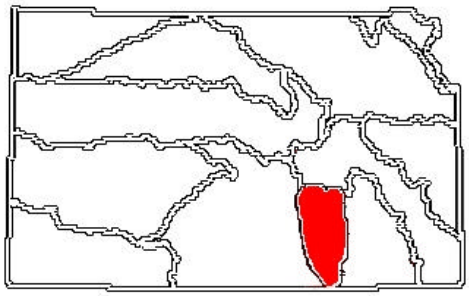
Walnut River Basin, Kansas
Section 905(b) Analysis (WRDA 86)



U.S. Army Corps of Engineers
Tulsa District
July 2000

The following analysis documents the first of two possible phases of specifically authorized planning studies. It was conducted to examine water resources problems and, if appropriate, to formulate measures to resolve identified problems. The Corps of Engineers efforts were at Federal expense. However, successful completion could not have been realized without the cooperation and assistance of the Kansas Water Office, the U.S. Fish and Wildlife Service, and many other State resource agencies whose contributions are gratefully acknowledged.

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1. STUDY PURPOSE. The first purpose of this reconnaissance study is to determine the scope of water resource problems in the Walnut River Basin. The second purpose is to identify one or more technically feasible solutions for each problem identified. Finally, the study also assesses Federal interest in continuing into the feasibility phase and identifies potential non-Federal feasibility phase cost sharing sponsors.

2. STUDY AUTHORITY. The Energy and Water Development Appropriations Act, 2000 (Public Law 106-60) is the authority for this Section 905(b)(WRDA 86) analysis. The appropriations language from the House Committee on Appropriations Report (House Report 106-253), dated July 23, 1999, reads in part:

"The Committee on Appropriations submits the following report in explanation of the accompanying bill making appropriations for energy and water development for the fiscal year ending September 30, 2000, and for other purposes.
... Walnut River Basin, Kansas.--The Committee has provided funding to initiate a reconnaissance study of flood control and related water resource issues in the Walnut River Basin, Kansas."

A. The Section 905(b) analysis, hereafter called the **reconnaissance study**, began in February 2000. Although the House Report indicated that the Committee provided funding for the Walnut River Basin reconnaissance study, the Energy and Water Development Appropriations Act, 2000 (Public Law 106-60) did not appropriate funding. Funds in the amount of $82,000 for Initiation of the study in fiscal year were transferred from within the General Investigation program, which is under the discretionary authority of the Chief of Engineers. An additional $18,000 may be transferred in fiscal years 2000 or

2001 to complete the reconnaissance phase. In the reconnaissance phase, the Corps of Engineers will negotiate a "project study plan" and a "feasibility cost sharing agreement" – prerequisites to the second phase of study called the feasibility phase.

B. This study reviews prior basin studies due to changed physical and economic conditions. The authority is the Flood Control Act of 1965 (Public Law 89-298) wherein Section 208, reads in part:

"The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and floods aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions which include the localities specifically named in this section. ... Arkansas River and tributaries at and above Tulsa, Oklahoma."

3. STUDY AREA. The Walnut River Basin covers about 2,000 square miles in southeastern Kansas. The Walnut River flows from north to south and combines with the Arkansas River at Arkansas City (both pronounced "Ar-KAN-sas"), which flows across the Kansas-Oklahoma State Line within about 10 miles of Arkansas City. The Walnut River Basin covers most of Butler County, about 40% of Cowley County, and small portions of five other counties. The four major tributaries of the Walnut River are Timber Creek (near Winfield), Little Walnut River (near Douglass), Whitewater River (near Augusta), and West Branch Walnut River (near El Dorado). The city of Wichita is located immediately west of the basin. The Kansas Water Office (KWO) planning area for the Walnut Basin includes the adjacent Grouse Creek watershed, which has a drainage area of about 380 square miles. The Grouse Creek watershed is located immediately downstream of the Walnut River Basin. The basins are shown on the attached study area map.

4. STAKEHOLDERS. A stakeholder is someone with something to gain or lose from a recommended course of action. The stakeholder may be a government agency, a private organization, an economic or environmental interest group, or concerned citizens.

A. Congressional District. The study area lies within the Congressional jurisdiction of Senators Sam Brownback and Pat Roberts and Congressman Todd Tiahrt (District KS-4).

B. Other Stakeholders. Because prehistoric presence of the Wichita and Affiliated Tribes in the present day State of Kansas was extensive, they are interested in the cultural resources known to exist within the basin, and specifically along basin watercourses. The KWO, under the Kansas Water Plan, serves as the lead in coordinating the efforts of the various State water-related agencies' riparian and wetland programs. The U.S. Fish and Wildlife Service (USFWS) is the primary Federal resource agency. The Kansas Department of Health and Environment (KDHE), the Kansas Department of Wildlife and Parks (KDWP), the Kansas State Conservation Commission (KSCC), the Kansas Forest Service (KFS), and the U.S. Forest Service (USFS) are all interested in water resource issues in the basin. While Butler and Cowley counties cover most of the basin, smaller portions of Sedgwick, Harvey, Marion, Greenwood, and Elk counties are also included in the basin. The larger communities of El Dorado, Augusta, Winfield, and Arkansas City are along watercourses. The city of Wichita, which is located immediately

west of the basin, is interested in the Walnut River Basin's ecosystem and related water resources for recreation and suburban residents. All these entities have the interests of the primary stakeholders, the people who live, work, and recreate in the basin, at the core of their responsibilities.

5. PRIOR STUDIES AND EXISTING WATER RESOURCES PROJECTS.

A. Prior Studies. The study team reviewed the following reports.

(1) Working Draft, The Kansas Water Plan, Fiscal Year 2002, April 2000. "The Kansas Water Plan is used to coordinate management, conservation, and development of the water resources of the state. The Kansas Water Plan sets out means to achieve the goals identified in the State Water Resources Planning Act (K.S.A. 82.a-901, et.seq.)."

