Photo Courtesy of Richie Kessler, The Nature Conservancy

KENTUCKY GREEN RIVER

Conservation Reserve Enhancement Program

DRAFT

Programmatic Environmental Assessment

U.S. Department of Agriculture, Farm Service Agency

August 2006

USDA

Abstract

Mandated Action: The U.S. Department of Agriculture, Commodity Credit Corporation (USDA/CCC) and the Commonwealth of Kentucky have agreed to implement the Kentucky Conservation Reserve Enhancement Program (CREP), a component of the national Conservation Reserve Program (CRP). CREP is a voluntary program for agricultural landowners.

USDA is authorized by the provisions of the Food Security Act of 1985, as amended (1985 Act) (16 U.S.C. 3830 *et seq*.), and its regulations at 7 CFR Part 1410. In accordance with the 1985 Act, USDA/CCC is seeking authorization to enroll lands into CREP through December 31, 2007.

Type of Document: Programmatic Environmental Assessment

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The *Kentucky Conservation Reserve Enhancement Program Programmatic Environmental Assessment* has been prepared pursuant to the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321-4347); the Council on Environmental Quality regulations (40 CFR Parts 1500-1508); USDA-Farm Service Agency draft environmental regulations (7 CFR Part 799.4, Subpart G); and USDA-Farm Service Agency *1-EQ, Revision 1, Environmental Quality Programs*, dated November 19, 2004.

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Cover photo courtesy of Dr. Richie Kessler, The Nature Conservancy. A relatively undisturbed bend in the Green River winding through Hart County, Kentucky.

The Kentucky Green River CREP Partners

Without the continued collaborative efforts of its Partners, the Kentucky Green River CREP and the sustainability of the Green River Watershed could not be accomplished—

USDA Farm Service Agency

USDA Natural Resources Conservation Service

The Office of the Governor of the Commonwealth of Kentucky

Kentucky General Assembly

Kentucky State Nature Preserves Commission

Kentucky Soil and Water Conservation Commission

Kentucky Division of Conservation

Kentucky Division of Forestry

Kentucky Division of Water

Kentucky Department of Fish and Wildlife Resources

The Nature Conservancy

National Park Service, Mammoth National Park

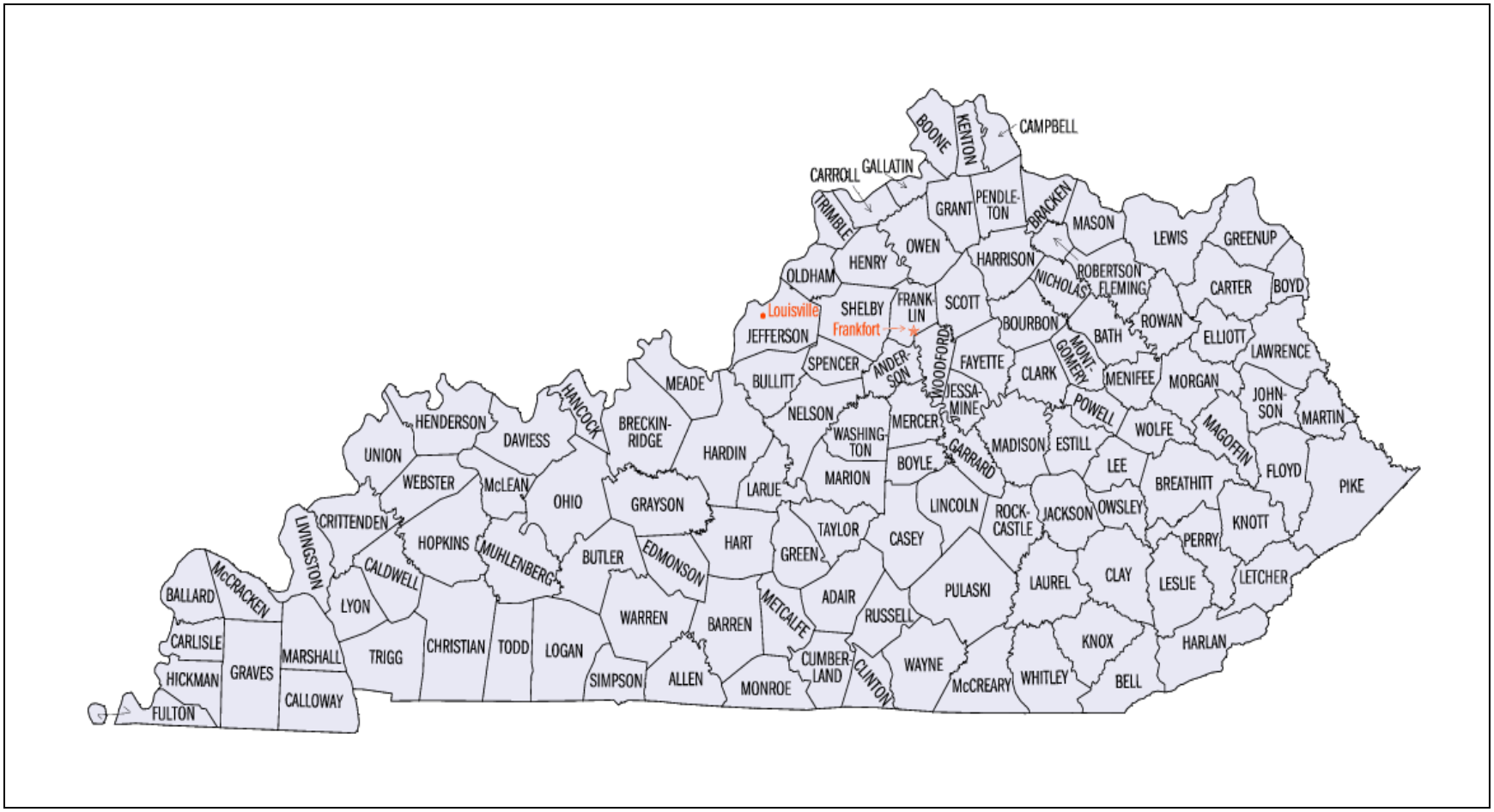
Kentucky Soil and Water Conservation Districts

U.S. Army Corps of Engineers

U.S. Environmental Protection Agency

Campbellsville University

Western Kentucky University



KENTUCKY COUNTIES

EXECUTIVE SUMMARY

The Green River is the most biologically diverse and rich branch of the Ohio River system. The greatest aquatic diversity occurs in a 100-mile stretch of unhindered river that flows from the Green River Reservoir dam through Mammoth Cave National Park (NP), the world's longest and most diverse cave systems in south-central Kentucky. This section of the Green River Watershed includes 917,197 acres in Adair, Barren, Edmonson, Green, Hart, Metcalfe, Russell and Taylor Counties, Kentucky.

The USDA Farm Service Agency, as lead Federal agency for administering the Conservation Reserve Enhancement Program (CREP), proposes improvements to the Kentucky Green River CREP that involve expanding the existing area by 28,904 acres to encompass a total of 946,101 acres. This proposed expansion would include all or parts of Allen, Butler, Edmonson, Grayson, Logan, Simpson and Warren Counties, and would add environmentally significant watersheds to encompass the entire Upper Green River Basin with the exception of the watersheds that lie above the U.S. Army Corps of Engineers' reservoirs.

The Kentucky Green River CREP was initially approved as a 100,000-acre and $110 million program, with the Federal government contributing $88 million, the Commonwealth of Kentucky contributing $17 million, and The Nature Conservancy contributing $5 million over 15 years.[1] However, in Fiscal Year 2002, Congress shifted $490,000 to the Farmland Protection Program for a farm along Green River in the CREP area. This diversion of funds resulted in limiting the land available for the Green River CREP to 99,500 acres and it reduced the program's funding to $109,510,000. Subsequently, USDA's share was reduced to $87,510,000. With only 10,813.3 acres currently enrolled in the program, no change or increase in acreage for enrollment into the program above the 99,500 acres is proposed.

The objectives of the Kentucky Green River CREP are to—

- Reduce by 10 percent the amount of sediment, pesticides, and nutrients from agricultural sources entering the tributaries and mainstem of the Green River and Mammoth Cave system. This would be accomplished through the installation of BMPs designed for that purpose and other conservation practices designed to improve water quality, such as re-establishing riparian buffers around sinkholes and along high-priority streams;
- Enhance habitat and populations of wildlife, including State and federally threatened and endangered species, species of special concern, and rare species, and measure success of this objective by reducing the need to list additional species as threatened and endangered;
- Sustain and restore the composition, structure, and function of riparian corridors associated with the Green River and its tributaries, targeting 28,000 acres that include buffers around sinkholes;
- Reconnect habitat types to restore the full range of the ecological system;
- Establish buffers around sinkholes, targeting 1,000 high priority sinkholes;
- Sustain and restore non-riparian wetlands, targeting 3,000 acres (riparian and non-riparian wetlands);
- Protect and restore subterranean ecosystems;

[1] USDA-Farm Service Agency. "Questions and Answers-Kentucky CREP." Release No. 1653.01, p. 3, question 8.

- Collect, store and analyze data to enhance planning for sustaining the health of the watershed; and
- Develop an outreach program targeting all active agricultural producers in the area.

The purpose of the proposed action is to provide protection to the Green River basin resources by including environmentally sensitive areas in the Upper Green River basin to preserve and protect the unique natural resources, especially the karst topography, that supports numerous threatened and endangered species and feeds the unique ecosystem of Mammoth Cave NP.

Changes have been proposed to the Kentucky CREP that would implement a community-based approach to more effectively protect locally unique resources and provide better service to the local landowners. The proposed changes to the KY CREP are as follows:

1. The addition of 28,904 acres, which would include the Green River Watershed from Mammoth Cave National Park to the confluence with the Barren River, including the Barren River Watershed. This area encompasses 946,101 acres and includes land in Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren Counties. This addition would place all of the Upper Green River Basin into the CREP with the exception of those areas above the U.S. Army Corps of Engineers' reservoirs.
2. The addition of CP29-Marginal Pastureland Wildlife Habitat Buffer as a conservation practice. This practice was not originally included into this program, but was determined important to the protection of the region's unique karst resources.
3. The flexibility to allow landowners to enroll entire marginal pastureland fields into conservation practices if a required percentage of the field meets eligibility requirements. This change was considered essential to protect the region's sinkhole plain, a fragile and critical resource specific to this region. Under the current program, only sinkholes in cropped fields could be buffered.
4. The increase in the maximum buffer widths on select streams within the watershed. Currently, the mainstem of the Green River has a maximum buffer width of 1,000 feet that exceeds the 300-foot width provided for tributaries.

The need for this action is to reduce runoff of sediments, nutrients, pesticides and pathogens from agricultural sources that are adversely affecting the health of the Green River system and threatening the integrity of the Mammoth Cave ecosystem and the region's water resources.

This programmatic environmental assessment (PEA) assesses two alternatives: (1) Alternative 1-No Action, which evaluates the current CREP program, its existing conditions, and its effects on the environment, and (2) Alternative 2-Expanded Kentucky Green River CREP, which assesses the effects of expanding the CREP area and other programmatic changes as described above. Alternative 2 is the agency's preferred alternative and the environmentally preferred alternative. Both alternatives would allow up to a total of 99,500 acres to be enrolled in the program. A total of 88,686.7 acres remains eligible for enrollment into the program.

In March 2006, FSA announced its intent to prepare a PEA of the Kentucky Green River CREP. Notices were placed in 17 local newspapers and letters were mailed to Federal, State and local agencies and organizations. Six comments were received from agencies and are summarized in Chapter 2 and provided in full in Appendix D.

LISTING OF ACRONYMS

BMPs	Best Management Practices
CASTNET	Clean Air Status and Trends Network
CCC	Commodity Credit Corporation
CD	Conservation District
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMRL	Common Method Reporting Level
COC	County or Area Committee
CP	Conservation Practice
CRP	Conservation Reserve Program
CREP	Conservation Reserve Enhancement Program
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
EBI	Environmental Benefits Index
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act of 1973
FIP	Forestry Incentive Program
FONSI	Finding of No Significant Impact
FSA	Farm Service Agency
FWS	U.S. Fish & Wildlife Service
IMPROVE	Interagency Monitoring of Protected Visual Environments
KAS	Kentucky Archaeology Survey
KDFWR	Kentucky Department of Fish and Wildlife Resources
KEPPC	Kentucky Environmental and Public Protection Cabinet
KRS	Kentucky Revised Statute
KYCREP	Kentucky Conservation Reserve Enhancement Program
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NADP/NTN	National Atmospheric Deposition Program/National Trends Network
NHL	National Historic Landmark
NNL	National Natural Landmark
NEPA	National Environmental Policy Act of 1969
NP	National Park
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRI	Nationwide Rivers Inventory
NRIS	National Register Information System
ORV	Outstanding Resource Value
PEA	Programmatic Environmental Assessment
Ph	Phosphorus
P.L.	Public Law
PM	Particulate Matter
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMZ	Streamside Management Zone
SNA	State Natural Area

SNP	State Nature Preserve
S&WG	State & Tribal Wildlife Grants
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TP	Total Phosphorus
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WHIP	Wildlife Habitat Improvement Program

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CHAPTER 1.0 INTRODUCTION

1.1 Background

1.1.1 Conservation Reserve Program (CRP)

The Conservation Reserve Program (CRP) began in 1985 with the enactment of the Food Security Act. This program was initiated to address issues related to erosion and soil losses on cropland, as well as the destruction of wildlife habitat due to the conversion of fallow land to production. Under Title XII of the Food Security Act of 1985 (16 U.S.C. 3830 et seq.), CRP was established as a long-term cropland retirement program. In exchange for retiring highly erodible or environmentally sensitive cropland from production, CRP offered farm owners, operators or tenants annual rentals plus payments for establishing a permanent conservation land cover, such as grasses or trees.

In 1990, the Food, Agriculture, Conservation, and Trade Act of 1990 extended the CRP enrollment period through 1995 and broadened the program's focus to improve water quality and other environmental goals. In April 1996, the Federal Agriculture Improvement and Reform Act (1996 Act) was passed, further amending the 1985 Act and confirming the CRP's new focus on environmental benefits.

In 2002, the Farm Security and Rural Investment Act expanded the program to provide for enrollment of up to 39.2 million acres. Of the 39.2 million acres authorized for CRP enrollment, CCC reserves about 3 million acres for special CRP initiatives that target the most pressing environmental needs. These initiatives are[2]:

- Continuous Sign-up – protecting the most environmentally sensitive land through ongoing enrollment;
- Conservation Reserve Enhancement Program – targeting defined geographic areas through Federal-State-private partnerships;
- Farmable Wetlands Program – protecting certain farmed and prior converted wetlands;
- Bottomland Hardwood Tree Initiative—planting trees that mitigate greenhouse gases;
- Presidential Quail Initiative – increasing quail habitat and populations; and
- Wetlands Restoration Initiative—restoring playa lakes and prairie potholes.

As of the end of fiscal year 2005, more than 34.9 million acres have been enrolled into CRP, providing $1.6 billion in annual rental payments to land owners and farm operators. CRP is an important part of USDA's conservation agenda that has helped reduce soil erosion by more than 40 percent on cropland since 1982. CRP is the national largest private-lands conservation program both in terms of acreage and dollars spent. Some of CRP's major accomplishments include[3]:

[2] USDA-Farm Service Agency, June 5, 2006. "USDA Announces Results of CRP General Sign-up and Contract Re-enrollments and Extensions." Release No. 0189.06.

[3] USDA-Farm Service Agency, April 2006. "America's Conservation Program Turns Twenty." http://www.fsa.usda.gov/crp20/index.asp

- Restoring and protecting more than 2 million acres of wetlands and adjacent buffers.
- Reducing soil erosion by 450 million tons per year.
- Establishing 1.7 million acres of grass and forested buffers to protect water quality.
- Improving wildlife populations and habitat.
- Mitigating 48 million metric tons of carbon dioxide annually.
- Reducing sediment into and nutrient enrichment of water bodies

General sign-up extended from March 27 to April 28, 2006. Of the 22,990 offers received for enrollment, FSA accepted 18,140 offers that will become effective on October 1, 2006. Of these, 252 offers were accepted in Kentucky, totaling 6,263 acres.[4]

In June 2006, USDA announced that it will accept 1 million acres of the 1.4 million acres offered under CRP's general sign-up. USDA selected the most environmentally fragile of the cropland acres offered, ranking offers based on cost and the Environmental Benefits Index (EBI) factors of soil erosion, water quality, enduring benefits, air quality and wildlife enhancement. In addition, USDA announced that existing CRP participants intend to re-enroll and extend contracts covering 13 million acres set to expire Sept. 20, 2007.

1.1.2 Conservation Reserve Enhancement Program (CREP)

The Conservation Reserve Enhancement Program (CREP) sprung from CRP in 1997, as the CCC and FSA joined with States to achieve specific conservation and environmental objectives. CREP is a conservation partnership program between the FSA and States that addresses specific State and nationally significant water quality, soil erosion and wildlife habitat issues related to agriculture. The primary goals of CREP are to—

- create an opportunity where the resources of a State or Tribal government and CCC can be targeted in a coordinated manner to address specific conservation and environmental objectives of that State and the nation; and
- improve water quality, reduce soil erosion, enhance air quality, or develop wildlife habitat in specific geographic areas that have been adversely impacted by agricultural activities.

CREP is administered by the FSA and funded through CCC. and differs from CRP in the following ways:

- CREP is a collaborative undertaking among Federal government, States, and local stakeholders;
- CREP focuses conservation practices on high-priority environmental concerns;
- CREP requires States to establish measurable objectives and conduct monitoring; and
- CREP offers more flexibility regarding local legal constraints and environmental conditions.

Under CREP agreements, Federal/State partnerships implement projects designed to address specific environmental objectives related to improving water quality and enhancing wildlife habitat through targeted CRP enrollments. Sign-up is held on a continuous basis, general sign-up practices may be included, and additional financial incentives are generally provided. The program provides incentives to landowners to develop conservation practices that protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and improve the quality

[4] USDA-Farm Service Agency. "History of the CRP." http://www.fsa.usda.gov/dafp/cepd/12crplogo/history.htm and "USDA Announces Results of CRP General Sign-up and Contract Re-enrollments and Extensions." Release No. 0189.06, dated June 5, 2006.

of water resources. Farmers and landowners voluntarily enroll land in the program through contracts with FSA and the State and agree to convert cropland to native vegetation and establish riparian buffer zones, plant trees and grasses, restore wetlands, and enhance wildlife habitat. As of June 2006, approximately 836,000 acres have been enrolled in CREP nationwide.[5]

1.1.3. Kentucky Conservation Reserve Enhancement Program (KYCREP)

The Kentucky CREP involves the restoration of riparian habitat and other vital natural habitats to protect Mammoth Cave NP and the ecologically significant Green River. In August 2001, the Commonwealth of Kentucky and USDA entered into an agreement to target the restoration of up to 100,000 acres of environmentally sensitive land in the Green River Watershed in south-central Kentucky and to protect Mammoth Cave. The acreage for enrollment into this program was later approved for 99,500 acres. Producers can enroll land in any part of the watershed below the Green River Lake Dam into CREP. Eligible acreage also includes areas adjacent to streams and rivers, surrounding sinkholes and other lands that meet CREP eligibility requirements.

The program was established to provide financial incentives to producers who agreed to plant vegetative covers designed to protect the water quality and improve wildlife habitat in the project area. The KYCREP area borders a 100-mile section of the Upper Green River Watershed and extends from the Green River Dam downstream to Mammoth Cave NP, encompassing all or part of the following eight counties (see **Figure 1-1**):

- Adair
- Barren
- Edmonson
- Green
- Hart
- Metcalfe
- Russell
- Taylor

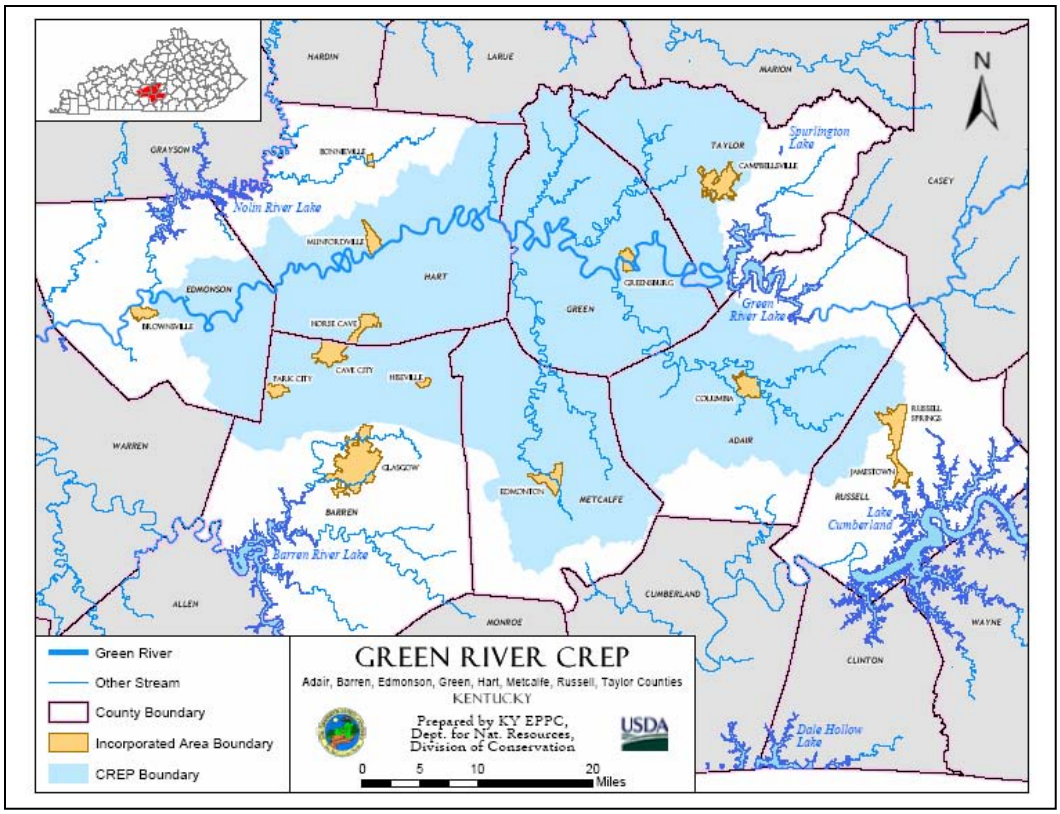
The proposed expanded CREP area would include all or parts of the existing counties listed above and all or parts of the following counties (see **Figure 1-2**):

- Allen
- Butler
- Grayson
- Logan
- Simpson
- Warren

As of May 2006, 574 contracts, totaling 10,813.3 acres were approved in the Kentucky CREP. Under Kentucky CREP, agricultural producers can enter into contracts from 10 to 15 years to convert eligible cropland to stands of native grasses, trees and other conservation practices. Program participants would have the opportunity to enter into the State incentive program and either extend the benefits of the CRP contract for another 15 or 35 years through a supplemental contract with Kentucky or receive payment from Kentucky in return for executing a voluntary permanent easement with Kentucky.

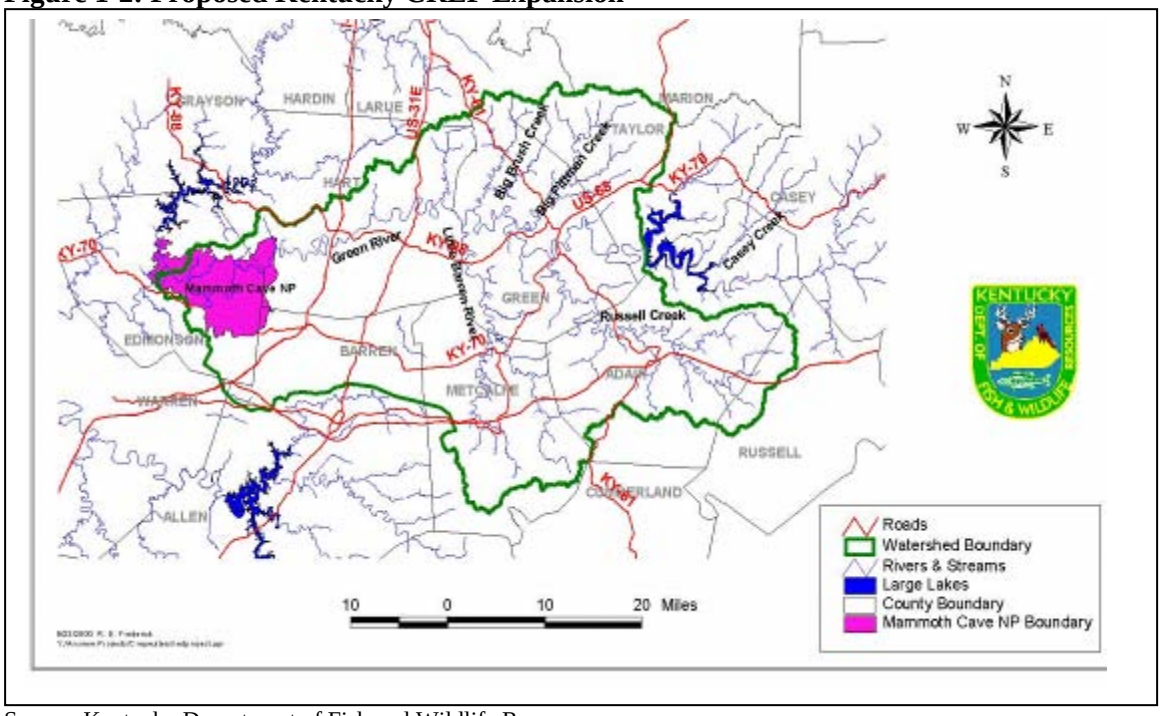
[5] CRP Enrollment Activity and News. “Continuous CRP Enrollment Since Inception,” http://fsa.usda.gov/

Figure 1-1: Existing Kentucky Green River CREP Area



Source: Kentucky Environmental and Public Protection Cabinet.

Figure 1-2: Proposed Kentucky CREP Expansion



Source: Kentucky Department of Fish and Wildlife Resources.

KYCREP is an environmental conservation program that focuses on the farming community and improving agricultural practices. This program provides the following benefits, including—

- reduction in soil erosion
- enhanced wildlife habitat
- improvement of water quality through the protection of streams, creeks and rivers from runoff
- improvement of aquatic habitat by providing shade along creeks and rivers through establishment of riparian buffer zones
- protection of sinkholes that further protect groundwater and cave ecosystems
- replenishment of depleted organic matter and nutrients and improves soil conditions
- restoration of flood storage capacity along creeks and streams

The program benefits landowners by—

- providing landowners with consistent income on less productive and highly erodible farmland
- providing landowners with a cost-effective way to address agriculturally related environmental problems, meet regulatory requirements and become stewards of the land
- providing landowners with an average rental rate of $100/acre per year for a 15-year contract
- providing landowners with an additional one-time bonus payments (depending on the conservation practice selected)
- providing landowners with an option to either return the land to production after the CREP agreement has expired or to purchase an optional and permanent easement for an added payment
- providing cost-sharing by both the State and the Federal government for installation of eligible conservation practices; there are additional bonus and/or incentive payments on most practices up front, which allows the landowner to actually make money on the installation process
- allowing the landowner to select areas of the farm to enroll in CREP and providing technical advisors to help develop a conservation plan that will work for both the landowner and the environment
- providing a broad range of conservation practices to accommodate both landowners and specific environmental needs
- encouraging wildlife diversity and providing opportunities for attracting wildlife for enjoyment

Funding for the Kentucky Green River CREP was initially approved at $110 million program, with the Federal government contributing $88 million, the Commonwealth of Kentucky contributing $17 million, and The Nature Conservancy contributing $5 million over 15 years.[6] In Fiscal Year 2002, Congress shifted $490,000 to the Farmland Protection Program for a farm along Green River in the CREP area. This diversion of funds resulted in a reduction in the land available for enrollment into the program from 100,000 acres to 99,500 acres and it reduced the program's funding to $109,510,000. Subsequently, USDA's share was reduced to $87,510,000. With only 10,813.3 acres currently enrolled in the program, there will be no change or increase in acreage. These parameters will serve the proposed new region, thus the only change to the

[6] USDA-Farm Service Agency. "Questions and Answers-Kentucky CREP." Release No. 1653.01, p. 3, question 8.

maximum designated acreage or cost of the program will be to reflect the reduction in USDA's commitment.

1.2 PURPOSE AND NEED FOR ACTION

The Green River is one of the most diverse ecosystems in North America and the most biologically rich branch of the Ohio River system. The Green River flows unhindered for more than 100 miles through eight counties and Mammoth Cave National Park, the world's largest and most diverse cave system. Mammoth Cave is a unique and valuable natural resource visited by approximately 1.8 million visitors annually. The quality of the water that enters this area has a significant impact on the ecosystem that supports Mammoth Cave. Sinkholes, characteristic of the region's karst topography, occur throughout the watershed and contribute to the sensitivity of the area's aquatic systems.

The Kentucky Green River Conservation Reserve Enhancement Program (KYCREP) seeks to reduce environmental impacts associated with agricultural uses in the Green River Watershed through voluntary and incentive-based conservation practices.[7] To accomplish this reduction, the FSA proposes to add 28,904 acres of environmentally significant watersheds in the Green River basin, to utilize the community-based approach of this program to more effectively protect locally unique resources, and to provide better service to the local landowners. The proposed additional area will include all or parts of Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren Counties. The expanded KYCREP will encompass a total of 946,101 acres with many of the same characteristics of the original Green River CREP area.

The goal of the Kentucky CREP is to greatly reduce runoff of sediments, nutrients, pesticides and pathogens from agricultural sources that currently have an adverse effect on the health of the Green River system. The *purpose* of the proposed action is to extend the project area to include environmentally sensitive areas down river (approximately 30 river miles) to include the entire Upper Green River Basin (excluding those watersheds that lie above U.S. Army Corps of Engineers Reservoirs). This proposal also addresses key needs for the specific geographic region in order to properly protect unique natural resources and to better service landowners by adapting this program so that it may be utilized in a practical manner.

Agricultural runoff significantly impacts the water quality and the aquatic life in the Green River Watershed. The impacts from this runoff include the flow of nutrients, pesticides, sediments, and pathogens into the waterways and the groundwater. Sinkholes associated with the region's karst topography contribute to the vulnerability of pollutants entering the area's aquatic system and ecosystems. Other agricultural impacts involve the fragmentation of riparian corridors, native grasslands and forestlands.[8]

The *need* for the Kentucky CREP is to ensure the long-term protection of the region's globally significant and irreplaceable natural resources, fragile karst ecosystem, and water quality, and to enhance habitat for a wide diversity of terrestrial and aquatic wildlife, many of which are listed as federally and State protected. The Green River is the most biologically diverse and species rich branch of the Ohio River system. Included in its watershed are Mammoth Cave, which is a unit of the national park system, a World Heritage site, and an International Biosphere Reserve; the Green River Bioreserve; and seven federally endangered species, as well as hundreds of other species. Implementation of the Kentucky Green River CREP will facilitate conservation practices

[7] Text obtained from original Green River CREP Proposal document.
[8] Ibid.

designed to improve water quality, protect the valuable resources within the watershed, and enhance wildlife habitat targeted at the State's declining species.

1.3 OBJECTIVES

The overall goal of the Kentucky CREP is to sustain and, where needed, restore the health and viability of degraded or threatened natural habitats and ecosystems in the project area. The program goals are to be accomplished through a voluntary, incentive-based program that seeks participation from 80 percent of the agricultural producers within the project area. The objectives of the Kentucky CREP are to—

1. reduce the amount of sediment, pesticides and nutrients entering the tributaries and mainstem of the Green River and Mammoth Cave system from agricultural sources by 10 percent (based on 1999 data), as measured by installation of Best Management Practices (BMPs) designed for that purpose and compliance with water quality standards (replanting riparian buffers along streams and around sinkholes are high priority);
2. enhance wildlife habitat and populations, including State and federally threatened and endangered species, species of special concern, and rare species, using as a measure of success a reduction in the need to list additional species as threatened or endangered;
3. sustain and restore composition, structure and function of riparian corridors associated with the Green River and its tributaries, targeting 28,000 acres that include buffers around sinkholes;
4. reconnect landscape elements that will restore landscape level ecological processes;
5. establish buffers around sinkholes, targeting 1,000 high priority sinkholes;
6. sustain and restore non-riparian wetlands, targeting 3,000 acres (riparian and non-riparian wetlands);
7. protect and restore subterranean ecosystems;
8. collect, store and analyze data to enhance planning for sustaining the health of the watershed; and
9. develop an outreach program targeting all active agricultural producers in the area.

1.4 ORGANIZATION OF DOCUMENT

This document follows the organization established by the USDA-FSA guidelines for preparing a programmatic environmental assessment and by the standard components for and environmental assessment as prescribed by NEPA.

- Cover Sheet, Executive Summary and Contents
- Chapter 1.0-Introduction: Presentation of the history and background of CREP, the purpose and need for the action and its objectives are presented in Chapter I.
- Chapter 2.0-Alternatives including the Proposed Action: This chapter describes the proposed action, summarizes the issues identified during the scoping process and evaluates alternatives to the proposed action, including the No Action alternative.
- Chapter 3.0-Affected Environment: This chapter describes the area affected by CREP, including the natural and cultural resources, and the social and economic characteristics of the affected area.
- Chapter 4.0-Environmental Consequences: This chapter evaluates the potential benefits and consequences of the alternatives to the natural, cultural and social and economic resources described in Chapter 3.0.
- Chapter 5.0-Cumulative Effects: The cumulative effects of the program, which are the past, present and reasonably foreseeable future actions, are identified.
- Chapter 6.0-Mitigation Measures: Measures to avoid or minimize adverse effects of the program are discussed.

- Chapter 7.0-List of Preparers, Contributors and Reviewers
- Chapter 8.0-Persons and Agencies Contacted
- Chapter 9.0-References

Appendices, which provide background material and supporting technical data, are appended to the end of this document as follows:

Appendix A	Proposed Memorandum of Agreement between U.S. Department of Agriculture and the Commonwealth of Kentucky and Addendum Agreement
Appendix B	Kentucky CREP Conservation Practices
Appendix C	Kentucky CREP Relevant Laws and Regulations
Appendix D	Kentucky CREP Agency Correspondence
Appendix E	Federally and State-Protected Species by Kentucky CREP County
Appendix F	Listing of National Register Sites and National Historic Landmarks
Appendix G	Nationwide Rivers Inventory by Kentucky CREP County
Appendix H	Kentucky Historic, Park and Recreation Areas
Appendix I	Listing of Kentucky's Exotic Species

CHAPTER 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Chapter 2.0 describes the proposed Federal action, discusses alternatives initially considered, provides reasons for dismissing any alternative because it was not determined feasible, and more fully evaluates the alternatives that were considered reasonable for further evaluation.

2.1 PROPOSED ACTION

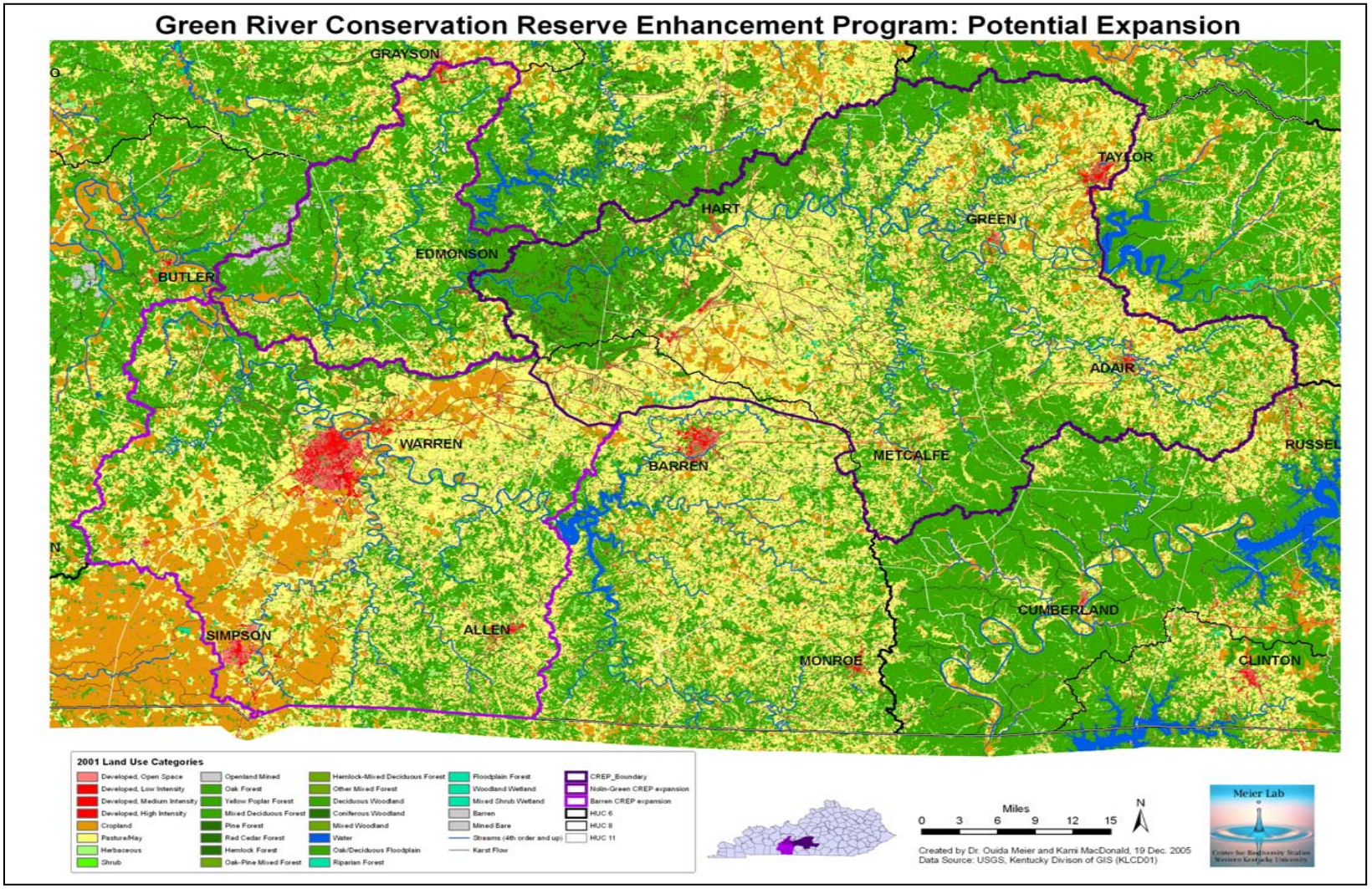
The Commodity Credit Corporation (CCC), FSA and the Commonwealth of Kentucky propose to amend the Green River CREP by including environmentally significant watersheds downstream of the existing CREP area and utilize the community-based approach of this program to more effectively protect locally unique resources and provide better service to the local landowners. The proposed additional area will include all or parts of Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren Counties. This area will encompass a total of 946,101acres. **Figure 2-1** shows this proposed new area. It should be noted that many of the characteristics of the proposed area are the same as those in the original Green River CREP region.

The proposed expansion to the Green River CREP will extend downstream to river 149.5 where the Green River joins the Barren River. This expansion will include the tributary watersheds contributing to the Green, including the Nolin River and Barren River systems upstream. The following changes are proposed to the program:

- Include the area of the Green River Watershed from Mammoth Cave National Park to the confluence with the Barren River (including the Barren River Watershed). This addition will not place the entire Upper Green River Basin (excluding those areas above USCOE reservoirs) into the program. This area encompasses 946,101 acres, and includes land in Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren Counties.
- Incorporate CP29–Marginal Pastureland Wildlife Habitat Buffer into the Green River CREP. This new practice was not included in the original program, and has been added due to the important benefits it would provide in protecting the region's unique karst resources.
- Enroll entire marginal pastureland fields into a conservation practice(s), if a required percentage of the field meets eligibility requirements. This proposal is essential for enrollment and installment to protect the valuable karst features of the region. Within the Green River Watershed, an area of pastureland is nearly three times greater than cropland.

  Because of this predominant land use and the karst topography, it would be beneficial to permit entire fields to be applied to marginal pastureland similar to the "infeasible to farm" criterion in the cropping history requirements. In this region, harvesting hay is as important as row cropping. It is common within this CREP area to have buffers on streams that "cut" fields up because of buffer width requirements and terrain characteristics. In addition, local landowners often question committing a large portion of productive land to a conservation easement, but "wasting" the remainder of the field. It is common for landowners not to enroll land into CREP for this reason and thus lose an entire buffer.

Figure 2-1: Proposed Kentucky Green River CREP Expansion Area



Source: Western Kentucky University, 2006.

- Increase maximum buffer widths on select streams within the watershed. Currently, the mainstem of the Green River has a maximum buffer of 1,000 feet. This buffer width exceeds that buffer for the tributaries (300 ft.). The extended buffer width of 1,000 feet is also needed along larger tributaries to the Green River.
- CREP is a conservation partnership program targeted to address specific State and nationally significant water quality, soil erosion and wildlife habitat issues associated with agriculture. CREP establishes voluntary contractual agreements between USDA and private landowners, who agree to implement eligible conservation practices. CREP is administered by the Farm Service Agency and the Commonwealth of Kentucky.

2.2 SCOPING

To comply with 40 CFR §1501.7 of the Council on Environmental Quality's regulations and to provide agencies and the public with an early opportunity to comment on the program, FSA conducted a scoping process and notified agencies and the public about the intent to prepare a programmatic environmental assessment on the proposed CREP. The Kentucky FSA office announced its plans to prepare a PEA on the Kentucky CREP by sending scoping letters to Federal and State agencies on March 27, 2006. An announcement was published in 17 local newspapers throughout the State during the first and second weeks of April 2006. The dates and newspapers are shown in **Table 2-1**.

Table 2-1: Kentucky Green River CREP Scoping Announcements

Newspaper	Announcement Published
Bowling Green Daily News	04/05/06 and 04/12/06
Brownsville Edmonson News	04/06/06 and 04/13/06
Campbellsville Central KY *News Journal*	04/06/06 and 04/13/06
Cave City Barren Co. *Progress*	04/06/06 and 04/13/06
Columbia Adair Co. *Community Voice*	04/06/06 and 04/13/06
Columbia Adair Progress	04/06/06 and 04/13/06
Edmonton Herald News	04/05/06 and 04/12/06
Franklin Favorite	04/06/06 and 04/13/06
Greensburg *Record-Herald*	04/06/06 and 04/13/06
Leitchfield Grayson Co. *News Gazette*	04/06/06 and 04/13/06
Leitchfield *The Record*	04/06/06 and 04/13/06
Morgantown Butler Co. *Banner/Green River*	04/06/06 and 04/13/06
Munfordville Hart Co. *News-Herald*	04/06/06 and 04/13/06
Russell Springs *Russell Register*	04/06/06 and 04/13/06
Russell Springs *Times-Journal*	04/06/06 and 04/13/06
Russellville *News Democrat & Leader*	04/04/06 and 04/11/06
Scottsville Citizen-Times	04/06/06 and 04/13/06

Source: USDA-Farm Service Agency-Kentucky, June 2006.

Six written comments were received during the scoping period that extended through April 20, 2006. These comments are summarized in the following section. **Appendix D** contains copies of all comments received from agencies during the scoping period.

Kentucky Division of Forestry, Kentucky Environmental and Public Protection Cabinet:

- The proposed area eligible for enrollment will negatively impact the Division of Forestry by challenging our ability to maintain other stewardship program services with limited personnel. Additional funding may be needed to support the Division of Forestry's assistance with CREP.

- Meeting the increased demand of tree seedlings for restoring the riparian areas within the 99,500-acre area is a concern. Pre-planning for the increased demand to support the program will be vital to ensure that we can meet the demand from the Division's two tree nurseries. Adequate notice would be required.

- The demand for the Division of Forestry's tree planting machines are currently at the maximum, thus more machines will be needed to cover the additional demand. The Division's ability to purchase new planters has been greatly reduced.

- The increase in establishing warm season grasses in riparian areas may also increase the risk of wildfires. The Division of Forestry would prefer more trees planted in the riparian areas to create permanent buffers, which would be more beneficial to water quality.

- The Division commented that it felt it would be excessive to provide a maximum 1,000-foot buffer width to all fourth order and higher streams within the CREP area. The Division provided a table comparing streamside management zone (SMZ) widths among other States in the southeastern United States. The table shows that for municipal waters the maximum SMZ is 200 feet dependent upon slope. Most of the Green River Watershed has minimal slope gradient especially in the agricultural areas.

U.S. Army Corps of Engineers (Two Sets of Comments)

The Corps responded with two sets of comments that are summarized as follows:

- The CREP has benefited its Green River Lake operations by allowing releases to occur as they were designed. Prior to CREP and other environmental enhancements by The Nature Conservancy, development had begun to occur around the lake and discharges from the lake had been inhibited. Similar encroachments occur below Barren River Lake in Warren County that inhibit outflow capabilities, as well as near the mouth of the Mud River, which is outside the CREP area.

- The goals of Kentucky CREP compliment the Corps' Environmental Operating Principles, especially in regards to environmental sustainability. The Louisville District office began a three-year experiment using a revised operating guide curve for Green River Lake, which is a Corps reservoir upstream of the original CREP area. A critical factor in the success of this project was early enrollment of the lowest lying lands. Enrollment of these low-lying properties eliminated many problems that had occurred with discharges impacting downstream landowners. The CREP PEA should recognize the benefits of CREP to the Corps' efforts to protect the same resources. Both projects contributed to the improvements in the downstream aquatic ecosystem.

- The Green River is rated the fourth most biodiverse stream in the country. The CREP covers the longest stretch of "exceptional surface water" in Kentucky. Expansion will assist in protecting additional "exceptional and reference reaches" of surface waters in the area. Such expansion will only benefit the Corps' efforts to operate projects in a more environmentally sustainable manner.

State Historic Preservation Office, Commerce Cabinet

- The Green River and its tributaries have a high density of significant archaeological sites. Some of the proposed practices (tree plantings, shallow water areas, wetland restoration, etc.) have potential for impacting prehistoric and historic archaeological sites. Consequently, archaeological surveys should be conducted by a professional

archaeologist on all tracts where ground-disturbing activities are proposed to determine if there are any sites eligible for listing in the National Register of Historic Places that could be affected.

- If any structures 50 years or older are affected by this program, FSA should provide photographs of the buildings that are keyed to maps.

