

KENTUCKY STATE NATURE PRESERVES COMMISSION

PROTECTING KENTUCKY'S NATURAL HERITAGE SINCE 1976



KENTUCKY WARBLER



BIENNIAL REPORT
JANUARY 2009

Cover photo by Steve Maslowski, USFWS: Kentucky Warbler (*Oporornis formosus*)

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Biennial Report of the Kentucky State Nature Preserves Commission January 2009

INTRODUCTION:

This biennial report is submitted to the Governor and the General Assembly as directed by KRS 146.410 et seq., the Kentucky State Nature Preserves Act, which created the Commission in 1976.

It is the **mission** of the Kentucky State Nature Preserves Commission to protect Kentucky's natural heritage by:

- 1. Identifying, acquiring and managing natural areas that represent the best known natural occurrences of rare native species, natural communities and significant natural features in a statewide nature preserves system.**
- 2. Working with others to protect biological diversity.**
- 3. Educating Kentuckians as to the value and purpose of nature preserves and biodiversity preservation.**

The Commission is composed of **five members appointed by the Governor**. Two are **at-large** and three Commissioners represent the following entities: the **Kentucky Farm Bureau Association**, the **State Association of Soil Conservation Districts** and the **National Farmers Organization**. The Commissioners are Mrs. Clara Wheatley, Chairperson (NFO), Mr. Carl W. Breeding (at-large), Mrs. Gayle Horn (Soil Conservation Districts), Mr. Peter E. Brown (at-large) and Mr. Adrian K. Arnold (KFB). The executive director is Donald S. Dott, Jr. The Commission has 20 full-time staff positions following a 2008 CAP reduction of two.

THE BENEFITS OF PROTECTING BIOLOGICAL DIVERSITY:

Protecting biological diversity (“biodiversity”) is our statutory mission, but that alone doesn’t explain why it is of such great consequence. A good start is to explain what is meant by “**biodiversity**”, which was described by the Kentucky Biodiversity Task Force in this way:

“Kentuckians are privileged to live in one of America’s most beautiful states with a rich tapestry of lands and waters, all **teeming with life**. This life is found in an abundance of **plants, animals** and **other organisms** that **interact** with each other and the **environments** they occupy.

These living things and their relationships with each other and with their surroundings form a **mosaic of biological communities and ecosystems** that represent the complex and valuable diversity that makes **Kentucky unique**. This diversity of life, long a central theme of biological studies, is much more than a scientific discipline. It is a **fundamental aspect of life on our planet**. The interdependency among living things is an essential feature that makes life unique and our existence possible...” (Executive Summary of Kentucky Alive! Report of the Kentucky Biodiversity Task Force.)

There are multiple reasons to protect Kentucky’s biodiversity– from the pragmatic to the ethical. They include:

1. **Economic Values** – Plants and animals are the basis for countless commercial products. Plants provide **food** and fibers for **clothing**. The Kentucky Division of Forestry reported in 2003 that the total value of **wood products** manufactured in the state was more than **\$5.8 billion**. More than **21,500 individuals were employed** at wood processing mills. **Ginseng** harvested from Kentucky forests since 1995 has exceeded 212,000 pounds, generating **\$63 million** in direct payments.
2. **Medicines** – Almost **one-fourth of all medical prescriptions** throughout the world are derived from plants and microorganisms or are synthesized versions of their chemical compounds.
3. **Recreation** – Our diverse natural areas draw **millions of visitors** each year to Kentucky’s state parks and other natural areas such as Kentucky State Nature Preserves, Wildlife Management Areas, Daniel Boone National Forest, The Land Between the Lakes and many others. According to the Kentucky Tourism, Arts and Heritage Cabinet, **tourism contributes a \$4.8 billion annual economic boost** from hunting, fishing, boating and wildlife watching. These activities provide an estimated **60,000 jobs**.

4. **Eco-Services** – Biological diversity is a key ingredient to a stable environment. Forests **provide oxygen** to the atmosphere, help **cool the climate** and **absorb air pollution**. **Wetlands purify water** runoff from uplands and are sometimes referred to as “nature’s kidneys.” Songbirds reduce crop damage by feeding on harmful insects. Other insects **pollinate food crops** and wildflowers. These biological functions and others are referred to as “**eco-services**” that are necessary to human communities, and are provided at no cost.
5. **Earth’s Steward** – Many people share the belief, whether based on social, religious or moral ideals – that man has a **responsibility to preserve** and share our natural resources – **held in trust for future generations** to benefit from the same natural wealth we have been privileged to enjoy – and left to us by earlier generations.

THREATS TO KENTUCKY’S BIODIVERSITY

1. **Land Conversion** - The number one threat to our natural areas and biological diversity continues to be land conversion or development – i.e. **habitat loss**. High quality **natural areas support a great diversity of species**, unlike our **managed landscapes which we populate with only a few preferred species**. Suburban lawns are planted in fescue and a relatively few ornamental plant and tree species that thrive in urban conditions. Farmlands are largely fescue pastures or monocultures of row crops. Certainly these types of managed landscapes are both desirable and necessary, but part of their overall cost is a **loss of biodiversity**. As the conversion of land to such uses increases, it becomes more **critical to protect the best remaining natural areas** that serve as reservoirs of Kentucky’s biological diversity. If we do not protect these areas they will continue being reduced to such a small scale that they will not be able to **sustain themselves over time**.

The 2004 Kentucky’s Forests Report, compiled by the Kentucky Division of Forestry and the USDA Forest Service, reports a **6 percent decline of forested land** from 1988 to 2003. A 6 percent loss may not sound like much, but it equals **729,000 acres**, an area nearly the size of **Jefferson, Shelby, Franklin and Woodford** counties combined – an area larger than the Daniel Boone National Forest, which is over 707,000 acres. It is encouraging to learn from the report that nearly half of Kentucky remains forested, but the trend in loss of forest acreage warrants incentives to retain existing forestlands.

A statistic compiled by the USDA Natural Resources Conservation Service reveals that Kentucky is **losing 130 acres per day** of forest and farmlands to development. This is an irreversible loss of prime farmland, wildlife habitat and natural areas. It equates to one square mile of land being developed *every week*, one of the highest rates in the country. When compared to the seven surrounding states, **Kentucky has protected the smallest percentage of its land.** State owned lands are approximately .9 percent of the state. When federal lands are added, including military bases, this figure increases to 7.5 percent. To be competitive with other states on a **quality of life** basis, Kentucky must support an expanded land stewardship and conservation initiative. The agencies and programs needed to purchase and protect natural lands are already in place. Recognizing the need to increase land conservation, the 2008 General Assembly authorized the **Land Conservation and Stewardship Task Force** to seek a larger sustained funding source to conserve natural lands. A report is due to the 2010 General Assembly. Based on the current availability of large blocks of land and reasonable land prices, there will never be a better time to act to preserve our best remaining high quality natural areas.

2. **Invasive Species** - Unquestionably, the invasion and competition from exotic (non-native) species is the **second most serious threat** to our native species. Invasive exotic species like **kudzu, musk thistle, multi-flora rose and zebra mussels**, unchecked by the natural controls that exist in their place of origin, spread rapidly and choke out native species. The U. S. Government Accounting Office has long recognized the enormous costs ranging in **billions of dollars in damages** to natural areas, agriculture, businesses and consumers caused by invasive species. Kentucky farmers fight musk thistle and Johnson grass, which are also a scourge for natural areas managers. Kudzu is the most widely recognized invasive exotic plant, but others like bush honeysuckle and winter creeper are rapidly changing the composition of forests in the Bluegrass area. Chinese yam and Asian bittersweet are invading much of southeastern Kentucky and moving into the rest of the state from there. Unfortunately, new invasive species continue to arrive in the United States, due in large measure to our global economy.

Historically, **American chestnut blight** and **Dutch elm disease** inflicted a devastating toll on these two very important trees, substantially changing the composition of our forests. More recent forest threats include the gypsy moth, dogwood anthracnose and butternut canker.

The **emerald ash borer** has devastated ash trees in northern states, including Ohio and Indiana, and is expected to soon infest Kentucky's forests.

The **hemlock wooly adelgid**, an insect pest that has decimated hemlock forests up and down the U.S. East Coast, was first found in Harlan County in March 2006. All nine of the state nature preserves in Bell, Harlan and Letcher counties, including **Blanton Forest**, the state's largest old growth forest are infested. This insect slowly kills hemlock trees which make up a significant portion of the forest canopy in the southeastern region of the state. **Kill rates** in other Appalachian states have been **about 80 percent**. Issues associated with hemlock die-off include water quality degradation, changes in forest composition including replacement by invasive tree species, increased forest fire danger, safety concerns for people using trails and campgrounds and for buildings near dead trees. Landscape vistas will be marred as the trees die over a course of five to ten years. Current treatments are expensive and not economically feasible for large expanses of forest.

