ENVIRONMENTAL ASSESSMENT

INSTALLATION OF FLOODWATER RETARDING SITE NO. 15

LYONS CREEK WATERSHED
DICKINSON, GEARY, MARION, AND MORRIS COUNTIES
KANSAS

SEPTEMBER 2009

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for the
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LYONS CREEK WATERSHED

DICKINSON, GEARY, MARION, AND MORRIS COUNTIES, KANSAS

Prepared by

U.S. Department of Agriculture Natural Resources Conservation Service

Lyons Creek Watershed Joint District No. 41

Dickinson County Conservation District

Geary County Conservation District

Marion County Conservation District

Morris County Conservation District

City of Herington

Prepared under the Authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, and in accordance with Section 102 (2) (c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 43221 et seq.).

ABSTRACT

The Lyons Creek Watershed Joint District No. 41 prepared and approved a watershed plan in 1968 that included land treatment and structural measures to aid in protecting the natural resources and address flood-related issues of the watershed. Site No. 15 is included in the original plan as part of a system of structural measures that provides a measurable degree of flood protection to the floodplains of the watershed and Lyons Creek.

Site No. 15, located above (east) Kansas Highway 77 (K-77), was originally planned to be a medium hazard class structure. However, it has been determined the highway is located in the breach inundation area and a breach wave could overtop the highway, creating a potential for loss of life. Therefore, Site No. 15 is being designed as a high hazard class structure to reduce this potential.

Identified terrestrial and aquatic habitat losses associated with the installation of Site No. 15 will be mitigated through avoidance, minimization, and compensation. Mitigation includes reduced permanent pool size, stream flow emulation, streambank stabilization and protection, in-stream habitat creation, tree and shrub establishment, and grass plantings.

Additionally, through coordination with the U.S. Fish and Wildlife Service (USFWS) and the Kansas Department of Wildlife and Parks (KDWP), it has been determined that no potential impacts to the endangered Topeka shiner (*Notropis topeka*) will likely occur. Furthermore,

additional impacts associated with the original planned project are being avoided and minimized by eliminating one of the remaining four structures (Site No. 18) and constructing one (Site No. 21) with no permanent reservoir pool.

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TABLE OF CONTENTS

SUMMARY S-1
CHAPTER 1 PURPOSE AND NEED FOR ACTION 1-1
1.1 Project Overview 1-1
1.2 Purpose of the Project 1-1
1.3 Need for the Project 1-1
1.3.1 Floodwater Damage 1-1
1.3.2 Erosion Damage 1-2
1.3.3 Other Social Effects 1-2
1.4 Other Problems and Opportunities 1-2
1.4.1 Problems 1-2
1.4.2 Opportunities 1-2
CHAPTER 2 AFFECTED ENVIRONMENT 2-1
2.1 Project Setting 2-1
2.1.1 Original Plan 2-1
2.1.2 Physical Data 2-1
2.1.3 Land Use 2-2
2.2 Existing Conditions 2-2
2.3 Resource Concerns 2-2
2.3.1 Floodwater Damage 2-2
2.3.2 Erosion Damage 2-2
2.3.3 Other Social Effects 2-3
CHAPTER 3 SCOPE OF ENVIRONMENTAL ASSESSMENT 3-1
CHAPTER 4 ALTERNATIVES 4-1
4.1 Formulation Process and Alternatives Eliminated From Detailed Study 4-1
4.2 Description of Alternative Plans 4-2
4.2.1 No-Action Alternative 4-2
4.2.2 Structural Alternative (Installation of Site No. 15) 4-2
4.2.3 Filter and/or Buffer Strip Alternative 4-3
4.2.4 Floodplain Easement Alternative 4-3
4.2.5 Wetlands 4-4
4.3 Comparison of Alternatives 4-4
4.4 Selection of the Preferred Alternative 4-6
CHAPTER 5 ENVIRONMENTAL CONSEQUENCES 5-1
5.1 Effects Of Alternative Plans 5-1
5.1.1 Flood Damages 5-1
5.1.2 Erosion Damage 5-1
5.1.3 Threatened and Endangered Species 5-2
5.1.4 Fish and Wildlife Resources 5-3
5.1.5 Floodplain Management 5-5
5.1.6 Historic, Cultural, and Scientific Resources 5-6

5.1.7 Migratory Birds 5-6
5.1.8 Other Social Effects 5-7
5.1.9 Prime and Unique Farmlands 5-8
5.1.10 Public Health and Safety 5-8
5.1.11 Riparian Areas 5-8
5.1.12 Wetlands and Other Waters of the U.S. 5-9
5.1.13 Wild and Scenic Rivers 5-11
5.2 Cumulative Effects Of Alternatives 5-11
5.2.1 Indirect Effects 5-13
5.3 Risk and Uncertainty 5-14
5.3.1 Engineering 5-14
5.4 Controversy 5-14
5.5 Precedent for Future Actions With Significant Impacts 5-15
5.6 Compliance With Federal, State, and Local Laws 5-15
5.6.1 Federal 5-15
5.6.2 State 5-15
5.6.3 Local 5-17
CHAPTER 6 CONSULTATION AND PUBLIC PARTICIPATION 6-1
6.1 Public Participation 6-1
6.2 Agency Consultation 6-1
CHAPTER 7 PROVISIONS OF THE PREFERRED ALTERNATIVE 7-1
7.1 Rationale for the Preferred Alternative 7-1
7.2 Permits and Compliance 7-1
7.3 Real Property Acquisition and Easements 7-1
7.4 Installation and Financing 7-1
7.4.1 Framework for Carrying Out the Plan 7-1
7.4.2 Planned Sequence of Installation 7-1
7.4.3 Responsibilities 7-2
7.4.4 Contracting 7-2
7.4.5 Real Property 7-2
7.4.6 Financing 7-2
7.5 Operation, Maintenance, and Replacement 7-2
7.6 Emergency Action Plan 7-3

LIST OF TABLES

Table S-1 Site-Specific Elements for Installation of Site No. 15 ..... S-1
Table S-2 Resource Information S-2
Table S-3 Summary of Land Use within Site No. 15 Drainage Area S-3
Table S-4 Range of Alternative Plans Considered S-3
Table S-5 Summary of Resource Concerns S-4
Table 2-1 Summary of Land Use in Drainage Area 2-2
Table 2-2 Highly Erodible Land Classification in Drainage Area 2-2
Table 2-3 Predicted Sediment Yield 2-3

Table 3-1 **Summary of Scoping** 3-1
Table 4-1 **Range of Alternatives and Determination for Detailed Study** 4-1
Table 4-2 **Site-Specific Elements of Structural Alternative** 4-2
Table 4-3 **Comparison of Alternatives** 4-4
Table 5-1 **State and Federal Threatened and Endangered Species** 5-2
Table 5-2 **Kansas Stream Mitigation Guidance Impact Summary** 5-9
Table 5-3 **Kansas Stream Mitigation Guidance Riparian Credits** 5-10
Table 5-4 **Kansas Stream Mitigation Guidance In-Stream Credits** 5-10
Table 5-5 **Kansas Stream Mitigation Guidance Summary** 5-11
Table 5-6 **Drainage Area Controlled** 5-12

LIST OF APPENDICES

Appendix A **Tables**
Structural Data Table – Site No. 15 ..... A-3
Appendix B **Comments and Responses**
U.S. Department of Interior - Fish and Wildlife Service B-3
Kansas Department of Wildlife and Parks B-9
Kansas Department of Wildlife and Parks B-11
Appendix C **Support Maps**
Figure 1 **Inundation Map** C-3
Figure 2 **Current Land Use** C-5
Figure 3 **Highly Erodible Classification** C-7
Figure 4 **Pool Elevations** C-9
Appendix D **Investigation and Analysis Report**
Section 1 **Sedimentation** D-3
Section 2 **Breach Routing Analysis** D-5
Section 3 **Agency Coordination** D-7
Section 4 **Environmental Evaluation** D-9
Section 5 **Alternative Evaluation** D-13
Appendix E **Supporting Information**
List of Preparers E-3
References E-5
Cultural Resource Assessment E-7
Acronyms, Abbreviations, and Short Forms E-9
Appendix F **Project Map**
Figure 1 **Location Map and Drainage Area** F-3
Figure 2 **Pool Elevations** F-5

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SUMMARY

ENVIRONMENTAL ASSESSMENT FOR LYONS CREEK WATERSHED DICKINSON, GEARY, MARION, AND MORRIS COUNTIES, KANSAS 1ST CONGRESSIONAL DISTRICT

Sponsoring Local Organizations (SLOs)

Lyons Creek Watershed Joint District No. 41

Dickinson County Conservation District

Geary County Conservation District

Marion County Conservation District

Morris County Conservation District

City of Herington, Kansas

Proposed Action

The proposed action (Project) is the installation of the Lyons Creek Watershed Site No. 15 (see Appendix F: Figure 1, Location Map and Drainage Area) with the Natural Resources Conservation Service (NRCS) Public Law 83-566 (PL-566) Watershed Program.

Purpose and Need for Action

The purpose of this federal action is to provide flood prevention and flood damage reduction in a manner that minimizes the risk of loss of human life and is environmentally acceptable.

Installation of Site No. 15 will provide flood prevention and floodwater damage reduction for 100 years, reduce the risk of loss of life, and address identified problems and opportunities.

Description of the Preferred Alternative/Plan

Site No. 15, as a measure within the Lyons Creek Watershed Plan of Work (POW), would provide adequate flood damage reduction to agricultural lands, roads, and bridges within flooded areas adjacent to the unnamed tributary and portions of Lyons Creek that it protects. The impoundment will provide stream flow emulation to maintain base flow of the impounded tributary. Table S-1 identifies site-specific elements of the Project.

Table S-1. Site-Specific Elements for Installation of Site No. 15

Structure	Site-Specific Elements
Site No. 15	Site No. 15 is designed to provide approximately 90 percent of the 100-year sediment storage volume below the crest of the principal spillway elevation. The embankment is designed to be 40 feet tall, 1,600 feet in length, and designed as a high hazard class (c) structure due to the potential overtopping of K-77 in the event of a dam failure.

Resource Information

Table S-2 provides relevant resource information for the installation of Site No. 15.

Table S-2. Resource Information

Resource	Site No. 15
Latitude and Longitude	**Latitude 38.7635°** **Longitude 96.9253°**
8-Digit Hydrologic Unit Code	**10260008** **Lower Smoky Hill (102600)**
Climate	**Continental and temperate, cold winters, warm and hot summers, low to moderate humidity, light precipitation in the winter, pronounced rainfall peaks late in spring and early in summer, moderate amount of wind** **Mean temperature:** **January = 29.3° F** **July = 79.3° F**
Annual Precipitation	**34.1 inches**
Topography	**Rolling to hilly, gently sloping to nearly level, with small valleys and narrow floodplains**
Prime and Unique Farmlands In Project Drainage Area	**Prime and Unique Farmland 727.1 acres** **Farmland of Statewide Importance 1,823.6 acres**
Watershed Size (acres)	**Site No. 15 Drainage Area – 2,707 acres** **Lyons Creek Watershed Drainage Area – 179,776 acres**
Land Ownership in Project Drainage Area	**98.8% private, 124 acres SLO easement**
Population/Demographics[1] (Morris [MO] and Dickinson [DK] counties)	**Population: 5,977 – MO County, 19,209 – DK County** **Demographics:** **White: 97% - MO County, 95% - DK County** **Hispanic or Latin origin[3]: 2.2% - MO County, 2.9% - DK County** **Black or African American: 0.3% - MO County, 0.9% - DK County** **American Indian and Alaska Native: 0.3% - MO County, 0.5% - DK County** **Asian: 0.2% - MO County, 0.4% - DK County** **Native Hawaiian and other Pacific Islander: Z[2] – MO County, 0.0% - DK County**
Number of Minority and Limited Resource Farmers in MO and DK counties	**Minority Operators in DK County 309** **Minority Operators in MO County 164** **Limited Resource Farmers in DK County 9[4]** **Limited Resource Farmers in MO County 5[4]**
Number of Farms	**DK County 976** **MO County 466**
Average Farm Size	**828 acres - MO County, 564 acres – DK County**

[1]Sources: Morris County Soil Survey; U.S. Census Bureau, 2000; 2002 Census of Agriculture
[2]Value greater than zero but less than half unit if measure shown
[3]Hispanics may be of any race, so also are included in applicable race categories
[4]Estimated by local USDA service center personnel

The Lyons Creek drainage area has experienced limited land use change or urban growth since the original plan was approved. Table S-3 provides existing land use classification and acreages for Site No. 15 drainage area.

Table S-3. Summary of Land Use within Site No. 15 Drainage Area

Land Use Classification	Acres[1]
Grazed Range	1551
Cropland	1042
Hay Land	29
Pastureland	23
Waterways	25
Farmsteads	5
Roads	32
Total	2707

[1]Rounded to the nearest acre

Alternative Plans Considered

Table S-4 summarizes the alternative plans considered.

Table S-4. Range of Alternative Plans Considered

Alternative	Summary of Alternative	Studied in Further Detail
Future Without Federal Project/No-Action	This alternative consists of utilizing ongoing programs to address resource concerns and relies on landowners participating at their own determined rate--a National Environment Policy Act (NEPA) requirement for study.	Yes
Structural Alternative (Installation of Site No. 15)	This alternative would control flooding caused by the probable maximum precipitation (PMP) rainfall event. This structure is designed as a high hazard structure, provides a 100-year design life, and provides flow through the impoundment to maintain base-flow of the stream.	Yes

Project Benefits

Project (preferred alternative) benefits for installing Site No. 15 include flood prevention; reduction of flood damage, sediment storage, and downstream scour erosion; and continued downstream water flow.

Period of Analysis

The period of analysis is 100 years.

Project Life

The Project life is based on a 100-year design life for Site No. 15.

Environmental Impacts

Table S-5 describes all resource elements that were identified during recent scoping and summarizes the potential impacts related to the installation of Site No. 15.

Table S-5. Summary of Resource Concerns

Resource Concerns	Resource Summary	Summary of Impact
Floodwater Damage	Cropland, roads, and bridges below Site No. 15 flood frequently.	Reduce flooding and flood damage to crops, roads, and bridges.
Erosion Damage	Cropland and streambank erosion and sedimentation on crops and cropland are concerns.	-Reduction of scour erosion by out-of-bank flow in crop fields. -Reduction of sediments in runoff when entering the impoundment. -Reduction of streambank erosion at the impoundment. -Adequate storage capacity to contain the expected sediment inflow for 100 years.
Threatened and Endangered (T&E) Species	Historically, Topeka shiner existed in the Project area.	USFWS and KDWP determined the species does not exist and Project will not likely have any adverse effect.
Fish and Wildlife	Macro-invertebrates, fish assemblage, and wildlife have been identified in the unnamed tributary where Project is proposed.	Project will affect hydrologic flow of tributary entering Lyons Creek by impounding the stream. This is addressed below in Waters of the U.S./Wetlands section. Grassland species will be temporarily affected by the Project.
Floodplain Management	Floodplain exists in Project area on unnamed tributary and adjacent to Lyons Creek.	MO County does not participate in the National Flood Insurance Program (NFIP). DK County participates in the NFIP. The benefit area is located mostly in DK County.
Cultural Resources	No cultural historic, cultural, or scientific resources have been identified in the Project area by the. State Historic Preservation Office (SHPO) and the Kansas State Historical Society (KSHS).	None.
Migratory Birds	Migratory birds frequently nest in central Kansas in the spring and summer, when construction activities may occur.	Site No. 15 will be surveyed prior to construction to determine if any migratory birds will be affected during construction. It is anticipated that no migratory birds will be displaced or disturbed during construction.
Other Social Effects	Local landowners wish to continue producing crops for farm operation, income, and livestock consumption.	Reduce frequent out-of-bank flooding, increase farm income by reducing crop loss and increasing crop production.
Prime and Unique Farmlands	Prime and unique farmlands and farmlands of statewide importance occur in the Flint Hills of MO County.	Direct impact from permanent inundation on approximately 23 acres of farmlands of statewide importance.
Public Health and Safety	K-77 is situated directly below the Project.	Site No. 15 is designed as a high hazard or class c impoundment.
Riparian Areas	Herbaceous riparian area exists in Project area.	Approximately 16 acres of herbaceous riparian area will be directly impacted by Site No. 15
Waters of the U.S./Wetlands	Waters of the U.S. stream channels are present in the Project area. Wetlands, as a Water of the U.S., are present in the Project area. No upland wetlands are in the Project area. Tributary is an intermittent stream with small shallow pools and minimal daily stream flow. Kansas Stream Mitigation Guidance (KSMG) has identified adverse affects on streams associated with this Project.	-Average annual base flow impounded. -Loss of 4,400 feet of creek channel will occur. -U.S. Army Corps of Engineers (USACE) Clean Water Act 404 permit is anticipated. -Stream flow will be emulated through impoundment. -Adverse affects identified in the KSMG are compensated thru in-stream out-of-kind compensatory mitigation.
Wild and Scenic Rivers	Lyons Creek is identified and listed on the Nationwide Rivers Inventory.	The Project will have negligible effects on Lyons Creek.

Mitigation

A site specific mitigation plan will be developed to document avoidance, minimization, and compensation of all lost habitats located at the Site No. 15 Project area.

Avoidance. Avoiding the potential impacts to the aquatic resource include removal of one floodwater retarding structure and designing one floodwater retarding structure as a dry impoundment from the original plan of work for the Lyons Creek Watershed. This effort was the result of consultation between the sponsors, USFWS, and the KDWP.

Minimization. Minimizing impacts to the stream resource included a reduction of the originally planned permanent pool of 40 acres, impacting approximately 9,200 linear feet of intermittent streams, to 23.4 acres, impacting 6,623 linear feet intermittent stream.

Compensation. The KSMG was used to document the effects on the stream resource. Existing stream base flow is being monitored, and will be compensated by allowing by-pass flow through the impoundment's existing appurtenances emulating existing average annual base flow. Range losses will be minimized by reducing the size of the permanent pool; and compensated by seeding the dam, auxiliary spillway, and disturbed areas. No riparian woodlands will be lost with the installation of Site No. 15. Additionally, areas adjacent to stream channels will be established and preserved to provide adequate compensation of losses that cannot be avoided or minimized in the project area.

The KDWP, USFWS, and USACE will review the mitigation plan to ensure accuracy and completeness.

The USACE had previously authorized and issued a Section 404 Clean Water Act permit (Permit No. 200100605) for the installation of Site No. 15 on August 20, 2003. This permit has since been revoked.

Major Conclusions

The installation of Site No. 15 provides needed flood damage reduction benefits, and presents limited environmental impacts of which all will be mitigated with the latest and most current information, knowledge, and technology.

Areas of Controversy

None.

Issues to be Resolved

None.

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CHAPTER 1
PURPOSE AND NEED FOR ACTION

This chapter explains the purpose and need for the Project based on the objectives set forth by the USDA-NRCS and the Lyons Creek Watershed District. Sufficient detail is provided to allow for the formulation of alternatives necessary to meet the desired objectives.

1.1 Project Overview

The need for the Environmental Assessment (EA) is to provide sufficient information detailing environmental impacts associated with the installation of the Project. The original preliminary design, developed during planning, was to install Site No. 15 as a medium hazard structure. A current breach analysis indicates that a catastrophic breach of the planned medium hazard structure would overtop K-77.

The NRCS and the SLOs have reconfirmed the installation of Site No. 15, with the high hazard modification, will provide adequate and desired flood prevention and flood damage reduction as originally planned. The intent of this study is to describe the environmental and social impacts of installing Lyons Creek Watershed Site No. 15 under the PL-566 Watershed Program. The study represents a new assessment of the original Watershed POW for the Lyons Creek Watershed approved in October 1968.