(2) Kansas River and Stream Corridor Management Guide by the Kansas State Conservation Commission, undated, circa 2000. "Kansas streams and riparian areas provide drinking water for humans and livestock, water for irrigation and industry, aquatic and terrestrial habitat, aesthetic values, and recreational areas. River and stream corridor management affects all citizens of the State. This publication is intended to promote responsible use and management of Kansas stream corridors and watersheds." – signed Governor Bill Graves. The publication is an excellent illustrated guide of best management practices.

(3) Non-Point Source Pollution in Butler County: Changes in Mussels Over the Last 20 Years, Bill Langley and Sara Hunter, Butler County Community College. This publication lends supporting information to the idea that non-point source pollution is contributing to reduced stream quality.

(4) Compilation And Review Of Completed Restoration And Mitigation Studies In Developing An Evaluation Framework For Environmental Resources, Volume I, by Timothy D. Feather, Donald T. Capan - IWR Report 95-R-4, April 1995.

(5) Compilation And Review Of Completed Restoration And Mitigation Studies In Developing An Evaluation Framework For Environmental Resources, Volume II, by Timothy D. Feather, Donald T. Capan - IWR Report 95-R-5, April 1995.

(6) National Review Of Corps Environmental Restoration Projects, by Joy D. Muncy, Dr. J. Craig Fischenich, E. A. Dardeau - IWR Report 96-R-27, Investments Research Program November 1996. This report provides descriptive information from 52 Corps environmental restoration studies. The report provides information for each project concerning its general location, resource problems being addressed, objective(s), management measures, outputs, and estimated total costs.

B. Existing Water Resources Projects. There are 11 small reservoirs in the basin, generally along the upper basin perimeter. Following is a discussion of Corps of Engineers projects.

(1) El Dorado Lake. This project was authorized by the Flood Control Act of 1965, approved 27 October 1965; Public Law 89-295, HD 232, 89th Congress, 1st Session. The lake is located about 2 miles northeast of El Dorado in Butler County. The project provides flood control, water supply, water quality control, and recreation. Construction began in October 1973 and was com-

pleted for full flood control operation in June 1981.

(2) Winfield Local Protection Project. This project was authorized for flood control by the Flood Control Act of June 1936, Public Law 74-738, House Document 308, 74th Congress, 1st Session; and the Flood Control Act of 1965, approved 27 October 1965, HD 232, 89th Congress, 1st Session. The project is located on the Walnut River and Timber Creek at Winfield in Cowley County, about 15 miles from the mouth of the Walnut River. The Kansas Works Progress Administration constructed an initial levee in 1937, essentially as authorized. The levee is inspected annually by the Corps of Engineers. The city of Winfield restored and raised the existing levee in 1986 in cooperation with ongoing evaluations by the Tulsa District, Corps of Engineers. The plan of improvement authorized by the Flood Control Act of 1965 provided for standard project flood protection by raising about 13,000 feet of the existing levee a maximum height of 2.5 feet and extending the levee 950 feet north and 7,600 feet south. Studies completed in 1988 and later concluded that the most economical plan would provide for a 200-year level of protection. Construction to the 200-year level is complete.

(3) Arkansas City Local Protection Project. This project was authorized for flood control by the Water Resources Development Act of 1986, Public Law 99-662, dated November 17, 1986. The project is located at the confluence of the Arkansas and Walnut Rivers in Cowley County and is currently under construction. The plan of improvement provided for raising and extending the existing horseshoe-shaped levee to provide standard project flood protection. A section of the lower Walnut River will be modified for improved flow capacity. C Street Canal, a small tributary to the Walnut River, flows through part of the city. The canal has been modified to contain pre-project flows. Authorized fish and wildlife mitigation measures include acquisition and development of 35 acres of bottomland adjacent to both the project and an existing Kaw Lake Wildlife Management Area.

6. PLAN FORMULATION. A Corps of Engineers study team used its professional and technical judgment to determine water resources problems. The team relied heavily on expert opinion and counsel of Kansas resource agency stakeholders. The team used readily-available data and information to assess problems within the basin. The team and stakeholders assessments, guided by Army policies for the estimation of costs, benefits, and environmental impacts and opportunities, were the basis for the conception and validation of technically feasible solutions. For studies to continue from the reconnaissance phase to the feasibility phase, a Federal interest must be demonstrated. The six-step planning process is a key process applied to that determination.

A. Federal Interest. Federal interest in subsequent feasibility study participation depends on identifying water resources needs, determining an environmentally and economically justified plan, and identifying a suitable cost sharing sponsor who will state their intent to participate financially in the feasibility study.

B. Six Step Planning Process. The reconnaissance study follows a structured approach to problem solving that is generally used by Federal agencies. That approach consists of six steps: 1) specify problems and opportunities, 2) inventory and forecast conditions, 3) formulate alternative plans (manage-

ment measures), 4) evaluate effects of alternative plans (management measures), 5) compare alternative plans, and 6) select a recommended plan. These steps follow a rational sequence of activities from identifying problems and opportunities to selecting a recommended solution. Underlying the general flow of activities from step 1 to step 6 are analytical iterations: iterations within each step as well as iterations of the entire process. Steps 5 and 6 were modified due to the scope of this study. A discussion of study scope limitations and potential collection of identified management measure outputs is in step 5. Step 6 discussion outlines a conceptual plan of basin riparian ecosystem restoration and preservation. The following discussions summarize the planning processes of the reconnaissance study.

