Kentucky
Forest Action Plan

A Comprehensive Strategy
~ for ~
Forest Resource Sustainability

2020

Ten years have passed since our *2010 Kentucky Statewide Assessment of Forest Resources and Strategy* was completed, and while some things haven't changed, others things have changed drastically. Consider the ash tree and how it once prominently thrived throughout its geographic range. Ash trees have been decimated by the Emerald Ash Borer over the past decade, and have retreated to being hazardous snags dotting the landscape. Similarly, the hemlock wooly adelgid was just taking hold in our state, and the vast majority of our hemlocks were alive and healthy as they contributed greatly to the stream ecosystems of eastern Kentucky. Although certain areas of once large and dominate hemlocks have receded, the Division of Forestry has made great strides in salvaging the species in as many ecosystems as possible. What has continued to stay consistent for the past 10 years has been the strength of Kentucky's forest industry, which now annually contributes over 13 billion dollars of total economic impact throughout the Commonwealth. In addition, the Division of Forestry has remained a cornerstone for citizens of this state to rely upon to provide solid forest management and forest protection services for their forest resources, which ultimately benefits us all.

As a state, Kentucky has accomplished much during the last 10 years to more actively address the primary issues identified in the inaugural *2010 Kentucky Statewide Assessment of Forest Resources and Strategy*. As the next ten-year cycle was considered, it was determined that although some gains have been made, our primary issues remain similar. Many local, state, and federal agencies tasked with the oversight and management of our forestlands have seen their staffing and funding levels continue to decline. In addition, Kentucky's forest industry needs continued support now more than ever to ensure that they can continue to provide our great state with such a large economic impact.

Working collectively to manage and mitigate these primary issues will allow our citizens to continue to enjoy both the timber and non-timber benefits found throughout Kentucky's diverse forestland ecosystem. The **2020 Forest Action Plan** will provide the public, forest managers, and policy makers with detailed information about the status of Kentucky's forestlands. The information contained within this document will continue to help guide future decisions on the best course of actions necessary to ensure that Kentucky's renewable forest resource is available for future generations.

A special thanks to all of the Kentucky Division of Forestry employees, cooperating partners, forest landowners, and citizens that provided feedback while assisting with the revision of this publication. We look forward to continuing to provide guidance in the oversight of one of Kentucky's most cherished resources.

Brandon K. Howard

State Forester and Director
Kentucky Division of Forestry

Acronyms

ACCF	American Chestnut Cooperators' Foundation
ARRI	Appalachian Regional Reforestation Initiative
ATFS	American Tree Farm System®
BMP	Best Management Practice
CARS	Communities at Risk
CRP	Conservation Reserve Program
CREP	Conservation Reserve Enhancement Program
CWPP	Community Wildfire Protection Plan
DBNF	Daniel Boone National Forest
EAB	Emerald Ash Borer
EQIP	Environmental Quality Incentives Program
FIA	Forest Inventory and Analysis
FLA	Forest Legacy Area
FLP	Forest Legacy Program
FSC	Forest Stewardship Council
HLCF	Kentucky Heritage Land Conservation Fund
HWA	Hemlock Woolly Adelgid
HUC	Hydrologic Unit Code
KAR	Kentucky Administration Regulations
KDF	Kentucky Division of Forestry
KDFWR	Kentucky Department of Fish and Wildlife Resources
KDOW	Kentucky Division of Water
KFCA	Kentucky Forest Conservation Act
KFHTF	Kentucky Forest Health Task Force
KRS	Kentucky Revised Statute
KYTC	Kentucky Transportation Cabinet
MACED	Mountain Association for Community Economic Development
MGD	Million Gallons per Day
NRCS	Natural Resources Conservation Service
NTFP	Non-Timber Forest Products
OKNP	Office of Kentucky Nature Preserves
SFI	Sustainable Forestry Initiative®
SFM	Sustainable Forest Management
TACF	The American Chestnut Foundation
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
WMA	Wildlife Management Area
WRP	Wetlands Reserve Program
WUI	Wildland-Urban Interface