The Project is located on a right bank tributary of Lyons Creek in the Lyons Creek Watershed. Its drainage area is located solely within Morris County, Kansas. Its benefit area, which lies in Dickinson County, is below the proposed location of Site No. 15 on the unnamed tributary and portions of Lyons Creek floodplains it protects. This watershed is situated on the western edge of the Flint Hills Level III Ecoregion. This region is entirely rural, the only urban influence comes from the city of Herington to the south, and the city of Woodbine to the north, both located outside the drainage area of the Project benefit area. The land use, both upstream and downstream of this site, is predominantly agricultural. See Appendix F: Figure 1, Location Map and Drainage Area, for the relative location of this site within the Lyons Creek drainage area.

1.2 Purpose of the Project

The purpose of this federal action is to provide flood control and flood damage protection in a manner that minimizes the risk to loss of human life and is environmentally acceptable. The original POW describes the minimum acceptable level of flood damage reduction at 57 percent. It also describes the method to accomplish this level of flood damage reduction by controlling a minimum of 34 percent of the watershed's drainage area. This was accomplished by formulating drainage area control with structural measures. The original POW, as supplemented, now provides 23 percent control of the drainage area while providing 41 percent flood damage reduction accomplished through structural measures. The SLOs and public desire to maintain this minimum level of drainage area controlled and flood damage reduction through structural measures within the Lyons Creek Watershed.

1.3 Need for the Project

The following sections discuss the need for Site No. 15 based on the requirements to provide flood prevention, flood damage reduction, and to meet current safety and performance standards.

1.3.1 Floodwater Damage

Since original plan development, flooding has continued to occur on this unnamed tributary and within the floodplain of Lyons Creek. Specifically, flood events occurred in 1981, 1982, and 1998 in which out-of-bank flows caused considerable damage. These flows have been recorded on U.S. Geological Survey (USGS) gage stations located within the Lyons Creek

drainage area and identified by local producers. The damages occurred to crops, cropland, roads, and bridges.

Additional floodwater damage information is described in the Watershed Problems, Erosion Damage section in the original POW (pp. 9-10).

1.3.2 Erosion Damage

Erosion damage to cropland in the floodplain continues to be moderate to severe within the Project area. Crop damage occurs when out-of-bank flow takes place on cropland adjacent to the stream channel. Permanent riparian vegetation exists in narrow linear corridors adjacent to the stream channel. These narrow corridors do not provide adequate crop protection from out-of-bank flow.

Additional erosion damage information is described in the Watershed Problems, Erosion Damage section in the original POW (p. 10).

1.3.3 Other Social Effects

Local producers and landowners desire to continue or improve crop and forage production within the floodplain below the proposed Project and Lyons Creek.

Additional needs within the Project area are fully described in the watershed problems section of the original POW.

1.4 Other Problems and Opportunities

1.4.1 Problems

Loss of rangeland and vegetative production for livestock at proposed Site No. 15 are a concern of the landowner. Other resource issues brought forward during recent scoping meetings include downstream channel aggradations for a portion of the tributary immediately below Site No. 15 and continued base-flow on this stream and tributary as a need to aid in water supply for aquatic life and livestock support.

1.4.2 Opportunities

Opportunities of the Project will provide flood control and flood damage reduction benefits.

The landowner has requested a reduction in the permanent pool elevation to reduce the impact on the rangeland resource. This has been accomplished by designing an inline water control (stop-log) structure into the drawdown pipe to reduce the permanent pool to an elevation that would provide a 21-surface-acre impoundment. This will be maintained until sediment reaches that elevation. At that point, the permanent pool will likely become larger due to the volume of sediment filling the sediment pool.

In addition, stream-flow monitoring of the existing tributary will determine the average base flow. If base flow exists, flow emulation through this impoundment and its appurtenances will be required to aid in preserving the stream flow for this tributary to Lyons Creek. Monitoring sites have been established to collect stream-flow data to determine the benchmark (pre-impounded) condition of this unnamed tributary.

CHAPTER 2
AFFECTED ENVIRONMENT

This chapter describes the Project setting. The information presented below is in addition to and/or provides clarification of information in the original POW.

2.1 Project Setting

2.1.1 Original Plan

The Lyons Creek Watershed POW was prepared under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666 [PL-566]). A flood prevention and watershed protection plan was completed and approved in October 1968. The plan proposed the construction of 21 floodwater retarding structures, one multi-purpose structure, as well as land treatment to protect the Lyons Creek Watershed.

2.1.2 Physical Data

Site No. 15 drainage area is located in the Lyons Creek Watershed, specifically on an east bank tributary to Lyons Creek. The drainage area is approximately 2,707 acres (4.2 square miles). The drainage area falls within the east-central area of the Lyons Creek Watershed. Lyons Creek Watershed district boundary contains approximately 179,776 acres, or 280.9 square miles in Dickinson, Geary, Marion, and Morris Counties. Additional information regarding the general setting is located in Section 2.2, Existing Conditions.

Lyons Creek Watershed is located in the Flint Hills ecoregion of Kansas. The Flint Hills ecoregion is the largest remaining intact tallgrass prairie in the Great Plains. This region is characterized by rolling hills composed of shale and cherty limestone, rocky soils, and by humid, wet summers. Average annual precipitation ranges from 28 to 35 inches. The Flint Hills marks the western edge of the tallgrass prairie. Erosion of the softer Permian limestone has left the more resistant chert (or flint) deposits, producing the hilly topography and coarse soils of the area. This rocky surface is difficult to plow; consequently, the region has historically supported very little cropland agriculture. The natural tallgrass prairie still exists in most areas and is used for range and pastureland. However, some cropland agriculture has been implemented in river valleys and along the periphery of the Flint Hills, especially in the northwest corner where the topography is more level. This northwest edge is transitional between the cherty, rocky soils of the Flint Hills (28) and the silty, loamy, loess-formed soils of the Smoky Hills (27a)[1].

Additionally, Lyons Creek Watershed is located in the Central Kansas Alluvial Plains Common Resource Area (CRA)[2]. The Central Kansas Alluvial Plains CRA is a level to nearly level plain mantled by loess and underlain by unconsolidated alluvial sediments. This CRA inter-fingers in the Central Kansas Sandstone Hills as broad river valleys and terraces with a local relief in the tens of feet. Pre-settlement vegetation was tall-to-mid grass prairies. Most of this land is in farms, dominantly small grains and hay.

---

[1] *Chapman, Shannen S., Omernik, James M., Freeouf, Jerry A., Huggins, Donald G., McCauley, James R., Freeman, Craig C., Steinauer, Gerry, Angelo, Robert T., and Schlepp, Richard L., 2001, Ecoregions of Nebraska and Kansas (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,950,000).*

[2] *USDA, NRCS, eFOTG Section II, Common Resource Areas of Kansas*

2.1.3 Land Use

The drainage area under evaluation lies completely in Morris County, Kansas. Table 2-1 summarizes the existing land use classification, acreages, and land units that are treated (see Appendix C: Support Maps, Figure 2). Table 2-2 summarizes the Highly Erodible Land classification within the Project's drainage area (see Appendix C: Support Maps, Figure 3).

Table 2-1. Summary of Land Use in Drainage Area

Land Use Classification	Lyons Creek Site No. 15 (acres[1])		Total	Percent of Drainage Area[2]	Percent of Drainage Area Treated[2]
	Treated[2]	Untreated			
Grazed Range	1,536	15	1,551	57	57
Cropland	695	347	1,042	39	26
Hay Land	29	0	29	1	1
Pasture	23	0	23	1	1
Waterways	25	0	25	1	1
Farmsteads	0	5	5	0	0
Roads	0	32	32	1	0
Total	2,308	399	2,707	100	86

[1]*Rounded to the nearest acre*
[2]*National Planning Procedures Handbook; NRCS Quality Criteria found in the NRCS electronic Field Office Technical Guide (eFOTG)*

Table 2-2. Highly Erodible Land Classification in Drainage Area

Highly Erodible Land Classification[1]	Acres[2]
Highly Erodible	1,049
Not Highly Erodible	879
Potentially Highly Erodible	778
Total	2,707

[1] *NRCS soils data from Web Soil Survey*
[2] *Rounded to the nearest acre*

2.2 Existing Conditions

The affected environment is described in further detail for the natural resources in Section 5.1, Effects of Alternative Plans, and the original POW.

2.3 Resource Concerns

2.3.1 Floodwater Damage

In addition to the flood damaging events listed in the POW, flood damages have continued to destroy crops, limit production, and cause scour erosion to the cropland adjacent to and within the floodplain of the unnamed tributary and Lyons Creek.

Additional floodwater damage information is described in the Watershed Problems, Floodwater Damage section in the original POW (pp. 9-10).

2.3.2 Erosion Damage

Sheet and rill erosion is the dominant erosion process in the evaluated drainage area. Gully erosion and streambank erosion contribute to sedimentation volumes; however, their contribution is minimal to the evaluated area.

Erosion products are delivered by overland flow and channel flow into Lyons Creek. Because of this delivery process, the volume of erosion on the landscape is not the same as the volume of

sediment delivered to the mouth of the drainage area. To reflect the effects of varying land use on sedimentation rates, the existing sediment accumulation rate requires conversion to an eroded soil quantity from the watershed.

Estimated soil loss rates were used to predict sediment yields over a 100-year time period to assess sediment yield. Table 2-3 illustrates the cumulative deposited sediment volumes predicted over the next 100 years. See Appendix D, Section 1, Sedimentation, for additional information.

Table 2-3. Predicted Sediment Yield

100-year Predicted Sediment Yield (acre-feet[1])
258

[1]Acre-feet is a unit of volume, defined as covering a surface area of 1 acre (43,560 square feet) by a depth of 1 foot of material

2.3.3 Other Social Effects

Reduced farm income due to crop loss and reduced crop production caused by frequent out-of-bank flooding was identified as a concern locally. The loss of crops affects livestock production and farm viability for those affected within the drainage area and adjacent to Lyons Creek.

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CHAPTER 3
SCOPE OF ENVIRONMENTAL ASSESSMENT

The EA for this Project location was based on agency and public scoping efforts, as well as best professional judgment. This chapter identifies the issues relevant in defining the problems, and formulating and evaluating alternative solutions. This chapter also includes a record of the issues that were considered but not found to require detailed discussion.

Scoping was conducted to determine the objectives and primary concerns of the public and to identify other relevant issues and environmental concerns associated with this Project. The SLOs sent out invitations to agencies and groups that might have an interest in providing input for the Project. An information packet was provided to agencies and groups that were present at the scoping meeting (see Appendix D, Section 3, Agency Coordination, for a complete list of agencies and groups that were contacted). This packet contained pertinent structural data, photos of the sites, an opportunity to tour the site, and an opportunity to comment on the Project. Agency and public scoping meetings were held January 9, 2006 (see Chapter 6, Consultation and Public Participation, for further information regarding the scoping meetings).

Table 3-1 identifies the resource concerns discussed for the Project at the January 9, 2006, meetings. Resource concerns found to be not relevant can be eliminated from further consideration and sufficient rationale is provided. Each resource concern noted in Table 3-1 as "Yes" in the "Relevant to the Proposed Action" column is discussed in further detail in Chapter 5, Environmental Consequences. Those noted as "No" in the "Relevant to the Proposed Action" column are not discussed further in this EA. See Appendix D, Section 4, Environmental Evaluation (Form KS-CPA-52), for further information on, and evaluation of some of these resource concerns.

Table 3-1. Summary of Scoping

Resource Concerns	Relevant to the Proposed Action?		Rationale
SLOs, Public, Agencies	**Yes**	**No**	
Flood Damages	X		Flood damage to agricultural areas below site limit crop production, add expense for additional planting and fertility, and reduce farm income.
Erosion Damages	X		Sediments transported in water degrade water quality. Sediments are deposited on crops and reduce yield in out-of-bank flow events.
Water Quality		X	Lyons Creek is listed on the 2002 303(d) list of impaired waters for Fecal Coliform Bacteria (see the Kansas Department of Health and Environment [KDHE] Total Maximum Daily Load [TMDL] information). Lyons Creek was proposed for delisting in 2004. The unnamed tributary in this Project area is not listed. Section 401 Water Quality Certification for construction was authorized on June 3, 2003 (permit on file).
NRCS Requirements			
Air Quality		X	No permit required from KDHE, Bureau of Air and Radiation (phone conversation 12/2/05). Project not in air-quality attainment area.
Coral Reefs		X	None present in Project area.
Ecologically Critical Areas		X	None present in Project area.
Threatened and Endangered Species		X	Area is in historic range to the threatened Topeka shiner (*Notropis topeka*). Not likely to adversely affect federally-listed species (USFWS concurrence letters dated 10/8/03 and 7/7/09 on file). Informal consultation addressed avoidance and minimization of impacts to the Topeka shiner and its habitat in the Project area.
Environmental Justice		X	To comply with regulations of Title VI of the Civil Rights Act of 1964 (42 U.S. Code 2000d, et seq.) and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 Federal Register [FR] 7629), the potential environmental impacts of the alternatives were studies with respect to the demographic and socioeconomic composition of the Project area. No minority or low-income populations would be affected by any of the alternatives.

Continued on page 3-2

Resource Concerns	Relevant to the Proposed Action?		Rationale
SLOs, Public, Agencies	**Yes**	**No**	
Essential Fish Habitat		X	No designated areas in Project area.
Fish and Wildlife/Fish and Wildlife Coordination	X		Project will affect hydrologic flow of tributary entering Lyons Creek by impounding stream. This is addressed below in Waters of the U.S./Wetlands section. Native grassland wildlife species are affected.
Floodplain Management	X		MO County does not participate in the NFIP. DK County participates in the NFIP. The Project benefit area is located in DK County.
Highly Erodible Land (HEL)		X	HEL and potential HEL soils exists in the Project area but will not be negatively affected by construction, operation, or maintenance of the Project.
Historic, Cultural, and Scientific Resources		X	SHPO cleared this Project for installation. See letter dated 11/7/01.
Invasive Species		X	Woody invaders exist in the immediate and adjacent area. The sponsors will operate and maintain, under an operation and maintenance (O&M) plan and agreement, the Project area to control woody invaders.
Migratory Birds	X		Project area will be surveyed prior to construction to determine if any migratory birds will be affected during construction. Project impact area not within any identified Bird Conservation Region (NRCS, eFOTG, Section II, 3/1/03). Migratory birds are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712, as amended).
National Economic Development		X	Plan does not require application of Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G).
Natural Areas		X	None present in Project area.
Other Social Effects	X		Reduced farm income, lost crops, and reduced production caused by frequent flooding.
Parklands		X	None present in Project area.
Prime and Unique Farmlands	X		No direct impact on prime farmland. Direct impact from permanent inundation on approximately 23 acres of farmlands of statewide importance.
Public Health and Safety	X		Site No. 15, as planned in the POW, does not meet current safety and hazard class criteria as a low hazard structure. This site is now designed as a high hazard class structure, reducing downstream risks to public safety. No vector[1] issues were raised during the scoping process.
Regional Water Resource Plans		X	None present in Project area.
Riparian Areas	X		No disturbance, inundation, and fill will be placed on any riparian woodland areas. Impacts on 16 acres of herbaceous native rangeland adjacent to the stream will occur and will be completely offset and compensated by plantings.
Scenic Beauty		X	A limited impact to the immediate Flint Hills visual resource will be impacted at the Project area. No concern was raised during the scoping process.
Waters of the U.S./Wetlands	X		The Project includes a flow-through device (drawdown appurtenance) from the impoundment. This aids in compliance with stream mitigation requirements. No upland wetlands identified within impact area, documentation on file.
Wild and Scenic Rivers	X		Lyons Creek is listed on the Nationwide Rivers Inventory (NRI).

[1] *An organism (as an insect) that transmits a pathogen.*

CHAPTER 4
ALTERNATIVES

This chapter discusses the formulation process of alternatives for the Project, discusses the range of alternatives considered and the rationale behind elimination of alternatives from detailed study, and describes the alternatives carried forward for detailed study. This chapter also identifies the hazard potential for the alternatives studied in detail, describes the National Economic Development (NED) alternative selection, presents the preferred alternative, and summarizes the impacts of the alternatives studied in detail. For more detailed information regarding the specific details for each alternative, see Appendix D, Section 5.0, Alternative Evaluation.

4.1 Formulation Process and Alternatives Eliminated From Detailed Study

A range of alternatives to satisfy the purpose of the Project was initially considered during original plan formulation. The range of alternatives included both structural and non-structural concepts with which to meet the Project purpose. Input on the range of alternatives was originally identified during original planning and was sought again at the agency and public scoping meetings held on January 9, 2006.

A screening process was used for the range of alternatives. Alternatives that failed any one of the following set of general screening criteria were not carried forward for detailed study.

- Considered not technically reliable.
- Not justifiable by tangible and/or intangible benefits[1].
- Not socially and/or environmentally acceptable.
- Unable to fulfill the Project purpose.

Table 4-1 summarizes the range of alternatives considered and the screening of the alternatives. Table 4-1 also identifies the alternatives eliminated and those carried forward for detailed study.

Table 4-1. Range of Alternatives and Determination for Detailed Study

Alternative	Summary of Alternative	Screening of Alternative	Carried Forward for Detailed Study
No-Action	In this Project, the No-Action Alternative equates to no federal project assistance.	Required to be studied by NEPA (1969).	Yes
Structural Alternative	Install Site No. 15, a watershed impoundment, to provide flood control to cropland areas within the floodplain.	This alternative would meet the purpose and need.	Yes
Filter and/or Buffer Strips	Install a series of filter and/or buffer strips through conservation programs to remove agricultural areas from frequent floods.	This alternative was unable to meet the purpose and need. Alternative would remove up to 10 percent of the cropland adjacent to the unnamed tributary and Lyons Creek from agricultural production.	No

Continued on page 4-2

[1] *Tangible benefits are those for which a measurable benefit can be quantified such as land values. Intangible benefits are those for which an improvement is obtained when quantification by a defined measurement is prohibitive such as visual enhancement or water quality improvements.*

Alternative	Summary of Alternative	Screening of Alternative	Carried Forward for Detailed Study
Floodplain Easements	Convert cropland within the 100-year, 24-hour floodplain to permanent vegetation and placed in a perpetual easement to remove agricultural areas from frequent damaging floods.	Alternative would remove up to 100 percent of the floodplain of the unnamed tributary and a portion of the benefit area below Site No. 15 of Lyons Creek from agricultural production. This alternative does not protect roads/bridges from flooding. This alternative was not socially acceptable by local landowners. Crop production for livestock use and farm support motivates continued cropping of these floodplain areas.	No
Wetlands	Create a wetland complex to provide floodwater control.	Wetland complex would require at least 165 acres of native prairie to be converted to an artificial wetland. Physical limitation would require grade stabilization structures and 6.221 million cubic yards of excavation. This alternative is cost prohibitive.	No

4.2 Description of Alternative Plans

4.2.1 No-Action Alternative

The No-Action Alternative equates to no federal Project assistance available to address problems and resource concerns within the Project area. Ongoing programs would be available to address local resource concerns, as program funding is available. Local landowners would determine what level of participation they would be willing to implement individual practices and/or systems of practices. Site No. 15 would not be implemented under this alternative.

4.2.2 Structural Alternative (Installation of Site No. 15)

Site No. 15 is designed with a 100-year sediment storage life. It will be designed as a high hazard class (c) floodwater retarding structure because of K-77 being directly below the Project. The breach wave of a low or significant hazard structure would overtop the highway and pose a serious risk to loss of life to motorists using the roadway. This structure will be able to pass the PMP event. Site No. 15 is planned to provide 1,036 acre feet of floodwater control.

Site No. 15 will be designed with an in-line water control structure (stop log structure) to reduce the permanent pool elevation to approximately 23 acres from the originally planned 40-acre pool. This modification will decrease environmental losses by reducing the impact streams and rangeland, and improve intermittent water control by providing a method for the landowner and watershed district to manage the water level for downstream water needs.

