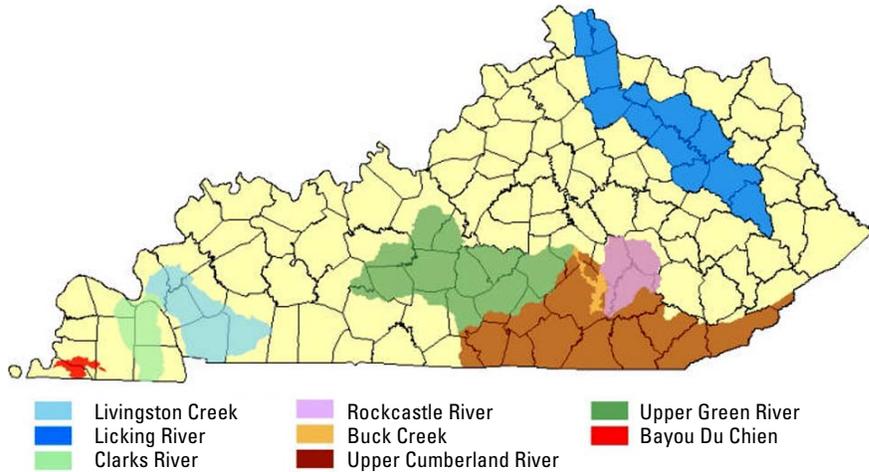


Appendix A: Kentucky



Kentucky Focus Areas

Introduction and Overview

Kentucky is one of the most biologically diverse states in the nation. It is divided into six distinctive physiographic regions, which includes the Appalachian or Cumberland Plateau, Knobs, Bluegrass, Pennyroyal, Shawnee Hills and the Coastal Plain. The beautiful hemlock mountain forests of the eastern Cumberland Plateau extend westward to the Knobs, Bluegrass and karst areas of the Pennyroyal of central Kentucky. The geography then turns into the hilly uplands of the Shawnee Hills, which finally reach the coastal plain of the Mississippi River known as the Jackson Purchase region of west Kentucky. The famous Land-Between the Lakes, now a National Recreation Area operated by the U.S. Forest Service, lies between the Cumberland and Tennessee Rivers and separates the Jackson Purchase region from the Pennyroyal. The Ohio River forms the northern boundary of Kentucky, separating it from Ohio, Indiana, and Illinois, while the Mississippi River forms the far western boundary of the state.

Kentucky contains 89,000 miles of streams within 17 major watersheds, supports 230 species of fish and approximately 103 species of mussels, which equates to about 35 percent of the nation’s fauna (Kentucky State Nature Preserves Commission (KSNPC 2006)).

Kentucky is ranked third in the nation in aquatic diversity. The bluegrass region has been labeled as one of the endangered ecosystems in the United States, with only one tenth of one percent of the original habitat remaining. Extensive wetlands once dominated the Mississippi River and Ohio River floodplains; however, approximately 85 percent have been lost.

Historically, there was an estimated two to three million acres of native grassland, savannah and barren habitats occupying portions of the Bluegrass and Pennyroyal, with less than one percent remaining. Many of these rare, unique and essential ecosystems have been severely altered, degraded or destroyed due to coal mining activities, urban sprawl and development, dams, highway systems, stream channelization, wetland and prairie conversion for agriculture, poor logging operations and destructive agricultural activities.

The state harbors 37 federally listed species, numerous federal candidate species and many other at-risk species. In its first Comprehensive Wildlife Conservation Strategy Plan (CWCS), the Kentucky Department of Fish and Wildlife Resources (KDFWR 2005) identified 251 species in 7 taxonomic groups as those in need of “Greatest Conservation Need”.

Additional species and taxa are expected to be added by KDFWR as new information arises. The Service’s Partner’s Program assists with the restoration and enhancement of every ecosystem in the Commonwealth of Kentucky that benefits federal trust species.

Overview of Geographic Focus Areas

For this five-year strategic plan Partners Program funds will be directed to eight major focus areas in Kentucky. The geographic focus areas were chosen because of the number of federal trust species and the ongoing effort to help recover species in those areas.