(1) Problems and Opportunities. The first step of the planning process is to identify problems and opportunities. During this step, the statement of problems and opportunities is developed and project scoping activities are initiated. Scoping activities include delineating the planning area, determining the period of analysis, and scoping the project objectives and constraints. The most significant water resources problems are ecosystem related. Riverine, aquatic, and riparian habitat issues, in particular, are significant and of primary concern to stakeholders. The KWO identified the entire Walnut River Basin in the draft State Water Plan as a "High Priority" for restoration, and identified the Grouse Creek watershed for protection. Degradation of aquatic and terrestrial resources within the Walnut River Basin and potential environmental and economic impacts to the State cause this to be a significant problem requiring corrective action. One Federal opportunity to address the problem lies within the mission and authorities of the U.S. Army Corps of Engineers. Ecosystem restoration is a primary mission of the Corps of Engineers Civil Works program. Civil Works ecosystem restoration initiatives attempt to return natural areas or ecosystems to a close approximation of their conditions prior to disturbance or to less degraded, more natural conditions. The purpose of Civil Works ecosystem restoration activities is to restore significant ecosystem function, structure, and dynamic processes that have been degraded. Protection may be included as part of ecosystem restoration initiatives when such measures involve efforts to prevent future degradation of elements of an ecosystem's structure and functions. Ecosystem restoration and protection are currently the only issues under consideration by State resource agencies for potential feasibility studies with the Corps of Engineers. The study team concurs with the State's resource agencies' need assessment.

(2) Inventory and Forecast Conditions. The second step of the planning process is to anticipate future conditions of the project area through a defined period of analysis. The emphasis is on forecasting the without-project condition. The planning analyses develop a picture of future site conditions if no action is taken, focusing on future conditions related to the problems and opportunities identified in the previous step. The Corps study team's appraisal of basin conditions heavily utilized the KWO Kansas Water Plan and supporting coordination of other State resource agencies. Paragraphs (a) through (h) below discuss "inventory," and paragraph (i) presents the "forecast".

(a) Undisturbed riparian habitat once existed along both banks of over 600 primary watercourse miles within the basin. Through coordination with stakeholders and based on prior experience with basin studies, the team

concluded that riparian habitat has significantly decreased and impacts are still occurring. The result is both a significant reduction in area and a major reduction in ecological system viability due to fragmentation.

↯↯↯ (b) The team determined, through coordination and review of reports, that the quality of riverine aquatic habitat is also declining. One evident impact is due to livestock grazing in and near riparian zones. The documented stream quality impacts are increased nutrients, increased sediment (due to vegetation loss), and increased bacteria (including fecal coliforms).

↯↯↯ (c) Contributors to ecosystem conditions include conversion of bottomland habitat to agriculture; grazing of riparian zones; and non-point source contributions to sediment load; turbidity; pesticides; nitrates; bridges; utility crossings; and in-stream commercial operations (typically sand and gravel operations). One result of conversion to agriculture is the loss of native grass buffer zones along watercourses.

↯↯↯ (d) The USFWS estimates that Kansas has lost almost 50% of its wetlands since the 1980's, with the vast majority of the losses since 1950. The Walnut River Basin is typical of those findings. The loss of these wetlands means that the urban and rural runoff that was previously "filtered naturally" before entering a watercourse now enters the stream directly. All the sediment and chemicals carried in the runoff are dumped into the stream. Because the wetlands no longer slow runoff, the stream discharges accumulate faster. The loss of wetlands habitat impacts the self-regulating capacity of the ecosystem. Losses in the Grouse Creek watershed are not as significant; therefore, the potential for preservation is high.

↯↯↯ (e) Urbanization, including suburban sprawl, causes faster and greater volume of runoff and increases in-stream contaminants such as phosphates and pesticides. The Kansas Department of Health and Environment, Division of Environment report, entitled "2000 Kansas Water Quality Assessment (305(B) Report)", dated March 31, 2000, tabulates total stream mileage impaired by various source categories. Over 50% of total impacts are directly attributable to non-point source agricultural operations. Less than 10% of the total impaired stream miles result from point source discharges. Solutions in this reconnaissance study were not formulated with the intent of mitigating point source impacts, but may inherently result in restoration of prior point source damages.

↯↯↯ (f) According to R. G. Bailey in Ecoregions of the United States, U.S. Forest Service, 1976, the study area is located in the northern floodplain forest of the Tall Grass Prairie Ecological Province. The main vegetation type in the area is bottomland forest, although, most of the natural forest has been cleared for farming development. Dominant trees in the lower basin are cottonwood, elm, green ash, osage orange, hackberry, and burr oak. Walnut sycamore, honey locust, Kentucky coffee tree, box elder willow, and mulberry are present to a lesser degree. Woody shrubs or smaller trees along the waterways include American plum, rough leaved dogwood, redbud, buckbush, grape, green briar, Virginia creeper, and euonymus. Herbaceous growth includes rye grass, nettle grass, bedstraw, phlox, and violets. Common shrubs important to wildlife include dogwood, grape, plum, and elderberry. The forest has been selectively logged for more valuable timber such as walnut and oak.

⇗⇗⇗ (g) Numerous faunal species occupy the riparian habitat. Those species include 10 amphibians, 42 reptiles, 266 birds, and 49 mammals. Characteristic species include spadefoot toad, ringneck snake, hognose snake, coachwhip, copperhead, green heron, turkey vulture, barred owl, chuck-will's widow, cardinal, opossum, cotton-tail rabbit, fox squirrel, coyote, raccoon, and striped skunk.

⇗⇗⇗ (h) The overall quality of the aquatic habitat in the basin varies from poor to good depending upon water level and turbidity. Although a rocky bottom with intermittent pools and riffles provides habitat for a diverse aquatic population, the shifting substrate of sand and silt as well as the frequent water level fluctuations prevent the establishment of a more diverse aquatic community. Aquatic species include 51 species of fish. Characteristic species include channel catfish, flathead catfish, largemouth bass, carp, sunfish, bullfrog, snapping turtle, and painted turtle. Samples from the Walnut River and tributaries have produced about 54 taxonomic categories of benthic macro invertebrates. Loss of riparian growths that shaded the stream results in higher water temperatures, which significantly impact the aquatic ecosystem.