Perforations are designed into the in-line water control structure to emulate pre-impounded stream flow. Currently the unnamed tributary is being monitored to determine what base-flow conditions exist.

Table 4-2 identifies site-specific elements of the Project as a High Hazard Class (c) structure.

Table 4-2. Site-Specific Elements of Structural Alternative

Structure	Site-Specific Elements
Site No. 15	This alternative would control flooding caused by rainfall events between the 2-year and 100-year storm events. This structure will be designed as a high hazard class (c) structure, provide a 100-year design life, and provide flow through the impoundment to maintain base-flow of the stream.

The Project would have an annual average cost (including O&M) of $62,600 and an annual average benefit of $27,000.

4.2.3 Filter and/or Buffer Strip Alternative

Under this alternative, cropland adjacent to the unnamed tributary would be converted to riparian forest buffers and filter strips. Up to 100 percent of the existing cropland within the 100-year, 24-hour floodplain would be converted to permanent vegetation and placed in a perpetual easement to remove agricultural areas from frequent damaging floods. Any herbaceous land use adjacent to the tributary would be maintained in its current state. These buffers and filter strips would be established to native perennial trees, shrubs, and herbaceous vegetation. They would be established as a method to reduce flood damages and reduce erosion from the scouring effects of out-of-bank flows.

The Conservation Reserve Program (CRP) administered by the USDA-Farm Service Agency (FSA) includes riparian forest buffers and filter strips conservation practices as eligible practices in the Continuous CRP (CCRP). CCRP, as a voluntary program, could be used to establish those areas eligible for program participation. CCRP includes annual rental payments, has limitations on width, and provides up to 180 feet of protected width adjacent to streambank. Term contracts under CCRP currently exist for up to 15 years and offer rental agreements and incentive payments to offset crop production loss in areas enrolled in CCRP.

The PL-566 program authorizes funding for installation of riparian forest buffers and filter strips practices as well. This would be for installation and would not include annual rental payments.

The NRCS has standards and specifications developed for these two practices and CCRP has specific requirements for practice limits by which this alternative would be planned and implemented. Areas for installation of this alternative exist within the Project area.

Although this alternative addresses reduction of floodwater damage by removal of cropped areas and reduced scouring of the floodplain by protecting sensitive cropland areas, amongst other ecological services, it does not fulfill the Project's purpose of flood control as stated in the purpose and need for the Project.

4.2.4 Floodplain Easement Alternative

Under this alternative, areas within the 100-year floodplain would be converted to permanent perennial herbaceous vegetation and placed in perpetual easements. Easement areas would be established as a method to reduce flood damage and reduce erosion from the scouring effects of out-of-bank flows for a minimum of the life of the Project.

This alternative would be considered for the benefit area of Site No. 15 only. Up to 100 percent of the unnamed tributary floodplain would be placed under easement. The benefited area of the floodplain adjacent to Lyons Creek associated with Site No. 15 would be placed under easement. However, this area would be difficult to separate from the entire Lyons Creek planned Project benefit area, as Site No. 15 was planned as a component of the Lyons Creek Project, which includes a total of 17 floodwater retarding dams (as revised).

There are conservation programs available, including PL-566, to accomplish the installation and persistence of this alternative.

Although this alternative addresses reduction of floodwater damage by removal of cropped areas and reduced scouring of the floodplain by protecting sensitive cropland areas, amongst other ecological services, it does not fulfill the Project's purpose of flood control as stated in the purpose and need for the Project.

4.2.5 Wetlands

A large wetland would be developed to provide floodwater retention during storm runoff events and seasonal and permanent pool levels during the remainder of the year. The wetland would be planned not to exceed a permanent water levels to exceed 5 feet in depth, dikes would be included to retain flood events, and water control structures would be used to regulate drawdown. Native adapted vegetation would be planted on dikes and temporary pool locations. Permanent pool location(s) would re-vegetate naturally.

To accomplish the needed flood control for a system within the Project area, the wetland would be designed with a 6 feet or less high dike and would be required to retain the 25-year, 1-day/10-day storm event. The wetland complex would need 660 acre feet of floodwater storage; average 4 feet of depth; and would require approximately 165 surface acres to meet this flood storage requirement. Due to the physical location in the landscape the wetland complex would require grade stabilization structures to reduce erosion at points where water enters the complex and would require approximately 6,221,013 cubic yards of excavation.

This alternative would provide the needed flood control the sponsors and public wish to accomplish. The physical location of the project area would require a substantial amount of excavation and grade control structures for water entering the wetland complex to retain the prescribed storm event. Initial costs for this alternative are estimated to be a minimum of $10 million to construct.

This alternative, as planned, is not carried forward to be studied in greater detail due to an unreasonable cost to install.

4.3 Comparison of Alternatives

Table 4-3 summarizes the effects on relevant resource concerns for each alternative carried forward for detailed study. Effects are characterized by the associated short- and long-term impacts for each alternative. For a more detailed comparison of these impacts, see Chapter 5, Environmental Consequences.

Table 4-3. Comparison of Alternatives

	Future Without Federal Project (No-Action)		**Structural Alternative**	
Alternative Description	No Project activity. Ongoing programs to address local resource concerns only.		Installation of Site No. 15, as a high hazard dam, to reduce flood damage, control flooding, and reduce risk to life and property.	
Environmental Effects	**Short-Term Effects**	**Long-Term Effects**	**Short-Term Effects**	**Long-Term Effects**
Flood Damage	Minor effect	Only limited flood damage reduction and no flood control would be gained through the ongoing program.	Minor effect during construction	Flood control benefits gained in the Project area due to the floodwater reduction of all flood events up to the PMP event.
Erosion Damage	No effect	Continued sediment transport and delivery to Lyons Creek, scour erosion will continue to occur.	Minor effect during construction	Structure will provide a sediment storage function as sediment rich water will not be transported downstream from stormwater runoff events in the same amount as what currently exists. Scour erosion will be significantly reduced on cropland.
Endangered and Threatened Species	No effect	No effect	Minor noise/ sediment disturbance during construction	Not likely to adversely affect; concurrence received from USFWS.

Continued on page 4-5

	Future Without Federal Project (No-Action)		**Structural Alternative**	
Alternative Description	No Project activity. Ongoing programs to address local resource concerns only.		Installation of Site No. 15, as a high hazard dam, to reduce flood damage, control flooding, and reduce risk to life and property.	
Environmental Effects	**Short-Term Effects**	**Long-Term Effects**	**Short-Term Effects**	**Long-Term Effects**
Fish and Wildlife Resources	No effect	No effect	Minor disturbance during construction	Loss of lotic stream system, aquatic habitat, and wildlife resources at and below impoundment. These impacts will be mitigated through compensation of lost habitat units. Creation of 23 acres of permanent water will be used by migratory waterfowl species.
Floodplain Management	No effect	No effect	Likely no effect during construction	Flood prone areas immediately below site will be protected to the probable maximum precipitation rainfall event. Site adds flood protection to the Lyons Creek floodplain. No land use changes are expected.
Historic, Cultural, and Scientific Resources	No effect	No effect	Likely no effect during construction	SHPO - the landscape and other factors indicate that it is very unlikely that any cultural resources are present.
Migratory Birds	No effect	No effect	Potential minor disturbance during construction	Creation of permanent shoreline areas, nesting opportunities for migratory waterfowl, and potential use areas for transient species.
Other Social Effects	Minor effect	Flood damages will continue to affect cropland and crops.	Minor effect during construction	Flood damage reduction will increase crop production, protect valuable topsoil from scouring, and protect roads and bridges.
Prime and Unique Farmlands	No effect	No effect	Minor effect during construction	Loss of 23 acres farmlands of statewide importance to impounded water and placement of fill.
Public Health and Safety	No effect	No effect	Minor effect during construction	K-77 will be protected from breach wave overtopping.
Riparian Areas	No effect	No effect	Disturbance during construction	Loss of approximately 16 acres herbaceous riparian areas associated with project installation.
Waters of the U.S./Wetlands	No effect	No effect	Disturbance during construction	Loss of existing stream function and value at the Project impact area.
Wild and Scenic Rivers	No effect	No effect	Negligible reduction in flooding	Negligible reduction in flooding frequency and duration.

4.4 Selection of the Preferred Alternative

Based on review of alternatives and their ability to meet the purpose and need for the Project and the overall impacts to human and natural environmental resources, the Structural Alternative, Installation of Site No. 15, is the preferred alternative for the Project. See Appendix C: Support Maps, Figure 4 showing several pool elevations of the preferred alternative. See Appendix A: Tables, Structural Data Table, for structural data pertaining to Site No. 15.

A mitigation plan has been developed to document avoidance, minimization, and compensation of lost stream habitats associated with the Site No. 15 project area. The KSMG, adopted by the USACE, was utilized to determine the adverse impacts associated with Site No. 15 and compensatory mitigation was developed as beneficial credits. The following is a summary of the credits.

> Sand Creek is a perennial stream located on USACE-owned property in which KDWP manages the stream as a public recreation site for trout fishing. The reach of stream used for mitigation work is in need of restoration. The stream suffered extreme damage in flood events of 2008 and lost most of the in-stream habitat, pools, and destabilized a significant portion of that reach. The restoration plan includes streambank stabilization, in-stream habitat development, and riparian forest establishment and enhancement to create a cool water fishery for public use. A memorandum of understanding (MOU) will be developed between the sponsors, USACE, KDWP, and NRCS for installation, financing, and O&M.
>
> Riparian corridors below the impoundment and within the Lyons Creek Watershed will be protected by installing riparian forest buffers and/or filter strips. These practices will convert existing cropland and replace it to permanent herbaceous and deciduous vegetation protecting degraded streams. Additionally, these areas will be protected from livestock use. Any area established for the offset of adverse environmental impacts associated with this impoundment will be protected by conservation easements held by the watershed district. At a minimum, these easements will be in place for the life of the Project.

CHAPTER 5
ENVIRONMENTAL CONSEQUENCES

The intent of this chapter is to provide the analytical basis for the comparison of the effects of the alternatives presented in Chapter 4. This chapter addresses long-term impacts on human and natural environment resources as well as short-term impacts associated with the Future Without Federal Project (No-Action) and Structural (the preferred alternative) alternatives. In addition, the cumulative and indirect impacts associated with the alternatives are evaluated. Only those resources identified in scoping (see Chapter 3, Scope of Environmental Assessment) are evaluated. Additional information regarding environmental impacts can be found in Appendix D, Section 4.0, Environmental Evaluation.

5.1 Effects of Alternative Plans

Effects of the alternatives, both positive and negative, were evaluated for each resource and are presented with quantitative supporting data when possible. In other instances, qualitative information was used as the basis for comparison but is supported by best professional judgment and sound scientific and engineering practice. In most instances, the information listed in this section will be in addition to what is listed in the original POW (and its supplements).

5.1.1 Flood Damages

Existing Environment

Flood damages from 2-year, 6-hour storm and larger events (out-of-bank flows) occur to crops, cropland, roads, and bridges.

Effects of Alternatives

Future Without Federal Project/No-Action

Flood damages would continue to occur to crops, cropland, roads, and bridges for out-of-bank flows.

Structural Alternative

The Project will reduce flood damages associated with crops, cropland, roads, and bridges. The impoundment is designed to release the 100-year, 6-hour storm event to be contained within the banks of the tributary.

5.1.2 Erosion Damage

Existing Environment

Frequent out-of-bank flows continue to scour unprotected cropland, roads, and bridges. Scoured areas affect growing crops by removing topsoil and growing crops. This results in reducing the availability of adequate topsoil for cropping and/or adding the need to replant and fertilize.

Sediment transported from within the drainage area is deposited on growing crops, therefore reducing yield by prolonging harvest or adding sediment to harvested crops, or by destroying growing crops. Expected sediment delivery to the proposed impoundment is estimated to be 2.58 acre-feet per year.

Effects of Alternatives

Future Without Federal Project/No-Action

Scour erosion will continue to occur, removing topsoil and reducing crop production.

Structural Alternative

This alternative would reduce flood damages below the proposed impoundment location. The impoundment would store up to 258 acre-feet of sediment. The impoundment will be operated to provide downstream water for livestock use and aid in maintaining aquatic life during periods of dry climate, both of which are incidental benefits of the project.

5.1.3 Threatened and Endangered Species

Existing Environment

Informal coordination with the USFWS and the KDWP was conducted to determine the potential occurrence for state or federally listed T&E species or habitat documented within the unnamed tributary drainage area. Table 5-1 summarizes the state and federal T&E species that may occur on or near the Project area as identified through agency coordination and available information.

Table 5-1. State and Federal Threatened and Endangered Species

Species – Type of Listing	Habitat	Nearest Documented Location	Potential to Occur At Structure
American Burying Beetle – State and Federal	Found in upland grasslands or near the edge of grassland/forest.	None. No designated critical habitat.	None on-site due to lack of suitable habitat.
Bald Eagle – State and Federal	Near large impoundments, marshes, and rivers with primary food sources.	Areas close to federal reservoirs and major river systems.	None on-site due to lack of suitable habitat.
Eastern Spotted Skunk – State	Forest edges and upland prairie grasslands, especially where rock outcrops and shrub clumps are present.	None. No designated critical habitat.	None on-site due to lack of suitable habitat.
Eskimo Curlew – State and Federal	Were formerly a regular spring transient through the eastern half of the state.	None. No designated critical habitat.	None on-site due to lack of suitable habitat.
Least Tern – State and Federal	Barren areas near water such as saline flats in salt marshes, sand bars in river beds, and shores of large impoundments.	None. No designated critical habitat.	None on-site due to lack of suitable habitat.
Neosho Madtom –State and Federal	Riffles and along sloping gravel bars in relatively clear, moderately-large rivers.	In the Cottonwood, Neosho, and Spring Rivers.	None on-site due to lack of suitable habitat.
Ouachita Kidneyshell Mussel – State	Gravel substrates with flowing water.	Historically occurred in the main stem and major tributaries of the Verdigris, Neosho, and Spring Rivers.	None on-site due to lack of suitable habitat.
Peregrine Falcon – State	Near marshes, lakes, and rivers where concentrations of waterfowl or other birdlife provide ample prey.	None. No designated critical habitat.	None on-site due to lack of suitable habitat.
Piping Plover – State and Federal	Sparsely vegetated shallow wetlands and open beaches and sandbars adjacent to or within streams and impoundments.	None. No designated critical habitat.	None on-site due to lack of suitable habitat.
Snowy Plover – State	Open salt flats, beaches and bars of rivers, and wetlands.	None. No designated critical habitat.	None on-site due to lack of suitable habitat.
Topeka shiner – State and Federal	Near headwaters of small prairie streams with high water quality and cool temperatures.	Dickinson and Morris Counties (location unknown). Additional sampling by KDWP occurred below proposed site and no *T. shiner* or its habitat was found.	None on-site due to lack of suitable habitat.

Effects of Alternatives

Future Without Federal Project/No-Action

No known effect on any T&E species will occur with this alternative.

Structural Alternative

Under the Project, the elimination of the free-flowing prairie stream system associated with the Project would change the overall aquatic habitat associated at and below the impoundment. Stream assessments and sampling have been performed at the proposed impoundment location to determine fish assemblage. No Topeka shiners (*Notropis topeka*) or likely suitable habitat has been found to occur during these sampling efforts. Informal consultation has occurred with the USFWS regarding impacts to the Topeka shiner at this site. The USFWS has determined that this alternative may affect, but is not likely to affect adversely, the Topeka shiner at or near the proposed location.

Additional sampling by KDWP and NRCS occurred below the proposed impoundment location, specifically between K-77 west to the tributary's confluence with Lyons Creek. This sampling was performed on July 6, 2006. No Topeka shiner or likely suitable habitat was identified during this sampling effort.

The permanent pool will create habitat for warm-water sport fisheries, which will likely provide hunting opportunities for avian predators. No comments or concerns were received during the scoping meetings as to the affect of the Project on such predators.

5.1.4 Fish and Wildlife Resources

Existing Environment

The unnamed tributary to Lyons Creek drainage area primarily consists of lands dedicated to rangeland and agricultural use, with riparian areas located along streams. Agricultural practices have altered the natural habitat in various areas within the drainage area. Large areas of native prairie uplands will remain intact and not be affected by the Project. Sparse wetlands will remain undisturbed and not be affected.

The wildlife plant and animal species found near the proposed site are common to the region. Wildlife associated with this area is dominated by a mix of wildlife habitats such as established trees in the riparian corridor below the proposed impoundment; land currently in agricultural production including grazed range, cropland, pasture, and hay; and odd areas of naturalized vegetation. Wildlife in this area includes birds, reptiles, amphibians, mammals, fish, crustaceans, insects, and worms. Typical wildlife species common in this type of setting include, but are not limited to, deer, turkeys, squirrels, rabbits, raccoons, and songbirds (such as robins). Because of the proximity of the Project to agricultural fields, other wildlife species such as white-tailed deer, striped skunk, northern harrier, and red-tailed hawk are commonly observed in the area. Migratory birds will likely use the native prairie, wetlands, and cropped areas in the drainage area that are in close proximity to the proposed impoundment for nesting and brood rearing, which occurs primarily between April 1 and July 15.

Approximately 40 percent of the land within the basin is in agricultural production, which makes agricultural land one of the primary wildlife habitats in the area. Wildlife species found here include those that feed on crops. Examples are white-tailed deer, rabbits, mice, and avian species such as crow, quail, pheasant, and numerous songbirds.

Approximately 60 percent of the drainage area is grazed range and is home to various wildlife species including birds, reptiles, amphibians, mammals, fish, insects, and worms. Common wildlife found in the area includes white-tailed deer, rabbits, mice, avian species including Bobwhite quail, prairie chicken, and numerous songbirds.

Effects of Alternatives

Future Without Federal Project/No-Action

No additional degradation will likely occur to the fish and wildlife resources under this alternative. Excess sediment eroding from the drainage area will continue to move downstream

through the aquatic system that may affect fish, wildlife, and their habitat.

Structural Alternative

•Plant and Animal Wildlife

Disturbance of terrestrial, riparian, and aquatic habitat near the Project will occur as a result of construction activities. However, there is adequate suitable habitat available in the area locally for wildlife to migrate to during and after construction. Further, any disturbed and/or denuded areas will be re-vegetated with herbaceous native vegetation similar to surrounding range sites to provide pre-installation equivalent habitat.

Long-term plant and wildlife resources would not be affected by this alternative. No permanent reductions in upland habitat would occur.

•Aquatic Habitat

The Project inundates approximately 6,623 linear feet of intermittent stream and associated aquatic habitat. Several stream segments will be replaced with a permanent impoundment altering the streams hydrology, morphology, and function.

Implementing the Project would reduce the existing intermittent streams function and value by reducing, if not eliminating, out-of-bank flow in most rainfall events. Reduction of flooding frequency and peak flows and lengthened flow event duration will occur for storms greater than the 2-year, 6-hour storm event. This disconnect of storm events from the floodplain will alter the existing ebb and flow of the natural system, affecting the aquatic and terrestrial (riparian corridor) ecosystems below the Project. The removal of the out-of-bank flows on the unnamed tributary will occur directly below the impoundment to the confluence of Lyons Creek.

This alternative is planned to emulate pre-impounded base flows through structural appurtenances associated with the design of the impoundment's principal spillway. Existing stream flow has been monitored to determine the average monthly flow this stream system currently experiences. Monitoring will continue after installation to determine if sub-surface flow through the impoundment will contribute to base flow, and to determine if measures installed will provide adequate flow volumes. Adjustments will be made to the flow through by the watershed district if insufficiencies occur through this planned regulation of flow.

An O&M agreement for structural measures included with the supplemented POW between the sponsors, the Soil Conservation Service (now NRCS), and the Kansas Forestry, Fish and Game (now KDWP), was approved in 1975. This agreement was developed to provide an assurance for natural stream flow to continue in the event that stream flow would cease. It was agreed that the amount of spring or groundwater inflow to the structure will be released through the structure.