Upper Cumberland Focus Area

Upper Cumberland River Basin (UCRB) Focus Area

The UCRB focus area is an approximate 1,900-square mile watershed that includes the mainstem of the Cumberland River and all of its tributaries upstream of Cumberland Falls. Historically, the middle and upper Cumberland River systems represented one of the most unique and diverse aquatic ecosystems in North America.

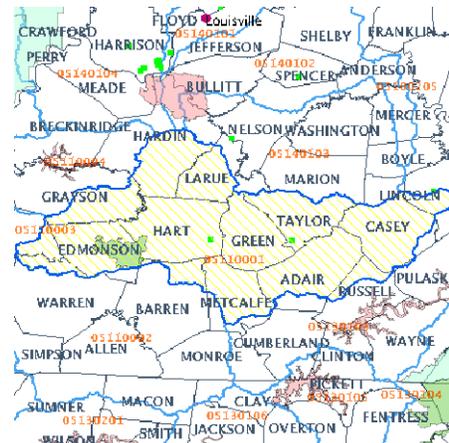
More mussel species (72) occurred in this system prior to settlement than in any other Kentucky drainage except the mainstem of the Ohio River. Of the 72 mussel species that inhabited the middle and upper Cumberland River basins, half of the species are extinct, extirpated from the State, or no longer occur in this region, and 11 of the 36 extant species are rare at the state or federal level.



Fish passage barrier and degraded stream habitat negatively affecting (T) blackside dace



Livestock in stream tributary adjacent to the Green River



Upper Green River Focus Area

USFWS

USFWS

There are 6 federally listed species, 2 federal candidate species, and 20 additional state-listed species that inhabit the middle and upper Cumberland River basins in southeastern Kentucky. The aquatic fauna continue to be impacted by pollutants associated with coal mining, domestic waste, road construction, urban development, and silviculture. The Cumberland River basin contains more miles of special use waters (Kentucky Wild Rivers, Outstanding State Resource Waters, Exceptional Waters) than any other major drainage basin in Kentucky.

The Partners Program recently began a major restoration initiative to benefit the threatened blackside dace and Cumberland darter, both species being endemic to the upper Cumberland River system. Habitat improvement efforts will concentrate on stream and riparian restoration, and implementing best management practices related to agriculture, livestock production and remediation of forestry practices.

Priority Habitats

Riparian and In-stream

Five-Year Target (FY 2007-2011)

Five miles riparian; 0.25 mile instream

Focus Species*

Cumberland elktoe (E); blackside dace (T); Cumberland Johnny darter (C); eastern hellbender (SOC)

Threats

Threats include degraded water quality from excessive sedimentation due to logging, mining, road construction, and agriculture, nutrient enrichment from livestock in streams, acid mine drainage from mining, lack of proper sewer systems, and poor management practices related to silviculture.

Action Strategies

Develop habitat restoration projects by working with private landowners and other partners, particularly the Natural Resource Conservation Service (NRCS) and local networks, such as Rural Resource and Development. Partners for Fish and Wildlife funds will be leveraged with Farm Bill (e.g. CRP, EQIP) and other conservation program funds to exclude livestock from streams, repair failing stream banks, provide alternate water sources, restore riparian habitat, remediate poor logging practices, remove fish passage barriers, and conduct Priority 1 stream restoration. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks to provide better fish and wildlife habitat than hard (e.g. rip rap) engineering techniques.

Upper Green River (UGR) Focus Area

The UGR focus area is a one of the most biologically significant watersheds in the United States in terms of fish and mussel fauna. There have been 150 species of fish and 70 species of mussels recorded from the Green River, including seven that are federally listed. This includes the rare ring pink mussel, which was thought to be extinct until 2005. The Green River basin has an extensive cave system and these sub terminal stream systems feed the famous Mammoth Cave National Park, which is home to the endangered Kentucky cave shrimp, gray and Indiana bats. The Partners Program in Kentucky has conducted numerous habitat improvement projects in the upper Green River watershed and is currently very active with restoration activities there. The Partners Program also provides technical assistance to the USDA Farm Service Agency, the NRCS, and other conservation partners regarding the Green River Conservation Reserve Enhancement Program (CREP) that was initiated in 2001. Eight Counties in the Upper Green River of south central Kentucky are eligible for enrollment in the program. Target goals are to restore up to 100,000 acres through the Green River CREP. Other goals of the Green River CREP are to,