3. Fire Exclusion - Loss of diversity, in both number of species and varieties of habitat, is also caused by the virtual elimination of **wildfire as a normal event** in natural environments where it **traditionally occurred**. Fire suppression is necessary to protect buildings and developed areas, but it has led to "non-natural" changes in ecosystems that evolved over eons with wildfire as a natural occurrence. For example, grasslands, prairies and rocky glades are invaded by woody shrubs and trees that historically were kept open by wildfires and large herds of grazing animals, like bison. Such areas now need restoration, through **controlled burns** carried out by trained professionals. Without periodic fire, the special fire-adapted communities of plants and their associated fauna will **cease to exist** as part of our landscape. Fire exclusion is also a cause in the **decline of oak reproduction**, which is changing the nature of the forest and reducing a hard mast food source that is critical for wildlife.

4. Climate Change - The newest, yet most serious threat is climate change. The director of the U.S. Fish and Wildlife Service (USFWS), H. Dale Hall posted on the USFWS Web site the following message, "The Intergovernmental Panel on Climate Change reports that... **warming of the climate system is unequivocal**. I have seen no substantial argument to dispute that

conclusion. The professionals of the USFWS have faced adversity in our history, from the severe droughts of the 1930s to the environmental effects of chemical pesticides highlighted in Rachel Carson's *Silent Spring*. The warming of the earth, however, could potentially have **more far-reaching impacts on wildlife and wildlife habitat than any challenge that has come before us.**"

The Intergovernmental Panel on Climate Change (IPCC), a scientific body created by the World Meteorological Organization and the United Nations issued a report in 2007 stating, "There is *medium confidence* that approximately **20 to 30 percent of plant and animal species** assessed so far are *likely* to be at **increased risk of extinction** if increases in global average temperature exceed 1.5 to 2.5 degrees C over 1980-1999 levels." *Climate Change 2007: Synthesis Report, Summary for Policy Makers*.

Climate change is unquestionably going to be a tremendous challenge. It is uncertain only in how soon and how severe it will be. Localized effects will be very difficult to predict, but one thing is clear – we will have to work on a **landscape level scale**. This means protecting larger areas and establishing **green corridors** to connect areas of high biodiversity to facilitate the movement of animals and plants as they are thrust into an unprecedented period of rapid change. Endemic and rare species are likely to be at greatest risk of extinction. The Land Conservation and Stewardship Task Force can help find the resources to make this level of response possible.

NATURAL HERITAGE PROGRAM

The Commission uses a methodology known as the natural heritage program to inventory and catalog information on rare plant and animal species and natural communities. This information is the foundation for making **science-based decisions** to **prioritize the protection** of the **most threatened natural areas and rare species**. The natural heritage program is used in all 50 states, most Canadian provinces and 12 South American countries. The Commission is a partner in the largest international biological data network in the world, and houses the most complete and accurate database of rare species and natural areas information in Kentucky.

The Commission has a staff of expert biologists to survey the state for rare species, including those federally listed as endangered or threatened. These field biologists include:

- ❖ **Two botanists** for rare plants, mosses and lichens (280 plants are listed as state rare by regulation and 57 are considered special concern);
- ❖ An **aquatic zoologist** who specializes in native fish and mussels (the most at-risk group of animals in the United States);
- ❖ An **invertebrate zoologist** for groups including insects, gastropods and numerous others, some of which are species of cave life unique to Kentucky.
- ❖ A **terrestrial zoologist** to survey **birds, mammals, reptiles and amphibians** – but this **position was lost** to retirement and an **agency cap reduction** in December 2008. The significance is that a great deal of expertise has been lost to track species that most people recognize as important – birds, bats, etc. This means **less protection** for these groups of species and less ability to facilitate their recovery or prevent further decline.

The biologists (botany, aquatics, and invertebrates) gather information from varied sources, confirm its accuracy and record it in the natural heritage database. An additional biologist was employed through the federally funded Landowner Incentive Program which began in 2003. This biologist **worked with private land owners** providing advice and cost share funding to **improve habitat for rare and endangered species on private lands**.

To find and document Kentucky's varied **plant communities**; i.e. different types of forest, wetlands, prairies, etc., the Commission employs a single **ecologist**. The Commission had a second ecologist, but he retired in December 2008 and the **position was lost** under the **agency's personnel cap reduction**. This was a great loss of knowledge on the current status of the natural areas of Kentucky, a state of over 25 million acres. The remaining ecologist continues a process called **Natural Areas Inventory (NAI)** to systematically find and evaluate the least disturbed natural areas of Kentucky, and guide the acquisition of the best of these for the **state nature preserves system**. The NAI process **has not yet completed a full assessment** of Kentucky's 120 counties, due to limited staff and resources. This work will slow further with a single person assigned to it. We estimate that only *one-half of one percent* (0.5 percent) of Kentucky remains in a natural condition comparable to what existed when the pioneers arrived. Locating such sites is akin to finding "a needle in the haystack". With land development progressing at a rate of 130 acres *per day*, this is **not a time to reduce this program**.

The natural heritage program also includes data management staff to maintain the information collected by the field biologists and ecologist. It provides all aspects of computer/technical support for the office. With assistance from the biologists, the data staff analyzes the heritage data to identify **priority conservation targets** through a process called the **scorecard report**. The data staff also provides Web site and Geographic Information Systems (GIS) support to all members of the Commission staff, facilitate environmental reviews and respond to **information requests from the public and consultants**. The development of new services such as delivering real-time data to other agencies, providing searchable data to the public via the web, and creating GIS products to facilitate planning has created many opportunities for the data staff to play key roles in fulfilling our mission.

Land Acquisition for Nature Preserves

The Commission has one land acquisition specialist to identify and locate property owners and manage the land purchase process. He also coordinates the Registered Natural Areas program. The primary source of funds to purchase nature preserves is **the Kentucky Heritage Land Conservation Fund (KHLCF)**. From January 2007 to December 2008, the Commission purchased properties totaling \$1,793,950. However our actual allotment of funds was only \$1,123,775. While this puts the Commission “in the red” we do not spend beyond our allotment. It is the nature of land acquisition that some projects will not be successful. Landowners decline our offers of fair market value or incurable title defects or boundary disputes are encountered.

The Commission has been successful in seeking out **additional funding sources to boost land acquisition**. For example, we received a Recovery Land Acquisition grant in the amount of **\$550,000** from the USFWS in 2008, enabling us to close on 571 acres to protect a population of Short’s goldenrod, one of Kentucky’s rarest plants. This land also provides an addition to Blue Licks Battlefield State Resort Park, doubling its size. The Commission and the Department of Parks maintain a strong partnership, with nine dedicated nature preserves on state parks.

The Commission also was selected for a grant of **\$461,000** from **American Electric Power** (locally Kentucky Power) under a settlement with the U.S. EPA. This was a competitive grant process that made \$10 million available to eight states. The Commission was fortunate to be awarded the grant, which will be used to purchase and restore over 330 acres at Crooked Creek

Barrens State Nature Preserve in Lewis County. This preserve protects a unique oak barrens community with prairie grasses such as big bluestem, five rare wildflower species, including scarlet Indian paintbrush and rare animal species.

The Commission is currently working to establish a **conservation easement** on approximately 2,500 acres in Meade County that harbors what is likely the **largest post oak woodland and limestone glade complex in the state**. It is also home to several rare plant and animal species. The easement negotiations are in the early stages, but appear promising. It would have cost the Commission between \$4 million and \$5 million to purchase this property at a recent auction, an amount we did not have. But if a conservation easement can be negotiated, we will have gained the protection of this property at a much lesser expense and it will remain in private ownership.

ACCOMPLISHMENTS IN THE 2007/2008 BIENNIUM

Private Lands – As **93 percent of the state is privately owned**, we estimate that 75 percent of Kentucky's rare plant populations occur on private lands. To promote conservation on private lands, the Commission entered into a partnership with the Kentucky Department of Fish and Wildlife Resources and The Nature Conservancy. Known as the **Landowner Incentive Program**, it was funded by the USFWS and allowed the Commission to hire one biologist for three years. A substantial amount of work was accomplished in cooperation with private landowners, but unfortunately the federal program has fallen victim to budget cuts.

During its last year, program accomplishments included protecting a **white-fringeless orchid population**, a **state endangered plant**; reduced an exotic pest plant threatening a population of **Braun's rock cress**, a **federal endangered** and **state threatened** plant; removed cedars invading a rocky glade, protecting **Kentucky gladecress**, a **state endangered** plant known only from **Jefferson and Bullitt** counties.

