of this new construction would remain above the Ordinary High Water Mark (OHWM) of Cowskin Creek.

3. We have completed an evaluation of the proposal and determined that a placement of dredged or fill material will not be required, permanently or temporarily, into any "waters of the United States," including jurisdictional wetlands. Therefore, this proposal is not subject to regulation pursuant to Section 404 of the Clean Water Act, and a Department of the Army (DA) permit will not be required.

4. Should the City of Wichita desire a change in their construction method that would necessitate a discharge into Cowskin Creek, we suggest they resubmit that portion of the project so we may determine whether an individual DA permit is required. The City of Wichita needs to be informed that changes in their construction method requiring an individual permit may delay the review process an additional 90 to 120 days.

5. If you have any questions, please contact Mr. Jeff Knack at 918-669-4904.

Jeff Knack For

Larry D. Hogue, P.E.
Chief, Planning, Environmental,
and Regulatory Branch

APPENDIX C

FISH AND WILDLIFE

COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Kansas Field Office

315 Houston Street, Suite E

Manhattan, Kansas 66502-6172

December 12, 2003

Mr. Larry D. Hogue
Chief, Planning, Environmental and Regulatory Division
U.S. Army Corps of Engineers- Tulsa District
Attn: CESWT-PE-E (Sturdy)
1645 South 101st East Ave.
Tulsa, Oklahoma 74128-4609

Dear Mr. Hogue:

This final Fish and Wildlife Coordination Act Report (report) for the Cowskin Creek Local Flood Protection Project (205 Study) identifies the major cover types within the project area, their relative wildlife value, Resource Category designation, and corresponding Mitigation Planning Goal. Your agency and the city of Wichita have indicated this kind of information would be useful in project planning and in avoiding environmentally sensitive areas during project development. The information contained in this letter is subject to revision and is prepared at a level of detail that is consistent with the rest of project planning. As project development continues it may be necessary to apply more sophisticated habitat evaluation techniques to accurately determine baseline conditions and projected impacts if compensitory mitigation ratios are not utilized. It is anticipated, however, that resource category designation and mitigation planning goals will not change significantly from what is contained in this report.

This report was prepared in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and will constitute the report of the Secretary of the Interior on the project within the meaning of section 2 (b) of this act in its final form. This report is provided pursuant to the fiscal year 2003 Scope-of-Work Agreement between the U.S. Fish and Wildlife Service (Service) and the Tulsa District, Corps of Engineers (Corps).

Classification of the major cover types within the Cowskin Creek project area is based on the Standards for the Development of Habitat Suitability Index Models, 103 ESM, U.S. Fish and Wildlife Service. The cover types in the Kellog to Maple streets project area, along with clarifying definitions where needed, are as follows:

(1) Riparian - This cover type consists of trees and shrubs adjacent to stream and riverine areas.

(2) Riverine - This cover type includes all wetlands and deep water habitats contained within a channel. It includes both intermittent and permanent streams.

(3) Wetland - Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following attributes: (1) at least periodically the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and, (3) the substrate is nonsoil and is saturated with water or covered by water at some time during the growing season of each year. From: Cowerdine, L. M., et al. 1979. Classification of wetlands and deep water habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS - 79/31.

The U.S. Fish and Wildlife Service's Mitigation Policy (Federal Register Vol. 46, No. 15, Pages 7644-7663; January 23, 1981) is used by the Service in the evaluation of impacts to land and water developments and in the subsequent recommendations to mitigate adverse impacts. The Policy establishes four Resource Categories, Designation Criteria, and Mitigation Planning Goals for the cover types that the Service anticipates will be impacted by development of a project. These are presented below:

Resource Category	Designation Criteria	Mitigation Planning Goal
1	High value for evaluation* species and unique and irreplaceable.	No loss of existing habitat value
2	High value for evaluation species and scarce or becoming scarce.	No net loss of in-Kind habitat value
3	High to medium value for Evaluation species and abundant.	No net loss of habitat value while Minimizing loss Of in-kind Habitat value.

4	Medium to low value for evaluation species.	Minimize loss of Habitat value.

* Fish and wild life species that are representative of the cover types occurring in the project area. They are to be selected by a team consisting of the Fish and Wildlife Service, the Kansas Department of Wildlife and Parks, and the Corps of Engineers, and reflect the projected habitat changes, both positive and negative that result from project development.

Using the Designation Criteria, the cover types in the Cowskin Creek project area would fall into the following Resource Categories.

	RESOURCE CATEGORY			
	1	2	3	4
Riparian		X		
Riverine		X		
Wetland		X		

In applying the mitigation planning goals, the mitigation policy directs that the following guidelines be followed:

Resource Category 1

The Service will recommend that the losses of existing habitat be prevented as these one-of-a-kind areas cannot be replaced. Insignificant changes that do not result in adverse impacts on habitat value may be acceptable provided they will have no significant cumulative impact.

Resource Category 2

The Service will recommend ways to avoid or minimize losses. If losses are likely to occur, then the Service will recommend ways to immediately rectify them or reduce or eliminate them over time. If losses remain likely to occur, then the Service will recommend that those losses be compensated by replacement of the same kind of habitat value so that the total loss of such in-kind habitat value will be eliminated.

Specific ways to achieve this planning goal include (1 physical modification of replacement habitat to convert it to the same type lost; (2) restoration or rehabilitation of previously altered habitat; (3) increased management of similar replacement habitat so that the in-kind value of lost habitat is replaced; or,(4) a combination of these measures. By replacing habitat value losses with similar habitat values, populations of species associated with that habitat may

remain relatively stable over in the area over time. This is generally referred to as in-kind replacement.

Resource Category 3

The Service will recommend ways to avoid or minimize losses. If losses are likely to occur, then the Service will recommend ways to immediately rectify them or reduce or eliminate them over time. If losses remain likely to occur, then the Service will recommend that those losses be compensated by replacement of habitat value so that the total loss of habitat value will be eliminated.

It is preferable, in most cases, to recommend ways to replace such habitat value losses in-kind. However, if the Service determines that in-kind replacement is not desirable or possible, then other specific ways to achieve this planning goal include (1) substituting different kinds of habitats, or (2) increasing management of different replacement habitats so that the value of the lost habitat is replaced. By replacing habitat value losses with different habitats or increasing management of different habitats, populations of species will be different, depending on the ecological attributes of the replacement habitat. This will result in no net loss of total habitat value but may result in significant differences in fish and wildlife populations. This is generally referred to as out-of-kind replacement.

Resource Category 4

The Service will recommend ways to avoid or minimize losses. If losses are likely to occur, then the Service will recommend ways to immediately rectify them or reduce or eliminate them over time. If losses remain likely to occur, then the Service may make a recommendation for compensation, depending on the significance of the potential loss.

However, because these areas possess relatively low habitat values, they will likely exhibit the greatest potential for significant habitat value improvements. Service personnel will fully investigate these areas' potential for improvement, since they could be used to mitigate Resource Category 2 and 3 losses.

Project Description

Within the Cowskin Creek project area the greatest negative impact associated with flood control alternatives is the clearing of riparian woodlands, potential for flooding riparian woodlands downstream, filling of existing wetlands and alteration of existing riverine habitat. We understand preliminary plans for a project to protect development along Cowskin Creek would entail providing added channel capacity within the city by reshaping the existing east bank of Cowskin Creek to provide added overflow channel capacity from Kellogg to Maple Streets. Reshaping the stream channel from Kellogg and Maple Streets, a distance of approximately 3,800 feet, to a uniform 300 foot bottom width and 3 to 1 side slopes (east bank of the channel) would eliminate the thin belt of riparian habitat remaining within this

residential/agricultural area. Of the 38 acres to be affected 24 acres are cropland, 7 acres are riparian timber, 5 acres of mixed grass/open savannah and 1.5 acres are wetland.