- 1) reduce by 10 percent the amount of sediment, pesticides, and nutrients entering the Green River and Mammoth Cave system by growing strips of grass and trees around streams and sinkholes;

- 2) protect wildlife habitat and populations, including threatened and endangered species;
- 3) restore riparian habitat along the Green River; and
- 4) restore the subterranean ecosystem by targeting 1,000 high priority sinkholes. The Partners Program is actively assisting its conservation partners to accomplish those goals.

Priority Habitats

Riparian and In-stream

Five-Year Target (FY 2007-2011)

Three miles riparian; 0.25 mile instream; 15 acres wetland

*Focus Species**

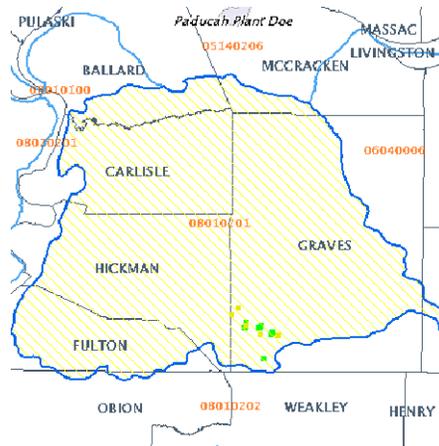
Six federally endangered mussels (pink mucket, fanshell, orange-footed pearly mussel, ring pink, and fat pocketbook; two species of endangered bats (Indiana bat, gray bat; and one species of crustacean (Kentucky cave shrimp)

Threats

Threats include degraded water quality from excessive sedimentation due to poor agriculture practices, nutrient enrichment from livestock in streams, lack of forested riparian and cold water discharge from dams.

Action Strategies

Develop habitat improvement projects by working with private landowners and other partners, particularly the NRCS and local conservation agencies. Partners funds will be leveraged with Farm Bill (e.g. CRP, EQIP) and other conservation program funds to exclude livestock from streams, repair failing stream banks, provide alternate water sources, restore riparian and wetland habitat, remove fish passage barriers, and conduct Priority 1 stream restoration. Past habitat improvement efforts have been focused primarily in Russell and Pittman Creeks to maximize funding and concentrate restoration efforts. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks to provide better fish and wildlife habitat.



Bayou du Chien Focus Area



Eroded Stream Bank and lack of forested riparian in Bayou du Chien

Bayou du Chien (BduC) Focus Area

The BduC focus area is located in the far western portion of Kentucky and is a major tributary of the Mississippi River. The upper portion of BduC contains unique cold springs and has a shallow sandy bottom with undercut banks. The lower third of BduC is a low gradient, alluvial and turbid system, commonly associated with the Mississippi River tributaries and wetlands. The federal endangered relict darter is restricted to the upper two thirds of the BduC watershed and is reliant upon the cool spring systems. Most of the spawning habitat is isolated in only a few areas in the upper watershed. Because BduC and its tributaries were channelized historically, many of the streams have begun to degrade causing severe bank failure.

Excessive sedimentation from bank failure and runoff from agricultural fields buries the in-stream spawning habitat of the relict darter creating further population declines. Habitat improvement projects have been conducted and are currently being developed through the Partners Program to reduce sedimentation in the watershed. In the future, the Partners Program hopes to secure funding to complete in-stream habitat restorations to create more quality habitat for this rare endemic species.