Fighting A New Invasive Species - The **hemlock wooly adelgid**, first found in Harlan County in March 2006, has infested all nine of the Commission's state nature preserves on Pine Mountain, including **Blanton Forest**, the state's largest old growth forest. It has been found in other areas in southeastern Kentucky and in the Red River Gorge. This insect slowly kills hemlock trees which make up a significant portion of the forest.

The Commission has been treating key areas at Bad Branch and Blanton Forest State Nature Preserves by either releasing predatory beetles that feed on the adelgid, or with an insecticide. These efforts are costly in staff time and materials and are restricted to groves of hemlocks which provide high quality habitat for rare species, or areas where visitor safety is a priority. The Commission and other state and federal agencies have joined with individuals and non-profit organizations to pool resources and prioritize areas to treat hemlocks. **Save Kentucky's Hemlocks** is an organization the Commission helped form in 2008 to coordinate efforts and inform the public of this new pest. The loss of hemlocks will be tragic in eastern areas of the state – damage caused by yet another invasive non-native species.

NatureServe Regional Representative - The Commission's director was re-elected in 2008 to a second three year term as a southeast representative on the U.S. Section Council of NatureServe. NatureServe is the parent organization for our natural heritage program for managing rare species and natural areas data. This gives Kentucky a stronger voice in this non-profit, international conservation organization.

Rare Species Discoveries - Over **95 percent** of Kentucky's animals are invertebrates, and over 15,000 insect species may exist in the state. Species accounts were updated for the **American burying beetle, federally listed endangered**, but now considered **extirpated** (no longer found) in Kentucky. The **first known** Kentucky populations of the **cobblestone tiger beetle**, a **globally imperiled** (G2) species and the **Appalachian tiger beetle**, a **globally vulnerable** (G3) species were discovered. Subsequent searches in museums revealed misidentified specimens of the Appalachian tiger beetle that had been overlooked for more than 100 years.

Natural Areas Registry - Two privately owned sites were added to the program: **Tatum Cave** in **Marion County** protects specific cave-adapted organisms and **Harberson's Station Cave** located in the **City of Perryville** is a historically significant cave which also supports two Kentucky endemic cave beetles, listed as **state threatened**.

Botany Activities - The botany program received funding from the USFWS and the National Park Service to:

- ❖ Focus on updating records for plants that are **nationally rare** but have not been federally-listed;
- ❖ Update the status of **federally listed plants** such as the endemic White-haired goldenrod and Virginia spirea; and
- ❖ Updated rare plant records (many that were more than 20 years old) for species found in **Cumberland Gap National Historic Park**.

The information gained from surveying Cumberland Gap Park indicates that several mountain species are more common than previously thought and we were able to downgrade their rarity listing. A less positive finding was the detection of a notable decline in **Canby's mountain lover**, a **globally imperiled** (G2) species, listed as **state threatened**. It is a small evergreen plant that has been affected by a disease found on cultivated plants (euonymus or wintercreeper).

Terrestrial Zoologist - Surveys for birds, mammals, reptiles and amphibians continued in close collaboration with field zoologists at the Kentucky Department of Fish and Wildlife Resources (KDFWR). Activities included:

- ❖ Surveys for hibernating bats, including the federally listed **Indiana bat**, **Rafinesque's big-eared bat** (state listed special concern), and multiple breeding birds including the federally listed **Interior Least tern**. The Least tern did not have a successful breeding season due to high water, the survey noting only about 10 young out of 300-400 birds.
- ❖ Observed a nesting of **Northern Shoveler ducks** in southern **Christian County**, the first seen since 1997.
- ❖ Updated **Breeding Bird Survey routes** (some were in areas that had become too developed), conducted multiple Breeding Bird surveys and created map products for the **U.S. Geological Survey**, under a small grant from KDFWR.
- ❖ Conducted **Gray bat** (federally listed threatened) emergence counts with USFWS at Goodrum and Mutters Caves State Nature Preserves. Approximately 33,000 bats were observed at each cave using thermal imaging and a computer program.

Ecology activities - The ecologists engaged in several new activities in 2007-2008. These included:

- ❖ Mapped the natural communities at **Clarks River National Wildlife Refuge**, which covers over 8,500 acres in Marshall, McCracken and Graves counties.
- ❖ Completed Natural Areas Inventory for **Muhlenberg, McLean and Carter** counties.
- ❖ Began inventorying rare **grasslands of central and western Kentucky** that provide habitat for declining grassland birds including the **Northern Bobwhite Quail**.
- ❖ Conducted a survey and provided community data on **rare bogs and seeps** of southeastern and western Kentucky under a NatureServe grant. This information will help classify and determine the **global rarity** of these communities.
- ❖ Continued work with NatureServe to cross-walk our **natural community classification** scheme to **national vegetation classifications**. The Commission is one of the earliest participants in the country on this project.
- ❖ Identified additional significant natural areas on **Pine Mountain**, including **Laurel Fork** in **Whitley County**.

Aquatic Activities - The aquatic zoologist engaged in several grant funded programs in addition to standard activities, including:

- ❖ Presented a poster at the **Freshwater Mollusk Conservation Society** conference in Little Rock, AR on freshwater snails, a group not well studied in Kentucky. Presented on rare aquatic species at the **Ohio River Watershed Summit** at Greenbo Lake State Park.
- ❖ Assisted KDFWR with **arrow darter** surveys in Lee County, **blackside dace** surveys in Knox County.
- ❖ Assisted with **mussel surveys** in the **Big South Fork, Green River** within **Mammoth Cave National Park** and relocated four federally listed species in **Slate Creek** (Bath/Fleming counties)
- ❖ Presented a paper on **Kinniconick Creek**, Lewis County. Mussel fauna show declines relative to an earlier 1984 study.

- ❖ Began a two year survey of **mussel fauna** in the **South Fork Kentucky River** watershed under a state wildlife grant from KDFWR. Sampling in a tributary, the **Redbird River**, Clay and Lee counties, indicates a diverse mussel fauna, but at low densities.
- ❖ Completed surveys for the **Blood River crayfish**, an **endemic** species found only in the Blood River watershed in Calloway County.

Land Conservation and Stewardship Task Force - The director was appointed to the task force, co-chaired by Representative Robin Webb and Senator Charlie Borders in 2007. The task force was charged with investigating the need for an **expanded conservation initiative**. The task force, with support from the Legislative Research Committee (LRC) staff, issued a thorough (LRC Research Memorandum, No. 502) report on the status of land conservation in Kentucky and a summary of **funding mechanisms** used around the country. The 2008 General Assembly reauthorized the task force and expanded its charge to include **recreation**. It is directed to complete a conservation and recreation plan and recommend revenue generating tools in advance of the 2010 legislative session.

Educating Kentuckians - The third prong of our mission statement directs the Commission to educate Kentuckians about the **value of biodiversity conservation** and the **importance of nature preserves**. The Commission has never had a staff position dedicated solely to this function, but has addressed this mission by spreading it among all staff. **Kentucky Educational Television (KET)** has been a **tremendous partner** and has helped to accomplish this mission by providing a broad public venue. In the last two years at least seven episodes have featured nature preserves and the rare species we work to protect as a part of the ***Kentucky Life*** programming.

The Commission also furthers its education mission through the KSNPC Web site: www.naturepreserves.ky.gov, which hosts the **Rare Plant Database**. The state nature preserve/natural areas **directory** allows visitors to print brochures on preserves that are open to the public. **Fact sheets** on trees, plants, insects and invasive exotic species are accessible, as well as our **scientific series of books** which are available for purchase. Another link identifies

opportunities to volunteer at a preserve and become a part of people making a difference.

Each quarter the *Naturally Kentucky* newsletter was distributed via e-mail to nearly 2,000 recipients who read about events such as the Short's Goldenrod Festival, species highlights and new preserves. However, the Commission will reduce the frequency of publication beginning in 2009 to twice a year, as an efficiency measure in response to budget cuts and CAP reductions.

Expert staff biologists offer **hikes** throughout the spring, summer and fall months. Varying in difficulty from easy to advanced, KSNPC hosts hikes in conjunction with events such as **Earth Day** and **Wildflower Weekend** at Natural Bridge. The Commission initiates hikes at strategic times when the optimum beauty of Kentucky's flora and fauna can be seen. KSNPC makes its presence known at numerous environmental functions through the use of a table top display.

The Commission entered into a **three year agreement with the KDFWR** in 2006, to enhance the scientific knowledge about distribution and status of wildlife **Species of Greatest Conservation Need** (SGCN) identified in the State Wildlife Action Plan (SWAP). This project builds upon the previous data sharing agreement with KDFWR and expands it to include data management objectives from Kentucky's SWAP.