This Project will create a permanent artificial water body of approximately 23 surface acres that will be used by migratory waterfowl, amphibians, reptiles, mammals, crustaceans, aquatic invertebrates, terrestrial insects, and fishes.

To offset adverse impacts of the in-stream work, riparian forest buffers, and filter strips, compensatory mitigation is planned for Sand Creek, a perennial stream located on USACE owned property and managed by the KDWP as a public recreation site for trout fishing. The reach of stream used for mitigation work is in need of restoration. The stream suffered extreme damage in flood events of 2008 and lost most of the in-stream habitat, pools, and destabilized a significant portion of that reach. The restoration plan includes streambank stabilization, in-stream habitat development, and riparian forest establishment and enhancement to create a cool water fishery for public use. A MOU will be developed between the sponsors, USACE, KDWP, and NRCS for installation, financing, and O&M.

Riparian corridors below the Lyons Creek impoundment and within the watershed will be protected by installing riparian forest buffers and/or filter strips. These practices will convert existing cropland and replace it to permanent herbaceous and deciduous vegetation protecting degraded streams. Additionally, these areas will be protected from livestock use. Any area established for the offset of adverse environmental impacts associated with this impoundment will be protected by conservation easements held by the watershed district. At a minimum, these easements will be in place for the life of the Project.

•Riparian Habitat

The existing riparian area that will be affected by the alternative consists of native herbaceous vegetation. No riparian woodland habitat would be disturbed with this alternative.

•Terrestrial Habitat

To reduce the impacts to the native range ecosystem, the landowner desired to decrease the elevation of the permanent pool to an area that will be approximately 24 acres. This reduces the permanent pool by close to one-half the originally planned permanent pool. This will be accomplished by designing an in-line water control structure into the principal spillway drawdown pipe located on the front erosion control slope. The maximum elevation of the in-line water control structure will be set at an elevation not to exceed one-half the pool size of the crest of the principal spillway. The in-line water control structure will be managed by the watershed district and the landowner to control the elevation of the permanent water below that level. The principal spillway crest is designed to an elevation of the expected sediment delivery to the impoundment within 100 years (Project life). Areas disturbed by construction at Site No. 15, and the embankment and auxiliary spillway, will be seeded with a native herbaceous mixture similar to surrounding range sites.

Summary

Effects on existing habitats from the Project would be minimal. Avoidance of adverse impacts has been completed with the consultation and subsequent conservation agreement between the watershed district and the KDWP. That agreement deleted one impoundment and modified the planned design of one impoundment to allow the construction of this impoundment (see POW, as supplemented). Minimizations of adverse impacts have been, are being, and will be completed according to the conservation agreement, formal mitigation plan, and those issues brought forward in this assessment. Stream credits are generated through buffer preservation with local landowners, and in-stream habitat development and streambank stabilization work on Sand Creek in cooperation with the KDWP and the USACE.

5.1.5 Floodplain Management

Existing Environment

Dickinson County participates in the NFIP. Floodplains exist and have been identified by the Federal Emergency Management Agency (FEMA).

Effects of Alternative

Future Without Federal Project/No-Action

No changes are anticipated to the management of floodplains with this alternative.

Structural Alternative

This alternative is not in conflict with floodplain management regulations set forth in Executive Order 11988, as no development or change in current land use or land use management in the floodplain is expected as a result of the construction of Site No. 15.

5.1.6 Historic, Cultural, and Scientific Resources

Existing Environment

Local, state, and national inventories were checked to determine the presence of any known archaeological, historic, or cultural sites (collectively termed cultural resources) in the potential area of effect of proposed features for the Project (see Appendix E, Cultural Resources Assessment). There are no known cultural resources in the identified area.

Effects of Alternatives

Future Without Federal Project/No-Action

There are no historic or cultural properties listed on, or eligible for listing on, the National Register of Historic Places, and it is very unlikely that any unknown cultural resources are present that would be affected by the installation of land treatment measures installed through ongoing programs.

Structural Alternative

The features considered in this plan for the Project will require excavation of approximately 200,000 cubic yards of native material for construction of the earthen dam (the auxiliary spillway being 200 feet wide) and excavation of the stilling basin and outlet channel, all of which will cover not more than 40 acres. In addition, the landscape and other factors indicate that it is very unlikely that any cultural resources are present (see Appendix E: Supporting Information, Cultural Resource Assessment).

5.1.7 Migratory Birds

Existing Environment

Migratory birds are protected under the Migratory Bird Treaty Act, 1918 as amended, and Executive Order 13186. Migratory birds included are all native wild birds found in the United States except the house sparrow, starling, feral pigeon, and resident game birds such as pheasant, grouse, quail, and wild turkeys. Resident game birds are managed separately by each state. A reference list of migratory game birds is found in Title 50, Code of Federal Regulations, Part 10.

The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs.

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, requires NRCS to consider the impacts of planned actions on migratory bird populations and habitats for all planning activities. Reasonable measures may be designed to avoid impacts or where avoidance is not practicable, minimize impact, rectify the impact, reduce or eliminate the impact over time, or compensate for impacts.

Avoidance and minimization practices would be required during construction for migratory species. To the extent possible, vegetation clearing and construction activities along the riparian corridor and in the upland rangeland area would be completed outside of the avian nesting period (primarily between April 1 and July 15) to avoid or minimize adverse effects on nesting migratory birds. Should clearing or construction activities be required during this time, a survey of the affected habitats would be conducted to determine if nesting migratory birds are present. This survey would be coordinated with USFWS and KDWP, with results submitted to USFWS to determine if any migratory birds would be affected.

The USFWS Flint Hills National Wildlife Refuge located near Hartford, Kansas, lists[1] some

[1]The USFWS Mountain-Prairie Region, Flint Hills National Wildlife Refuge, birding list: http://www.r6.fws.gov/REFUGES/FLINT/flint1.htm

294 birds, including 90 species that nest on the refuge. Since most birds listed are migratory, their seasonal occurrence and relative abundance is variable dependant on season, frequency of use of the area, and distribution of individual species.

Other practices are available for avoidance and minimization pursuant to the Migratory Bird Treaty Act of 1918, as amended. The Migratory Bird Treaty Act only applies to federal actions or where there is a federal nexus.

Effects of Alternatives

Future Without Federal Project/No Action

No effect to migratory birds will likely occur under this alternative.

Structural Alternative

Under the Project, construction activities will disturb native upland rangeland that may harbor ground-nesting migratory birds. Initiating construction activities during the nesting season (April 1 to July 15) will be avoided to the extent possible. Vegetation clearing and construction activities in rangeland areas will be initiated outside of the avian nesting period to avoid or minimize adverse effects on nesting migratory birds.

Construction activities are planned to begin mid-March. A work zone will be established prior to April 1 and construction activities will be active in the work zone and only the work zone prior to and during the migratory bird nesting season. The work zone will consist of the embankment where work will be focused, borrow area(s) for fill material, spoil and mixing area, and travel lane(s) for all heavy construction equipment. These areas will be void of native vegetation and will be active with equipment travel throughout the construction period. Migratory birds will not utilize or nest in the active work zone until recovered and construction activities have ceased.

As construction activities occur during the nesting season, a construction inspector, with assistance from other NRCS and KDWP personnel, will frequently evaluate site conditions for migratory birds and caution will be taken for any excavation, fill, and travel activities in the area of the proposed action.

See also Section 5.1.4, Threatened and Endangered Species, Effects of Alternatives, Structural Alternative for further information.

5.1.8 Other Social Effects

Existing Environment

Crops grown in this area are used for commodity production for sale at local and regional markets. The sales of these commodities are essential for farm operation and persistence.

Cropping floodplain acres in this region also provides a primary source of winter-feed supplement for livestock use. Summer grown crops are stockpiled locally for livestock use during winter months when range and pasture are no longer producing adequate forage for livestock maintenance.

Effects of Alternatives

Future Without Federal Project/No-Action

Frequent out-of-bank flood events will continue to reduce crop production and affect rural roads and bridges.

Structural Alternative

Installing this impoundment will provide adequate flood damage reduction to reduce damages to cropland and crops. Expected annual flood damage reduction benefits will be $27,000 to crops, cropland, roads, and bridges.

5.1.9 Prime and Unique Farmlands

Existing Environment

Prime and unique farmlands have been identified within the Project area. Farmlands of statewide importance have also been identified within the Project area.

Effects of Alternatives

Future Without Federal Project/No-Action

No effect on prime and unique farmland or farmland of statewide importance will likely occur with this alternative.

Structural Alternative

The Project will inundate approximately 23 acres of farmlands of statewide importance in the permanent pool elevation, embankment, and auxiliary spillway. This activity is not an unnecessary or irreversible conversion of farmland to nonagricultural use.

5.1.10 Public Health and Safety

Existing Environment

Highway K-77 crosses the drainage area for the Project running north and south. Current runoff storm events do not pose a threat to overtopping the highway. No disease or vector issues were identified in the Project area.

Effects of Alternatives

Future Without Federal Project/No-Action

No increase of risk to public safety will likely occur from flood events with this alternative. No disease or vector issues related to public health are anticipated with this alternative.

Structural Alternative

Site No. 15, as planned in the original POW, does not meet current state and NRCS safety and hazard class criteria as a medium hazard structure due to the traffic count on K-77. This site is now designed as a high hazard class structure meeting current state and NRCS design criteria. This design reduces downstream risks to public safety. No vector or disease issues were raised concerning public health during the scoping process for this alternative.

5.1.11 Riparian Areas

Existing Environment

The riparian areas in the Project area east of K-77 are characterized as native herbaceous vegetation. The area that will be impacted by Site No. 15 is currently managed as grazed range with only very sparse woody species present. Woody species present that will be impacted are comprised solely of Osage orange (*Maclura pomifera*), an invasive species.

The riparian area below the project area west of K-77 to the unnamed tributary's confluence to Lyons Creek is mixed with cropland, pasture, grazed range, and narrow linear bands of forested riparian areas adjacent to the channel of the unnamed tributary.

Effects of Alternatives

Future Without Federal Project/No-Action

No changes will likely occur to the herbaceous or woody riparian areas with this alternative.

Structural Alternative

Approximately 23 acres of the herbaceous native range, including approximately 16 acres of riparian areas, will be inundated for the life of the project. The impacted riparian area will be

mitigated with in-kind or similar new seeding and/or preservation areas.

Site No. 15 will remove the existing ebb and flow during out-of-bank runoff storm events of the riparian area adjacent to the unnamed tributary. The bank-full flow caused by draw down of stormwater through the principal spillway of Site No. 15 will occur for up to 10 days after a runoff storm event. The removal of frequent out-of-bank flows will reduce the deposition and scouring effects in and on the riparian area on the unnamed tributary.

5.1.12 Wetlands and Other Waters of the U.S.

Existing Environment

Waters of the U.S., including wetlands, waterways, lakes, natural ponds, and impoundments, are regulated by USACE under Section 404 of the Clean Water Act (CWA). A permit from USACE is required to authorize the discharge of dredged or fill material into waters of the U.S. The KDHE has been given regulatory jurisdiction over all waters within the state's boundary for water quality by the Environmental Protection Agency (EPA) through Section 401 of the CWA.

Streams

The main hydrological feature of the Lyons Creek drainage area is the main channel of Lyons Creek and several unnamed tributaries. The evaluated area is located on an unnamed intermittent tributary (see Appendix F: Figure 1, Location Map and Drainage Area). The waterways above the site are small drainages fed by agricultural runoff. The downstream area of the waterway is slightly incised with sparsely forested banks. This waterway is considered jurisdictional by USACE due to definable bed and bank.

Wetlands

An on-site investigation and wetland determination was conducted by NRCS staff trained in using the Great Plains Supplement to the 1987 USACE Wetland Delineation Manual. Areas within the footprint of the dam and area of permanent pool were evaluated and sampled for wetland presence. Areas outside of that were not sampled nor inventoried for wetlands. No upland wetlands were identified in the Project impact area. The intermittent stream was determined to be other waters (OW) and wetland.

Effects of Alternatives

Future Without Federal Project/No-Action

Under this alternative, wetlands and streams within the drainage area would not be impacted. The channel, flow, hydrology, function of the stream system, and aquatic habitat would remain unaltered from its naturally occurring condition.

Structural Alternative

The USACE approved KSMG was used to document the impacts to the streams in the Project area. The embankment, permanent pool, and stilling basin were identified as Project impacts to the intermittent streams. It is expected that there would be a permanent loss of approximately 6,623 linear feet of intermittent stream with permanent pools.

There are no upland wetlands associated with the streams or upland in the Project area.

Table 5-2. Kansas Stream Mitigation Guidance Impact Summary

Adverse Impact Factors for Riverine Systems Worksheet						
Factor	**Dam**	**Impact 2**	**Impact 3**	**Impact 4**	**Impact 5**	**Impact 6**
Stream Type Impacted	0.6	0.6	0.4	0.6	0.4	0.4
Stream Status	0.1	0.1	0.1	0.1	0.1	0.1

Continued on page 5-10

Adverse Impact Factors for Riverine Systems Worksheet						
Factor	**Dam**	**Impact 2**	**Impact 3**	**Impact 4**	**Impact 5**	**Impact 6**
Existing Condition	0.8	0.8	0.8	0.8	0.8	0.8
Duration	0.3	0.3	0.3	0.3	0.3	0.3
Activity	2.5	2	2	2	2	2
Total Project Impact	2.65	2.65	2.65	2.65	2.65	2.65
Sum of Factors = **M**	6.95	6.45	6.25	6.45	6.25	6.25
Linear Feet of Stream Impacted in Reach = **LF**	800	100	1308	1473	1349	1593
M x LF	5560	645	8175	9500.85	8431.25	9956.25
Total Mitigation Credits Required =			42268.35			

The sponsors and NRCS identified opportunities to generate credits identified in the KSMG. Credits include riparian buffer preservation, access control for livestock, in-stream habitat development, streambank stabilization, and unrestricted water flow through the impoundment.

Table 5-3. Kansas Stream Mitigation Guidance Riparian Credits

Riparian Buffer Creation, Enhancement, Restoration and Preservation Worksheet				
Factors	**13-15-3**	**15-15-3**	• **16-13-3**	**Sand Creek Riparian**
Stream Type	0.2	0.4	0.4	0.4
Priority Status	0.05	0.4	0.4	0.4
Net Benefit (stream side A)	0.08	0.08	0.06	0.08
Net Benefit (stream side B)	0.08	0..08	0	0
Supplemental Buffer Credit	0.08	0.08	0	0
Control/Site Protection	0.2	0.2	0.2	0.2
Mitigation Construction Timing (stream side A)	0	0	0	0
Mitigation Construction Timing (stream side B)	0	0	0	0
Temporal Lag (years)	0	0	0	-0.1
Sum Factors (**M**) =	0.69	1.24	1.06	0.98
Linear Feet of Stream Buffer (**LF**)	3050	3030	7947	7169
Credits (**C**) = **M** x **LF**	2104.5	3757.2	8423.8	7025.6
Site Factor (**SF**)	1	1	1	1
Total Credits Generated **C** x Site Factor (**SF**)	2104.5	3757.2	8423.8	7025.6
Total Riparian Restoration Credits generated =			21311.1	

Table 5-4. Kansas Stream Mitigation Guidance In-Stream Credits

In-Stream Work/Channel Restoration or Enhancement and Relocation Worksheet			
Factors	**Flow Pipe**	**Cattle Exclusion**	**Sand Creek**
Stream Type	0.4	0.4	0.4
Priority Area	0.05	0.05	0.4
Existing Condition	0.05	0.05	0.4
Net Benefit	1	1	0.5
Control/Site Protection	0.4	0.4	0.1
Mitigation Construction Timing	0	0	0.3
Sum Factors (**M**)	1.9	1.9	2.1
Stream Length in Reach (**LF**)	1000	3052	7169
Credits (**C**) = **M** x **LF**	1900	5798.8	15054.9
Site Factor (**SF**) pg 19	1	1	1
Total Credits Generated **C** x **SF** =	1900	5798.8	15054.9
Total Channel Restoration/Relocation Credits Generated =		22753.7	

The summary below indicates the credits fall short of the adverse impacts associated with the Structural Alternative by less than 10 percent. The total linear feet benefitted from the proposed stream mitigation exceed the impacted reach over four times. This leaves this alternative with less than a significant impact to the stream resource and makes a substantial improvement to a public use area, which is not accounted for in the Kansas SMG.

Table 5-5. Kansas Stream Mitigation Guidance Summary

Summary Totals	Credits	Linear Feet
K. Total Riparian Enhancement Mitigation	21311.1	21196
L. Total Stream Restoration Mitigation	22753.7	11221
M. Total Proposed Mitigation = K + L	44064.8	32417
	Yes or No	
Proposed Mitigation Credits = Total Debits	Yes	
Proposed Stream Restoration Credits greater than or equal to 25% of the Debits	Yes	

5.1.13 Wild and Scenic Rivers

Existing Environment

Section 5(d) of the National Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) requires that "In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas." It further requires that "the Secretary of the Interior shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas . . . shall be evaluated in planning reports by all Federal agencies as potential alternative uses of water and related land resources involved."

In partial fulfillment of the Section 5(d) requirements, the National Park Service has compiled and maintains a NRI, a register of river segments that potentially qualify as national wild, scenic or recreational river areas. The NRI qualifies as a comprehensive plan under Section 10(a)(2)(A) of the Federal Power Act.

The NRI listed Lyons Creek in 1982 as a river which met criteria as a river with Outstanding Remarkable Value. The specific river reach identified in Geary and Dickinson counties is from the Smoky Hill River to the railroad bridge south of Woodbine. NRI identified Lyons Creek as a scenic northern Flint Hills stream with good water quality, dense tree corridor, good canoeing, good native fish population, and a large blue heron rookery.

Effects of Alternatives

Future Without Federal Project/No-Action
Under this alternative Lyons Creek status as a listed river would not be impacted.

Structural Alternative
This alternative will alter the hydroperiods of the tributary it impounds and will reduce the prescribed storm events to be contained within the banks of the stream. This individual impoundment provides a slight decrease in flooding to Lyons Creek. These effects have been reduced by including a seven-day drawdown period of storm events.

5.2 Cumulative Effects of Alternatives

A cumulative impact is defined as the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such

other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Cumulative effects include the direct and indirect effects of a project together with effects from reasonably foreseeable future actions of others. For a project to be reasonably foreseeable, it must have advanced far enough in the planning process that its implementation is likely. Reasonably foreseeable future actions are not speculative, are likely to occur based on reliable sources, and are typically characterized in planning documents.

This assessment of the cumulative effects for federal, state, and private actions is required by the Council on Environmental Quality (CEQ) regulations developed from NEPA. Cumulative effects were evaluated in accordance with CEQ guidance (CEQ, January 1997).

The cumulative impact issues associated with the Project would be the loss of terrestrial and aquatic wildlife habitat (native rangeland, riparian, wetland areas, and streams) and the potential effects on wildlife associated with this alternative.

For the Project, cumulative effects on wildlife habitat were evaluated within the drainage area and benefited area associated with Site No. 15 in Morris and Dickinson Counties. The loss of habitat is cumulatively important because several wildlife species are dependent on wetland and riparian habitats. The following projects, either recently past or reasonably foreseeable future actions, may have cumulative effects with the selection of the Structural Alternative relating to the loss of wildlife habitat:

- The installation of the two Lyons Creek Watershed PL-566 impoundments remaining to be constructed within the Lyons Creek Watershed POW would permanently affect the stream systems they would impound. These two sites, known as 8A and 21, would affect similar fish and wildlife resources as Site No. 15. Once an area is converted, the value of the wildlife habitat in the immediate vicinity is typically lost or diminished. Wildlife using the converted habitat is typically displaced. If wildlife habitat is created in another location, its replacement value is generally not fully realized until the created habitat is mature. These two impoundments are planned as single-purpose floodwater retarding structures, similar to Site No. 15.
- There have been 14 PL-566 single-purpose floodwater control structures installed within the Lyons Creek Watershed District since plan approval in 1968. These installed impoundments control approximately 20 percent of the watershed. The addition of Site No. 15 will increase the drainage area controlled by 1.5 percent. With other remaining sites (8A and 21) to be installed, the total drainage area controlled by PL-566 impoundments would be increased to approximately 22 percent. Table 5-3 (page 5-10) provides drainage area controlled by each PL-566 structure planned and installed.