Glossary

Acre – An area of land measuring 43,560 square feet. A square 1-acre plot measures approximately 209 feet by 209 feet; a circular acre has a radius of 117.75 feet.
Aesthetics – Sensitivity to or appreciation of the forest's beauty through recognition of its unique and varied components, or beauty through an orderly appearance.
Afforestation – Planting seeds or trees to make a forest on land which has not been a forest recently, or which has never been a forest.
Agroforestry – An integrated approach of using the interactive benefits from combining trees and shrubs with crops and/or livestock. It combines agricultural and forestry technologies to create more diverse, productive, profitable, healthy and sustainable land use systems.
Attrition – A type of forest fragmentation in which the size of a forest tract gradually shrinks until it is removed entirely.
Best management practices (BMPs) – A method or combination of methods that is an effective and practical way (technologically and economically) to prevent or reduce pollution.
Biodiversity – The number and variety of species of plant and animal life within a region.
Biota – Classifications of plant or animal life.
Carbon sequestration – A geoengineering technique for the long-term storage of carbon dioxide or other forms of carbon.
Clear-cutting – A silviculture system where all trees in a specified area are harvested in one operation.
Crown – Technically, the point where the tree trunk meets the roots of a tree. Commonly, it refers to the leaves and branches in the uppermost part of the tree.
Detritus – Non-living particulate organic matter which is often decomposed.
Dissection – A type of fragmentation in which a tract of land is divided.
Down woody debris – Woody pieces of trees and shrubs that have been uprooted (no longer supporting growth) or severed from their root system, not self-supporting, and are lying on the ground.
Duff – The partially decomposed organic material of the forest floor beneath the litter of freshly fallen twigs, needles and leaves.
Ecosystem – An interacting system of living organisms, soil and climatic factors. Forests, wetlands, watersheds, ponds, prairies and communities are ecosystems.
Edge habitat – The margin where two or more different habitat types meet.
Environment – The complex surroundings of an item or area of interest, such as air, water, natural resources and their physical conditions (temperature and humidity).
Erosion – The wearing away of the land surface by water, wind, ice or other geologic agents and by such processes as gravitational creep.
Eutrophication – The process by which a body of water becomes enriched in dissolved nutrients (as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen.
Evapotranspiration – The combined evaporation of water into the atmosphere from water, soil, and plants.
Exotic – From another part of the world, non-native.
Extirpated – When a species ceases to exist in a given area, but still exists elsewhere.
Extinct – When a species ceases to exist anywhere.
Forest – Any area where trees and other woody vegetation are present.
Forest diversity – Different types of forest communities and numbers of species within forests.
Forest loss – The conversion of forestland to some other land use.
Forest structure – The complexity of the vertical and horizontal forest.

Forestland – Land at least 10% stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for non-forest use. The minimum area considered for classification is one acre. Forested strips must be at least 120 feet wide.
Fragmentation – The process, by which large continuous tracts of forestland are broken into smaller, disconnected units.
Hardwoods – Dicotyledonous trees, usually broadleaf and deciduous.
Harvesting – Felling, loading and transporting forest products, roundwood or logs.
Herbaceous – A non-woody type of plant which grows along the forest floor and has leaves and stems which die down at the end of the growing season to the soil level.
Herbicide – Any substance or mixture of substances intended to prevent the growth of or destroy terrestrial or aquatic weeds.
Hydrologic Unit Code – A series of numbers in a nested hierarchy that are used to identify a watershed size and location. The greater number of digits in the identification number, the smaller the area. The first two digits identify the region of the United States. An eight-digit hydrologic unit code typically identifies a basin and averages around 703 square miles. A 14-digit code is typically the smallest watershed identified.
Impervious – Surface that is not passable for water.
Invasive species – Species, which is often non-native, whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
Karst – An irregular limestone region with sinkholes, underground streams, and caverns.
Log – A primary forest product harvested in long, primarily 8-, 12-, and 16-foot lengths.
Mesophytic – Area where terrestrial plants that are adapted to neither dry nor wet environments grow.
Native species – A species that is a part of the original fauna or flora of the area in question.
Old-growth forest – A forest that contains trees that have attained great age and exhibits unique ecological features.
Organic matter – Plant and animal residue in the soil in various stages of decomposition.
Parcelization – The change in ownership patterns when larger forested tracts are divided into smaller parcels owned by several owners.
Perforation – A type of fragmentation in which openings are created inside forested tracts.
Physiographic – Physical geography.
Prescribed fire – Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions that allow the fire to be confined to a predetermined area. The application produces the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives.
Pulpwood – A roundwood product that will be reduced to individual wood fibers by chemical or mechanical means. The fibers are used to make a broad generic group of pulp products that includes paper products, as well as fiberboard, insulating board, and paperboard.
Regeneration – Process of replacing old trees with young through harvest or other means.
Riparian – Pertaining to the banks of a stream, river or pond.
Roundwood – Logs, bolts, or other round sections cut from trees for industrial manufacture or consumer uses.
Runoff – Portion of precipitation that flows from a drainage area or in open channels.
Saw-log – A roundwood product, usually 8 feet in length or longer, processed into a variety of sawn products such as lumber, cants, pallets, railroad ties, and timbers.
Sedimentation – A process that deposits soils, debris and other materials in bodies of water.
Seedtree cut – A silviculture practice in which most trees are removed and only a few trees are left behind to regenerate an even-aged stand.