⇗⇗⇗ (i) Expected future conditions. In the absence of joint Federal and State cooperation and implementation of ecosystem restoration, ecological damages would continue at or slightly below historic rates. These damages would be accompanied by economic consequences. Impacts would continue for a number of years before sufficient public commitment was realized to minimize further impacts and begin restoration efforts. Valuable habitat would continue to be lost while public understanding of its value gradually improved. Where the line lies that would make meaningful aid too late is unknown. If restoration is deferred until the future, the costs would be compounded by interim foregone National Economic Development (NED) and National Ecosystem Restoration (NER) benefits. In the absence of near term ecosystem restoration, a limited array of punitive and/or regulatory opportunities will be available to stakeholders to resolve riverine and riparian ecological problems in the future.

⇗⇗ (3) Formulate Alternative Plans. The third step of the planning process is to develop alternative plans. The formulation of alternative plans is an iterative process that considers the location, dimensions, materials, and timing of the alternatives. Structural and non-structural plans are to be considered. Mitigation plans are also developed as part of the formulation of alternatives, if necessary. However, an ecosystem restoration project is unlikely to have a mitigation component. For a reconnaissance study, identification of one "feasible" alternative is sufficient to establish a Federal interest to proceed to the feasibility phase.

⇗⇗⇗ (a) Planning objectives and planning constraints. The national or Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. The maximization of both contributions is the ultimate objective.

⇗⇗⇗⇗ (i) Contributions to **National Economic Development (NED)** are increases in the net value of the national output of goods and services expressed in monetary units. Contributions to NED are the direct net benefits that ac-

crue in the planning area and the rest of the nation.

(ii) Contributions to **National Ecosystem Restoration (NER)** are improvements to the nation's ecosystems through preservation and restoration efforts. These contributions are measured by changes in the amount and value of habitat in a system context. The system changes are formulated to improve the potential for long-term survival of aquatic, wetland, and terrestrial complexes as self-regulating, functioning systems. The value of ecosystem restoration outputs shall equal or exceed their cost. Protection measures are included as part of restoration initiatives to prevent future degradation of an ecosystem's structure and function.

(b) Public concerns. The study team obtained input on the proposed study through coordination with the KWO, the USFWS, the KDHE, the KDWP, and the KSCC. Completion of the feasibility study's "project study plan" will include coordination with the U.S. Forest Service (USFS) and other stakeholders.

(c) Study planning objectives. The two national objectives listed above are general statements of emphasis and are not specific enough for plan formulation. The water and related land resource problems and opportunities for this study are stated as more specific objectives to provide focus for the formulation of alternatives. The objectives reflect the problems and opportunities and represent desired positive changes. The general objective of ecosystem restoration is to restore degraded ecosystem structure, function, and dynamic processes to a less degraded, more natural condition. Restored ecosystems should mimic, as closely as possible, conditions that would occur in the area in the absence of human changes to the landscape and hydrology. Indicators of success include the presence of a large variety of native plants and animals, the ability of the area to sustain larger numbers of certain indicator species or more biologically desirable species, and the ability of the restored area to continue to function and produce desired outputs with a minimum of continuing human intervention. Those restoration opportunities associated with wetlands, riparian, and other floodplain and aquatic systems are most appropriate for Corps involvement. The specific planning objectives are:

(i) Restore riparian habitat (including native grass buffer zones) that improves the value and function of the ecosystem.

(ii) Restore wetlands that improve the value and function of the ecosystem.

(iii) Restore aquatic riverine habitat that improves the value and function of the ecosystem.

(iv) Preserve riparian habitat (including native grass buffer zones) essential to the value and function of restored habitat (i), (ii), and (iii) above.

(v) Preserve wetlands essential to the value and function of restored habitat (i), (ii), and (iii) above.

(vi) Preserve aquatic habitat essential to the value and function of restored habitat "(iii)" above.

(d) Planning constraints. Whereas the planning objectives represent a desired positive change, planning constraints represent restrictions that should not be violated. If these constraints are not met, mitigating measures must be incorporated. The planning constraints are:

↗↗↗↗ (i) Avoid negative impacts to threatened or endangered species.

↗↗↗↗ (ii) Avoid negative impacts to historic and archaeological features.

↗↗↗↗ (iii) Avoid negative impacts to wetlands.

↗↗↗↗ (iv) Avoid negative impacts to bottomland hardwoods.

↗↗↗↗ (v) Minimize temporary negative impacts to water quality, particularly turbidity. Avoid long-term impacts.

↗↗↗↗ (vi) Minimize negative implementation impacts to landowners, agricultural interests, and the auxiliary agricultural, municipal, and industrial infrastructure.

↗↗ (4) Effects of Management Measures. In the fourth step, the study team evaluates alternative plans. This step includes assessment and appraisal of alternative plans. There are assessments of: (1) the differences between the with- and without-project futures, (2) the effectiveness of meeting project objectives, and (3) project effects. The assessments are followed by appraisals of the significance of project effects to determine if they are beneficial or adverse. An alternative plan consists of a system of structural and/or non-structural measures, strategies, or programs formulated to meet, fully or partially, the identified study planning objectives subject to the planning constraints. A management measure is a feature or an activity that can be implemented at a specific geographic site to address one or more planning objectives. Equal consideration is given to structural and non-structural measures during the planning process. A range of alternative plans are identified at the beginning of the planning process and are screened and refined in subsequent iterations throughout the planning process. The no action plan and non-structural and structural measures are discussed below.

↗↗↗ (a) No Action. The Corps considers "No Action" as one of the alternatives to comply with requirements of the National Environmental Policy Act (NEPA). No action is the condition reasonably expected to prevail over the period of analysis, given current conditions and trends, and assuming that no project would be implemented by the Federal Government to achieve the planning objectives. No Action, which is synonymous with the "Future Without-Project Condition," is based on projection of the “expected future conditions” described above. No Action is the base condition from which other “action” alternatives are measured.