Table 5-6. Drainage Area Controlled

Planned Site No.	Approximate Drainage Acres	Square Miles	Percent Drainage Area Controlled[1]
8a	2,277	3.45	1.2
15	**2,707**	**4.22**	**1.5**
21	766	1.16	0.4
Sub-total	5,750		3.1
Installed Site No.			
1	947	1.48	0.5
2	1,690	2.64	0.9
3	1,856	2.9	1.0
MP6	15,853	24.77	8.8

Continued on page 5-13

Installed Site No.	Approximate Drainage Acres	Square Miles	Percent Drainage Area Controlled
7	704	1.1	0.4
9	499	0.78	0.3
10	1,754	2.74	1.0
11	973	1.52	0.5
12	1,152	1.8	0.6
13	1,254	1.96	0.7
14	723	1.13	0.4
16	1,338	2.09	0.7
17	5,197	8.12	2.9
19	954	1.49	0.5
Sub-total	34,894		19.2
Total	40,644	53.04	**22.3**

[1]Lyons Creek Watershed Drainage Area is 179,776 acres.

Preservation strategies for wildlife habitat include federal programs such as the Grassland Reserve Program (GRP) and the Wetlands Reserve Program (WRP) sponsored by NRCS, CRP administered by FSA, requirements under CWA, the Migratory Bird Treaty Act, and potentially the Endangered Species Act. In addition, the national goal of no net loss of wetlands, coupled with the need for Section 404 permits to address effects on waters of the U.S. (including wetlands), indicates that wetland resources should not diminish in the future.

In addition, some past projects or reasonably foreseeable future projects within the Lyons Creek Watershed would enhance wildlife habitat. The following exists in a ten-mile radius of the Project area:

- Approximately 611 acres of CRP exist in Morris and Dickinson Counties. These areas consist of conservation practices such as quail borders, grass filter strips, and riparian forest buffers. These areas are under contract for up to 15 years and are operated and maintained by the landowner.
- There are approximately 70 acres of prairie wetlands that have been restored through WRP in Morris County, offering protection to sensitive wetland ecosystems that will harbor numerous wildlife species.
- GRP easements exist on approximately 1,030 acres, protecting valuable native rangeland from development, and offering important resident and migratory species use areas.

5.2.1 Indirect Effects

Indirect effects are project-induced effects (positive or negative) that would affect the socioeconomic and/or natural environment beyond the construction corridor and would occur later in time or be farther removed in distance from a project area. The following describes some potential indirect effects that have been identified for the Project.

One potential indirect effect of installing an impoundment on an ephemeral stream is the removal of frequent out-of-bank flows that remove sediment and debris from scour areas. Normally out-of-bank flow results in deposition of sediment except in scour areas (old channel meanders). This flood removal or disconnect that is described in the riparian corridor and floodplain will remove the existing systems functions and dynamics. Indirect effects of impoundments on Kansas streams are not well documented and much uncertainty exists. It has been observed that impoundments can narrow and incise or widen and cause channel aggradations or degradation. These effects may contribute to reducing pool and riffle complexes and potentially armor the streambed. These effects have been observed in reach(s)

directly below impoundments.

A breach inundation area map identifies areas subject to flooding should this structure breach. A breach inundation area map will be provided to the SLOs to aid communities in developing an emergency action plan in the event of such a breach.

5.3 Risk and Uncertainty

5.3.1 Engineering

All cost and structural data are based on 100 years of life. Dams that fail are nearly equally divided by three triggering mechanisms. These are inadequate spillway capacity, foundation defects, or piping and seepage through the embankment. Failures occur on both engineered and non-engineered dams.

Hydrologic modeling is part of the design process to ensure adequate spillway capacity. The 30-inch reinforced concrete pipe will pass a 100-year storm event without flow through the auxiliary spillway. The runoff from this event will pass through the pipe in approximately 7 days, leaving the flood detention pool available for another 100-year rainfall event. The auxiliary spillway is designed to pass the 6-hour PMP of 27.3 inches of rainfall without overtopping the dam. The model is also used to verify that a failure will not occur through the spillway during the passage of this flood event.

Thorough geologic investigations have been conducted for the embankment foundation, auxiliary spillway area, and borrow area. Additionally, soil samples in each geologic investigation location were tested in a soil mechanics laboratory to determine strength, permeability, stability, and consolidation potential. During construction, the dam will have continuous inspection by NRCS personnel to ensure that it is constructed according to design. Collectively, these activities will aid to minimize the potential for foundation or embankment failures.

Land use change was not figured into the Project's drainage area as a potential adjustment for runoff volumes. Land use was forecasted not to change significantly over the life of the Project. If land use changes occur in the drainage area, sediment delivery may increase and the life of the Project decrease.

5.4 Controversy

Impacts of the temporary flood pool on grassland for the Structural Alternative were identified as a concern not identified initially in scoping. This adverse impact is not specifically identified in the KSMG. Impacts to rangeland in relation to migratory birds use, other wildlife species, and native flora were associated with this concern. This concern suggested that the plant community in the flood pool would be altered by changing species composition from good quality native grassland to annual plants and would no longer persist as native grassland. There are numerous examples of this very scenario in the Flint Hills Region that suggests a plant community shifts only slightly to a different species composition of native flora; field observations of existing flood pool areas have typically conclude a static native grass plant community persists and a transition to annuals species does not occur. Occasionally a shift in plant community occurs when appropriate management does not take place. These mismanaged areas may become invaded by undesirable trees or experience a downward trend in desirable herbaceous species.

No other direct areas of controversy were identified during scoping or subsequent public meetings (see Chapter 6, Consultation and Public Participation). In general, the agencies and public supported the installation of the Project because of the benefits this structure and its pool area provide to the affected area.

5.5 Precedent for Future Actions with Significant Impacts

The Project, as the preferred alternative, does not set a precedent for future actions to follow that would be associated with significant impacts. Future watershed projects will be evaluated on their own merits and evaluated for effects based on relevant resources identified during each projects' scoping process.

5.6 Compliance with Federal, State, and Local Laws

5.6.1 Federal

Section 404 Permit

A Section 404 permit from USACE is required for impacts to wetlands and other Waters of the U.S. USACE requires prior authorization of discharges of dredge or fill material, including those for temporary construction purposes, into waters of the U.S. (33 U.S.C. 1344).

A Section 404 permit from the USACE has been requested for the installation of the Project.

Threatened and Endangered Species Act

Formal consultation with USFWS, in accordance with Section 7 of the Endangered Species Act, would be required if it is determined that any T&E species would be adversely affected by the Project (PL-93-205, Endangered Species Act). Coordination with the KDWP is also required in accordance with the Kansas Non-game and Endangered Species Conservation Act of 1975. A list of potentially affected species was provided by the KDWP and the USFWS. Based on review of the species and the Project area, each alternative would have no effect on the listed species.

Informal consultation has occurred with the USFWS and the KDWP as a result of the potential existence of the Topeka shiner (*Notropis Topeka*), listed as endangered. Sampling of the tributary indicated that neither the species nor its habitat were present.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to determine whether their undertakings will have an adverse impact on historic properties that are listed on or are eligible for listing on the National Register of Historic Places and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. To complete this process, NRCS consulted with the SHPO. The SHPO found that the proposed Project would have no effect, as described in 36 CFR 800.5, on any cultural resources listed in or eligible for listing on the National Register of Historic Places or the State Register. Based on the cultural resource information assembled and consultation with the SHPO, NRCS concludes that there will be no effect on properties listed or eligible for listing. If cultural resources are discovered during layout, construction, and/or checkout; NRCS will follow procedures outlined in NRCS Kansas State Level Agreement. Work will cease and the discovery will be evaluated by a cultural resources specialist. NRCS will conduct the appropriate consultation prior to continuation of this undertaking. If the discovery consists of human remains, provisions of the Kansas Unmarked Burial Sites Preservation Act will be implemented.

5.6.2 State

Kansas Department of Agriculture, Division of Water Resources, Construction Permit

Through the Kansas Stream Obstruction Act (K.S.A. 82a-301 to 305a, 2004), a permit is required to be obtained prior to the construction of a dam or other water obstruction.

The Kansas Water Appropriations Act (K.A.R. 5-6-2, Storage of water in watershed district reservoirs) states that a permit may be issued to appropriate water for beneficial use that proposes the storage of water in a watershed district reservoir. The landowner is to have the use of space in the sediment pool to store the water to which he or she might be entitled under

the water appropriation act. The watershed district board of directors allocated or gave to the landowner all or a specified part of the sediment pool for the storage of water in accordance with the water appropriation act. (Authorized by K.S.A. 82a-706a; modified, L. 1978, ch. 460, May 1, 1978.)

Additional Kansas law requires that (K.A.R. 5-30-1 Approval of or Permits for Dams) the chief engineer shall not approve or grant a permit for any dam subject to the jurisdiction of the chief engineer under the authority of K.S.A. 1979 Supp. 82a-301 through 305a as amended, unless the applicant also receives prior approval of his or her application to appropriate water for beneficial use to be diverted by means of the dam for which the approval or permit is sought, unless the sole proposed use for the water is for domestic use. (Authorized by K.S.A. 82a-706a, 82a-709; effective May 1, 1980.)

Section 401 Water Quality Certification

As part of the Section 404 permit, Section 401 Water Quality Certification must be obtained from the KDHE. This certifies that the proposed action will not violate state water quality standards (33 U.S.C. 1341). The certification must be provided or waived before USACE can issue a Section 404 permit for any project. Any specific permit conditions required for compliance with the state's water quality standards would be specified in the Section 401 certification and in the permit conditions of the issued Section 404 permit.

The 401 Water Quality Certification for the installation of Site No. 15 was issued in conjunction with the Section 404 permit on June 3, 2003, and is authorized through December 31, 2018, the same as the 404 permit.

Section 402 National Pollutant Discharge Elimination System

KDHE administers the federal National Pollutant Discharge Elimination System (NPDES) and issues permits for stormwater discharges for construction activities (33 U.S.C. 1342). The purpose of the program is to improve water quality by reducing or eliminating contaminants in stormwater. Disturbance of more than one acre requires an NPDES permit. Because the Project would involve disturbance of more than one acre, a stormwater discharge permit for construction activities would be obtained from KDHE prior to construction of the Project.

Kansas Unmarked Burial Sites Preservation Act

The Unmarked Burial Sites Preservation Act (KSA 75-2741-75-2754) is the state law for the protection of unmarked burials. If human remains are found during construction activities, construction must stop in that area and procedures set forth by the state must be followed. The purposes of this act are to:

(1) Provide adequate protection for unmarked burial sites and human skeletal remains located on all lands within the state of Kansas.
(2) Prohibit unauthorized disturbance of any unmarked burial sites.
(3) Provide procedures for the proper care and protection of unmarked burial sites and human skeletal remains found in the state of Kansas.

Under the provisions of the Kansas Unmarked Burial Sites Preservation Act, the law specifically relates to unmarked burial sites, human remains, and artifacts on private and public lands. No one without a permit may disturb an unmarked burial site or possess human remains or grave goods. Possession of grave goods obtained prior to January 1, 1990, is exempted. No one may display human remains or artifacts from burials or trade in such artifacts. Anyone with knowledge of such activities must report it or is guilty of a misdemeanor with a fine of not less than $100 or more than $500. Anyone discovering human skeletal remains must immediately notify the local law enforcement agency, which notifies the coroner. The coroner determines if the remains are forensic, and then notifies the State Historical Society. The Society consults with the Unmarked Burial Sites Preservation Board. After disinterment, the State Historical

Society may study the remains and goods for up to one year. Scientific study may be extended by six months. Upon completion of the analysis, the remains and goods will be under the direction of the Unmarked Burial Sites Preservation Board. The Secretary of the State Historical Society will establish, with board approval, a cemetery on state land for reinterment of human skeletal remains and grave goods from unmarked burials.

5.6.3 Local

Compliance with local zoning, regulated floodplain, or other watershed plans is anticipated.

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CHAPTER 6
CONSULTATION AND PUBLIC PARTICIPATION

6.1 Public Participation

The POW was a result of the public's desire to control flooding, reduce flood damages, and protect the watershed.

The SLOs held public meetings during original watershed planning to receive input, discuss Project alternatives, and update progress. Those meetings are discussed in the original POW.

Additionally, a recent public meeting was held and general comments received during and subsequent to the meeting. Those comments are summarized below:

January 9, 2006 – The SLOs requested additional public input to review Site No. 15 as originally planned, determine if other resource concerns existed, and determine if additional alternatives were needed to address the concerns. The PL-566 Watershed Program was on the agenda for their meeting, which was open to the public. The comments received at the meeting included the following:

- Those present were concerned with the amount of flooding occurring below the proposed location of Site No. 15.
- Concerns were raised with roads and fences that may be inundated in large storm events upstream of the impoundment.
- Two individuals were concerned with downstream effects that impoundments may have on the stream as they have observed stream channel widening, channel aggradations, and timber falling into the stream.
- Another individual observed this on a stream that has no impoundments.
- The landowner where the Project is proposed was concerned with the size of the permanent pool for Site No. 15 and the impact that will have on the amount of rangeland available for grazing, the rate at which the flood retention draw downs occur, and the effect inundation will have on the grasses.
- There were no concerns with mitigation of habitat losses.

Throughout the course of the Project, information was provided through public meetings conducted by the local sponsors. All public correspondence was logged.

The USACE issued a public notice (2003) after receiving a CWA Section 404 permit application from the SLO. The result of the public notice was the execution of Permit No. 200100605 by the USACE on August 20, 2003.

6.2 Agency Consultation

Various federal, state, and local agencies, as well as other organizations and public citizens, were consulted for the Project. A list of these individuals is provided in Appendix D: Section 3 – Agency Coordination.

On January 9, 2006, an agency meeting was held to discuss the installation of Site No. 15 located on an unnamed tributary to Lyons Creek in Morris County, Kansas. All agencies identified in Appendix D: Section 3 – Agency Coordination, were invited to attend. Agency representatives from the KDWP, USFWS, USACE, and the Kansas Forest Service attended. In addition, representatives from the planning team included members from NRCS and the SLOs. Twelve people attended: four agency/governmental representatives, two Project team members, five local watershed board members, and the landowner. The agencies had the

opportunity to comment on the Project and the effects on their respective resources for which they are responsible. Their input aided in determining the resources that would be of concern in relation to the propose alternative. An on-site visit was conducted after the agency meeting.

Specific consultation regarding historic and cultural resources was performed by NRCS with the SHPO and KSHS.

Specific correspondence relating to tribal participation was submitted to tribes with potential interest in the proposed action in December 2006. No correspondence or comments were received from any of the tribes contacted.

The USACE was requested to provide information relating to the Project permit to aid in developing this assessment.

The USACE, KDWP, and the USFWS will be requested to provide input and reviews of the assessments and mitigation plan associated with the Project. The USACE permit will require mitigation of impacts to the environment associated with the Project.

CHAPTER 7
PROVISIONS OF THE PREFERRED ALTERNATIVE

7.1 Rationale for the Preferred Alternative

The Installation of Site No. 15 Alternative has the greatest potential for reducing flood damages while maintaining crop production at desirable levels.

7.2 Permits and Compliance

The following permits and compliance actions will be required for the Project construction to occur:

- During construction, if previously unevaluated cultural resource information becomes known, the area of discovery will be avoided, the SHPO and NRCS will be notified, and the significance of the resource will be evaluated.
- A Section 404 is required to be obtained by the SLOs. It authorizes this Project for construction and all associated mitigation. Special conditions of the permit will require mitigation to offset the adverse impacts associated with the installation of the Project.
- A Section 401 Water Quality Certification has been obtained by the SLOs from the KDHE and authorizes this Project for construction.
- A stormwater NPDES permit for construction activity would be required because the disturbed area would be greater than one acre.
- A construction permit from the Kansas Department of Agriculture, Division of Water Resources (DWR), will be required prior to construction.

7.3 Real Property Acquisition and Easements

Easements have been acquired for the Project by the SLOs to an elevation equal to the crest of the auxiliary spillway. This elevation is the minimum required by PL-566 and DWR. These easements are required for construction, and operation and maintenance of the impoundment. The district has been made aware of the potential for development between the minimum easement acquisition elevation and the top of dam elevation and the related concerns if this occurs.

Easements have been acquired for compensatory mitigation purposes. These are required by the CWA 404 permit. These easements are required for a minimum of the life of the Project.

7.4 Installation and Financing

7.4.1 Framework for Carrying out the Plan

Site No. 15 is expected to be installed during year one of the evaluation period. The SLOs would secure all needed permits; easements; and rights for installation, operation, and maintenance. NRCS would provide technical assistance, engineering services, consultation for special environmental concerns, and Project administration.

7.4.2 Planned Sequence of Installation

All easements, permits, and installation will be completed in year one of the evaluation period.

The SLOs have taxing authority for Project funding. The SLOs have the power of eminent domain and may exercise their authority as needed to acquire any necessary land rights.

7.4.3 Responsibilities

The SLOs will obtain the permits identified in Section 7.2, Permits and Compliance, above. In addition, the SLOs are responsible for obtaining real property and construction easements required for the Project.

The SLOs have analyzed their financial needs in consideration of the scheduled installation of the works of improvement, and is able to make funds available when needed. Federal funds are to be provided by NRCS for technical assistance, engineering services, Project administration, and construction. The availability of federal funds is contingent upon appropriations available for this purpose.

Prior to entering into agreements that obligate NRCS funds, the SLOs will have a financial management system for control, accountability, and disclosure of PL-566 funds received; and for control and accountability for property and other assets purchased with PL-566 funds.

7.4.4 Contracting

This structure will be installed through Project agreements between NRCS and the SLO by means of federal contract procedures and resultant contracts.

7.4.5 Real Property

No real property has been acquired by NRCS to date and is not anticipated to be acquired for Site No. 15.

7.4.6 Financing

This Project is classified as an installation activity by the SLOs. All maintenance activities are funded by general tax funds derived from a property tax levee for all individuals within the jurisdiction of the SLOs. Annual budgets for maintenance activities range from $3,000 to $6,000 per year. The Project has been approved by the SLOs, and is on the fiscal budget for implementation.

Costs for permits and licenses are not eligible for PL-566 funds. The financing for these have been or will be provided by the SLOs through their maintenance activities fund.

7.5 Operation, Maintenance, and Replacement

Operation includes the administration, management, and performance of non-maintenance actions needed to keep the structure safe and functioning as planned.

Maintenance includes performance of work, preventing deterioration of practices, and repairing damage or replacement of the structure if one or more of its components fail. Damages to a completed structure caused by normal deterioration, droughts, flooding caused by rainfall in excess of design rainfall, or vandalism are considered maintenance.

Measures in this plan will be operated and maintained by the SLOs, with the technical assistance from federal, state, and local agencies in accordance with their delegated authority. A specific O&M plan will be prepared using the NRCS National Operation and Maintenance Manual.

The SLOs' liability for O&M extends throughout the actual life of the structure, until the structure is modified to remove potential risk for loss of life and property or as may be required by federal, state, and local laws.

An O&M agreement will be developed before construction. The agreement will provide for inspections, reports, and procedures for performing the maintenance items. The agreement will include specific provisions for retention, use, and disposal of property acquired or improved with PL-566 assistance.