There are three distinct habitat losses which would warrant mitigation. One is the loss of riparian woodland bordering on Cowskin Creek. With the proposed channel improvement none of the existing riparian area on the east bank of the stream would remain after project completion. This habitat loss should be replaced by purchase or easement of a suitable amount of similar habitat that would be managed to maximize its potential to offset losses or by purchase and conversion of agricultural land in the immediate vicinity to woodland.

In addition to riparian area losses there is a small wetland (water tolerant grasses and smartweed present on 1 to 1.5 acres) in and abutting Cowskin Creek within the southeastern area to be reshaped.

A wetland determination will be necessary to determine how many acres would be filled by the proposed channel re-alignment. The quantity and quality of existing wetland will determine the amount of compensation necessary to offset project losses. A wetland mitigation plan would be developed in coordination with at least the Corps, Service, EPA, and the Kansas Department of Wildlife and Parks. This plan would include site locations, time frames, construction plans, a monitoring plan, progress reports, and standards of success. This plan would be a condition of any Section 404 permit issued for the project. The plan should be implemented regardless of the regulatory nature of the wetland.

Compensatory Mitigation

Advance creation	1.5:1	Forested
	1:1	Emergent wetland
Concurrent creation	2:1	Forested
	1.5:1	Emergent wetland
Advanced restoration	1.5:1	Forested
	1:1	Emergent wetland
Concurrent restoration	2:1	Forested
	1.5:1	Emergent wetland
Advanced enhancement	3:1	Forested
	2:1	Emergent wetland
Concurrent enhancement	4:1	Forested
	3:1	Emergent wetland
Preservation	5:1	Forested

Total re-channelization of 3,800 feet of Cowskin Creek is no longer a project feature. The present project calls for working with only the east bank of the stream leaving habitat on the opposite bank. The natural stream channel will not be filled and existing riparian habitat on the

west bank will be retained. Riparian habitat on the east bank should be retained wherever possible.

Endangered and Threatened Species

Due to the urban and residential nature of the immediate project area Ferderaly listed or proposed species will not be adversely affected by project implementation.

One species of note from the project area is the Eastern Spotted Skunk (Spilobale putorius interrupta). This species is listed as threatened by the state and is protected by the Kansas Nongame and Endangered Species Conservation Act and it's administrative regulations. Currently, Cowskin Creek within Sedgwick County is designated as critical habitat for the Eastern Spotted Skunk. A determination of whether the riparian habitat within the project area is suitable for the Eastern Spotted Skunk will have to be made by the Kansas Department of Wildlife and Parks.

Kansas State Law (K.S.A. 32-504, 32-507: effective May 1, 1981) require persons undertaking or sponsoring publicly funded or State or Federally assisted action which is likely to impact endangered or threatened wildlife habitats where they are likely to occur, to obtain a project action permit from the Secretary of the Kansas Department of Wildlife and Parks prior to initiation of such action. In addition to the Federally listed threatened and endangered species, the State lists additional species that may be of concern within the project area. This list should be requested from the Division of Environmental Services, Kansas Department of Wildlife and Parks, Rt. 2, Box 54A, Pratt, KS 67124-9599.

Recommendations

In the interest of protecting the fish and wildlife resources of Cowskin Creek and adjacent lands between Kellogg and Maple Streets, Kansas it is recommended that:

1. Clearing of one bank only is less damaging than total channelization of this reach however 7 acres of riparian timber will be eliminated by the project. Mitigation planning goals and compensatory mitigation (concurrent mitigation 2:1 ratio for forested areas) indicate native tree species should be planted in a 160 foot wide buffer (approximately 14 acres) immediately adjacent to the altered reach.

2. Wetland determinations should be conducted for all hydric soil types and soil types with hydric inclusions within the project area. Mitigation planning goals and compensatory mitigation (concurrent mitigation) indicate 1.5 acres of wetland should be created for every acre lost. Preliminary indications are that 2.3 acres of wetland should be reestablished within the floodway.

3. A conservation easement should be provided on the 38.8 acres of restored wetland, riparian habitat and prairie grassland (grassed waterway) that will be planted and maintained for the life of the project by project sponsors.

4. If the mitigation ratios are not acceptable, terrestrial and aquatic habitat within the project area should be evaluated by a team of biologists from the U.S. Fish and Wildlife Service, the Kansas Department of Wildlife and Parks and the U.S. Army, Corps of Engineers by applying the Habitat Evaluation Procedures (HEP) or the Fish and Wildlife Habitat Analysis Procedures developed by the Kansas Department of Wildlife and Parks.

Fish and wildlife habitat losses attributable to preferred project alternative, preliminary mitigation areas and costs associated with these recommendations have been developed by the City of Wichita and reviewed by the Service and the Kansas Department of Wildlife and Parks. The plan outlined on the map submitted by MKEC October 29, 2003 (Figure 1.) depicting the outline of mitigation areas and acreage is acceptable to the agencies. The Service and the Department will continue to cooperate with the city of Wichita and the Corps to refine and finalize preliminary mitigation plans.

Please continue to keep us informed concerning the status of this study as it develops. Comments on this final Fish and Wildlife Coordination Act Report are welcomed.

Sincerely,

William H. Gill

William H. Gill
Field Supervisor

cc: FWS/ES, Denver,CO. (Fed. Act.)
KDW&P, Pratt, KS (Environmental Services)
KDW&P, Valley Center, (Region 4 Office)