Seedling – A small, young tree, less than three years old.
Shelterwood – A silviculture method that involves removing trees in a series of two or more cuttings so new seedlings can grow from the seed of older trees.
Silviculture – The art, science, and practice of caring for forests to accomplish desired objectives.
Softwood – Coniferous trees, usually evergreen, with leaves that are needles or scale like.
Soil – Unconsolidated mineral and organic material on the immediate surface of the earth, serving as a natural medium for the growth of plants.
Stand – A group of trees defined by human disturbance or by common species composition and structure.
Stream – A body of concentrated flowing water in a natural low area of land. 1. "Ephemeral stream" means a stream that flows only during and for short periods following precipitation and flows in low areas that may or may not have a well-defined channel. 2. "Intermittent stream" means a stream that flows only during wet periods of the year (30% to 90% of the time) and flows in a well-defined channel. 3. "Perennial stream" means a stream that flows throughout a majority of the year (greater than 90% of the time) and flows in a well-defined channel.
Sustainable forest management – Management in an attempt to attain balance between societies' increasing demands for forest products and benefits including non-consumptive uses, and the conservation and maintenance of forest health and diversity.
Thinning – Cutting or removing certain trees to allow those remaining to grow faster. Usually a commercial operation in younger stands that brings an income to the landowner while improving a forest.
Timber product output – The total volume of roundwood products from all sources plus the volume of byproducts recovered from mill residues (equals roundwood product drain).
Tree – Woody plant having one erect perennial stem or trunk at least three inches diameter at breast height, a more or less definitely formed crown of foliage, and a height of at least 13 feet (at maturity).
Veneer log – A roundwood product either rotary cut, sliced, stamped, or sawn into a variety of veneer products such as plywood, finished panels, veneer sheets, or sheathing.
Watershed – Area within which all runoff collects into a single stream or drainage system, exiting through a single mouth or outlet.
Wetland – An ecosystem that is inundated or saturated with water for long enough periods to produce hydric soils and support hydrophytic vegetation.
Wildland – A natural environment that has not been significantly modified by human activity.
Wildland-Urban Interface – area in which residences border or are intermixed with undeveloped wildland vegetation.
Wildfires – Uncontrolled fires occurring in forestland, brushland, and grassland.

Table of Contents

TABLES

FIGURES

INTRODUCTION

What is the value of Kentucky's forests?

Historically, the way in which Kentucky's forests have been valued has varied, as the attitudes of the people and the resource itself have changed. According to one estimate, 24,320,000 acres of the total 25,669,760 acres in Kentucky (almost 95%) were originally forested.[1] Figure 1 shows a geographic estimate of how Kentucky may have looked prior to European settlement. In the late 1700s, botanist F. A. Michaux showed his awe of Kentucky's forests by saying, "In more than a thousand leagues of the country over which I have traveled at different epochs in North America, I do not remember having seen one to compare with the latter (Kentucky) for vegetative strength of the forests."[2] Thomas Crittenden Cherry describes Kentucky forests of that same period as "dense forests crowded to the water's edge and reaching back in endless profusion…through valleys and uphill slopes…were matted many places with a tangled undergrowth of bushes, briars, and vines that made difficult, a passage even for the wild animals. Giant forests of oak and tulip, beech and ash, sycamore and linden, cedar and pine, and many branches spread a canopy through which the rays of the sun could scarcely penetrate, producing twilight effects even at high noon."[3] Such descriptions paint a picture of Kentucky's forests much different from what we see today, and the attitudes of the people towards forests have been shaped accordingly.