↗↗↗ (b) Non-Structural Management Measures.

↗↗↗↗ (i) Grass buffers along watercourses can reduce erosion, nutrient load, and bacteria in streams. Grass buffers are composed of native grasses. The widths of buffers would vary according to basin location and other factors. Opportunities exist for preservation and restoration.

↗↗↗↗ (ii) Crop offsets from watercourses can reduce stream loads of sediments, pesticides, and fertilizer. Offsets would vary according to location and other factors, such as contributing drainage area.

↗↗↗↗ (iii) Fencing to eliminate livestock grazing in riparian zones would essentially eliminate vegetation losses from browsing and trampling, limit the proximity of fecal material to the watercourse, and reduce bank erosion and stream sediment load. Once livestock

access was restricted, natural re-vegetation would occur providing the benefit of a vegetation buffer. Recreational access would not be restricted for managed trails, fishing, or hunting.

↗↗↗↗ (iv) Controlled stream access through riparian buffers (assumes riparian areas are fenced) could provide livestock with necessary water while drastically reducing the impacts of uncontrolled access.

↗↗↗↗ (v) Wetlands slow both runoff and flood water velocities, retard erosion, encourage sediment deposition, filter pollutants, and provide wildlife habitat. Opportunities exist for preservation of the limited remaining wetland resources. The larger opportunity is for restoration of riverine, palustrine, and lacustrine wetland areas that have been converted to other uses since the basin was settled.

↗↗↗↗ (vi) Timber management can increase the growth of high value trees, increase the ecological value of riparian forest, and improve stream quality by ensuring a diverse mixture of healthy trees, understory, and grass vegetation. Managed harvesting of selected timber would be encouraged. Better managed and restored riparian growths would increase stream shading and provide cooler, more naturally regulated water temperatures.

↗↗↗↗ (vii) Controlled burning can effectively maintain buffer zones, whether grass, brush, or trees.

↗↗↗↗ (viii) Over bank shaping would provide opportunities to restore damages from livestock and poorly selected agricultural stream crossing. Shaping to retard or store flood flows or runoff would augment the beneficial effects of buffers and wetlands.

↗↗↗↗ (ix) Bendway weirs and rock vanes would restore aquatic habitat and slow the loss of stream bank tree zones.

↗↗↗↗ (x) Live stake, pole, and grass plantings could also reduce buffer losses while creating wildlife habitat and shading the stream.

↗↗↗↗ (xi) Institutional programs could provide assistance and incentives to involved real estate interests. While some programs consist of technical assistance without financial incentives, these programs inherently provide educational value as well as ecological results. Other programs provide financial incentives designed to ease the impact of reduced agricultural productivity as a result of restricted use of lands for crop production or livestock grazing. Collectively, these programs include the KFS Stewardship Program, the KFS Community Forest Program, the KFS Conservation Tree Planting Program, the KDWP Riparian and Wetland Easement Program, the KDWP Wildlife Habitat Improvement Program, the SCC Riparian and Wetland Protection Program, the Kansas Water Quality Buffer Initiative, the KDHE Non-point Source Pollution Technical Assistance Program, the Federal Wetlands Reserve Program, and the USFWS Partners for Wildlife Program.

↗↗↗ (c) <u>Structural Management Measures</u>. The only structural measures identified were those discussed with a representative of the Whitewater Watershed District. The watershed district has been very active in developing small reservoirs for flood control, water supply, and recreation The Whitewater watershed is located immediately east of Wichita. The rural setting is, for many, an attractive alternative to the expanding urbanization of the Wichita area. With increasing residential devel-

opment in the watershed, economic opportunities to preserve and restore the ecosystem and to develop additional reservoirs are dwindling. The watershed district has expressed an interest in partnering with the Corps to evaluate their current system of reservoirs and various proposed reservoirs, and, optionally, to jointly develop additional reservoirs. The specific avenue of partnering may be through the authority of Planning Assistance to States (Public Law 93-251) or through a cost shared feasibility study. Additional small reservoirs would provide economically and environmentally attractive opportunities. Studies to optimize the outputs of existing and future small multi-purpose reservoirs are fundamental, especially when viewed as working in concert with ecosystem restoration of the Walnut River Basin. However, at this time, the watershed district is not prepared to pursue feasibility phase studies.

(d) Other Features. Recreational features, such as trails, might be viable opportunities, but were deferred pending feasibility studies. Recreational features would be cost-shared 50/50. During implementation of a number of the measures above, opportunities to identify and protect cultural resource sites are expected. Cultural resources field surveys and investigations are not feasible prior to implementation efforts because of the large study area. To meet the cultural resources constraint stated before to "Avoid impacts to historic and archaeological features," trained personnel would survey and inspect all areas during real estate appraisals and restoration efforts. If cultural resources were identified before or during implementation, restoration measures would be reviewed for risk of impact and modified as appropriate or abandoned to avoid cultural resource impacts. Restoration measures, such as fencing and grass buffers, can protect cultural resource sites at no additional cost.