WHG/drc/

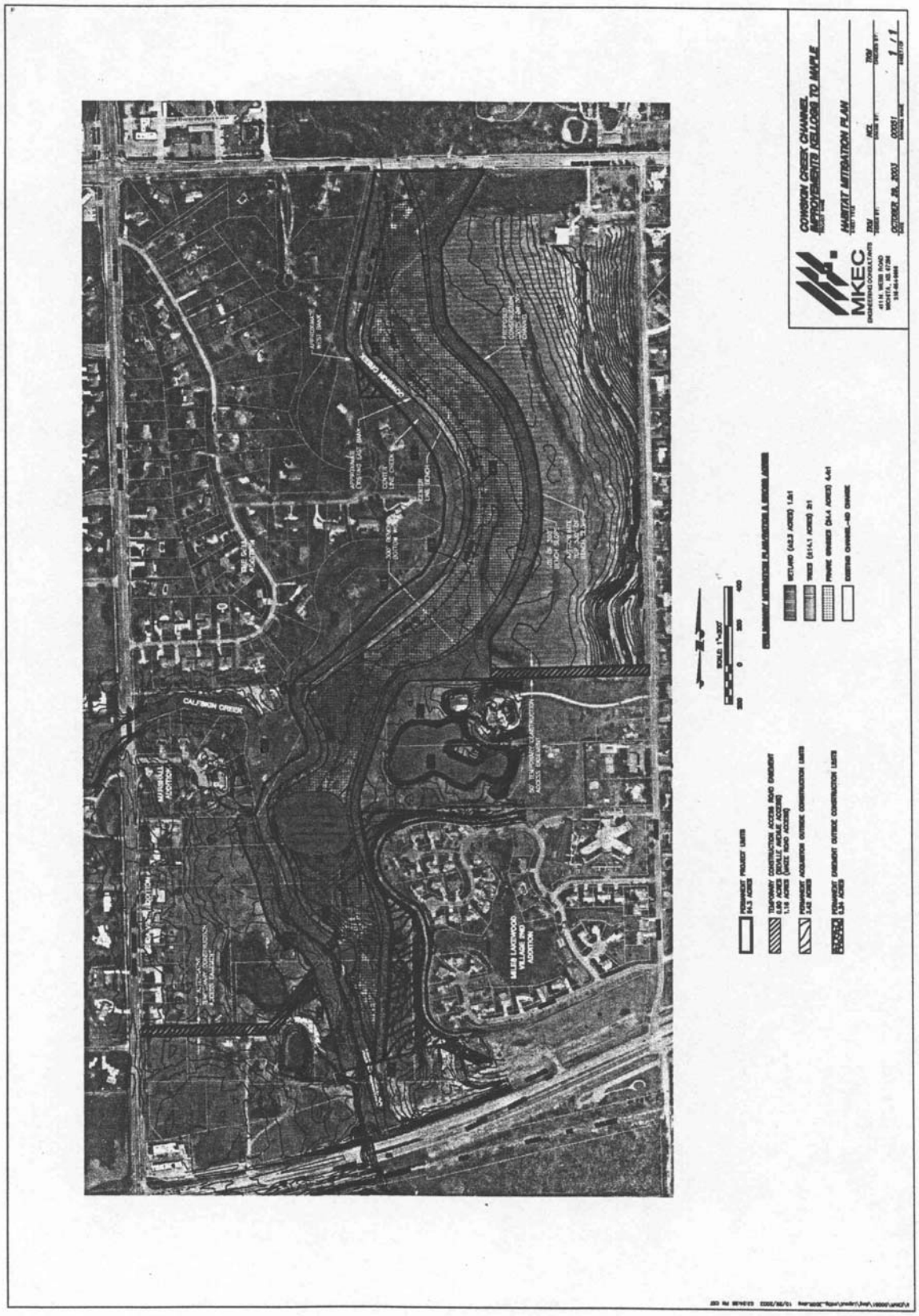

CONNION CREEK CHANNEL
IMPROVEMENTS (KELLOGG TO MAPLE)
HABITAT MITIGATION PLAN
MKEC
ENGINEERING CONSULTANTS
4110 N. WEBB ROAD
WICHITA, KS 67204
316-838-5884
TOM
ACE
TOM
OCTOBER 26, 2001
02201
1 / 1
CALFMON CREEK
MUNDWALL ADDITION
MILES LAKEWOOD VILLAGE 2ND ADDITION
SCALE 1"=200'
PROJECT LIMITS
TEMPORARY CONSTRUCTION ACCESS ROAD EASEMENT
PERMANENT ACQUISITION OUTSIDE CONSTRUCTION LIMITS
PERMANENT EASEMENT OUTSIDE CONSTRUCTION LIMITS
WETLAND
TREES
PRIVATE GRADED
EXISTING CHANNEL-NO CHANGE

Figure 1.

APPENDIX D

CULTURAL RESOURCES COORDINATION

DEPARTMENT OF ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

February 22, 2001

Planning, Environmental, and Regulatory Division
Environmental Analysis and Compliance Branch

Mr. Ramon Powers
State Historic Preservation Officer
Historic Preservation Office
Kansas State Historical Society
6425 SW 6th Avenue
Topeka, KS 66615-1099

Dear Mr. Powers:

The purpose of this letter is to initiate consultation under Section 106 of the National Historic Preservation Act of 1966 concerning a proposed flood control project for the City of Wichita on Cowskin Creek in Sedgwick County, Kansas.

The City of Wichita has requested the assistance of the U.S. Army Corps of Engineers (USACE) to control flooding along Cowskin Creek. Under Section 205 of the Flood Control Act of 1948, the USACE has the authority to assist in the development and construction of local flood control projects. As the result of a reconnaissance phase study of the Cowskin Creek flood problem, recommendations have been developed that will be further explored during the preparation of a feasibility report on the proposed project.

As presently defined, the proposed flood control work on Cowskin Creek consists of modifications to two sections of Cowskin Creek within the city limits of Wichita and construction of a large detention pond just west of Wichita (see enclosed maps and project descriptions). We are consulting with you at this time to seek your recommendations on how best to proceed with this undertaking for the purposes of identifying cultural resources within the project areas. Specifically, we are interested in what cultural resources are known to exist within the proposed project areas, and for your recommendations regarding the conduct of cultural resources inventory work in these areas.

If you have any questions, please contact Mr. Louis Vogele, Archeologist, at 918-669-4934.

Sincerely,

David L. Combs
Chief, Environmental Analysis and
Compliance Branch

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY, CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

May 10, 2001

Planning, Environmental, and Regulatory Division
Environmental Analysis and Compliance Branch

Mr. Gary McAdams, President
Wichita and Affiliated Tribes
P.O. Box 729
Anadarko, OK 73005

Dear Mr. McAdams:

The purpose of this letter is to initiate consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, regarding a flood control project under study for western Wichita, Kansas. The U.S. Army Corps of Engineers, Tulsa District, has been asked by the City of Wichita to provide planning and engineering assistance for this project, which classifies it, in part, as a Federal action.

In 1998, portions of the City of Wichita and its western surrounding areas were flooded, causing millions of dollars in damages. In particular, the City experienced problems with overflow from Cowskin Creek, Calfskin Creek, and Dry Creek in central Sedgwick County, Kansas. In response to the threat of similar future floods, the City of Wichita has employed consultants, including the Corps, to design flood control measures to be implemented in these areas.

In accordance with Section 106, the Tulsa District will be conducting archaeological investigations of the potentially affected areas. If historic properties are identified, they will be evaluated for eligibility to the National Register of Historic Places. At this stage in project planning, the City of Wichita is studying the feasibility of implementing bank stabilization procedures on two sections of Cowskin Creek, between Kellogg and Maple Roads (Sec. 29, T27S, R1W), and between Maize and Central Roads (Sec. 19, T27S, R1W)(see enclosures). Additionally, the project calls for a 200-600 acre detention pond to be constructed in the upper drainage areas of Calfskin Creek and Dry Creek to the west of Wichita. Unfortunately, at this time the detention pond site has not been specifically determined. However, enclosed is a map showing its most likely location, in the vicinity of 13th Street North and 151st Street West (Sec. 14, T27S, R2W).

Please review these areas of western Wichita, Kansas, for information that you may be willing to share with us on archaeological sites, historic properties, sacred sites, or

traditional cultural properties that may be significant to the Wichita and Affiliated Tribes. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources.

Any information or comments you are able to provide will be appreciated. Tulsa District is committed to ensuring your proper involvement in the Section 106 consultation process. If you have any questions, please contact Mr. Ken Shingleton at 918 669-7661.