U.S. Fish and Wildlife Service

- Fully supports FSA's proposal to expand and improve on the Green River CREP. Supports the following programmatic changes to CREP—
    a) Include sink hole protection as a primary objective of the program
    b) Increase riparian buffer width eligibility on many of the larger Green River tributaries within the program area; and
    c) Provide landowners with "whole field" eligibility under specified circumstances.
- Large area south of the Green River, known as the sinkhole plain, is an important groundwater recharge zone for the Green River. It is important that as many sinkholes as possible are buffered in this area to reduce the input of sediments and other contaminants into the groundwater system and ultimately the Green River.
- Other significant benefits from the CREP program improvements are—
    a) Increased buffers on larger Green River tributaries, and
    b) "whole field" eligibility.

These improvements make the program more "landowner friendly" which, in turn, ensure that greater conservation benefits will be achieved from the program. The improvements offer more flexibility for landowners. As a result, landowners who might not otherwise enroll may now enroll into CREP.

National Park Service, Mammoth Cave National Park

The National Park Service reviewed the "Green River Conservation Reserve Enhancement Program, Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation." Central to the mission of the National Park Service (NPS) is the conservation and protection of natural resources within its boundaries. As a long-time active partner in the Green River CREP, the NPS fully supports the proposal to expand the Green River CREP and believes that the proposed changes will enhance program goals relative to improving water quality at Mammoth Cave NP. The following key changes are of special interest to NPS:

a) Treatment of sinkholes, either by inclusion as marginal pastureland or as whole fields, addresses a general land use throughout much of Mammoth Cave's recharge area. If approved, this change would affect large portions of the Pennyroyal Plateau.
b) The increased buffers along stream corridors from 300 feet to 1,000 feet would seem to benefit wildlife habitat, water quality, and perhaps most importantly, increase landowner participation.

Mammoth Cave NP is the primary recipient of land conservation practices of CREP.

2.3 PRELIMINARY ALTERNATIVES ELIMINATED FROM ANALYSIS

Shifting Acreage from Various Conservation Programs—Preliminary consideration was given to shifting acreages from various other agricultural programs into conservation easements. A conservation easement is a voluntary, legally enforceable land preservation agreement between a landowner and a land trust or government agency that permanently restricts real estate

development, commercial and industrial uses, and certain other activities in order to protect its conservation values. The primary purpose of a conservation easement is to protect agricultural land, timber resources, and/or other valuable natural resources such as wildlife habitat, clean water, clean air, or scenic open space by separating the right to subdivide and build on the property from the other rights of ownership. The landowner who gives up these "development rights" continues to privately own and manage the land and may receive significant State and Federal tax advantages for having donated the conservation easement. Perhaps more importantly, the landowner has contributed to the public good by preserving the conservation values associated with their land for future generations. In accepting the conservation easement, the easement holder has a responsibility to monitor future uses of the land to ensure compliance with the terms of the easement and to enforce the terms if a violation occurs.

KYCREP counties gave shown varying levels of success with different conservation programs. **Table 2-2** identifies some of the various conservation programs and their acreages, as provided by a survey of FSA offices in the CREP area.

Table 2-2: Other Conservations Programs within the KYCREP Area

CREP County	Other Conservation Program	Contracts(Acres Enrolled)
Allen	CRP WHIP	26 contracts 1 contract
Butler	CRP	80 contracts (1,500 acres)
Grayson	CRP	319 contracts (13,253 acres)
Logan	CRP EQIP WHIP State cost-share practices	502 contracts (13,224 acres) N/A N/A N/A
Simpson	CRP	20 contracts
Warren	CRP WHIP EQIP State cost-share practices	1,500 acres 50 acres 116 contracts (5,000 acres) >110 contracts to install animal waste feeding facilities and other conservation practices

N/A=data not available.
Source: Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program. Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation,* p. 10.

Further consideration of this alternative was considered infeasible because administration of many of these programs is not under the authority of FSA, because this alternative did not contribute to meeting the goals of reducing sediment, pesticides, and nutrients that enter the Green River and Mammoth Cave systems and because the viability of other programs cannot be reasonably predicted.

2.4 ALTERNATIVES SELECTED FOR ANALYSIS

2.4.1 Alternative 1-No Action (Existing Program)

Alternative 1 describes the existing Kentucky CREP, which was established through a Memorandum of Agreement (MOA) between USDA-CCC and the Commonwealth of Kentucky in August 2001. The authority for the original Kentucky CREP initially extended through December 31, 2002, and later was extended through the end of 2003.
The purpose of this agreement is to restore up to 99,500 acres in south-central Kentucky's Green River Watershed. Under the existing CREP, producers can enroll land in the watershed below the Green River Lake Dam. Restoring this area will help protect the resources in Mammoth Cave NP and the ecologically rich Green River.

Under Alternative 1, eligible producers can enroll land in the Kentucky CREP through 14- to 15-year CRP contracts. Eligible acreage includes areas adjacent to streams, rivers, and sinkholes and other land that meet the existing CREP eligibility requirements. Producers may extend the benefits of CREP through separate contracts with the State. Applicants must be able to offer eligible acreage and must satisfy the basic eligibility criteria for CRP. Land must be cropland that has been cropped 2 out of the past 5 years and is physically and legally capable of being cultivated. Marginal pastureland is also eligible provided it is suitable for use as a riparian buffer that can be planted to trees. Haying and grazing are not permitted during the CRP contract period unless USDA permits these practices for emergency purposes under standard CRP rules.

Applicants must generally have owned or operated the land for at least one year prior to enrollment. Persons with an existing CRP contract or an approved offer with a contract pending are not eligible for CREP until that contract expires.
Program Goals
The goals of the Kentucky CREP are to—

1. To reduce by 10 percent (based on 1999 data) the amount of sediment, nutrients, and pesticides from agricultural sources entering the tributaries and the mainstem of the Green River and the Mammoth Cave System as measured by installation of Best Management Practices (BMPs) designed for that purpose and compliance with water quality standards (replanting riparian buffers along streams and around sinkholes are high priority);
2. To enhance habitats and populations of wildlife, including State and Federal special concern, rare, threatened and endangered species, using as a measure of success a reduction in the need to list additional species as threatened or endangered;
3. To sustain and restore composition, structure and function of riparian habitat corridors associated with the Green River and tributary watersheds, targeting 28,000 acres that include buffers around sinkholes;
4. To reconnect landscape elements that will restore landscape level ecological processes;
5. To establish buffers around sinkholes, targeting 1000 high priority sinkholes;
6. To sustain and restore non-riparian wetlands, targeting 3000 acres (riparian and non-riparian wetlands);
7. To protect and restore subterranean ecosystems;
8. To collect, store, and analyze data to enhance planning for sustaining the health of the watershed; and
9. To develop an outreach program targeting all active agricultural producers in the area.

Eligible Conservation Practices

The CRP conservation practices approved for Alternative 1 are—

- CP1 Introduced Grasses
- CP2 Native Grasses
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (corridors)
- CP4D Permanent Wildlife Habitat
- CP8A Grassed Waterways, Non-easement
- CP9 Shallow Waterways for Wildlife
- CP10 Grass Cover - Already Established
- CP11 Tree Cover - Already Established
- CP12 Wildlife Food Plots
- CP21 Filter Strips
- CP22 Riparian Buffer
- CP23 Wetland Restoration
- CP25 Rare and Declining Habitat

Acreage and Targeted Land for Enrollment

Under Alternative 1, the Kentucky CREP would allow enrollment of up to 99,500 acres into the program. Landowners can enroll land in the watershed below the Green River Lake Dam. This area includes land adjacent to streams, rivers and sinkholes and other land that meet CREP eligibility requirements. As of May 2006, 574 contracts have been approved enrolling 10,813.3 acres into the Kentucky Green River CREP. As a result, a total of 88,686.7 acres remain available for enrollment into Kentucky CREP under Alternative 1. **Table 2-3** presents the currently approved CREP contracts and acreages by county and conservation practice. **Figure 2-2** shows the locations existing CREP contracts under this alternative.

Table 2-3: Kentucky CREP Contracts and Acreages by Conservation Practice through May 2006

	Approved Contracts		
County	**Conservation Practice**	**Number**	**Acres**
Adair	CP 1 Permanent Native Grasses	1	4.0
	CP2 Permanent Native Grasses	9	193.7
	CP3A Hardwood Tree Planting	3	6.8
	CP22 Riparian Buffer	110	1036.3
	CP25 Rare and Declining Habitat	1	55.9
Barren	CP1 Permanent Introduced Grasses/Legumes	1	2.7
	CP2 Permanent Native Grasses	63	2353.8
	CP3 Tree Planting	1	15.5
	CP3A Hardwood Tree Planting	1	.50
	CP22 Riparian Buffer	25	275.7
Edmonson	CP1 Permanent Introduced Grasses/Legumes	2	39.0
	CP2 Permanent Native Grasses	2	122.1
	CP21 Filter Strips	1	1.0

County	Approved Contracts		
	Conservation Practice	**Number**	**Acres**
Green	CP1 Permanent Introduced Grasses/Legumes	1	16.3
	CP2 Permanent Native Grasses	9	287.3
	CP22 Riparian Buffer	113	2054.8
	CP25 Rare and Declining Habitat	1	68.7
Hart	CP1 Permanent Introduced Grasses/Legumes	6	150.1
	CP2 Permanent Native Grasses	12	572.3
	CP22 Riparian Buffer	50	1215.0
Metcalfe	CP1 Permanent Introduced Grasses/Legumes	2	22.0
	CP2 Permanent Native Grasses	13	431.1
	CP22 Riparian Buffer	20	195.5
Russell	CP22 Riparian Buffer	6	12.8
	CP25 Rare and Declining Habitat	3	5.1
Taylor	CP2 Permanent Native Grasses	23	498.2
	CP3A Hardwood Tree Planting	3	53.8
	CP22 Riparian Buffer	91	1089.1
	CP25 Rare and Declining Habitat	1	34.2
	TOTAL	**574**	**10,813.3**

Source: USDA-Kentucky Farm Service Agency, June 2006. CREP-May 2006 Approved Contracts.

Sign-up and Eligibility Requirements

Eligible producers can enroll in CREP through 14- to 15-year CRP contracts. Producers may extend the benefits of CREP through separate contracts with the State. Applicants must be able to offer eligible acreage and must satisfy the basic eligibility criteria for CRP. Land must be cropland that has been cropped 2 out of the past 5 years and is physically and legally capable of being cropped. Marginal pastureland is also eligible provided it is suitable for use as a riparian buffer planted to trees. Applicants must generally have owned or operated the land for at least one year prior to enrollment. Persons with an existing CRP contract or an approved offer with a contract pending are not eligible for CREP until that contract expires.

CREP Payments

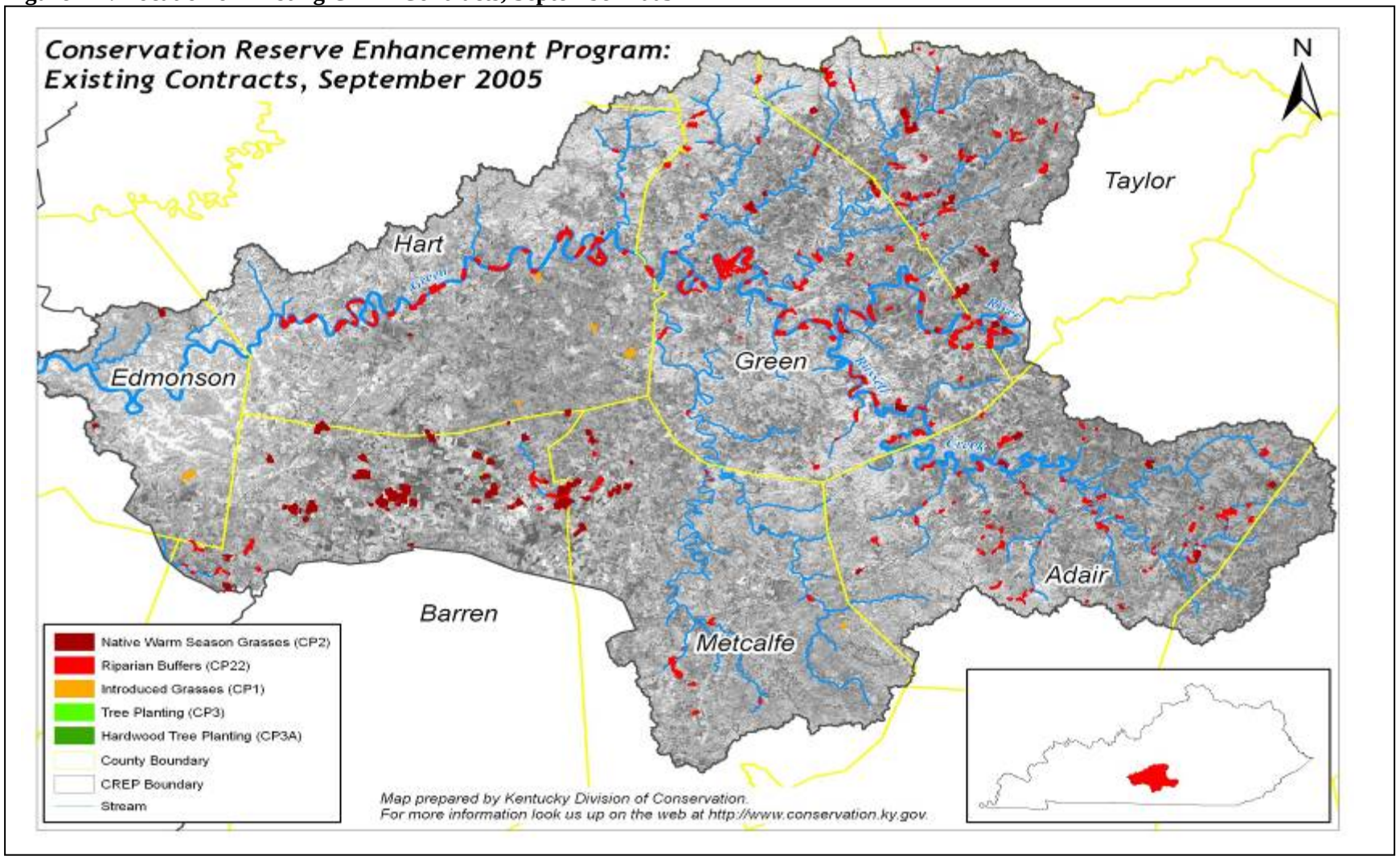
Kentucky CREP participants are eligible for four types of USDA payments:

1. Signing Incentive Payment - a one-time payment of $140 to $150 per acre for land enrolled in a riparian buffer practice, filter strip, or grassed waterway. USDA makes this payment soon after the contract has been signed.
2. Practice Incentive Payment - payment equal to about 40 percent of the total cost for establishing the riparian buffer practice, filterstrip, or grassed waterway practice. This payment is in addition to the 50 percent cost share assistance that USDA provides.
3. Annual rental payment of 125 percent to 200 percent of the dryland cash rental rate, depending on the practice that is selected.
4. Cost share assistance for installing the conservation practices on land that is retired.

Kentucky can also offer one-time lump sum incentive payments for contract extension or permanent easements and will provide additional cost-share assistance.

Land is currently authorized for enrollment through December 31, 2007, under Alternative 1.

Figure 2-2: Location of Existing CREP Contracts, September 2005



Source: "Kentucky Green River Conservation Reserve Enhancement Program, Annual Program Accomplishment Report." (CEP-68R) FY 2005. Jan. 5, 2005.

2.4.2 Alternative 2-Expanded Kentucky Green River CREP (Agency Preferred Alternative)

Alternative 2 proposes to amend and expand the Kentucky Green River CREP area by adding 28,904 acres of environmentally significant watersheds downstream of the existing project area (refer to **Figure 2-1**) for a total of 946,101 acres into CREP. Further, Alternative 2 proposes to more effectively protect locally and globally significant resources and provide better government service to the local landowners. The proposed additional area for inclusion into the CREP boundary will encompass all or parts of Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren Counties. Of the total of 946,101acres, 99,500 acres may be enrolled into the program. The 99,500 acres eligible for enrollment will be available from areas along the Green River and its tributaries.

The Kentucky CREP will consist of a Federal continuous sign-up CRP component and a voluntary State incentive program. This alternative would provide for the enrollment of crop and pastureland with high environmental value along the mainstem of the Green River and its tributaries. The project objectives are—

- To reduce by 10 percent the amount of sediment, nutrients, and pesticides from agricultural sources entering the tributaries and mainstem of the Green River and Mammoth Cave System through the installation of BMPs designed for that purpose, and other conservation practices designed to improve water quality (replanting riparian buffers around sinkholes and along streams are high priority).
- To enhance habitats and populations of wildlife, including those listed as State and Federal special concern, rare, threatened and endangered, using a measure of success a reduction in the need to list additional species as threatened or endangered.
- To sustain and restore the composition, structure, and function of riparian habitat corridors associated with the Green River and tributary watersheds.
- To reconnect habitat types in order to restore the full range of ecosystem function.
- To establish buffers around sinkholes, targeting 1,000 high priority sinkholes.
- To sustain and restore non-riparian wetlands.
- To protect and restore subterranean ecosystems.
- To collect, store, and analyze data to enhance planning for sustaining the health of the watershed.
- To develop an outreach program targeting all active agricultural producers in the area.
- To utilize native species, including warm season grasses, to the greatest extent possible.

The following are the principal changes to the Kentucky CREP proposed under this alternative[9]:

- The addition of the Green River Watershed from Mammoth Cave National Park to the confluence with the Barren River (including the Barren River Watershed). This addition would place the entire Upper Green River Basin (excluding those areas above USCOE reservoirs) into the program. This area would encompass a total of 946,101 acres, which is an increase of 28,904 acres more than Alternative 1. The area includes all or portions of Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren Counties in the Upper Green River Watershed.

[9] Memorandum from Jeffery S. Hall, State Executive Director to Deputy Administrator Farm Program, dated May 8, 2006. Subject: Proposed Expansion of the Green River Conservation Reserve Enhancement Program.

- The incorporation of the CP29 – Marginal Pastureland Wildlife Habitat Buffer into the Green River CREP. This practice was not originally included into this program, but has been determined important to the protection of the region's unique karst resources. The purpose of CP29 is to remove nutrients, sediment, organic matter, pesticides and other pollutants from surface runoff and subsurface flow by deposition, absorption, plant uptake, de-nitrification and other processes and thereby reduce pollution and protect surface water and subsurface water quality while enhancing the ecosystem of the waterbody. Through restoration of native plant communities, particularly along streambanks, these plantings will help in stabilizing soils adjacent to streams, improve flood control, and restore and enhance wildlife habitat.
- The ability to enroll "whole fields" or entire marginal pastureland fields into conservation practices if a required percentage of the field meets eligibility requirements. This is essential to protect karst features.
- The increase of maximum buffer widths on select streams within the watershed. Currently, the mainstem Green River has a maximum buffer with (1,000 ft.) that exceeds the buffers for tributaries (300 ft.). The extended buffer width of 1,000 feet is also needed on larger tributaries.

The Kentucky Green River CREP was finally approved for 99,500 acres with a $109,510,000 budget. USDA's share was approved at $87,510,000. No increase in acreage for enrollment is proposed for this alternative.

Eligible Conservation Practices

The following practices are proposed for Alternative 2:

- CP1 Introduced Grasses and Legumes
- CP2 Native Grasses, Legumes and Forbs
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (Corridors), Non-easement
- CP4D Permanent Wildlife Habitat, Non-easement
- CP8A Grassed Waterways, Non-easement
- CP9 Shallow Waterways for Wildlife
- CP10 Vegetative Cover--Grass--Already Established
- CP11 Vegetative Cover--Trees--Already Established
- CP12 Wildlife Food Plots
- CP15A Permanent Vegetative Cover (Contour Grass Strips), Non-easement
- CP21 Filter Strips
- CP22 Riparian Buffer
- CP23 Wetland Restoration
- CP25 Rare and Declining Habitat
- CP29 Marginal Pastureland Wildlife Habitat Buffer

Additionally, in accordance with FSA's *2-CRP Handbook*, the project will include the following practices funded through the Kentucky Soil Erosion and Water Quality State Cost Share Program:

1. Alternative Water Supplies for Livestock:
    a. Limited point access to streams for livestock
    b. Water lines and tanks

Table 2-4 shows the proposed contracts pending approval by county and conservation practice as of May 2006.

Table 2-4: Kentucky CREP Contracts and Acreages by County and Conservation Practice through May 2006

County	Pending CRP-2s in Progress		
	Conservation Practice	**Number**	**Acres**
Adair	CP22 Riparian Buffer	7	45.0
Barren	CP2 Permanent Native Grasses		18.0
Edmonson	CP1 Permanent Introduced Grasses/Legumes	2	29.0
Hart	CP22 Riparian Buffer	5	136.9
Metcalfe	CP22 Riparian Buffer	3	65.0
Russell	CP2 Permanent Native Grasses	1	3.0
	CP22 Riparian Buffer	5	45.0
TOTAL		**23[1]**	**341.9**

[1] Estimated. No number of contracts identified for Barren County.
Source: USDA-Kentucky Farm Service Agency, June 2006. CREP-May 2006 Approved Contracts.

Enrollment Period

Land would be authorized for enrollment through December 31, 2007. All CRP contracts for land enrolled in the CREP will be not less than 10 years or more than 15 years and will be subject to all normal CRP provisions as provided for in the CRP guidance. Program participants will have the opportunity to enter into the State incentive program and either extend the benefits of the CRP contract for another 15 or 35 years through a supplemental contract with Kentucky, or receive payment from Kentucky in return for executing a voluntary permanent easement with the State.

CREP Payments

Kentucky CREP participants are eligible for four types of USDA payments:

1. Signing Incentive Payment - a one-time payment of $140 to $150 per acre for land enrolled in a riparian buffer practice, filter strip, or grassed waterway. USDA makes this payment soon after the contract has been signed.
2. Practice Incentive Payment - payment equal to about 40 percent of the total cost for establishing the riparian buffer practice, filterstrip, or grassed waterway practice. This payment is in addition to the 50 percent cost share assistance that USDA provides.
3. Annual rental payment of 125 percent to 200 percent of the dryland cash rental rate, depending on the practice that is selected.
4. Cost share assistance for installing the conservation practices on land that is retired.

In addition, Kentucky can offer one-time lump sum incentive payments for contract extension or permanent easements and will provide additional cost-share assistance.

2.5 COMPARISON OF ALTERNATIVES

Table 2-2 compares the existing and proposed components of Alternatives 1 and 2. A total of 99,500 acres would be eligible for enrollment into the Kentucky Green River CREP. The expiration of the program would be December 31, 2007 for both alternatives.

Table 2-2: Comparison of Kentucky CREP Alternatives, 2006

Program Component	Alternative 1-No Action (Existing Program)	Alternative 2-Expanded Kentucky Green River CREP
Expiration	December 31, 2007	December 31, 2007
Contract Term	14-15 years	10-15 years; maintenance plans
CREP Boundary Area	917,197 acres	946,101acres, an increase of 28,904 acres into the program
Eligible Enrollment Acreage	Allows up to 99,500 acres for CREP enrollment; currently 10,813.3 acres are enrolled; 88,686.7 acres remaining for enrollment	Allows up to 99,500 acres for CREP enrollment; 88,686.7 acres remaining for enrollment
Targeted Lands for CREP	Green River Watershed counties: ▪ Adair ▪ Barren ▪ Edmonson ▪ Green ▪ Hart ▪ Metcalfe ▪ Russell ▪ Taylor	Green River Watershed, including the Barren River Watershed counties. Counties shown in bold are proposed areas for expansion: ▪ Adair ▪ **Allen** ▪ Barren ▪ **Butler** ▪ Edmonson ▪ **Grayson** ▪ Green ▪ Hart ▪ **Logan** ▪ Metcalfe ▪ Russell ▪ **Simpson** ▪ Taylor ▪ **Warren**
Eligible CRP Practices	▪ CP1 Introduced Grasses and Legumes ▪ CP2 Native Grasses ▪ CP3 Tree Planting ▪ CP3A Hardwood Tree Planting ▪ CP4B Permanent Wildlife Habitat (Corridors), Non-easement ▪ CP4D Permanent Wildlife Habitat, Non-easement ▪ CP8A Grassed Waterways, Non-easement ▪ CP9 Shallow Waterways for Wildlife ▪ CP10 Vegetative Cover--Grass--Already Established ▪ CP11 Vegetative Cover--Trees--Already Established ▪ CP12 Wildlife Food Plots	▪ CP1 Introduced Grasses and Legumes ▪ CP2 Native Grasses ▪ CP3 Tree Planting ▪ CP3A Hardwood Tree Planting ▪ CP4B Permanent Wildlife Habitat (Corridors), Non-easement ▪ CP4D Permanent Wildlife Habitat, Non-easement ▪ CP8A Grassed Waterways, Non-easement ▪ CP9 Shallow Waterways for Wildlife ▪ CP10 Vegetative Cover--Grass--Already Established ▪ CP11 Vegetative Cover--Trees--Already Established ▪ CP12 Wildlife Food Plots

Program Component	Alternative 1-No Action (Existing Program)	Alternative 2-Expanded Kentucky Green River CREP
	▪ CP15A Permanent Vegetative Cover (Contour Grass Strips), Non-easement ▪ CP21 Filter Strips ▪ CP22 Riparian Buffer ▪ CP23 Wetland Restoration ▪ CP25 Rare and Declining Habitat	▪ CP15A Permanent Vegetative Cover (Contour Grass Strips), Non-easement ▪ CP21 Filter Strips ▪ CP22 Riparian Buffer ▪ CP23 Wetland Restoration ▪ CP25 Rare and Declining Habitat ▪ **CP29 Marginal Pastureland Wildlife Habitat Buffer**
Program Cost	▪ $105 million total program cost: $88 million from the Federal Government; $17 million from the State; $5 million from The Nature Conservancy	▪ $109,510,000 total program cost; $87,510,000 from the Federal Government; $17 million from the State; $5 million from The Nature Conservancy

Source: MOA between CCC and Commonwealth of Kentucky for Implementation of the Conservation Reserve Enhancement Program.

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CHAPTER 3.0 AFFECTED ENVIRONMENT

Chapter 3 describes the natural, cultural, and social resources that exist within the proposed 14-county Kentucky Green River CREP area.

3.1 BIOLOGICAL RESOURCES

The Green River is the most biologically diverse branch of the Ohio River system. Although its upper headwaters are impounded, the river flows unhindered for more than 100 miles from Green River Reservoir to Mammoth Cave NP, the world's longest and most diverse cave system. The Upper Green River Basin also includes several recognized endangered ecosystems of the United States. These include native prairies, hardwood savannahs, canebrakes, and old-growth deciduous forest. Agricultural runoff significantly impacts the health and diversity of aquatic ecosystems. Habitat conversion to agricultural use has contributed to fragmentation of endangered riparian and upland ecosystems. [10]

3.1.1 Wildlife and Fisheries

The South-Central Kentucky karst region has cave species and biotic cave communities among the most diverse in the world. The Green River area below Green River Lake is considered to be one of the most diverse rivers for fish and mussel species in the United States. The upper Green River system historically harbored 66 mussel species, or 22 percent of North America's mussel fauna, including the endemic Kentucky creekshell (*Villosa ortmanni*). Eight of these mussels and one endemic crustacean are protected under the Endangered Species Act.

Based on the U.S. Army Corps of Engineers Green River Lake Sustainable River Project, the area includes over 151 species of fish and 71 species of fresh water mussels.[11] Of these species, more than 130 species are regular inhabitants within the Mammoth Cave system.

The Nature Conservancy (TNC) ranked the upper Green River fourth nationally in the number of imperiled aquatic species.[12] The following sections describe the aquatic and terrestrial species. This information was obtained from the National Park Service Mammoth National Park, Nature and Science, website at http://www.nps.gov/maca/pphtml/nature.html.

In 2005, the Kentucky Department of Fish and Wildlife Resources (KDFWR) completed a Comprehensive Wildlife Conservation Strategy (CWCS) which was developed to identify and conserve Kentucky's Species of Greatest Conservation Need and to comply with the requirements of the congressionally authorized State and Tribal Wildlife Grants (STWG) Program. This strategy represents a proactive plan for sustaining the diversity of species and habitats found throughout Kentucky. A total of 251 Species of Greatest Conservation Need were identified for Kentucky, representing species from seven taxonomic groups: bivalves, fishes, lampreys, amphibians, reptiles, birds, and mammals. Priority Conservations Areas were identified where many of these species can be found in relatively small regions. **Table 3-1** shows the classification of wildlife species, the total number of species, the number of species in need of conservation, and the number of threatened and endangered species.

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[10] Byron, William J. "Green River Lake, KY—Sustainable River Project." Text obtained from original Green River CREP proposal document.
[11] Ibid.
[12] Butler, Robert S., et al. "Down by the Green River." *Endangered Species Bulletin.* March-April 2003. Vol. XXVIII, No. 2, p. 20.

Table 3-1: Kentucky Wildlife by Classification, Number in Need of Conservation and Listed as Threatened or Endangered

Wildlife Classification	Total Number of Species	Species in Need of Conservation	Species Listed as Threatened or Endangered
Mussels	134	46	21
Fish	269	59	7
Amphibians	74	22	0
Reptiles	80	27	1
Birds	361	81	6
Mammals	94	16	3
TOTALS	**1,012**	**251**	**38**

*The criteria are based on the list of species monitored by Kentucky Heritage Program and NatureServe Global Rank. The list was modified based on biologists' knowledge of State endemics, species that are not well-studied, and potential re-introductions.
Source: *Kentucky's Wildlife Action Plan*, 2005. Executive Summary. http://fw.ky.gov/kfwis/stwg/and http://www.teaming.com/summary_reports/Kentucky.pdf

3.1.1.1 Aquatic Species

Currently there are many aquatic and semi-aquatic species of concern in the Green River and the Barren River Watersheds. These species of concern are discussed later in section 3.1.3. This section describes the most common aquatic species in the CREP area.

*Fish*es: Common species of fish that occur in the Green River system include white, largemouth, smallmouth and Kentucky bass; crappie; muskie; bluegill; muskellunge; yellow perch; gar; and catfish. Cave-adaptive fish species occur in the Mammoth Cave system, known generally known as eyeless fish. These unusual fish have adapted to lightless, low-energy environments and do not have eyes or skin pigment.

Amphibians: The following common amphibians are known to occur in the Green River basin: mudpuppy, hellbender, red-spotted newt, Jefferson salamander, spotted salamander, marbled salamander, tiger salamander, zigzag salamander, slimy salamander, eastern mud salamander, northern red salamander, northern two-lined salamander, long-tailed salamander, cave salamander, northern dusky salamander, small-mouthed salamander, eastern spadefoot toad, American toad, Fowler's toad, southern cricket frog, mountain chorus frog, spring peeper, gray treefrog, bullfrog, green frog, pickerel frog, leopard frog, wood frog, and eastern narrow-mouthed toad.

Invertebrates: The following crustaceans are found in area caves and streams: the endangered Kentucky cave shrimp, cave crayfish, partially cave-adaptive amphipod, crayfish, sculpin, and the springfish. Sediments of Mammoth Cave streams support nematodes or roundworms (undescribed), copepods, tardigrades, and oligochaete worms.

The aquatic and terrestrial ecosystems in caves are generally distinct and separate, but areas near cave streams are transitional. For example, mud banks support troglobitic beetles, which feed on worms and other small invertebrates. As part of the community dependent upon flood-deposited organic films, springtails are preyed upon by the troglobitic daddy longlegs. Troglobites are "cave dwellers" that can pass their life history either in cool, dark, moist areas outside the cave or inside caves if sufficient food is found.

Another major transition area develops at cave entrances when litter from vegetation accumulates, providing habitat for collembolans or springtails. Predators in these areas include the beetle (*Pseudanophthalmus*), and a mite (*rhagidid*).[13]

3.1.1.2 Terrestrial Species

Terrestrial wildlife commonly seen in the Kentucky Green River Watershed include white-tailed deer; red fox; small mammals, including cottontail rabbits, several types of squirrels, raccoons, opossum, skunks; wild turkey; eastern bluebird and other song birds; Northern bobwhites; migratory waterfowl, including Canada geese, great blue heron; bald eagle; and red-tail hawk. The following discussion provides an overview of the most common terrestrial species within the watershed.

Mammals. Mammals commonly seen in Mammoth Cave NP include whitetail deer, bobcats, foxes, muskrats, gray squirrels, flying squirrels, rabbits, opossums, raccoons, striped and spotted skunks, beaver, mink, groundhogs, chipmunks, moles, voles, shrews, mice, and woodrats. Woodrats and raccoons were formerly abundant in Mammoth Cave, but are fewer in number today. A reintroduction program for river otter has been initiated within the park and the rock shrew, nine-banded armadillo, pygmy shrew, or least weasel have also been recorded in Kentucky.[14]

Bats: Kentucky provides habitat for 14 species of bats, three of which are federally endangered: Indiana bat, gray bat, and Virginia big-eared bat. In addition to the variety of terrestrial habitats available to bats in Kentucky (e.g., upland forests, riparian corridors, forested wetlands, etc.), subterranean karst caves and sinkholes are abundantly scattered throughout the State. Caves and sinkholes offer breeding sites for gray bats and Virginia big-eared bats, and also provide important hibernacula for numerous species of bats that migrate from other States.[15]

Indiana bats, and to a lesser extent gray bats, were once prominent species in Mammoth Cave about 150 years ago, but today these species are federally protected and listed as endangered. Little brown bats were also abundant, whereas the big brown bat and eastern pipistrelle were less common. While many bat species still exist in Mammoth Cave, their numbers have been greatly reduced.

Reptiles: Among the reptiles in the area, the following species are known to occur:
fence lizard, slender glass lizard, six-lined racerunner, ground skink, coal lizard, five-lined skink, broad-headed skink; stinkpot turtle, snapping turtle, eastern box turtle, map turtle, slider, red eared turtle, smooth softshell turtle, eastern spiny softshell worm snake, northern ringneck snake, hognose snake, rough green snake, northern black racer, gray rat snake, northern pine snake, prairie king snake, scarlet king snake, black king snake, eastern milk snake, scarlet snake, northern water snake, northern brown snake, red-bellied snake, eastern garter snake, Butler's garter snake, eastern ribbon snake, southeastern crowned snake, northern copperhead, and timber rattlesnake.

Insects: Many insects are called troglophiles, which means essentially “cave lovers.” These creatures can only complete their life histories in caves. These troglophiles are in the form of spiders, mites, copepods, cave crickets, millipedes, and pseudoscorpions. Trogloxenes are “cave

[13] National Park Service, Mammoth Cave National Park; http://www.nps.gov/maca/pphtml/nature.html
[14] *Kentucky’s Comprehensive Wildlife Conservation Strategy 2005*, Kentucky Department of Fish and Wildlife Resources, #1 Game Farm Road, Frankfort, KY 40601; Web site: http//fw.ky.gov/kfwis/stwg/
[15] Ibid.

guests" and cannot complete their life history in caves. These creatures may be crickets, flies, and gnats as well as other non-insect creatures.

On mud banks, the troglobitic beetles *Pseudanophthalmus striatus*, *P. menetriesi*, and *Neaphaenops tellkampfi* prey upon worms and other small invertebrates. As part of the community dependent upon flood-deposited organic films, the springtails (*Folsomia candida*) and *Pseudosinella* are preyed upon by daddy longlegs (*Phalangodes armata*). At cave entrances, collembolans or springtails (*Tomocerus*, *Hypogastrura*, *Sinella*, and *Arrhopalites*) are found.

Cave crickets (*Hadenoecus subterraneus*) bury their eggs in sandy passages with moderate moisture in the constant temperature zone and blind cave beetles (*Neaphaenops*) often prey on those eggs. This beetle has the highest density of any species in Mammoth Cave after the cave crickets. The springtail (*Arrhopalites*) and the *dipluran Litocampa* are preyed upon by the mite *Arctoseius*, the spider *Anthrobia*, and the *pseudoscorpion Kleptochthonius*. These latter two are in turn preyed upon by blind cave beetles.

Cricket guano supports millipedes, springtails, plus bristletails, beetles, snails and mites. These species are preyed upon by the pseudoscorpion *Kleptochthonius*, the beetle *Pseudanophthalmus menetriesi*, the larval fly (*Macrocera nobilis*), and the spider *Phanetta*.[16]

Invertebrates: The following invertebrate species have been found in the Green River: ring pink, rough pigtoe, pistolgrip, fatmucket, spectaclecase, plain pocketbook, washboard, sheepnose, and snuffbox. Several of the mussel species are federally endangered. A snail (*Antroselates spiralis*) is known to occur in cave environments.[17]

Birds: Approximately 375 species of birds have been recorded in Kentucky, and of these, about 150 species are known to regularly breed in the State (B. Palmer-Ball, pers. comm.). These bird species include landbirds, waterbirds, shorebirds, and waterfowl.[18] The following birds have been recorded in the Green River Watershed: grebes, herons, geese, ducks, vultures, hawks, bald eagles, quail, wild turkey, sandpipers, doves, hummingbirds, kingfishers, whip-poor-wills, owls, flycatchers, crows, blue jays, chickadees, titmice, nuthatches, wrens, thrushes, catbirds, starlings, vireos, wood warblers, tanagers, cardinals, sparrows, blackbirds and finches.

3.1.2 Vegetation

Kentucky once encompassed a vast area of savannah grassland known as the "Barrens." This vegetation pattern was maintained by intentional burning by Native Americans before European contact. Although largely eliminated from the region by agricultural practice and fire suppression, small remnant stands of native grasses still exist comprised of varieties of Indian grass, big bluestem, and little bluestem. These varieties tend to be genetically distinct from their cousins in the Great Plains.[19]

[16] National Park Service, Mammoth Cave National Park, http://www.nps.gov//maca/pphtml/nature.html
[17] Ibid.
[18] *Kentucky's Comprehensive Wildlife Conservation Strategy 2005*, Kentucky Department of Fish and Wildlife Resources, #1 Game Farm Road, Frankfort, KY 40601; Web site: http//fw.ky.gov/kfwis/stwg/
[19] National Park Service, Mammoth Cave National Park, http://www.nps.gov//maca/pphtml/nature.html.

Oak-hickory forest is the predominant forest type.[20] Vegetation features second growth forests of various vintages and small areas of old growth. Old fields are largely dominated by eastern red cedar and Virginia pine mixed with deciduous trees along the outer margins. More mature upland sites are generally oak hickory forest, and in moist hollows, beech-maple-tulip poplar forest dominates.

Mesic Slope and Floodplain Forests - Moist ravines connected with the major river valleys support beech, maple, and tulip poplar in largely calcareous mesic habitats. On the floodplain alluvium, boxelder, sycamore, and river birch complement beech and maple.[21]

Cedar-Oak Glades - In the driest limestone habitat types (calcareous xeric and sub-xeric), especially on south to west facing slopes, cedar-oak glades prevail. These are sites where the dryness of the site is an important factor in limiting growth of deciduous trees other than drought-tolerant species, such as chinquapin oak and blue ash, and eastern red-cedar is not successional.

Ridgetop Pine-Oak Stands - Located on the dry edges of sandstone cliffs facing south to west, acid habitats support nearly pure but narrow stands of Virginia pine and chestnut oak. As with cedar-oak glades mentioned above, Virginia pine is not successional at these sites.

Prairie Ecosystem: Prairie grasses and forbs, such as big bluestem, Indian grass, goldenrod, and tall coreopsis, serve as refuges for species marginalized by conversion of former prairie on the sinkhole plain to agriculture.

Along the Green and Nolin Rivers, sycamore, silver poplar, river birch, box elder and American elm are found. Special communities of limited distribution include upland swamps with pin oak, red sweet gum, and red maple; deep sandstone hollows with hemlock and umbrella magnolia; dry limestone cedar oak glades; and cliff margin stands of Virginia pine on sandstone cliff margins. Patches of prairie, locally called “barrens” due to the lack of trees, were originally maintained by Native Americans through burning, and now exist only in remnant patches. Efforts to restore native prairie within Mammoth Cave NP are currently underway.[22]

Invasive Species: Often referred to as exotic, nonnative, alien, noxious, or non-indigenous weeds, invasive species impact native plant and animal communities by displacing native vegetation and competing with native species for food and habitat. As defined in *Executive Order 13112*, an "invasive species" is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., microbes). Human disturbance is the primary means of introducing invasive species into an area.

As a Federal agency, FSA must comply with *Executive Order 13112*, which prevents the introduction of invasive species and provides for their control. As conversion of cropland to grasslands, riparian areas, forestlands and wetlands can provide opportunities for non-native plants and animals to establish, monitoring converted farmland for these species and working with NRCS and FWS to prevent and eradicate these species is encouraged.

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[20] Commonwealth of Kentucky. “Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.” Submitted to the U.S. Department of Agriculture.
[21] National Park Service, Mammoth Cave National Park, http://www.nps.gov//maca/pphtml/nature.html.
[22] Ibid.

The most predominant exotic species noted by the Kentucky Nature Preserves Commission are—

- Bush Honeysuckle (*Lonicera maackii*)
- Chinese Yam (*Dioscorea oppositifolia*)
- Garlic Mustard (*Alliaria petiolata*)
- Japanese Honeysuckle (*Lonicera japonica*)
- Japanese Knotweed (*Polygonum cuspidatum*)
- Japanese Stilt Grass (*Microstegium vimineum*)
- Musk Thistle (*Carduus nutans*)
- Wintercreeper (*Euonymus fortunei*)

A more comprehensive listing of Kentucky's exotic and invasive flora and fauna can be found in **Appendix I.**

3.1.3 Protected Species and Habitat

The Green River Watershed ranks second to the Cumberland River drainage with respect to species diversity and endemism (Butler et al. 2003). Five darter species (teardrop darter, splendid darter, orangefin darter, Kentucky darter, and Shawnee darter), as well as the blackfin sucker, are endemic to the upper Green River drainage area, and one darter species (frecklebelly darter) is shared exclusively with the Kentucky River (Burr and Page, 1986; Ceas and Page, 1997). Three species in the cavefish family Amblyopsidae also occur in the karst region of the Green River. At least 20 of the 61 species listed as species of special concern, rare, or endangered by the Kentucky State Nature Preserves Commission are found in the Green River drainage.[23]

Table 3-2 lists the species and identifies their occurrence by CREP county. **Appendix E** presents a table listing the federally protected species by CREP county, as well as a listing of State-protected plant species identified by the Kentucky State Nature Commission.

Table 3-2: Federally and State Protected Species by CREP County, Kentucky

Common Name	Scientific Name	CREP County	Federal Status	KY Status
Bald eagle	*Haliaeetus Leucocephalus*	Adair, Allen, Barren, Russell, Taylor, Warren,	PS:LT, PDL	T
Catspaw	*Epioblasma Obliquata Obliquata*	Butler, Hart, Russell, Warren	LE	E
Clubshell	*Pleurobema Clava*	Butler, Edmonson, Grayson, Green, Hart, Taylor, Warren	LE, XN	E
Copperbelly water snake	*Nerodia Erythrogaster Neglecta*	Butler, Logan	PS:LT	S
Cumberland bean	*Villosa Trabalis*	Russell	LE, XN	E
Cumberlandian combshell	*Epioblasma Brevidens*	Russell	LE, XN	E
Fanshell	*Cyprogenia Stegaria*	Butler, Edmonson, Green, Hart, Russell, Taylor, Warren	LE	E

[23] *Kentucky's Comprehensive Wildlife Conservation Strategy 2005*, Kentucky Department of Fish and Wildlife Resources, #1 Game Farm Road, Frankfort, KY 40601; Web site: http//fw.ky.gov/kfwis/stwg/

Common Name	Scientific Name	CREP County	Federal Status	KY Status
Gray bat	*Myotis grisescens*	Adair, Allen, Barren, Edmonson, Grayson, Green, Hart, Logan, Metcalfe, Simpson, Taylor, Warren	LE	T
Indiana bat	*Myotis sodalis*	Adair, Allen, Barren, Edmonson, Grayson, Hart, Logan, Taylor, Warren	LE	E
Littlewing pearlymussel	*Pegias Fabula*	Logan	LE	E
Mammoth cave shrimp	*Palaemonias Ganteri*	Edmonson	LE	E
Northern riffleshell	*Epioblasma Torulosa Rangiana*	Edmonson, Grayson, Hart, Taylor, Warren	LE	E
Orangefoot pimpleback	*Plethobasus Cooperianus*	Hart, Russell	LE	E
Pink mucket	*Lampsilis Abrupta*	Butler, Russell, Warren	LE	E
Piping plover	*Charadrius Melodus*	Warren	LE, LT	N
Ring pink	*Obovaria Retusa*	Butler, Edmonson, Hart, Russell	LE	E
Rough pigtoe	*Pleurobema Plenum*	Butler, Edmonson, Green, Hart, Warren	LE	E

Source: Kentucky Dept. of Fish and Wildlife Resources. http://fw.ky.gov/kfwis/speciesInfo/CountyListSpecies.asp
Federal Listings: LE=Listed Endangered; LT=Listed Threatened; PS=Partial Status, indicating that the status only applies to a portion of the species range; PDL=Proposed delisting; XN=Nonessential Experimental Population
State Listings: E=Endangered; T=Threatened; N=None; S=Special Concern

Mammoth Cave NP is home to more than 70 threatened, endangered or State-listed species, including birds, crustaceans, fish, gastropods, insects, mammals, mussels, plants, reptiles, and aquatic species. Currently, there are many aquatic species of concern located within the Green River and Barren River Watersheds. These watersheds are identified as "hot spots" of aquatic diversity by both the Kentucky State Nature Preserves Commission and The Nature Conservancy because of the extreme diversity of aquatic species present in their waters. There are at least 11 aquatic species within the park boundary classified as either State or federally threatened or endangered. Nine of these are mussel species and two are fish.[24]

Table 3-3 lists the threatened and endangered species within the Green River and Barren River Watersheds.

[24] Commonwealth of Kentucky. "Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation." Submitted to the U.S. Department of Agriculture, p. 8.