(5) Compare Alternative Plans. The most important difference between restoration projects and traditional water resources projects is that the benefits of restoration are often measured in many metrics (e.g., habitat units, acres restored, increase in species populations), not simply dollars. While the costs of ecosystem restoration can usually be estimated in dollar values with little difficulty, restoration benefits can be much more challenging. Some indirect restoration benefits, such as improvements in water supply or recreation, may be measurable in monetary terms; however, the outputs of restored ecosystems are typically described in ecological terms, such as habitat units. The non-monetary benefits of restoration projects challenge planning methodologies that were developed to assess and compare the dollar costs and dollar benefits of alternative plans. Environmental decision making is often forced to rely on subjective, rather than objective, measures of efficiency and effectiveness. The State of Kansas and the study team currently envisions that the measures for the Walnut River Basin could include all the identified non-structural measures. These measures would result in preservation of riparian habitat and restoration of limited value or significantly converted riparian areas (including wetlands). The basin has a drainage area of 2,380 square miles, over 600 watercourse miles (1,200 bank miles), and floodplain widths ranging from hundreds to thousands of feet. Potentially all the floodplain may have been riparian and wetland habitat in recent history. It was not within the scope of this reconnaissance study to evaluate and design one riparian preservation and restoration plan – or an array of such alternative plans - for a basin with a riparian area

this large. Therefore, the ecosystem measures could only be evaluated in a conceptual, basin-wide approach. The economic and feasible viability of opportunities to preserve or restore the riverine aquatic and riparian habitat were evaluated, but no specific plans were defined. Opportunities are highest for preservation in the Grouse Creek watershed. Ecosystem restoration projects having some general characteristics of the measures above have been evaluated for economic viability, found to be positive, and successfully implemented at other locations.

(6) Recommended Plan. The recommended plan is a conceptual collection of ecosystem management measures for basin-wide riparian and riverine ecosystem restoration and preservation. Based on the review of IWR Report 96-R-27, National Review Of Corps Environmental Restoration Projects, it is clear that restoration of high value ecosystems can be justified and implemented.

(a) It is the unanimous professional opinion of the study team and the following coordination participants that the ecosystem restoration measures described herein can be economically and effectively implemented to develop a long-term, self-regulating, functioning ecosystem of significantly greater ecological value:

- Kansas Water Office
- U.S. Fish and Wildlife Service
- Kansas Department of Wildlife and Parks
- Kansas Department of Health and Environment
- State Conservation Commission

(b) Realization of the plan would consist of three main elements:

- **survey** of riparian resources and needs and opportunities,
- **design** of preservation or restoration measures, and
- **implementation** of measures.

The **survey** would identify resources and determine their quality, then identify opportunities for improvement by evaluating localized habitat quantity and quality and synergistic opportunities of adjacent corridor reaches. Preservation or restoration **design** would be based on needs and optimal measures for each location. Key natural condition abiotic processes would be identified, and proactive management strategies would be formulated. **Implementation** is envisioned to be a multi-year project wherein the highest need areas are implemented first based on opportunity and the estimated value of outputs. Implementation constraints would include financial resource limitations (both Federal and State), staging of real estate acquisition (potentially, “conservation easements”), changing restoration priorities, identification and avoidance of cultural resources during implementation, and changes in listed Federal or State threatened or endangered species. Implementation would end when combined NED and NER benefits were insufficient to justify expenditures for additional increments of preservation or restoration. A detailed implementation plan would be one product of the feasibility study.

(c) One key objective would be to reconnect segmented riparian habitat into more productive ecosystem corridors. The original corridors have been severed and segmented by roads, railroads, agriculture, urbanization, and industry. Reconnecting existing riparian remnants would involve restoration of lost habitat and, if necessary, restora-

tion of existing but low value habitat. One potential makeup of corridor would be selected native flora outlined in the "Inventory and Forecast" section above. A typical restored corridor might consist of:

- native grass buffers (farthest from the stream bank),
- selected native shrubs and woody vegetation (in the mid-section of the corridor), and
- native bottomland hardwoods (nearest the stream bank).

From the stream bank outward, the restored riparian habitat could measure from 50 feet to 200 feet or more. Defining parameters include ecological need, acquisition cost, other restoration costs, runoff volume, and soil type. Fencing to restrict livestock access would be an integral component.

🗲🗲🗲 (d) Reshaping of over banks may be necessary to restore runoff conditions to a more natural state.

🗲🗲🗲 (e) Wetlands would be important to slow runoff and flood flow velocities, entrap sediments, filter pollutants, and provide wildlife habitat. Agricultural runoff contains nitrates that can increase algal production in streams and negatively affect stream habitat. The majority of these nitrates (up to 90%) could be prevented from entering streams if the agricultural runoff could be processed through wetlands and vegetative buffers. The buffer vegetation consumes 10 to 12% of the nitrates, and microbes in the wetland soils convert the balance into atmospheric nitrogen. Other chemicals are also filtered by wetlands.

🗲🗲🗲 (f) Other non-structural measures would be incorporated in various combinations.

🗲🗲🗲 (g) Project outputs would include a diverse and stable riparian habitat (including wetlands), increased terrestrial and aquatic species populations, improved stream quality, more stable and valuable riparian buffer corridors, reduced agricultural chemical runoff, reduced bacterial runoff, reduced sediment stream loading, retention of topsoil, increased sediment over bank trapping, increased recreational opportunities, and identification and protection of cultural resources. Other benefit categories may be identified in feasibility phase studies. While it is expected that NER benefits will be the greater category, NED benefits are also expected.

🗲🗲🗲 (h) Management measures that could be implemented under the authorities of other Federal agencies, State and local entities, and non-government interests will be considered.

7. DETERMINATION OF FEDERAL INTEREST. Ecosystem preservation and restoration in the Walnut River Basin will contribute to NER by increasing the net quantity and quality of riverine aquatic, riparian, and wetland habitats. Contributions to NED are also anticipated, but were not evaluated. Because historic ecological losses have resulted in significant riparian habitat shortages, the value that will be associated with restored ecosystem components will be high. Therefore, the ecological value of restoration measure outputs is expected to exceed the cost of implementation. By fulfilling a primary mission of the Corps of Engineers with anticipated restoration outputs (NER outputs) exceeding costs and with the identification of a non-Federal sponsor, there is a Federal interest in initiating feasibility phase studies.