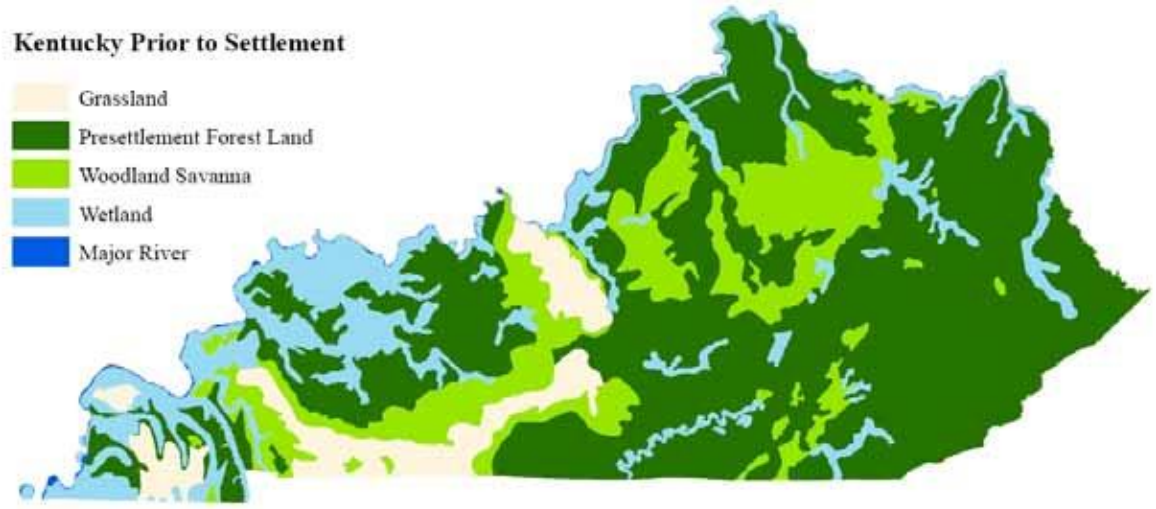


FIGURE 1 – KENTUCKY PRIOR TO SETTLEMENT

As shown in Figure 2, today's forests cover approximately 49% of Kentucky with the most common composition type being 76% oak-hickory forests.[4] Kentucky forests provide its citizens with a wide array of values including clean water, clean air, recreational opportunities, wood products, and habitats for a multitude of plants and animals. Sustaining these values for future generations requires a shared vision and coordination among many stakeholders including landowners, public and private agencies, forest industry, natural resource professionals, conservation organizations, community leaders, and policy makers. The intent of this Forest Action Plan is to document the condition of Kentucky's forests across all ownerships, and to develop strategies that will achieve long-term forest sustainability. Ownership of Kentucky's forests rests largely within the private sector, who own approximately 88% of its forestlands. The balance of Kentucky's forestland ownership is comprised of 9.5% federal government ownership, and 2.5% state/county government ownership.[4]