Priority Habitats

Riparian and In-stream

Five-Year Target (FY 2007-2011)

3.5 miles riparian; 0.25 mile instream

*Focus Species**

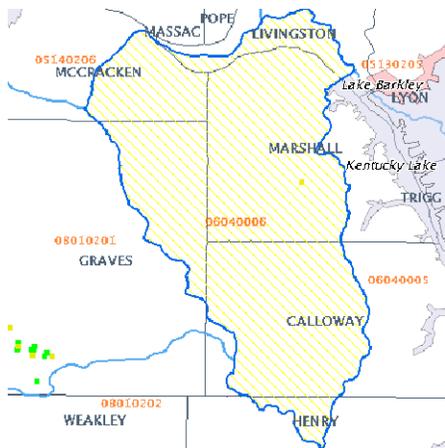
Relict darter (E)

Threats

Past channelization has destabilized the entire watershed causing massive bank failure. Excessive sedimentation from bank failure and lack of riparian buffers adjacent to row crop fields buries in stream spawning habitat (e.g. logs). Lack of forested riparian habitats, nutrient rich materials from swine and chicken production and water depletion from crop irrigation are also causes for relict darter declines.

Action Strategies

Habitat improvement efforts will continue to focus on building landowner relationships, developing projects through NRCS, and through past project success. Efforts are being made to establish filter strips and riparian corridors and repair failing stream banks to help reduce sediments from entering Bayou du Chien. Biologists will try and secure a larger source of funding to conduct habitat improvement projects in the watershed. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks. Various conservation programs (e.g. Farm Bill, LIP) will be leveraged with Partners funds to maximize restoration results.



Clark's River Focus Area

Clark's River (CR) Focus Area

The CR focus area flows through the newly established Clark's River National Wildlife Refuge. There is currently 8,000 acres in the refuge with 18,000 within acquisition boundaries. Clark's River is a major tributary of the Tennessee River and contains a very diverse mussel and fish assemblage. A recent mussel and fish survey conducted in Clark's River NWR revealed 24 species of freshwater mussels and 54 species of fish. Wetland and bottomland hardwood forest essential to migratory birds were once common in this watershed, and there are many opportunities for restoration of these two habitat types.

Priority Habitats

Riparian, Wetland and In-stream

Five-Year Target (FY 2007-2011)

Four miles riparian; 0.25 mile instream; 20 acres wetland; 40 acres upland

*Focus Species**

Indiana bat (E); and gray bat (E); numerous state listed mussels and various neo-tropical migrants

Threats

Past channelization has destabilized the entire watershed causing massive bank failure. Excessive sedimentation from bank failure and lack of riparian buffers adjacent to row crop fields contributes to species declines. Lack of forested riparian habitats, nutrient rich materials from swine and chicken production and water depletion from crop irrigation are also contribute to water quality problems in Clark's River. Many wetlands in the Clark's River watershed have been tiled and drained.

Action Strategies

Habitat improvement efforts will continue to focus on building landowner relationships, developing projects through NRCS, and developing new partnerships associated with Clark's River NWR. Efforts are being made to establish filter strips and riparian corridors and remediate failing stream banks to reduce sediments from entering the watershed. Efforts will be made to restore wetlands adjacent to Clark's River NWR and throughout the watershed. Biologists with the Partners Program will help develop projects for enrollment in the Wetlands Reserve Program (WRP), as well as, helping NRCS facilitate WRP in the Clark's River watershed. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks. Various conservation programs (e.g. Farm Bill, LIP) will be leveraged with Partners funds to maximize restoration results.

Lower Cumberland River Basin (LCRB) (Livingston Creek) Focus Area

The LCRB focus area is a major tributary to the Lower Cumberland River and contains a diverse mussel assemblage. Five federally listed mussel species have been recorded from the Lower Cumberland River. These species are the fanshell, ring pink, orange-foot pimpleback, clubshell, fat pocketbook and pink mucket. Livingston Creek is an important watershed to the Lower Cumberland River mussel and fish fauna. In 2004, the Partners Program began a watershed restoration initiative in Livingston Creek to abate poor land use practices, primarily from agriculture.