Small Grants - The Commission has used the Sherri Evans Memorial Fund for varied projects. Most aquatic surveying techniques require at least two people to operate and with budgets tightening, we used these donated grant funds to hire a summer assistant for the aquatic zoologist, allowing this work to continue. **Aquatic surveys** in the Purchase region led to additions to the nature preserve system. Sherri Evans Memorial grants were also used to fund **dendrochronological research** on drought history at Blanton Forest and Three Ponds, compilation of a statewide **atlas of the flora** of Kentucky and **genetic research** at Bradley University to study the effects of isolation and small population size on rare plant survival, specifically **yellow gentian**.

Environmental Reviews - The specialized expertise of the Commission's biologists is utilized in the review of development proposals. Many of these proposals involve federal funding which requires a review for potential impacts to endangered and threatened species or high quality wildlife habitat. Commission staff regularly reviews proposals from state and federal agencies, such as the Kentucky Transportation Cabinet and the U.S Army Corps of Engineers.

This program was coordinated by the terrestrial zoologist who retired and cannot be replaced. This task will have to be added to another staff person.

Grants and Contract Work – These **provide agency receipts** to supplement the Commission’s budget. During 2007 and 2008, KSNPC undertook grant and contract work in addition to the regular demands of agency operations. As a point of reference, during 1997 and 1998, the Commission received \$567,030 via grants and contracts. The main sources of these were federal agencies. In comparison, the total was \$232,135 in 2007 and \$294,918 in 2008, approximately a **50 percent decline**. The reduction has virtually ended our ability to hire seasonal assistants to conduct biological field surveys. The contract work we are still able to obtain helps the budget, but diverts our biologists from their most pressing work with rare species conservation.

The following tables list projects undertaken by the Commission for 2007 and 2008:

Contracts by Agency and Project 2007	Amount
U.S. Fish and Wildlife Service, Endangered Species Act	\$ 30,722
Cooperative Agreement, U.S. Fish and Wildlife Service	\$ 7,344
KDFWR - Landowner Incentive Program	\$ 50,000
Ky. Dept. for Natural Resources	\$ 33,000
Division of Abandoned Mine Lands	\$ 5,000
KDFWR – SWG Data Agreement	\$ 75,000
Division of Water – Smith Tract Survey	\$ 7,500
KDFWR, Breeding Bird Survey	\$ 2,639
Heritage Land Board Spatial Data Development	\$ 2,000
Dept. of Military Affairs-Wendell Ford-Artemus site surveys	\$ 15,000
NatureServe, Data Review	\$ 3,930
Grants/Contracts total for 2007	\$ 232,135

Contracts by Agency and Project 2008	Amount
U.S. Fish and Wildlife Service, Endangered Species Act	\$ 33,908
Cooperative Agreement U.S. Fish and Wildlife Service, White haired goldenrod and Short's goldenrod "Showing Success"	\$ 49,600
KDFWR – Landowner Incentive Program	\$ 50,000
Ky. Dept. for Natural Resources	\$ 33,000
Division of Abandoned Mine Lands	\$ 5,000
Division of Water – Sinking Creek Survey	\$ 6,000
Dept of Parks – Biological inventory	\$ 4,000
KDFWR, Breeding Bird Survey	\$ 5,863
KDFWR – State Wildlife Grant Data Agreement	\$ 75,000
Heritage Land Board Spatial Data Development	\$ 3,000
U. S. Office of Surface Mining, research grant	\$ 29,547
Grants/Contracts total for 2008	\$ 294,918

Natural Heritage Program - Data Services

The Natural Heritage Program maintains the most complete and accurate database of information on rare species, natural communities, conservation sites and managed lands in Kentucky. The database is the result of 32 years of field research by Commission biologists, as well as the compilation of herbarium and natural history museum records and field records from other biologists. The Commission provides timely and accurate data through data request services and by agreement with other state and federal agencies and conservation organizations. It is invaluable for providing government and private requesters with **current, reliable data for environmental impact statements, biological analyses, research and long-term conservation planning**. We responded to 385 data requests during fiscal years 2007 and 2008.

Geographic Information Systems (GIS) provide the Commission with tools that aid us with everything from tracking species locations to creating preserve designs. Data are stored in real world coordinates that enable us to integrate data from other agencies and organizations. The **modeling and mapping capabilities of GIS** are particularly useful for monitoring plant and animal species and ecological communities and **assessing threats** to their existence.

The natural heritage data for Kentucky is maintained in the Biodiversity Tracking and Conservation System (BIOTICS); developed by NatureServe specifically for use in natural heritage programs. The natural heritage database currently contains an impressive **11,968 species**

and **ecological community** records, **748 site** records and **556 managed lands** records.

The use of BIOTICS allows our data to be more readily compiled with data from other members of the Natural Heritage Network throughout North America and portions of South America. This enables the ranking of species and community rareness on a **global level** (the G ranks). This data is shared with state and federal agencies for many purposes, such as **environmental review projects** for road development and surface mining permit applications.

Some of the **changes experienced by Kentucky's rare species** can be revealed by reviewing the natural heritage data for a **six year period** from November 2002 to November 2008. One tool used for monitoring species status is the SRANK – a rating of species rareness on a state level (i.e. Kentucky populations only). S1 is rarest, to S5 more common. SH – “historic” indicates the species has not been found in 20 years, SX – “extirpated” means the species is no longer found in the wild in Kentucky.

Based on the SRANK (S1-S5, SH, SX)

- **43 species declined** by becoming rarer, such as ranks changing from S2 to S1. Of these 43 species, 17 are now ranked historic and 5 as extirpated.
- **24 improved in rank**, becoming less rare, such as ranks changing from S1 to S2, including 15 previously ranked historic that were relocated.

Based on the SPROT (or state protection status: endangered -E, threatened-T, special concern-S, historic- H, or extirpated -X)

- **52 species declined** (for example, moved from threatened to endangered)
- **25 species improved** (such as moved from endangered to threatened)

GIS enables us to provide meaningful data and comments in a timely manner and provide accurate information in many different formats for data requests. The Commission continues to support and enhance custom GIS applications created for the **Department for Natural Resources, Division of Permits** for surface coal mine permit reviews and for the **Division of Abandoned Mine Lands** for reclamation project review. The applications provide a suite of tools to streamline the review process saving limited staff time and providing customized reports.

The Commission has also been involved in planning with a variety of conservation organizations in the last biennium. We have worked extensively with the **Kentucky Natural Lands Trust** in its conservation work on **Pine Mountain**. We provided natural heritage data to **The Nature Conservancy** to assist projects in its designated focus areas. Commission data was used to support a diverse array of projects such as biological assessments for numerous

infrastructure and development projects statewide, **land preservation efforts in Jefferson County**, identifying significant areas for wildlife species of greatest concern for the **state wildlife grants, best management practices on private forestland**, and conservation work in the **Green River and Obion Creek Watersheds**.

The Commission also used GIS to generate public educational posters and cartographic products, such as:

- ❖ ***Managed Areas Map*** – A map showing the location of federal, state and privately managed lands that retain natural qualities at various levels. The map has been used to create dialogue with other agencies aimed at establishing a comprehensive statewide data layer that is annually updated and is a key tool for assessing the status of land conservation in Kentucky.
- ❖ ***State Nature Preserve Trail Maps*** – Numerous hiking trail maps and information panels have been created and are used in preserve brochures, kiosks and on the web.
- ❖ ***Kentucky Then & Now Map*** – A map that compares current land cover to presettlement land cover, a data illustration created by the Commission.

NATURE AND WILDLIFE FUND

The Nature and Wildlife Fund allows **taxpayers** to **donate** to the **Commission** and the KDFWR a portion of their state income tax refund using the tax check-off boxes. Contributions are evenly divided between the Commission and KDFWR. The table below lists receipts, but the Revenue Cabinet may further adjust figures beyond tax year 2008.

Tax Year	Total Receipts
1996	\$109,792
1997	\$90,946
1998	\$76,732
1999	\$48,084
2000	\$38,188
2001	\$34,256
2002	\$37,676
2003	\$38,114
2004	\$35,837
2005	\$34,182
2006	\$34,204
2007	\$33,831
2008*	\$40,932
*receipts received thru November 2008	

Unfortunately, donations have declined over time, in part due to the addition of other tax check-off donation boxes. Appeals to the public are made through all possible media that offer free advertising. As specified in KRS 141.470, all funds from the Nature and Wildlife Fund are used by the Commission solely for **land acquisition** or the **maintenance of nature preserves**. The **decline** in funds from this source creates a need for **additional general funds** to keep pace with preserve management needs.

NATURE PRESERVES AND STEWARDSHIP

The Commission's Nature Preserves and Natural Areas Branch manages 59 preserves and easements containing 24,498. Ten preserves are jointly owned by the Commission with the KDFWR, The Nature Conservancy and by county governments. The Division of Water, Berea College and Murray State University each own one. Nine are established within Kentucky state parks, three are privately owned and three are owned by private non-profit foundations.