8. PRELIMINARY FINANCIAL ANALYSIS. As the non-Federal sponsor, the State of Kansas through the Kansas Water Office would provide 50% of the cost of the feasibility phase. A letter of intent is attached. The State of Kansas is capable of funding their share of the feasibility phase study. The non-Federal share of implementation of ecosystem measures in the Walnut River Basin will be 35% of the total project cost, unless project authorization specifies otherwise. The non-Federal sponsor will provide 100% of the lands, easements, rights-of-way; utility or public facility relocations; dredged or excavated material disposal areas (LERRD), and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R). If the value of LERRD exceeds the 35% share, the sponsor will be reimbursed for the value of LERRD's that exceed their 35% share. The KWO anticipates this to be the first of several Kansas river basin ecosystem studies.

9. SUMMARY OF FEASIBILITY STUDY ASSUMPTIONS.

A. Mapping and imagery of topographic, riverine, wetland, bottomland hardwood, and agriculture features exist and are sufficient for field investigations.

B. A geographical information system (GIS) will be used to assist in the formulation of ecosystem preservation and restoration measures and presentation of study findings.

C. An initial site assessment to determine the potential risk for HTRW will be sufficient to avoid further HTRW investigation.

D. The magnitude of the implementation cost estimate will not impact the start of implementation but will alter the completion date. The implementation schedule could range from 1 to 10 years or more.

E. An exception from National Environmental Protection Act (NEPA) requirements for an environmental assessment or environmental impact statement will be requested. Due to the limited potential for exemption, estimated NEPA coordination costs of $150,000 are currently included in the study cost estimate.

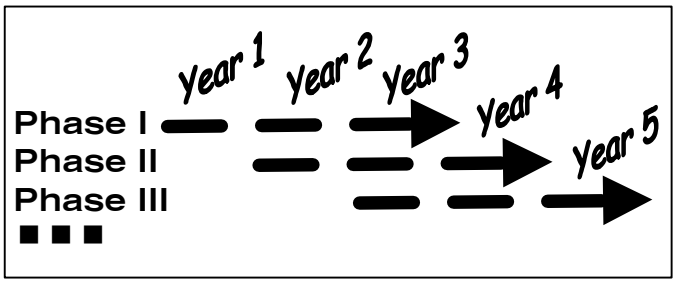
F. The real estate estimate for the LERRD's will be based on a gross appraisal. A Real Estate Design Memorandum (REDM) will be part of each phased "plans and specifications" document.

G. The feasibility report will be reproduced on CD-ROM. An executive summary will be reproduced on paper to document correspondence and for public coordination.

H. The feasibility recommendation will include the option of State agency implementation of restoration measures. State resource agencies are imminently qualified to execute restoration measures.

I. The feasibility study will be the first interim report and will evaluate basin-wide ecosystem needs. The report will include detailed restoration measures (including the REDM), costs, and benefits for Phase I, the highest priority phase of implementation. The first phase is assumed to be a 3-year effort. All remaining basin need areas will be identified and ranked in the feasibility report for succeeding phases of implementation, subject to the Chief of Engineers discretionary authority. Each additional implementation phase will consist of separate plans and specifications and a REDM.

J. The concept would be to begin each succeeding phase of design at the end of the first year of the preceding phase. Then, to complete design and acquisition in the second and third years so that implementation of the next phase could be started as the previous phase is nearing completion. Each phase might be roughly divided into one year of design, one year of acquisition, and one year of implementation.



K. A request for approval of a non-standard estate, specifically a type of permanent easement (less than fee), will be approved as an option to the standard fee simple estate.

10. FEASIBILITY PHASE MILESTONES AND COST ESTIMATE. Preliminary estimates of project milestones are attached. The study is expected to take about 17 months. The feasibility cost estimate with the list of milestones is also attached. In-kind services are estimated. The estimated total feasibility phase study cost is $890,000. Local and Federal shares would each be $445,000. The estimated study cost and schedule will be refined during negotiation of a feasibility phase cost sharing agreement.

11. POTENTIAL ISSUES AFFECTING INITIATION OF FEASIBILITY PHASE. None.

12. RECOMMENDATIONS. I recommend that this reconnaissance study be certified in accordance with current policy and that a feasibility study be conducted at an estimated cost of $890,000. The estimated schedule for completion of the feasibility report is 17 months. The Kansas Water Office has, by letter, indicated a willingness to be the lead cost-sharing sponsor. The estimated study cost and schedule contained herein would be refined during negotiation of a feasibility phase cost sharing agreement.