The structure is to be inspected annually by the SLOs on a regularly scheduled basis; during or immediately following the initial filling of a reservoir; and during or immediately following major storms, earthquakes, or other occurrences that may adversely affect the structure and appurtenant works. In addition, the State Dam Safety Agency requires that high hazard class (c) structures have formal inspections completed every three years by licensed engineers.

7.6 Emergency Action Plan

The SLOs are responsible for having an Emergency Action Plan (EAP) prepared prior to installation. The EAP will provide a notification flow chart, statement of purpose, project description, emergency detection, evaluation and classification, preparedness, breach inundation maps, and reviews. NRCS will provide technical data and assist the SLOs in preparing the EAP.

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APPENDIX A
TABLES

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Structural Data Table – Site No. 15[1]
Lyons Creek Watershed, Kansas

Item	Unit	Site No. 15
Class of structure		c
Seismic zone		2
Uncontrolled drainage area	square miles	4.22
Controlled drainage area	square miles	0
Total drainage area	square miles	4.22
Runoff curve No. (1-day) (AMC II)		78
Time of concentration (T_c)	hours	3.3
Elevation top dam	feet	1324.2
Elevation crest auxiliary spillway	feet	1316.0
Principal spillway crest elevation	feet	1302.0
Auxiliary spillway type		Vegetated
Auxiliary spillway bottom width	feet	200
Auxiliary spillway exit slope	percent	3.6
Maximum height of dam	feet	40
Volume of fill	cy	164,800
Total capacity	acre-feet	2,674.4
Sediment submerged	acre-feet	218.9
Sediment aerated	acre-feet	41.5
Floodwater retarding	acre-feet	1036.2
Surface area		
Sediment pool[2]	acres	43.7
Floodwater retarding pool[3]	acres	123.7
Principal spillway design		
Rainfall volume (1-day)	inches	7.9
Rainfall volume (10-day)	inches	12.7
Runoff volume (10-day)	inches	7.5
Capacity at auxiliary spillway crest elevation	cfs	102
Dimensions of conduit	inches	30
Type of conduit		Concrete
Frequency operation-emergency spillway	% chance	<1
Auxiliary spillway hydrograph		
Rainfall volume	inches	11.4
Runoff volume	inches	8.6
Storm duration[4]	hours	6
Velocity of flow (V_e)	feet/second	7.4
Maximum reservoir water surface elevation	feet	1319.1
Freeboard hydrograph		
Rainfall volume	inches	39.0
Runoff volume	inches	35.8
Storm duration[4]	hours	48
Maximum reservoir water surface elevation	feet	1324.2
Capacity equivalents		
Sediment volume	inches	1.16
Floodwater retarding volume	inches	4.61

[1]*Data complied: May 2006.*
[2]*Surface area at principal spillway crest elevation.*
[3]*Surface area at auxiliary spillway crest elevation.*
[4]*The more restrictive 48-hour duration was used for hydraulic evaluation.*

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APPENDIX B
Comments and Responses

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Ecological Services Office
2609 Anderson Avenue
Manhattan, Kansas 66502-2801

July 7, 2009

Ken Kuiper
NRCS
760 South Broadway
Salina, KS 67401-4604

RE: Lyons Creek WJD 41, Structure #15 FWS Tracking # 2009-FA-0582

Dear Mr. Kuiper:

This letter is in response to your request for information on federally threatened and endangered species and requirements under the Migratory Bird Treaty Act (MBTA) for use in your Environmental Assessment for the above structure, an earthen filled dam and impoundment.

This letter constitutes our comments pursuant to our authorities under the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.); section 404(b) of the Clean Water Act (33 U.S.C 1344); the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 *et seq*); the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*.); and executive orders 11990 (wetland protection) and 11988 (floodplain management).

Topeka Shiner and Stream Impacts

The site was initially sampled in1974 and documented the presence of Topeka shiners (*Notropis topeka*), federally listed as endangered, in the streams to be impounded. Subsequent sampling in the mid-1990s did not find Topeka shiners in the subject stream reaches. On July 6, 2006, Nate Davis, formerly with KDWP, reported that KDWP's sampling effort of the dam site area and downstream to the confluence with Lyons Creek did not identify any listed species, including the Topeka shiner. Surveys done in the mid-1990s also noted changes in the fish assemblage from those found in the 1974 survey. The surveys found large numbers of Centrarchids in the stream system likely due to escape from existing impoundments in the watershed. Research has found that Centrarchids are predators of native minnows and Topeka shiners, and that as the numbers of Centrarchids increase in a stream system, the numbers of native minnows, including Topeka shiners, decrease.

Although it is believed that Topeka shiners are extirpated from this stream reach at this time,

measures could be taken to return Topeka shiners to sites where they have historically been found. The construction of this structure will prevent Topeka shiners from utilizing upstream reaches and likely introduce more Centrarchids into downstream reaches. By pass structures or pass-through facilities to allow for Topeka shiner access and egress both upstream and downstream to aid in Topeka shiner recovery have been discussed in the past. However, there are several concerns about using such facilities for Topeka shiners. Instead we recommend that measures be implemented as part of the mitigation plan to prevent the escape of Centrarchids and other stocked fish into downstream reaches.

We recommend that the Kansas Stream Mitigation Guidance be used to determine the debits for stream impacts and the credits for proposed mitigation.

Erosion Control

We recommend that the EA discuss how the NRCS will control erosion and sediment originating from the project. Some fish may be killed by sediment discharged from projects. Fish sensitivity to suspended sediment varies by species and life stage however, larval fish and fish eggs are generally more susceptible to the effects of sediment than adult fish. Therefore, construction activities at all times within the stream, along the stream banks, and in areas that drain into the stream should not be allowed unless a comprehensive and effective erosion and sediment control plan is maintained throughout all phases of construction, including post-construction stabilization. Erosion controls should include on-land best management practices, such as mulching bare areas, properly maintaining silt fences, hay bales, or coir mats, and reseeding disturbed areas as-soon-as-possible. Good information on BMPs for erosion control can be found at
http://www.dot.ca.gov/hq/construc/stormwater/BMP_Field_Master_FullSize_Final-Jan03.pdf,
http://www.fws.gov/midwest/fisheries/streamcrossings/images/Stream%20Crossings_Master.pdf (starting on page 42), and
http://www.mainroads.qld.gov.au/web/AttachStore.nsf/allobjects/Road%20Drainage%20Design%20Manual%20-%20Chapter%205%20Erosion/$file/RDDM_Chapter5_Erosion.pdf. In addition, in-stream sediment controls should also be considered in sensitive areas or where upland erosion controls may not be adequate. These practices should be properly maintained for the life of the project. Before removing any in-stream structures, the accumulated silt should be carefully removed, so as not to disturb the natural substrate or vegetation of the stream and to prevent the downstream migration of sediments that have accumulated behind the structure.

Native Tallgrass Prairie

Other fish and wildlife resources will be impacted from the project as well. KDWP's letter dated February 10, 2006 stated that 53.6 acres of good quality native rangeland with a value of 402 habitat units would be lost to the impoundment. Native, unplowed grassland areas have been and are currently being disturbed, invaded by exotic and invasive plants, fragmented, and destroyed. Unplowed, native tallgrass prairie is unique and, for all practical purposes, irreplaceable on a national basis and in the ecoregion. Estimates of the amount remaining range from 10 percent to one percent. A host of native wildlife, including endemic grassland birds and migratory birds depends on this vanishing resource for areas to rest, feed, and reproduce. No

other group of North American birds have declined so steeply and over so large an area as has the grassland community. We note that in a letter from NRCS dated November 13, 2002, a recommendation was made to compensate this loss by reseeding the dam and construction area to a mixture of native warm season grasses and forbs. While this measure should be done to protect the dam and impoundment from sedimentation and erosion, we disagree that this is adequate to replace the lost habitat or that this measure by itself would generate 402 habitat units. Reseeding the dam and construction areas should not generate any habitat units because those areas are currently good quality native prairie. We recommend that 402 habitat units be replaced by converting non-native areas or restoring areas dominated by invasive species (e.g. cedar trees) to a tallgrass prairie community. Replacement of this habitat would provide the most value if it is situated in a similar setting to the lost habitat, that is land adjoining a stream. This replacement for native prairie habitat is separate from the compensatory mitigation for stream impacts and wetland impacts required by the Clean Water Act.

It appears that the habitat unit calculations did not include the 123.7 acres that would used as a temporary flood pool. The periodic flooding will change the plant community of the area. We expect that it would become dominated by annual plants and would no longer be good quality native grassland. Therefore, we recommend that the 123.7 acres be replaced in a similar manner as the native grassland that would be inundated by the permanent pool.

National Rivers Inventory

Lyons Creek is listed on the Nationwide Rivers Inventory (NRI). The cumulative effects of this project with other impoundments in the watershed have the potential to adversely affect the values for which Lyons Creek was listed on the NRI.

The NRI is a register of rivers that may be eligible for inclusion in the National Wild and Scenic River System. These rivers were included on the NRI based on the degree to which they are free-flowing, the degree to which the rivers and their corridors are undeveloped, and the outstanding natural and cultural characteristics of the rivers and their immediate environments. Section 5(d) of the National Wild and Scenic River Act (Public Law 90-542) requires that, "In all planning for the use and development of water and related land resources, consideration shall be given by all federal agencies involved to potential national wild, scenic and recreational river areas." In partial fulfillment of the section 5(d) requirements, the NPS has compiled and maintains the NRI.

A 42-mile long stretch of Lyons Creek between the Smoky Hill River and the railroad bridge south of Woodbine is listed on the NRI because of its scenic, recreational, fish, and wildlife values. Withholding of water to the stream system, changes in the hydroperiods, and changes to plants and animal communities are just a few of the expected effects of this and other impoundments. The EA should address how the proposed dam and impoundment may affect the characteristics for which Lyons Creek was listed and any measures to mitigate impacts to those characteristics.

- 3 -

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. Takings could result from projects in prairies, wetlands, stream and woodland habitats, and those that occur on bridges and other structures if swallow or phoebe nests are present. While the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Kansas occurs during the period of April 1 to July 15. However, some migratory birds are known to nest earlier than this (e.g., hawks and owls) and some later (e.g., goldfinches). If the proposed project appears likely to result in the take of migratory birds, I recommend a field survey during the nesting season of the affected habitats and structures to determine the presence of active nests. Our office should be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that you believe cannot be avoided temporally or spatially by the planned activities.

While the MBTA has no provision for allowing unauthorized take, the USFWS realizes that some birds may be killed during project construction and implementation even if all reasonable measures to protect them are used. The USFWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to minimize their impacts on migratory birds, and by encouraging others to enact such programs. It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without regard for their actions or without following recommendations to avoid take. Adhering to our recommendations for replacement of the unplowed, native tallgrass prairie would show a commitment to conservation measures for migratory birds.

Invasive Species

Invasive species have been identified as a major factor in the decline of native flora and fauna and impact aquatic resources. Executive order 13112 Section 2 (3) directs Federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere and to ensure that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions. Tools to perform Hazard Analysis and Critical Control Points (HACCP) planning for invasive species control are available at http://haccp-nrm.org/. HACCP planning focuses attention on critical control points where non-target species can be removed. Documenting risks and methods used to remove non target species gives managers a strategic method to make consistent decisions based on identified risks. Planning builds a logical framework of information to weigh risks for species spread against management benefits. Human actions are the primary means of invasive species introductions. Prevention of introductions is the first and most cost-effective option for dealing with invasive species. The EA should discuss the measures NRCS will take to comply with Executive Order 13112 and prevent invasive species transfers.

- 4 -

Thank you for the opportunity to comment on this project. If you have any questions, please contact me or Susan Blackford of my staff at (785) 539-3474.

Sincerely,

Mike LeValley

Mike LeValley
Field Supervisor

cc: EPA, Kansas City, KS (Wetland Protection Section)
KDWP, Pratt, KS (Environmental Services)
KDHE, Topeka, KS (Bureau of Water)

MJL/shb

- 5 -

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FROM: **DAVIS, NATE [MAILTO:NATED@WP.STATE.KS.US]**
SENT: **THURSDAY, JULY 06, 2006 11:14 PM**
TO: **KREHBIEL, DEAN - SALINA, KS**
CC: **SUSAN BLACKFORD; MIKE LEVALLEY; WOODWARD, DEBRA K NWK**
SUBJECT: **LYON'S CR. SITE 15, PROPOSED PL566 STRUCTURE: FISH SAMPLING**

We sampled the dam site and the reach below the proposed dam along HWY 77 down to the confluence with Lyon's Creek in Morris County. Very little water was in 2 1/2 mile reach of the stream. The most water was in the proposed lake and very near the confluence w/Lyon's Creek. No Topeka shiners were found and habitat was generally unsuitable for the species.

Although the Topeka shiner was found at this location in 1974; the site as it currently exists is unsuitable likely due to livestock access and 20 give or take 1 or 2 small stock ponds found in the watershed above the site (I counted them off 2004 FSA aerials). These stock ponds are likely supplementing the stream with Centrarchid species. Spring &/or stream flow may have been diminished over time as well as the stream only had a few small isolated shallow pools. Substrate is thick mud/grit with some cobble/gravel mixed in. Pools were less than 2' in depth & only 3 pools existed in the reach above the HWY, of which we seined 2 (the other was had too much woody debris). Fish communtiy was dominated by Fathead minnows, Red shiners, Centrarchids (5 spp in abundance: Bluegill, Orangespot SF, Largemouth Bass, Green SF, Longear SF). Other species included Yellow Bullhead, Bluntnose minnow, & Redfin shiner

We scouted the area for approximately 1/2 stream mile below HWY 77 & only one pool had enough depth to seine. Similar species were found as above the HWY, along w/a large number of Bullfrogs & Crawfish.

We scouted the stream approximately 1.5 miles downstream of the bridge. No pools were available to seine.

We sampled the stream approximately 0.2 a mile upstream from the confluence with Lyon's Creek. The fish community was drastically different in composition, being dominated by juvinal White suckers, Redfin shiners, Red shiners. Other species collected included Johnny Darter, Centrarchids (LESF, OSSF), Bullhead minnow. Seining was difficult due to the large amount of woody debris.

No state or federally listed species should be impacted by the project; however, we strongly recommend the mitigation of stream channel and terrestrial habitat impacted by the construction and impoundment of water. We would like to sample the stream again following construction to see if any changes occur in hydrology & fish community to the stream.

Thanks

Nate Davis
Aquatic Ecologist
KDWP, Environmental Services Section
nated@wp.state.ks.us
Phone: (620) 672-5911 ext 195
Fax: (620) 672-2972

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KANSAS

DEPARTMENT OF WILDLIFE AND PARKS KATHLEEN SEBELIUS, GOVERNOR

Febuary 10, 2006

Track: 20010261
MR
Ref: D1.0402
Lyon's Creek WJD #41
Site #15

Mr. Dean Krehbiel
Natural Resources Conservation Service
760 South Broadway
Salina, KS 67401-4604

Dear Mr. Krehbiel,

Thank you and the Lyon's Creek WJD #41 for inviting us to participate in a site visit on January 9, 2005 at flood detention structure Site 15, a proposed dam and 41 acre permanent pool located in the NW/4 7-15-5, Morris County, KS. Please accept the following comments related to the development on an Environmental Assessment for the proposed structure. The project was reviewed for potential impacts on crucial wildlife habitats, current state-listed threatened and endangered wildlife species, and public recreation areas for which this agency has some administrative authority.

Lyon's Creek watershed (including WJD #41) contains populations of the state and federally listed Topeka Shiner (*Notropis topeka*). The species was documented at site 15 in 1974; however, sampling in the mid-1990's failed to relocate the species. It was noted during surveys from the mid-1990's that community changes in the fish assemblage had occurred since the survey in 1974, and that large numbers of Centrarchids (Largemouth Bass, Green Sunfish, Bluegill) and Black Bullheads were present in these latest surveys. The site was retained in supplemental agreement #5 (Feb., 2004) through informal consultation with the USFWS, NRCS, KDWP, and Lyon's Creek WJD #41.

Impoundments significantly impacts lotic ecosystems by altering hydrology and subsequently fluvial geomorphology. Biological community assemblages shift both up and downstream of impoundments as habitat changes occur. Fish migration is obstructed and recolonization of upstream reaches ceases. Interspecific competition and predation by fish that thrive in impoundments, primarily Centrarchids and *Ameiurus spp*. (bullheads), typically cause shifts in community assemblages with decreases in species diversity or extirpation of native Cyprinids. Approximately 12, 580 feet of channel exists from the downstream portion of the proposed dam to the stream's confluence with Lyon's Creek. Only general comments on fish community assemblage has been produced for site 15, specifically the reference to a general increase in abundance of predaceous fish and the absence of Topeka shiners since the sample effort in 1974. We do not know if the reach below site 15 has been sampled. We (KDWP) would like to conduct sampling in the downstream reach in order to document the fish community prior to

impoundment and ask NRCS to facilitate private land access in cooperation with the watershed district board of directors.

Alternatives may be available for flood control other than a dam with permanent pool. We recommend NRCS continue to evaluate all suitable alternatives such as, dry dams, flood plain easements, flood plain levees, wetland restoration, etc. Altering the management and/or landuse in the flood prone area to reduce damages would certainly be less environmentally impacting than an impoundment, and we recommend NRCS evaluate the economic and social potential as well.

Habitat assessments at the site in 2002 identified 402 HUs of native rangeland (53.6 acres, R=7.5) and 4,400 feet of intermittent stream channel (R=4.7). These values should be verified for accuracy based on the modifications to the pool size. If a dam and permanent pool is pursued by WJD #41, a compensatory mitigation plan should be incorporated that mitigates all lost habitats in accordance with the National Environmental Policy Act and the National Wetlands Mitigation Action Plan. Specifically, native prairie should be reestablished to offset all habitat units, and stream channel restoration should be implemented to offset the loss of stream channel. In accordance with the NWMAP, preservation of existing habitats as mitigation should only be used if a reasonable threat to the resource is demonstrated. Some recommendations for stream mitigation include:

1. Dam removal (concrete low-heads/earthen)

2. Restoration of riffle-pool sequencing in previously channelized streams

3. Restoration of stream channel through alteration of land management practices. For example, exclusion of livestock from stream reaches that are currently degraded.

4. Bank stabilization in highly erodable areas

5. Restoration of wetlands or other special aquatic sites

Please contact us at your convenience to coordinate sampling efforts in the tributary. Sampling in spring or early summer would be preferred. In addition, we would like to review and comment on mitigation if the site is pursued.

No Department of Wildlife and Parks permits or special authorizations are required. Because the Department's recreational land obligations, state threatened and endangered species list and critical habitat designations periodically change; if construction has not started within one year of the date of this review, or if design changes are made in the project plans, the project sponsor must contact this office to verify continued applicability of this review assessment. For our purposes, we consider construction started when advertisements for bids are distributed.

Thank you for the opportunity to provide these comments and recommendations.