The nature preserves primary purpose is to protect rare species and the best examples of Kentucky's varied **natural habitats**. They provide opportunities for the public to experience unaltered natural lands. They are also a key resource for environmental education ranging from elementary school outings to graduate student research. **Stewarding** the nature preserve system requires **specialized expertise in ecosystem restoration** techniques such as prescribed burning and exotic plant control. Tasks range from researching the viability of various rare species populations to building hiking trails.

Nature preserves are often thought of as areas in an undisturbed natural state, best left to "Mother Nature." Unfortunately, there are too many human-caused threats to these high quality natural areas for a hands-off approach. Threats come in the form of unauthorized use of ATVs, timber theft, degradation of adjoining habitat, arson, etc. Even more serious is what is considered the second greatest threat to native biodiversity – the encroachment of non-native invasive species, which plague preserves and overwhelm the native species we are protecting without constant vigilance.

The Commission also holds **conservation easements on private properties** with significant populations of rare species. Currently, 116 acres have been protected by the Commission in this way. One conservation easement in Franklin County protects a population of the federally listed endangered plant Brauns' rockcress. Two sites protect maternity caves for the federally listed endangered Gray bat. An easement in Bullitt County protects the state endangered gladeceess. Conservation easements are a **less costly** method to protect a natural area than a full fee simple purchase.

One of our major acquisitions was a 571 acre tract, of which 81 acres was dedicated as an addition to **Short's Goldenrod State Nature Preserve in Fleming County**. The remaining 490 acres serve as an addition to **Blue Licks Battlefield State Resort Park**. Blue Licks State Park

will be able to develop hiking trails and primitive camping. This project provided a great partnering opportunity for two state agencies and the federal government.

Another **federally listed endangered species, Braun’s rockcress** was protected in 2007 with the acquisition of 65 acres in Franklin County using \$45,000 from a Recovery Land Acquisition grant from the **USFWS**. A new preserve was established in **Harlan County** in partnership with the Department of Parks, adding perpetual protection to over 600 acres on the south face of Pine Mountain adjacent to the Little Shepherd Trail. This preserve protects several rare species and its rugged beauty will enhance the experience for hikers along **Pine Mountain Trail**. An addition of over 300 acres to **Three Ponds State Nature Preserve** in **Hickman County** adds critical upstream protection to a wetland complex on the banks of the Mississippi River.

Nature Preserve Additions 2007-2008		
COUNTY	PRESERVE	ACRES
Fleming	Short's Goldenrod SNP	81
Franklin	Rockcress Hills SNP	65
Harlan	Blanton Forest SNP	34
	Pine Mountain Trail SPNP	609
Hickman	Obion Creek SNP	23
	Three Ponds SNP	312
TOTAL:		1124

Stewardship activities have steadily increased. All preserves require routine maintenance such as boundary posting and inspections. Projects involving habitat manipulation, exotic species control, trail construction or species monitoring are developed according to the purpose of each preserve. A number of preserves require **intensive management to restore** the integrity of natural communities **and ensure the survival of rare species.**

A less obvious threat to the nature preserve system comes from our **growing inability to maintain a sufficient level of stewardship.** We are fortunate to have a stable funding source for land acquisition, which earmarks 10 percent of the acquisition cost for management activities. While these funds defray some of the initial stewardship expenses, they do not enable the Commission to hire much needed additional staff to provide for **long term** management. The Commission needs a separate **infrastructure maintenance budget** to provide for interim

salaries, equipment and supplies.

Two regional preserve managers are stationed in satellite offices to reduce travel costs; one is in Bowling Green and the other is in Whitesburg, in Letcher County. Additionally, two stewardship assistants write management plans for each preserve, develop interpretive materials for visitor use and assist with the administrative and field duties of a statewide operation. The 59 nature preserves are scattered across the commonwealth from the banks of the Mississippi River to Pine Mountain on the Virginia border.

The nature preserve system continues to expand, but due to CAP reductions and budget cuts, we have **not been able to add new stewardship staff in over 10 years**. The constantly growing work load is becoming **overwhelming** and crucial tasks, like controlling exotics which displace rare species, go uncompleted. It is inefficient, at best, to remove invasive plants one year and be unable to return the next, allowing them to retake areas that had been cleared. There are 24,488 acres in the nature preserve system, but **only 6 full-time staff** to manage them. Without sufficient stewardship these high quality natural areas and the rare species they shelter are put at risk and the quality of the visitor experience will decline. To address our immediate needs, **two additional preserve managers** are sought to divide the oversized eastern and western regions. **Two additional full time stewardship assistants** and **4 seasonal/interim** workers are needed to rotate among the preserves, conducting prescribed burns, controlling exotics, building trails, marking boundaries and implementing other stewardship tasks.

The preserves in southeastern Kentucky will continue to require a significant amount of staff time and resources due to their size, remoteness and the lack of sufficient staff to patrol them effectively on a regular basis. We continue to have **encroachment problems and illegal trespass** on our seven Pine Mountain preserves and those on Stone, Cumberland and Brush Mountains as well. Damage from **illegal off-road vehicle use is increasing** as local communities seek to promote tourism opportunities for ATV enthusiasts. Areas set aside specifically for all-terrain vehicles are being developed, but more will be needed to keep pace with the interest. The assistance of **local law enforcement** will be necessary to restrict off-road vehicle users to areas appropriate for such heavy usage.

Additionally, infestations from the **hemlock woolly adelgid**, a non-native insect pest that was first found in Kentucky in 2006, are devastating the hemlock-dominated forests of

southeastern Kentucky. The preserves are beginning to show signs of the die-offs that will alter the landscape and damage habitat for numerous plants and animals dependent upon the cool, moist habitat provided by hemlocks. **Multi-agency efforts have begun** to assess public lands and treat trees in priority areas. The Commission has led the way with over 4,000 trees treated in **areas critical to visitor safety and rare species protection. Fundraising and coordination between private and public groups** has provided chemicals to treat hemlock trees and for staff time to apply the pesticide. The Commission has already spent \$19,000 in staff time and associated costs to conduct this critically important effort.

To respond to the increasing demands of preserve management, the Commission has entered into **partnerships** to help ensure that preserves are properly maintained. Custodial care of two preserves has been assigned to other organizations in accordance with statutory authority. We use Memoranda of Agreement with other public agencies and private organizations to assume partial responsibility for the costs of preserve maintenance and operation, when we can find willing partners. Agreements are in effect with the **Louisville Nature Center**, the **Jefferson County Board of Education** and the **Blackacre Conservancy**. The Commission continues to **recruit volunteers** as management demands have increased. Volunteers include scout troops, school groups and members of organizations such as the Sierra Club, the Kentucky Native Plant Society and preserve neighbors. Volunteers patrol trails and boundaries and add to our knowledge of the flora and fauna of selected preserves.

Major stewardship activities since January 2007 include:

- ❖ Acreage needing **prescribed burns** has increased each year. Communities at Crooked Creek, Jim Scudder, Raymond Athey Barrens and Eastview Barrens (SNPs) are becoming more open as woody stem densities decrease by using fire. Long-term goals are coming to fruition on these preserves with restoration of periodic burns.
- ❖ The Commission and the Kentucky Department of Parks co-hosted **two annual festivals** to heighten awareness of the federally endangered Short's goldenrod at Blue Licks State Park.
- ❖ **Exotic plant control** demands an increasing amount of time on state nature preserves. Kudzu control at Vernon-Douglas, Blanton Forest and Pine Mountain State Park Nature Preserve (SPNP) has virtually eliminated this pest plant from these preserves.

- ❖ Asian bittersweet control at James Bickford SNP and Pine Mountain SPNP has been very successful.
- ❖ **Hemlock woolly adelgid** control plans have been developed for our most significant preserves and over 4,000 trees were treated in 2008.
- ❖ A joint project with the Kentucky Department of Parks and the American Cave Conservation Association resulted in construction of gates to protect a **federally endangered bat roosting cave** at Natural Bridge State Park.
- ❖ The preserves branch manager continues her **leadership role in communicating the threat of exotic species in natural areas** to the public and to other agencies by participating in both state and regional exotic species organizations. **Weed Awareness Week** was proclaimed in February 2007 by the Governor and events were held in recognition. In December 2008, the branch manager helped plan and gave a presentation at an invasive species conference held in partnership with the University of Kentucky.
- ❖ **Tree ring research** at Floracliff SNP resulted in identifying a tree that dates to **1611**, making it one of the oldest known in the state. Other research projects on preserves have discovered a number of insects and plants that are considered rare or were previously unknown for Kentucky. Increased black bear usage of preserves along Pine Mountain attests to the importance of having high quality, undisturbed habitat available or species requiring large home ranges.