Table 3-3: Aquatic Species of Concern within the Green River and Barren River Watersheds, Kentucky CREP

Common Name	Scientific Name	Classification
Mussels		
Spectaclecase	*Cumberlandia mondonta*	State Endangered/Federal Species of Concern
Fanshell	*Cyprogenia stegaria*	State/Federally Endangered
Catspaw*	*Epioblasma obliquata obliquata*	State/Federally Endangered
Longsolid	*Fusconaia subrotunda subrotunda*	State Special Concern
Pink Mucket	*Lampsilis abrupta*	State/Federally Endangered
Pocketbook	*Lampsilis ovata*	State Endangered
Sheepnose	*Plethobasus cyphyus*	State Endangered/Federal Species of Concern
Rough Pigtoe	*Pleurobema plenum*	State/Federally Endangered
Pyramid Pigtoe	*Pleurobema rubrum*	State Endangered
Fishes		
Spotted Darter	*Etheostoma maculatum*	State Threatened
Stargazing Minnow	*Phenacobius uranops*	State Special Concern

*The Catspaw is not found in any other watershed in the Commonwealth of Kentucky.
Source: Commonwealth of Kentucky. "Green River Conservation Reserve Enhancement Program," p. 8. Data compiled from Ky. State Nature Preserve Assessment of Hot Spots and Priority Watersheds for Conservation of Freshwater Mussels and Fishes.

Kentucky's Comprehensive Wildlife Conservation Strategy 2005, prepared by the Kentucky Department of Fish and Wildlife Resources, classifies much of the proposed CREP expansion area as a Tier I Priority Conservation Area, based on overlapping conservation areas for four or more taxonomic groups. This designation is limited to 14 percent of the State. [25]

Habitat Diversity. Kentucky possesses a range of habitat types due to the variability in the State's topography, soils, and water resources (i.e., streams, rivers, ponds, sloughs, lakes, and reservoirs). Elevations range from a high of 1,262 meters in the rugged mountains of southeastern Kentucky down to 78 meters in the Mississippi River floodplains of western Kentucky, with extremely variable types of topography and thousands of kilometers of streams in between (Jones 2005). Highly diverse plant communities are scattered throughout the State because of variations in soil properties, moisture, and slope characteristics (Jones 2005).

Kentucky's habitat variability supports a diversity of mammals that represents communities typical of the region as well as those found elsewhere. As examples, several animals reach their northern limit in or just north of Kentucky (e.g., Rafinesque's big-eared bat (*Corynorhinus rafinesquii*); swamp rabbit (*Sylvilagus aquaticus*)). Others are typical of southern States (e.g., cotton mouse, *Peromyscus gossypinus*), western States (e.g., prairie vole, *Microtus ochrogaster*; coyote, *Canis latrans*), northern States (e.g., meadow jumping mouse, *Zapus hudsonius*), or even the Appalachian Mountains (e.g., Appalachian cottontail, *Sylvilagus obscurus*; rock shrew, *Sorex dispar*) (Barbour and Davis 1974).

[25] *Kentucky's Comprehensive Wildlife Conservation Strategy 2005*, Kentucky Department of Fish and Wildlife Resources, #1 Game Farm Road, Frankfort, KY 40601; Web site: http//fw.ky.gov/kfwis/stwg/

3.2 CULTURAL RESOURCES

Consultation with the Kentucky Heritage Council was conducted in April 2006. The State Historic Preservation Officer (SHPO) submitted comments during the scoping period (see **Appendix D**). Based on the SHPO's comments, the Green River and its tributaries have a high density of significant archaeological sites. Specific concerns will be discussed in Chapter 4.

3.2.1 Archaeological Resources

The Kentucky Heritage Council has a unit call the Kentucky Archaeological Survey (KAS) whose mission is to provide a service to other State agencies, to work with private landowners to protect archaeological sites, and to educate the public about Kentucky's rich archaeological heritage. KAS is jointly administered by the Kentucky Heritage Council (State Historic Preservation Office) and the Department of Anthropology at the University of Kentucky.[26]

During the summer of 1996, KAS archaeologists conducted joint excavations with the Louisville District Corps of Engineers in Barren River State Park, Barren County. Work focused on recovering a small Mississippian site inhabited between A.D. 1260-1300. KAS archaeologists uncovered the remains of at least four houses. The houses were built in basins that measured about 15 feet on a side.

In addition to KAS, the National Park Service has conducted an archaeological survey within Mammoth Cave NP. Information on the discoveries within the park boundary can be obtained by accessing http://www.nps.gov/maca/archeo.htm. Cultures that were described in this survey included PaleoIndians, Archaic Indians, Woodland Indians, Mississippian Cultures and Proto-Historic Cultures.

In addition to Mammoth Cave NP within the Kentucky CREP area, the NPS administers Russell Cave National Monument, which was home to around 10,000 years of habitation by Pre-historic people. Russell Cave is unique to have had people from all five periods of southeastern prehistoric cultures listed in the preceding paragraph inhabiting the cave shelter. Russell Cave has an extensive archeological record that reveals detailed information about the way of life of the Pre-historic people who once lived in Russell Cave.

3.2.2 Traditional Cultural Properties

Indigenous tribes believed to have inhabited the area now known as Kentucky were the Cherokee, Chickasaw, Mosopelea, Shawnee, and the Yuchi. According to some early maps, the Yuchi had established a town in Kentucky on a river that appears to be identical with Green River. Hunting bands of Illinois, Miami, Iroquois, and Delaware were also thought to have passed through Kentucky at times.[27]

By the time the first white settlers moved to Kentucky following the Revolutionary War, much of the land was used as a hunting ground by the Shawnee, Cherokee, and other groups. Soon, white settlers pushed these few remaining tribes from their lands. So ended thousands of years of Native American settlement in Kentucky and Mammoth Cave NP.[28]

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[26] Kentucky Heritage Council, http://www.state.ky.us/agencies/khc/kas.htm.
[27] Copyright AccessGeneology.com "Kentucky Indian Tribes."
http://www.accessgenealogy.com/native/kentucky/index.htm
[28] Prentice, Guy. NPS Archeologist. Mammoth Cave National Park. http://www.nps.gov/maca/archeo.htm

On June 29, 2006, discussions with the U.S. Department of the Interior, Bureau of Indian Affairs, Easter Region Realty Officer, were conducted to determine the presence of Native American tribal lands within the expanded CREP area. No tribal entities and no lands held in trust exist in Kentucky.[29]

3.2.3 National Register Sites and National Historic Landmarks

Since the 1980s, the Kentucky Heritage Council has been recognized for its successful National Register Program. In fact, among all States, Kentucky has the fourth highest number of listings in the National Register of Historic Places. From 1998 to 1999, Kentucky gained 75 Register listings and 3 official Determinations of Eligibility, bringing its total to 3,015 listings overall. **Table 3-4** presents the number of National Register sites listed within each CREP county.

Table 3-4: Number of National Historic Register Sites by Kentucky CREP County

Kentucky CREP County	Number of Sites Listed in the National Register of Historic Places
Adair	9
Allen	11
Barren	20
Butler	20
Edmonson	18
Grayson	12
Green	44
Hart	10
Logan	20
Metcalfe	4
Russell	1
Simpson	14
Taylor	11
Warren	93
TOTAL	**287**

Source: National Park Service, National Register Information System (NRIS).
http://www.cr.nps.gov/nr/research/nris.htm June 2006

Of the 14 CREP counties, Warren County holds the most sites listed in the National Register. A listing of all the sites in the National Register of Historic Places by CREP county can be found in **Appendix F**. There are 30 National Historic Landmarks (NHLs) listed within the National Historic Landmarks Survey for the entire Commonwealth of Kentucky. A list of these NHLs is found at the end of **Appendix F**.

3.2.5 State Historic Sites

Kentucky offers 11 State historic sites. These are listed below:

- Boone Station, Lexington
- Constitution Square, Danville
- Dr. Thomas Walker, Barbourville
- Isaac Shelby Cemetery, Stanford
- Jefferson Davis Monument, Fairview
- Old Mulkey Meeting House, Tompkinsville
- Perryville Battlefield, Perryville

[29] Telecon with Randall Trickey and Eileen Carlton, BIA Eastern Region Realty Officer. June 29, 2006.

- Waveland Museum, Lexington
- White Hall, Richmond
- Wickliffe Mounds, Wickliffe
- William Whitley House, Stanford

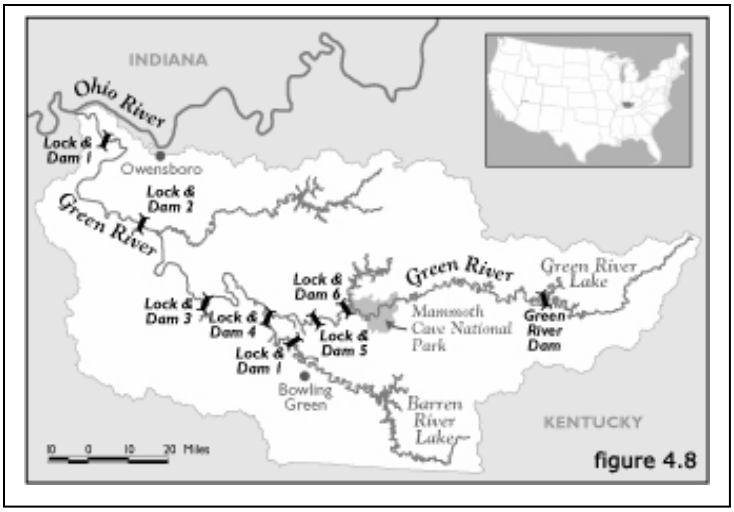
3.3 WATER RESOURCES

3.3.1 Surface Waters

The Green River is one of Kentucky's largest, longest, and most navigable rivers. It flows west creating Green River Lake and draining 12 counties before emptying into the Ohio River across from Evansville, Indiana. The Green and Nolin Rivers possess one of the most diverse array of fish (82 species) and invertebrates (51 mussel species) in North America. In addition, there are also approximately 200 species of benthic macroinvertebrates (bottom-dwelling creatures without a backbone, such as mussels, crustaceans, and insects) in these rivers. For these biological reasons, the Green River has been designated an "Outstanding Resource Water" by the National Park Service in the Nationwide Rivers Inventory (NRI).[30] The Green River is also considered the most biologically diverse and rich branch of the Ohio River system.

Although its upper headwaters are impounded, the river flows unhindered for more than 100 miles from Green River Reservoir to Mammoth Cave NP, the world's longest and most diverse cave system. There is a relict lock and dam (Lock and Dam #6) located on the Green River just upriver from Brownsville, KY, at river mile 181.7 (see **Figure 3-1**). This constraint impounds waters within the river channel approximately 16-17 miles depending on water levels. This lock and dam also impounds waters up a major tributary, the Nolin River, approximately 5 miles. This project was part of a collaborative The Nolin River flows into the Green River at river mile 183.5 within Mammoth Cave NP.[31]

Figure 3-1: Green River Lock and Dams, U.S. Army Corps of Engineers



Source: ©The Nature Conservancy. Sustainable Rivers Program. "Case Studies. Army Corps of Engineers Dam Operations." http://www.nature.org/initiatives/freshwater/work/art16854.html

[30] National Park Service, Nationwide Rivers Inventory; http://www.nps.gov/ncrc/programs/rtca/nri/states/ky.html

[31] The Nature Conservancy. Sustainable Waters Program. "Case Studies. Army Corps of Engineers Dam Operations." http://www.nature.org/initiatives/freshwater/work/art16854.html

In 2001, the Corps proposed removing Lock and Dam 6 to restore ecological conditions in the Green River and Mammoth Cave. In its environmental assessment of the dam removal proposal, the Corps explained that the locks and dams had caused a shift in river habitats from cool, free-flowing conditions to slower-flowing, warm-water conditions, to the great detriment of many of the river's species. Riffle and shoal areas with sand and gravel beds were eliminated by the navigation dams, replacing them with silty-bottomed artificial pools.

By removing Lock and Dam 6, the Corps can restore 27 kilometers of river habitat. In addition, the endangered Kentucky cave shrimp and innumerable other creatures in Mammoth Cave will likely benefit from the restoration of their habitats.[32]

The proposed Green River CREP expansion area would encompass 946,101 acres and extend the Green River CREP boundary to its confluence with the Barren River at river mile 149.5. This expansion would include the tributary watersheds contributing to the Green, including the Nolin River and Barren River systems upstream to their respective reservoirs. This area also includes the Difficult Creek, Trammel Creek, Buck Creek, and Bays Fork Creek Watersheds.

Normal flow of 16 miles of the Green River, 7 miles of the Nolin River, and many miles of cave streams in the park are slowed by Lock and Dam #6. Habitats for seven federally listed endangered aquatic species are seriously degraded through reduction of natural flow velocity and resultant siltation.

The 100-mile section of the Green River between the Green River Reservoir Dam and Mammoth Cave NP is the focus of a major TNC community-based habitat restoration project. The primary goals of this project are to reduce nonpoint source pollution and eliminate other stresses on aquatic habitats.[33]

The Green River and some of its tributaries contend with adverse effects related to agricultural activities. Section 303(d) of the Clean Water Act (CWA) requires States to identify waters that do not meet applicable water quality standards and for which a Total Maximum Daily Load (TMDL) must be approved. A TMDL is defined as the sum of wasteload allocations (for point sources) and load allocations (for nonpoint sources) which do not violate the loading capacity of a waterbody, i.e., do not violate water quality standards. In 2006, 12 TMDLs were approved in the entire State, which was up from four approved in 2004, but slightly lower than the 14 approved in 2001.[34]

As defined in the Act, water quality standards include the designated uses of a waterbody, the adopted water quality criteria and an antidegradation policy. Kentucky Regulations define water quality standards as beneficial uses to be made of a waterbody and the established water quality objectives. The Section 303(d) listing must include a description of the pollutants causing the violation of the water quality standards.

As mentioned above, the *2004 303(d) List of Waters of Kentucky*, prepared by the Kentucky Division of Water, lists 12 the surface waters within the Green River Basin that do not meet applicable water quality standards: four for the Upper Green, five for the Middle Green, and three

[32] Ibid.
[33] Butler, Robert S., Aquatic Fauna Recovery Specialist, U.S. Fish and Wildlife Service. *Endangered Species Bulletin*, March/April 2003. Vol. XXVIII, No. 2,
[34] U.S. Environmental Protection Agency and Kentucky Division of Water.

for the Lower Green.[35] The 1st Priority Listings[36] identified in the CREP counties include the following:

- Bacon Creek of Nolin River, Hart/Larue Counties
- Barren River of Green River, Allen County
- Bear Creek of Green River, Grayson County
- Big Creek of Russell Creek, Adair County
- Big Reedy Creek of Green River, Butler/Edmonson Counties
- Glens Fork of Russell Creek, Adair County
- Green River of Ohio River, Hart/Edmonson/Green Counties
- Nolin River of Green River, Hart/Grayson Counties
- Lake Cumberland, Russell County
- Barren River Lake Reservoir, Allen/Barren Counties
- Campbellsville City Lake Reservoir, Taylor County
- Caneyvillle Reservoir, Grayson County
- Green River Lake, Taylor/Adair Counties
- Rough River Lake, Grayson County
- Spa Lake, Logan County

Approximately 89,431 miles of rivers and streams flow through Kentucky, of which 6,992 miles are monitored by the State. Between 1997 and 1999, 34 percent of the rivers monitored were found to be impaired. Agricultural activities are the leading source of water pollution in monitored waterways based on the most available data. Contaminated runoff containing agricultural nutrients and chemicals is impacting 25 percent of the monitored impaired stream miles.

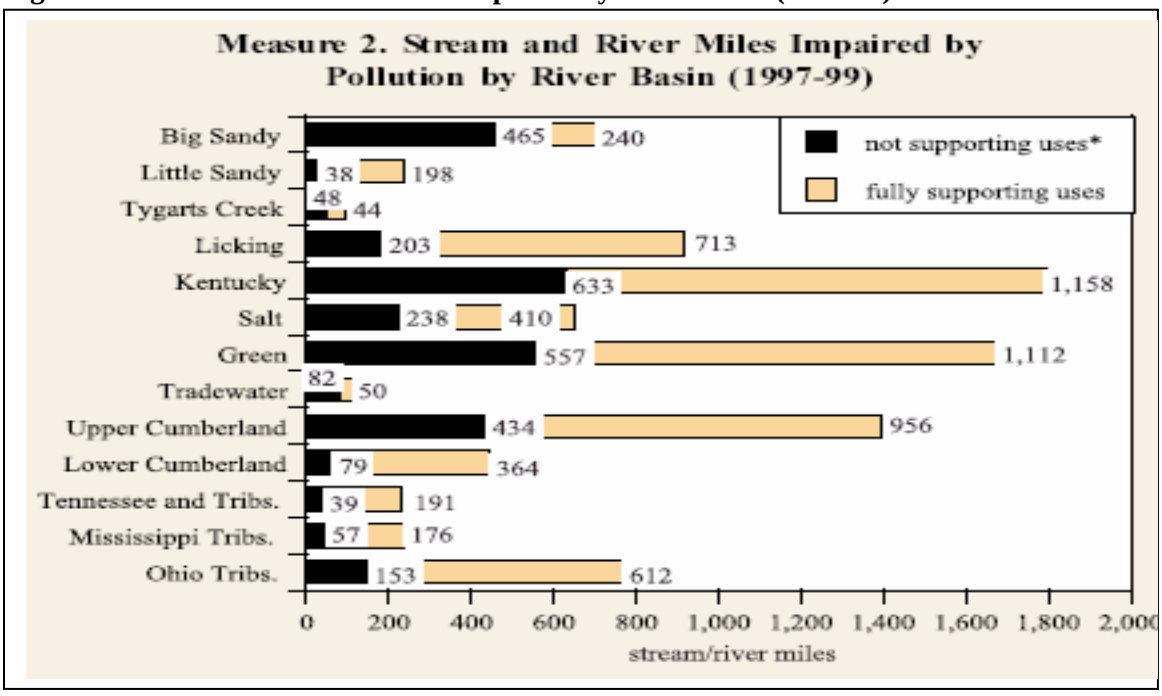
The Green River is rated the fourth most biodiverse stream, particularly for fish and mussel species in the United States. Despite its outstanding qualities, sections of the river and its tributaries experience significant impairment from various sources of pollution. Refer to Chapter 3 for more detail on the streams and water quality in the area.

As a result, a number of segments are listed in the State's listing of impaired waters, which are required under Section 303(d) of the Clean Water Act. For most of the Section 303(d) river segments listed in the List of Impaired Waters for Kentucky, agriculture is the principal source of contamination (refer to Chapter 3). **Figure 3-2** illustrates the percentage of stream and river miles impaired by pollution by river basin. Note that in 1997-99 the Green River has 557 river miles that are impaired and cannot support designated uses. **Figure 3-3** illustrates the percentage of the sources of pollution found in Kentucky's waterways in 1997-99.

The Kentucky Agriculture Water Quality Act, enacted in 1994, requires all farms greater than 10 acres in size and that meet the definition of an agricultural operation to develop and implement water quality plans to protect water quality and prevent pollution. As of June 2001, 32,592 agriculture operations (36 percent of the State's 91,000 farms) had voluntarily filed plans with the State Conservation Districts, based on the finding in the *2000-2001 State of Kentucky's Environment*.[37]

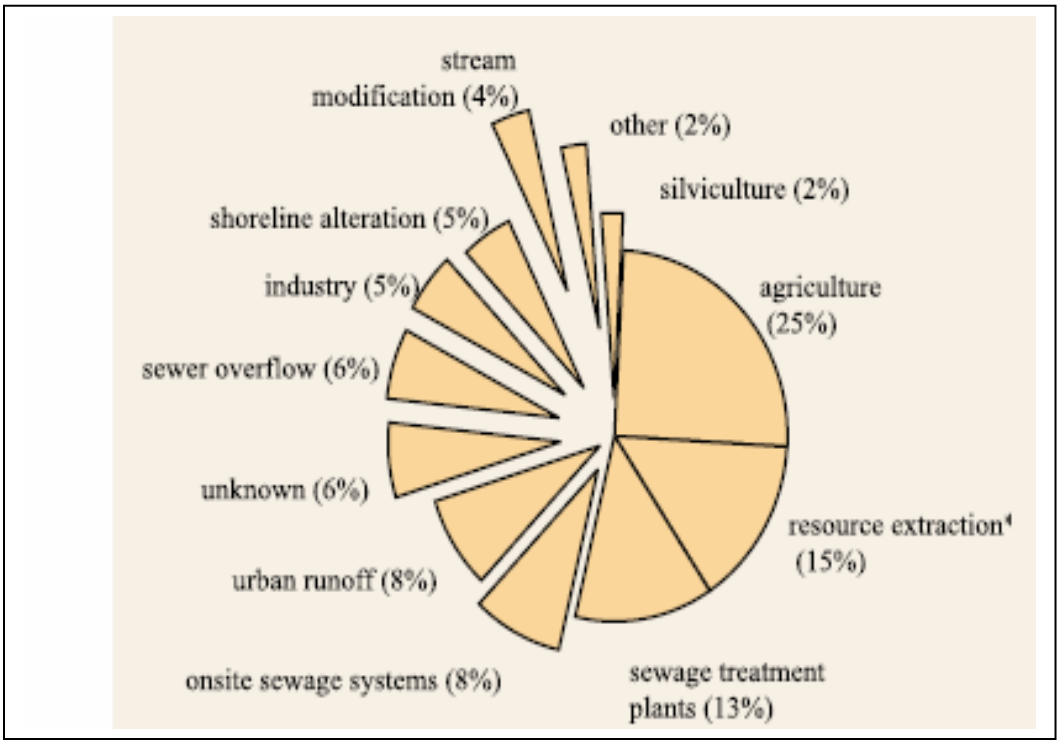
[35] Kentucky Division of Water, September 2005. *2004 303(d) List of Waters for Kentucky.*
[36] Waters on the 1st Priority Listing are those that are impaired or threatened by one or more pollutants or an unknown cause.
[37] Commonwealth of Kentucky. *2000-2001 State of Kentucky's Environment*. "Water Resources," pp. 30.

Figure 3-2: Stream and River Miles Impaired by River Basin (1997-99)



Source: *2000-2001 State of Kentucky's Environment*, p. 30.

Figure 3-3: Sources of Pollution to Pollutions to Kentucky Stream and River, 1997-99



Source: *2000-2001 State of Kentucky's Environment*, p. 30.

3.3.2 Groundwater

Groundwater is the water from rain or melting snow that soaks into the ground to fill the cracks and cavities in soils and rocks. Much water transport within the CREP region occurs in underground conduits rather than surface streams. The groundwater that flows underground from the sinkhole plain south of Mammoth Cave NP into the Green River through countless springs. Among the most notable springs in Mammoth Cave NP are River Styx Spring, Echor River Spring and Turnhole Spring.[38]

Groundwater has been intensively studied for years at Mammoth Cave NP. Base-line water quality inventories have been done, as well as investigations into the mechanisms of non-point contaminant transport and water quality. Mammoth Cave NP also operates several continuous-recording digital water monitoring sites, which yield data on the physical and chemical characteristics of the groundwater.

Large portions of the upper Green River Watershed and the groundwater basins affecting Mammoth Cave NP are beyond the park's boundaries, but activities in these areas greatly influence water quality within the park. The primary activities that influence the park's water quality include: disposal of domestic, municipal and industrial sewage, solid waste disposal, agricultural and forestry management practices, oil and gas exploration and production, urban land-use and recreational activities.[39]

Several measures have been undertaken to protect groundwater resources in Kentucky, including promulgating regulations requiring facilities that have the potential to pollute groundwater to develop and implement groundwater protection plans by 2003. The Kentucky Division of Water established a statewide Ambient Groundwater Monitoring Program in 1995. Samples from more than 260 wells had shown that various pesticides had been detected in springs and wells sampled.

The percentages of chemicals above State standards in sampled springs are shown below:

- Metolachlor 5.44 percent
- Benzene 2.3 percent
- Atrazine 1.34 percent
- Nitrates 0.34 percent
- Fluoride 0.12 percent

The percentages of chemicals above State standards in sampled wells are shown below:

- Nitrates 4.3 percent
- Atrazine 2.8 percent
- Fluoride 0.9 percent
- Metolachlor 0.88 percent

Other major sources of groundwater contamination in Kentucky included the following:

- Animal feedlots
- Landfills
- Mining and mine drainage
- Septic systems
- Spills

[38] National Park Service, Mammoth Cave National Park, http://www.nps.gov//maca/pphtml/nature.html.
[39] Ibid.

- Underground storage tanks
- Runoff

Despite of these groundwater pollutants, the Kentucky Division of Water considers groundwater quality generally good throughout the State. The State has implemented three major programs to help protect groundwater:

1) the Groundwater Protection Plan Program, which requires development and implementation of a protection plan by anyone conducting activities that could have the potential to pollute groundwater.
2) The Wellhead Protection Program, which requires public water supplies that rely on groundwater to delineate the recharge area of the well or spring from which it draws its water, identify potential contaminant sources in the area and implement groundwater protection strategies.
3) Drillers Certification Program, which requires certification of water wells.

3.3.3 Aquifers

There are no sole-source aquifer recharge areas designated by EPA within the Commonwealth of Kentucky. The KYCREP involves water supplies of 83 reservoirs that provide water for 58 public water suppliers. [40] The KYCREP is located in karst topography with hundreds of sinkholes occurring throughout the area, many of which feed into one of the world's largest and most diverse cave systems. The primary geological feature of the KYCREP area is the "sinkhole plain," which lies in the Western Pennyroyal. This area drains southern Hart and Edmonson Counties and northern Barren County. The sinkhole plain serves as the underground watershed for the Green River. It also includes the karst aquifers that drain into the Mammoth Cave system.[41] A portion of the area's sinkhole plain currently lies within the existing Green River CREP area and much of it would be included within the KYCREP under the proposed expansion plan (Alternative 2). **Figure 3-4** shows a field within the sinkhole plain.

Figure 3-4: Aerial Photograph of a Field within the Sinkhole Plain

Source: *Green River Conservation Reserve Enhancement Program. Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.*

[40] USDA-FSA. Preliminary Programmatic Environmental Assessment Kentucky Conservation Reserve Enhancement Program.

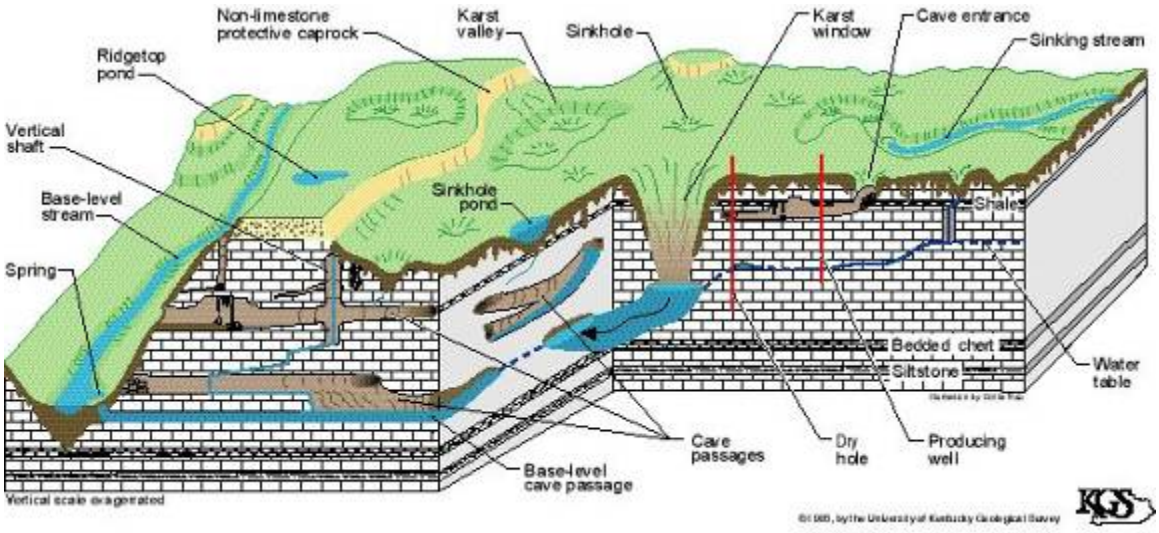
[41] Commonwealth of Kentucky. "Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation." Submitted to the U.S. Department of Agriculture, pp. 6-7.

The following text describes the sinkhole plain and karst drainage. This text was extracted from the Kentucky Division of Water's *The Green and Tradewater Basins Status Report 2001*:

> "Karst landscapes and their associated aquifers are very important features in parts of the Green River Basin. These are areas of soluble limestone bedrock where the bedrock has dissolved, leading to the development of caves, sinkholes, sinking streams, and underground rivers. Indeed, the Green River Basin contains some of the world's most famous and well-developed karst areas, including the longest known cave, the Mammoth Cave System. Due to the spectacular nature of karst development within the basin, parts of Hart, Barren, and Edmonson Counties have not only been protected with the establishment of Mammoth Cave NP, but have been designated by the United Nations as a World Heritage Site and International Biosphere Reserve.
>
> Within the Green River Basin, contaminants can be introduced to karst groundwater from urban, industrial, and agricultural sources. Nowhere is this a more significant concern than in the sinkhole plain. The sinkhole plain extends from Hart County to the northeast, through Mammoth Cave NP, into Logan County in the southwest. An especially severe and widespread problem is bacterial contamination from human and animal waste."[42]

Figure 3-5 is an illustration that represents the dynamics of the sinkhole plain and Mammoth Cave. The sinkhole plain is the underground watershed for the Green River above the existing western boundary, including the karst aquifers that drain into Mammoth Cave NP. As this sinkhole plain trends southeastward, the underground water flows to base level streams outside of the existing boundary, including the Barren River.

Figure 3-5: Diagram of the Dynamics of Mammoth Cave and the Sinkhole Plain



Source: Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program. Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.*

[42] Reynolds, Dale. *The Green and Tradewater Basin Status Report 2001*, Kentucky Division of Water.

3.3.4 Wetlands

Under Executive Order 11990, *Protection of Wetlands*, wetlands are "those areas that are inundated by surface or groundwater with a frequency sufficient to support and, under normal circumstances, support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as potholes, wet meadows, river overflows, mud flats and natural ponds." Approximately 789.2 acres of wetlands (0.08 percent of the proposed area) would be included in the CREP expansion area.[43]

3.3.5 Floodplains

Floodplains are defined in Executive Order 11988, *Floodplain Management*, as "the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year;" i.e., the area that would be inundated by a 100-year flood. Executive Order 11988 directs Federal agencies to "take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare and to restore and preserve the natural and beneficial values served by floodplains…".

Chapter 151 of the Kentucky Revised Statutes (KRS), approved in 1966, is Kentucky State Statute 151, which addresses the development of floodplain areas. The most pertinent sections of KRS 151 are—

1) KRS 151.250, which establishes the requirements for obtaining a floodplain development permit;
2) KRS 151.125, which establishes the authority and powers of the secretary of the Natural Resources and Environmental Protection Cabinet to administer KRS 151; and
3) (3) KRS 151.320. Pursuant to KRS 151, the Division of Water in the Kentucky Natural Resources and Environmental Protection Cabinet is the State coordinating agency for the National Flood Insurance Program (NFIP).

In July 2002, the U.S. Army Corps of Engineers and TNC formed a partnership to restore and preserve rivers across the country. This partnership, known as the "Sustainable Rivers Project," focused its efforts in Kentucky on the Green River habitat below Green River Lake.[44] Green River Lake is a multipurpose lake providing flood control, water supply, water quality and recreational benefits to the Green River Basin and Lower Ohio River Basin. The lake was authorized by the Flood Control Act of 1938 and began operation in February 1969. The drainage are above the dam is 682 square miles. The dam was constructed of earth and fill material and is controlled by a gated concrete control structure and conduit system located at the base of the dam. There is minor capability for release of water from different levels of the impounded pool.

The lake maintains a pool elevation of at least elevation 664 during the winter months. Around mid-March the lake stores spring runoff and to build an 11 ft conservation storage pool. This pool allows the lake to maintain a desired minimum low flow below the dam during normal low flow periods of the year and provides a recreation pool through the summer and early fall. It is a goal for the lake to reach the conservation pool (a.k.a. summer pool) by mid-April. At the end of

[43] Commonwealth of Kentucky. "Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation." Submitted to the U.S. Department of Agriculture, p. 5.
[44] Byron, William J. Chief Water Management, CELRL-ED-TW., U.S. Army Corps of Engineers. "Green River Lake, KY—Sustainable River Project."

the recreation season the lake begins releasing from the conservation storage in order to return to the normal pool elevation of 664 by early December. This lake drawdown begins slowly in mid-September and increases in mid-October.[45]

Throughout the year the lake is operated to store flood waters when river levels below the dam are above target stages and release the accumulated flood storage as fast as possible when levels below recede below their target stages. The lake was designed to release at maximum outflow of 8,000 cfs during non-crop periods and 5,300 cfs during crop periods. Following the dam's early operational years downstream, property owners slowly encroached on the stream to a point where maximum outflows were reduced to about 6,000 cfs during non-crop periods and 4,400 cfs during crop periods.

During non-flood periods, the lake is operated to maintain elevation near the guide curve by regulating outflow and to release at least a minimum of 50 cfs. The lake also follows a tailwater temperature guide curve that was developed in the early 1970s in cooperation with FWS.[46]
The direct effects resulting from this effort was early enrollment of the lowest lying properties in the area into CREP. This eliminated many problems experience by the Corps District with discharges from lake operations impacting properties downstream. This project is contributing to improvements in the downstream aquatic ecosystem, the same resource that the Kentucky Green River CREP is designed to protect and enhance.

This partnership indirectly led to other successful projects within the watershed designed to improve the riparian and ecological habitat while still maintaining flood control in the basin. Modifications to the operation of the Green River Dam were evaluated through a 3-year trial period to assess the impacts that were identified as potential ecological improvements in the downstream target areas. The Green River Lake operational modifications will provide improved ecological management for the environment while continuing to provide its authorized benefits to the Green River Basin.[47]

3.4 SOIL RESOURCES

The proposed expanded CREP region is situated on the Mississippian Plateau. There are three primary physiographic subdivisions that describe this area: the Eastern Pennyroyal, which is primarily in Allen and southern Barren Counties; the Western Pennyroyal, which underlies Barren, Warren, Simpson, and Logan Counties; and the Western Coal Field, which extends through Butler, Grayson, and Edmonson Counties.
The Eastern Pennyroyal subdivision lies in the extreme southeastern portion of the expanded KYCREP area and is underlain by Pennsylvanian and Silurian sedimentary rock layers. The predominant soils in this area are ultisols and inceptisols. Watersheds include Difficult Creek, Trammel Creek, Buck Creek, and Bays Ford Creek.

Just to the northwest of the Eastern Pennyroyal is the largest area of the three physiographic subdivisions, the Western Pennyroyal. This region is underlain by Mississippian and some Ordovician limestone, calcareous shale, sandstone, siltstone, and shale. The predominant soils in

[45] Ibid.
[46] Ibid.
[47] Letter from Michael Turner, Chief, Economics and Environmental Resources, U.S. Army Corps of Engineers, dated Apr. 19, 2006, to Joyce Hobbs, State Environmental Coordinator, Kentucky FSA; and "Green River Lake, KY—Sustainable River Project," William J. Byron, Jr., Chief, Water Management, CELRL-ED-TW, U.S. Army Corps of Engineers, Louisville District.

this area are alfisols. The sensitive "sinkhole plain" exists mainly in the Western Pennyroyal area where much water transport occur in underground conduits rather than surface streams.[48]

The Western Coal Field lies in the northern reaches of the proposed CREP expansion area and spans Butler, Grayson, and Edmonson Counties. This subdivision is underlain by Pennsylvanian sandstone, siltstone, shale, and limestone. The predominant soil is thin loess. The primary watersheds in this area include the Green River, Alexander Creek, Bear Creek, and Big Reedy Creek. [49]
The "sinkhole plain" drains southern Hart and Edmonson Counties, and northern Barren County, and essentially is the underground watershed for the Green River. It also includes the karst aquifers that drain into Mammoth Cave NP. As the sinkhole plain trends southeastward, the groundwater flows to base level streams outside of the existing CREP boundary.[50] More information on the sinkhole plain is provided in **section 3.3.3 Aquifers**.

North of the Green River an alternating series of limestone and insoluble rocks are exposed with the main limestone strata accessible only near the river and in the bottom of a few deeply incised valleys. This formation has resulted in rugged topography with streams that alternately flow on insoluble rocks, over waterfalls, enter caves in limestone and resurface at springs perched on the next lower stratum of insoluble rock. South of the Green River, the insoluble sandstone and shale caprock over the limestone has preserved significant portions of Mammoth Cave.

CREP practices are eligible for use with highly erodible lands (HEL):

- CP1 Introduced Grasses
- CP2 Native Grasses
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (corridors)
- CP4D Permanent Wildlife Habitat
- CP10 Grass Cover - Already Established
- CP11 Tree Cover - Already Established
- CP12 Wildlife Food Plots
- CP25 Rare and Declining Habitat

3.5 AIR QUALITY

The Commonwealth of Kentucky has operated an air-quality monitoring network since July 1967. This network includes 143 monitors located in 31 counties, three of which are located in the following counties within the proposed CREP area:

1) Mammoth Cave National Park in Edmonson County,
2) Simpson County, and
3) Warren County.

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[48] Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.* Submitted to the U.S. Department of Agriculture, p. 6.
[49] Information on physiographic characteristics obtained from "HUC 11 Narratives," Kentucky Division of Water, Dale Reynolds.
[50] Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.* Submitted to the U.S. Department of Agriculture, p.5.

Data from the network are used to demonstrate compliance with and/or progress toward meeting EPA's ambient air quality standards and to identify pollution trends. The data are also used to provide pollutant levels for daily air quality index reporting and to detect elevated pollutant levels for activation of emergency control procedures, if necessary.

Mammoth Cave NP is situated in an industrialized part of the United States where a number of coal-fired power plants line the Ohio Valley. Recently, a number of new power plants have been proposed in Kentucky and Tennessee, and the emissions from those sources are likely to affect air quality at the park. The park extends through Edmonson, Barren, and Hart Counties. All three counties are classified as in attainment under EPA's National Ambient Air Quality Standards (NAAQS).

The park has operated an air monitoring station since 1992. Enhanced, high sensitivity air quality monitoring instrumentation was installed at Green River Bluffs Overlook, a monitoring site to measure ozone, sulfur dioxide, carbon monoxide, nitric oxide, mercury vapor, and particulate matter (PM). PM is composed of tiny particles of a solid, such as smoke, or liquid that is suspended in a gas. PM is monitored as part of the National Park Service's IMPROVE visibility program. IMPROVE is the Interagency Monitoring of Protected Visual Environments program composed of representatives from Federal and regional-State organizations. IMPROVE was established in 1985 to help with the development of Federal and State Implementation Plans (SIP) for the protection of visibility in Class I areas, as stipulated by the Clean Air Act, as amended.

Mammoth Cave NP is one of 49 national park system units designated as a Class I area by the Clean Air Act, as amended, and is Kentucky's only Class I area. A Class I area is one that receives the most stringent degree of air quality protection within and around its borders. For example, potential new or modified sources of significant pollution that plan to locate near a Class I area must obtain a permit from the State. The NPS has significant input to the permitting process to ensure that potential air emissions do not pose a threat to visibility or other park air quality related values.[51]

Another air quality concern facing the park relates to a 1,500-megawatt coal-fired power plant proposed by Peabody Energy in Muhlenberg County about 50 miles west of the park. In August 2002, the U.S. Department of the Interior requested that the State lower the plant's emissions limit to a level that would not induce an adverse impact on visibility at Mammoth Cave NP. In October 2002, the Commonwealth of Kentucky issued an air permit but in the spring of 2004, this project has suspended due to improper procedures that occurred in filing this permit. This project is currently in court pending a decision.[52]

Based on data from the IMPROVE Program, Mammoth Cave was ranked fifth in a list of national parks with the worst annual average visibility as measured in miles, although the site has shown a significant improvement in recent years (NPS 2002). With respect to ozone, the park area is in attainment with the one-hour standard, but has shown a significant degradation trend over the 1990s, similar to the conditions found in Great Smoky Mountains National Park in nearby Tennessee and North Carolina.[53]

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[51] Telecon with Bob Carson, Air Quality Specialist, Mammoth Cave National Park, Aug. 9, 2006.

[52] Notice of Intent Paradise-Wilson Transmission System Upgrades. http://www.tva.gov/environment/reports/paradise-wilson/#purpose

[53] EA Engineering, Science, and Technology. November 2002. *2000 Air Emissions Inventory Mammoth Cave National Park.*, pp. 10-12.

Visibility at Mammoth Cave ranges from 10 to 17 miles during the summer and 60 miles in the winter. The average visibility year-round at the park is about 30-35 miles. Based on the deciview scale for visibility, visibility should be 88 miles.[54] Deciview is a scale that makes changes in visibility based on what one can see rather than in miles. It is analogous to the decibel scale for sound. Higher decivew levels are hazier whereas lower deciview levels are clearer.[55]

Discussions with the park's air quality specialist identified major air quality issues in the region and how these issues affect not only the park's resources, but resources that are external to the park as well. These issues included haze and visibility impacts, mercury deposition, acidification, and ozone. Sources of these impacts include emissions from mobile sources, coal-fired power plants, and biogenic sources, such as off-road vehicles and fires.

A National Atmospheric Deposition Program/National Trends Network (NADP/NTN) wet deposition monitor has been in operation at Mackville, Kentucky, located about 62 miles northeast of the park, since 1983. The Commonwealth of Kentucky has monitored the chemistry and amount of precipitation at Mammoth Cave since 1992. A comparison of State and NADP/NTN data shows the Mackville site likely underestimates pollutant deposition at Mammoth Cave NP. A NADP/NTN monitor, a Mercury Deposition Network monitor, and a Clean Air Status and Trends Network (CASTNET) monitor will be installed at the park in the near the future.[56]

A CASTNet dry deposition site monitor has also been operating at Mackville since 1990. Data gathered from this site show a decrease in dry sulfur deposition, but no trend in dry nitrogen deposition. CASTNet estimates total nitrogen deposition at the site is composed of 38 percent dry deposition and 62 percent wet deposition, while total sulfur deposition is 50 percent dry and 50 percent wet.

Limited soil studies also indicate some soils in the park are sensitive to acidification from atmospheric deposition. Surface water chemistry data collected in the Green and Nolin Rivers confirm that the rivers are well buffered against acidification. Although the chemistry of small creeks in Mammoth Cave NP has not been systematically monitored, concern has been expressed by park staff that acidification occur in ponds and water up on the ridges. There is also concern that during rainstorms, when there is little opportunity for rainwater to come into contact with deep soils, episodic acidification could occur. Park staff noted that sulfates have been showing a downward trend and nitrates are holding steady. [57]

Ozone has been monitored at Mammoth Cave NP since 1985. Data from monitoring sites indicate that ozone concentrations in the park consistently have exceeded levels known to cause foliar injury and growth loss in certain species of vegetation. There are 19 species known to be sensitive to ozone within the park. Surveys of the effects of ozone on park vegetation were conducted in the 1980s and foliar injury was observed on a number of plants.

As part of the IMPROVE network, visual air quality in Mammoth Cave NP has been monitored. EPA's regional haze regulations require improving visibility in Class I air quality areas on both the best visibility and the worst visibility days. A review of aerosol data collected at Mammoth

[54] Telecon with Bob Carson, Air Quality Specialist, Mammoth Cave National Park, Aug. 9, 2006.
[55] Deciview definition provided by Clean Air Task Force, http://www.catf.us
[56] National Park Service, Nature and Science, Air Resources Division. "Mammoth Cave National Park Air Quality Information." http://www2.nature.nps.gov/air/Permits/ARIS/maca/
[57] Ibid.

Cave NP show no significant trend in visibility on good, bad, or average visibility days since 1991. Although the park reports slight improvements in regional haze, this condition has not been improving as rapidly as the park would like.

The component that relates most directly to agriculture is particulates, which are small particles of dust, dirt, chemicals and soot in the air. Concerns about the impacts of particulates on public health prompted the U.S. Environmental Protection Agency (EPA) to issue a PM_{10} standard in 1987 to control particulates that are 10 microns in diameter or smaller. Particulates are emitted from cars, construction sites, agricultural operations and roads. The largest source of particulates in 1998 was fugitive dust, followed by agriculture and forestry activities.[58]
Air monitors are measuring particulates based on the PM_{10} standard developed in 1987. The closest air monitoring station is located at Mammoth Cave NP. Since 1983, a National Atmospheric Deposition Program monitor has been operating at Mackville, Kentucky, 100 km northeast of the park (site #KY03). The Commonwealth of Kentucky has monitored precipitation amount and chemistry at Mammoth Cave NP since 1992. A comparison of State and NADP/NTN data indicates the Mackville site likely underestimates pollutant deposition at Mammoth Cave NP. A NADP/NTN monitor, along with a Mercury Deposition Network monitor, will be installed at the park this year.

Ozone has been monitored at Mammoth Cave NP since 1985. The data show ozone exceeded the 1-hr human health-based primary National Ambient Air Quality Standard (NAAQS) in 1987, 1988, and 1999, and has exceeded of the updated 8-hr primary NAAQS.

Ozone injury surveys were conducted in the park in the 1980s and foliar injuries were observed on a number of species of plants. Ozone concentrations in Mammoth Cave NP consistently exceed levels known to cause foliar injury and growth loss in sensitive species of vegetation.

Industrial development near the park, such as coal-fired power plants that emit sulfur dioxide and other pollutants, has contributed to the region's air quality problems, as have other industrial development and nearby interstate highway traffic.[59]
EPA's new Regional Haze regulations require improving visibility in Class I air quality areas on both the best visibility and the worst visibility days. A review of aerosol data collected at Mammoth Cave NP shows no significant trend in visibility on good, bad, or average visibility days since 1991.

The park reports that Western Kentucky University will investigate the fate and transport of mercury in the karst aquifer system of Mammoth Cave. The researcher hopes to 1) establish the extent, occurrence, and distribution of mercury in groundwater, surface water, and sediments in the park; 2) determine the level of mercury in fish and mussels in the park; and 3) investigate the fate and transport characteristics of mercury in a karst aquifer. This study, combined with mercury deposition monitoring, will give the National Park Service a better understanding of how mercury emissions from power plants and other sources are affecting resources at Mammoth Cave NP.[60]

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[58] *2000-2001 State of Kentucky's Environment*. Particulates. P. 54.
[59] "Air, Water Quality Remain Concerns at Kentucky's Mammoth Cave." ©Associated Press, *USA Today*, June 22, 2006.
[60] National Park Service, "Mammoth Cave National Park Air Quality Information." http://www2.nature.nps.gov/air/Permits/ARIS/maca/

In June 2006, an article appeared online at the *USA Today* website, noting that one of the biggest issues for Mammoth Cave has been air quality. According to the article, a group of national environmental groups listed Mammoth Cave NP as one of the country's five most polluted parks in 2004, citing ozone concentration and particulates as the main source of their criticism. Coal-fired power plants in the area that emit sulfur dioxide and other pollutants have contributed to the problem, as have other industrial development and nearby interstate highway traffic.