Priority Habitats

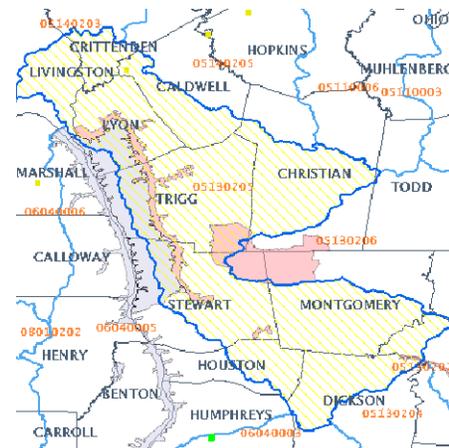
Riparian and In-stream

Five-Year Target (FY 2007-2011)

Four miles riparian; 0.25 mile instream

*Focus Species**

Pink mucket (E); fanshell (E); orange-footed pearly mussel (E); and fat pocketbook (E); Indiana bat (E); gray bat (E)



Lower Cumberland River Basin Focus Area



USFWS

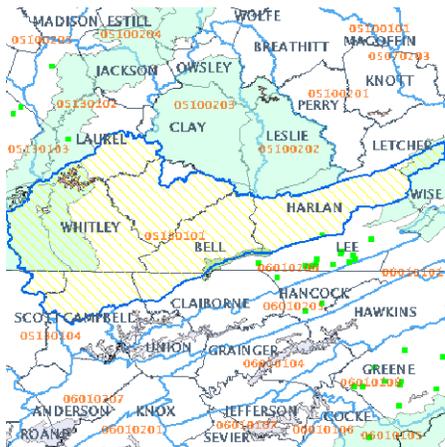
Stabilizing eroded streambank

Threats

Past channelization has destabilized the entire watershed causing massive bank failure. Excessive sedimentation from bank failure and lack of riparian buffers adjacent to row crop fields has caused poor water quality throughout the watershed. Lack of forested riparian habitats, nutrient rich materials from swine and chicken production and water depletion from crop irrigation are also causes for species declines.

Action Strategies

Habitat improvement efforts will continue to focus on building landowner relationships and developing projects through NRCS and other conservation partners. Efforts are being made to establish filter strips and riparian corridors and repair failing stream banks to help reduce sediments from entering the watershed.



Buck Creek Focus Area

Biologists will try and secure a larger source of funding to conduct habitat improvement projects in the watershed. Efforts are being concentrated in the Livingston Creek watershed of the Lower Cumberland River Basin to concentrate restoration efforts and maximize funding. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks. Various conservation programs (e.g. Farm Bill, LIP) will be leveraged with Partners funds to increase restoration results.

Buck Creek (BC) Focus Area

The BC focus area is a 188,000 plus acre watershed containing more than 30 species of freshwater mussels, five being federally endangered and five listed as state concern, 77 species of fish, and two endangered bat species, the gray and Indiana bat. Federally listed mussels include the Cumberland combshell, oyster mussel, little-wing pearly mussel and Cumberland bean pearly mussel. It is located in the Upper Cumberland drainage of Southeast Kentucky. In 2002, Critical Habitat was designated in Buck Creek for the oyster and Cumberland combshell mussels. Because of its biodiversity, it has been targeted by conservation groups in Kentucky, including the Partners Program. The Partners Program has been conducting habitat improvement projects in the Buck Creek watershed since 2000. The focus of our habitat improvement work in Buck Creek is stream restoration, bank stabilization, livestock exclusion fencing, forest riparian establishment, sink hole and cave protection and general stream and wetland restoration and protection. Brushy Creek, a major tributary of Buck Creek has been a recent Partners priority area within the watershed.

*Focus Species**

Cumberland combshell (E), oyster mussel (E), little-wing pearly mussel (E) and Cumberland bean (E)

Threats

Most of the threats in the Buck Creek watershed are from poor agricultural practices. Livestock freely using the streams, feeding adjacent to streams, failing banks, erosion from row crop fields, and lack of forested riparian contribute excessive amounts of sediments into streams throughout the watershed. In addition, restriction of the floodplain, logging of riparian areas, and illegal gravel mining have also greatly contributed to destabilization of in-stream habitat.