The following is a current list of dedicated state nature preserves:

COUNTY	PRESERVE	ACRES
Allen	Carpenter Cave CE	14
	Goodrum Cave SNP	51
Ballard	Axe Lake Swamp SNP	458
Barren	Brigadoon SNP	181
	Mutters Cave SNP	108
Bell	Pine Mountain SPNP	868
Boone	Boone County Cliffs SNP	75
	Dinsmore Woods SNP	107
Bullitt	Apple Valley Glades CE	23
Carter	Bat Cave SNP	128
	Cascade Caverns SNP	18
Christian	Bob Overton Cave CE	55
Clark	Lower Howards Creek SNP	228
Fayette	Floracliff SNP	287
Fleming	Short's Goldenrod SNP	210
Franklin	Feindel CE	15
	Julian Savanna SNP	42
	River Cliffs SNP	112
	Rockcress Hills SNP	65
	Tom Dorman SNP *	674
Graves	Terrapin Creek SNP	231
Greenup	Jesse Stuart SNP	714
	Eastview Barrens SNP	119
	Jim Scudder SNP	167
	Springhouse Barrens SNP	54
Harlan	Vernon-Douglas SNP	730
	Blanton Forest SNP	3124
	Hi Lewis SNP	303
	James E. Bickford SNP	348
	Martin's Fork SNA	1601
	Pine Mountain Trail SPNP	609
Harrison	Stone Mountain SNA	1025
	Quiet Trails SNP	165
	John James Audubon SPNP	339
Hickman	Obion Creek SNP	1601
	Three Ponds SNP	528
Jefferson	Beargrass Creek SNP	41
	Blackacre SNP	175
	Six Mile Island SNP	81
Jessamine	Tom Dorman SNP *	143
LaRue	Thompson Creek Glades SNP	169
Letcher	Bad Branch SNP	2639
	Kingdom Come SPNP	225
Lewis	Crooked Creek SNP	398

Lincoln	Bouteloua Barrens SNP	261
Livingston	Bissell Bluff SNA	563
	Newman's Bluff SNA	169
Logan	Logan County Glade SNP	42
	Raymond Athey Barrens SNP	156
McCracken	Metropolis Lake SNP	123
McCreary	Cumberland Falls SNP	1294
Muhlenberg	Cypress Creek SNP	98
Powell	Natural Bridge SPNP	1188
	Pilot Knob SNP	742
Pulaski	Francis Johnson Palk SNP	150
Robertson	Blue Licks SPNP	53
Rockcastle	John B. Stephenson SNP	123
Simpson	Flat Rock Glade SNP	99
Warren	Chaney Lake SNP	169
	Woodburn Glade SNP	20
TOTAL NUMBER OF COUNTIES		37
TOTAL NUMBER OF PRESERVES		59
TOTAL NUMBER OF ACRES		24,498

A directory is available upon request, or at www.naturepreserves.ky.gov.

Registered Natural Areas

The Kentucky Natural Areas Registry program enrolls eligible properties and assists owners to wisely steward their property. The registry is a non-regulatory program that recognizes landowners who agree to exercise good stewardship of ecologically significant property. The registry simply **encourages the preservation of important habitat** on private and public lands that are not available for acquisition, or may not qualify for dedication as a state nature preserve. Private individuals, government agencies, businesses or other corporate entities may register property they own. Those who have enrolled in the Natural Areas Registry have earned the appreciation of all citizens of the Commonwealth for their preservation of high quality natural lands. With 93 percent of the state in private ownership it is **critical to partner** with other landowners.

As of December 2008, a total of 53 landowners with interests in 62 different sites are enrolled in the Natural Areas Registry program. These agreements encompass 4900.5 acres in 43 counties. Since December 2007, two new sites covering 4 acres were enrolled in the program (indicated by an asterisk in the accompanying table).

REGISTERED NATURAL AREAS

NAME	COUNTY	ACRES	OWNERSHIP	SIGNIFICANCE
Rosson-Mayne Woods	Adair	230	Private	Mature Woods
Axe Lake	Ballard	385	Private	Wetland Community
Dinsmore Foundation	Boone	2	Private	Running Buffalo Clover
Central Kentucky Wildlife Refuge	Boyle	500	Private	Southern Knobs Forest
Harberson's Station Cave*	Boyle	2	City of Perryville	Old Well Cave Beetle, Hidden Cave Beetle
Rocky Run Glade	Bullitt	25	Private	Glades, Kentucky Gladecress
Jefferson County Sportsmen Club	Bullitt	12	Private	Kentucky Gladecress
Panther Creek Swamp	Calloway	128	TVA	Wetland, Virginia Bunchflower, Cluster Bluets
Back Slough/Laketon	Carlisle	43	Private	Wetland Community
Bradley Lewis Weddle	Casey	73	Private	Least Trillium
Pennyrile SF Clifty Creek	Christian	75	KDOF	Communities, Carolina Larkspur, Rare Insect
Seventy-six Falls	Clinton	1	USACE	Largeleaf Grass-of-Parnassus
Goodman/Clouser Sandstone Glade	Crittenden	15	Private	Glades
White's Cave	Edmonson	5	NPS	Rare Invertebrates
Raven Run	Fayette	274	Municipal	Kentucky River Palisades
Boone Creek	Fayette	260	Private	Undisturbed Woods, Running Buffalo Clover, Purple Oat, Walter's Violet
Ashland	Fayette	15	Private	Running Buffalo Clover
Camp Pleasant Woods	Franklin	131	Private	Braun's Rockcress
Strohmeiers Hill	Franklin	53	Private	Braun's Rockcress

NAME	COUNTY	ACRES	OWNERSHIP	SIGNIFICANCE
Tucker Creek	Franklin	30	Private	Braun's Rockcress
Far Side Farm	Franklin	27	Private	Braun's Rockcress
Leeland Valley	Franklin	26	Private	Braun's Rockcress
Rockcress Woods (Greene/Adams)	Franklin	15	Private	Braun's Rockcress
Rockcress Woods (Bryan)	Franklin	10	Private	Braun's Rockcress
Big Clifty Prairie	Grayson	2	KTC	Prairie Remnant
Knights Barrens	Hardin	400	Private	Barrens Community
Dowell	Hardin	20	Private	Silky Aster Great Plains Ladies' tresses Eggleston's Violet Rough Rattlesnake-Root, Purple Prairie Clover
Hardin Cedar Glade	Hardin	20	Private	Glade, Barrens Silky Aster
Big Woods	Hart	307	NPS	Old-growth Woods
Riders Mill Cave	Hart	260	Private	Gray Bat
Surrey Hills Woods	Jefferson	35	Private	Mature Forest
Shippingport Island Rookery	Jefferson	10	USACE	Heron Rookery
Jackson Pond	Larue	8	Private	Geologically Significant Pond
Bad Branch (Crawford)	Letcher	245	Private	Yellow Wild Indigo, Common Raven
Bad Branch (Gatton)	Letcher	215	Private	Yellow Wild Indigo
Poor Fork Wetland	Letcher	36	USFS	Eastern Red Damsel, Osmunda Borer Moth
Corley Farm	Livingston	100	Private	Price's Potato-bean
Log House Prairie	Logan	10	Private	Prairie Remnant
Katie White Barrens (Lockett)	Logan	15	Private	Glades/Barrens Communities

NAME	COUNTY	ACRES	OWNERSHIP	SIGNIFICANCE
Katie White Barrens (Webb)	Logan	15	Private	Glades/Barrens Communities
Cannon Springs Woods	Lyon	220	USACE	Recovering Woods
Jean's Glade	Madison	6	Private	Yellow Gentian
Tatum Cave*	Marion	2	Private	Tatum Cave Beetle
Bear Creek Rookery	Marshall	10	TVA	Heron Rookery
Bayou Creek Ridge	McCracken	150	TVA/KDFWR	Old-growth Woods
Metropolis Lake	McCracken	2	TVA	Natural Lake, Redspotted Sunfish
Floyd Woods	McLean	25	Private	Old-growth Woods
Kingsolver Goldenrod	Nicholas	5	Private	Short's Goldenrod
Blue Licks Highway	Nicholas, Robertson, Fleming	2	KTC	Short's Goldenrod
Abnee Goldenrod	Nicholas	1	Private	Short's Goldenrod
Morris Kentucky Ladyslipper	Owsley	5	Private	Southern Ladyslipper
Stillhouse Branch	Perry	105	USACE	Mature Forest
Blowing Cave	Pulaski	5	Private	Mountain Maple, Northern White Cedar, Gray Bat
Lake Cumberland (7 discrete sites)	Russell, Pulaski, Wayne	188	USACE	Mountain Lover, Spreading False Foxglove, Least Trillium
Sundew Meadow	Russell	12	Private	Sundew
Blue Knob	Taylor	30	Private	Glades, Barrens
Lake Barkley Rookery	Trigg	10	USACE	Heron Rookery
North Elk Fork Woods	Todd	41	Private	Old-growth Woods
South Elk Fork	Todd	37	Private	Old-growth Woods