Recent studies on air quality at Mammoth Cave NP show that the air quality is neither improving nor worsening; in fact, according to the park air quality specialist, ozone concentrations and visibility have improved since the early 1990s.[61] **Table 3-5** shows the principal sources of particulates (PM_{25}) emissions in Kentucky during 1998.

Table 3-5: Principal Sources of PM_{25}) Emissions in Kentucky, 1998

Source of Emission	Percent
Fugitive dust	60.8%
Agriculture and forestry	20%
Residential wood combustion	3%
Open burning	2.4%

Source: *2000-20001 State of Kentucky's Environment,* p. 54.

Particulate matter (PM) has been improving on hazy days and slightly on clean days. By 2064, the goal is to achieve a natural background at Mammoth Cave. The definition of a "natural background" has not yet been specified, but the objective is to try to achieve an ambient level that was pre-industry. [62]

Limited soil studies also indicate some soils in the park are sensitive to acidification from atmospheric deposition. Surface water chemistry data collected in the Green and Nolin Rivers confirm that the rivers are well buffered against acidification. Although the chemistry of small creeks in Mammoth Cave NP has not been systematically monitored, concern has been expressed by park staff that acidification occur in ponds and water up on the ridges. There is also concern that during rainstorms, when there is little opportunity for rainwater to come into contact with deep soils, episodic acidification could occur. Park staff noted that sulfates have been showing a downward trend and nitrates are holding steady. [63]

USGS and Western Kentucky University have been conducting studies of mercury found in fish in the Green River within the park boundary. The fish survey showed 1 ppm of mercury in bass, compared with EPA's threshold of 0.3 ppm as an acceptable level for mercury in fish. As part of this collaborative study, Western Kentucky University is also investigating mercury in the karst aquifer system of Mammoth Cave NP. The objectives of this study are to: 1) establish the extent, occurrence, and distribution of mercury in groundwater, surface water, and sediments in the park; 2) determine the level of mercury in fish and mussels in the park; and 3) investigate the fate and transport characteristics of mercury in a karst aquifer.

This study, combined with USGS' ongoing mercury deposition monitoring, will give the park a clearer understanding of how mercury emissions from power plants and other sources are affecting resources at Mammoth Cave. Mercury is a particular concern due to impacts on the

[61] "Air, Water Quality Remain Concerns at Kentucky's Mammoth Cave." ©Associated Press, *USA Today*, June 22, 2006.
[62] Telecon with Bob Carson, Air Quality Specialist, Mammoth Cave National Park, Aug. 9, 2006.
[63] Ibid.

cave's aquatic species such as mussels and fish. The USGS report is expected to be completed in December 2006.[64]

Other park concerns regarding mercury pertain to the potential effects this pollutant may have on bats. The park is home to two federally endangered bats: the Indiana bat and the gray bat. Results of tests on bat hair sampled from clippings showed that concentrations of mercury ranged from very low up to 11 ppm.

Other issues affecting the region's air quality include mobile sources from the major transportation network (I-65 and a new I-66 corridor), coal-fired power facilities throughout the Ohio Valley, and biogenic sources such as fires and off-road vehicles.

In addition to stationary and mobile sources that contribute to air quality issues, global sources that contribute to the air quality conditions in the Green River basin include Saharan and Asian dust, Mexican fires, hurricanes and tropical storms.

3.6 RECREATION

The Green River is one of the best areas for paddling in the region. Canoe rental and camping facilities are available at the American Legion Park in Greensburg (among other locations). The Green River also runs through Mammoth Cave NP, an especially beautiful paddling spot and visitor destination.

Mammoth Cave NP was established in 1941 to protect the unparalleled underground labyrinth of caves, the rolling hilly country above and the Green River valley. Approximately 1.8 million visitors a year tour Mammoth Cave NP. Activities at Mammoth Cave include:

- Auto Touring
- Backpacking
- Biking
- Bird Watching
- Photography
- Boating
- Camping
- Caving
- Fishing
- Hiking
- Horseback Riding
- Nature Walks
- Wildlife Viewing

Mammoth Cave, the largest cave system in the world, has more than 350 miles of known underground passageways and possibly hundreds of more miles not yet discovered. Touring this subterranean limestone labyrinth, of course, is why most people come to the national park. Indeed, the visitor center has a kind of Grand Central Station feel to it as tourists rush to sign up for the popular cave trips, which are often sold out. The park's 52,830 aboveground acres are also an attraction, but one less known. The park covers scores of wooded hollows and ridges along the Green River. In spring especially, these little valleys are alive with creeks and waterfalls,

[64] Ibid.

punctuated by spreads of colorful wildflowers. Running across it all are some 70 miles of hiking trails.

The 32-mile Ferry Loop crosses two ferries on its way around the western two-thirds of the park. It follows gravel roads for 6 miles of its length. The Flint Ridge Loop covers 12 miles of the eastern part of the park on paved roads. At nine miles, the Joppa Ridge Loop is shortest. It includes 2.3 milers of gravel on Joppa Ridge Road. All rides are suitable for cyclists of all skill levels. Mammoth Cave is a scenic trail located 35 miles northeast of Bowling Green.

The Commonwealth of Kentucky has a network of Recreation Parks, managed by the Department of Parks. The following are State Recreation Parks that are located within the proposed CREP area.

- Green River Lake, Taylor County
- Lake Malone, Logan County
- Nolin Lake, Edmonson County

The Kentucky State Nature Preserves Commission maintains a system of nature preserves, whose primary function is to protect rare biological resources and natural communities. For this reason, only passive recreation is appropriate on a nature preserve. These preserves offer passive recreational activities such as hiking, photography, bird watching and nature study. The Kentucky State Nature Preserves Commission owns and manages State Nature Preserves (SNP), State Natural Areas (SNA) and conservations easements. Combined, these areas encompass a total of 23,190 acres of ecological communities and natural habitat supporting rare species across the State.

The majority of the preserves are open to the public for hiking, birding, photography, and nature study. SNPs are legally dedicated areas recognized for their natural significance and protected by law for scientific and educational purposes. SNPs were established to protect and preserve rare species and the natural environment. SNAs are sites jointly managed as a Wildlife Management Area with the Kentucky Department of Fish and Wildlife Resources. These areas are also dedicated to permanently protecting resources, but allow hunting, which differentiates them from the Preserves. There are seven SNPs located within the proposed expanded CREP area. **Table 3-5** lists the SNPs and SNAs in the State by CREP county.

Table 3-5: State Nature Preserves and State Natural Areas by Kentucky CREP County

CREP County	State Nature Preserve/Natural Area
Allen	Goodrum Cave SNP
Barren	Brigadoon SNP
Logan	Logan County Glade SNP; Raymond Athey Barrens SNP
Simpson	Flat Rock Glade SNP
Warren	Chaney Lake SNP; Woodburn Glade SNP

Source: Kentucky State Nature Preserves Commission, http://www.naturepreserves.ky.gov

3.7 LAND USE

The proposed expanded CREP area is similar to the initial Kentucky Green River CREP area. Although the eastern portion of the sinkhole plain lies within the original CREP boundary (the portion that flows directly to the Green River), this geologic feature trends from northwest to southeast, thus incorporating large areas into the proposed expansion area. More agricultural activities occur within the sinkhole plain than in surround terrain, thus agricultural land use tends

to increase within this region. Row cropping is noticeably more frequent in this area, particularly in Warren, Simpson and Logan Counties.[65]

Table 3-6 provides a summary of the land use characteristics within the proposed expansion area.[66]

Table 3-6: Land Use and Cover Types of the Proposed Kentucky CREP Expansion Area

Land Use	Acreage	Percent
Forest/Woodland	372,571.48	39.38%
Pasture/Hay	336,783.48	35.97%
Cropland	128,038.52	13.53%
Developed	69,597.70	7.36%
Wetlands	789.2	0.08%
Other (including water, mined areas, barrens, etc)	34,816.51	3.68%

*Data supplied by Meier Lab, Center for Biodiversity Studies, Western Kentucky University
Source: Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.*

3.8 TRAFFIC AND TRANSPORTATION

Interstate 65 and Cumberland Parkway are the major highways that extend through the Green River basin. The Kentucky Green River CREP area is rural and is relatively sparsely populated, with the exception of Warren County. However, industries, such as Peabody Energy, have begun to settle in the area, which increase employment, housing and traffic.

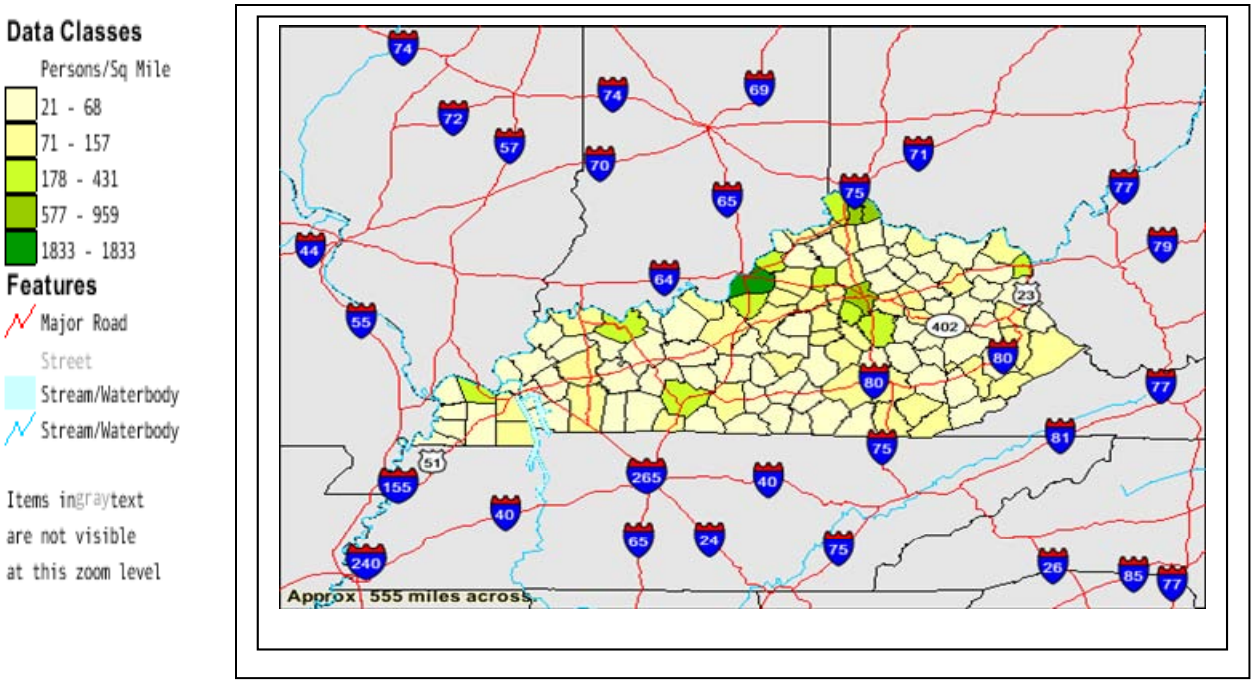
Figure 3-2 shows the major transportation network throughout the State. The figure also shows that Warren County, within the Kentucky Green River CREP area, represents the densest population (persons/sq. mile) of the counties within the CREP.

The *1999 Kentucky Statewide Transportation Plan*, a long-range 20-year plan for all modes of transportation (highways, air, bikeways and pedestrian, public transportation, rail, and waterways) lists projects in two phases: a short-range element (ranging from one to six years) and a long-range element (generally fourteen to nineteen years beyond the short-range element), based on estimated funding over the 20-year period. The following transportation projects are proposed for the respective CREP counties[67]:

- KY-1008-Simpson County
- Proposed I-66-Edmonson County
- Proposed I-66 and Bowling Green Outer Beltline-Warren County
- Heartland Parkway-Adair and Taylor Counties
- KY-88-Grayson and Hart Counties
- Northwest Leitchfield Bypass Study-Grayson County

[65]Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.* Submitted to the U.S. Department of Agriculture, p. 5
[66]Ibid.
[67] Kentucky Transportation Cabinet, Planning Division. http://transportation.ky.gov/planning/projects/dist

Figure 3-2: Major Roadway Systems in Kentucky



Source: Kentucky Transportation Cabinet. http://transportation.ky.gov/planning/stp/stp2002.asp

3.9 HUMAN HEALTH AND SAFETY

Springs located in the Green River Basin, Kentucky, are valuable natural resources and important sources of public and domestic water supplies. Groundwater and springs in the Green River Basin potentially are vulnerable to increased concentrations of pesticides and nitrates associated with agricultural activities because of the region's karst topography. The karst topography can allow rapid flow from the surface into groundwater through fractures in rock and conduits with little opportunity for natural filtering to occur.

Potential exists for groundwater contamination associated with the use of pesticides and fertilizers in the Green River Basin because of the extensive agricultural development of land. By sampling the water quality of karst springs and examining the use and detections of pesticides, information can be provided to better evaluate ground-water quality and agricultural nonpoint-source pollution in the Green River Basin, and assist resource managers in the planning and implementation of nonpoint-source pollution-control programs.

A groundwater study by the USGS in 2001 found--

- Nine different pesticides were detected in eight karst springs sampled in the Green River drainage basin.
- The five most frequently detected pesticides at all springs were atrazine (100 percent), simazine (93 percent), metolachlor (80 percent), tebuthiuron (66 percent), and prometon (58 percent).
- The pesticides detected were not necessarily the pesticides most heavily applied in the Green River drainage basin.
- Nitrite plus nitrate-nitrogen concentrations did not exceed EPA's drinking water standards (10 milligrams per liter) at any of the eight springs.

Pesticides

Pesticides have become an integral part of controlling insects, weeds, fungi, and bacteria in both agricultural and urban settings. The use of pesticides has increased over the last 40 to 50 years. This increased crop production and controlled public health hazards (Larson and others, 1997), but also raised concerns about the possible harmful effects of increased pesticide concentrations on the environment and human health.

Of the 50 pesticides analyzed, 8 herbicides and 1 insecticide were detected at or above a common method reporting level (CMRL) of 0.01 micrograms per liter (µg/L) at the 8 springs. A CMRL allows the detection frequencies of pesticides to be compared to each other. The detected pesticides in the springs were atrazine, simazine, metolachlor, tebuthiuron, and prometon. Based on estimated pesticide sales data for agricultural applications in 2000, a total of 1.5 million pounds of herbicides (fig. 3) and 18,000 pounds of insecticides were applied in the Green River Basin (Ernest Collins, Kentucky Department of Agriculture, written commun., 2001).

The pesticides detected were not necessarily the pesticides most heavily applied (in pounds of active ingredient) in the Green River Basin. Acetochlor, a restricted-use pesticide, was found in only 14 percent of the samples, but was one of the most heavily applied pesticides. **Table 3-7** summarizes the concentrations of certain pesticides sampled in the Green River Basin between May and September 2001.

Nutrients

More than 60 water samples were collected at the eight springs and analyzed for nutrients: ammonia-nitrogen (NH3-N), nitrite plus nitrate-nitrogen (NO2+NO3-N), total phosphorus (TP), and orthophosphate (orthoP). Concentrations of ammonia-nitrogen were at, or below, the method reporting level of 0.04 milligrams per liter (mg/L), except for Crawford Blue Hole and Finney Spring.

Nitrite and nitrate are inorganic ions produced during various stages of the nitrogen cycle. Nitrate is the predominant ion in well-oxygenated water because of the rapid oxidation of nitrite. Concentrations of nitrate greater than 10 mg/L in drinking water can have adverse human-health effects, especially to infants who may experience reduced blood-oxygen levels, as a result of drinking the water, a life-threatening condition termed methemoglobinemia (blue-baby syndrome) (U.S. Environmental Protection Agency, 1999b). Nitrite plus nitrate-nitrogen concentrations from the eight springs ranged from 2.92 to 8.39 mg/L.[68]

Although there is no established aquatic-life criterion for dissolved phosphorus, the EPA recommends a maximum concentration of total phosphorus of 0.1 mg/L to discourage excessive growth of aquatic plants and algae. Approximately 13 percent of the samples resulted in TP concentrations greater than 0.1 mg/L. The highest TP concentration among the springs sampled was 0.28 mg/L in Finney Spring. The high TP concentrations possibly were associated with high values of turbidity measured at this site because phosphorus can adsorb sediment particles. The median concentration of TP for all springs sampled was 0.06 mg/L. Orthophosphate concentrations ranged from 0.02 to 0.18 mg/L.[69]

[68] Crain, Angela S. "Pesticides and Nutrients in Karst Springs in the Green River Basin, Kentucky, May-September 2001." U.S. Geological Survey.
[69] Ibid.

Table 3-7: Concentrations, Detection Frequencies and Aquatic-life Criteria of Pesticides Collected in Samples, Green River Basin, Kentucky, May-September 2001

Pesticide/Trade Name	Type of pesticide	Lab reporting level (µg/L)	% Detected (number of samples)	Median concentration of detections (µg/L)	Maximum concentration of detections (µg/L)	Water-quality criteria for aquatic life (µg/L)
Acetochlord/Harness Plus, Surpass	Herbicide	0.004	14 (59)	0.004	0.099	--
Atrazined/Atrex, Atred	Herbicide	.007	100 (59)	.159	7.40	a1.8
Chlorpyrifos/Brodan, Dursban	Insecticide	.005	2 (59)	.005	.011	b.041
Metolachlor/Dual, Pennant	Herbicide	.013	80 (59)	.035	.343	a7.8
Metribuzin/Lexone, Sencor	Herbicide	.006	5 (59)	.006	.011	a1
Napropamide/Devrinol, Naproguard	Herbicide	.007	3 (59)	.007	.011	--
Prometon/Pramitol	Herbicide	.015	58 (59)	c.014	.468	--
Simazine/Aquazine, Princep	Herbicide	.011	93 (59)	.019	.210	a10
Tebuthiuron/Spike, Tebusan	Herbicide	.016	66 (59)	c.014	.043	a1.6

Source: U.S. Geological Survey, 2001. "Pesticides and Nutrients in Karst Springs in the Green River Basin, Kentucky, May-September, 2001," Angela S. Crain. Fact Sheet 133-01. [µg/L, micrograms per liter; --, not established]

3.10 SOCIOECONOMICS

The proposed Kentucky CREP area consists of 14 counties: Adair, Allen, Barren, Butler, Edmonson, Grayson, Green, Hart, Logan, Metcalfe, Russell, Simpson, Taylor and Warren. Based on the 2000 Census, approximately 335,526 people were living in the 14-county CREP area. **Table 3-8** presents the overall population for these CREP counties, based on the 2000 Census, and shows the respective land area by CREP county.

Table 3-8: Population and Land Area by Kentucky CREP County, 2000

CREP County	2000 Population	Square Miles
Adair	17,244	407
Allen	17,800	346
Barren	38,033	491
Butler	13,010	428
Edmonson	11,644	303
Grayson	24,053	504
Green	11,518	289
Hart	17,445	416
Logan	26,573	556
Metcalfe	10,037	291
Russell	16,315	254
Simpson	16,405	236
Taylor	22,927	270
Warren	92,522	545
Total CREP Area Population	**335,526**	**5,336**

Source: National Association of Counties (NACo), Kentucky. www.naco.org and U.S. Census Bureau.

Table 3-9 provides greater detail on the demographic profile of the existing eight CREP counties and **Table 3-10** provides demographic data on the proposed expanded CREP area and six new counties. These tables also show changes in demographic characteristics in these areas over time.

The fastest growing counties were Allen, which jumped 21.7 percent between 1990 and 2000, and grew another 5.1 percent between 2000 and 2005, and Warren, which grew 19 percent between 1990 and 2000. Warren County is the most populated county in the proposed CREP area with 98,960 residents. More recent growth spurts occurred with Warren County, which leaped another 7 percent between 2000 and 2005. This compares with the overall State growth, which was only 3.2 percent between 2000 and 2005 and 9.6 percent between 1990 and 2000. Warren County is also the most densely populated county with more than 169.7 persons per square mile in a county that is 545 square miles in size.

Economically, Logan County had $1.7 billion in manufactured shipments in 2002 and Warren County had $1.2 billion in retail sales.

Demographically, Simpson and Warren Counties were homes to the largest non-white populations, with blacks comprising 9.9 percent of the population for Simpson County and 8.8 percent for Warren County in 2004. Warren County showed more diversity with 1.7 percent of its population Asian and 3.3 percent Hispanic or Latino. Approximately 7.5 percent of the State population was black during this time period. Blacks represented the largest minority population for Logan, Simpson and Warren Counties in 2004.

Table 3-9: Socioeconomic Profile by Existing Kentucky CREP County

Characteristic	Adair	Barren	Edmonson	Green	Hart	Metcalfe	Russell	Taylor	Kentucky
Population, 2005 estimate	17,573	40,073	12,030	11,588	18,319	10,197	17,020	23,754	4,173,405
Population, percent change, April 1, 2000 – July 1, 2005	1.9%	5.4%	3.3%	0.6%	5.0%	1.6%	4.3%	3.6%	3.2%
Population, 2000	17,244	38,033	11,644	11,518	17,445	10,037	16,315	22,927	4,041,769
Population, percent change, 1990 – 2000	12.3%	11.9%	12.4%	11.1%	17.2%	12.0%	10.9%	8.4%	9.6%
White persons, percent, 2004 (a)	95.9%	94.7%	98.6%	96.5%	93.4%	97.5%	98.7%	94.0%	90.4%
Black persons, percent, 2004 (a)	2.9%	4.0%	0.6%	2.6%	5.5%	1.8%	0.7%	5.2%	7.5%
American Indian and Alaska Native persons, percent, 2004 (a)	0.2%	0.2%	0.4%	0.0%	0.2%	0.2%	0.1%	0.1%	0.2%
Asian persons, percent, 2004 (a)	0.4%	0.4%	0.1%	0.2%	0.1%	0.1%	0.2%	0.3%	0.9%
Native Hawaiian and Other Pacific Islander, percent, 2004 (a)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Persons reporting two or more races, percent, 2004	0.6%	0.6%	0.2%	0.7%	0.6%	0.3%	0.4%	0.5%	1.0%
Persons of Hispanic or Latino origin, percent, 2004 (b)	0.7%	1.0%	0.8%	1.2%	1.0%	0.6%	0.8%	1.1%	1.9%
White persons, not Hispanic, percent, 2004	95.2%	93.8%	97.9%	95.5%	92.5%	97.0%	97.9%	93.0%	88.7%
Housing units, 2004	7,837	17,424	6,334	5,433	8,232	4,746	9,188	10,214	1,842,971
Homeownership rate, 2000	80.2%	72.3%	85.6%	78.2%	77.3%	79.3%	79.5%	72.3%	70.8%
Median value of owner-occupied housing units, 2000	$60,800	$77,900	$63,700	$52,500	$60,100	$52,600	$62,000	$70,700	$86,700
Households, 2000	6,747	15,346	4,648	4,706	6,769	4,016	6,941	9,233	1,590,647

Characteristic	Adair	Barren	Edmonson	Green	Hart	Metcalfe	Russell	Taylor	Kentucky
Persons per household, 2000	2.44	2.44	2.47	2.41	2.54	2.47	2.33	2.41	2.47
Per capita money income, 1999	$14,931	$16,816	$14,480	$16,107	$13,495	$13,236	$13,183	$15,162	$18,093
Median household income, 2003	$25,205	$32,837	$29,058	$27,314	$26,550	$25,390	$24,555	$30,351	$36,663
Persons below poverty, percent, 2003	20.0%	15.3%	16.3%	17.1%	19.4%	19.4%	19.8%	16.6%	14.9%
Private non-farm establishments, 2003	324	860	116	180	249	119	378	676	90,651
Private non-farm employment, percent change 2000-2003	-3.4%	-0.2%	15.7%	-10.9%	28.2%	-43.0%	15.6%	23.8%	-2.8%
Manufacturers shipments, 2002 ($1000)	NA	1,006,589	NA	NA	256,279	171,163	286,362	240,799	88,513,497
Retail sales, 2002 ($1000)	106,552	410,128	26,242	40,212	81,086	37,279	118,321	329,342	40,062,561
Retail sales per capita, 2002	$6,124	$10,584	$2,218	$3,443	$4,582	$3,722	$7,169	$14,151	$9,795
Land area, 2000 (square miles)	407	491	303	289	416	291	254	270	39,728
Persons per square mile, 2000	42.4	77.5	38.5	39.9	41.9	34.5	64.4	85	101.7

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, and are included in applicable race categories.
Source: U.S. Census Bureau State & County QuickFacts.

Table 3-10: Socioeconomic Profile by Proposed New Kentucky CREP County

Characteristic	Allen	Butler	Grayson	Logan	Simpson	Warren	Kentucky
Population, 2005 estimate	18,706	13,414	25,189	27,169	17,021	98,960	4,173,405
Population, percent change, April 1, 2000 to July 1, 2005	5.1%	3.1%	4.7%	2.2%	3.8%	7.0%	3.2%
Population, 2000	17,800	13,010	24,053	26,573	16,405	92,522	4,041,769
Population, percent change, 1990 to 2000	21.7%	15.7%	14.3%	8.8%	8.3%	19.0%	9.6%
White persons, percent, 2004 (a)	97.8%	98.6%	98.5%	91.2%	88.2%	87.9%	90.4%
Black persons, percent, 2004 (a)	1.4%	0.5%	0.6%	7.4%	9.9%	8.8%	7.5%
American Indian and Alaska Native persons, percent, 2004 (a)	0.1%	0.2%	0.1%	0.2%	0.2%	0.3%	0.2%
Asian persons, percent, 2004 (a)	0.2%	0.3%	0.2%	0.2%	0.9%	1.7%	0.9%
Native Hawaiian and Other Pacific Islander, percent, 2004 (a)	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%
Persons reporting two or more races, percent, 2004	0.5%	0.5%	0.6%	1.0%	0.7%	1.3%	1.0%
Persons of Hispanic or Latino origin, percent, 2004 (b)	0.8%	1.6%	1.0%	1.5%	1.0%	3.3%	1.9%
White persons, not Hispanic, percent, 2004	97.0%	97.0%	97.5%	89.8%	87.3%	84.8%	88.7%
Housing units, 2004	8,327	5,990	12,911	12,063	7,512	41,689	1,842,971
Homeownership rate, 2000	79.0%	79.6%	77.3%	75.2%	71.8%	64.0%	70.8%
Median value of owner-occupied housing units, 2000	$69,300	$59,900	$65,600	$67,100	$81,400	$100,400	$86,700
Households, 2000	6,910	5,059	9,596	10,506	6,415	35,365	1,590,647
Persons per household, 2000	2.55	2.52	2.47	2.5	2.52	2.46	2.47
Per capita money income, 1999	$14,506	$14,617	$14,759	$15,962	$17,150	$18,847	$18,093

Characteristic	Allen	Butler	Grayson	Logan	Simpson	Warren	Kentucky
Median household income, 2003	$33,759	$30,620	$29,240	$33,588	$38,381	$37,483	$36,663
Persons below poverty, percent, 2003	14.8%	16.1%	16.1%	14.9%	13.1%	15.2%	14.9%
Private non-farm establishments, 2003	214	205	463	512	366	2,613	90,651
Private non-farm employment, percent change 2000-2003	-2.8%	-20.1%	0.0%	-14.1%	0.0%	1.4%	-2.8%
Manufacturers shipments, 2002 ($1000)	$195,256	$126,000	$536,304	$1,780,412	$786,584	N/A	$88,513,497
Retail sales, 2002 ($1000)	$81,336	$142,242	$142,242	$158,388	$288,715	$1,243,132	$40,062,561
Retail sales per capita, 2002	$4,481	$4,799	$5,858	$5,922	$17,350	$13,197	$9,795
Land area, 2000 (square miles)	346	428	504	556	236	545	39,728
Persons per square mile, 2000	51.4	30.4	47.8	47.8	69.5	169.7	101.7

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, and are included in applicable race categories.
Source: U.S. Census Bureau State & County QuickFacts.

Homeownership was highest in Edmonson County (85.6 percent), followed by Adair and Butler Counties in 2000. Warren County experienced the highest ($100,400) median value of home, compared with the State median value of $86,700. There were 35,365 households in Warren County, which was significantly higher than the other CREP counties. Green County offered the lowest median value of housing at $52,500 and had 4,706 households recorded in 2000.

Per capita income was highest in Warren County ($18,847) and lowest in Russell County ($13,183) in 1999. Simpson County had the highest median household income ($38,381) in 2003, and Russell had the lowest household income level ($24,555). Most of the proposed CREP counties, with the exception of Allen and Simpson Counties, were above the State's poverty rate (14.9 percent). Adair County had the highest percentage of persons living below poverty in 2003. Russell, Metcalfe, Hart, Green, Butler and Grayson Counties also showed a high percentage of county residents living in poverty.

CCC has disbursed more than $1.7 million dollars to landowners for KYCREP since its inception. **Table 3-11** summarizes the cumulative payments to landowners for CREP enrollments.

Table 3-11: Kentucky CREP Cumulative Payment Summary

County	Average Acres/Contract	Avg. Rental Rate/Acre	Incentive Paid Per Acre	Total Estimated Cost-Share
Adair	10	$97	$45	$342,172
Barren	30	$111	$46	$426,724
Edmonson	49	$103	$41	$14,544
Green	20	$129	$61	$393,254
Hart	25	$138	$64	$189,559
Metcalfe	21	$103	$44	$91,880
Russell	NA	NA	NA	NA
Taylor	15	$119	$54	$260,488
Total Region	19	$118	$53	$1,765,863

Source: *Kentucky Green River Conservation Reserve Enhancement Program Annual Program Accomplishment Report.*

In FY 2005, the program paid $548,600 to landowners (**Table 3-12**). Landowners are compensated for retiring environmentally sensitive land from cultivation. In addition to the money they receive from the program, they often gain further revenues from this land by opening it to hunting or other purposes.

FSA determines the eligibility to participate in the CRP portion of the Enhancement Program and pays the landowner 50 percent of the costs of CRP conservation practices. Landowners, in turn, receive rental payments for the 15-year CRP contract at normal CRP rates, plus several incentive payments. Landowners, for example, receive an additional 30-percent increase in the annual per acre rental rate for

enrolling cropland situated in riparian areas or for restoring wetlands. The corresponding incentive payment for enrolling erodible land is 20 percent.

Table 3-12: Fiscal Year 2005 CREP Payments

County	Average Acres/Contract	Avg. Rental Rate/Acre	Incentive Paid Per Acre	Total Estimated Cost-Share
Adair	10	$100	$46	$244,992
Barren	16	$118	$50	$22,379
Edmonson	NA	NA	NA	NA
Green	18	$125	$67	$161,940
Hart	23	$137	$65	$23,435
Metcalfe	20	$104	$46	$39,103
Russell	NA	NA	NA	NA
Taylor	6	$124	$58	$24,350
Region	**13**	**$114**	**$52**	**$548,699**

Source: *Kentucky Green River Conservation Reserve Enhancement Program Annual Program Accomplishment Report.*

The Kentucky Division of Conservation is the State agency that administers the financial portion of the Green River CREP (State cost share and incentive payments), and works closely with local conservation districts and partner agencies to promote and administer the program. **Table 3-13** present payment information on the State's contributions to CREP contracts.

Table 3-13: Total State Share of Payments for CREP Contracts

County	Total Contracts	Total Dollars
Adair	54	$96,366.00
Barren	76	$334,525.00
Edmonson	3	$10,688.00
Green	82	$202,122.75
Hart	60	$158,888.50
Metcalfe	34	$71,307.00
Russell	0	$0.00
Taylor	102	$238,553.00
TOTAL	**411**	**$1,112,450.25**

Source: *Kentucky Green River Conservation Reserve Enhancement Program Annual Program Accomplishment Report.*

During 2005, the CREP permanent easement (valued at $480 in 2005) was recorded on 14 tracts totaling just over 380 acres for the year. The cumulative total is 20 easements totaling ~ 460 acres. TNC ceased recording easements in October 2005 in order to reevaluate the value of the easement. The value increased substantially to $650 per acre.

Farm Demographics

Table 3-14 provides an overview of the area's agriculture and summarizes the agricultural demographics for the proposed expanded CREP counties.

Table 3-14: Farm Demographics by Proposed Expanded CREP County

Farm Characteristic	Allen	Barren	Butler	Edmonson	Grayson	Logan	Simpson	Warren	Totals
No. of Farms	1,500	100	475	1,450	656	800	450	4,400	9,831
Avg. Acres/Farm	120	125	250	140	103	110	200	136	138
Crops	**Acres**								
Pasture/Hay	66,590	10,205	13,891	31,534	20,930	21,249	35,213	140,124	339,736
Corn	2,000	624	3,475	1,700	1,143	5,154	18,102	27,500	59,698
Soybeans	550	600	3,790	3,800	1,753	4,000	16,474	25,700	56,667
Wheat	400	200	125	200	NA	2,000	8,819	14,500	26,244
Tobacco	245	106	59	275	194	160	200	1,100	2,339
Grain Sorghum	NA	NA	NA	NA	NA	200	NA	NA	200
Barley	NA	NA	NA	NA	NA	NA	400	NA	400
Oats	NA	NA	NA	NA	NA	NA	100	NA	100

*Data supplied by local county FSA Offices and Meier Lab, Center for Biodiversity Studies, Western Kentucky University.
Source: Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program; Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.*

3.11 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs all Federal agencies to achieve environmental justice as part of their mission by identifying and addressing disproportionately high and adverse human health or environmental effects of their activities on minority and low-income populations. **Table 3-15** shows the number of farm operators by race for each of the Kentucky Green River CREP counties, as well as the number living below poverty. The poverty rate for the entire State was estimated at 14.9 in 2003, which declined from 15.8 in 1999 and 19.0 in 1989.[70]

In 2003, Logan, Simpson, and Allen Counties had the lowest rates of persons living in poverty, whereas Adair, Hart, Metcalfe, and Russell Counties had the highest rates. Simpson and Warren Counties represented the largest minority populations of the CREP counties. Blacks comprised 9.9 percent of the county population for Simpson County and 8.8 percent for Warren County in 2004. Blacks comprised approximately 7.5 percent of the State population during this time period. Among all counties, blacks comprised the largest minority population for farm operators.

In 2004, USDA awarded 22 competitive grants totaling more than $5.9 million to land grant colleges, universities, and non-profit organizations that serve socially disadvantaged farmers and ranchers. A socially disadvantaged farmer is one of a group whose members have been subjected to racial or ethnic prejudice without regard to their individual qualities. The grants are part of the Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers Program, also referred to as the 2501 program, and are administered by USDA's Cooperative State Research, Education and Extension Service. Kentucky State

[70] "Kentucky Fact Sheet: KY Agriculture Income Population Education Employment…" http://www.ers.usda.gov/StateFacts/KY.htm

University was awarded $300,000 to enhance the knowledge of socially disadvantaged farmers, specifically Native American and African American farmers in beef cattle and dairy beef operations and marketing systems. This effort will
improve their farms' profitability by applying risk management strategies, farm management and recordkeeping systems.[71]

Table 3-15: Farm Operators by Race and Number Living below Poverty, Kentucky CREP

	2003		Farm Operators by Race (2002 Census of Agriculture)					
CREP County	Estimated Poverty Rate	Estimated Number in Poverty	Black	American Indian/ Alaska Native	Native Hawaiian/ Pacific Islander	Asian	Multi- racial	Spanish/ Hispanic/ Latino
Adair	20.0	3,376	18	3	2	1	6	11
Allen	14.8	2,726	0	2	0	1	0	14
Barren	15.3	5,949	51	3	0	4	11	19
Butler	16.1	2,120	0	3	0	0	0	7
Edmonson	16.3	1,934	0	0	0	0	7	7
Grayson	16.1	3,988	3	4	0	0	7	20
Green	17.1	1,972	26	2	0	0	0	10
Hart	19.4	3,498	40	7	0	0	4	13
Logan	14.9	3,983	16	2	0	0	0	16
Metcalfe	19.4	1,956	32	1	0	0	0	20
Russell	19.8	3,309	0	0	0	0	2	12
Simpson	13.1	2,177	21	0	0	0	0	2
Taylor	16.6	3,802	28	0	1	0	0	3
Warren	15.2	13,981	75	4	0	2	13	13
Kentucky	14.9*		900	256	31	64	314	892

*18.4 rate rural; 12.3 rate urban for the Commonwealth.
Source: 2002 Census of Agriculture, State and County Profiles, and USDA-Economic Research Service, "2003 County Level Poverty Rates for Kentucky." http://www.ers.usda.gov/Data/PovertyRates/PovListpct.asp?ST=KY&view=Percent

CREP's landlord-tenant provisions can be found in *Handbook 2-CRP*, rev. 4, Amendment 1, paragraph 86. These requirements state that landlords must provide tenants who have an interest in the acreage being offered at the time of sign-up, an opportunity to participate in CRP and not reduce the number of tenants on the farm as a result of or in anticipation of enrollments in CRP. All producers, landlords and tenants are to be fully informed at the time of sign-up and that landlords violating the provisions will be ineligible to earn CRP/CREP payments.

Although CREP contracts provide compensation to farmers for enrolling certain land in CREP, FSA does not monitor whether these funds are being passed on to compensate tenant farmers for the loss of land. The County Office Committee (COC) is responsible for determining whether landlord tenant provisions have been violated before approving CRP-1. The determination shall be made by reviewing the documentation submitted with the CRP-1 and researching the tenant history on the farm. When there is a dispute between a landlord and a tenant, and the COC determines there is insufficient evidence to make a

[71] ALFA Farmers. 2004. "USDA Awards Grants to Assist Disadvantaged Farmers." http://www.alfafarmers.org/headlines/headline.phtml?id=4513

determination, the COC shall not approve the CRP contract until the landlord and tenant resolve the dispute.

A tenant may sign a statement voluntarily relinquishing his/her interest in the farm or CRP benefits allowing the landlord to offer land for CRP that has a history of a tenant if COC determines that the landlord has the “necessary means” to conduct the farming operation. As of February 6, 2002, all CRP participants, landlords and tenants are required to sign a copy of the CRP-1 indicating that they fully understand the provisions relating to Tenants and Landlords.[72]
Some tenant farmers, who have low incomes and are of minority status, may actually benefit from CREP by receiving a reduction in rent without a reduction in the area that can be farmed.

3.12 OTHER PROTECTED RESOURCES

3.12.1 Wild and Scenic Rivers

The Nationwide Rivers Inventory (NRI) is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. Under a 1979 Presidential directive, and related Council on Environmental Quality procedures, all Federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments. The NRI is a source of information for statewide river assessments and Federal agencies involved with stream-related projects.

The segment of the Green River listed in the NRI extends through Edmonson, Hart and Green Counties from river mile 189 at Mammoth Cave NP and Lock No. 6 to river mile 290 at Greensburg. The Green River was listed in the NRI in 1982 and is also listed with the State as a Kentucky Wild River and a State Outstanding Resource Water. Other rivers listed in the NRI that extend through the CREP counties include segments of the Barren River, Gasper River, Nolin River, Red River and South Fork of the Red River. **Appendix G** describes these river segments and their Outstanding Resource Values.

3.12.2 National Natural Landmarks

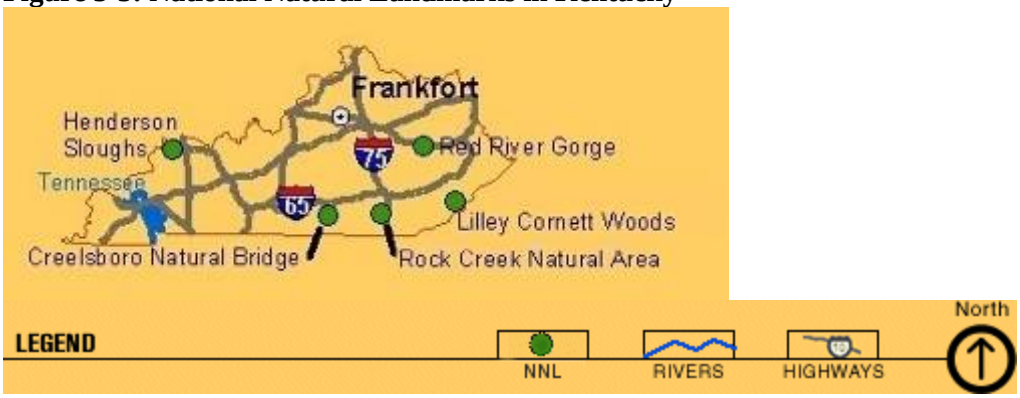
The National Natural Landmarks Program, which is administered by the National Park Service, recognizes and encourages the conservation of outstanding examples of our country's natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. National Natural Landmarks (NNLs) are designated by the Secretary of the Interior, with the owner's concurrence. To date, fewer than 600 sites have been designated as an NNL. If requested, the NPS assists NNL owners and managers with the conservation of these important sites.

Kentucky is home to five NNLs, two of which are located in a Kentucky CREP county.
Creelsboro Natural Bridge, located in Russell County about 14 miles southwest of Jamestown, is the longest natural bridge or natural tunnel, in the Highland Rim Section of the Interior Low Plateaus natural region. Henderson Sloughs is also mainly located in Russell County and extends into Union County. This NNL is one of the largest wetlands remaining in the State and an important habitat for waterfowl and other wildlife. Henderson Sloughs is also the "home" of John James Audubon.

Figure 3-3 shows the locations of the NNLs in Kentucky.

[72] USDA-FSA Memorandum, Subject: CRP Landlord and Tenant Provisions. February 6, 2002.

Figure 3-3: National Natural Landmarks in Kentucky



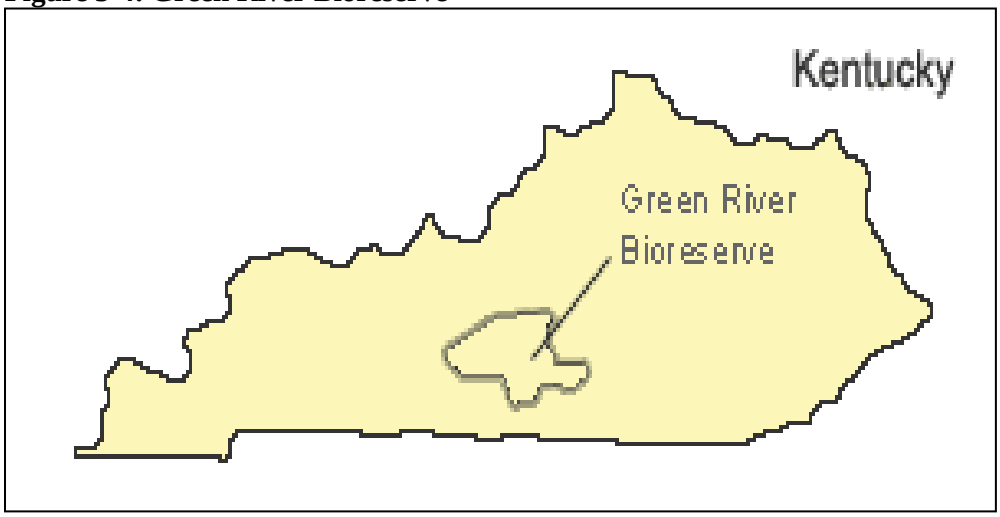
Source: National Park Service, http://www.nature.nps.gov/nnl/Registry/USA_Map/States/Kentucky/kentucky.cfm

3.12.3 Green River Bioreserve

The Green River Bioreserve is a 1,350-square-mile area within the Green River Basin that extends 110 river miles from the tailwater of the COE Green River Lake to downstream of Mammoth Cave NP at old Lock and Dam 6 on the Green River at Brownsville, Kentucky. The Green River Bioreserve is among the most significant aquatic systems in the United States and has been given The Nature Conservancy's highest biodiversity rating. The area is known to support over 151 species of fish and 71 species of freshwater mussels. There are 35 aquatic species in the area that are considered imperiled.

To implement strategies throughout the watershed to protect and restore the ecosystem functions and rare plants, animals, and communities that are indigenous to this aquatic area was the goal of the U.S. Army Corps of Engineers and The Nature Conservancy (TNC).[73] **Figure 3-4** shows the general location of the Green River Bioreserve.

Figure 3-4: Green River Bioreserve



Source: The Nature Conservancy, http://www.nature.org/initiatives/freshwater/work/greenriver.html

[73] Byron, William J. "Green River Lake, KY—Sustainable River Project." U.S. Army Corps of Engineers.

3.12.4 World Heritage Sites

The World Heritage Convention, the most widely accepted international conservation treaty, is comparable to the American national park system on worldwide basis. Under this Convention, each participating nation retains sovereignty and control over its listed World Heritage Sites. All participating nations pledge to identify and protect their key natural and cultural sites as part of this global heritage and to cooperate with each other to achieve that goal. By 2004, 178 nations had ratified the World Heritage Convention, and had placed 788 sites, including Mammoth Cave, on the World Heritage List. There are currently 20 World Heritage sites in the United States (including two sites jointly administered with Canada).[74]

Mammoth Cave NP was designated a World Heritage Site in 1981 and an International Biosphere Reserve in 1990.[75] Inscription as a World Heritage Site formally recognizes the respect that the world community holds for this resource.

[74] National Park Service, Office of International Affairs.
[75] Bob Carson, Mammoth Cave National Park, Aug. 2006.

CHAPTER 4-ENVIRONMENTAL CONSEQUENCES

Chapter 4 assesses the direct, indirect and cumulative effects of two alternatives designed to greatly reduce runoff of sediments, nutrients, pesticides, and pathogens from agricultural sources that adversely affected the health and viability of the Green River Watershed. Two alternatives are evaluated in this PEA—

- Alternative 1-No Action, which evaluates the existing conditions and resources of the Kentucky Green River CREP
- Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

The components of these alternatives are described in Chapter 2. Chapter 3 describes the affected environment and the context in which the resources exist. The impact categories that are evaluated in this chapter correspond to the resource categories described in Chapter 3-Affected Environment. These categories were determined through USDA-Farm Service Agency draft environmental regulations (7 CFR Part 799.4, Subpart G) and USDA-Farm Service Agency *1-EQ, Revision 1*, Environmental Quality Programs, dated November 19, 2004. In summary, the following resources will be evaluated for each alternative.