Sincerely,

Nate Davis, Aquatic Ecologist
Environmental Services Section

xc: KDWP Reg FW Sup, Swan

KDWP Dist Bio, McFadden

KBS, Liechti

KDHE, Mueldener

SCC, Greene

USFWS, LeValley

USEPA, Mulder

WJD #41, George Poland

COE, Woodward

Pratt Operations Office

512 SE 25th Ave., Pratt, KS 67124-8174

Phone 620-672-5911 Fax 620-672-6020 www.kdwp.state.ks.us

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APPENDIX C
Support Maps

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Figure 1

Lyons Creek Watershed Site No. 15
Inundation Map

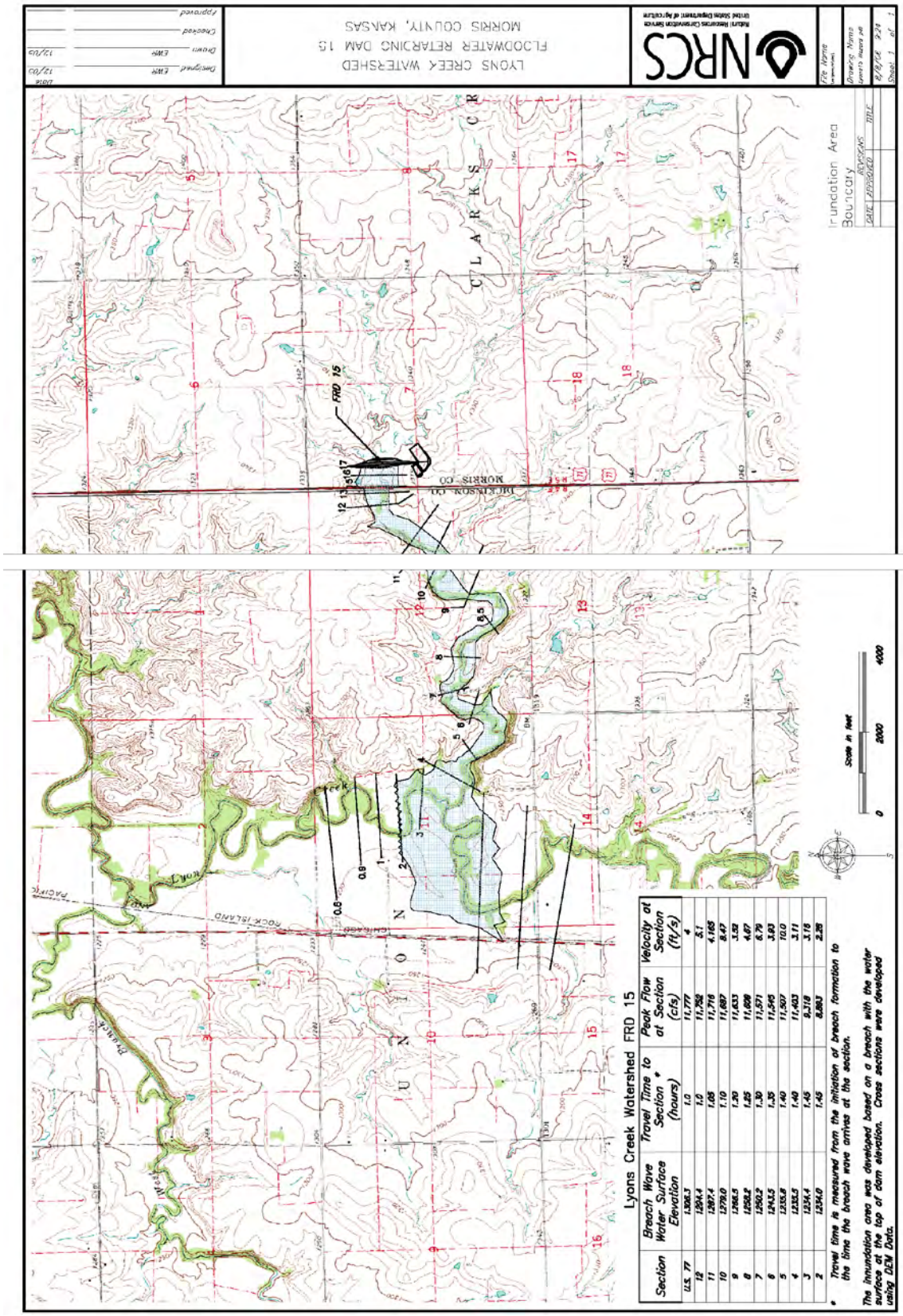

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Figure 2

Lyons Creek Watershed Site No. 15
Current Land Use

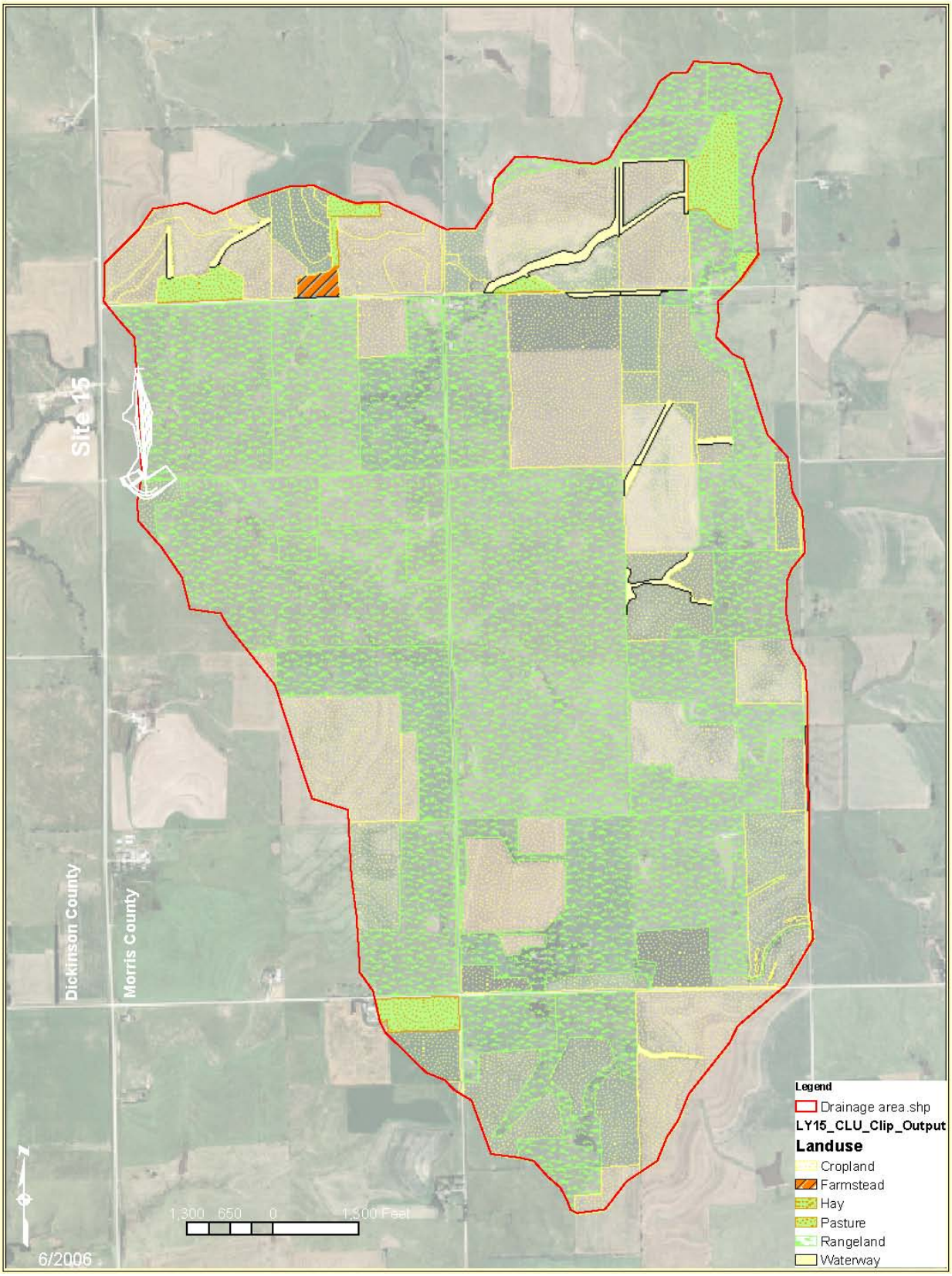

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Figure 3

Lyons Creek Watershed Site No. 15
Highly Erodible Classification

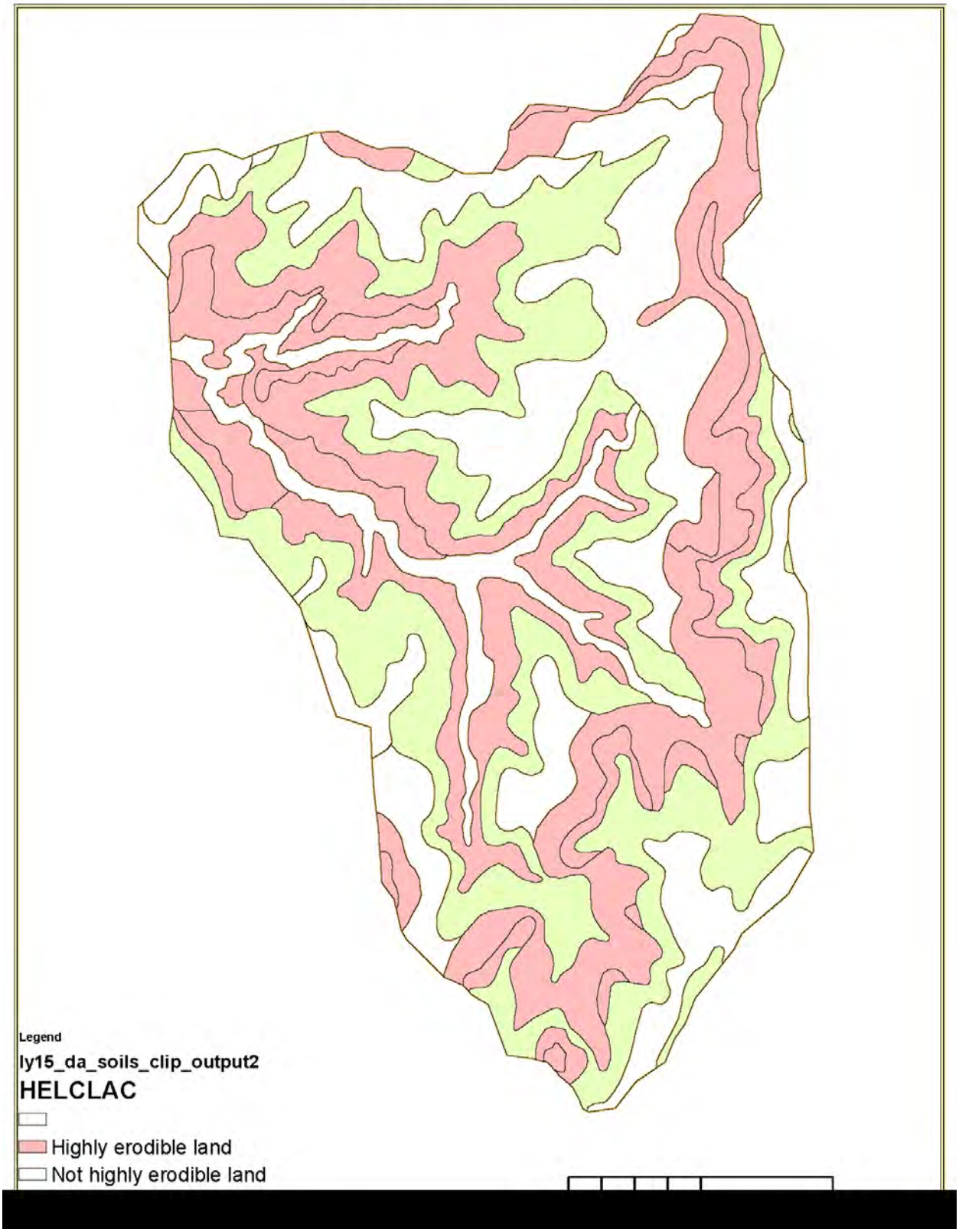

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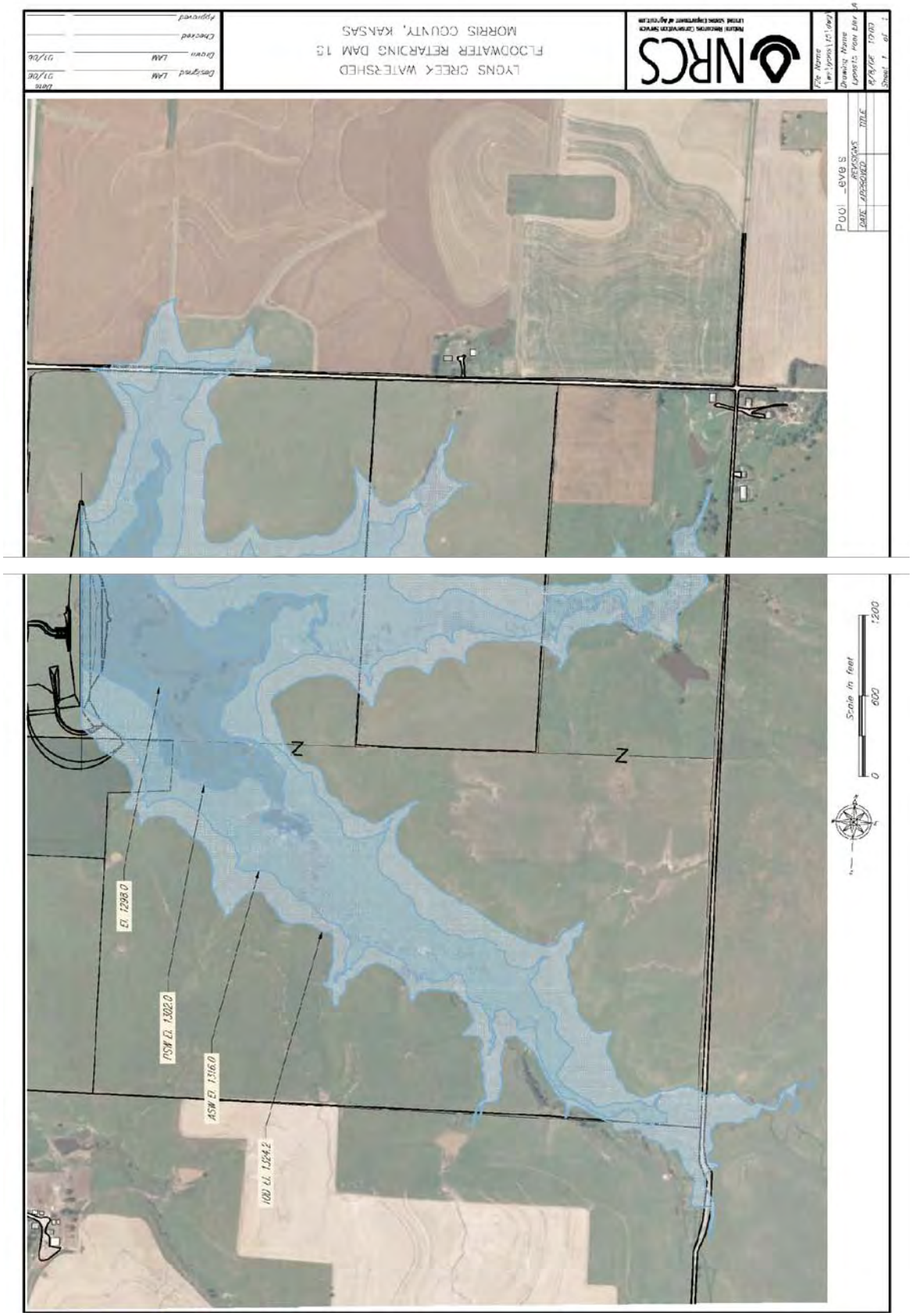
Figure 4

Lyons Creek Watershed Site No. 15
Pool Elevations



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APPENDIX D
Investigation and Analysis Report

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SECTION 1 – SEDIMENTATION

The sediment storage capacity of the dam is the volume that would be required to contain 100 years of sediment inflow into the pool area. The sedimentation rate was based on the topography of the watershed upstream of the dam and the type of soil and land use in the watershed.

Sediment is deposited below the principal spillway crest (submerged) and above the principal spillway crest (aerated). The capacity of the reservoir above the principal spillway crest includes volume for the aerated sediment plus flood detention. The estimated sediment volume coming into the reservoir is 258 acre-feet over the 100-year life of the structure. Approximately 42 acre-feet of this volume will be stored above the principal spillway crest. In addition to this, additional sediment storage volume will be made available by the material excavated from the pool area to construct the embankment. When the sediment level reaches the principal spillway crest, no permanent water will exist, but the dam will continue to provide flood detention. The rate of sediment deposition will decrease significantly at that time, as the water will be detained for less than 10 days. More of the fine soil particles will flush through the principal spillway rather than settling out. If no credit is given to the additional available sediment volume from the borrow area and no decrease in the rate of sediment deposition is accounted for 200 years past construction, then 75 percent of the original flood detention volume would still be provided. The chance of flow through the auxiliary spillway would increase from the designed 1 percent chance to a 2 percent chance occurrence in any one year. This would not represent a significant increase in risk to the integrity of the structure.

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SECTION 2 – BREACH ROUTING ANALYSIS

The dam site is approximately 500 feet upstream of K-77. This highway is considered a major highway because it has a traffic count of over 2,600 vehicles per day according to the Kansas Department of Transportation highway traffic count map. The Hydrologic Engineering Center - River Analysis System one-dimensional computer program by the USACE was used to determine the stage discharge capacity of the channel sections downstream of the dam and the flow over K-77 and through the culvert that passes under the highway. This data was then used in the NRCS SITES computer program along with the breach discharge hydrograph to route the flood wave, treating the highway embankment as a dam with the culvert acting as a principal spillway and the roadbed as an auxiliary spillway. The dimensions of the culvert, roadway, and immediately adjacent sections were taken from Kansas Department of Transportation design data. Other section data was taken from USGS digital elevation models.

This analysis indicated that in the event of a breach of this structure, K-77 will be flooded for approximately 1.7 hours at a maximum depth of 3.3 feet. Due to the close proximity of the dam to the highway, there would be little advance warning at the highway in the event of a breach of the dam. This factor combined with the depth of flow of water over the highway and the high traffic volume carried by the highway causes this dam to be classified as a high hazard structure.

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SECTION 3 – AGENCY COORDINATION

U.S. Army Corps of Engineers
El Dorado Project Office

U.S. Fish and Wildlife Service
Region 6, Kansas

U.S. Environmental Protection Agency
Region 7

Kansas Water Office
Topeka

Kansas State Conservation Commission
Topeka

State Association of Kansas Watersheds
Chapman

Kansas Department of Agriculture, Division of Water Resources
Topeka

Kansas Department of Wildlife and Parks
Field Operations, Pratt

Kansas Department of Health and Environment
Topeka

Kansas Forest Service
Manhattan

Kansas State Historic Preservation Office
Topeka

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SECTION 4 - ENVIRONMENTAL EVALUATION

USDA
NRCS

Environmental Effects for Conservation Planning

KS-CPA-52
5/04

Environmental Effects for Conservation Planning	**A. Client (name/address):** Lyons Creek Watershed Joint District No. 41
	B. Plan ID Number (as applicable):
	C. Fields/Legal Description (as applicable): Section 7, Township 15 south, Range 5 east
D. Client's Objective(s): Reduce flooding, flood damage to crops and cropland, and reduce scour erosion on tributary to Lyons Creek and floodplain of Lyons Creek	**E. Proposed Action(s)** Install one floodwater retarding structure, Site No. 15

F. Resource Considerations	H. Alternatives and Effects					
	No Action		Alternative 1		Alternative 2	
Check preferred alternative	○		●		○	
Effects	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
SOIL						
Erosion						
Scour	NO EFFECT	NO EFFECT	moderate decrease	moderate decrease		
Sheet and Rill	NO EFFECT	NO EFFECT	slight decrease	slight decrease		
Condition						
WATER						
Quantity						
Flooding/Flood Damage	NO EFFECT	NO EFFECT	significant decrease	significant decrease		
Quality						
AIR						
Quality						
PLANTS						
Condition						
ANIMALS						
Fish and Wildlife						
Domestic Animals						

USDA
NRCS

Environmental Effects for Conservation Planning

KS-CPA-52
Page 2

G. Economic and Social Considerations	I. Effects					
	No Action		Alternative 1		Alternative 2	
Effects	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
Land Use	NO EFFECT	NO EFFECT	slight decrease	slight increase		
Capital	NO EFFECT	NO EFFECT	Not Applicable	To Be Determined		
Labor	NO EFFECT	NO EFFECT	slight increase	slight increase		
Management Level	NO EFFECT	NO EFFECT	slight increase	moderate increase		
Profitability	slight decrease	slight decrease	slight increase	moderate increase		
Risk	slight increase	slight increase	moderate decrease	moderate decrease		

COMPLIANCE WITH APPLICABLE FEDERAL LAWS AND EXECUTIVE ORDERS
(National Environmental Policy Act [NEPA] planning requirements for resource issues)

Attach appropriate effects help sheet as needed to clarify special environmental concerns

J. Special Environmental Concerns (See Evaluation Procedure Guide Sheets)	K. Effects		
	No Action	Alternative 1	Alternative 2
Cultural Resources	No Effect	No Effect-see documentation	
Threatened and Endangered Species	No Effect	No Effect-see documentation	
Environmental Justice	Not Applicable	No Effect-see documentation	
Fish and Wildlife Coordination Act	Not Applicable	No Effect-see documentation	
Floodplain Management	Not Applicable	No Effect-see documentation	
Invasive Species	No Effect	No Effect	
Migratory Birds	No Effect	No Effect-see documentation	
Natural Areas	Not Applicable	Not Applicable	
Prime and Unique Farmlands	No Effect	See Attached Documentation	
Riparian Area	No Effect	See Attached Documentation	
Scenic Beauty	Not Applicable	Not Applicable	
Waters of US/Clean Water Act	No Effect	See Attached Documentation	
Wetland	No Effect	No Effect-see documentation	
Wild and Scenic River	Not Applicable	No Effect-see documentation	

USDA
NRCS

Environmental Effects for Conservation Planning

KS-CPA-52
Page 3

L. Easements, permissions, or permits:

Land rights are acquired for installation of Site No. 15, obtained by Lyons Creek Watershed District; U.S. Army Corps of Engineers Clean Water Act, Section 404 Permit needed prior to installation; Section 401, CWA Water Quality Certification authorized by the Kansas Department of Health and Environment; Kansas Department of Agriculture, Division of Water Resources Permit will be required to install Site No. 15.