Action Strategies

Habitat improvement efforts will continue to focus on building landowner relationships and develop projects through NRCS and past project success. Efforts are being made to establish filter strips and forested riparian corridors to reduce sediments from entering the Buck Creek watershed. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks. Biologists will continue to try and secure a larger source of funding to conduct habitat improvement projects in the watershed. Various conservation programs (e.g. Farm Bill; Landowner Incentive Program) will be leveraged with Partners funds to maximize restoration results.

Rockcastle River (RR) Focus Area

The RR focus area is part of the Upper Cumberland Basin. The Rockcastle River has five federally listed mussel species, one candidate mussel species, and in 2002 the Sinking Creek tributary was designated as critical habitat for the Cumberland bean and Cumberland elktoe mussels. The Sinking Creek watershed has the last best known population of the Cumberland bean mussel.

Priority Habitats

Riparian and In-stream

Five-Year Target (FY 2007-2011)

3.5 miles riparian; 0.25 mile instream



USFWS

Severely eroded stream bank without forested riparian on Brushy Creek



USFWS

Restored eroded stream bank on Brushy Creek one year after implementation of a cedar revetment



Rockcastle River Focus Area



Eroded stream bank and riparian devoid of trees in the Rockcastle River watershed

In addition, Kentucky Department of Fish and Wildlife currently has a major restoration effort to restore a native river run strain of walleye, endemic to the Rockcastle River. There was once a large and viable native walleye fishery before the Cumberland Dam system was established. However, due to the interruption of their spawning run, historical populations all but disappeared. Fortunately remnant populations of the walleye remain and efforts are being made to restore the fishery. Numerous Partners projects have been conducted in partnership with the NRCS in the Roundstone Creek watershed of the Rockcastle River. Most habitat improvement work is focused on stream restoration, bank stabilization, livestock exclusion fencing, establishment of forested riparian, and general wildlife habitat practices. Various conservation programs (e.g. Farm Bill, LIP) will be leveraged with Partners funds to maximize restoration results.

Priority Habitats

Riparian and In-stream

Five-Year Target (FY 2007-2011)

Two miles riparian; 0.25 mile instream

*Focus Species**

Cumberland bean mussel (E) and the Indiana bat (E)

Threats

Most of the threats in the Rockcastle River are from poor agricultural practices. Livestock freely using the streams, feeding adjacent to streams, failing banks, erosion from row crop fields, and lack of forested riparian contribute excessive amounts of sediments into streams throughout the watershed. In addition, restriction of the floodplain, logging of riparian areas and gravel mining has also greatly contributed to destabilization of in-stream habitat.

Action Strategies

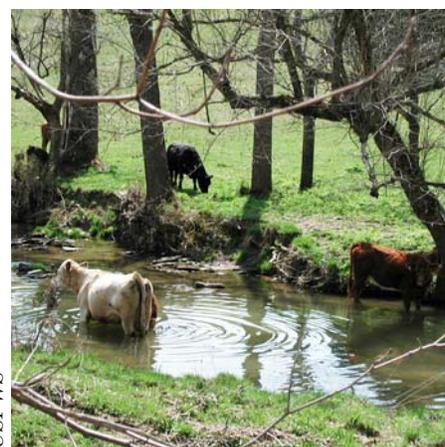
Habitat improvement efforts will continue to focus on building landowner relationships and develop projects through NRCS and past project success. Efforts are being made to establish filter strips and forested riparian corridors to reduce sediments from entering the watershed. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks. Biologists will continue to try and secure a larger source of funding to conduct habitat improvement projects in the watershed. Various conservation programs (e.g. Farm Bill, LIP) will be leveraged with Partners funds to maximize restoration results.

Licking River Basin (LRB) Focus Area

The LRB focus area is a major tributary of the Ohio River in northeast Kentucky. It encompasses 16 Counties and is part of a major restoration effort by several Kentucky conservation partners. The Licking River has a very diverse fish and mussel assemblage and may have the second most diverse mussel population in Kentucky (M. McGregor KDFWR). It has two federally listed mussel species, which include the fanshell and clubshell mussel. The Licking River is thought



Licking River Basin Focus Area



Livestock degrading a stream in the Licking River Basin

to have the last best population of the fanshell mussel and is a viable element for its overall recovery. There are many “wet meadow” wetlands in the Licking River basin and projects are being developed to restore them through various conservation programs. Two federally endangered plants species, Short’s golden rod and running buffalo clover also occur in the watershed. Most of the habitat improvement efforts have been concentrated in Beaver and Greasy Creeks and the North Fork sub-basins. The primary focus of work has been on stream restoration, bank stabilization, livestock exclusion fencing, forest riparian establishment, guidance for establishment rotational grazing practices and general wildlife habitat practices.