- Biological Resources
- Cultural Resources
- Water Resources
- Soil Resources
- Air Quality
- Recreation
- Land Use
- Traffic and Transportation
- Human Health and Safety
- Socioeconomics
- Environmental Justice
- Other Protected Resources

The environmental consequences described in this chapter contrast Alternative 1-No Action (Existing Conditions) with Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative). It is important to understand that there are environmental benefits and consequences for both alternatives.

4.1 BIOLOGICAL RESOURCES

4.1.1 Wildlife and Fisheries

4.1.1.1 Alternative 1-No Action (Existing Conditions)

Under Alternative 1, CREP goals that specifically target the needs of wildlife (non-threatened and endangered) are—

- Reconnecting habitat types in order to restore the full range of ecosystem function
- Utilizing native species, including warm season grasses, to the greatest extent possible

Eligible conservation practices under this alternative designed to benefit wildlife habitat are—

- CP1 Introduced Grasses
- CP2 Native Grasses
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (corridors)
- CP4D Permanent Wildlife Habitat
- CP22 Riparian Buffer
- CP23 Wetland Restoration
- CP25 Rare and Declining Habitat

Table 4-1 presents the number of contracts approved in the current program by conservation practice. Although most or all of the practices provide benefits to wildlife habitat and improve water quality, CP25 specifically focuses on improving wildlife habitat for rare and declining species. *2-CRP* Handbook specifies that the following requirements must be met before this practice may be approved:

- The approved endangered or threatened habitat shall be restored
- The size of the area established should be of sufficient size and location on the landscape to meet the purpose of this practice.
- Any chemicals used in performing this practice must be registered and applied according to directions

Table 4-1: Cumulative CREP Enrollments by Conservation Practice and County, through FY2005

CREP County	APPROVED CONTRACTS		
	Conservation Practice	**Number of Contracts**	**Acres**
Adair	CP 1 Introduced Grasses	1	4.0
	CP2 Permanent Native Grasses	7	186.6
	CP3A Hardwood Tree Planting	2	5.8
	CP21 Filter Strips		
	CP22 Riparian Buffer	105	1,029.9
	Total	**115**	**1,226.3**
Barren	CP1 Introduced Grasses	1	2.7
	CP2 Permanent Native Grasses	61	2,326.4
	CP3 Tree Planting	1	15.5
	CP3A Hardwood Tree Planting		
	CP21 Filter Strips		
	CP22 Riparian Buffer	25	276
	Total	**88**	**2620.6**
Edmonson	CP1 Introduced Grasses	1	22.7
	CP2 Native Grasses	2	122.1
	CP21 Filter Strips	1	1.0
	CP22 Riparian Buffer		

CREP County	APPROVED CONTRACTS		
	Conservation Practice	**Number of Contracts**	**Acres**
	Total	**4**	**144.8**
Green	CP1 Introduced Grasses	8	157
	CP22 Riparian Buffer	82	1,729.4
	Total	**90**	**1,886.40**
Hart	CP1 Introduced Grasses	6	150.1
	CP2 Native Grasses	4	56.5
	CP22 Riparian Buffer	47	1,182.8
	Total	**57**	**1,389.4**
Metcalfe	CP2 Native Grasses	15	453.1
	CP22 Riparian Buffer	20	195.5
	Total	**35**	**648.6**
Russell	**Total**	**0**	**0**
Taylor	CP2 Native Grasses	23	498.2
	CP3A Hardwood Tree Planting	2	45.8
	CP22 Riparian Buffer	89	1,081
	Total	**114**	**1,625**
	GRAND TOTAL	**503**	**9,542.1**

Source: Commonwealth of Kentucky. Jan. 5, 2006. Kentucky Green River Conservation Reserve Enhancement Program. Annual Program Accomplishment Report (CEP-68R), FFY 2005.

With Alternative 1, enrollment would be expected to continue at about the same rate and predominantly in practices supporting grass plantings and riparian buffers. Of the lands enrolled into KYCREP, 179.5 acres (2 percent) of all enrollments, were planted to grasses under CP1; nearly 3,800 acres (40 percent) were converted to warm season grasses; a little more than 67 acres (1 percent) involved tree plantings; 1acre was used to establish a grass filter strip; and 5,494.6 acres (57 percent) were established as riparian buffers to protect the Green River and its tributaries.[76] **Table 4-2** shows the number of stream miles buffered by KYCREP county.

Under Alternative 1, Adair, Green, Hart, and Taylor Counties showed had the greatest number of stream miles buffered, thus providing the greatest benefits for wildlife through development of corridors along water resources.

The *2005 Kentucky CREP Annual Program Accomplishment Report* (CEP-68R) reported that Adair, Barren, Green and Taylor Counties had exhibited the most consistency in terms of enrollment into the program.

[76] *Kentucky CREP Annual Program Accomplishment Report* (CEP-68R), FFY 2005.

Table 4-2: Stream Miles Buffered by Kentucky Green River CREP, Alternative 1

County	Miles of Stream Buffered
Adair	38.6
Barren	8
Edmonson	0
Green	33.8
Hart	23.4
Metcalfe	7.4
Russell	0
Taylor	23.3
Total	**134.5**

Source: *Kentucky CREP Annual Program Accomplishment Report (CEP-68R), FFY 2005.* Jan. 5, 2005.

Based on the dominant conservation practice being grass plantings for Alternative 1, the benefits of this alternative would be continuation of enhancing and increasing habitat, mainly for grassland bird species, and for controlling erosion. Most grassland conservation practices are implemented on highly erodible land, although some grasses are planted in filter strips and in conjunction with other practices in floodplains.

Grass plantings provide positive benefits for grassland and songbirds and their nesting areas. Buffers and related conservation practices have proven valuable to these species. Grassland practices would provide the greatest benefit to birds if they are placed near other grasslands and away from trees, creating a complex that can support a variety of species. The actual benefits to grassland birds depend upon the volume of enrollment and location of these grassland conservation practices. Studies have shown that CREP fields have exhibited a greater diversity of nesting birds, and because these fields are not mowed during the nesting season and they are able to provide a more stable environment. Other studies have concluded that birds nesting in CREP grassland fields have a higher nesting success rate than those nesting in neighboring hayfields. To be successful, it is important that these areas are of sufficient size and not fragmented. Alternative 1 does not include CP29, which minimizes fragmentation of field sizes.

Grasslands also benefit cottontail rabbits and other small mammals through habitat enhancement. As an edge species, the cottontail rabbit inhabits CREP fields that are in close proximity to wooded areas. Study areas that had an average of 11 percent CREP habitat was used by cottontails more than any other habitat area. The interior portions of larger fields were used less than the edges.

The direct impacts would be habitat improvement for grassland species, songbirds, deer and small mammals. The indirect impacts would be the supply of these species as a food source for larger predators, such as coyotes, bobcat, bear, raptors, and other birds of prey.

4.1.1.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative))

The CREP goals established in the MOA between the State and USDA that focus on habitat enhancement and protection are—

- Protect wildlife habitat and populations, including threatened and endangered species;
- Restore riparian habitat along the Green River;
- Restore the subterranean ecosystem by targeting 1,000 high priority sinkholes

In support of these goals, Alternative 2 would allow for the inclusion of a broader area to be incorporated into the Kentucky Green River CREP boundary. If Alternative 2 is selected, an additional 28,904 acres--mostly from the sinkhole plain area--would be available for enrollment into the program. This additional area would increase the land eligible for enrollment to 917,197 acres.

Expansion of the CREP into other areas of the watershed would provide added benefits to federally listed species through improved water quality and habitat conditions and reduced sediment loads in streams. This alternative places emphasis on sinkhole protection, increased riparian buffer widths along many of the larger tributaries to the Green River and opportunities for landowners to enroll whole fields or entire marginal pasture fields into the program under CP29. CP29 would not require trees to be planted, but rather would allow native grasses to be planted on contiguous buffered area.

Implementation of this alternative would encourage increased enrollment into the program, provide opportunities for leveraging and partnering with new landowners, would improve water quality, and would expand benefits to wildlife. The increase in buffer width would also increase functional wildlife habitat.

The direct impacts of Alternative 2 would be—

- An increase the amount of available wildlife habitat through the expansion of the area eligible for selection into the program by 28,904 acres of environmentally sensitive land;
- Species diversity;
- An increase in dissolved oxygen content in aquatic environments needed by aquatic, aerobic life forms;
- Establishment of tree canopy along waterways, which will lower water temperatures and restore aquatic invertebrate communities that serve as food sources for birds, fish, reptiles and amphibians
- Utilize native species, including warm season grasses, to the greatest extend possible
- Reconnect habitat corridors associated with the Green River and its tributary watersheds
- Sustain and restore the composition, structure and function of riparian habitat corridors associated with the Green River
- Enhance habitats and wildlife populations, including those listed as State and Federal species of concern, rare and threatened and endangered

Under Alternative 2, the following eligible conservation practices would focus on improving and enhancing fish and wildlife habitat:

- CP1 Introduced Grasses and Legumes
- CP2 Native Grasses, Legumes and Forbs
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (Corridors), Non-easement
- CP4D Permanent Wildlife Habitat, Non-easement
- CP8A Grassed Waterways, Non-easement
- CP9 Shallow Waterways for Wildlife
- CP10 Vegetative Cover--Grass--Already Established
- CP11 Vegetative Cover--Trees--Already Established
- CP12 Wildlife Food Plots
- CP22 Riparian Buffer
- CP23 Wetland Restoration

- CP25 Rare and Declining Habitat
- CP29 Marginal Pastureland Wildlife Habitat Buffer

Approximately 50 new acres of grasses would be planted and nearly 292 acres of riparian buffer would be planted once pending contracts are approved. These new areas would provide additional bird habitat and wildlife corridors in the Green River Watershed. It should be considered, however, that an increase in establishing warm season grasses in riparian areas could also increase the potential risk of wildfires.

The incorporation of CP29 into the Kentucky Green River CREP was proposed for this alternative to ensure greater protection of the region's unique karst resources. The main purpose of CP29 is to remove nutrients, sediment, organic matter, pesticides and other pollutants from surface runoff and subsurface flow by deposition, absorption, plant uptake, de-nitrification and other processes and thereby reduce pollution and protect surface water and subsurface water quality while enhancing the ecosystem of the waterbody. By restoring native plant communities, characteristics for the site will assist in stabilizing streambanks, reduce flood damage impacts and restore and enhance fish and wildlife habitat.

The direct effect on wildlife from farmers enrolling "whole fields" or entire marginal pastureland into the program would be the establishment of larger contiguous areas for wildlife. Wildlife diversity would increase. The increase in buffer widths on larger tributaries to 1,000 feet would also directly provide broader wildlife corridors and links to other food sources and habitat.

4.1.1.3 Conclusion

Based on contracts pending approval, approximately 50 new acres of grasses would be planted and nearly 292 acres of riparian buffer would be established. These new areas would provide additional bird habitat and wildlife corridors in the Green River Watershed, thus increasing the diversity of wildlife species. In comparison to Alternative 1-No Action, wildlife habitat and wildlife diversity would increase after the establishment of the conservation practices. Grassland birds, generally removed from cropland, would be the principal beneficiaries from the establishment of grasses (CP1 and 2). Other species of wildlife in the area would benefit from tree plantings (CP3 and 3A), and nongame and game species would benefit from CP4B, 4D, 12, 25 and 29). Waterfowl would benefit from CP9 and CP23 permanent wildlife habitat and the benefits to threatened and endangered species would occur through implementation of CP25.

In the short-term, increases in wildlife on CREP fields would have a minor effect on the CREP area, although some species such as deer could proliferate and cause damage in many areas, including vehicular incursions, destruction of property and destruction of forest vegetation.

4.1.2 Vegetation

CREP goals that address vegetation benefits to wildlife and improve water quality are—

- Establish tree canopy along waterways, which will lower water temperatures and restore aquatic invertebrate communities that serve as food sources for birds, fish, reptiles and amphibians, and
- Utilize native species, including warm season grasses, to the greatest extent possible

4.1.2.1 Alternative 1-No Action (Existing Conditions)

As of May 2006, a total of 574 contracts, comprised of 10,813.3 acres were enrolled in the Kentucky CREP. Of these, 179.5 acres, or 2 percent of all enrollments, were planted to grasses under CP1; nearly 3,800 acres (40 percent) were converted to warm season grasses under CP2; hardwood trees were planted on 67.1 acres (1 percent) under CP3A; one acre was developed into a grass filter strip enrolled under

CP21; and 5,494.6 acres (57 percent) were established under CP22 as riparian buffers to protect the Green River and its tributaries.[77] Under Alternative 1, 88,686.7 acres remain eligible for enrollment into the program.

The following conservation practices would continue to benefit vegetation in CREP areas under Alternative 1—

- CP1 Introduced Grasses and Legumes
- CP2 Native Grasses, Legumes and Forbs
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (Corridors), Non-easement
- CP4D Permanent Wildlife Habitat, Non-easement
- CP8A Grassed Waterways, Non-easement
- CP9 Shallow Waterways for Wildlife
- CP10 Vegetative Cover--Grass--Already Established
- CP11 Vegetative Cover--Trees--Already Established
- CP22 Riparian Buffer
- CP25 Rare and Declining Habitat
- CP29 Marginal Pastureland Wildlife Habitat Buffer

Based on the trend shown in the *Kentucky CREP Annual Program Accomplishment Report*, dated January 5, 2005, planting of grasses appears to be the most widely used CRP practice in the Kentucky Green River CREP. Reasons for selecting this practice may be the relative ease in establishing grasses, the cost and the control of erosion on highly erodible land. Most grassland conservation practices are implemented on highly erodible land, although some grasses are planted in filter strips and in conjunction with other CRP practices in floodplain areas. Planting warm season grasses provides the greatest benefit to bird species if these grasses are planted near other grasslands and away from trees, and can create a complex that can support a variety of species. The actual benefits to grassland birds from this practice depend upon the volume of enrollment, the land allocated to grasslands and the location of these plantings.

4.1.2.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

Continuation of and expansion of the Kentucky CREP would allow for a broader area to be considered for—

- establishing tree canopy along waterways, which will lower water temperatures and restore aquatic invertebrate communities that serve as food sources for birds, fish, reptiles and amphibians
- utilizing native species, including warm season grasses, to the greatest extend possible

Under this alternative, up to 99,500 acres may be enrolled into the Kentucky CREP. As with Alternative 1, approximately 88,686.7 acres remain eligible for enrollment into the program. With the proposed expansion of the Kentucky CREP boundary under Alternative 2, an increase of 28,904 acres in the Upper Green River Watershed would be included in the program.
Eligible conservation practices that enhance vegetation under this alternative are—

[77] *Kentucky CREP Annual Program Accomplishment Report* (CEP-68R), FFY 2005.

- CP1 Introduced Grasses and Legumes
- CP2 Establishment of Permanent Native Grasses
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (Corridors), Non-easement
- CP4D Permanent Wildlife Habitat, Non-easement
- CP8A Grassed Waterways, Non-easement
- CP10 Vegetative Cover--Grass--Already Established
- CP11 Vegetative Cover--Trees--Already Established
- CP15A Permanent Vegetative Cover (Contour Grass Strips), Non-easement
- CP22 Riparian Buffer
- CP25 Rare and Declining Habitat
- CP29 Marginal Pastureland Wildlife Habitat Buffer

Establishing native grasses and planting hardwood trees, such as oak-hickory forest covers, and other trees along streams and creeks are conservation practices permitted under this alternative. Based on the contracts that have been submitted as of May 2006 for approval under this alternative, approximately 50 new acres of grasses would be planted under CP1 and CP2 and nearly 292 acres of riparian buffer would be planted using CP22.

The demand for tree planting equipment is currently at a high level and with the proposed CREP expansion, there may be difficulty meeting this additional demand, as well as meeting the increased demand for more tree seedlings.

Another issue relates to the potential for an increased risk of wild fires as more grasses are planted throughout the area.

Alternative 2 includes the use of CP29, Marginal Pastureland Wildlife Habitat Buffer. Because much of the expanded area is karst terrain, it is used as pastureland. Many landowners would resist planting trees around sinkholes for protection, as required by CP22, and consequently, many have disclosed that they would not be interested in enrolling their land in CREP. CP29 does not require tree plantings, and allows the planting of native grasses on the entire buffered area.

It would also be highly beneficial in this region to allow for CP29 to be applied to entire fields. It is common with the Green River region to have buffers on streams that “cut” or divide fields up because of the buffer width requirements and the existing terrain. Landowners have questions committing a large portion of productive land to a conservation easement, but wasting the remainder of the field.

4.1.2.3 Conclusion

For both alternatives, ground disturbance would occur with any planting, especially tree plantings. There could also be an increased risk in potential wildfires as more areas within the CREP are planted to grasses.

Based on the contracts that have been received as of May 2006, approximately 50 new acres of grasses and nearly 292 acres of riparian buffer would be planted. Additional tree plantings may stress resources that provide tree planting equipment and seedlings due to higher demand. However, these administrative impacts could be mitigated through grants to help fund personnel and equipment needs.
Alternative 1 would continue to focus mainly on grass plantings with some tree plantings associated with

riparian buffers. Warm season grasses would directly benefit grassland species, songbirds and small mammals, as well as enhance other wildlife habitat areas.

Greater benefits would be expected from Alternative 2 due to the expansion of the CREP area to include much of the Upper Green River Watershed. In addition, the inclusion of CP29 would allow larger or entire fields to be covered under a conservation practice.

4.1.3 Protected Species And Habitat

The Green River is one of the top four river systems in the United States in terms of fish and mussel diversity, particularly the segment of the river below Green River Lake. Aquatic species are of particular importance and include a number of fish and mussel species unique to this area, as described in Chapter 3.

There are currently seven species federally listed as endangered by FWS in the Green River Watershed, and the CREP area also encompasses several ecosystems recognized as Endangered Ecosystems in the United States. These systems include native prairies, hardwood savannahs, canebrakes, and old-growth deciduous forests.[78] A specific CREP goal was established "to enhance habitats and populations of wildlife, including those listed as State and Federal special concern, rare, threatened and endangered, using a measure of success a reduction in the need to list additional species as threatened or endangered." The CRP practice that supports this goal is CP25-Rare and Declining Habitat.

4.1.3.1 Alternative 1-No Action (Existing Conditions)

Sinkhole protection is particularly important within the Green River Watershed, not only for protection of the area's groundwater and aquifers, but for the improvement of habitat conditions for the federally endangered Kentucky cave shrimp (*Palaemonias ganteri*).[79] This species is endemic to Kentucky and only lives in the underground aquifers associated with Mammoth Cave. In recognition of the need to protect these resources, the Kentucky CREP established a goal "to establish buffers around sinkholes, targeting 1,000 high-priority sinkholes." A separate goal was established "to protect and restore subterranean ecosystems."

Two endangered bats, the gray bat (*Myotis grisescens*) and the Indiana bat (*M. sodalis*) are also known to inhabit the area. Chapter 3 describes the rare, threatened and endangered species that are known to occur in the area. **Appendix E** lists the federally protected species and the State-listed plant species in the area. Based on FWS' scoping comments, there are at least 10 federally listed species, 8 of which are aquatic species.

CP25, an eligible CRP practice under the Kentucky CREP, is designed to restore the functions and values of critically endangered, endangered and threatened ecosystem. Through May 2006, 163.9 acres have been enrolled in CREP under CP25 in Green, Adair, Taylor, and Russell Counties where CP25 has been implemented.

[78] Kentucky Green River Conservation Reserve Enhancement Program, Annual Program Accomplishment Report (CEP-68R), FFY 2005, dated Jan. 5, 2006.
[79] FWS scoping letter, dated June 28, 2006. See Appendix D.

4.1.3.2 Alternative 2-Expanded Kentucky Gen River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

The addition of the Green River Watershed from Mammoth Cave NP to the confluence with the Barren River, including the Barren River Watershed), is a component of this alternative. This area will encompass approximately 946,101 acres and will include all or portions of land in Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson and Warren Counties. This alternative would provide 28,904 more acres for consideration in the program than Alternative 1. However, both alternatives are limited to enrollment of up to 99,500 acres into the program.

One of the principal goals of the Kentucky CREP is to enhance habitats and populations of wildlife, including State and Federal-listed species of special concern and threatened and endangered species. A measure of the success of the program is the reduction in the need to list additional species as threatened or endangered. In support of this goal, CREP includes CP25, which focuses on improving rare and declining habitat. Restoration of critically endangered, endangered and threatened habitats is the primary consideration when implementing this practice. Approved ecosystems relative to this region include bluegrass savanna-woodland and prairies in Kentucky, canebrakes, wetlands and spruce fir forests.

Although all of the eligible CRP practices listed for Alternative 2 would provide benefits to wildlife habitat and to water quality, CP25 is the principal conservation practice that targets benefits to rare, threatened and endangered species. CP25 is designed to restore the functions and values of critically endangered, endangered and threatened ecosystem. Through May 2006, 163.9 acres have been enrolled in CREP under CP25 in Green, Adair, Taylor, and Russell Counties where CP25 has been implemented.

4.1.3.3 Conclusion

Nearly 164 acres of CREP land are currently enrolled under CP25, a conservation practice designed to restore the functions of critically endangered, endangered and threatened ecosystems. Restoration of these ecosystems is the primary consideration when making determinations about the types of plantings, spacing and other practice specifications. This conservation practice is available under both Alternative 1 and 2.

Alternative 2 proposes to include lands from Mammoth Cave NP to the confluence with the Barren River into the Kentucky CREP. This addition encompasses much of the "sinkhole plain," which feeds the aquifers and groundwater flowing into the Mammoth Cave system where the endangered cave shrimp exist. The inclusion of this area will make lands available for conservation that will enhance the habitat and conditions for the continued survival of this species and other imperiled aquatic life.

4.1.4 Invasive Species

Often referred to as exotic, nonnative, alien, noxious, or non-indigenous weeds, invasive species impact native plant and animal communities by displacing native vegetation and competing with native species for food and habitat. As defined in Executive Order 13112, an "invasive species" is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., microbes). Human disturbance is the primary means of introducing invasive species into an area.

As a Federal agency, FSA must comply with Executive Order 13112, which prevents the introduction of invasive species and provides for their control. As conversion of cropland to grasslands, riparian areas, forestlands and wetlands can provide opportunities for non-native plants and animals to establish, monitoring converted farmland for these species and working with NRCS and FWS to prevent and eradicate these species is encouraged.

Chapter 3identifies the predominant exotic species in Kentucky. **Appendix I** is a listing of the most common, though not all, invasive and exotic species in Kentucky.

4.1.4.1 Alternative 1-No Action (Existing Conditions)

Areas that have been cultivated or have lain fallow provide prime opportunities for invasive species to thrive. Invasive species include mammals, birds, fishes, plants, trees, insects, and other aquatic species, as well as fungi and bacteria. The probability that these species will occur in riparian areas, farm fields, forest edges, wetlands and woodlands that have previously been cut or disturbed is very high, as such species are opportunistic and generally occur in disturbed areas. All CREP contracts stipulate that noxious weeds and other undesirable plants, insects and pests must be controlled to avoid adverse impacts on surrounding land.

Measures to control these species require a management plan when use of pesticides or biocides, including insecticides, fungicides, rodenticides and herbicides, is proposed. Another non-chemical method of controlling noxious weeds is mowing, though FSA *Handbook 2-CRP, rev. 4*, limits or prohibits mowing in certain circumstances, particularly when nesting and breeding birds are in season.

Weed control is eligible for cost-share as provided in FSA *Handbook 2-CRP, rev. 4*. After planting, cost-share may be authorized for one post-planting weed control application if it is applied within the first year after planting the cover.

Under Alternative 1, provisions to manage noxious weeds and other invasive species were incorporated into CREP agreements and in conservation plans and are further supported by the Commonwealth's requirements to prevent, manage and control invasive species. These provisions can be found in *Handbook 2-CRP, rev. 4*. All CREP contracts must stipulate that noxious weeds and other undesirable plants, insects and pests will be controlled to avoid adverse impacts on surrounding land.

4.1.4.2 Alternative 2-Expanded Kentucky Gen River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

For all CREP contracts, landowners would be required to perform management activities as part of their approved conservation plan. These management activities shall be designed to ensure plant diversity and wildlife benefits, while ensuring protection of the soil and water resources. The conservation plan must also address maintenance for weed, insect and pest control for the life of the contract. Management activities are site-specific and are used to enhance the wildlife benefits for the site. In exchange for approved management activities, the landowner may receive up to 50 percent cost-share for the management practices.

Under Alternative 2, weed control would be eligible for cost-share as provided in FSA *Handbook 2-CRP, rev. 4*. After planting, cost-share may be authorized for one post-planting weed control application if it is applied within the first year after planting the cover. All CREP contracts must stipulate that noxious

weeds and other undesirable plants, insects and pests will be controlled to avoid adverse impacts on surrounding land.

4.2 CULTURAL RESOURCES

4.2.1 Archaeological Resources

Consultation with the SHPO revealed that the Green River and its tributaries have a high density of significant archaeological sites, particularly within the floodplains. Some of the proposed conservation practices, such as tree plantings, shallow water areas, and wetland restoration have the potential to adversely impact both recorded and unrecorded archaeological sites. Archaeological surveys will be conducted by a qualified archaeologist of all tracts where ground-disturbing activities occur to determine if any sites exist that may be eligible for inclusion in the National Register of Historic Places. The results of these surveys will be submitted to the SHPO for review and comment prior to conducting ground disturbing activities.

For both alternatives, certain eligible conservation practices, such as CP3-Tree Planting; CP3A-Hardwood Tree Planting; CP9-Shallow Waterways for Wildlife; CP4D-Permanent Wildlife Habitat; CP22-Riparian Buffers; and CP23-Wetland Restoration, may have potential impacts on a range of cultural resources. Many archaeological sites are known to occur in floodplains and along rivers. Kentucky and the Green River basin were once home to a number of indigenous tribes (see Chapter 3).

Significant prehistoric and historic archaeological resources are often found below the plow zone, although plowing does not usually constitute significant ground disturbance. However, prior to any ground disturbance, FSA will consult with the SHPO to determine if archaeological resources are known to occur in the area. If any such resources are discovered at any time, all activities will be halted and the Kentucky Heritage Council consulted. All archaeological surveys will be conducted by a qualified professional archaeologist and performed in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeological Investigations in Kentucky.* Upon review by the SHPO, additional investigations of discovered resources may be requested.

A listing of the sites listed in the National Register of Historic Places by CREP county can be found in **Appendix F**. The greatest number of sites listed in the National Register occurs in Warren County.

4.2.2 Architectural Resources

For both alternatives, all eligibility evaluations for historic structures must be made by qualified professionals who meet the Secretary of the Interior's *Professional Qualifications Standards as Architectural Historian or Historian* (FR 44738-9 or 36 CFR Part 61. If an architectural survey is conducted, it must be submitted to the Kentucky Heritage Council for review and comment. Upon review by the SHPO, additional investigations of identified resources may be requested.

4.2.3 Traditional Cultural Properties

As discussed in Chapter 3, indigenous tribes believed to have inhabited the area now known as Kentucky were the Cherokee, Chickasaw, Mosopelea, Shawnee and the Yuchi nations.[80]

[80] Copyright AccessGeneology.com "Kentucky Indian Tribes." http://www.accessgenealogy.com/native/kentucky/index.htm

On June 29, 2006, discussions with the U.S. Department of the Interior, Bureau of Indian Affairs, Easter Region Realty Officer, were conducted to determine the presence of Native American tribal lands within the expanded CREP area. No tribal entities and no lands held in trust exist in Kentucky.[81]

4.2.3 Conclusion

For both Alternatives 1 and 2, there is high potential for archaeological resources to exist in areas where CREP practices will occur. If any such resources are discovered, all ground disturbing activities will be immediately halted and the Kentucky Heritage Council consulted. All required archaeological surveys will be conducted by a qualified professional archaeologist and performed in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeological Investigations in Kentucky.*

If an architectural or archaeological survey is required for potential effects to any historic structure, it will be submitted to the Kentucky Heritage Council for review and comment.

Because there are no traditional cultural properties, tribal lands or recognized tribes within the CREP area, no impacts to these resources would occur.

4.3 WATER RESOURCES

4.3.1 Surface Waters

Contaminated runoff containing agricultural nutrients and chemicals is impacting 25 percent of the monitored impaired stream miles. Mineral extraction accounts for 15 percent of the miles impaired and sewage treatment plants impair 13 percent of the monitored waterways. Disease-carrying pathogens often associated with untreated or poorly treated animal and human waste account for impairing the remaining 31 percent of monitored waterways.

Water quality and water supply, stormwater management, flash flooding, and changes associated with surrounding development are all prominent local and regional issues that impact the State's surface waters. The *2000-2001 State of Kentucky's Environment* report cited agricultural activities as a leading source of water pollution in Kentucky's waterways. Some of these agricultural-related impacts are from—

- excessive sedimentation,
- biological oxygen demand,
- pesticides, and
- fecal coliform

Chapter 3 provides information on the existing conditions of the surface water resources within the CREP area.

4.3.1.1 Alternative 1-No Action (Existing Conditions)

The goals for the KYCREP are described in Chapter 2-Alternative 1. Specifically the goals that focus on improving water quality in the Green River Watershed are—

- To reduce the amount of sediment, nutrients and pesticides from agricultural sources entering the tributaries and mainstem of the Green River and Mammoth Cave System by 10 percent through the installation of BMP's designed for that purpose, and other conservation practices designed to

[81] Telecon with Randall Trickey and Eileen Carlton, BIA Eastern Region Realty Officer. June 29, 2006.

improve water quality (replanting riparian buffers around sinkholes and along streams are high priority).

- To sustain and restore the composition, structure, and function of riparian habitat corridors associated with the Green River and tributary watersheds.
- To establish buffers around sinkholes, targeting 1,000 high-priority sinkholes.
- To sustain and restore non-riparian wetlands.

These goals complement the Corps of Engineers' Environmental Operating Principles, especially in regards to environmental sustainability. In July 2002, the Louisville District teamed with TNC to restore and preserve many rivers across the country. This nationally recognized project, known as the "Sustainable Rivers Project," began in Kentucky with a project to improve habitat along the Green River below Green River Lake, a Corps reservoir located just upstream of the original CREP area (see Chapter 3, Floodplains).

Under Alternative 1, the eligible conservation practices designed to improve water quality are presented in **Table 4-3** along with the acreages enrolled through 2005.

Table 4-3: CRP Practices and Acreage Enrolled in Kentucky CREP Targeted to Improve Water Quality, Alternative 1

CRP Practice	Acres Enrolled
CP1 Introduced Grasses	179.5
CP2 Native Grasses	3,799.9
CP21 Filter Strips	1
CP22 Riparian Buffer	5,494.6
Total	**9,475.0**

Source: *Kentucky Green River Conservation Reserve Enhancement Program Annual Program Accomplishment Report.* (CEP-68R), FFY 2005, Jan. 5, 2006.

KYCREP currently allows a 1,000-foot buffer along the mainstem of the Green River and a maximum 300-foot buffer on all tributary streams. Many landowners with farms along the tributary streams with large (wide) bottomland are reportedly not enrolling land into the program because: (1) local farmers are often not willing to divide their most productive land, putting part of it into the program, and often have relatively little use for the remaining area; and (2) fencing is impractical in many of the more flood-prone fields due to the frequency of required maintenance.

Often farmers will not even consider CREP after they learn that the entire bottom will not be eligible and their fields will have to be divided. As a result, a significant amount of potential buffers are being lost along very important tributary streams. Evidence of this sentiment was shown in Adair County when 15 landowners who filled out inquiries for the program subsequently declined to establish a buffer because their bottomland would have been split. Of those that declined, all but one or two stated that if program changes allowed for their entire bottomland to be entered, then they would be "likely" to participate in the program.

Several other landowners have changed their minds about enrolling in CREP because they felt that splitting their fields would essentially be "wasting" the remaining land. By splitting the bottomland, it

would take money away from the overall income because there would not be enough land left to be profitable farming.[82]

In Adair County, 15 landowners reportedly declined to establish buffers because their bottomland would have been split. Those who declined said they would be more "likely" to participate in the program if the program allowed for their entire bottomland to be included under contract. By splitting the bottomland, the farmers would lose money because there would not be enough land left to make money from farming.

4.3.1.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

Inclusion of the expanded area through implementation of Alternative 2 will add 28,904 acres to the KYCREP. This expansion will enable landowners to install eligible conservation practices on up to 99,500 acres of marginal cropland in the Upper Green River Watershed. The following expanded CREP goals focus on improving water quality in this watershed:

- To reduce the amount of sediments, nutrients, and pesticides from agricultural sources entering the tributaries and mainstem of the Green River and Mammoth Cave System by 10 percent through the installation of BMPs designed for that purpose, and other conservation practices designed to improve water quality (replanting riparian buffers around sinkholes and along streams are high priority).
- To sustain and restore the composition, structure, and function of riparian habitat corridors associated with the Green River and tributary watersheds.
- To establish buffers around sinkholes, targeting 1,000 high priority sinkholes.
- To sustain and restore non-riparian wetlands.
- To protect and restore subterranean ecosystems.

To achieve these goals, the following CPs target water quality improvements under Alternative 2:

CP1	Introduced Grasses and Legumes
CP2	Native Grasses, Legumes and Forbs
CP3	Tree Planting
CP3A	Hardwood Tree Planting
CP8A	Grassed Waterways, Non-easement
CP15A	Permanent Vegetative Cover (Contour Grass Strips), Non-easement
CP21	Filter Strips
CP22	Riparian Buffer, which widens buffers to 1,000 feet
CP23	Wetland Restoration
CP29	Marginal Pastureland Wildlife Habitat Buffer

Benefits that would be gained from implementing these conservation practices would be—

- Reduction in runoff of sediments and nutrients into surface waters
- Filtering of pesticides and other pollutants
- Replenishing water tables
- Providing tree and ground cover plantings to hold soil in place
- Emphasis on no-till farming and other smart farming practices adjacent to CREP fields

[82] Excerpts taken from the *Green River Conservation Reserve Enhancement Program Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.*

- Flood control through soil-stabilization and plantings

Several changes are proposed under Alternative 2 would benefit and improve the surface and groundwater resource in the Green River Watershed. These involve the addition of land from Mammoth Cave NP to the confluence with the Barren River, including the Barren River Watershed. This expansion will place the entire Upper Green River Basin into the program, excluding those watersheds that lie above the Corps of Engineers reservoirs. The total area will encompass 946,101 acres, which adds 28,904 acres to the Kentucky CREP for future enrollment.

Alternative 2 proposes a 1,000-foot maximum buffer width for all fourth order and higher streams within the KYCREP area. Lower order streams that exhibited excessive bottomland widths could be added to this listing if applicable. This change would not only greatly increase landowner participation in the program, but it would also increase functional wildlife habitat on a landscape scale and improve overall water quality in the watershed by gaining more miles of buffered stream.

An analysis was conducted of buffer widths on two major tributary streams, Russell Creek and Little Barren River in Green County with a small portion in Hart County. The lower ends of both of these streams were observed. Of 54 potentially eligible bottomland/riparian fields on Russell Creek in Green County, the existing 300-foot buffer width only entirely captured 14 fields (26 percent). If the buffer width was widened to 1,000 feet, then 52 (96 percent) of the 54 fields could have been entirely buffered. Comparably, of 51 potentially eligible bottomland/riparian fields on the Little Barren River in Green and Hart Counties, the existing 300-foot buffer width only entirely captured 11 of the fields, or 22 percent. If the buffer width were widened to 1,000 feet, then 50 of the 51 fields, or 98 percent, could have been entirely buffered.[83]

This change would affect several other tributary streams and potentially offer more effective buffer opportunities on several more miles of stream within the Green River basin.[84] The increase in buffer width would not only greatly increase landowner interest and participation in the program, but it would also increase functional wildlife habitat on a landscape scale and improve overall water quality in the watershed by gaining more miles of buffered stream. As CREP was designed to be regionally specific to meet the needs of different areas of the country, implementation of CP22 would benefit the water quality, aquatic resources and wildlife by reducing sedimentation, erosion, and runoff of pollutants into surface waters and would provide wider wildlife corridors.

4.3.1.3 Conclusion

Alternative 1 would allow for a 1,000-foot buffer on the mainstem of the Green River, and a 300-foot buffer along all tributary streams. Many landowners are reportedly not enrolling land into the program because they do not want to divide up their land feeling it would be unprofitable for them to farm remnants that are not enrolled in the program. Farmers also feel that fencing is impractical in flood-prone areas due to the frequent maintenance required on the fences.

[83] Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation,* p.14.
[84] Ibid.

Studies have shown that the current buffer widths allowable for the existing CREP under Alternative 1 may not meet the needs of surface water protection. In addition, only less than 10 percent of the eligible acreage has been enrolled in CREP.

Alternative 2 would provide greater benefits to surface waters within the Green River basin because—

1) all fourth order and higher streams within the KYCREP region would have 1,000-foot buffer width,
2) lower order streams that have excessive bottomland widths could be included to this listing
3) wider buffer widths would increase functional wildlife habitat on a broader scale,
4) wider buffer widths would improve overall water quality in the watershed by gaining more miles of buffered stream, and
5) it is anticipated that more landowners would participate in the program.

Studies have shown that f the buffer widths were widened to 1,000 feet within the KYCREP, a much larger percentage (96-98percent) of the fields surveyed would be included in the program. This alternative would impact several other tributary streams and potentially offer more effective buffer opportunities on several more miles of stream within the basin.

4.3.2 Groundwater

Impacts on groundwater quality occur more frequently in the karst areas of the region and are most often caused by agricultural runoff, trash and hazardous materials in sinkholes, as well as runoff of nitrates from fertilizers.[85] These impacts would occur under both Alternatives 1 and 2.

Chapter 3 discusses and illustrates the dynamics associated with the region's sinkhole plain and the groundwater.

4.3.2.1 Alternative 1-No Action (Existing Conditions)

As described in Chapter 3, a portion of the watershed's sinkhole plain drains southern Hart and Edmonson and northern Barren Counties currently lies in the KYCREP boundary. This area is essentially the underground watershed for the Green River above the current western boundary, including the karst aquifers that drain into Mammoth Cave NP. Initially, sinkholes in marginal pastureland were not eligible for conservation purposes under KYCREP. Only those in cropped fields could be buffered. With hay/pastureland acreage at nearly a 3:1 ratio over cropland within the Green River Watershed, little was being done to protect these unique resources and the region's sensitive underground ecosystems.

Chapter 2, Table 2-3 shows the current acreages enrolled and the CRP practices under which contracts in the current CREP are enrolled for Alternative 1.

4.3.2.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

Alternative 2 would continue conservation practices implemented under Alternative 1, as well as offer new practices to buffer pollution movement into sinkholes. CP22-Riparian Buffer was modified to include sinkholes and karst features. However, more refinement is needed to be able to practically incorporate this sinkhole protection and allow it to be effective. The inclusion of CP29–Marginal Pastureland Wildlife Habitat Buffer into the Kentucky CREP is an important improvement to the

[85] *2000-2001 State of Kentucky's Environment*, p. 33.

program. Much of the sinkhole plain area lies in the western portion of the current CREP boundary. The karst terrain in this region varies in character, but could be characterized as gently rolling, open land due to the high concentration of sinkholes with relative gentle slopes. Because of this terrain and land use characteristics, many landowners may resist planting trees around each of these sinkholes and, consequently, many would not enroll their land into the program. CP29 does *not* require the planting of trees; instead, native grasses could be planted on the entire buffered area, which would make enrolling in this practice more desirable.[86]

The inclusion of "whole fields" allowed under CP29 is essential to the success of the sinkhole protection plan. As previously stated, because pastureland acreage is nearly three times that of cropland within the region, it would be a tremendous benefit to allow entire fields within practices applied to marginal pastureland to be enrolled in a similar manner to fields which meet the infeasible to farm criteria in the cropping history requirements. In this area, harvesting of hay is as important as many row cropping activities. It is common within the Kentucky CREP to have buffers on streams that "cut" fields up because of buffer width requirements and terrain characteristics. As a result, it is common for a landowner not to enter land into a CREP contract for this reason, thus losing an entire buffer.

Table 4-6 shows the current interest landowners are exhibiting in the expanded CREP.

Table 4-6: Interest in Expanded CREP by Practice and County, Alternative 2

County	CRP Practice	Acres
Adair	CP22 Riparian Buffer	45
Barren	CP2 Native Grasses	18
Edmonson	CP1 Introduce Grasses	29
Hart	CP22 Riparian Buffer	136.9
Metcalfe	CP22 Riparian Buffer	65
Russell	CP2 Native Grasses CP22 Riparian Buffer	3 45
Total		**341.9**

Source: Kentucky FSA, 2006.

4.3.2.3 Conclusion

Alternative 1 would not provide the protection to sinkholes, the option for landowners to enroll entire fields, and does not offer the wider buffers for tributary streams. Alternative 2 would improve protection of the region's karst topography through CP 29, which would allow enrollment of entire fields in the program, and through CP22, which allows for wider buffer zones from 300 to 1,000 feet for fourth order and higher streams.

4.3.3 Aquifers

More information on the impacts to groundwater is found in section 4.3.2, Groundwater.

4.3.3.1 Alternative 1-No Action (Existing Conditions)

There are no sole-source aquifers in the existing KYCREP region. However, a portion of the sinkhole plain lies within the existing CREP boundary. As the sinkhole plain trends southeastward, the under

[86] Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation,* p.12.

groundwater flows to a base level outside the existing CREP boundary. There is a need for consistent best management conservation practices throughout this continuous landscape. Because only a portion of the sinkhole plain lies is included within the current CREP boundary, Alternative 1 would not adequately protect or conserve this valuable resource.

4.3.3.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

There are no sole-source aquifers known in the expanded KYCREP area. However, full coverage of the sinkhole plain was a major reason behind expanding the Kentucky Green River CREP boundary. Alternative 2 would encompass the entire sinkhole plain in the Upper Green River Watershed, would provide more complete protection to this resource, and would be more amenable to landowners. Much of the sinkhole plain is open pastureland and many landowners may resist planting trees around each of the sinkholes as required in a riparian buffer practice (CP22). As a result, many landowners may not wish to enroll their land. CP29 (Marginal Pastureland Wildlife Habitat Buffer) does not require the planting of trees; rather, native grasses could be planted on the entire buffered area.

4.3.3.3 Conclusion

There are no EPA-designated sole-source aquifers in the KYCREP area. Only a portion of the sinkhole plain lies within the existing KYCREP area under Alternative 1. However, Alternative 2 would encompass most of the sinkhole plain in the Upper Green River Watershed. No impacts to aquifers would occur under either Alternative 1 or 2.

4.4 SOIL RESOURCES

4.4.1 Alternative 1-No Action (Existing Conditions)

Soil erosion can result in significant changes in surface soil properties affecting sustainability of production. The organic composition of soil is not only important for good fertility, improved soil permeability, resistance to surface soil crusting and other factors related to crop production potential, but it is also important to the soil's ability to resist erosion.[87]

CREP protects surface waters and improves water quality by controlling soil erosion and sedimentation that occurs from runoff into rivers and streams. The following conservation practices provide greater protection to surface waters by buffering the flow of sediments into streams. These CPs are eligible for use with land classified as HEL[88]:

- CP1 Introduced Grasses
- CP2 Native Grasses
- CP3 Tree Planting
- CP3A Hardwood Tree Planting
- CP4B Permanent Wildlife Habitat (corridors)
- CP4D Permanent Wildlife Habitat
- CP10 Grass Cover - Already Established

[87] Veseth, Roger. Oregon State University, Conservation Tillage Handbook, Chp. 1. "Erosion Makes Soils More Erodible."

[88] Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation.*, Kentucky CREP Matrix.

- CP11 Tree Cover - Already Established
- CP12 Wildlife Food Plots
- CP25 Rare and Declining Habitat

The current allowable buffer width along the Green River mainstem is a maximum of 1,000 feet and all tributaries are allowed a buffer of 300 feet. Many landowners with fields along the tributaries with large bottomland fields are not enrolling land into the program mainly because they do not want to divide their fields and because the installation of fencing is impractical in many of the more flood-prone areas.[89] In addition to erosion, limited soil studies indicate that some soils are sensitive to acidification from atmospheric deposition. This issue is addressed more under Air Quality. There is also concern that during rainstorms, when there is little opportunity for rainwater to come into contact with deep soils, episodic acidification could occur.[90]

Under Alternative 1, approximately 10,813 acres have been conserved under CREP through May 2006 by planting native grasses and trees in riparian areas. This total is only slightly more than 10 percent of the 100,000-acre enrollment acreage for the program. Because of CREP, improvements have been made toward curbing soil erosion and sedimentation in the Green River Watershed with the use of riparian buffers and grass plantings.

Table 4-7 shows the acreage enrolled by conservation practice that prevents runoff and sedimentation from occurring in the Green River and its tributaries. As shown, nearly 5,495 acres have been enrolled in CP22, riparian buffers, and the remaining acreage has been enrolled under a grass program.

Table 4-7: Existing CREP Acreage by CRP Practice that Targets Erosion, Alternative 1

CRP Practice	Acres Enrolled
CP1 Introduced Grasses	179.5
CP2 Native Grasses	3,799.9
CP8A Grassed Waterways	0
CP22 Riparian Buffer	5,494.6

Source: *Kentucky Green River Conservation Reserve Enhancement Program Annual Program Accomplishment Report.*

4.4.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

Although the existing Kentucky CREP has made progress toward controlling erosion along the Green River and its tributaries, the expanded CREP would allow for wider buffers which may offer greater incentives for landowners to enroll. As with the current CREP, up to 99,500 acres may be enrolled into the program. In addition, this alternative would encompass 28,904 additional acres in its boundary, mostly within the "sinkhole plain" portion of the State. Alternative 2 supports the goal to reduce the amount of sediments and other agricultural pollutants from entering the Green River waterways by 10 percent.

Currently, CREP allows a maximum 1,000-foot buffer along the Green River mainstem, and a maximum 300-foot buffer along the tributaries. Increasing the buffer widths would provide added incentives to many landowners as they would not need to consider splitting fields or fencing.

[89] Commonwealth of Kentucky. *Green River Conservation Reserve Enhancement Program Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation*.
[90] Ibid.