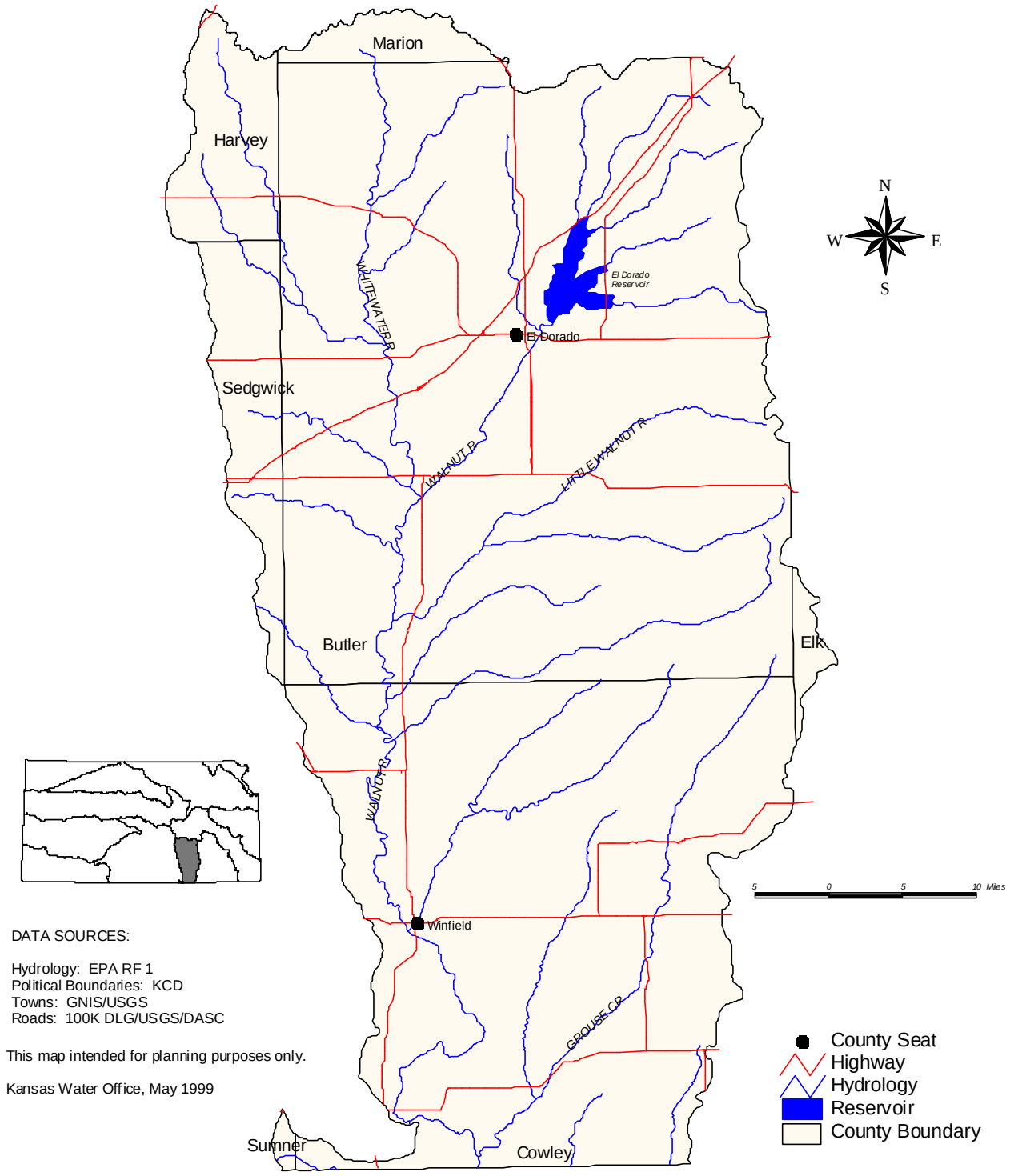
LEONARDO V. FLOR
Colonel, U.S. Army
District Engineer

Date: 31 July 2000

Attachments:

- Letter of Intent
- Walnut River Basin Map
- Feasibility Phase Milestones & Cost Estimate

Walnut Basin



STATE OF KANSAS

Bill Graves, Governor

KANSAS WATER OFFICE
Al LeDoux
Director

901 S. Kansas Ave.
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785-296-3185
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June 22, 2000

Colonel Leonardo V. Flor
District Engineer
U.S. Army Corps of Engineers
1645 South 101st East Avenue
Tulsa, OK 74128-4608

Dear Colonel Flor:

The State of Kansas, through the Kansas Water Office, the State's Water Planning and Coordination Agency and the Kansas Water Plan has identified riparian and wetland restoration and protection needs in the Walnut River Basin. I understand that the Corps of Engineers can conduct a cost-shared feasibility study of these needs and opportunities in the Walnut Basin, under the General Investigations Program.

I understand that the State has no cost-share obligation for the initial reconnaissance phase of this study and that the States's cost-sharing responsibility during the feasibility phase is 50 percent; up to one-half of which can be provided in in-kind services. I also understand that any preconstruction engineering and design and construction for riparian or wetland buffers or restoration are cost-shared at a maximum of 65 percent Federal and a minimum of 35 percent by the local sponsor. The local sponsor provides all the lands, easements, right-of-way, relocations and disposal areas needed for the project as part of their share of the project.

The purpose of this letter is to express the intent of the State of Kansas, through the Kansas Water Office, to enter into negotiations for the feasibility phase. The Project Study Plan developed during the negotiations will describe the study activities, proposed schedule and cost of the study. I understand that this letter is not a contractual obligation on the part of either the Corps or the State of Kansas and either party may discontinue the project development process at any time.

Sincerely

Al LeDoux
Director
Kansas Water Office

AL:SH:ol

cc: Clark Duffy
Margaret Fast
Steve Hurst

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Feasibility Phase Milestones (subject to change)

Milestone	Description	Duration (months)	Cumulative (months)
1	Initiate Study	0	0
2	Public Workshops 1,2,3,4,5 (scoping)	2	2
3	Feasibility Scoping Meeting	1	3
4	Preliminary Field Investigations	2	5
5	Formulation Criteria Development	1	6
6	Optional Field Investigations	1	7
7	Formulation Completed	4	11
8	Prioritization Completed	2	13
9	Alternative Formulation Briefing	1	14
10	Prepare Feasibility Report	2	16
11	Revise Feasibility Report (Final)	1	17
12	Commander's Public Notice	0	17
13	Chief's Report	4	21
14	Project Authorization	18	39

Feasibility Phase Cost Estimate (subject to change)

Major Work Items	Federal Share	Local Sponsor Share		Total
		Cash	In-Kind	
Public Involvement	20,000	10,000	10,000	40,000
Environmental Studies	90,000	0	90,000	180,000
NEPA Coordination	75,000	75,000	0	150,000
Economic Studies	18,000	18,000	0	36,000
Project Management	7,500	2,500	5,000	15,000
Plan Formulation	50,000	25,000	25,000	100,000
Engineering/Design	13,000	13,000	0	26,000
Real Estate Studies	70,000	50,000	20,000	140,000
Report Preparation (incl GIS)	45,000	30,000	15,000	90,000
Washington Level Review Contingency	17,500	17,500	0	35,000
Study Contingency	39,000	39,000	0	78,000
Total	**$445,000**	**$280,000**	**$165,000**	**$890,000**