Sincerely,

David L. Combs,
Chief, Environmental Analysis
and Compliance Branch

Enclosures

KANSAS

STATE

HISTORICAL

SOCIETY

◆

Historic Preservation Office

◆

6425 S.W. 6th Avenue
Topeka, Kansas
66615-1099
PHONE# (785) 272-8681
FAX# (785) 272-8682
TTY# (785) 272-8683

◆

KANSAS HISTORY CENTER

Administration
Center for Historical Research
Cultural Resources
Education / Outreach
Historic Sites
Kansas Museum of History
Library & Archives

HISTORIC SITES

Adair Cabin
Constitution Hall
Cottonwood Ranch
First Territorial Capitol
Fort Hays
Goodnow House
Grinter Place
Hollenberg Station
Kaw Mission
Marais des Cygnes Massacre
Mine Creek Battlefield
Native American Heritage Museum
Pawnee Indian Village
Pawnee Rock
Shawnee Indian Mission

HISTORIC PRESERVATION OFFICE
6425 SW 6TH AVE
TOPEKA, KS 66615-1099
785-272-8681 *FAX 785-272-8682

March 14, 2001

David L. Combs
Chief, Environmental Analysis and Compliance Brance
Corps of Engineers, Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma 74128-4609

Re: Proposed flood control, Cowskin Creek, City of Wichita
Sedgwick County

Dear Mr. Combs:

The Kansas State Historic Preservation Office has reviewed its cultural resources file for the areas of the above mentioned project in accordance with 36 CFR 80. The areas to be modified for flood control along Cowskin Creek, and area of the proposed detention pond, should be evaluated by a professional archeologist before construction of the project is initiated. These areas represent regions of high and moderate archeological potential that have never been surveyed. We recommend that this survey consist of both a pedestrian evaluation along with subsurface testing (i.e. coring and/or backhoe trenching) to determine if there are any buried soils or cultural levels present in the project area. A report describing the survey, its results, and recommendations for mitigating the effects of construction on archeological sites, if any, should be sent to this office for review. In addition, in compliance with the recently revised 36 CFR 800, Native American tribes and other potential consulting parties should be invited to comment on the project. A list of potentially interested Native American tribes, organized by county, can be found at our website, www.kshs.org, under Programs and Services, Preservation, Project Review and Compliance.

If you have any questions or need additional information concerning these comments, please contact Will Banks at (785) 272-8681, ext. 214.

Sincerely,

Ramon Powers
State Historic Preservation Officer

R. Pankratz/cc

Richard Pankratz, Director
Historic Preservation Office

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

September 8, 2003

Planning, Environmental, and Regulatory Division
Environmental Analysis and Compliance Branch

Ms. Mary R. Allman
State Historic Preservation Officer
Historic Preservation Office
Kansas State Historical Society
6425 SW 6th Avenue
Topeka, KS 66615-1099

Dear Ms. Allman:

The purpose of this letter is to continue consultation under Section 106 of the National Historic Preservation Act of 1966 (as amended) concerning the planned construction of a local flood control project along Cowskin Creek in western Wichita, Kansas.

In accordance with Section 106, the U.S. Army Corps of Engineers, Tulsa District conducted archaeological investigations of the area of potential effect in an effort to identify historic properties. The enclosed draft report describes the project and methods of investigation. No prehistoric or historic archaeological sites, or historic standing structures were identified within the project area. Therefore, we have determined that no historic properties will be affected by this federal undertaking.

We request your comment on the adequacy of the enclosed report, and we request your comment on our finding of "no historic properties affected."

Thank you for your assistance. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Larry D. Hogue, P.E.
Chief, Planning, Environmental
and Regulatory Division

Enclosure

KSR&C No. 03-09-176

KANSAS

Kansas State Historical Society
Dick Pankratz, *Director, Cultural Resources Divison*

KATHLEEN SEBELIUS, GOVERNOR

October 3, 2003

Larry D. Hogue
Planning, Environmental and Regulatory Division
Corps of Engineers, Tulsa District
1645 South 101st East Avenue
Tulsa, OK 74128-4609

RE: Cultural Resources Inventory
Cowskin Creek, Sedgwick County

Dear Mr. Hogue:

In accordance with 36 CFR 800, the Kansas State Historic Preservation Office has reviewed the report entitled *Letter Report for a Cultural Resources Inventory for Cowskin Creek in Wichita, Kansas*. We concur with your finding of "no historic properties affected" pursuant to 36 CFR 800.4. This office has no objection to implementation of the project.

Any changes to the project, which include additional ground disturbing activities, will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately. If you have questions or need additional information regarding these comments, please contact Will Banks 785-272-8681 (ext. 214) or Jennifer Epperson (ext. 225).

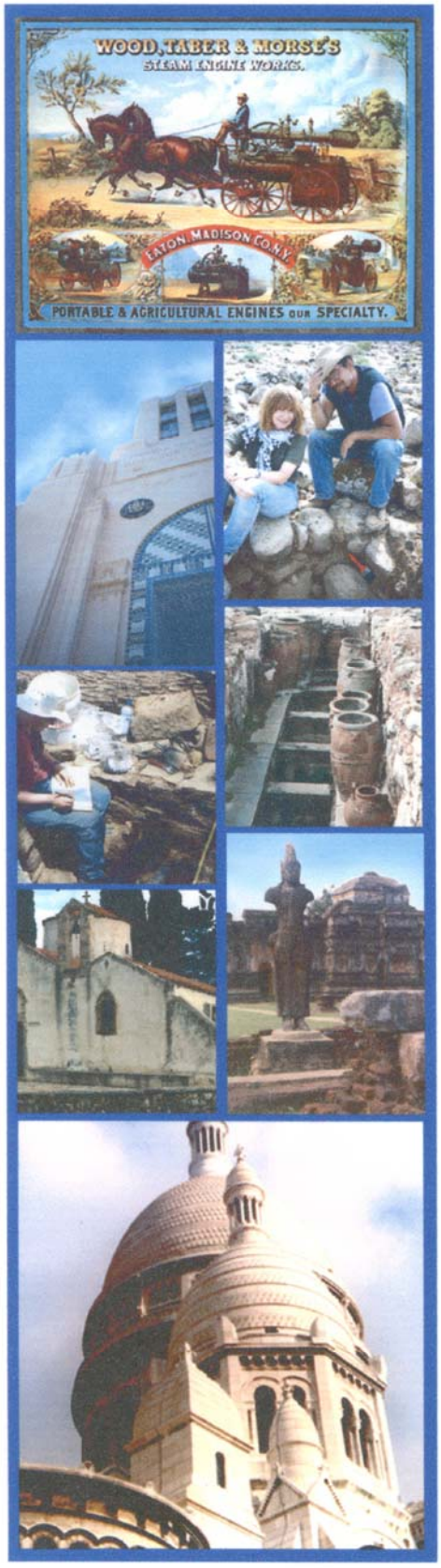
Sincerely,

Mary R. Allman
State Historic Preservation Officer

Richard Pankratz

Richard Pankratz, Director
Cultural Resources Division

6425 SW Sixth Avenue • Topeka, KS 66615-1099
Phone 785-272-8681 Ext. 217 • Fax 785-272-8682 • Email dpankratz@kshs.org • TTY 785-272-8683
www.kshs.org



Letter Report for a Cultural Resources Inventory for Cowskin Creek in Wichita, Kansas

A WOMEN-OWNED SMALL BUSINESS

4G CONSULTING
CULTURAL RESOURCES
RESEARCH & COMPLIANCE
267 MARIA AVENUE, ST. PAUL, MN 55106

Letter Report for a Cultural Resources Inventory for Cowskin Creek in Wichita, Kansas

Report Prepared by: 4G Consulting, LLC (4G)

4G CONSULTING
CULTURAL RESOURCES
RESEARCH & COMPLIANCE
TEL: 651.298.0926 ■ FAX: 651.330.7256
267 MARIA AVE, ST. PAUL, MN 55106
A WOMAN-OWNED SMALL BUSINESS

Principal Investigator: James F. Rust, MA, RPA

Report Author: James F. Rust

Date of Report: September 2, 2003

Report Submitted to: U.S. Army Corps of Engineers, Tulsa District

Contract Number: DACW56-03-F-0047

USGS Quadrangles: Wichita West (1982)

Project Location: E 1/2 NW 1/4; E 1/2 NW 1/4 SW 1/4 and E 1/2 SW 1/4 SW 1/4 T27S R1W Sec. 29

Signature:

INTRODUCTION

4G Consulting conducted a Phase I cultural resources inventory for the U.S. Army Corps of Engineers (COE), Tulsa District in order to identify historic properties as mandated by Section 106 of the National Historic Preservation Act of 1966, as amended. The project area was located in Wichita, Kansas, Delano Township south of Maple Drive, east of Cowskin Creek and north of Hwy 54 in the E 1/2 NW 1/4; E 1/2 NW 1/4 SW 1/4 and E 1/2 SW 1/4 SW 1/4 T27S R1W Sec. 29. The total Area of Potential Effect (APE) was about 50 acres (Figure 1).