4.4.3 Conclusion

Alternative 1 addresses control of erosion and HEL through the 10 conservation practices discussed above. The current buffer widths permitted under Alternative 1 are a maximum of 1,000 feet for the mainstem of the Green River and 300 feet along streams and tributaries to the mainstem.

In addition to the 10 conservation practices identified in the discussion for Alternative 1, Alternative 2 includes CP29-Marginal Pastureland Wildlife Habitat Buffer. As much of the land within the KYCREP area is pastureland, this practice would not require planting trees, but rather would allow native grasses to be planted on an entire buffered field. This practice has been proposed as a Priority I practice, which would make it eligible for all State cost-share and incentive payments, and would make it more attractive to landowners. The ability to establish wider buffers in riparian zones and to include whole fields in the program under Alternative 2 offer greater incentives to landowners and protect a broader critical area

4.5 AIR QUALITY

Chapter 3 describes the air quality sources, monitoring programs and conditions in the KYCREP region. Although no CPs directly address air quality within the KYCREP, several practices have either direct or indirect effects that may lead to improving air quality. These practices involve establishing grass covers (CP1, CP2, CP10, CP11, CP15A, CP25, and CP29) and tree plantings (CP3, CP3A).

4.5.1 Alternative 1-No Action (Existing Conditions)

Particulates are emitted through fugitive dust and construction equipment. By retiring marginal cropland from production, enrollment of land into the program would improve the air quality by reducing tilling and for the use of farm equipment. Dust would not be generated except during planting and establishing certain practices.

4.5.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

By expanding the CREP area, widening buffers and increasing enrollments into the program, Alternative 2 would show continued signs of improvement in air quality. As land is enrolled into the program, less tilling and use of farm machinery and equipment would occur. However for both alternatives, short term emissions and dust would be generated during tree plantings and establishment of certain CRP practices, such as digging shallow wildlife ponds.

4.5.3 Conclusion

The benefits to air quality through the conversion of cropland to grasslands or trees will provide long-term positive benefits to the region's air quality. As discussed in Chapter 3, agriculture generates fugitive dust (60.8% of all sources of emission). Alternative 1 would continue to provide benefits through continued enrollments into the program. Alternative 2 would enable entire pasture fields to be enrolled into the program.

4.6 RECREATION

Chapter 3 describes the recreation opportunities and facilities within the Kentucky CREP area. Mammoth Cave NP, a major tourist attraction to the region lies within the CREP. There are a number of other State parks and nature preserves, as well as historic sites in the area that generate tourism. The Green River is one of the top recreation rivers for paddling sports, camping, hiking and nature watching.

4.6.1 Alternative 1-No Action (Existing Conditions)

Farming and CREP provide a highly compatible land use with Mammoth Cave NP, as well as the Green River Bioreserve and other parks, recreation resources and activities in the area. The visitor experience that the NPS wishes to achieve at Mammoth Cave is one reflective of the magnificent scenic, natural, and rural beauty of the area.

CREP offers added benefits to recreationalists and park visitors: implementation of CREP practices enhances the rural environment, provides habitat for birds and wildlife for birders and wildlife enthusiasts to enjoy, allows visitors from congested areas to get back in touch with nature, minimizes dust and pollution, improves the water quality of rivers and streams, and preserves and protects the natural resources. For many parks, preservation of the adjacent and surrounding areas is equally important to preserve and protect as the core of the park itself.

4.6.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

The proposed addition to the Green River CREP area would encompass 946,101 acres, and extend down the Green River to its confluence with the Barren River at river mile 149.5. This would include the tributary watersheds contributing to the Green, including the Nolin River and Barren River systems upstream to their respective reservoirs. This area would include land from Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson and Warren Counties and extend the CREP boundary to Mammoth Cave NP. An additional 28,904 acres would be included in the Kentucky Green River CREP boundary.

With up to 99,500 acres eligible for enrollment in the program, mostly in the sinkhole plain, the environmental benefits to the park's resources and to the Green River Watershed will be measurable when more land is enrolled into the program. The water quality, air quality, wildlife habitat and scenic beauty of the area will be enhanced under this alternative

4.6.3 Conclusion

Under Alternative 1, the benefits of CREP to recreational users would be continued improvements in water quality for swimming, boating and fishing, as well as conservation of a rural environment, wildlife habitat and natural resources in the area. Alternative 2 would extend the CREP boundary to Mammoth Cave, enabling an additional 28,904 acres to be included within the CREP area. CREP would not only continue to benefit the cave's natural, aquatic, and scenic resources, it would ensure protection of adjacent land uses surrounding the park.

4.7 LAND USE

Changes in land uses and incompatible development may have the greatest impact on the resources CREP strives to protect. **Table 3-6** in Chapter 3 shows the percentage of various land uses that occur within the proposed expanded CREP area. Major land use issues that could impact the CREP area relate primarily to transportation (i.e., roadway corridors), mining, and to land development.

4.7.1 Alternative 1-No Action (Existing Conditions)

Under Alternative 1, changes in land uses, such as transportation projects, housing development, mining operations and other infrastructure projects, have the potential to adversely impact the CREP land and the goals of the program. For transportation projects, land may be acquired through the imminent domain process by the Department of Transportation for highway or airport projects. These types of projects

could severe parcels currently enrolled in CREP. In some respects, CREP land would be considered a compatible land use for certain transportation projects, such as airports. However, the effect of fragmenting or splitting parcels may not be suitable for the landowner or for the goal of CREP in achieving wildlife benefits and improving water quality.

4.7 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

A limestone quarry located in Hart County is proposed within the expanded KYCREP area. The specific goals of the Kentucky CREP are to reduce by 10 percent the amount of sediment, pesticides, and nutrients entering the Green River and Mammoth Cave system; to protect wildlife habitat and populations, including threatened and endangered species; to restore riparian habitat along the Green River; and to restore the subterranean ecosystem by targeting 1,000 high priority sinkholes. The designation of this reach of the Green River and associated terrestrial habitat are recognized as ecologically sensitive areas of the river and riparian ecosystem. As such, this proposed quarry may pose a threat to the environment through disruption of groundwater quality and flow patterns, and through contamination of surface drainage.

An extension of Interstate 66 is proposed south of Mammoth Cave NP. Other transportation projects are identified in Chapter 3. These changes in land use will spur future development either along the corridors or at interchanges. In conjunction with these changes, ancillary or supporting infrastructure, such as public water and sewer extensions, could be expected, spanning additional residential and commercial development.

A major coal-fired power plant is proposed in Muhlenberg County, about 50 miles from Mammoth Cave NP. Coal-fired power plants are throughout the Ohio Valley and present problems with air quality and visibility.

4.7.3 Conclusion

Changes in land uses could adversely affect or conflict with the goals of CREP. Limestone quarries could alter the pH of groundwater; the coal-fired power plants could potentially impact the visibility and air quality of the region, and produce acidification of the soils.

4.8 TRAFFIC AND TRANSPORTATION

A brief description of some of the proposed surface transportation projects found in the State's Transportation Improvement Plan is provided in Chapter 3.

4.8.1 Alternative 1-No Action (Existing Conditions)

The Kentucky Green River CREP has a number of major transportation corridors extending through the region. An extension of Interstate 66 has been proposed to the south. Depending on the exact corridor location, CREP lands enrolled in the program could be impacted. The benefits provided by CREP in terms of improving air quality and retaining the rural character of the area would offset the adverse effect of more roadways and more development in the area.

4.8.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

Under Alternative 2, the proposed CREP expansion area would extend to Mammoth Cave NP and include an additional 28,904 acres through six new counties. Transportation corridors, such as Interstate 66, could potentially impact these lands by segmenting them..

4.8.3 Conclusion

Impacts resulting from transportation systems, patterns and traffic for both Alternatives 1 and 2 could adversely affect CREP lands by fragmenting or dividing lands.

4.9 HUMAN HEALTH AND SAFETY

Chapter 3 identifies issues that could affect human health and safety. Most of these issues were directed at water quality in the CREP area. Nitrates were detected above the drinking water standard in less than 1 percent of the springs and 4.3 percent of the wells samples. The highest nitrate levels in Kentucky have been detected in shallow, hand-dug wells, while the lowest nitrate levels occur in deeper, drilled wells. Improper water well construction and inadequate maintenance also contribute to making these wells more susceptible to nitrate contamination.

Other health and safety concerns related to the use of pesticides and air quality in the region. CREP practices will not only improve water quality, but will also curb fugitive dust and particulates that occur during plowing and the operation of construction and farm equipment.

4.9.1 Alternative 1-No Action (Existing Conditions)

Enrolling marginal farmland into CREP will reduce the amount of land cultivation and tilling, minimize the application of pesticides and fertilizers and will reduce the amount of fugitive dust and emissions from farm equipment. The human health benefits of retiring marginal farmland may be measurable as more land is enrolled into the program and these benefits can be monitored and measured.

4.9.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

No adverse effects to human health and safety are expected to occur from the expanded Kentucky CREP. Alternative 2 would present greater long-term benefits to human health, as more land would be included in the CREP boundary and available for enrollment into the program. By retiring cropland, the need for pesticides, fertilizers, tilling and use of heavy farm equipment is reduced.

4.9.3 Conclusion

One of the goals of CREP is to reduce nonpoint source pollution loading, such as sediments and fertilizers from agricultural sources into the mainstem of the Upper Green River by 10 percent. The impact to human health and safety would be Negligible for both Alternatives 1 and 2.

4.10 SOCIOECONOMIC IMPACTS

4.10.1 Alternative 1-No Action (Existing Conditions)

Population growth and dispersion, human disturbance, incompatible land uses and development and changes in the regulatory framework are the principal social factors that impact natural resources. Based

on the 2000 Census, approximately 8 percent of the State's population resides in the expanded Kentucky CREP area. Chapter 3 shows the population by county throughout the CREP region.

4.10.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

The potential economic impacts related to agricultural suppliers of products and services, such as fertilizer, seed, mulch, equipment, fuel and transportation, are unknown. As land is retired from production, the indirect effects on the local and State economy has not been determined.

4.9.3 Conclusion

Farm policies have been amplified in the 2002 Farm Bill that aim at preserving farmland, assisting farmers in environmental stewardship and providing support for commodity producer to offset low prices. Recent farming trends have shown that land is disappearing from farming and farm operators are leaving the tradition and not being replaced because the economic benefits of farming are less than the rewards from nonagricultural professions.

The threshold impacts for Alternatives 1 and 2 for socioeconomic impacts are Low.

4.11 ENVIRONMENTAL JUSTICE

CREP is a voluntary enrollment program that is open to all landowners or operators who meet the eligibility requirements. No data exist that specifically describe the demographic characteristics of Kentucky CREP participants. **Chapter 3** shows the demographic characteristics of the Kentucky Green River CREP counties. Simpson and Warren Counties have the highest percentage of minorities, and Adair, Russell, Metcalfe and Hart Counties had the highest percentage of persons living below poverty.

4.11.1 Alternative 1-No Action (Existing Conditions)

Adair, Russell, Metcalfe and Hart Counties, which have the highest percentage of persons living below poverty, are counties that have been in the CREP since its inception. However, no disproportionate impacts to minority or low-income communities are expected to occur from the Kentucky CREP.

4.11.2 Alternative 2-Expanded Kentucky Green River CREP (Agency's Preferred Alternative and Environmentally Preferred Alternative)

Simpson and Warren Counties, counties showing the highest percentage of minorities, would be included in the expanded CREP if Alternative 2 is selected. As with Alternative 1, no disproportionate impacts to minority or low-income communities are expected to occur from expanding the CREP boundary.

4.11.3 Conclusion

There would be no impact under either Alternative 1 or 2 for Environmental Justice.

4.12 OTHER PROTECTED RESOURCES

4.12.1 Wild and Scenic Rivers

The Green River was listed in the NRI in 1982 and is also designated a Kentucky Wild River. Refer to Chapter 3 and to **Appendix G** for a description of the segment listed in the NRI.

4.12.1.1.1 Alternative 1-No Action (Existing Conditions)

Alternative 1 does not include a critical portion of the Upper Green River Watershed that would provide conservation to a segment of the Green listed in the NRI. In addition, Alternative 1 does not include elements allowing wider buffers along certain tributaries to this system.

4.12.1.2 Alternative 2-Expanded Kentucky Green River (Agency's Preferred Alternative)

Alternative 2 includes the entire Upper Green River Basin, excluding those watersheds that lie above the Corps' reservoirs. It includes approximately 30 additional river miles and provides greater protection to the Green River and its outstandingly remarkable values (ORVs): Scenic, Recreation, Geologic, Fish, Historic, Cultural, and Wildlife. This expanded area would encompass 946,101 acres and extend down the Green River to its confluence with the Barren River at river mile 149.5. This expanded area would include the tributary watersheds contributing to the Green, including the Nolin River and Barren River systems upstream to their respective reservoirs.

CREP practices encourage the establishment of buffers along riparian corridors. These buffers not only protect the surface waters from agricultural runoff and sedimentation, but they provide wildlife corridors, control flooding and provide shade for fish. They also add to the scenic quality of the river for recreationalists and canoeists.

4.12.1.3 Conclusion

Under Alternative 1, there would be no change in the existing CREP area and no increase in the protection of the Upper Green River basin. Under Alternative 2, the Upper Green River Basin would be encompassed in KYCREP. There would be modifications to certain CRP practices that provide added value to the ORVs.

4.12.2 National Natural Landmarks

Two NNLs are located within Russell County, a Kentucky CREP county for both alternatives. There would be no affect from the Kentucky CREP to either NNL.

4.12.2.1 Conclusion

KYCREP would not affect either NNLs under either alternative.

CHAPTER 5.0 CUMULATIVE IMPACTS

Cumulative impacts are defined by CEQ in §1508.7 as the incremental effect of the proposed action when added to other past, present and reasonably foreseeable future actions regardless of who or what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions that occur over time.

Since the inception of the KYCREP, 574 contracts composed of 10,813.3 acres have been approved for enrollment into the program. As of May 2006, an estimated 23 new contracts, totaling about 342 acres are pending approval. Cumulatively, this enrollment represents only about 11 percent of area eligible for enrollment into the program.

FY 2005 showed steady enrollment with 109 contracts approved, totaling 1,397.7 acres. Of the contracts enrolled, CP22 (Riparian Buffer) and CP2 (Native Grasses) are the dominant practices selected. These two practices account for about 97 percent of the enrolled acreage. By the end of FY 2005, a total of 53 contracts, totaling 9,542.1 acres had been enrolled. **Table 5-1** shows the cumulative number of approved contracts at the end of FY 2005 by conservation practice.

Table 5-1: Cumulative Approved Contracts and Acreage by Conservation Practice, through FY 2005

Conservation Practice	Approved Contracts		
	Practice	Number	Acres
CP1	Introduced Grasses/Legumes	9	179.5
CP2	Native Warm Season Grasses	120	3,799.9
CP3A	Tree Planting	5	67.1
CP21	Filter Strip	1	1
CP22	Riparian Buffer	368	5,494.6
TOTAL		**503**	**9,542.1**

Source: Commonwealth of Kentucky. Jan. 5, 2006. *Kentucky Green River Conservation Reserve Enhancement Program Annual Program Accomplishment Report (CEP-68R), FY 2005.*

The cumulative effects of the Kentucky Green River CREP are contingent upon the willingness of farmers to voluntarily enroll certain environmentally sensitive land into the program for the purpose of reducing runoff and sedimentation and ultimately to improve the water quality in the Green River Watershed. Within the existing KYCREP area, Barren, Green, Taylor, and Hart current lead with the counties with the most acreage enrolled. **Figure 5-1** illustrates the trends for enrollment by the existing CREP counties.

Cumulative effects by the resource topics evaluated in Chapters 3 and 4 are addressed in the following sections:

Biological Resources

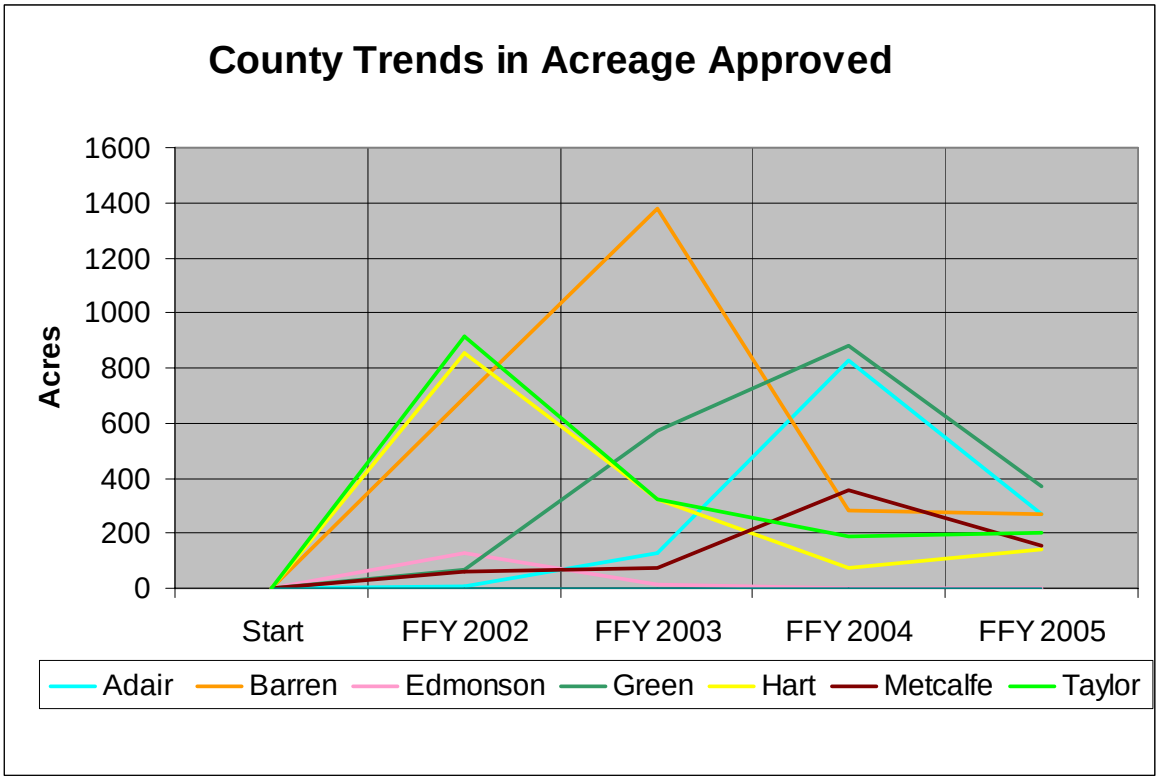
Slightly more than 10 percent of the total acreage eligible for enrollment into KYCREP (99,500 acres) has been approved to date. Specific goals addressed at improvements to the biological resources within the watershed have been established to measure progress. These are identified in Chapters 2 and 3.

A number of studies are ongoing to monitor the water quality and erosion points within the Green River Watershed, including the Nolin River. These include, but are not limited to:

- Historic and projected water quality and biological data, incorporating the results of USGS, Kentucky Dept. of Water, the Upper Green River Watershed Watch, the Kentucky Waterways Alliance Green River Basin, and other studies through modeling
- Analysis of historical patterns of channel migration and field surveys of in-channel and floodplain sediment storage
- Ongoing streamflow gaging and suspended sediment collection and monitoring at three mainstem sites (Mammoth Cave Ferry, Munfordville, Greensburg)
- Streamflow gaging and suspended sediment collection at Green River surface tributary on Pitman Creek in Green County
- Subsurface flux and water quality monitoring in Logsdon River in Barren and Edmonson Counties.

Trends for enrollment within the existing KYCREP area are shown in **Figure 5-1** by county.

Figure 5-1: KYCREP County Trends in Acreage Enrolled into KYCREP through FY 2005



Source: Commonwealth of Kentucky. Jan. 5, 2006. *Kentucky Green River Conservation Reserve Enhancement Program Annual Program Accomplishment Report (CEP-68R), FFY 2005.*

The cumulative impacts to the area's water resources occur mainly from the following sources:

- Animal feedlots
- Fertilizers
- Landfills
- Mining and mine drainage

- Pesticides
- Septic systems
- Spills
- Underground storage tanks
- Runoff

If Alternative 1 is selected, the cumulative effects of the KYCREP would most likely continue to focus on planting grasslands (CP1 and CP2) and establishing riparian buffers (CP22). Although these practices have proven beneficial, utilizing wider buffers as proposed for Alternative 2 would result in greater benefits for water quality and for wildlife corridors over time. Under Alternative 1, a 1,000-foot buffer would be allowed along the mainstem of the Green River and a 300-foot buffer would be allowed along all tributaries. For Alternative 2, all fourth order and higher streams within the expanded KYCREP area would be allowed a maximum 1,000-foot buffer width. Furthermore, lower order stream that have excessive bottomland widths could also be permitted to have 1,000-foot buffers under Alternative 2. In addition to a wider buffer, sinkholes and karst features are proposed for inclusion as eligible for CP22-Riparian Buffer. Wider buffers would potentially result in the following:

- More landowners would most like enroll their fields in the program because the wider buffers would avoid splitting their bottomland, thus making it economically more attractive to enroll under the buffer practice
- Surveys showed that more fields in the KYCREP area would be entirely buffered rather than fragmented if wider buffers were implemented
- The increased buffer would benefit wildlife habitat, which would be increased on a landscape scale
- Overall water quality would be improved by gaining more miles of buffered stream
- Aquatic habitat for rare, endangered and threatened mussels and aquatic species, as well as the aquifers and groundwater feeding the Mammoth Cave system would be vastly improved as sediments, fertilizers and pesticides are filtered and prevented from run-off into streams
- Sinkholes and karst features would be protected

Alternative 2 proposes CP29-Marginal Pastureland Wildlife Habitat Buffer. Cumulatively, this practice can be used with CP22-Riparian Buffer for best protection. CP29 allows for the planting of native grasses on entire fields and does not require the planting of trees. As much of the land is open pastureland, landowners are expected to be more amenable to implementing this practice around sinkholes rather than planting trees or installing fences around the sinkholes. Inclusion of this practice is considered essential for the future protection of the region's karst features and sinkholes.

Cultural Resources

Many tribal communities and cultural resources have been found along floodplains and in river corridors where historic and prehistoric cultures once lived. By establishing riparian buffers and protecting these river corridors through CREP, minimal disturbance to these areas and any potential resources in the area would occur. By retaining these resource lands in a conservation program rather than risking development of these areas, archaeological and cultural resources can be preserved.

Prior to any ground disturbing activities, FSA will consult with the SHPO to determine if archaeological resources are known to occur in the area. Any archaeological surveys determined necessary would be conducted by a qualified archaeologist in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeological Investigations in Kentucky.*

Water Resources

Cumulatively, CREP, combined with other conservation efforts in the Green River Watershed, will vastly improve the water quality of the Green River and its tributaries, as well as the groundwater system that flows through Mammoth Cave. With existing and proposed conservation practices aimed at improving water quality, this program helps reduce runoff and sediments, nutrients and agricultural pollutants from entering surface streams and the rivers. Currently, approximately 134.5 stream miles are buffered through the KYCREP. With CP22 and propose CP29, it is assured that many additional miles will be buffered through the program.

Soils

Two principal cumulative impacts affect the quality of soils in the KYCREP area: erosion and acidification. CREP would mitigate the effects of erosion through conservation practices that utilize grass plantings and tree plantings. Alternative 2 proposes wider buffer zones along streams and tributaries to the mainstem of the Green River. Conservation practices would be implemented to control erosion.

Air Quality

Conditions affecting the region's cumulative air quality may be induced from global sources, such as fires from Mexico and other parts of the world, major storms and hurricanes, and Saharan and Asian dust storms. CREP involves landowners planting ground covers to control dust and to help mitigate the effect of emissions and particulate matter. CREP offsets the effects of development and various other projects. Certain domestic projects, such as mining operations, require preparation of a plan for controlling fugitive dust emissions. All sources of dust, from vehicular traffic, material storage and transfer, and windblown erosion of soil and rock storage piles, must be assessed and mitigation measures proposed to eliminate visible dust emissions at the property boundary. A dust control plan indicating how the offsite effects of dust from the crushing and stockpiling activity, haulage and mining activity, will be controlled in order to prevent violations of the fugitive dust standards of the Division of Air Quality.

Recreation

The cumulative effects of CREP on recreational resources focus on improved water quality for fishing and swimming, as well as hiking, and bird watching. Other forms of recreation that are supported by CREP are—

- Boating
- Camping
- National Park tours
- Caving
- Nature Walks and Wildlife Viewing
- Photography

CREP supports passive activities, and in some areas, is supportive of hunting. As the quality of the water and air improve, combined with the rural environment, recreationalists tend to visit CREP areas for the rural experience, peace and beauty the area offers. Indirectly, these visits generate income to farmers and to the local economy. For the KYCREP area, Mammoth Cave National Park brings about 1.8 million visitor a year to the region.

Land Use

Land uses change through enactment of State legislation and local ordinances. Cumulatively, land use changes may precipitate the most significant impacts to CREP land and to agriculture. Mining and

mineral operations, forestry, transportation, residential development and power plants in the region are all threats to the resources CREP is striving to protect and conserve.

Traffic and Transportation

The major transportation projects that are proposed for construction in the KYCREP area are identified in Chapter 3. Construction of these projects will cumulatively impact air quality, potentially fragment CREP land, and will place more pressure on farm operators to remain in farming. Construction of these major roadways could potentially induce more commercial and residential development.

Human Health and Safety

KYCREP would cumulative contribute to the decreased use of pesticides, herbicides and fertilizers that are flowing into the Green River and its tributaries. In addition, with the installation of conservation practices, such as filter strips, wider buffers, riparian corridors, these practices would mitigate the effects of runoff and pollutants attempting to enter surface waters. CREP provides cumulative benefits by buffering surface waters and sinkholes from trash and pollutants impacting these sensitive resources.

Socioeconomic Impacts

Based on the 2000 Census statistics, about 8 percent of the State's population resides in the Kentucky CREP area. CREP maintains a natural and rural environment and preserves natural resources that are rapidly diminishing due to development pressures, exotic species, blights and diseases, human disturbance and natural disasters. Cumulatively, CREP has provided more than $1.7 million in payments. These payments would be much greater with the expansion area.

Other Protected Resources

CREP is a conservation program and through its implementation would continue to conserve the resources in the region. These would include the Green River, which is listed in the NRI, and the resources adjacent to and underlying Mammoth Cave National Park.

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CHAPTER 6.0 MITIGATION MEASURES

The Commonwealth of Kentucky is conducting several monitoring studies to determine the effectiveness of CREP in Kentucky. These monitoring studies will analyze the historic and projected water quality and the biological data. Use of Geographic Information System mapping and analysis of land use in the Upper Green River Basin will be conducted to determine erosion points, distribution of cane breaks and stretches of very thin riparian along the mainstem of the Green River. Results of these monitoring studies will provide more substantial data to develop appropriate mitigation targeted at improving the resources.

High-quality natural areas, containing rare plant and animal species or relatively undisturbed natural communities, are becoming increasingly imperiled throughout the Commonwealth of Kentucky. A critically important aspect of the Commission's mandate is working with public and private landowners to ensure for the protection of ecologically significant land in Kentucky. Land protection actions by the Commission are always undertaken with the full cooperation and agreement of landowners. For owners of qualifying natural areas, the Commission offers a variety of land protection options, including acquisition of land or conservation easements, dedication of public or private property as a State nature preserve, and enrollment in the Kentucky Natural Areas Registry Program.

The Kentucky Natural Areas Registry is a voluntary, non-regulatory program designed to provide recognition for sound stewardship and awareness of the ecological significance of a landowner's property. Under the terms of the registry agreement, the landowner does not relinquish any rights to the property and agrees to protect it to the best of their ability. Further, the landowner agrees to notify the Commission if they are interested in selling the land or if the area is threatened in any way. Landowners who enroll their property in the registry program receive a registry certificate and, if desired, other appropriate public recognition. To be eligible for registration, a property must contain habitat for plants or animals that are rare or have declining populations in Kentucky or that contain an outstanding example of a Kentucky ecological community, such as an old growth forest, wetland, glade or prairie.[91]

Protection of rare species requires cooperation of private landowners. Private individuals hold 95 percent of the land in Kentucky. This rich landscape is home to a diverse group of species. Changes in land use, pollution and fragmentation have had a negative impact on many of these species. Pallid sturgeon, Virginia big-eared bat, vesper sparrow, Braun's rockcress and littlewing pearlymussel are a few of the 390 plant and 317 animal species that are currently listed as rare in the Commonwealth. Additionally, six plant and 49 animal species are considered extirpated from the State or extinct.

The protection of surface water and groundwater resources is a primary environmental issues facing pesticide applicators. Pesticides can reach surface water by running off the application site following a heavy rainfall and into neighboring streams and rivers or sink holes. Pesticides can also leach through the soil profile into the groundwater. Water contamination can also be the result of a direct or specific source, such as a spills or backsiphoning during filling of pesticide application equipment. This type of contamination is referred to as "point source" contamination and can be mitigated. All pesticide users are responsible for ensuring that every means available is used to prevent pesticides from contaminating Kentucky's surface water and groundwater resources. Pesticides applicators can greatly reduce the risk of either point or non-point source contamination from pesticides by utilizing BMPs. BMPs are effective, common sense practices that emphasize proper mixing, loading and application of pesticides and also include methods that should be used before, during and after application.

[91] Nature Preserves Commission. "Natural Areas Registry," modified Jan. 17, 2006.

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CHAPTER 7.0 LIST OF PREPARERS, CONTRIBUTORS, AND REVIEWERS

The following individuals contributed to the data, the mapping and the review of the Kentucky Green River CREP PEA.

Name	Agency/Firm	Expertise
Sally Benjamin, National Biologist	USDA-Farm Service Agency	Biology and NEPA compliance
Charles (Chad) Chadwell, CREP Program Manager	USDA-Farm Service Agency	CREP policies
Matthew Ponish, Agricultural Program Technology Specialist	USDA-Farm Service Agency	Agency reviewer
Kathleen Schamel, Federal Preservation Officer	USDA-Farm Service Agency	Section 106 compliance; cultural resources; historic preservation
Jeffery S. Hall State Executive Director	USDA-Farm Service Agency	Director of Farm Service Agency
Robert Finch Chief, Farm Program Division	USDA-Farm Service Agency	Kentucky CREP policy, Document Reviewer
Joyce Hobbs, Kentucky State Environmental Coordinator	USDA-Farm Service Agency	Environmental Compliance, Document Review
Faye Brown, Kentucky Conservation Program Specialist	USDA-Farm Service Agency	Kentucky CREP policy
David Sawyer State Conservationist	USDA-Natural Resources Conservation Service	NRCS Technical Assistance, CREP Partnership
Mark Waggoner State Resource Conservationist	USDA-Natural Resources Conservation Service	CREP practices, NRCS Technical Assistance
Danny Hughes State Technology Coordinator	USDA-Natural Resources Conservation Service	CREP practices, NRCS Technical Assistance, Conservation Planning
Mason Howell Wildlife Biologist	USDA-Natural Resources Conservation Service	CREP practices, wetland restoration, mid-contract management.
Steve Coleman Director, Division of Conservation	Kentucky Department of Natural Resources, Division of Conservation	GIS and Mapping, State Cost-Share Program
Jay Nelson, Kentucky Green River CREP Coordinator	Kentucky Department of Natural Resources	Coordinate CREP Activities
Brent Harrel Private Lands Coordinator	U.S. Fish & Wildlife Service, Threatened & Endangered Species Program	Threatened and endangered species and critical habitat

Name	Agency/Firm	Expertise
Dan Figert Fish & Wildlife Program Manager	Kentucky Department of Fish Wildlife	KDFWR CREP Partnership, Threatened and endangered species and critical habitat
Mark DePoy Chief of Resource Management	Mammoth Cave NP Service,	GIS and mapping
Dale Reynolds Green River Basin Coordinator	Kentucky Division of Water	Water quality, nutrients and phosphorus
Jim Aldrich Vice President and State Director	The Nature Conservancy	CREP Partner
Dr. Richie Kessler Green River Project Director	The Nature Conservancy	CREP Easements
Dr. Scott Grubbs Project Director	Department of Biology and Center for Biodiversity Studies, Western Kentucky University	Monitoring and Evaluation
Dr. Ouida Meier Project Manager	Center for Biodiversity Studies, Western Kentucky University	Water Quality and Biological Monitoring
David Morgan , Preservation Officer, Project Review	Kentucky State Historic Preservation Office	Archeological, historical and cultural resources
Eileen M. Carlton, Principal Environmental Planner	Environmental Management Collaboration, Ltd.	Document author, NEPA & regulatory compliance

CHAPTER 8.0 PERSONS AND AGENCIES CONTACTED

During the planning process for the Kentucky CREP PEA, a number of agencies were consulted at the outset of the project during scoping. **Appendix D** is a compendium of correspondence received from agencies regarding this program to date.

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APPENDICES

APPENDIX A
PROPOSED MEMORANDUM OF AGREEMENT
BETWEEN
U.S. DEPARTMENT OF AGRICULTURE
AND
THE COMMONWEALTH OF KENTUCKY
and
ADDENDUM AGREEMENT

MEMORANDUM OF AGREEMENT
BETWEEN
THE U.S. DEPARTMENT OF AGRICULTURE,
THE COMMODITY CREDIT CORPORATION,
AND
THE COMMONWEALTH OF KENTUCKY

I. PURPOSE

This Memorandum of Agreement (MOA) is between the U.S. Department of Agriculture (USDA), the Commodity Credit Corporation (CCC), and the Commonwealth of Kentucky, to implement a Conservation Reserve Enhancement Program (CREP) in connection with the Conservation Reserve Program (CRP) for certain portions of the Green River watershed. This program is undertaken in order to enhance wildlife habitats in the watershed and to protect the quality of these waters by reduction of sediment and nutrients.

II. GENERAL PROVISIONS

The purpose of this Agreement is to allow, where deemed desirable by USDA, CCC, and Kentucky, certain acreage in the Green River watershed to be enrolled under the CREP. The Green River is the most biologically diverse branch of the entire Ohio River system. The area of greatest biodiversity is located on the 100-mile free-flowing section below Green River Lake Dam and extends into the Mammoth Cave National Park.

The establishment of a CREP seeks to greatly reduce runoff of sediments, nutrients, pesticides, and pathogens from agricultural sources that currently have an adverse impact on the health of the Green River system. Sinkholes, resulting from the area's karst topography, occur throughout the watershed and contribute to the high sensitivity of the areas' aquatic systems to pollution. Other agricultural impacts include fragmentation of riparian corridors, native grasslands, and forestlands.

The overall goal is to sustain and, where needed, restore the health and viability of degraded or threatened natural habitats and ecosystems in the project area. The program goals are to be accomplished through a voluntary, incentive-based program that seeks participation from
80 percent of the agricultural producers within the project area.

The primary goals for the CREP are:

1. To reduce by 10 percent (based on 1999 data) the amount of sediment, nutrients, and pesticides from agricultural sources entering the tributaries and the main stem of the Green River and the Mammoth Cave System as measured by installation of Best Management Practices (BMPs) designed for that purpose and compliance with water quality standards (replanting riparian buffers along streams and around sinkholes are high priority);
2. To enhance habitats and populations of wildlife, including state and federal special concern, rare, threatened and endangered species, using as a measure of success a reduction in the need to list additional species as threatened or endangered;
3. To sustain and restore composition, structure and function of riparian habitat corridors associated with the Green River and tributary watersheds, targeting 28,000 acres that include buffers around sinkholes;
4. To reconnect landscape elements that will restore landscape level ecological processes;
5. To establish buffers around sinkholes, targeting 1000 high priority sinkholes;

6. To sustain and restore non-riparian wetlands, targeting 3000 acres (riparian and non-riparian wetlands);
7. To protect and restore subterranean ecosystems;
8. To collect, store, and analyze data to enhance planning for sustaining the health of the watershed; and
9. To develop an outreach program targeting all active agricultural producers in the area.

This agreement is not intended to supersede any rules or regulations, which have been, or may be, promulgated by either USDA, CCC, Kentucky, or any other governmental entity participating in the CREP.

III. AUTHORITY

A. Federal

The CCC has the authority under the provisions of the Food Security Act of 1985, as amended (1985 Act)(16 U.S.C. 3830 et seq.), and the regulations at 7 Code of Federal Regulations (CFR) part 1410 to perform all activities contemplated by this agreement. Pursuant to the 1985 Act, CCC is authorized to enroll land in the CRP through December 31, 2002. Sections 1230, 1234, and 1242 of the 1985 Act and the regulations at 7 CFR §1410.50 authorize CCC to enter into agreements with States to use the CRP in a cost-effective manner to further specific conservation and environmental objectives of a State and the Nation. Other authorities may also apply.

B. State

Kentucky has the authority to perform the activities contemplated by this MOA pursuant to Kentucky Revised Statute (KRS) 146.080, which authorizes the Secretary for Natural Resources and Environmental Protection Cabinet to divide the State into nine soil and water conservation areas, to be approved by the Kentucky Soil and Water Conservation Commission. KRS 262.020 states that the purpose of the Soil and Water Conservation Districts (CD) is to conserve and develop all renewable natural resources within the CD. The individual districts, as agents of the State, are authorized to participate in projects that include among their objectives the control of soil erosion, the retardation of water runoff, the maintenance of flood plains, the stabilization of watersheds, avoidance and abatement of sedimentation and pollution in streams and other bodies of water, and protection of fish and wildlife. Additionally, KRS 262.700 authorizes the State, through the CDs, to form sub-districts of a CD, called Watershed Conservancy Districts, for the purpose of developing and executing plans and programs relating to any phase of conservation of water, water usage, erosion prevention and control of erosion, and sediment damages.

KRS 224.10-100 authorizes the State, through the Natural Resource and Environmental Protection Cabinet, to: provide for the prevention, abatement and control of all water, land and air pollution including but not limited to, that related to pesticides, nutrients and other contaminants; and advise, consult, and cooperate with other agencies of the Commonwealth, other States, the Federal government, and interstate and local agencies, and affected persons, groups, and industries.

KRS 224.70-100 states that the policy of the Commonwealth of Kentucky is to conserve the waters of the State for public water supplies; provide a comprehensive program for the public interest for the prevention, abatement and control of pollution; to provide for cooperation with agencies of other States or of the Federal government in carrying out these objectives; to safeguard from pollution the uncontaminated waters of the Commonwealth; to prevent the creation of any new pollution of the waters of the Commonwealth; and to abate existing pollution.

KRS 224.71-100 to KRS 224.71-140, the Kentucky Agriculture Water Quality Act, created the Agriculture Water Quality Authority to be a multidisciplinary peer group that is attached to the Natural Resource and Environmental Protection Cabinet to establish statewide and regional agriculture water quality plans and to generally promote soil and water conservation activities that protect waters of the Commonwealth from the adverse impacts of agriculture operations within the Commonwealth.

IV. PROGRAM ELEMENTS

USDA, CCC, and Kentucky agree that:

A. The Kentucky CREP will consist of a Federal continuous sign-up CRP component and a voluntary state incentive program. This MOA contemplates the enrollment of up to 100,000 acres of crop and pastureland with high environmental value along the main stem of the Green River and its tributaries.

B. The 100,000 acres to be enrolled in the CREP will come from a 917,197 acre area along the Green River from the Green River Lake Dam downstream to Lock and Dam 6 and includes Adair, Barren, Edmonson, Green, Hart, Metcalfe, Russell and Taylor counties in Kentucky.

C. The eligible CRP practices for the Kentucky CREP will be:

CP-1	Introduced Grasses and Legumes
CP-2	Native Grasses, Legumes and Forbs
CP-3	Tree Planting
CP-3A	Hardwood Tree Planting
CP-4B	Permanent Wildlife Habitat (Corridors), Non-easement
CP-4D	Permanent Wildlife Habitat, Non-easement
CP-8A	Grassed Waterways, Non-easement
CP-9	Shallow Waterways for Wildlife
CP-10	Vegetative Cover--Grass--Already Established
CP-11	Vegetative Cover--Trees--Already Established
CP-12	Wildlife Food Plots
CP-15A	Permanent Vegetative Cover (Contour Grass Strips), Non-easement
CP-21	Filter Strips
CP-22	Riparian Buffer
CP-23	Wetland Restoration
CP-25	Rare or Declining Habitat

D. Additionally the project will include the following practices funded by the Kentucky Soil Erosion and Water Quality State Cost Share Program, in accordance with 2-CRP handbook:

1. Alternative Water Supplies for Livestock:
   a. Limited point access to streams for livestock
   b. Water lines and tanks

E. In determining reimbursable costs to be made by CCC, CCC shall use the appropriate CRP practices. All conservation practices shall meet, but may exceed, the minimum specifications outlined in the applicable Natural Resources Conservation Service (NRCS) Field Office Technical Guide, and in accordance with 2-CRP handbook.

F. All CRP contracts for land enrolled in the CREP will be not less than 10 years or more than 15 years and will be subject to all normal CRP provisions as provided for in the CRP regulations. Program participants will have the opportunity, as described herein, to enter into the State incentive program and either extend the benefits of the CRP contract for another 15 or 35 years through a supplemental

contract with Kentucky, or to receive payment from Kentucky in return for executing a voluntary permanent easement with Kentucky.

G. Eligible agricultural producers will not be denied the opportunity to offer eligible acreage for enrollment during other CRP enrollment periods.

V. FEDERAL COMMITMENTS

USDA and the CCC will:

A. Determine applicant eligibility for participation in the CRP portion of the CREP consistent with the regulations at 7 CFR Part 1410 and administer those CRP contracts that are executed.

B. Pay 50 percent of reimbursable costs of conservation practices. Reimbursements to CREP participants from all sources may not exceed 100 percent of the cost of such practices.

C. Make rental payments under the CRP contract at normal CRP county cropland soil rental rates, subject to such further payments as are provided for in paragraphs D. and E. of this section.

D. Make incentive payments, as a percentage of the basic CRP maximum annual rental rate otherwise applicable to the land under CRP, in an amount equal to:

1. 100 percent for priority one practices (tree planting, hardwood tree planting, riparian buffer, wetland restoration, and rare or declining habitat);
2. 75 percent for priority two practices (native grasses, legumes and forbs; permanent wildlife habitat (corridors), non-easement; permanent wildlife habitat, non-easement; grassed waterways, non-easement; shallow waterways for wildlife; filter strips; and
3. 50 percent for priority three practices (introduced grasses and legumes, wildlife food plots; vegetative cover-grass-already established, vegetative cover-trees-already established, permanent vegetative cover (contour grass strips), non-easement.

E. Pay additional rental incentives, if any, as would otherwise normally apply under the CRP, including any incentives for obligations of maintenance consistent with the applicable CRP payment process.

F. Provide information to landowners concerning Kentucky's CREP and technical assistance for the CREP in general.

G. Provide, in a manner consistent with the existing CRP program, assistance to producers whose practices are destroyed by circumstances beyond the producers' control.

H. Permit successors-in-interest to contracts enrolled under this CREP in the same manner as allowed generally for other CRP contracts.

VI. STATE COMMITMENTS

Kentucky agrees to:

A. Enroll landowners who decide to participate in the Kentucky Incentive Program (KIP) in either a 15-year, 35-year, or permanent contract with Kentucky. Landowners will be required to enroll in one of these options in order to receive benefits afforded by Kentucky in the form of either incentive payments or cost-share payments for implementation of conservation practices. Landowners may participate in the Federal portion of the CREP without participating in the voluntary Kentucky portion.

B. Pay 50 percent of reimbursable cost for installation of all CRP practices, and provide, in addition to federal payments, front-end purchases of seeds and seedlings for CP-3, CP-3A, and CP-22, not to exceed 100 percent of the cost of such practices.

C. Provide additional reimbursement for the costs of installation of approved conservation practices equal to:

1. 75 percent of the cost of installing practices not eligible for federal CRP payments, enumerated in point D of this section.

2. 50 percent of the costs of implementing the practice, when the land will be entered into a permanent easement.
3. 30 percent of the costs of implementing the practice, when the land will be entered into a 35-year supplemental contract (totaling 50 years) for lands enrolled as riparian buffers or wetland restoration.
4. 25 percent of the cost of implementing the practices, when land will be entered into 15-year supplemental contract (totaling 25-30 years), regardless of the practice.

D. The Kentucky Soil Erosion and Water Quality State Cost Share Program will, in addition to acreage paid for under the CREP agreement and in accordance with 2-CRP handbook, provide:
   1. Alternative Water Supplies for Livestock:
      1) Limited point access to streams for livestock
      2) Water lines and tanks

E. Provide additional State payments for:
   1. Voluntary permanent easement, a lump sum payment of $400 per acre.
   2. 35-year conservation easement or supplemental contract, a lump sum payment of $300 per acre.
   3. 15-year supplemental contract, a lump sum payment of $150 per acre.
F. Provide technical guidance to ensure that practice specifications are met.
G. Provide assistance in field practice completion.
H. Develop and implement a monitoring program that will include:
   1. Enrollment counts;
   2. Acres buffered;
   3. BMP installations; and
   4. Pollutant reductions that advance water quality objectives.
I. Prepare an annual report for USDA, which summarizes, but is not limited to, the:
   1. Level of program participation;
   2. Results of the annual monitoring program; and
   3. Non-federal CREP expenditures
J. Complete the State enrollment forms and approve contracts for the KIP of the CREP.

VII. OTHER PROVISIONS

A. CRP contracts executed under this CREP will be administered in accordance with the CRP regulations at 7 CFR Part 1410 and other program authorities.
B. The Deputy Administrator for Farm Programs, USDA Farm Service Agency, is delegated authority to carry out this MOA and, with the Secretary of the Natural Resources and Environmental Protection Cabinet, or their designees, may further append this MOA consistent with the provisions of the Food and Security Act of 1985, the regulations at 7 CFR part 1410, and the provisions of this MOA.
C. This MOA, or any portion thereof, may only be modified by written agreement between the parties.
D. This MOA may be terminated by either party after written notice. Such termination will not alter existing contractual obligations under the CREP or affect reporting requirements provided for in this MOA.