Priority Habitats

Riparian and In-stream

USFWS

USFWS

Five-Year Target (FY 2007-2011)

3.5 miles riparian; 0.25 mile stream;
20 acres upland

*Focus Species**

Fanshell mussel (E); clubshell mussel (E); and Indiana bat (E)

Threats

Most of the threats in the Licking River watershed are from poor agricultural practices. Livestock freely using the streams, feeding adjacent to streams, failing banks, erosion from row crop fields, and lack of forested riparian contribute excessive amounts of sediments into streams throughout the watershed. In addition, restriction of the floodplain from the logging of riparian areas, stream barriers and culverts that limit fish passage have also greatly contributed to destabilization of in-stream habitat.

Action Strategies

Habitat improvement efforts will continue to focus on building landowner relationships and develop projects through NRCS and past project success. Efforts are being made to establish filter strips and forested riparian corridors to reduce sediments from entering the watershed. Bioengineering techniques (e.g. cedar tree revetments) will be used to repair stream banks. Biologists will continue to try and secure a larger source of funding to conduct habitat improvement projects in the watershed. Various conservation programs (e.g. Farm Bill, LIP) will be leveraged with Partners funds to maximize restoration results.

*E=federally listed endangered species; T=federally listed threatened species; C=federal candidate species; SOC=species of concern

Stakeholders Involved

The list below represents stakeholders (partners) that the Partners Program has worked with in some capacity in Kentucky. A meeting was held early in the planning process with a core set of partners through which most projects are conducted. Primary stakeholders include the Natural Resources Conservation Service, Kentucky Department of Fish and Wildlife Resources, Kentucky State Nature Preserves Commission, Kentucky Division of Conservation and The Kentucky Chapter of the Nature Conservancy.

- Bernhiem Forest
- Bluegrass Caving Grotto
- Cumberland Valley RC & D
- Ducks Unlimited
- East Kentucky Power
- Eastern Kentucky University
- Environmental Protection Agency
- Farm Services Agency
- Jackson Purchase RC and D
- Jackson County Development Association
- Kentucky Division of Conservation
- Kentucky Department of Local Governments
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Nature Preserve Commission
- Kentucky Division of Water
- Kentucky Division of Forestry
- Kentucky Chapter of The Nature Conservancy
- Kentucky Transportation Cabinet
- Mammoth Cave National Park
- Madison County Solid Waste
- National Wildlife Turkey Federation
- Natural Resources Conservation Service
- Northern Jackson County Commission
- Powell County School Board
- Personal Responsibility in a Desired Environment

- Private Landowners throughout Kentucky
- Quail Unlimited
- Roundstone Seed, Inc.
- Southern Conservation land Corporation, LLC
- Steele-Reese Foundation
- Tennessee Valley Authority
- Toyota
- Upper Cumberland Waterwatch Group
- University of Kentucky
- U.S. Forest Service
- U.S. Geological Survey
- U.S. Army Corps of Engineers

References

- Kentucky Department of Fish and Wildlife Resources State Strategic Plan
(<http://fw.ky.gov/futureplan.asp>)
- Kentucky Alive, Report of the Kentucky Bio-diversity Task Force. 2006
- U.S. Fish and Wildlife Service Species Lists. 2006
- Kentucky State Nature Preserves Commission. 2006. Species Lists and Annual Reports.
- Barnes, T. G. 2002. Kentucky's last great places. University of Kentucky Press, Lexington, Kentucky.
- Jones, R. J. 2005. Plant life of Kentucky, University of Kentucky Press, Lexington, Kentucky.