The proposed actions consist of flood control measures along Cowskin Creek including re-channeling and re-dyking. The horizontal extent of the APE varies from 200 to 400 feet east of the current creek channel. Based on engineering cross-sections provided by MKEC Engineering Consultants, the vertical extent of new construction excavation within the APE varies from approximately 2.5 to 7 feet.

James F. Rust, MA, RPA served as the Principal Investigator and Holly A. Raab, PhD served as the Project Archaeologist. An assistant archaeologist was also part of the field crew. Rolfe Mandel, PhD of the Kansas Geological Survey, who has researched the geomporphology of over 1000 drainages in the state of Kansas, served as the project geomorphologist.

METHODS

Literature and Records Search

The initial records search and literature survey was conducted between July 1 and July 8, 2003. The following repositories were visited for relevant site files and reports:

- Kansas State Historical Society, Site Files assisted by Ms. Anita Frank
- Watson Library, University of Kansas, Lawrence
- Anschutz Library, University of Kansas, Lawrence
- Kansas Geological Survey, Lawrence

Further records and literature review was conducted during the course of the fieldwork and included the following repositories:

- Sedgwick County Records Office, Wichita
- Sedgwick County Historical Museum, Wichita

To date, no archaeological sites have been documented within the Cowskin Creek (Wichita) project area, although the 1882 GLO map (Edwards 1882) shows a barn and residence on the property of O. Martinson in a meander bend, on the west side of Cowskin Creek now abandoned by rechanneling.

Fieldwork

Intensive pedestrian survey was performed in the approximately 50 acres of the project area on July 29 and August 2, 2003. Transects were spaced no greater than 10 meters. Average labor hours spent on pedestrian survey was about 2.1 acres per hour, almost three times the intensity of the average pedestrian survey in the Plains (6.25 acres per hour). Apart from stream banks, slopes greater than 30 percent were generally not surveyed, although such terrain was not common in the project area, 75 percent of which was a recently plowed and flat field (Figure 2). Extra time and attention was given to exposed creek beds, trails, open areas in the sparsely wooded sections, and the farmed field. The farmed field afforded close to 100 percent visibility throughout.

Six shovel tests were conducted in the southern portion of the project area in the vicinity of Isolated Find 1, which consists of structural debris and recent garbage dumping. Two hand auger cores were taken further south on the banks of the abandoned stream channel. The augering was accomplished with a 3-inch diameter bucket auger and went to average depths of 150 centimeters (Figure 3). Two of the field crew rafted down the eastern bank of Cowskin Creek to observe any eroded creek bank exposures (Figure 4).

Five areas were initially selected for backhoe trenching and geomorphological investigations. All five were located in the northern open fields because southern, woody portions of the project area could not be accessed by the backhoe (Figure 5). However, after review of the area by the geomorphologist, Dr. Rolfe Mandel, it was determined that given the vertical APE of the proposed action, backhoe trenching in these areas would provide no significant information and the trenching program was abandoned. Based on inspection of the landscape and several cutbanks, he concluded that this area is within the boundaries of the modern floodplain (T-0) of the creek. As an active floodplain, it is seasonally flooded and is currently aggrading. The upper 2 to 3 meters of the T-0 fill is composed of alluvium that is less than ca. 150 years old, and, therefore, has no potential for containing buried prehistoric cultural deposits. Therefore, trenches were not excavated in Cowskin Creek valley.

RESULTS

No significant cultural remains were noted in the 50-acre survey area. The plowed field, which offered excellent visibility, was surprisingly bereft of even modern artifacts, with only a few shards of modern glass noted in the entire field area. Likewise, no artifactual debitage was observed in visible portions of the eroded creekbank viewed from the ground or during the raft inspection, or in the lightly wooded areas in the southern 25 percent of the project area, with the exception of Isolated Find No. 1 mentioned below.

The six shovel tests in the area of Isolated Find No. 1 all proved negative for subsurface deposits and were virtually identical in profile (Table 1). The isolated find itself consisted of randomly scattered historic debris including some wire nails, glass, wood fragments, remains of some wooden fenceposts and barbed wire, and parts of a corrugated tin roof. Also observed were dump areas with parts from modern barbecues, refrigerator parts, buckets, and similar items. No diagnostics were observed that would allow for the conclusion that the remains were directly related to the farmstead shown on the 1882 plat map, nor were any historic building foundations observed. The observed wooden fenceposts with barbed wire may have been associated with the earlier, historic landowners, but clear association is not evident. The farmstead shown on the 1882 plat map was located in a meander bend of the creek. The 1905 plat map (Ogle 1905) does not show the farmstead buildings in this location anymore, but does show a building further to the southwest, still on the property of O. Martinson. It is quite likely that the farmstead buildings were moved further away from the creek to avoid flooding and to relocate closer to the new Atchinson, Topeka and Sante Fe railroad line which ran through the south portion of the property by 1905. The majority of the current debris in this area is late twentieth century.

The auger cores placed above the abandoned creek bed also proved negative for artifactual deposits (Table 2) and revealed to depths of approximately 150 centimeters the dark brown silt and sandy silt loam typical of the alluvial Elandco series in this environment (Penner and Wehlmueller 1979:51). In conjunction with the assessment of the geomorphologist, it was determined that this area also had a low potential for subsurface archaeological deposits.

In summary, the investigations at Cowskin Creek proved negative for significant cultural deposits. Given the horizontal extent of the APE and the relatively shallow depth of the proposed construction excavations within the T-O floodplain fill, we do not consider that the proposed action will have a significant impact on any archaeological or historical remains.