IT IS SO AGREED:

So agreed:

On behalf of the United States Department of Agriculture and the Commodity Credit Corporation

_____ _____

J. B. Penn Date
Under Secretary
for Farm and Foreign Agricultural Services
President
Commodity Credit Corporation

_____ _____

Thomas Hunt Shipman Date
Acting Deputy Under Secretary
for Farm and Foreign Agricultural Services

FOR THE STATE OF KENTUCKY

_____ _____

Paul E. Patton Date
Governor
Commonwealth of Kentucky

ADDENDUM AGREEMENT
BETWEEN
THE U.S. DEPARTMENT OF AGRICULTURE,
THE COMMODITY CREDIT CORPORATION
AND
THE COMMONWEALTH OF KENTUCKY

This Addendum Agreement is entered into between the U.S. Department of Agriculture (USDA), the Commodity Credit Corporation (CCC), and the Commonwealth of Kentucky (Commonwealth) to implement a Conservation Reserve Enhancement Program (CREP) for portions of the Green River Watershed in Kentucky. This program is undertaken to protect the habitats in the Green River Watershed. This Addendum hereby modifies the Memorandum of Agreement (MOA) entered into between USDA, CCC, and the Commonwealth as a part of the National Conservation Reserve Program (CRP) operated by USDA for CCC.

The following language is made as an Addendum to the MOA and to modify the respective clauses as numbered in the original agreement.

III. AUTHORITY

A. Federal

The CCC has the authority under the provisions of the Food Security Act of 1985, as amended (1985 Act)(16 U.S.C. 3830 et seq.), and the regulations at 7 Code of Federal Regulations (CFR) part 1410 to perform all activities contemplated by this agreement. Pursuant to the 1985 Act, CCC is authorized to enroll land in the CRP through **December 31, 2007**. Sections 1230, 1234, and 1242 of the 1985 Act and the regulations at 7 CFR §1410.50 authorize CCC to enter into agreements with states to use the CRP in a cost effective manner to further specific conservation and environmental objectives of a state and the nation. Other authorities may also apply.

IT IS SO AGREED:

FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE AND THE COMMODITY CREDIT CORPORATION,

_____ _____

John A. Johnson Date
Deputy Administrator
For Farm Programs
Farm Service Agency and
Deputy Vice President
Commodity Credit Corporation

For the Commonwealth of Kentucky

_____ _____

Ernie Fletcher Date
Governor
Commonwealth of Kentucky

United States Department of Agriculture

Farm and Foreign Agricultural Services

Farm Service Agency

Kentucky State FSA Office
771 Corporate Dr., Ste 100
Lexington KY 40503

Telephone: 859-224-7601
Fax: 859-224-7691
Email: kyfsaso@ky.usda.gov

Website at: www.fsa.usda.gov/ky

May 8, 2006

TO: Deputy Administrator Farm Programs
Attn: Chad Chadwell, CREP Project Manager

FROM: Jeffery S. Hall
State Executive Director

SUBJECT: Proposed Expansion of the Green River Conservation Reserve Enhancement Program

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Enclosed is a proposed Addendum to the current Green River CREP agreement. The Addendum is submitted on behalf of all partners and has their full support.

The proposal is to amend the CREP project area to add environmentally significant watersheds downstream of our current project area, and to utilize the community-based approach of this program to more effectively protect locally unique resources and provide better service to the local landowners in both the original and added regions. The following items are the primary changes requested in the program:

- The addition of the Green River Watershed from Mammoth Cave National Park to the confluence with the Barren River (including the Barren River Watershed). This addition will not place the entire Upper Green River Basin (excluding those areas above USCOE reservoirs) into the program. This area encompasses 946,101 acres, and includes land in Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren Counties.
- The incorporation of the CP29 – Marginal Pastureland Wildlife Habitat Buffer into the Green River CREP. This practice was not originally included into this program, but has been deemed important to the protection of the region's unique karst resources.
- The ability to enroll entire marginal pastureland fields into conservation practices if a required percentage of the field meets eligibility requirements. This request is essential for practicality of enrollment and installment if the karst features are to be protected.
- The increase of maximum buffer widths on select streams within the watershed. Currently, the main stem Green River has a maximum buffer with (1,000 ft.) that exceeds that of tributaries (300 ft.). After four years of program implementation, it has become obvious that the extended buffer width of 1,000 ft. is needed on larger tributaries as well.

Please direct questions on this proposal to Faye Brown, Conservation Specialist, at either (859) 224-7685 or Faye.Brown@ky.usda.gov.

Thank you for your consideration of this proposal.

APPENDIX B
KENTUCKY CREP CONSERVATION PRACTICES

The proposed eligible CRP practices for the Kentucky CREP are as listed below—

CP1	Introduced Grasses and Legumes
CP2	Native Grasses, Legumes and Forbs
CP3	Tree Planting
CP3A	Hardwood Tree Planting
CP4B	Permanent Wildlife Habitat (Corridors), Non-easement
CP4D	Permanent Wildlife Habitat, Non-easement
CP8A	Grassed Waterways, Non-easement
CP9	Shallow Waterways for Wildlife
CP10	Vegetative Cover--Grass--Already Established
CP11	Vegetative Cover--Trees--Already Established
CP12	Wildlife Food Plots
CP15A	Permanent Vegetative Cover (Contour Grass Strips), Non-easement
CP21	Filter Strips
CP22	Riparian Buffer
CP23	Wetland Restoration
CP25	Rare or Declining Habitat
CP29	Marginal Pastureland Wildlife Habitat Buffer

The proposed program would also include the following practices funded by the Kentucky Soil Erosion and Water Quality State Cost Share Program, in accordance with *2-CRP* handbook:

Alternative Water Supplies for Livestock:

a. Limited point access to streams for livestock
b. Water lines and tanks

APPENDIX C
KENTUCKY CREP
RELEVANT LAWS AND REGULATIONS

Appendix Table C-1: Federal and State Requirements Related to Implementing Kentucky CREP

Mandate	Administering Agency	Purpose
National Environmental Policy Act of 1969 (NEPA, P.L. 91-190, as amended by P.L. 94-52 and P.L. 94-52; (42 U.S.C. 4321-4347*)*	All Federal agencies	Establishes national policy for protection of the human environment and ensures that decisionmakers taken environmental factors into account. Requires all Federal agencies to analyze alternatives and document impacts resulting from proposed actions that could potentially affect the natural and human environment.
Council on Environmental Quality Regulations, as amended; 40 CFR Parts 1500-1508	All Federal agencies	Implements NEPA and provides guidance to Federal agencies in the preparation of environmental documents identified under NEPA.
Farmland Protection Policy Act of 1981 (7 U.S.C. 4201-4209)	USDA-NRCS	Minimizes impacts from Federal activities on farmland and maximizes compatibility with State and local policies.
Watershed Protection and Flood Prevention Act of 1954 (P.L. 83-566; 16 U.S.C. 1001-1008)	USDA-NRCS	Prior to FY 1996, watershed planning activities and the cooperative river basin surveys and investigations authorized by Section 6 of the Act were operated as separate programs.
Flood Control Act (P.L. 78-534)	USDA-NRCS	Authorized the Secretary of Agriculture to install watershed improvement measures to reduce flooding, sedimentation, and erosion damages, and to further the conservation, development, use and disposal of water and the proper utilization of land.
Food Security Act of 1985. as amended (16 U.S.C. 3830 *et seq.*); 7 CFR 1410	USDA-CCC	CCC is authorized to enroll land in the CRP. 7 CFR 1410.50 authorizes CCC to enter into agreements with States to use the CRP in a cost-effective manner to further specific conservation and environmental objectives of a State and the nation.

Mandate	Administering Agency	Purpose
Farm Security and Rural Investment Act of 2002 (P.L. 107-171; 2002 Farm Bill)	USDA-NRCS	The 2002 Farm Bill enhances the long-term quality of our environment and conservation of our natural resources. Published Conservation Reserve Program rule and launched CRP. Provides funding for conservation programs on working farm lands.
Clean Water Act (CWA) of 1977, as amended (33 U.S.C. 1251, et seq.)	U.S. Environmental Protection Agency; U.S. Army Corps of Engineers	Sec. 401 regulates water quality requirements specified under the CWA. Section 402 requires a National Pollutant Discharge Elimination System (NPDES) permit for discharges into waters of the U.S. Sec. 404 requires a permit before dredging or filling wetlands can occur.
Section 303(d)	U.S. Environmental Protection Agency	Requires States to review, modify and submit the Section 303(d) listing of State impaired waters to the EPA.
U.S. Army Corps of Engineers Regulatory Guidance Letter and National Wetlands Mitigation Action Plan, dated 12/24/02		Clarified President George W. Bush Administration's policies on wetland loss and mitigation.
Endangered Species Act of 1973 (16 U.S.C. 1531-1543)	U.S. Fish & Wildlife Service	Establishes a policy to protect and restore federally listed threatened and endangered species of flora and fauna.
Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711), as amended	U.S. Fish & Wildlife Service and Federal agencies	Implemented the 1916 Convention between the U.S. and Great Britain (for Canada) for the protection of migratory birds. Later amendments implemented treaties between the U.S. and Mexico, the U.S. and Japan, and the U.S. and Russia.
Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-666c; 48 Stat. 401), as amended	U.S. Fish & Wildlife Service	Requires Federal agencies to coordinate with the FWS when any project involves impoundment, diversion, channel deepening or other modification of a stream or water body.

Mandate	Administering Agency	Purpose
Federal Water Pollution Control Act of 1972 (33 U.S.C. 1251-1376, et seq.)	U.S. Environmental Protection Agency	Establishes standards for the restoration and maintenance of the chemical, physical and biological integrity of the nation's waters through prevention, reduction, and elimination of pollution.
National Wild and Scenic Rivers Act, Sec. 5(d) (16 U.S.C. 1271-1287)	National Park Service	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." The NPS maintains a Nationwide Rivers Inventory (NRI) of river segments that potentially qualify as national wild, scenic or recreational river areas.
Executive Order 11990, *Protection of Wetlands*	U.S. Fish & Wildlife Service; USDA-NRCS; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency	Requires Federal agencies to consider all practicable alternatives to impacting wetlands.
Executive Order 11988, *Floodplain Management*	Federal Emergency Management Agency; USDA-NRCS; U.S. Army Corps of Engineers	To restore and preserve the natural and beneficial values served by floodplains.
Executive Order 13112, *Invasive Species*	All Federal agencies	Prevents introduction of invasive species and provides for their control to minimize the economic, ecological and human health effects that invasive species cause.

Mandate	Administering Agency	Purpose
Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*	Departments of Agriculture, Commerce, Defense, Energy, Interior, State, Transportation and U.S. Environmental Protection Agency	Creates comprehensive strategy for conservation of migratory birds by Federal agencies. Enhances coordination among agencies regarding their responsibilities under the treaties on the conservation of migratory birds.
National Historic Preservation Act of 1966, as amended; Sec. 106 and Sec. 110; 16 U.S.C. 470; 36 CFR Parts 60, 63, 65, 78-79, 800	National Park Service; State Historic Preservation Offices	Protects and preserves districts, sites, structures, architectural, archaeological, and cultural resources. Sec. 106 requires consultation with the SHPO. Sec. 110 requires that NPS identify and nominate all eligible resources under its jurisdiction to the National Register of Historic Places.
Archaeological and Historic Preservation Act of 1974, as amended; 16 U.S.C. 469-469c; 74 Stat. 220	National Park Service; all Federal agencies	Requires survey, recovery, and preservation of significant scientific, prehistorical, historical, archaeological, or paleontological data when such data may be destroyed to due Federal activities.
Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*	All Federal agencies	To avoid Federal actions that cause disproportionately high, adverse impacts on minority and low-income populations with respect to human health and environment.
Commonwealth of Kentucky Statutes		
KRS Chapter 146.080	Environmental and Public Protection Cabinet	Authorizes the Secretary for Natural Resources and EPPC to divide the State into nine soil and water conservation areas, to be approved by the Kentucky Soil and Water Conservation commission.
KRS Chapter 262.020	Environmental and Public Protection Cabinet	States that the purpose of the Kentucky Soil and Water Conservation Districts (CD) to

Mandate	Administering Agency	Purpose
		conserve and develop all renewable natural resources with the CD.
KRS Chapter 262.700	Environmental and Public Protection Cabinet	Authorizes the State, through the CDs, to form sub-districts of a CD, called Watershed Conservancy Districts, for the purpose of developing and executing plans and programs relating to any phase of conservation of water, water usage, erosion prevention and control of erosion, and sediment damages.
KRS Chapter 224.10-100	Environmental and Public Protection Cabinet	Authorizes the State to provide for the prevention, abatement and control of all water, land and air pollution, including, but not limited to, that related to pesticides, nutrients and other contaminants; and advise, consult and cooperate with other agencies of the Commonwealth, other States, the Federal Government and interstate and local agencies, and affected persons, groups and industries.
KRS Chapter 224.70-100	Environmental and Public Protection Cabinet	States that the policy of the Commonwealth of Kentucky is to conserve the waters of the State for public water supplies; provide a comprehensive program for the public interest for the prevention, abatement and control of pollution; to cooperate with other States or Federal agencies in carrying out these objectives; to safeguard from pollution the uncontaminated waters of the Commonwealth; to prevent the creation of any new pollution of the waters of the Commonwealth; and to abate existing pollution.

Mandate	Administering Agency	Purpose
KRS Chapter 224.71-100 to 140	Environmental and Public Protection Cabinet	Kentucky Agriculture Water Quality Act, created the Agriculture Water Quality Authority to establish statewide and regional agriculture water quality plans and to generally promote soil and water conservation activities that protect waters of the Commonwealth from the adverse impacts of agriculture operations within the Commonwealth.
KRS Chapter 146	Environmental and Public Protection Cabinet	Contains statutes relating to the Division of Conservation, the Kentucky Soil and Water Conservation Commission, the Kentucky Wild Rivers System and the Nature Preserves Commission. Under this statute, the Kentucky Soil Erosion and Water Quality Cost-Share Fund was added, the Kentucky Heritage Land Conservation Fund was amended, and a section relating to endangered and threatened plants was added. The Division of Water is authorized to coordinate activities with those affected agencies to assure protection of water quality.
KRS Chapter 151	Environmental and Public Protection Cabinet	Addresses water supply plans, water withdrawals, dams and reservoirs, floodplain construction and water resources policy.
KRS Chapter 223	Environmental and Public Protection Cabinet	Provides for the certification program for water and sewage plant operators and water well drillers.

Mandate	Administering Agency	Purpose
KRS Chapter 224A	Environmental and Public Protection Cabinet	Creates the Kentucky Infrastructure Authority which provides financial assistance to Kentucky government agencies for water treatment and water distribution projects and other water resource projects.
KRS Chapter 74	Environmental and Public Protection Cabinet	Establishes water districts
KRS Chapter 217B	Environmental and Public Protection Cabinet	Addresses fertilizer and pesticide application
KRS Chapter 235	Environmental and Public Protection Cabinet	Addresses boating
Kentucky Wild Rivers Act KRS Chapter 146	Environmental and Public Protection Cabinet	Identifies portions of nine rivers of exceptional quality and aesthetic character that have been designated as Kentucky Wild Rivers.
KRS Chapter 150.183, 990 (1978)	Importing, Transporting or Possessing Endangered Species of Wildlife	Unlawful to import, transport, possess or sell any endangered species of wildlife, or any article made in whole or in part from a species of wildlife designated as an endangered.
302 KAR Chapter 27	Kentucky Dept. of Agriculture	Applies to agricultural animal and plant pest control and forest pest control.

Source: Kentucky EPPC, Water Division. Compiled by Environmental Management Collaboration, Ltd., 2006.

APPENDIX D
KENTUCKY CREP
AGENCY CORRESPONDENCE

Pursuant to §1501.7 of the Council on Environmental Quality regulations (40 CFR 1501.7), a scoping process was conducted to gather information in preparing the PEA for the Kentucky Green River CREP. Correspondence received during this process is included in its entirety in this appendix and summarized in section 2.2, Chapter 2.

1. Leah MacSwords, State Forester, Kentucky Division of Forestry, Environmental and Public Protection Cabinet
2. William J. Byron, Water Management Team Leader, U.S. Army Corps of Engineers
3. Michael Turner, Chief, Economics and Environmental Resources, U.S. Army Corps of Engineers
4. David L. Morgan, Chief, Kentucky Heritage Council and State Historic Preservation Officer, Commerce Cabinet
5. Virgil Lee Andrews, Jr., Field Supervisor, U.S. Fish and Wildlife Service

From: MacSwords, Leah (EPPC DNR DOF) [mailto:Leah.Macswords@ky.gov]
Sent: Tuesday, April 18, 2006 2:42 PM
To: hobbs, joyce - Lexington, KY
Cc: West, Stewart (EPPC DNR DOF); Kull, Steve (EPPC DNR DOF); Olszowy, Diana (EPPC DNR DOF); Snyder, Pamela (EPPC DNR DOF); Lowe, Larry (EPPC DNR DOF); Sheehan, Tim (EPPC DNR DOF); Gray, Steve (EPPC DNR DOF)
Subject: CREP Expansion Proposal for the Green River Watershed

Dear Joyce:

RE: USDA Commodity Credit Corporation/Farm Service Agency Notice of Intent to Prepare a Programmatic Environmental Assessment (PEA) for the Kentucky Conservation Reserve Enhancement Program (CREP) and Request for Preliminary Scoping Comments

The Kentucky Division of Forestry supports expanding the Conservation Reserve Enhancement Program (CREP), to include the additionally proposed counties containing the Green River watershed to restore riparian areas and decrease non-point source water pollution. Although we fully support the proposal we also recognize the following potential impacts to our agency:

- The proposed land area expansion eligible for enrollment will negatively impact the Division of Forestry by challenging our ability to maintain other stewardship program services with limited personnel. We may need to seek additional funding, perhaps through an EPA 319(h) grant, to support the CREP assistance.

- Meeting the increased demand of tree seedlings for restoring the riparian areas within the 99,500 acre project area is a concern. Pre-planning for the increased demand to support the program will be vital to ensure that we can meet the demand from our two tree nurseries. We would need as much notice as possible.

- The demand for the Division of Forestry's tree planting machines are currently at the maximum, thus more machines will be needed to cover the additional demand. Under our current budget as well as the recently passed budget for the next biennium, our ability to purchase new planters has been greatly reduced.

- The increase in establishing warm season grasses in riparian areas may also increase the wildland fire risk. We would certainly prefer more trees planted in the riparian areas to create permanent buffers, which we believe would be more beneficial to water quality.

- In the proposal it is stated that all fourth order and higher streams within the CREP area will have a maximum of 1,000-foot buffer widths. This appears to be excessive when comparing streamside management zone (SMZ), width requirements in the southeastern United States. (Please note the table below.)

(*Harvesting in the Stream Side Management Zone: A Study of Soil Disturbance and Canopy Cover Changes; Thesis by Christine Lamb Hodges of Virginia Polytechnic Institute and State University, February 18, 2005)*

State	Perennial			Intermittent	Cold Water Fisheries*	Wetlands	Municipal Waters
	(All widths ft)	(0-20 ft)	(20-40 ft)	(ft)	(ft)	(ft)	(ft)
Alabama	35			35			
Arkansas	35-80sc			35-80sc			
Florida		35	75-300sc	35-300sc		50	200
Georgia	40-100sc			25-50sc	100		50-150
Kentucky	25-55sc			0	60	50	
Louisiana		50	100	35			
Mississippi	30-60sc			30			
No. Carolina	50			50	50-125sc		
So. Carolina	40-160sc			40-160sc	40-200sc		
Tennessee	25-145sc			25-145sc			
Virginia	50			50	60-120sc	50	100-200sc

sc=slope class dependent

The table shows that for municipal waters the maximum SMZ is 200 feet dependent upon slope. Most of the Green River watershed has minimal slope gradient especially in the agricultural areas.

Thank you for allowing the division to comment on the proposal.

Leah W. MacSwords
Director/State Forester
Kentucky Division of Forestry
627 Comanche Trail
Frankfort, KY 40601
ph: 502-564-4496, 800-866-0555
fax: 502-564-6553

From: Byron, William J LRL [mailto:William.J.Byron@lrl02.usace.army.mil]
Sent: Tuesday, April 18, 2006 4:30 PM
To: hobbs, joyce - Lexington, KY
Subject: PEA for KY CREP

I am sending you these comments based on a letter I received from Jeff Hall dated 27 March 2006 regarding the subject matter.

We have no issues or concerns regarding the CREP program along the Green River below the Green River Lake. So far, the CREP program has benefited our lake operations at Green River Lake by allowing our project to make releases as it was designed. Prior to the CREP program and other environmental enhancements by the Nature Conservancy, encroachments had occurred along the river corridor that inhibited our discharge capabilities from the lake.

There are similar encroachments below our Barren River Lake in Warren County that inhibit our outflow capabilities and farther downstream near the mouth of the Mud River which I believe is outside your considered area.

Good luck in your program. If you need any other information regarding our flood control projects, feel free to call me.

Bill Byron
Water Management Team Leader
CELRL-ED-TH
(502) 315-5390

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

http://www.lrl.usace.army.mil/

April 19, 2006

Joyce Hobbs
State Environmental Coordinator
Kentucky State FSA Office
771 Corporate Drive, Ste 100
Lexington, KY 40503-5478

Dear Ms. Hobbs,

I have reviewed information provided in your agency's letter of March 27, 2006, regarding proposed expansion of CREP in the upper Green River basin. Goals of Kentucky CREP are complimentary of the Corps of Engineers Environmental Operating Principles, especially as regards environmental sustainability.

In December 2002, Louisville District began a three-ear experiment using a revised operating guide curve for Green River Lake, a Corps reservoir just upstream of the original CREP. This project was done in partnership with The Nature Conservancy. A critical factor in success of this effort was early enrollment of lowest lying properties. This eliminated many problems that the District had experienced over 32 years of lake operations with discharges impacting downstream landowners. This operating guide curve is contributing to improvements in the downstream aquatic ecosystem, the same resource that CREP is designed to protect and enhance. This joint effort has subsequently led to a national effort, i.e., Sustainable Rivers Project. FSA should recognize benefits of CREP to the Corps efforts to protect the same resources in its programmatic EA.

The Green is rated the fourth most bio-diverse stream in the United States. CREP covers the longest stretch of "exceptional surface water" in Kentucky. Expansion to will assist in protection of additional "exceptional and reference reaches" of surface waters in the area. Further, such expansion will only benefit Corps efforts to operate projects in a more environmentally sustainable manner.

If you have any questions or need of assistance contact me at your convenience.

Sincerely,

/s/

Michael Turner
Chief, Economics and Environmental Resources
USACE-CELRL-PM-P-E

502-315-6900

COMMERCE CABINET
KENTUCKY HERITAGE COUNCIL

Ernie Fletcher
Governor

The State Historic Preservation Office
300 Washington Street
Frankfort, Kentucky 40601
Phone (502) 564-7005
Fax (502) 564-5820
www.kentucky.gov

George Ward
[redacted]
Secretary

David L. Morgan
Executive Director and
State Historic Preservation Officer

April 19, 2006

Ms. Joyce Hobbs
State Environmental Coordinator
Farm Service Agency
United States Department of Agriculture
771 Corporate Drive, Suite 100
Lexington, KY 40503-5478

Dear Ms. Hobbs:

I am writing in response to Jeffery S. Hall's letter of March 27, 2006 concerning the USDA's Conservation Reserve Enhancement Program which is a voluntary program for agricultural landowners. The USDA is preparing a Programmatic Environmental Assessment addressing the alternatives and potential effects of changing the existing Conservation Reserve Enhancement Program in Kentucky. The program would allow the enrollment of up to 99,500 acres of cropland and pastureland along the main stem of the Green River and its tributaries. The expansion will include all or parts of Allen, Barren, Butler, Edmonson, Grayson, Logan, Simpson, and Warren counties. Current counties include Adair, Barren (partial), Edmonson (partial), Green, Hart, Metcalfe, Russell, and Taylor. In order to accomplish the 10 goals of the program, several practices are proposed. These practices include introduced grasses and legumes; native grasses, legumes and forbs; tree planting; hardwood tree planting; permanent wildlife habitat (corridors), non-easement; permanent wildlife habitat, non-easement; grasses waterways, non-easement; shallow water areas for wildlife; vegetative cover-grass, already established; vegetative cover-trees, already established; wildlife food plats; permanent vegetative cover (contour grass strips), non-easement; filter strips; riparian buffers; wetland restoration; rare or declining habitat; and marginal pastureland wildlife habitat buffer.

The Green River and its tributaries have a high density of significant archaeological sites. Some of the proposed practices (tree plantings, shallow water areas, wetland restorations, etc.) have potential for impacting both recorded and unrecorded archaeological sites (both prehistoric and historic). Consequently, archaeological surveys should be conducted of all tracts where ground-disturbing activities are proposed by a professional archaeologist to determine if there are any sites eligible for listing in the National Register of Historic Places which might be affected.

The archaeological reports must be submitted for my review, comment, and approval. Also, if any structures 50 years of age or older are to be affected by this program, the USDA should provide photographs of these buildings that are keyed to maps. Once the photographs have been reviewed, we will advise you of any potential effects to significant buildings from the program.

Should you have any questions, feel free to contact Charles Hockensmith of my staff at (502) 564-7005.

Sincerely,

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3761 Georgetown Road
Frankfort, Kentucky 40601

June 28, 2006

Mr. Jeff Hall
USDA Farm Service Agency
771 Corporate Drive
Suite 100
Lexington, Kentucky 40503

Subject: FWS #06-1117; Proposed Expansion and Improvements to the Green River Conservation Reserve Enhancement Program in Kentucky

Dear Mr. Hall:

Our office recently received a letter and supporting information from your office that requested our review and comment on the Farm Service Agency's (FSA) proposal to expand and improve the Green River Conservation Reserve Enhancement Program (CREP) in Kentucky. We have reviewed the information that you provided, and we are fully supportive of FSA's proposal to expand and improve the Green River CREP.

As you know, the Green River watershed is perhaps the most biologically diverse watershed in Kentucky, particularly for aquatic species. This watershed contains at least 10 federally listed species, with 8 of those being aquatic species. As the lead federal agency for the recovery and conservation of these species, the Fish and Wildlife Service is keenly interested in supporting any conservation effort that would help remove or reduce the threats to these and other species. We believe the existing Green River CREP does just that. Therefore, we believe an expansion of the program to other locations in the watershed will improve an already successful program by providing added benefits to these species through improved water quality and habitat conditions and reduced sediment loads in streams.

In addition, we are also supportive of the proposed programmatic changes to the Green River CREP that you have proposed. In particular, we believe that the proposals to: (a) include sink hole protection as a primary objective of the program; (b) increase riparian buffer width eligibility on many of the larger Green River tributaries within the program area; and (c) provide landowners with "whole field" eligibility under specified circumstances, will prove to be very important aspects of the program. We believe these additions to the program will increase enrollment in the program, provide additional opportunities for leveraging and partnering with new program landowners, and expand the wildlife, water quality, and other benefits the Green River CREP currently provides.

We believe the sinkhole protection proposal is particularly noteworthy. The large area south of the Green River, known as the sinkhole plain, is an important ground water recharge zone for the

TAKE PRIDE IN AMERICA

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Green River. Those sinkholes often feed extensive underground aquifers that are connected, directly or indirectly to the Green River. As a result, land uses in and around these sinkholes can degrade water quality in the Green River, so it is important that we buffer as many sinkholes as possible in this area to reduce the input of sediments and other contaminants into the groundwater system, and ultimately the Green River.

Also, protection of the sinkholes in this area would improve habitat conditions for the federally endangered Kentucky cave shrimp. This species is endemic to Kentucky and only lives in the underground aquifers associated with Mammoth Cave National Park. Protection of the water quality entering these aquifers could help ensure this species' survival.

We also see significant benefits from the other two programmatic improvements to the program: increased buffers on larger Green River tributaries and "whole field" eligibility. These improvements make the program more "landowner friendly" which, in turn, ensures that we will achieve greater conservation benefits from the program. We consider these proposals by FSA to improve the flexibility of the program for landowners to be equally important to the other proposals, because they have already demonstrated themselves to be key decision-making issues for landowners who are deciding whether to enroll in the program or not. With these provisions as part of the program, we believe additional landowners will enroll that would not otherwise enroll.

Again, we are pleased that FSA has proposed to expand and improve the Green River CREP, and we offer our assistance and full support to FSA and FSA's partner agencies in the program.

Thank you for the opportunity to provide comments on this important conservation opportunity. If you have any questions, please call me at (502) 695-0468.

Sincerely,

Virgil Lee Andrews

Virgil Lee Andrews, Jr.
Field Supervisor

United States Department of the Interior

NATIONAL PARK SERVICE
Mammoth Cave National Park
P.O. Box 7
Mammoth Cave, Kentucky 42259-0007

IN REPLY REFER TO:

N 16

February 17, 2006

Jay Nelson
Kentucky Division of Conservation
375 Versailles Road
Frankfort, Kentucky 40601

Dear Mr. Nelson,

We have reviewed the document "Green River Conservation Reserve Enhancement Program, Subproject Amendment: Area Expansion and Programmatic Requests to Enhance Resource Protection and Landowner Participation". Mammoth Cave National Park has been an active partner in the Green River Conservation Reserve Enhancement Program (CREP) since days of the early draft proposals. Central to the mission of the National Park Service is the conservation and protection of natural resources within our boundaries. Of course, many threats to these resources originate from beyond the park. Water resources can be thought of as a paradigm to external stressors as land use activities far upstream of the park can directly affect the park's aquatic resources.

We believe that proposed amendments to the Green River CREP detailed in your document will enhance program goals relative to improving water quality to Mammoth Cave National Park. While nearly all the additional land area is downstream of the park, there are two main changes to the program that are of keen interest to us. First, sinkholes; either by inclusion as marginal pastureland or as whole fields, addresses a general land use throughout much of Mammoth Cave's recharge area. This, if approved, would affect large portions of the Pennyroyal Plateau. Second, the increased stream corridor, from 300 to 1000 feet would seem to benefit wildlife habitat, water quality, and perhaps most importantly, landowner participation.

Mammoth Cave National Park, as the primary recipient of land conservation practices of the Green River CREP fully support your proposal. We anticipate continued cooperation with the Commonwealth, the US Department of Agriculture, and The Nature Conservancy in this next phase of the program. If you have any questions, please contact park Hydrogeologist Joe Meiman at 270-758-2137.

Sincerely,

Sgn/Bruce Powell, Acting

Patrick H. Reed
Superintendent

APPENDIX E
FEDERALLY AND STATE-PROTECTED SPECIES BY KENTUCKY CREP COUNTY

Federally Protected Species by CREP County

Adair County
Gray bat - *Myotis grisescens* (E)
Indiana bat - *Myotis sodalis* (E)

Barren County
Gray bat - *Myotis grisescens* (E)
Indiana bat - *Myotis sodalis* (E)
Kentucky cave shrimp - *Palaemonias ganteri* (E)
Fanshell - *Cyprogenia stegaria* (E)
Eggert's sunflower - *Helianthus eggertii* (T)

Edmonson County
Gray bat - *Myotis grisescens* (E)
Indiana bat - *Myotis sodalis* (E)(CH)
Bald eagle - *Haliaeetus leucocephalus* (T)
Red-cockaded woodpecker - *Picoides borealis* (E)(h)
Bachman's warbler - *Vermivora bachmanii* (E)(h)
Kentucky cave shrimp - *Palaemonias ganteri* (E)(CH)
Pink mucket pearly mussel - *Lampsilis orbiculata* (E)(h)
Ring pink - *Obovaria retusa* (E)(h)
Rough pigtoe - *Pleurobema plenum* (E)
Fat pocketbook - *Potamilus capax* (E)(h)
Tuberculed-blossom pearly mussel - *Epioblasma torulosa torulosa* (E)(h)
Cracking pearly mussel - *Hemistena lata* (E)(h)
Fanshell - *Cyprogenia stegaria* (E)
Northern riffleshell - *Epioblasma torulosa rangiana* (E)
Clubshell - *Pleurobema clava* (E)
Price's potato bean - *Apios priceana* (T)
Eggert's sunflower - *Helianthus eggertii* (T)(h)

Green County
Gray bat - *Myotis grisescens* (E)
Rough pigtoe - *Pleurobema plenum* (E)
Fat pocketbook - *Potamilus capax* (E)(h)
Northern riffleshell - *Epioblasma torulosa rangiana* (E)(h)
Clubshell - *Pleurobema clava* (E)
Tuberculed-blossom pearly mussel - *Epioblasma torulosa torulosa* (E)(h)
Fanshell - *Cyprogenia stegaria* (E)

Hart County
Gray bat - *Myotis grisescens* (E)
Indiana bat - *Myotis sodalis* (E)
Kentucky cave shrimp - *Palaemonias ganteri* (E)
Pink mucket pearly mussel - *Lampsilis orbiculata* (E)(h)
Rough pigtoe - *Pleurobema plenum* (E)
Tuberculed-blossom pearly mussel - *Epioblasma torulosa torulosa* (E)(h)
Fat pocketbook - *Potamilus capax* (E)(h)
Cracking pearly mussel - *Hemistena lata* (E)(h)
Ring pink - *Obovaria retusa* (E)

Purple cat's paw pearly mussel - *Epioblasma sulcata sulcata* (E)
Northern riffleshell - *Epioblasma torulosa rangiana* (E)
Clubshell - *Pleurobema clava* (E)
Fanshell - *Cyprogenia stegaria* (E)
Cumberlandian combshell - *Epioblasma brevidens* (E)(h)
Eggert's sunflower - *Helianthus eggertii* (T)
Scaleshell - *Leptodea leptodon* (C)(h)

Metcalfe County
Gray bat - *Myotis grisescens* (E)
Eggert's sunflower - *Helianthus eggertii* (T)

Russell County
Bald eagle - *Haliaeetus leucocephalus* (T)
Red-cockaded woodpecker - *Picoides borealis* (E)(h)
Orange-footed pearly mussel - *Plethobasus cooperianus* (E)(h)
Dromedary pearly mussel - *Dromus dromas* (E)(h)
Yellow-blossom pearly mussel - *Epioblasma florentina florentina* (E)(h)
Cumberland bean pearly mussel - *Villosa trabalis* (E)(h)
Tan riffleshell - *Epioblasma walkeri* (E)(h)
Pink mucket pearly mussel - *Lampsilis orbiculata (*E)
Rough pigtoe - *Pleurobema plenum* (E)
Ring pink - *Obovaria retusa* (E)(h)
Cracking pearly mussel - *Hemistena lata* (E)(h)
Fanshell - *Cyprogenia stegaria* (E)
Cumberlandian combshell - *Epioblasma brevidens* (E)
Oyster mussel - *Epioblasma capsaeformis* (E)(h)
Scaleshell - *Leptodea leptodon* (C)(h)

Taylor County
Gray bat - *Myotis grisescens* (E)
Indiana bat - *Myotis sodalis* (E)
Bald eagle - *Haliaeetus leucocephalus* (T)
Rough pigtoe - *Pleurobema plenum* (E)(h)
Fat pocketbook - *Potamilus capax* (E)(h)
Clubshell - *Pleurobema clava* (E)
Tuberculed-blossom pearly mussel - *Epioblasma torulosa torulosa* (E)(h)
Northern riffleshell - *Epioblasma torulosa rangiana* (E)(h)
Eggert's sunflower - *Helianthus eggertii* (T)

C=Candidate Species, (h)=Historic (pre-1970), E=Endangered Species, T=Threatened Species

State-Listed Plant Species[92] by CREP County

Adair County
Mountain maple-*Acer spicatum*
Spreading false foxglove-*Aureolaria patula*
Svenson's wildrye -*Elymus svensonii*
Eggert's sunflower -*Helianthus eggertii*
Grassleaf mud-plantain -*Heteranthera dubia*
Round-head bush-clover-*Lespedeza capitata*
Carolina anglepod -*Matelea carolinensis*
Large-leaved grass-of-parnassus -*Parnassia grandifolia*
September elm -*Ulmus serotina*

Barren County
Spreading false foxglove-*Aureolaria patula*
American chestnut-*Castanea dentata*
Sharp-scaled manna-grass-*Glyceria acutiflora*
Plains frostweed-*Helianthemum bicknellii*
Eggert's sunflower-*Helianthus eggertii*
Blue mud-plantain-*Heteranthera limosa*
Round-head bush-clover-*Lespedeza capitata*
Tall bush-clover-*Lespedeza stuevei*
Hairy Ludwigia-*Ludwigia hirtella*
Rough dropseed-*Sporobolus clandestinus*
Barrens silky aster-*Symphyotrichum pratense*
Narrowleaved bluecurls-*Trichostema setaceum*
Buffalo clover-*Trifolium reflexum*

Edmonson County
Spreading false foxglove -*Aureolaria patula*
Epiphytic sedge -*Carex decomposita*
French's shooting star-*Dodecatheon fenchii*
Prairie gentian-*Gentiana puberulenta*
Plains frostweed-*Helianthemum bicknellii*
Eggert's sunflower -*Helianthus eggertii*
Blue mud-plantain-*Heteranthera limosa*
Western dwarf dandelion-*Krigia occidentalis*
Tall bush-clover-*Lespedeza stuevei*
Hairy Ludwigia -*Ludwigia hirtella*
Crossleaf milkwort-*Polygala cruciata*
Spotted pondweed-*Potamogeton pulcher*
Grassleaf arrowhead-*Sagittaria graminea*
Sessile-fruited arrowhead-*Sagittaria rigida*
Fringed nutrush-*Scleria ciliata*
Barrens silky aster-*Symphyotrichum pratense*
Buffalo clover-*Trifolium reflexum*
Wood's bunchflower-*Veratrum woodii*

[92] Kentucky State Nature Preserves Commission. "KY Rare Plant Database." Copyright © 2003. Commonwealth of Kentucky http://www.naturepreserves.ky.gov/inforesources/SpeciesCommunityInfo.htm

Eggleston's violet-*Viola septemloba var. egglestonii*

Green County
Southern maidenhair-fern-*Adiantum capillus-veneris*
Spreading false foxglove-*Aureolaria patula*
White walnut-*Juglans cinerea*
Hairy Ludwigia-*Ludwigia hirtella*
September elm -*Ulmus serotina*

Hart County
Southern maidenhair-fern-*Adiantum capillus-veneris*
Spreading false foxglove-*Aureolaria patula*
Epiphytic sedge-*Carex decomposita*
Straw sedge-*Carex straminea*
Small enchanter's nightshade-*Circaea alpina*
French's shooting star -*Dodecatheon frenchii*
Prairie gentian -*Gentiana puberulenta*
Sharp-scaled manna-grass -*Glyceria acutiflora*
Short's hedgehyssop-*Gratiola viscidula*
Plains frostweed -*Helianthemum bicknellii*
Eggert's sunflower -*Helianthus eggertii*
Slender blazingstar-*Liatris cylindracea*
Threadfoot-*Podostemum ceratophyllum*
Pickerel-weed-*Pontederia cordata*
Spotted Pondweed-*Potamogeton pulcher*
Tall Beaked-rush-*Rhynchospora macrostachya*
Royal Catchfly-*Silene regia*
Tansy Rosinweed -*Silphium pinnatifidum*
Barrens Silky Aster -*Symphyotrichum pratense*
Buffalo Clover -*Trifolium reflexum*
Eggleston's Violet-*Viola septemloba var. egglestonii*

Metcalfe County
Eggert's sunflower -*Helianthus eggertii*
Hairy Ludwigia-*Ludwigia hirtella*
Carolina anglepod-*Matelea carolinensis*
Spotted pondweed -*Potamogeton pulcher*
September elm-*Ulmus serotina*

Russell County
Spreading false foxglove-*Aureolaria patula*
Spoon-leaved sundew-*Drosera intermedia*
Mercury spurge-*Euphorbia mercurialina*
St. Peter's-wort-*Hypericum crux-andreae*
Round-head bush-clover-*Lespedeza capitata*
Plains Muhly-*Muhlenbergia cuspidata*
Canby's mountain-lover-*Paxistima canbyi*
Crossleaf milkwort -*Polygala cruciata*
Northern white cedar-*Thuja occidentalis*
Least trillium-*Trillium pusillum*
September elm-*Ulmus serotina*

Taylor County
Spreading false foxglove-*Aureolaria patula*
Eggert's sunflower-*Helianthus eggertii*

Appendix E-State-Listed Plant Species[93] by CREP County

County	Scientific Name	Common Name	Federal Status	State Status
Adair	*Acer spicatum*	Mountain Maple		E
	Aureolaria patul	Spreading False Foxglove		S
	Elymus svensonii	Svenson's Wildrye		S
	Helianthus eggertii	Eggert's Sunflower		T
	Heteranthera dubia	Grassleaf Mud-plantain		S
	Lespedeza capitata	Round-head Bush-clover		S
	Matelea carolinensis	Carolina Anglepod		E
	Parnassia grandifolia	Large-leaved Grass-of-parnassus		E
	Ulmus serotina	September Elm		S
Allen	*Hydrocotyle americana*	American Water-pennywort		E
	Ptilimnium nuttallii	Nuttall's Mock Bishop's-weed		E
Barren	*Aureolaria patula*	Spreading False Foxglove		S
	Castanea dentata	American Chestnut		E
	Glyceria acutiflora	Sharp-scaled Manna-grass		E
	Helianthemum bicknellii	Plains Frostweed		E
	Helianthus eggertii	Eggert's Sunflower		T
	Heteranthera limosa	Blue Mud-plantain		S
	Lespedeza capitata	Round-head Bush-clover		S
	Lespedeza stuevei	Tall Bush-clover		S
	Ludwigia hirtella	Hairy Ludwigia		E
	Sporobolus clandestinus	Rough Dropseed		T
	Symphyotrichum pratense	Barrens Silky Aster		S
	Trichostema setaceum	Narrowleaved Bluecurls		E
	Trifolium reflexum	Buffalo Clover		E
Butler	*Gentiana flavida*	Yellow Gentian		E
	Leavenworthia torulosa	Necklace Gladecress		T
Edmonson	*Aureolaria patula*	Spreading False Foxglove		S
	Carex decomposita	Epiphytic Sedge		T
	Dodecatheon frenchii	French's Shooting Star		S
	Gentiana puberulenta	Prairie Gentian		E
	Helianthemum bicknellii	Plains Frostweed		E
	Helianthus eggertii	Eggert's Sunflower		T
	Heteranthera limosa	Blue Mud-plantain		S
	Krigia occidentalis	Western Dwarf Dandelion		E
	Lespedeza stuevei	Tall Bush-clover		S
	Ludwigia hirtella	Hairy Ludwigia		E
	Polygala cruciata	Crossleaf Milkwort		E
	Potamogeton pulcher	Spotted Pondweed		T
	Sagittaria graminea	Grassleaf Arrowhead		T
	Sagittaria rigida	Sessile-fruited Arrowhead		E
	Scleria ciliate	Fringed Nutrush		E
	Symphyotrichum pretense	Barrens Silky Aster		S
	Trifolium reflexum	Buffalo Clover		E
	Veratrum woodii	Wood's Bunchflower		T

[93] Kentucky State Nature Preserves Commission. "KY Rare Plant Database." Copyright © 2003. Commonwealth of Kentucky http://www.naturepreserves.ky.gov/inforesources/SpeciesCommunityInfo.htm

County	Scientific Name	Common Name	Federal Status	State Status
	Viola septemloba var. egglestonii	Eggleston's Violet		S
Grayson	*Baptisia bracteata var. glabrescens*	Cream Wild Indigo		S
	Carex crawei	Crawe's Sedge		S
	Dodecatheon frenchii	French's Shooting Star		S
	Helianthemum bicknellii	Plains Frostweed		E
	Helianthus eggertii	Eggert's Sunflower		T
	Hieracium longipilum	Hairy Hawkweed		T
	Lespedeza capitata	Round-head Bush-clover		S
	Prenanthes aspera	Rough Rattlesnake-root		E
	Spiranthes magnicamporum	Great Plains Ladies'-tresses		T
	Viola walteri	Walter's Violet		T
Green	*Adiantum capillus-veneris*	Southern Maidenhair-fern		T
	Aureolaria patula	Spreading False Foxglove		S
	Juglans cinerea	White Walnut		S
	Ludwigia hirtella	Hairy Ludwigia		E
	Ulmus serotina	September Elm		S
Hart	*Adiantum capillus-veneris*	Southern Maidenhair-fern		T
	Aureolaria patula	Spreading False Foxglove		S
	Carex decomposita	Epiphytic Sedge		T
	Carex straminea	Straw Sedge		T
	Circaea alpine	Small Enchanter's Nightshade		S
	Dodecatheon frenchii	French's Shooting Star		S
	Gentiana puberulenta	Prairie Gentian		E
	Glyceria acutiflora	Sharp-scaled Manna-grass		E
	Gratiola viscidula	Short's Hedgehyssop		S
	Helianthemum bicknellii	Plains Frostweed		E
	Helianthus eggertii	Eggert's Sunflower		T
	Liatris cylindracea	Slender Blazingstar		T
	Podostemum ceratophyllum	Threadfoot		S
	Pontederia cordata	Pickerel-weed		T
	Potamogeton pulcher	Spotted Pondweed		T
	Rhynchospora macrostachya	Tall Beaked-rush		E
	Silene regia	Royal Catchfly		E
	Silphium pinnatifidum	Tansy Rosinweed		S
	Symphyotrichum pratense	Barrens Silky Aster		S
	Trifolium reflexum	Buffalo Clover		E
	Viola septemloba var. egglestonii	Eggleston's Violet		S
Logan	*Adiantum capillus-veneris*	Southern Maidenhair-fern		T
	Amianthium muscitoxicum	Fly Poison		T
	Aureolaria patula	Spreading False Foxglove		S
	Baptisia australis var. minor	Blue Wild Indigo		S
	Bouteloua curtipendula	Side-oats Grama		S
	Carex gigantea	Large Sedge		T
	Dalea purpurea	Purple Prairie-clover		S
	Delphinium carolinianum	Carolina Larkspur		T