NAME	COUNTY	ACRES	OWNERSHIP	SIGNIFICANCE
Woods				
Shanty Hollow Cave	Warren	1	Private	Gray Bat
Greenhill Woods	Warren	.5	Private	Least Trillium
Grove Powerline	Whitley	8	Utility	Pine Barren Remnant
TOTAL		4900.5		

Abbreviations: Kentucky Dept of Fish & Wildlife Resources (KDFWR), Kentucky Dept. of Forestry (KDOF), Kentucky Transportation Cabinet (KYTC), National Park Service (NPS), Tennessee Valley Authority (TVA), U.S. Army Corps of Engineers (USACE), U.S. Forest Service (USFS)

Conclusion

The Kentucky State Nature Preserves Commission, despite being a small agency, has created an impressive system of state nature preserves, safeguarding some of the most unique habitats in Kentucky. The **best resource** for information on the rare species and natural areas of the state is the Commission’s **Natural Heritage database**. It is relied upon by federal and state agencies, private consultants and Kentucky’s scientific community. Our biologists, ecologists and preserve stewardship staff are experts in their fields and well respected among their peers.

A great deal has been accomplished by the Commission in 32 years, but much work remains to be done. **24,488 acres have been forever protected as preserves**, but considering that Kentucky has over 25 million acres, it becomes apparent we need a greatly expanded preserve system to protect at least **one viable example** of each of Kentucky’s many unique natural communities. The commonwealth is blessed with a diversity of them – from lushly forested mountains in eastern Kentucky to bald cypress swamps in western Kentucky and the myriad transitional areas in between – tallgrass prairies, rocky glades, karst blue holes and caves, meandering rivers, bluegrass savannas and more. Other natural areas are held under public ownership, but the Commission’s nature preserve system is truly the best-protected **repository for Kentucky’s biological diversity**.

Nature Preserves and Stewardship: A very pressing need is providing a basic level of stewardship for the expanding nature preserves system. Very simply, more acres require more staff for field work, and more funds for infrastructure such as trails and parking areas. The Commission's stewardship branch is **woefully understaffed**. The geographic distribution of **only three regional managers** provides bare minimum coverage to prevent serious damage to the preserves. **Staff levels have not increased since 1998**, yet total acreage has *doubled* and the restoration demands of the nature preserve system increase at an even faster rate.

There are **only six** full-time permanent stewardship staff to care for a preserve system of over **24,000 acres**. We need at least **two additional permanent full-time staff** and **four seasonal interims** to keep up with the increased work of conducting prescribed burns and controlling the growing threat from invasive plants and exotic pests that expand their range each year. Additional staff is critical to the future of Kentucky's nature preserves. **We are losing ground in our ability to care for our preserves** and provide for the safety and education of visitors.

Natural Area Surveys: To forge ahead with our task of surveying the remaining **half of Kentucky that has yet to be inventoried** for high quality natural areas, we need to employ a **second ecologist** before the escalating rate of land conversion destroys more of these scarce remaining gems. Until December 2008 the Commission employed two full-time ecologists. The senior ecologist was lost to retirement, and with the budget cuts and an agency CAP reduction, he can not be replaced. **We cannot take another 20 years to complete the natural areas inventory** if we are to be successful at saving the best remaining natural areas.

Rare Species Surveys: The biologists' contract work (for generating agency receipts) is increasing, which means they cannot adequately revisit the highest priority rare species sites, **increasing the risk** to these species. It also harms the integrity of the natural heritage database.

For the database to remain a viable tool, the records for all tracked sites and species must be regularly updated. This provides the information needed to monitor the changes in Kentucky's biodiversity. **We are not able to perform this function without additional scientific staff**. It will also adversely impact other agencies, which rely on the Commission for this data.

Until December 2008 we employed a **single terrestrial zoologist to survey birds, mammals, reptiles and amphibians** statewide. This multifaceted zoologist was lost to retirement and due to budget cuts and the agency CAP reduction **the position can not be replaced**. This

position is greatly needed to continue working with these species groups as well enabling us to undertake biological inventory contracts to generate agency receipts. A **second invertebrate zoologist** is also needed, considering the thousands of species this category includes and because the Commission is the **only state agency working on these groups**.

We acutely need an additional **interim position to assist the aquatic zoologist**. Presently, assistance is gained by trading work time with other agencies to perform basic aquatic inventories, which is very difficult to manage. **Kentucky is critical to the protection of fish and freshwater mussels**, the most endangered group of organisms in the nation. We are **ranked third and fourth** respectively after only Alabama and Tennessee for the number of **freshwater fish and mussels** species found in the state. Considering Kentucky's importance to these highly endangered aquatic animals, we must provide an enhanced level of conservation effort.

The wide variety of plant and animal species and unique natural areas that make Kentucky the ecologically diverse state that it is are perhaps the **most precious endowment** we can leave to our children and their children. In 1976 the **General Assembly declared** that,

As a part of the continuing growth of the population and the economic development of the commonwealth, it is necessary and desirable that the overall impact on the natural ecology be considered when major alterations are proposed affecting same and that certain areas of unusual natural significance be set aside and preserved for the benefit of present and future generations. Such unique areas are valuable to the **vital human dependence upon fresh air, clean water and unspoiled natural areas**.

The pending threat of **climate change** is adding a **new urgency** to the mission. As observed by Director Hall of the USFWS, "The warming of the earth could potentially have **more far-reaching impacts on wildlife and wildlife habitat than any challenge that has come before us.**" We need to lay the ground work now for the best responsive measures we can devise to ensure the greatest survival of our critical biological resources. The maxim that an **ounce of prevention** is worth a pound of cure is particularly apropos in the costly field of environmental restoration.

It is the task of the Kentucky State Nature Preserves Commission to protect our natural heritage – but in order to be successful **we are in critical need of greater resources**.

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Appendix 1

Kentucky's Federally Listed Endangered and Threatened Species

This list includes only species that are not extinct or extirpated from the state.

SCIENTIFIC NAME	COMMON NAME	STATUS
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Vascular Plants

<i>Apios priceana</i>	Price's Potato-bean	LT
<i>Arabis perstellata</i>	Braun's Rockcress	LE
<i>Conradina verticillata</i>	Cumberland Rosemary	LT
<i>Minuartia cumberlandensis</i>	Cumberland Sandwort	LE
<i>Schwalbea americana</i>	Chaffseed	LE
<i>Solidago albopilosa</i>	White-haired Goldenrod	LT
<i>Solidago shortii</i>	Short's Goldenrod	LE
<i>Spiraea virginiana</i>	Virginia Spiraea	LT
<i>Trifolium stoloniferum</i>	Running Buffalo Clover	LE

Freshwater Mussels

<i>Alasmidonta atropurpurea</i>	Cumberland Elktoe	LE
<i>Cyprogenia stegaria</i>	Fanshell	LE
<i>Epioblasma brevidens</i>	Cumberlandian Combshell	LE
<i>Epioblasma capsaeformis</i>	Oyster Mussel	LE
<i>Epioblasma florentina walkeri</i>	Tan Riffleshell	LE
<i>Epioblasma obliquata obliquata</i>	Catspaw	LE
<i>Epioblasma torulosa rangiana</i>	Northern Riffleshell	LE
<i>Lampsilis abrupta</i>	Pink Mucket	LE
<i>Obovaria retusa</i>	Ring Pink	LE
<i>Pegias fabula</i>	Littlewing Pearlymussel	LE
<i>Plethobasus cooperianus</i>	Orangefoot Pimpleback	LE
<i>Pleurobema clava</i>	Clubshell	LE
<i>Pleurobema plenum</i>	Rough Pigtoe	LE
<i>Potamilus capax</i>	Fat Pocketbook	LE
<i>Villosa trabalis</i>	Cumberland Bean	LE

Crustaceans

<i>Palaemonias ganteri</i>	Mammoth Cave Shrimp	LE
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Fishes

<i>Etheostoma chienense</i>	Relict Darter	LE
<i>Etheostoma percnurum</i>	Duskytail Darter	LE
<i>Notropis albizonatus</i>	Palezone Shiner	LE
<i>Phoxinus cumberlandensis</i>	Blackside Dace	LT
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE

Breeding Birds

<i>Sternula antillarum athalassos</i>	Interior Least Tern	LE
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Mammals