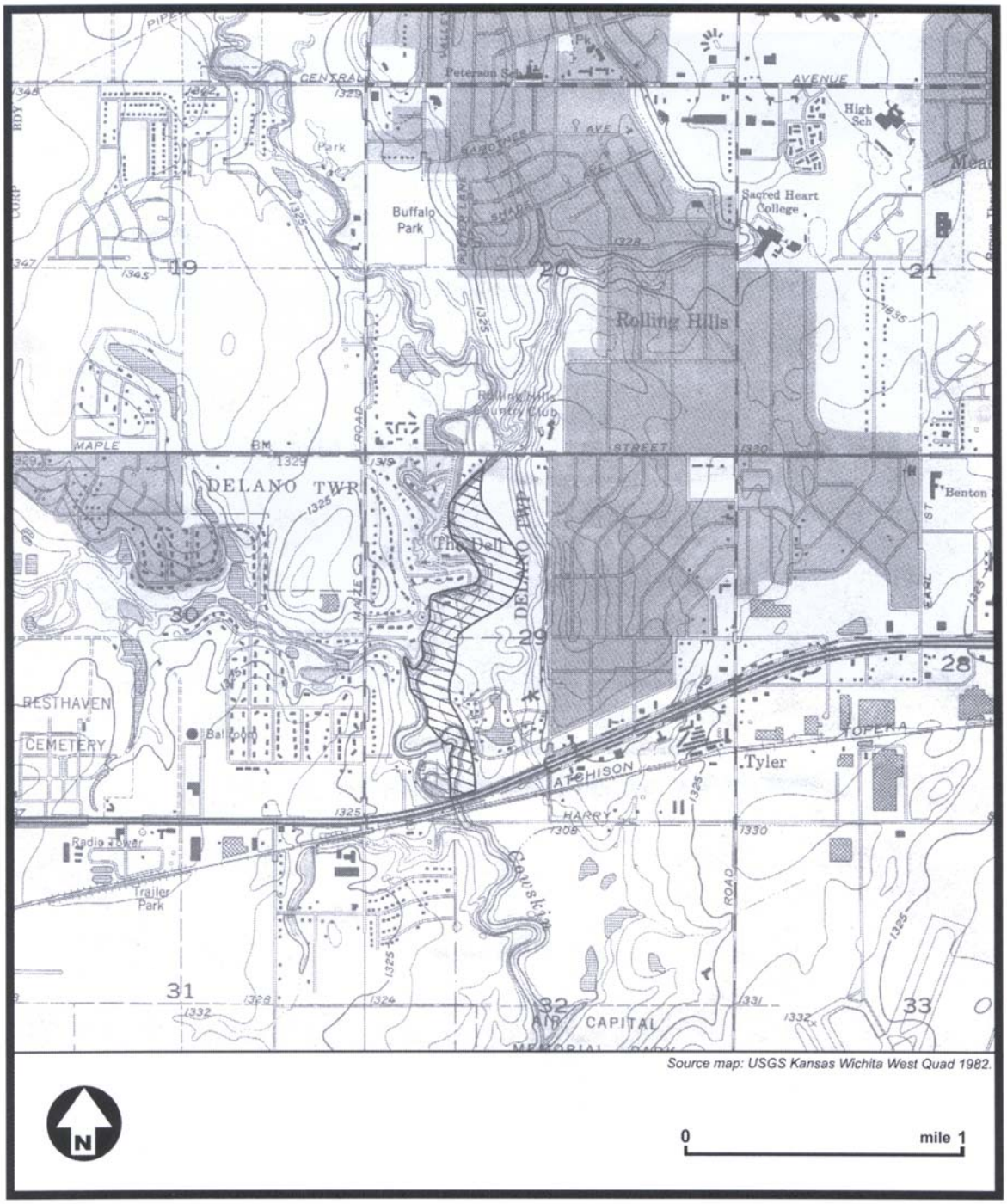


Figure 1. Project Area.

Figure 2. General view of project area, looking south.

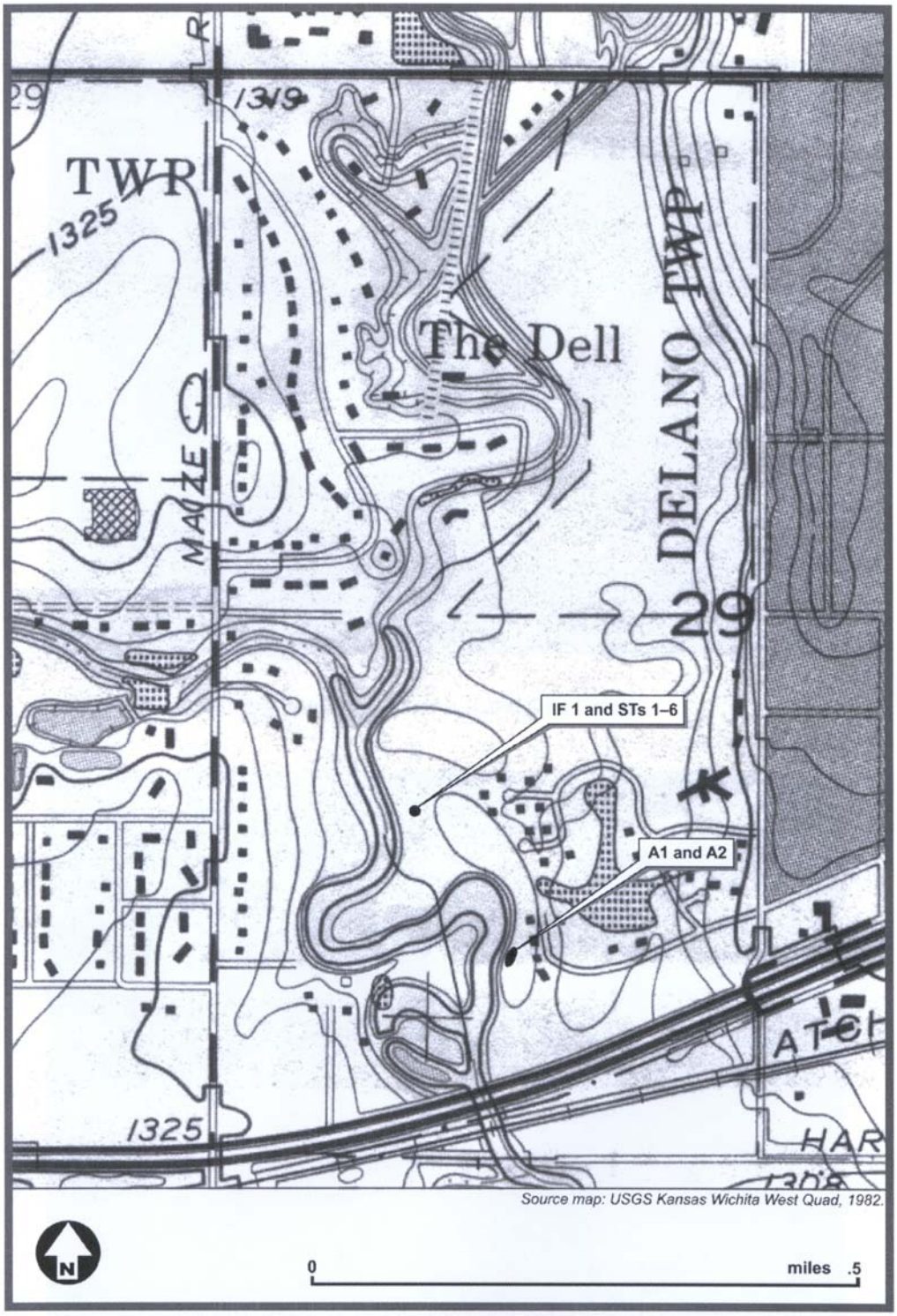


Figure 3. Locations of IF1, STs 1–6, A1 and A2.

Figure 4. East bank, Cowskin Creek.

Figure 5. Area proposed for trenches, looking north.

Table 1. Shovel Test Descriptions

Isolated Find #1 UTM E0636028 N4169947 (NAD 27)

ST #1		
	0–25cm	Moist, black (5YR 2.5/1) silty loam, some roots, organics
	25–40cm	Dark brown (7.5YR 3/2) dry, sandy silt, no inclusions
		No cultural materials observed
ST #2		
	0–22cm	Moist, black (5YR 2.5/1) silty loam, some roots, organics
	22–40cm	Dark brown (7.5YR 3/2) dry, sandy silt, no inclusions
		No cultural materials observed
ST#3		
	0–6cm	Moist, black (5YR 2.5/1) silty loam, some roots, minute pebbles, organics
	6–40cm	Dark brown (7.5YR 3/2) dry, sandy silt, no inclusions
		No cultural materials observed
ST#4		
	0–20cm	Moist, black (5YR 2.5/1) silty loam, some roots, organics
	20–40cm	Dark brown (7.5YR 3/2) dry, sandy silt, no inclusions
		No cultural materials observed
ST#5		
	0–22cm	Moist, black (5YR 2.5/1) silty loam, roots, organics
	22–40cm	Dark brown (7.5YR 3/2) dry, sandy silt, no inclusions
		No cultural materials observed
ST#6		
	0–6cm	Moist, black (5YR 2.5/1) silty loam, some roots, organics
	6–40cm	Dark brown (7.5YR 3/2) sandy silt, moist in upper 10cm, no inclusions
		No cultural materials observed