County	Scientific Name	Common Name	Federal Status	State Status
	Dodecatheon frenchii	French's Shooting Star		S
	Fimbristylis puberula	Hairy Fimbristylis		T
	Forestiera ligustrina	Upland Privet		T
	Gentiana puberulenta	Prairie Gentian		E
	Isoetes butleri	Butler's Quillwort		E
	Juncus filipendulus	Ringseed Rush		T
	Leavenworthia torulosa	Necklace Gladecress		T
	Malvastrum hispidum	Hispid Falsemallow		T
	Muhlenbergia cuspidate	Plains Muhly		T
	Muhlenbergia glabrifloris	Hair Grass		S
	Oenothera triloba	Stemless Evening-primrose		T
	Prenanthes aspera	Rough Rattlesnake-root		E
	Silphium pinnatifidum	Tansy Rosinweed		S
	Symphyotrichum pratense	Barrens Silky Aster		S
	Symphyotrichum priceae	White Heath Aster		T
	Talinum calcaricum	Limestone Fameflower		E
	Viola septemloba var. egglestonii	Eggleston's Violet		S
Metcalfe	*Helianthus eggertii*	Eggert's Sunflower		T
	Ludwigia hirtella	Hairy Ludwigia		E
	Matelea carolinensis	Carolina Anglepod		E
	Potamogeton pulcher	Spotted Pondweed		T
	Ulmus serotina	September Elm		S
Russell	*Aureolaria patula*	Spreading False Foxglove		S
	Drosera intermedia	Spoon-leaved Sundew		E
	Euphorbia mercurialina	Mercury Spurge		T
	Hypericum crux-andreae	St. Peter's-wort		T
	Lespedeza capitata	Round-head Bush-clover		S
	Muhlenbergia cuspidata	Plains Muhly		T
	Paxistima canbyi	Canby's Mountain-lover		T
	Polygala cruciata	Crossleaf Milkwort		E
	Thuja occidentalis	Northern White Cedar		T
	Trillium pusillum	Least Trillium		E
	Ulmus serotina	September Elm		S
Simpson	*Draba cuneifolia*	Wedge-leaf Whitlow-grass		E
	Forestiera ligustrina	Upland Privet		T
	Isoetes butleri	Butler's Quillwort		E
	Leavenworthia torulosa	Necklace Gladecress		T
	Malvastrum hispidum	Hispid Falsemallow		T
	Oenothera triloba	Stemless Evening-primrose		T
	Perideridia americana	Eastern Yampah		T
	Silphium pinnatifidum	Tansy Rosinweed		S
	Sporobolus clandestinus	Rough Dropseed		T
	Talinum calcaricum	Limestone Fameflower		E
Taylor	*Aureolaria patula*	Spreading False Foxglove		S
	Helianthus eggertii	Eggert's Sunflower		T

County	Scientific Name	Common Name	Federal Status	State Status
Warren	*Apios priceana*	Price's Potato-bean	LT	E
	Arabis hirsuta	Western Hairy Rockcress		T
	Aureolaria patula	Spreading False Foxglove		S
	Baptisia bracteata var. glabrescens	Cream Wild Indigo		S
	Bouteloua curtipendula	Side-oats Grama		S
	Carex gigantean	Large Sedge		T
	Carya carolinae-septentrionalis	Southern Shagbark Hickory		T
	Delphinium carolinianum	Carolina Larkspur		T
	Didiplis diandra	Water-purslane		S
	Dodecatheon frenchii	French's Shooting Star		S
	Draba cuneifolia	Wedge-leaf Whitlow-grass		E
	Forestiera ligustrina	Upland Privet		T
	Gentiana flavida	Yellow Gentian		E
	Hedeoma hispidum	Rough Pennyroyal		T
	Helianthus eggertii	Eggert's Sunflower		T
	Heteranthera limosa	Blue Mud-plantain		S
	Hypericum crux-andreae	St. Peter's-wort		T
	Isoetes butleri	Butler's Quillwort		E
	Isoetes melanopoda	Blackfoot Quillwort		E
	Leavenworthia torulosa	Necklace Gladecress		T
	Lilium superbum	Turk's Cap Lily		T
	Lobelia gattingeri	Gattinger's Lobelia		E
	Ludwigia hirtella	Hairy Ludwigia		E
	Oenothera triloba	Stemless Evening-primrose		T
	Perideridia Americana	Eastern Yampah		T
	Polygala cruciata	Crossleaf Milkwort		E
	Sagittaria graminea	Grassleaf Arrowhead		T
	Silene ovata	Ovate Catchfly		E
	Silene regia	Royal Catchfly		E
	Silphium pinnatifidum	Tansy Rosinweed		S
	Symphyotrichum priceae	White Heath Aster		T
	Trifolium reflexum	Buffalo Clover		E
	Trillium pusillum	Least Trillium		E

Source: Source: Kentucky State Nature Preserves Commission, Rare Plants Database.
http://eppcapps.ky.gov/nprareplants/index.aspx
C=Candidate Species
(h)=Historic (pre-1970)
E=Endangered Species
T=Threatened Species

APPENDIX F
LISTING OF NATIONAL REGISTER SITES
AND
NATIONAL HISTORIC LANDMARKS

National Register of Historic Places Sites, by CREP County, Kentucky

Adair County

County	Resource Name	Address	City	Listed	Multiple
Adair	Adair County Courthouse	500 Public Sq.	Columbia	1974-08-27	
Adair	Archeological Site 15 Ad 33	Address Restricted	Columbia	1978-12-08	
Adair	Archeological Site 15 Ad 36	Address Restricted	Glens Fork	1978-11-16	
Adair	Archeological Site 15 Ad 54	Address Restricted	Columbia	1978-11-16	
Adair	Field, John, House	111 E. Fortune St.	Columbia	1978-02-08	
Adair	Gaither, Dr. Nathan, House	100 S. High St.	Columbia	1979-03-21	
Adair	Giles, Janice Holt and Henry, Log House	302 Spout Springs Rd.	Knifley	1997-11-06	
Adair	Trabue, Daniel, House	299 Jamestown St.	Columbia	1974-12-16	
Adair	Zion Meetinghouse and School	SE of Columbia on KY 55	Columbia	1976-05-13	

Allen County

County	Resource Name	Address	City	Listed	Multiple
Allen	Allen County Poor Farm	3540 Holland Rd.	Scottsville	1991-11-07	
Allen	Big Spring School--Oliver Farmstead	3293 and 3109 Big Springs Rd.	Settle	2004-07-12	
Allen	Dumont Hill	0.25 mi. N of KY 1386	Scottsville	2003-12-04	
Allen	Graves, Dr. Pellie G., House	301 N 4th St.	Scottsville	2001-08-02	
Allen	Satterfield, Edward and Julia, House	10085 Bowling Green Rd.	Scottsville	2005-11-25	
Allen	Scottsville Downtown Commercial Historic District	Public Square and extending roughly one block N and S on Court St., and one block E and W on Main	Scottsville	2001-08-02	
Allen	Scottsville Freight Depot	E. Main St. at 8th St.	Scottsville	2001-08-02	
Allen	Scottsville Public Spring	Jct. of First and Locust Sts.	Scottsville	2001-08-02	
Allen	Tabernacle, The	829 Holland Rd.	Scottsville	2001-08-02	
Allen	Turner, J.L. and Son, Building	Old East Main St. at 7th St.	Scottsville	2001-11-21	

Allen	Whitney, Andrew M., House and Barn	KY 1855 NE of Scottsville	Scottsville	1994-03-17	

Barren County

County	Resource Name	Address	City	Listed	Multiple
Barren	Belle's Tavern	KY 255	Park City	1987-01-08	Early Stone Buildings of Kentucky Outer Bluegrass and Pennyrile TR
Barren	Cave City Commercial District	Broadway between 1st and 2nd Sts.	Cave City	1983-07-20	Barren County MRA
Barren	Confederate Monument in Glasgow	Jct. of Main and Green Sts.	Glascow	1997-07-17	Civil War Monuments of Kentucky MPS
Barren	Edmunds, Charles Penn, House	E of Becton	Beckton	1983-05-20	Barren County MRA
Barren	First National Bank	Main St.	Glasgow	1983-05-20	Barren County MRA
Barren	First Presbyterian Church	Washington and Broadway	Glasgow	1983-05-20	Barren County MRA
Barren	Fort Williams	Between Glasgow Municipal Cemetery and U.S. 31E Bypass	Glasgow	1975-06-10	
Barren	Glasgow Central Business District	207 W. Main--117 E. Main, 100--114 S. Green and 104 and 109 N. Race Sts.	Glasgow	1993-02-11	
Barren	Glasgow Central Business District (Boundary Increase)	Roughly bounded by Water St., Broadway St. ,	Glasgow	2004-02-11	

County	Resource Name	Address	City	Listed	Multiple
		Wayne St., and Liberty St.,			
Barren	Glasgow OMS #9	Cavalry Dr.	Glasgow	2002-09-06	Kentucky's National Guard Facilities
Barren	Gullian Gerig's Mill	Beaver Valley Rd.	Glasgow	1987-10-05	Early Stone Buildings of Kentucky TR
Barren	Hicks, William House	Jeff Hicks Rd.	Austin	1983-05-20	Barren County MRA
Barren	Landrum	SR 1318	Roseville	1983-05-20	Barren County MRA
Barren	Martin, Benjamin, House	Berry Store Rd.	Finney	1983-05-20	Barren County MRA
Barren	Mayfield, John, House	SW of Glasgow	Glasgow	1983-05-20	Barren County MRA
Barren	McCoy, Andrew, House	Railroad Ave.	Cave City	1983-05-20	Barren County MRA
Barren	Morris Building	Washington and Green Sts.	Glasgow	1983-05-20	Barren County MRA
Barren	North Race Street Historic District	N. Race St. between Front and Cherry Sts.	Glasgow	1983-07-20	Barren County MRA
Barren	North Race Street Historic District (Boundary Increase)	Roughly bounded by Happy Valley Rd., Green St., Garmon Ave. and Front St.	Glasgow	2003-12-04	Barren County MRA
Barren	Octagon Cottage	Off SR 1297	Rocky Hill	1983-07-20	Barren County MRA

Butler County

County	Resource Name	Address	City	Listed	Multiple
Butler	Annis Mound and Village Site (15BT2; 15BT20; 15BT21)	Address Restricted	Logansport	1985-12-21	
Butler	Baby Track Rock Petroglyphs (15BT40)	Address Restricted	Morgantown	1989-09-08	Prehistoric Rock Art Sites in Kentucky MPS
Butler	Carlston Annis Shell Mound (15BT5)	Address Restricted	Schulztown	1986-04-01	Green River Shell Middens of Kentucky TR
Butler	Carson's Landing	1086 Annis Ferry Rd.	Morgantown	1998-07-31	
Butler	Carson, John, House	205 S. Main St.	Morgantown	1991-07-26	
Butler	Confederate--Union Veterans' Monument in Morgantown	1 blk. N of jct of US 231 and KY 403	Morgantown	1997-07-17	Civil War Monuments of Kentucky MPS
Butler	DeWeese Shell Mound (15BT6)	Address Restricted	Highview	1986-04-01	Green River Shell Middens of Kentucky TR
Butler	Finney Hotel	Jct. KY 403 and Hime St.	Woodbury	1995-11-07	
Butler	Ice House on Little Muddy Creek	US 231	Morgantown	1987-01-08	Early Stone Buildings of Kentucky Outer Bluegrass and Pennyrile TR
Butler	Rayburn Johnson Shell Mound (15BT41)	Address Restricted	Prentiss	1986-04-01	Green River Shell Middens of Kentucky TR

Edmonson County

County	Resource Name	Address	City	Listed	Multiple
Edmonson	Asphalt Rock Pictographs (15ED24)	Address Restricted	Asphalt	1989-09-08	Prehistoric Rock Art Sites in Kentucky MPS
Edmonson	Bransford Spring Pumphouse	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Colossal Cavern Entrance	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Crystal Cave District	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Dismal Rock Shelter Petroglyphs (15ED15)	Address Restricted	Sweeden	1989-09-08	Prehistoric Rock Art Sites in Kentucky MPS
Edmonson	Ford, William, House	S of Brownsville on U.S. 31W	Brownsville	1980-11-28	
Edmonson	Good Spring Baptist	Mammoth Cave	Mammoth	1991-	Mammoth Cave

County	Resource Name	Address	City	Listed	Multiple
	Church and Cemetery	National Park	Cave	05-08	National Park MPS
Edmonson	Great Onyx Cave Entrance	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Hercules and Coach No. 2	Off KY 70 in Mammoth Cave National Park	Mammoth Cave	1975-10-10	
Edmonson	Joppa Baptist Church and Cemetery	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Mitchell--Estes Farmstead	1706 Upper Smiths Grove Rd.	Smiths Grove	1996-01-11	
Edmonson	Old Guide Cemetery	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Reed--Dorsey House	Upper Main Cross and Jefferson Sts.	Brownsville	1986-10-16	
Edmonson	Residential Area District	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Salts Cave Archeological Site	Address Restricted	Mundfordville	1979-05-15	
Edmonson	Superintendent's House	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Three Springs Pumphouse	Mammoth Cave National Park	Mammoth Cave	1991-05-08	Mammoth Cave National Park MPS
Edmonson	Willis, Mathias, Store House	Cummins Rd.	Windyville	1987-01-08	Early Stone Buildings of Kentucky Outer Bluegrass and Pennyrile TR

Green County

County	Resource Name	Address	City	Listed	Multiple
Green	Allen's, James, Inn	103 E. Court St.	Greensburg	1987-01-08	Early Stone Buildings of Kentucky Outer Bluegrass and Pennyrile TR
Green	Allen, John C., House	KY 61	Summersville	1985-04-19	Green County MRA

County	Resource Name	Address	City	Listed	Multiple
Green	Anderson House	KY 1913	Haskingsville	1984-08-24	Green County MRA
Green	Barrett-Blakeman House	Hodgenville Rd.	Greensburg	1985-04-19	Green County MRA
Green	Brents-Lisle House	US 68	Greensburg	1984-08-24	Green County MRA
Green	Chewning House	KY 88	Donansburg	1984-08-24	Green County MRA
Green	Christie, Christopher Columbus, House	KY 1915	Haskingsville	1984-08-24	Green County MRA
Green	Court Clerk's Office-County & Circuit	East Court St.	Greensburg	1987-01-08	Early Stone Buildings of Kentucky Outer Bluegrass and Pennyrile TR
Green	Cowherd, Francis, House	Off U.S. 68	Greensburg	1985-04-19	Green County MRA
Green	Creal Store	KY 61	Creal	1984-08-24	Green County MRA
Green	Downtown Greensburg Historic District	Public Square and bounded by N. and S. Main St., and E. and W. Court Sts.	Greensburg	2003-02-28	Green County MRA
Green	Ebenezer School	Off KY 61	Greensburg	1984-08-24	Green County MRA
Green	Edwards House	KY 745	Exie	1984-08-24	Green County MRA
Green	Edwards, David, House	Off KY 745	Exie	1984-08-24	Green County MRA
Green	Elmore-Carter House	KY 793	Summersville	1984-08-24	Green County MRA
Green	Emory-Blakeman-Penick House	Off KY 487	Greensburg	1984-08-24	Green County MRA
Green	Federal House	S. Main and E. Columbia	Greensburg	1985-04-19	Green County MRA
Green	Goose Creek Foot Bridge	Court and Depot Sts.	Greensburg	1985-04-19	Green County MRA
Green	Greensburg Academy	101 2nd St.	Greensburg	1976-12-12	
Green	Greensburg Bank Building	E. Court St.	Greensburg	1979-08-21	

County	Resource Name	Address	City	Listed	Multiple
Green	Greensburg Cumberland Presbyterian Church	Hodgenville Ave. and N. 1st St.	Greensburg	1985-04-19	Green County MRA
Green	Groves-Cabell House	Off KY 61	Gresham	1984-08-24	Green County MRA
Green	Herndon, William H., House	203 S. Main St.	Greensburg	1985-04-19	Green County MRA
Green	Hilliard, David, House	Off KY 487	Greensburg	1984-08-24	Green County MRA
Green	Hobson, William, House	102 S. Depot St.	Greensburg	1985-04-19	Green County MRA
Green	Keltner House	KY 1913	Haskingsville	1984-08-24	Green County MRA
Green	L & N Passenger Depot	103 N. Depot St.	Greensburg	1984-08-24	Green County MRA
Green	Lewis, Woodson, House	Main St. and Hodgenville Ave.	Greensburg	1985-04-19	Green County MRA
Green	Livesay House	Off KY 208	Campbellsville	1984-08-24	Green County MRA
Green	Mears House	KY 61	Greensburg	1984-08-24	Green County MRA
Green	Montgomery House	Off KY 1464	Donansburg	1984-08-24	Green County MRA
Green	Montgomery's Mill	Off KY 88	Greensburg	1984-08-24	Green County MRA
Green	Mt. Gilead Baptist Church	KY 767	Haskingsville	1984-08-24	Green County MRA
Green	Old Courthouse	Public Sq.	Greensburg	1972-04-10	
Green	Philpot House	KY 729	Exie	1985-04-19	Green County MRA
Green	Sandidge House	KY 88	Donansburg	1984-08-24	Green County MRA
Green	Simpson Log House	KY 1464	Webbs	1984-08-24	Green County MRA
Green	Wallace, Napoleon, House	Off KY 218	Pierce	1984-08-24	Green County MRA
Green	Webbs Female Academy	Off KY 88	Webbs	1984-08-24	Green County MRA
Green	White-Penick House	106 S. Depot St.	Greensburg	1985-04-19	Green County MRA
Green	Whitlock Log Cabin	US 68	Exie	1984-08-24	Green County MRA

County	Resource Name	Address	City	Listed	Multiple
Green	Williams, Daniel Motley, House	KY 323	Summersville	1984-08-24	Green County MRA
Green	Wilson, R. H., House	402 N. Water St.	Greensburg	1984-08-24	Green County MRA
Green	Woodward House	Off US 68	Greensburg	1984-08-24	Green County MRA

Grayson County

County	Resource Name	Address	City	Listed	Multiple
Grayson	Cedars, The	E of Leitchfield on KY 1214	Leitchfield	1976-05-17	
Grayson	Court Square Historic District	Court House Square between Walnut and Market Sts.	Leitchfield	1984-11-23	
Grayson	Court Square Historic District (Boundary Increase)	106 & 104 N. Main	Leitchfield	1988-01-12	
Grayson	Crow Hollow Petroglyphs (15GY65)	Address Restricted	Clarkson	1989-09-08	Prehistoric Rock Art Sites in Kentucky MPS
Grayson	Falls of Rough Historic District	KY 110	Falls of Rough	1978-01-31	
Grayson	Grayson Springs	S of Clarkson	Clarkson	1978-12-06	
Grayson	Hunter House	118 W. Walnut St.	Leitchfield	1985-05-16	
Grayson	Saltsman Branch Petroglyphs (15GY66)	Address Restricted	Moutardier	1989-09-08	Prehistoric Rock Art Sites in Kentucky MPS
Grayson	Saltsman Branch Shelter Petroglyphs (15GY67)	Address Restricted	Moutardier	1989-09-08	Prehistoric Rock Art Sites in Kentucky MPS
Grayson	St. Augustine Catholic Church	KY 88	Grayson Springs	1989-04-07	
Grayson	Thomas, Jack, House	108 E. Main St.	Leitchfield	1976-04-21	
Grayson	Walnut Grove School	Walnut Grove Rd.	Caneyville	1988-02-02	

Hart County

County	Resource Name	Address	City	Listed	Multiple
Hart	Barrett, Dr. Lewis, House	2nd and Caldwell Sts.	Munfordville	1980-07-24	Munfordville MRA
Hart	Battle of Munfordville Site	Roughly bounded by Green R., US 31, Rowletts, and L and N RR tracks	Munfordville	1999-10-15	
Hart	Chapline Building	Main St.	Munfordville	1980-07-24	Munfordville MRA
Hart	Cox, Alvey, House	1st and Washington Sts.	Munfordville	1980-07-24	Munfordville MRA
County	**Resource Name**	**Address**	**City**	**Listed**	**Multiple**
Hart	Gardner House	farm lane on N side of W. Walker Rd.	Northtown	2004-08-04	
Hart	Hart County Courthouse	Town Sq.	Munfordville	1980-07-24	Munfordville MRA
Hart	Hart County Deposit Bank and Trust Company Building	Main St.	Munfordville	1980-07-24	Munfordville MRA
Hart	Horse Cave Historic District	KY 218, roughly bet. US 31W and Edwards Ave.,	Horse Cave	2001-08-02	
Hart	Munford Inn	109 Washington St.	Munfordville	1984-03-19	Munfordville MRA
Hart	Munfordville Baptist Church	313 S. 5th St.	Munfordville	1980-07-24	Munfordville MRA

Logan County

County	Resource Name	Address	City	Listed	Multiple
Logan	Auburn Historic District	Roughly, along E. and W. Main, N. Lincoln, Perkins, Pearl, Caldwell, Wilson, Maple and Viers Sts.	Auburn	1994-03-28	
Logan	Brodnax--Conn House	3288 Conn Rd.	Adairville	1992-10-23	
Logan	Cedar Grove Rosenwald School	375 Cedar Grove Rd.	Olmstead	2002-04-11	
Logan	Confederate Monument in Russellville	Town Square. Jct. of US 431 and US 68	Russellville	1997-07-17	Civil War Monuments of Kentucky MPS
Logan	Davidson, G. W., House and Bank	Main St.	Auburn	1982-10-29	
Logan	Forst, William, House	4th and Winter Sts.	Russellville	1973-07-19	
Logan	Long-Briggs House	Cornelius Ave.	Russellville	1978-11-27	
Logan	Longview Farm House	Bores Rd.	Adairville	1992-03-19	
Logan	McCutchen Meadows	Off U.S. 68	Auburn	1984-11-23	
Logan	McGready, Rev. James, House	W of Russellville off U.S. 68	Russellville	1976-04-21	
Logan	Page Site (15LO1)	Address Restricted	Lewisburg	1985-11-14	
Logan	Pleasant Run Methodist Church	SE of Russellville on KY 663	Russellville	1982-10-29	
Logan	Red River Presbyterian Meetinghouse Site and Cemetery	NE of Adairville off KY 663	Adairville	1976-06-18	
Logan	Russellville Armory	190 S. Winter St.	Russellville	2000-03-24	Kentucky's National Guard Facilities MPS

Logan	Russellville Historic District	Roughly bounded by 2nd, 9th, Caldwell, and Nashville Sts.	Russellville	1976-07-14	
Logan	Savage Cave Archeological Site	Address Restricted	Adairville	1970-04-03	
Logan	Sawyer, David, House	Off KY 103	Chandler's Chapel	1987-01-08	Early Stone Buildings of Kentucky Outer Bluegrass and Pennyrile TR
Logan	South Union Shaker Center House and Preservatory	U.S. 68	South Union	1974-06-28	
Logan	South Union Shakertown Historic District	KY 73 at Louisville and Nashville RR tracks, and jct. of U.S. 68	South Union and vicinity	1975-04-03	
Logan	Watkins Site (15L012)	Address Restricted	South Union	1985-12-05	

Metcalfe County

County	Resource Name	Address	City	Listed	Multiple
Metcalfe	Metcalfe County Jail	Corner of East	Edmonton	2004-08-04	
Metcalfe	Metcalfe County Kentucky Courthouse	Public Square	Edmonton	2000-03-24	
Metcalfe	Stockton--Ray House	Off jct. of US 68/KY 80 and Cumberland Pkwy.	Edmonton	1992-04-13	
County	Resource Name	Address	City	Listed	Multiple
Metcalfe	Sulphur Well Historic District	Roughly by Wister Wallace Rd., S fork of the Little Barren R., Mitchell-Edwards Rd., and KY 70	Sulphur Well	1998-08-14	

Russell County

County	Resource Name	Address	City	Listed	Multiple
Russell	Russell Lodge No. 284	Public Square	Jamestown	1994-01-28	

Simpson County

County	Resource Name	Address	City	Listed	Multiple
Simpson	Cedars, The	812 E. Cedar St.	Franklin	1996-01-11	
Simpson	Duncan House	301 N. Main St.	Franklin	1982-10-29	
Simpson	Franklin Downtown Commercial District	Roughly Main and College Sts. between Washington and Madison Sts.	Franklin	1983-02-17	
Simpson	Franklin Downtown Commercial District (Boundary Increase)	200 S. Main and 207 S. College Sts.	Franklin	1983-08-18	
Simpson	Goodnight House	201 S. Main St.	Franklin	1977-08-12	
Simpson	Hampton Hall	6240 Bowling Green Rd.	Franklin	1996-01-11	
Simpson	Hargis House	300 E. Cedar St.	Franklin	1996-01-11	
Simpson	Harristown Historic District	Roughly bounded by Walker Ave., Bell St., W. Washington St. and West St.	Franklin	1996-01-11	
Simpson	Moore, Randolph Gilbert, House	321 S. College St.	Franklin	1996-01-11	
Simpson	Octagon Hall	SE of Franklin on KY 31W	Franklin	1980-04-10	
Simpson	Simpson County Courthouse	KY 73	Franklin	1980-03-18	
Simpson	Sinking Creek Cave System	Address Restricted	Franklin	1983-04-28	
Simpson	Triple Pine Farm	5945 Bowling Green Rd.	Franklin	1996-01-11	
Simpson	West Cedar Street Historic District	W. Cedar St., N and S sides, between N. High and West Sts.	Franklin	1996-01-11	

Taylor County

County	Resource Name	Address	City	Listed	Multiple
Taylor	Battle of Tebb's Bend Monument	Romine Loop Rd. 0.5 mi. N of jct. of Romine Loop Rd. and KY 55	Campbellsville	1997-07-17	Civil War Monuments of Kentucky MPS
Taylor	Battle of Tebbs Bend	Off KY 55, Tebbs Bend Rd.	Campbellsville	1999-07-28	
Taylor	Campbellsville Historic Commercial District	Roughly bounded by Columbia Ave., Broadway, 1st, Hotchkiss Sts., Central Ave. (both sides), and RR tracks	Campbellsville	1983-02-10	
Taylor	Chandler, John, House	Off KY 210	Campbellsville	1987-01-08	Early Stone Buildings of Kentucky Outer Bluegrass and Pennyrile TR
Taylor	Clay Hill	5 mi. N of Campbellsville on KY 55	Campbellsville	1975-10-10	
Taylor	Cowherd, Jonathan, Jr., House	W of Campbellsville off KY 70	Campbellsville	1977-04-11	
Taylor	Hiestand, Jacob, House	W of Campbellsville off KY 210	Campbellsville	1983-02-10	
Taylor	Merchant's Hotel	102 E. Main St.	Campbellsville	1980-11-25	
Taylor	Sanders, Durham, House	1251 Sanders Rd.	Campbellsville	1996-07-31	
Taylor	Tate, Isaac, Farm	Five mi. S of Campbellsville on KY 55	Campbellsville	2004-08-04	
Taylor	Taylor County Clerk’s Office	Courthouse Sq.	Campbellsville	1977-12-20	

Warren County

County	Resource Name	Address	City	Listed	Multiple
Warren	Allen, Carter, House	Off SR 31W	Smiths Grove	1979-12-18	Warren County MRA
Warren	Allen, Thomas, House	SR 31W	Smiths Grove	1979-12-18	Warren County MRA
Warren	Barren River L & N Railroad Bridge	Spans Barren River	Bowling Green	1980-11-26	Warren County MRA
Warren	Blakeley, W. H., House	1162 College St.	Bowling Green	1979-12-18	Warren County MRA

County	Resource Name	Address	City	Listed	Multiple
Warren	Bowling Green OMS #10	719 Old Morgantown Rd.	Bowling Green	2002-09-06	Kentucky's National Guard
Warren	Bryant, Garnett, House	Sunnyside Rd.	Oakland	1979-12-18	Warren County MRA
Warren	Burnett, Aubrey, House	Aubrey Burnett St.	Oakland	1979-12-18	Warren County MRA
Warren	Campbell, David C., House	Beech Bend Rd.	Plum Springs	1979-12-18	Warren County MRA
Warren	Cave Spring Farm	Rocky Hill Rd., approximately .5 mi. NE of Smiths Grove	Smiths Grove	1996-12-02	
Warren	Cecilia Memorial Christian Church	716 College St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Cherry Hall	College St., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University campus TR
Warren	College Hill District	Roughly bounded by College and Chestnut Sts., 11th and 15th Aves.	Bowling Green	1979-12-18	Warren County MRA
Warren	College Hill Historic District (Boundary Increase)	416 E. 12th Ave.	Bowling Green	1996-01-11	
Warren	College Street Bridge	Spans Barren River	Bowling Green	1980-11-26	Warren County MRA
Warren	Confederate Monument of Bowling Green	Fairview Cemetery. N of jct. of KY 234 and Collette Ln.	Bowling Green	1997-07-17	Civil War Monuments of Kentucky MPS
Warren	Cooke, Peyton , House	Off SR 31W	Oakland	1979-12-18	Warren County MRA
Warren	Curd-Moss House	Off SR 68	Bowling Green	1980-11-26	Warren County MRA
Warren	Davidson, A. C., House	W of Leayou Rd.	Bowling Green	1980-11-26	Warren County MRA
Warren	Downtown Commercial District	Roughly bounded by Adams and State Sts., 8th and 10th Aves.	Bowling Green	1979-12-18	Warren County MRA

County	Resource Name	Address	City	Listed	Multiple
Warren	Drakes Creek Baptist Church	Cemetery Rd.	Bowling Green	1979-12-18	Warren County MRA
Warren	Ennis, Willis, House	Beech Bend Rd.	Plum Springs	1979-12-18	Warren County MRA
Warren	Everhardt, W. H., House	1223 College St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Ewing, James F., House	Cemetery Rd.	Bowling Green	1979-12-18	Warren County MRA
Warren	Fairview Methodist Church	SR 526	Oakland	1979-12-18	Warren County MRA
Warren	First Colored Baptist Church	340 State St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Ford, John Jackson, House	Off SR 31W	Smiths Grove	1979-12-18	Warren County MRA
Warren	Fort C.F. Smith	E Main St.	Bowling Green	1984-12-05	Warren County MRA
Warren	Fort Lytle	Western Kentucky University	Bowling Green	1984-12-05	Warren County MRA
Warren	Fort Webb	Country Club Dr.	Bowling Green	1984-12-05	Warren County MRA
Warren	Gossom, William, House	SR 31W	Plum Springs	1979-12-18	Warren County MRA
Warren	Grider House	1320 Park St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Grider, Tobias, House	864A Fairview Ave.	Bowling Green	1979-12-18	Warren County MRA
Warren	Hall House	104 W. Main St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Hays, James, House	US 68 and SR 259	Hays	1979-12-18	Warren County MRA
Warren	Health Buildings-Gymnasium	Normal Dr., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University
Warren	Heating Plant	Dogwood Dr., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA

County	Resource Name	Address	City	Listed	Multiple
Warren	Hines House	1103 Adams St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Home Economics Building	State St., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings at Western Kentucky University campus TR
Warren	Horse Shoe Camp	8241 Louisville Rd.	Bowling Green	1997-11-18	US 31W in Warren MPS
Warren	Oakland--Freeport Historic District	Vine, Young, Lee, Mills, Rasdall,Church,Main,Oakland,Kelly, Burnett, Oakland-Smiths Grove,Cooke, Grimes and Mansfield St	Oakland	2004-08-02	
Warren	Magnolia Street Historic District	Magnolia St. between Broadway and Tenth St.	Bowling Green	1989-11-16	
Warren	Merritt-Hardin House	SR 31W	Bowling Green	1979-12-18	Warren County MRA
Warren	Middleton, Jesse, House	Tuckertown Rd.	Oakland	1979-12-18	Warren County MRA
Warren	Moore, Maria, House	801 State St.	Bowling Green	1972-06-20	Warren County MRA (AD)
Warren	Mount Olivet Cumberland Presbyterian Church	SR 526	Bowling Green	1979-12-18	Warren County MRA
Warren	Murrell, Samuel, House	8 mi. NE of Bowling Green on U.S. 31W	Bowling Green	1976-03-26	Warren County MRA (AD)
Warren	Neale, William P., House	N of Woodburn	Woodburn	1980-11-26	Warren County MRA
Warren	Newton-Kemp Houses	804--806 Chestnut St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Nine Hearths	1244 Park St.	Bowling Green	1979-12-18	Warren County MRA
Warren	Old Log Church	W of Riverside	Riverside	1979-12-18	Warren County MRA

County	Resource Name	Address	City	Listed	Multiple
Warren	Perry, William F., Monument	Fairview Cemetery. N of jct. of KY 234 and Collette Lane	Bowling Green	1997-07-17	Civil War Monuments of Kentucky MPS
Warren	Pioneer Log Cabin	Kentucky St., near jct. with University Dr.	Bowling Green	2004-08-04	
Warren	Polk House	Ring Rd.	Woodburn	1979-12-18	Warren County MRA
Warren	President's Home	State St., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University campus TR
Warren	Rauscher House	818 Adams St.	Bowling Green	1978-07-12	
Warren	Richardsville Road Bridge	Spans Barren River	Bowling Green	1980-11-26	Warren County MRA
Warren	Riverview	Hobson Grove Park at end of Main St.	Bowling Green	1972-02-23	Warren County MRA
Warren	Robb, Dr. William, House	Market St.	Woodburn	1979-12-18	Warren County MRA
Warren	Seeley, Edward B., House	Beech Bend Rd.	Plum Springs	1979-12-18	Warren County MRA
Warren	Shake Rag Historic District	Roughly bounded by US 31W Bypass, Chestnut St., E. 5ht Ave. and College St.	Bowling Green	2000-08-18	
Warren	Shobe, Moses, House	SR 31W	Smiths Grove	1979-12-18	Warren County MRA
Warren	Sloss, John, House	Old Springfield	Bowling Green	1979-12-18	Warren County MRA
Warren	Smiths Grove Baptist Church	Main and 5th Sts.	Smiths Grove	1979-12-18	Warren County MRA
Warren	Smiths Grove District	1st and Main Sts.	Smiths Grove	1979-12-18	Warren County MRA
Warren	Smiths Grove Historic District (Boundary Increase)	NW corner of Second and Main Sts.	Smiths Grove	1987-05-20	Warren County MRA
Warren	Smiths Grove Presbyterian Church	College and 2nd Sts.	Smiths Grove	1979-12-18	Warren County MRA

County	Resource Name	Address	City	Listed	Multiple
Warren	Snell, Perry, Hall	State St., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University campus TR
Warren	St. James Apartments	1133 Chestnut St.	Bowling Green	1984-08-02	Warren County MRA
Warren	St. Joseph Roman Catholic Church	430 Church St.	Bowling Green	1975-07-03	
Warren	St. Joseph's District	Roughly bounded by Gilbert and Potter Sts., Church and Brown's Lock Aves.	Bowling Green	1980-11-26	Warren County MRA
Warren	Stadium	Russellville Rd., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University campus TR
Warren	Sterrett House	SR 526	Plum Springs	1979-12-18	Warren County MRA
Warren	Underwood-Jones House	506 State St.	Bowling Green	1978-07-07	Warren County MRA (AD)
Warren	Upper East Main Street District	E. Main and Elm Sts.	Bowling Green	1979-12-18	Warren County MRA
Warren	Van Meter Hall	15th St., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University campus TR
Warren	Walnut Lawn	W of Bowling Green on Morgantown Rd.	Bowling Green	1983-10-20	Warren County MRA

County	Resource Name	Address	City	Listed	Multiple
Warren	Wardlaw, Andrew James, House	Off SR 31W	Oakland	1979-12-18	Warren County MRA
Warren	Warren County Courthouse	429 E. 10th St.	Bowling Green	1977-08-02	
Warren	West Hall	Virginia Garrett Ave., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University campus TR
Warren	Wilson, Gordon, Hall	15th St., Western Kentucky University campus	Bowling Green	1979-12-18	Warren County MRA;Davis, Brinton B., Buildings on the Western Kentucky University campus TR
Warren	Wright, J. L., House	1st St.	Smiths Grove	1979-12-18	Warren County MRA
Warren	Young's Ferry House	Ferry Rd.	Bowling Green	1979-12-18	Warren County MRA

Source: National Park Service, National Register Information System (NRIS).
http://www.cr.nps.gov/nr/research/nris.htm, June 2006.

NATIONAL HISTORIC LANDMARKS SURVEY

NATIONAL PARK SERVICE
1849 C Street, N.W. Room NC-400
Washington, DC 20240

LISTING OF NATIONAL HISTORIC LANDMARKS BY STATE

KENTUCKY (30)

BEARD, DANIEL C., BOYHOOD HOME 06/23/65
COVINGTON, KENTON COUNTY, KENTUCKY

BELLE OF LOUISVILLE (River Steamboat) 06/30/89
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

BURKS' DISTILLERY 01/16/80
MARION COUNTY, KENTUCKY

CHURCHILL DOWNS 10/21/86
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

CLAY, HENRY, HOME (Ashland) 12/19/60
LEXINGTON, FAYETTE COUNTY, KENTUCKY

COVINGTON AND CINCINNATI SUSPENSION BRIDGE (*Also in Ohio*) 05/15/75
COVINGTON, KENTON COUNTY, KENTUCKY and CINCINNATI, HAMILTON COUNTY, OHIO

FORT BOONESBOROUGH 06/19/96
MADISON COUNTY, KENTUCKY

GREEN RIVER SHELL MIDDENS ARCHEOLOGICAL DISTRICT 05/05/94
BUTLER, HENDERSON, MCLEAN, MUHLENBERG, & OHIO COUNTIES, KENTUCKY

INDIAN KNOLL 09/23/64
OHIO COUNTY, KENTUCKY

JACOBS HALL, KENTUCKY SCHOOL FOR THE DEAF 12/21/65
DANVILLE, BOYLE COUNTY, KENTUCKY

KEENELAND RACE COURSE 09/24/86
LEXINGTON, FAYETTE COUNTY, KENTUCKY

LABROT & GRAHAM'S OLD OSCAR PEPPER DISTILLERY 05/16/00
VERSAILLES, WOODFORD COUNTY, KENTUCKY

LIBERTY HALL 11/11/71
FRANKFORT, FRANKLIN COUNTY, KENTUCKY

LINCOLN HALL, BEREA COLLEGE 12/02/74
BEREA, MADISON COUNTY, KENTUCKY

LOCUST GROVE 06/23/86
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

LOUISVILLE WATER COMPANY PUMPING STATION 11/11/71
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

MAYOR ANDREW BROADDUS (Lifesaving Station) 06/30/89
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

McDOWELL, DR. EPHRAIM, HOUSE 01/12/65
DANVILLE, BOYLE COUNTY, KENTUCKY

MIDDLE CREEK BATTLEFIELD 10/05/92
PRESTONSBURG, FLOYD COUNTY, KENTUCKY

MILL SPRINGS BATTLEFIELD 04/19/94
NANCY, PULASKI and WADE COUNTIES, KENTUCKY

OLD BANK OF LOUISVILLE 11/11/71
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

OLD MORRISON, TRANSYLVANIA COLLEGE 12/21/65
LEXINGTON, FAYETTE COUNTY, KENTUCKY

OLD STATE HOUSE 11/11/71
FRANKFORT, FRANKLIN COUNTY, KENTUCKY

PERRYVILLE BATTLEFIELD 12/19/60
BOYLE COUNTY, KENTUCKY

PINE MOUNTAIN SETTLEMENT SCHOOL 12/04/91
BLEDSOE, HARLAN COUNTY, KENTUCKY

SHAKERTOWN AT PLEASANT HILL HISTORIC DISTRICT 11/11/71
MERCER COUNTY, KENTUCKY

TAYLOR, ZACHARY, HOUSE 07/04/61
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

UNITED STATES MARINE HOSPITAL 09/25/97
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY

WENDOVER (Frontier Nursing Service Headquarters) 07/17/91
WENDOVER, LESLIE COUNTY, KENTUCKY

YOUNG, WHITNEY M., BIRTHPLACCE AND BOYHOOD HOME 04/27/84
SHELBY COUNTY, KENTUCKY

Source: National Park Service, List of National Historic Landmarks,
http://www.cr.nps.gov/nhl/designations/listsofNHLs.htm

APPENDIX G
NATIONWIDE RIVERS INVENTORY
BY KENTUCKY CREP COUNTY

Nationwide Rivers Inventory Segments by Kentucky CREP County

River	County	Reach	Length (miles)	Year Listed/ Updated	ORVs	Description
Barren River	Butler, Warren	RM 0, confluence with Green River, to RM 31, below Bowling Green	31	1982	S, R, F	Broad stream with banks of various steepness; lush vegetation; islands common.
Barren River	Warren, Allen	RM 43, above Bowling Green, to RM 84, Barren River Lake	41	1982	S, R, F	See initial comments.
Cumberland River	Monroe, Cumberland, Clinton, Russell	RM 385, one mile below town of Vernon, to RM 462, US 127 bridge over Wolf Creek Dam	77	1982	S, R, G, F, W	Extensively wooded, high bluffs, remote and rugged; corridor area excellent for canoeing, hiking and camping.
Gasper River	Warren, Logan	RM 0, confluence with Barren River, to RM 35, headwaters northwest of Auburn	35	1982	S, R, G, F, W	One of western Kentucky's most beautiful rivers; flows through small scenic gorge area.
Green River	Edmonson, Hart, Green	RM 189, Mammoth Cave National Park and Lock No. 6, to RM 290, Greensburg	101	1982	S, R, G, F, W, H, C	Designated Kentucky Wild River; habitat for numerous rare or endangered species; abundance and variety of wildlife; most productive muskellunge fishery in

						State.
Nolin River	Edmonson	RM 0, confluence with Green River, to RM 8, Nolin River Dam	8	1982	S, R, G, F, W	Flows through attractive forested shoreline and backcountry woodlands of Mammoth Cave National Park; especially scenic with high exposed bluffs; plentiful and diverse wildlife.
Red River	Logan, Simpson	RM 50, TN State line, to RM 79, TN State line	29	1982	S, R, G, F, W, H, C	Relatively remote, undeveloped, and deeply entrenched stream; possesses recreational, educational, and esthetic potential.
Red River, South Fork	Logan	RM 0, confluence with Red River, to RM 8, TN State line	8	1982	S, R, F, W	Small pastoral stream lined with hardwoods.

ORV=Outstandingly Remarkable Value; C=Cultural; F=Fish; G=Geology; H=History; R=Recreation; S=Scenery; W=Wildlife
Source: National Park Service, RTCA. Nationwide Rivers Inventory. http://www.nps.gov/rtca/nri/eligb.html

APPENDIX H
KENTUCKY HISTORIC, PARK AND RECREATION AREAS

Kentucky Historic Sites, Parks and Recreation Areas

Historic/Recreation Areas	State	Managing Authority
Abraham Lincoln Birthplace National Historic Site	KY	National Park Service
Barren River Lake	KY	US Army Corps of Engineers
Buckhorn Lake	KY	US Army Corps of Engineers
Capt Anthony Meldahl Locks And Dam	OH/KY	US Army Corps of Engineers
Carr Creek Lake	KY	US Army Corps of Engineers
Cave Run Lake	KY	US Army Corps of Engineers
Clarks River National Wildlife Refuge	KY	Fish and Wildlife Service
Cumberland Gap National Historical Park	KY	National Park Service
Daniel Boone National Forest	KY	USDA Forest Service
Dewey Lake	KY	US Army Corps of Engineers
Fishtrap Lake	KY	US Army Corps of Engineers
Fishtrap Lake	KY	US Army Corps of Engineers
Grayson Lake	KY	US Army Corps of Engineers
Green River +2 Locks	KY	US Army Corps of Engineers
Green River Lake	KY	US Army Corps of Engineers
Greenup Locks And Dam <Ohio River>	KY	US Army Corps of Engineers
Greenup Locks And Dam	KY, OH	US Army Corps of Engineers
Headley-Whitney Museum	KY	Smithsonian Institution Affiliations Program
Kentucky River +4 Locks	KY	US Army Corps of Engineers
Lake Barkley	KY	US Army Corps of Engineers
Laurel River Lake	KY	US Army Corps of Engineers
Mammoth Cave National Park	KY	National Park Service
Markland Lock and Dam +Ohio River	KY	US Army Corps of Engineers
Martins Fork Lake	KY	US Army Corps of Engineers
McAlpine Lock And Dam +Ohio River	KY	US Army Corps of Engineers
Nolin River Lake	KY	US Army Corps of Engineers
Paintsville Lake	KY	US Army Corps of Engineers
Rough River Lake	KY	US Army Corps of Engineers
Taylorsville Lake	KY	US Army Corps of Engineers
Wolf Creek Dam Lake Cumberland	KY	US Army Corps of Engineers
Wolf Creek National Fish Hatchery	KY	Fish and Wildlife Service
Yatesville Lake	KY	US Army Corps of Engineers

Source: http://www.recreation.gov/advancedsearch.cfm?StartRow=1&UnitName=&States=KY

APPENDIX I
KENTUCKY EXOTIC AND INVASIVE SPECIES

Name	Type	Origin	Extent	Damage
Zebra mussel	Mollusk	Caspian Sea region of Asia; accidentally released into Lake St. Clair in 1988 in ship ballast water	Kentucky River and throughout length of Ohio River	Voracious filter feeders that out-compete native animals; fouls boats & clogs intake pipes at power plants and municipal water sources
Chestnut blight	Fungus	China; probably introduced on nursery stock in the 1890s. It was first detected in New York city in 1904.	By 1926, the disease had devastated chestnuts from Maine to Alabama	Chestnut once comprised one-fourth to one-half of eastern U.S. forests, and was prized for its durable wood, and as a food for humans, livestock and wildlife. Today, only stump-sprouts from killed trees remain.
Dutch elm disease	Fungus	Asia; one strain of the disease arrived in the 1930s in Cleveland, OH on infected elm logs from Europe; a more virulent strain arrived in 1940s	American elm originally ranged in all states east of Rockies- most of this area is infested	Elms were once the nation's most popular urban street tree, have now largely disappeared from both urban and forested landscapes. It is estimated that "Dutch" elm disease has killed over 100 million trees.
West Nile virus	Virus	Uganda; first reported in NY and CT in 1999	Documented in 85 of Kentucky's 120 counties	Disease has affected several hundred horses in Kentucky and killed over 150.
Multiflora rose	Plant	Japan & China; promoted in 1900s as a "living fence"	Found in 37 counties in Kentucky	Forms dense thickets that crowd out native species, also a weed in crop and pasture lands
Canada thistle	Plant	Despite the name, Canada thistle is native to Eurasia	Found in 17 counties in Kentucky	Aggressive and highly competitive, competes with crops and forage plants
Purple loosestrife	Wetland plant	Europe and Asia; introduced in 1800s as ornamental and medicinal plant in 1800s	Discovered in KY in 2002, now in 21 counties	Displaces native wetland plants; has less food and habitat value for waterfowl and other wildlife

Source: The Biodiversity Partnership, http://www.biodiversitypartners.org/state/ky/invasive.shtml