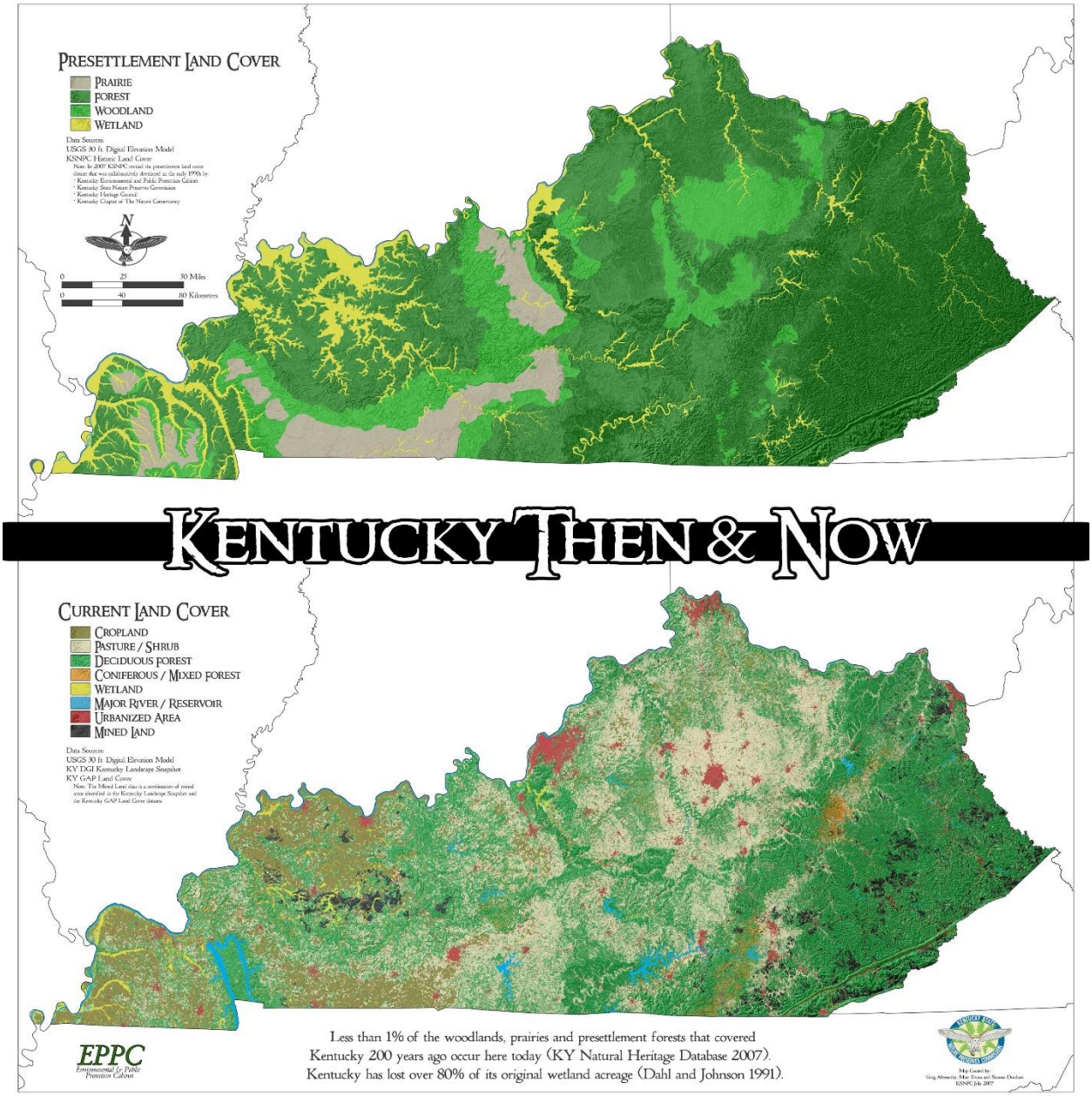


FIGURE 2 – KENTUCKY CURRENT LAND USE

History has shown us that there is no single, universally accepted statement regarding the value of Kentucky's forests. Attitudes towards forests have evolved throughout Kentucky's history and will continue to do so as cultural concerns, status of the resource, and desired end uses continue to fluctuate. Significant threats to forests, such as insects and diseases, catastrophic fire, and loss of forested landscapes to development, coupled with pressure placed on local economies by the increasingly global demand for forest products, point to the need for more progressive strategies for managing forest resources. Although these future concerns are difficult to predict, the decisions made today concerning Kentucky's forest resources, in most cases will not grow to maturity until decades later. In order to provide the most options for the future, the objective of the Kentucky Forest Action Plan is to continually assess the conditions,

trends, threats, and priorities of the state's forests in order to develop the best long and short-term strategies for managing Kentucky's valuable forest resources.

The Kentucky Division of Forestry (KDF) receives funding from the U.S. Forest Service for forestry-related programs such as Forest Health, Forest Stewardship, Urban and Community Forestry, and Wildland Fire Prevention and Suppression. Completing this ten-year update of Kentucky's Statewide Assessment of Forest Resources, along with the associated strategy, is a requirement of the 2018 Farm Bill, thus ensuring continued funding for these programs. In addition to meeting the federal requirements, the division is utilizing this process as an opportunity for the long-term evaluation and strategic planning of Kentucky's forests.