Table 2. Auger Core Descriptions

A #1 UTM E0636079 N4169867 (NAD 27)

0–40cm	Dark brown (7.5YR 3/2) sandy silt loam, few roots in upper 10cm, homogenous
40–100cm	Brown (7.5YR 4/2) silt loam mixed with fine sand, no inclusions
100–150cm	Dark Brown (7.5YR 3/2) silty clay with small yellowish-brown (5YR 4/6) iron stains (1.0–2.0mm), homogenous
	No cultural materials observed

A #2 UTM E0636079 N4169847 (NAD 27)

0–50cm	Dark brown (7.5YR 3/2) sandy silt loam. small roots in upper 10cm, some small pebbles (less than 1cm)
50–95cm	Brown (7.5YR 4/2) silt loam mixed with fine sand, homogenous
95–150cm	Dark brown (7.5YR 3/2) silty clay, friable, with small 3.0mm–1.0cm) white inclusions presenting as powdery to pebble-like and small yellowish-brown (5YR 4/6) iron stains (1.0–2.0mm)
	No cultural materials observed

REFERENCES CITED

Edwards, John P. (publisher)
1882 *Historical Atlas of Sedgewick County, Kansas.* Reprinted 1982 by the Midwest Historical and Geneological Society, Sedgewick County, Kansas.

Ogle, Geo. A. & Co, (publisher)
1905 *Standard Atlas of Sedgewick County, Kansas*. Chicago.

Penner, Harold L. and William A. Wehlmueller
1979 *Soil Survey of Sedgewick County.* United States Department of Agriculture, Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station.

APPENDIX E

PUBLIC COMMENTS

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
9 West 28th Avenue, Suite B
Hutchinson, Kansas 67502-3453

Phone: 620-663-3501
FAX: 620-663-3866
www.ks.nrcs.usda.gov

May 25, 2004

Mr. Larry D. Hogue, P.E.
Tulsa District, Corps of Engineers
ATTN: Environmental Analysis & Compliance
Cowskin Creek Project
1645 S. 101st East Ave
Tulsa, Oklahoma 74128

Dear Mr. Hogue:

Thank you for the opportunity to review the plans to construct flood dikes for the City of Wichita in Sedgwick County, Kansas.

Because the project is on land owned by the city or within the city limits, there are no negative impacts to important farmland as defined by the Farmland Protection Policy Act. There are no other negative effects for which the Natural Resources Conservation Service is responsible for evaluating as defined by the Farmland Protection Policy Act.

Sincerely,

Jess F. Crockford

JESS F. CROCKFORD
Assistant State Conservationist

cc:
Harold L. Klaege, State Conservationist, NRCS, Salina, Kansas
Rodney D. Egbarts, Soil Conservationist, NRCS, Salina, Kansas
Robert K. Stutzman, District Conservationist, NRCS, Wichita, Kansas

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

Ben T. Huie, PhD LG CHMM REP
BTH CONSULTING
12011 Rolling Hills Dr.
Wichita, KS 67235-1303
(316) 208-8635
email: BTHuie@netscape.net

June 12, 2004

Tulsa District
Corps of Engineers
ATTN: Environmental Analysis and Compliance Branch
Cowskin Creek Project
1645 S. 101st East Ave
Tulsa, OK 74128

Sirs:

Enclosed please find my comments regarding the above-referenced "Local Flood Protection Project" in Wichita, KS. Please see that they become a part of the official record. Thank your for your cooperation.

Very truly yours,

Ben T. Huie

Ben T. Huie, PhD LG CHMM REP
BTH CONSULTING
12011 Rolling Hills Dr.
Wichita, KS 67235-1305
(316) 208-8635
email: BTHuie@netscape.net

June 12, 2004

Comments on the Cowskin Creek Local Flood Protection Project

The US Army Corps of Engineers has presented an Environmental Assessment on this flood control project in which they conclude there will be "no significant adverse impact on the natural or human environment." In particular, they claim "no appreciable impact" on surface water quality, water supply, and groundwater and only minor adverse impact on terrestrial habitat.

Groundwater

At first glance it would seem that this project would have no effect on groundwater. However, upon further examination it appears that there *will* be an adverse impact on groundwater. It is stated in the Assessment that "Under with-project conditions floodwater would recede … at a faster rate …" than at present. Groundwater recharge is enhanced during periods when the flood plain is inundated with water (Fetter, 1994; Nebel, 1990). This effect is particularly important for 'bank storage' along the stream bed; this then migrates into the over-all aquifer. A decrease in duration of inundation will result in a decrease in groundwater recharge. One of the designated uses for the Cowskin Creek as listed in the assessment is "Ground Water Recharge."

Water Supply

As with groundwater the assessment claims no impact on water supply. As the "existing channel will be retained to serve as a low flow channel" it would appear *at first glance* that this would be correct. However, due to decreased bank storage in the aquifer this is not correct. As is mentioned in the Assessment, "Cowskin Creek is a perennial, warm water stream … essentially a series of pools …" Low flow in such a stream is maintained by discharge from the related aquifer (Fetter, 1994); a decrease in bank storage will lead to a concomitant decrease in stream flow during dry conditions.

Surface Water Quality

The assessment claims no impact on surface water quality after project completion. However, further examination suggests otherwise. The low flow rates (seemingly paradoxically) common in a natural flood plain allow sediment to settle out of floodwaters and be deposited in the flood plain (Bloom, 1991). The channelization of the creek and acceleration of stream flow will prevent this settling of sediment; thereby increasing the sediment load that will flow downstream. In addition, under low flow conditions, the decreased discharge from the aquifer will lead to higher concentrations of pollution in the stream. As is pointed out in the assessment "Fecal Coliform Bacteria loading capacity varies as a function of flow present in the creek".

Terrestrial Habitat

The assessment claims only a minor adverse impact on terrestrial habitat. Although the project area is small, it serves an important role as a link between the larger habitat areas to the north (Buffalo Park) and the south (Pawnee Prairie Park). Removal of riparian vegetation will decrease the ability of this corridor to support migration between these two parks. As a result, each of these "islands" will tend to be isolated from each other and their effective areas reduced. Such a reduction will, in turn, reduce the ability of these habitats to support both biodiversity and genetic diversity (Rickleffs, 1993).

Alternative Proposal

Two alternative proposals were considered that involved the creation of large Detention Basins on Dry Creek. Not considered, however, was the modification of the numerous small detention and retention ponds throughout the Cowskin Basin. As a part of the normal platting process, developers are required to include "flood control" as a part of their sub-division design. However, in many cases these ponds are designed in such a way that they serve no such purpose. There is often little or no "freeboard" designed into these ponds. Remediating these structures to allow them to store run-off as should have been required in the first place will result in a lowering of peak flood levels. As this should be a basin-wide effort this would in turn reduce flooding throughout the Cowskin Basin; not only for a one-half mile section as indicated for this Project. This would also reduce flooding pressure downstream of the project area.

Such improved detention/retention would also reduce sediment load in the streams and increase groundwater recharge throughout the basin. This, in turn, will increase low flow in the Creek and its tributaries as well as increase the groundwater resource available for other purposes. Thus, improving dispersed detention/retention ponds to replicate conditions that existed prior to development will improve both the quality and quantity of water in the Cowskin Creek system.