<i>Corynorhinus townsendii virginianus</i>	Virginia Big-eared Bat	LE
<i>Myotis grisescens</i>	Gray Myotis	LE
<i>Myotis sodalis</i>	Indiana Bat	LE

Appendix 2

Plants and animals presumed extinct or extirpated from Kentucky, December 2008

	US Status ¹		US Status ¹
PLANTS			
Vascular Plants			
<i>Anemone canadensis</i>	--	<i>Epioblasma stewardsonii</i>	--
Canada Anemone		Cumberland Leafshell	
<i>Caltha palustris</i> var. <i>palustris</i>	--	<i>Epioblasma torulosa torulosa</i>	LE
Marsh Marigold		Tuberclad Blossom	
<i>Lysimachia fraseri</i>	SOMC	<i>Hemistena lata</i>	LE
Fraser's Loosestrife		Cracking Pearlymussel	
<i>Orbexilum stipulatum</i>	--	<i>Leptodea leptodon</i>	LE
Stipuled Scurf-pea		Scaleshell	
<i>Physostegia intermedia</i>	--	<i>Lexingtonia dolabelloides</i>	C
Slender Dragon-head		Slabside Pearlymussel	
<i>Polytaenia nuttallii</i>	--	<i>Plethobasus cicatricosus</i>	LE, XN
Prairie Parsley		White Wartyback	
		<i>Quadrula fragosa</i>	LE
		Winged Mapleleaf	
		<i>Quadrula tuberosa</i>	--
		Rough Rockshell	
		<i>Villosa fabalis</i>	C
		Rayed Bean	
ANIMALS			
Freshwater Mussels		Insects	
<i>Dromus dromas</i>	LE	<i>Nicrophorus americanus</i>	LE
Dromedary Pearlymussel		American Burying Beetle	
<i>Epioblasma arcaeformis</i>	--	<i>Pentagenia robusta</i>	--
Sugarspoon		Robust Pentagenian Burrowing Mayfly	
<i>Epioblasma biemarginata</i>	--		
Angled Riffleshell		Fishes	
<i>Epioblasma cincinnatiensis</i>	--	<i>Ammocrypta vivax</i>	--
Cincinnati riffleshell		Scaly Sand Darter	
<i>Epioblasma flexuosa</i>	--	<i>Crystallaria asprella</i>	SOMC
Leafshell		Crystal Darter	
<i>Epioblasma florentina florentina</i>	LE	<i>Erimystax x-punctatus</i>	--
Yellow Blossom		Gravel Chub	
<i>Epioblasma haysiana</i>	--	<i>Etheostoma microperca</i>	--
Acornshell		Least Darter	
<i>Epioblasma lewisii</i>	--	<i>Hemitremia flammea</i>	--
Forkshell		Flame Chub	
<i>Epioblasma obliquata perobliqua</i>	LE	<i>Ichthyomyzon gagei</i>	--
White Catspaw		Southern Brook Lamprey	
<i>Epioblasma personata</i>	--	<i>Moxostoma lacerum</i>	--
Round Combshell		Harelip Sucker	
<i>Epioblasma propinqua</i>	--	<i>Moxostoma valenciennesi</i>	SOMC
Tennessee Riffleshell		Greater Redhorse	
<i>Epioblasma sampsonii</i>	--	<i>Percina burtoni</i>	SOMC
Wabash Riffleshell		Blotchside Logperch	

Plants and animals presumed extinct or extirpated from Kentucky, December 2008

	US Status ¹	US Status ¹
Reptiles		
<i>Masticophis flagellum flagellum</i> Coachwhip	--	
Breeding Birds		
<i>Anhinga anhinga</i> Anhinga	--	
<i>Campephilus principalis</i> Ivory-billed Woodpecker	LE	
<i>Chlidonias niger</i> Black Tern	--	
<i>Conuropsis carolinensis</i> Carolina Parakeet	--	
<i>Ectopistes migratorius</i> Passenger Pigeon	--	
<i>Elanoides forficatus</i> Swallow-tailed Kite	--	
<i>Picoides borealis</i> Red-cockaded Woodpecker	LE	
<i>Tympanuchus cupido</i> Greater Prairie-chicken	--	
<i>Vermivora bachmanii</i> Bachman's Warbler	LE	
Non-Breeding Birds		
<i>Cygnus buccinator</i> Trumpeter Swan	--	
<i>Grus americana</i> Whooping Crane	LE	
Mammals		
<i>Bos bison</i> American Bison	--	
<i>Canis lupus</i> Gray Wolf	--	
<i>Canis rufus</i> Red Wolf	LE	
<i>Puma concolor cougar</i> Eastern Cougar	LE	

¹ The US Status provided here refers to the current status of the taxon under the U.S. Endangered Species Act (USES) as interpreted for its range within the state of Kentucky.

Appendix 3

Key to Status Categories

(US) Endangered Species Act of 1973

E: Endangered. "... any species ... in danger of extinction throughout all or a significant portion of its range ..." (USFWS 1992).

T: Threatened. "... any species ... likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (USFWS 1992).

C: Candidate. Species for which the USFWS has "... on file sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened" (USFWS 2004).

SOMC: Species Of Management Concern: Species the USFWS believes are in need of conservation management.

Extinct/Extirpated. A taxon for which habitat loss has been pervasive and/or concerted efforts by knowledgeable biologists to collect or observe specimens within appropriate habitat have failed.

Extinct: A taxon that no longer exists.

Extirpated: A taxon that no longer exists in the wild in Kentucky, but exists elsewhere in the wild.

For status category definitions see:

- United States Fish and Wildlife Service. 1992. Endangered Species Act of 1973 as amended through the 100th Congress. United States Government Printing Office, Washington, District of Columbia.
- United States Fish and Wildlife Service. 2004. Endangered and threatened wildlife and plants; review of species that are candidates or proposed for listing as endangered or threatened; annual notice of findings on resubmitted petitions; annual description of progress on listing actions; notice of review; proposed rule. Federal Register 69:24876-24904.

US statuses were taken from:

- United States Fish and Wildlife Service. 2000. Endangered and threatened wildlife and plants. Department of the Interior, Washington, DC.
- United States Fish and Wildlife Service. 2004. Endangered and threatened wildlife and plants; review of species that are candidates or proposed for listing as endangered or threatened; annual notice of findings on resubmitted petitions; annual description of progress on listing actions; notice of review; proposed rule. Federal Register 69:24876-24904.

Appendix 4

Kentucky State Nature Preserves Commission, 2006 State Listing Status of the Major Groups of Organisms in Kentucky

Number of Kentucky Species or Taxa ¹	Lichens	Mosses	Vascular Plants	Gastropods	Freshwater Mussels	Crustaceans	Insects	Fishes	Amphibians	Reptiles	Breeding Birds	Mammals
Native	Unknown	326	2030	ca. 281	123	Unknown	Unknown	241	59	65	351	77
Exotic	Unknown	0	570	ca. 13	4	Unknown	Unknown	24	0	1	6	4
KSNPC Endangered	1	11	149	4	27	9	16	32	2	2	18	4
KSNPC Threatened	0	5	110	8	5	7	36	11	1	8	13	3
KSNPC Special Concern	0	0	57	14	2	8	12	17	8	7	15	7
KSNPC Historical	0	0	62	0	0	0	15	0	0	0	2	0
Presumed Extinct or Extirpated	0	0	6	0	22	0	1	9	0	1	11	4
Federal Listing Candidate	0	0	2	0	5	0	7	1	0	0	0	0

Key to Status Categories

Endangered:

A taxon in danger of extirpation and/or extinction throughout all or a significant part of its range in Kentucky.

Threatened:

A taxon likely to become endangered within the foreseeable future throughout all or a significant part of its range in Kentucky.

Special Concern:

A taxon that should be monitored because (a) it exists in a limited geographic area, (b) it may become threatened or endangered due to modification or destruction of habitat, (c) certain characteristics or requirements make it especially vulnerable or declining but insufficient information exists for assignment to the threatened or endangered status categories.

Historical:

A taxon documented from Kentucky but not observed reliably since 1984.

Extirpated:

A taxon that no longer exists in the wild in Kentucky, but exists elsewhere in the wild.

Extinct:

A taxon that no longer exists.

¹ Totals include some distinctive subspecies and varieties for gastropods, freshwater mussels, and fishes but only species for lichens, mosses, vascular plants, amphibians, reptiles, breeding birds, and mammals. Totals do not include species recorded from Kentucky based on fossil specimens. Sources for totals of native taxa/species: mosses (Risk 1999; Snider et al. 1988); vascular plants (Jones 2004); gastropods, freshwater mussels, fishes, amphibians, reptiles, breeding birds, and mammals (KSNPC 2006).

Appendix 5