2020 Kentucky Forest Action Plan – Background

The Food, Conservation, and Energy Act of 2008 required that all states evaluate their forest resources and, in coordination with stakeholders, develop strategies for addressing forestland issues. At a minimum, the bill required that the assessment and strategy include:

- Conditions and trends of our forest resources
- Threats to our forestlands and resources in Kentucky consistent with national priorities (conserve, enhance and protect forests)
- Areas or regions of Kentucky that are a priority
- Any multi-state areas that are a regional priority (areas that are a priority to us and to a state or states that border us)
- Long-term strategies to address threats to our forest resources

In order to meet these requirements, the KDF chose to focus its *2010 Statewide Assessment of Forest Resources* on the most prominent forestland issues, while also generally addressing all aspects of forest resources. In order to identify the key issues, the KDF reviewed reports and minutes from summits, meetings, and conferences over the previous 15 years, and identified 10 issues that routinely emerged. The KDF organized these 10 issues into an online survey, in which participants from every region of Kentucky ranked the five most important issues. The issues with the highest ranking by the most respondents included:

1. Forest Health
2. Water Quality and Quantity
3. Forest Loss and Fragmentation
4. Forest Management
5. Funding

These five issues stood out as the most important among the other issues identified, which included public awareness, urban and community forestry, unlawful activity (*i.e.,* timber theft and trespass), wildland fire, forest economy, mountaintop removal, public access, prescribed fires, and other corollary issues such as renewable energy, carbon sequestration, and ecosystem services. Why were these issues considered so important? In the original assessment, *Part 1: Forestry Issues*, provided an overview of the then current status of the public benefits, resources, key conditions, threats, and opportunities associated with the top five forest issues in Kentucky. The following is a short summary for each of those top 2010 issues:

Issue 1: Forest Health

In the past several decades, the threats to Kentucky's forestlands have steadily increased. A vast majority

of the threats are the result of the introduction of diseases and non-native invasive plants and insects. The impacts of these pests along with air pollution, wildfires, increased public accessibility, little to no forest management, and poor logging practices continue to compromise Kentucky's forest productivity and quality. To address these threats, effective and economically feasible management strategies must be developed and implemented.

Issue 2: Water Quality and Quantity

Although multiple factors have an impact on water quality and quantity, Kentucky's forestlands play a key role in protecting and enhancing water quality. The beneficial chemical, physical, and biological effects of forests on the waters of Kentucky include filtration of pollutants, stabilizing the water supply, and providing habitat for aquatic ecosystems. Considering the high degree of impairment of the waters of Kentucky, particularly from sedimentation, effective forest management is critical to improving and maintaining this life-sustaining resource.

Issue 3: Forest Loss and Fragmentation

Since the 1940s, the amount of Kentucky's forestlands have seen steady increases. However, the period between 1988 and 2003 marked a loss in Kentucky's forestlands averaging 137 acres per day. Road building, agriculture, mining, and urban development have all contributed to the loss and fragmentation of Kentucky's forest resources. As more people are migrating from urban to rural environments, large tracts of land are being parceled for development, and forestland has gradually been subdivided into smaller tracts. This loss and fragmentation of our forests impacts their integrity, economic vitality, and biological diversity. Smaller forest properties are expensive to manage and do not provide the wildlife habitat, ecosystem services, or recreational opportunities of larger tracts.

Issue 4: Forest Management

Whether the desired use is wildlife habitat, timber production, improved water quality, carbon sequestration, recreation, or all of the aforementioned utilizations; proper forest management is necessary to achieve the desired use. Despite Kentucky's ranking amongst the top 10 states in the production of hardwood lumber, and hardwood and total wood exports[5], the vast majority of forest landowners do not manage their lands for timber production, or for any desired use. As private landowners own the majority of lands in Kentucky, additional strategies must be developed to encourage them to manage their forest resources in a responsible and sustainable manner.