It has been the channelization of the Cowskin Creek and its tributaries that has caused the flooding conditions that exist today. This channelization has reduced the storage capacity of the upstream reaches of the basin and has accelerated the delivery of runoff and sediment to the lower reaches. Local officials have acknowledged that development permits they have issued increase the severity of flooding; but "only by an inch" for each permit. What they fail to acknowledge is that a dozen such permits raise flooding by a foot and several dozen such permits result in Halloween 1998. The proposed project will only serve to further the development of flooding downstream of the project area. On the other hand, an approach that emphasizes the restoration of the basin's storage and recharge capacity will reduce flooding pressure throughout the basin and also downstream of the basin being considered; this will also improve both water quality and water quantity throughout the basin.

Bernard J. Nebel said it well in *Environmental Science* (1990, pp. 215-219): "The traditional approach in addressing stormwater has been to get rid of it as quickly as possible … streams are channelized … The channelized stream carries both water and sediment more efficiently … water removed from one area is put somewhere else. Consequently channelization often amounts to moving a flood from one place to another.

In contrast, the modern ecological concept of stormwater management is to keep the stormwater near where it falls and preserve the natural infiltration/runoff ratio. Runoff after development should not exceed the ratio before development. A number of techniques … have been developed to achieve this goal …"

Rather than clinging to the 'traditional' methods that squander our water resources the Army Corps of Engineers should be moving forward toward the more modern approaches that preserve this valuable resource.

BEN TERRELL HUIE
LICENSED
553
KANSAS
GEOLOGIST

6/12/04

Ben T. Huie
June 12, 2004

References

Draft Environmental Assessment, Cowskin Creek Local Flood Protection Project, Wichita, Kansas, 2004.

Bloom, Arthur L., 1991. *Geomorphology,* Prentice-Hall, Inc., Englewood Cliffs, NJ 07632.

Fetter, C. W., 1994. *Applied Hydrogeology Third Edition,* Prentice-Hall, Inc., Englewood Cliffs, NJ 07632.

Miller, G. Tyler, 1994. *Living in the Environment, Eighth Edition,* International Thompson Publishing, Wadsworth Publishing, Belmont, CA 94002.

Nebel, Bernard J., 1990. *Environmental Science Third Edition,* Prentice-Hall, Inc., Englewood Cliffs, NJ 07632.

Rickleffs, Robert E., 1993. *The Economy of Nature Third Edition*, W. H. Freeman, New York.

Comments received during the Public Review period:

Letter from BTH Consulting (above):

Comment:

Groundwater

Response:

Do not concur. The draft Environmental Assessment states in Section 5.2.2 Prime Farmland, the following. "Under with-project conditions floodwaters would recede from the farmland at a faster rate because of the improved drainage and 'storage' provided by the enlarged channel." The recommended plan is a grass lined overflow bench on the east side of the channel. This bench will begin at the existing east bank of the stream approximately 1.5 feet above the ordinary high water mark of the stream. Therefore, "bank storage" of the stream should be unaffected by the recommended plan. As an added feature the existing 1.5 acre wetland on the east side will be enlarged to a 2.3 acre wetland and supply additional recharge area for the groundwater aquifer.

Comment:

Water Supply

Response:

Do not concur. The draft Environmental Assessment states in Section 5.2.2 Prime Farmland, the following. "Under with-project conditions floodwaters would recede from the farmland at a faster rate because of the improved drainage and 'storage' provided by the enlarged channel." The recommended plan is a grass lined overflow bench on the east side of the channel. This bench will begin at the existing east bank of the stream approximately 1.5 feet above the ordinary high water mark of the stream. Therefore, "bank storage" of the stream should be unaffected by the recommended plan. As an added feature the existing 1.5 acre wetland on the east side will be enlarged to a 2.3 acre wetland and supply additional recharge area for the groundwater aquifer.

Comment:

Surface Water Quality

Response:

Do not concur. See response 'Water Supply' above.

Comment:

Terrestrial Habitat

Response:

Do not concur. The mitigation plan for this project is designed to avoid or offset habitat losses caused by the project. Only the east side of the bank will be disturbed. The disturbance will be temporary while the vegetation is becoming re-established. The natural stream channel will not be filled and flows will continue to follow the existing channel except during periods of high flows. Mitigation consists of planting a native grass/forb mix, creating an excavated wetland, and planting native trees. The native grass/forb mix was provided by the Kansas Department of Wildlife and Parks, and the native trees consist of species that occur in the area. The native grass/forb area will be increased at a 4.4 : 1 ratio with the project; the wetland will be replaced at a 1.5 : 1 ratio; and the riparian trees will be replaced on a 2 : 1 ratio.

Comment:

Alternative Proposal

Response:

Do not concur. Early in the formulation phase of this study effort, consideration was given to development of numerous upstream floodwater detention structures, however due to the high costs associated with the necessary real estate acquisition, this option could not be supported in the final assessment. The recommended plan does provide for additional storage capacity for Cowskin Creek. Excavation of the bench area and moving the excavated material out of the floodway will provide a place for the floodwaters to be contained for a short period of time before flowing downstream.

APPENDIX F

NEWSPAPER PUBLIC NOTICE

AFFIDAVIT

STATE OF KANSAS \
- SS.
County of Sedgwick /

Milt Mounts, of lawful age, being first duly sworn, deposeth and saith: That he is Record Clerk of The Wichita Eagle, a daily newspaper published in the City of Wichita, County of Sedgwick, State of Kansas, and having a general paid circulation on a daily basis in said County, which said newspaper has been continuously and uninterruptedly published in said County for more than one year prior to the first publication of the notice hereinafter mentioned, and which said newspaper has been entered as second class mail matter at the United States Post Office in Wichita, Kansas, and which said newspaper is not a trade, religious or fraternal publication and that a notice of a true copy is hereto attached was published in the regular and entire Morning issue of said The Wichita Eagle for

1 consecutive issues - weeks, that the first publication of said notice was

made as aforesaid on the 26th day, of

May A.D. 2004, with

subsequent publications being made on the following dates:

And affiant further says that _____ he has personal knowledge of the statements above set forth and that they are true.

Subscribed and sworn to before me this

26th Day of May, 2004

Notary Public Sedgwick County, Kansas

NORMA J. HOCH
NOTARY PUBLIC
STATE OF KANSAS

My Appointment Expires August 12, 2006

Printer's Fee **$24.60**

LEGAL PUBLICATION

Published in The Wichita Eagle
May 26, 2004 (#2082025)

Announcing: COMMENT PERIOD
DRAFT ENVIRONMENTAL ASSESSMENT
as related to the
Cowskin Creek Local Flood Protection Project
Wichita, Kansas
in compliance with
The National Environmental Policy Act
FORMAL COMMENT PERIOD
May 21, 2004 through June 21, 2004

The Draft Environmental Assessment addresses the environmental effects of a channel modification project to provide additional flood relief within the City of Wichita, Kansas. The comment period is a continuation of public involvment used to develop the draft assessment. The public is invited to review the draft assessment and make comments. A copy of the assessment is available at:

Central Library
223 South Main
Wichita, Kansas

All written comments and questions will be addressed in the Final Environmental Assessment. To be included in the final assessment, comments and questions must be received prior to the close of the formal comment period. Comments and questions about the draft assessment or the comment process can be directed to:

Mr. Stephen L. Nolen
Chief, Environmental Analysis and Compliance Branch
U.S. Army Corps of Engineers, Tulsa District
1645 S. 101st East Avenue
ATTN: CESWT-PE-E
Tulsa, Oklahoma 74128
Phone: 918-669-7660
e-mail: Stephen.L.Nolen@usace.army.mil