M. Mitigation/Best Management Practices:

Mitigation plan required to offset adverse environmental impacts. Plan will offset stream habitat lost from installation of impoundment.

N. The information recorded above is based on the best available information.

Signature */s/ Dean Krehbiel* Title Resource Conservationist Date July 2009

O. Agencies, persons, and references consulted:

Kansas Department of Wildlife and Parks, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Kansas Forest Service, Kansas Department of Health and Environment, U.S. Army Corps of Engineers, Kansas State Historical Society

P. Findings	**I have considered the effects of this action and the alternatives on the Resource, Economic, and Social Considerations; the Special Environmental Concerns; and the extraordinary circumstances criteria in the Instructions for Form KS-CPA-52. I find, for the reasons stated in (Q) below, that the preferred alternative:**		
Check one	NEPA review identified	NEPA action required	NEPA reference documentation
	is **not a federal action.**	No additional analysis is required.	National Environmental Compliance Handbook Part 610.21
	is **categorically excluded** from further environmental analysis and there are **no extraordinary circumstances.**	No additional analysis is required.	National Environmental Compliance Handbook Part 610.22
	has been sufficiently analyzed in an existing NRCS environment document.	No additional analysis is required.	
x	may require preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS).	The action will be referred to the state office.	

Q. Rationale supporting the finding:

Refer to the Original Lyons Creek Watershed Work Plan (as supplemented) and Supplemental Watershed Plan No. 6 and Environmental Assessment for complete analysis.

R.

/s/ Dean Krehbiel Resource Conservationist Jul-09

Signature Title Date

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SECTION 5 - ALTERNATIVE EVALUATION

	Future Without Federal Project (No-Action)		Structural Alternative (Project)	
Alternative Description	No Project activity. Ongoing programs to address local resource concerns only.		Installation of Site No. 15, as a high hazard dam, to reduce flood damage, control flooding, and reduce risk to life and property.	
Environmental Effects	**Short-Term Effects**	**Long-Term Effects**	**Short-Term Effects**	**Long-Term Effects**
Flood Damage	Minor effect	Only limited flood damage reduction and no flood control would be gained through the ongoing program.	Minor effect during construction	Flood control benefits gained in this Project area due to the floodwater reduction of all flood events up to the PMP event.
Erosion Damage	No effect	Continued sediment transport and delivery to Lyons Creek, scour erosion will continue to occur.	Minor effect during construction	Structure will provide a sediment storage function as sediment rich water will not be transported downstream from stormwater runoff events. Scour erosion will be significantly reduced on cropland.
Endangered and Threatened Species	No effect	No effect	Minor noise/ sediment disturbance during construction	Not likely to adversely affect; concurrence received from USFWS.
Fish and Wildlife Resources	No effect	No effect	Minor disturbance during construction	Loss of lotic stream system, aquatic habitat, and wildlife resources at and below impoundment. These impacts will be mitigated through compensation of lost habitat units. Creation of 21 acres of permanent water will be used by migratory waterfowl species.
Floodplain Management	No effect	No effect	Likely no effect during construction	Flood prone areas immediately below site will be protected to the probable maximum precipitation rainfall event. Site adds flood protection to the Lyons Creek floodplain. No land use changes are expected.
Historic, Cultural, and Scientific Resources	No effect	No effect	Likely no effect during construction	Kansas SHPO - the landscape and other factors indicate that it is very unlikely that any cultural resources are present.
Migratory Birds	No effect	No effect	Potential minor disturbance during construction	Creation of permanent shoreline areas, nesting opportunities for migratory waterfowl, and potential use areas for transient species.
Other Social Effects	Minor effect	Flood damages will continue to affect cropland and crops.	Minor effect during construction	Flood damage reduction will increase crop production, protect valuable topsoil from scouring, and protect roads and bridges.
Prime and Unique Farmlands	No effect	No effect	Minor effect during construction	Loss of 23 acres farmlands of statewide importance to impounded water and placement of fill.
Public Health and Safety	No effect	No effect	Minor effect during construction	K-77 will be protected from breach wave overtopping.
Riparian Areas	No effect	No effect	Disturbance during construction	Loss of approximately 16 acres herbaceous riparian areas associated with project installation.
Waters of the U.S./Wetlands	No effect	No effect	Disturbance during construction	Loss of existing stream function and value at the Project impact area.
Wild and Scenic Rivers	No effect	No effect	Negligible reduction in flooding.	Negligible reduction in flooding frequency and duration.

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APPENDIX E
Supporting Information

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LIST OF PREPARERS

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B.S. Civil Engineering; M.S. Civil Engineering, Kansas State University

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B.A. Economics, University of Montana

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B. S. Agriculture Engineer, Kansas State University

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B.S. Agricultural Engineer, Kansas State University

R. Dean Krehbiel, Resource Conservationist, Natural Resources Conservation Service, Salina, Kansas
Resource Conservationist, Ecological Sciences Staff, 1 year; Watershed Planning Specialist, 5 years, NRCS; District Conservationist, 4 years, NRCS; Soil Conservationist, 2.5 years, NRCS; Soil Conservation Technician, 1.5 years, NRCS
B.S. Biology (Wildlife Management), Fort Hays State University

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REFERENCES

Watershed Work Plan, Lyons Creek Watershed: Dickinson, Geary, Marion, and Morris Counties, March 1967.

U.S. Department of Agriculture, Natural Resources Conservation Service, National Watershed Manual, Second Edition, 1992.

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U.S. Department of Agriculture, Natural Resources Conservation Service, Technical Releases:
- TR-210-5 - Structural Design of Underground Conduits
- TR-210-18 - Computation of Joint Extensibility Requirements
- TR-210-20 - Computer Program for Project Formulation Hydrology
- TR-210-30 - Structural Design of Standard Covered Risers (including Notice TR 30-1)
- TR-210-48 - SITES Water Resource Site Analysis Computer Program User's Guide
- TR-210-60 - Earth Dams and Reservoirs
- TR-210-66 - Simplified Dam-Breach Routing Procedure (third edition)
- TR-210-69 - Riprap for Slope Protection Against Wave Action

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U.S. Department of Agriculture, Natural Resources Conservation Service, National Biology Manual, July 2003.

Kansas Department of Agriculture, Division of Water Resources, Engineering Guide -1 (EG-1) and Engineering Guide – 2m (EG-2).

Sediment Yields from Small Drainage Areas in Kansas, Bulletin Number 16, The Kansas Water Resources Board, 1971.

U.S. Department of Interior, National Park Service, National Center for Recreation and Conservation, Nationwide Rivers Inventory: www.nps.gov/ncrc/programs/rtca/nri/index.html

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CULTURAL RESOURCE ASSESSMENT

KANSAS
STATE
HISTORICAL
SOCIETY

Cultural Resources
Historic Preservation
Office (ext. 240)

6425 S.W. 6th Avenue
Topeka, Kansas
66615-1099
PHONE# (913) 272-8681
FAX# (913) 272-8682
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KANSAS HISTORY CENTER

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

November 7, 2001

Tomas M. Dominguez, State Conservationist
Natural Resources Conservation Service
760 South Broadway
Salina, Kansas 67401

Attn: Kenneth F. Sherraden, Cultural Resources Coordinator

Re: Phase II completed; Clearance recommended for Lyon Creek Watershed Structure 15-15A located in Dickinson County, Kansas.

Dear Sir:

This is to inform you that we have received the Cultural Resource Evaluation report submitted by the Archeology Office of the Kansas State Historical Society with regard to the above referenced project. All recommended cultural resource investigations and staff review have now been completed. We find that the proposed project will have no effect as described in 36 CFR 800.5 on any cultural resources listed in or eligible for listing on the National Register of Historic Places or the State Register.

Sincerely yours,

Ramon Powers
State Historic Preservation Officer

Richard Pankratz

Richard Pankratz, Director
Historic Preservation Office

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ACRONYMS, ABBREVIATIONS, AND SHORT FORMS

CD	**Conservation District**
CEQ	**Council on Environmental Quality**
CFR	**Code of Federal Regulations**
cfs	**cubic feet per second**
CRA	**Common Resource Area**
CRP	**Conservation Reserve Program**
CWA	**Clean Water Act**
DWR	**Division of Water Resources**
EA	**Environmental Assessment**
EAP	**Emergency Action Plan**
eFOTG	**Electronic Field Office Technical Guide**
EPA	**U.S. Environmental Protection Agency**
ERS	**Economic Research Service**
et seq.	***et sequentia* (and the following)**
FEMA	**Federal Emergency Management Agency**
FPPA	**Farmland Protection Policy Act**
FR	**Federal Register**
FSA	**Farm Service Agency**
GRP	**Grassland Reserve Program**
HEC-RAS	**Hydrologic Engineering Centers River Analysis System**
HEL	**Highly Erodible Land**
KDHE	**Kansas Department of Health and Environment**
KDWP	**Kansas Department of Wildlife and Parks**
KSMG	**Kansas Stream Mitigation Guidance**
MLRA	**Major Land Resource Area**
NAVD88	**North American Vertical Datum of 1988**
NED	**National Economic Development**
NEPA	**National Environmental Policy Act of 1969**
NFIP	**National Flood Insurance Program**
NGVD29	**National Geodetic Vertical Datum of 1929**

NPDES	**National Pollutant Discharge Elimination System**
NRCS	**Natural Resources Conservation Service**
NWM	**National Watershed Manual**
O&M	**Operation and Maintenance**
P&G	**Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (NRCS, March 10, 1983)**
PMP	**Probable Maximum Precipitation**
POW	**Watershed Plan of Work: [Lyons Creek Watershed, Dickinson, Geary, Marion, and Morris Counties, Kansas, 1967 (as supplemented)]**
Project	**Lyons Creek Watershed Site No. 15**
RCB	**Reinforced Concrete Box**
RCP	**Reinforced Concrete Pipe**
RCPP	**Reinforced Concrete Pressure Pipe**
SHPO	**State Historic Preservation Officer**
SLOs	**Sponsoring Local Organizations**
State	**State of Kansas**
T&E	**Threatened and Endangered**
TMDLs	**Total Maximum Daily Loads**
TR	**Technical Release**
USACE	**U.S. Army Corps of Engineers**
U.S.C.	**United States Code**
USDA	**U.S. Department of Agriculture**
USFWS	**U.S. Fish and Wildlife Service**
WRP	**Wetlands Reserve Program**

APPENDIX F
Project Map

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Figure 1

Lyons Creek Watershed Site No. 15
Location Map and Drainage Area

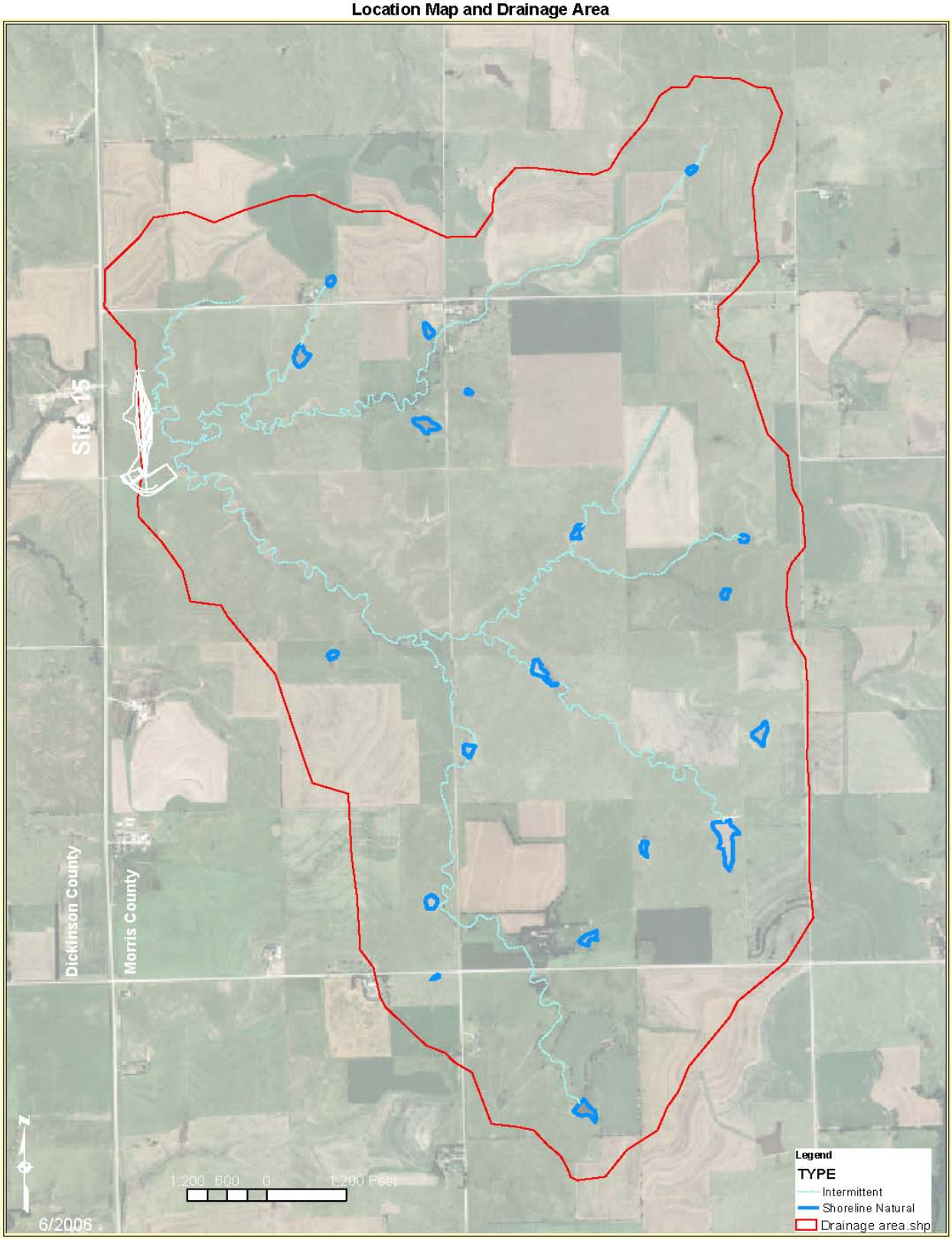

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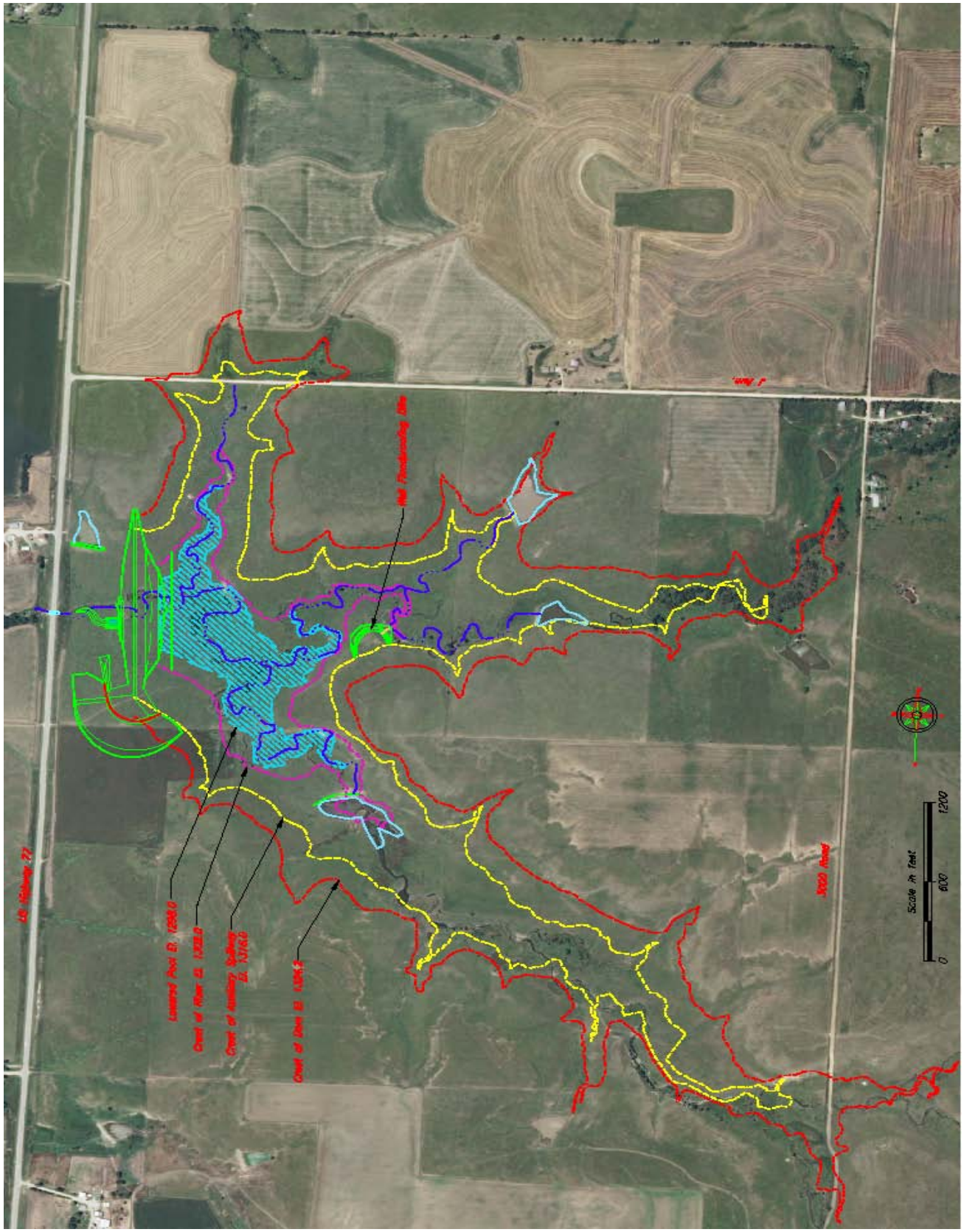
Figure 2

Pool Elevations