Issue 5: Funding

The total economic importance of Kentucky's forests is nearly $13 billion annually, with one of the largest timber and non-timber forest product economies in the south. However, support for these industries is at risk as the USFS's State and Private Forestry Programs have faced large reductions in some programs. Even though the KDF has been forced to reduce its staffing, the needs of Kentucky's forests have not diminished. In fact, the needs of Kentucky's forests are increasing including assisting a growing number of private landowners with planning, monitoring, reducing timber theft, increasing educational efforts, and fighting one of the nation's highest rate of arson fires. Proper management does not come without a cost, and this has never been more so than it is today.

Part 2: Forest Priority Areas, of the original 2010 assessment builds on the information presented in Part 1 by defining priority forest areas within Kentucky and in multi-state areas in order to focus implementation efforts for each issue towards the areas in which the need is the greatest. These priority areas are described

along with the process by which these areas were selected.

In the final part of the original 2010 assessment, *Part 3: Forest Resource Strategy*, the short and long-term strategies to address the threats to Kentucky's forest resources were examined in relationship to the top five issues and the priority areas. Goals, objectives, and performance measures were developed for each issue in a manner consistent with the national priorities of conserving, protecting, and enhancing our forest resources.

2020 Kentucky Forest Action Plan – 2015 National Priorities Addendum

The 2015 National Priorities Addendum served as a record of some of the activities undertaken in Kentucky from June 1, 2010-September 30, 2015 to address the five issues discussed in detail in the 2010 Kentucky Statewide Assessment of Forest Resources and Strategy. The purpose of the National Priorities Section is to show the link between Kentucky's five critical issues and the three national priorities: Conserve and Manage Working Forest Landscapes for Multiple Values and Uses, Protect Forests from Threats, and Enhance Public Benefits from Trees and Forests. Almost all of the activities undertaken from June 1, 2010-September 30, 2015 are linked to more than one national priority. (Appendix 1)

2020 Kentucky Forest Action Plan – 2020 Public, Partner, and Stakeholder Survey

In developing Kentucky's 2020 Forest Action Plan, the Kentucky Division of Forestry again employed the use of an online survey to solicit input from its partners, stakeholders, and the public on a variety of forestry-related issues. The survey was critical in identifying concerns, threats, and opportunities across all ownership groups for Kentucky's forest resources. Respondents were first asked to rank the top five most important issues pertaining to Kentucky's forest resources, and then to rate their level of concern for each. As shown below, the issues and their ranking were identical to those listed in the *2010 Statewide Assessment of Forest Resources*. However, the 'level of concern' rating from respondents was new information.

1. Forest Health **(Very Concerned)**
2. Water Quality and Quantity **(Very Concerned)**
3. Forest Loss and Fragmentation **(Very Concerned)**
4. Forest Management **(Concerned)**
5. Funding **(Concerned)**

In addition to the aforementioned information gathered from the survey, respondents were asked to identify other important forestry-related issues pertaining to Kentucky's forest resources, and a wide-variety of responses were received. Some of the more common responses were:

- The environmental effects of fracking
- The need for more K-12 environmental education
- High-grading of timber stands
- The political dismissal / distorting of scientific research and information
- The need for greater public awareness of forest resource benefits

Input was sought from both the state stewardship coordinating committee, and individual members of the state technical committee, and all were contacted to participate and provide comments via an online survey. Along with the Army Corps of Engineers, foresters from Kentucky's military installations at Fort Knox and Fort Campbell were also included in the survey contact list.

The input collected from the survey has contributed to a Forest Action Plan that leads Kentucky into the next decade, spanning public and private forestlands, and urban and rural areas. The result of that effort will ultimately ensure that resources are being focused on important landscape areas with the greatest opportunity to address shared management priorities, and achieve meaningful outcomes.

2020 Kentucky Forest Action Plan – What's New Since 2010

- Determination of State Priority Areas via Numbers-Based Methodology (Analytic Hierarchy Process)
- Development of the Forest Stewardship Priority Areas
- Update of Strategies
- White Oak Initiative
- Partnering with the University of Kentucky and the USDA Forest Service Southern Research Station to form the Forest Health Research and Education Center (FHC)
- Inclusion of Urban Priority Areas

The Kentucky Division of Forestry will utilize the 2020 Forest Action Plan for determining staffing priorities, justifying funding for projects, and identifying opportunities for engaging partners and stakeholders. The strategies developed for each of the priority issues will provide direction for how the division utilizes U.S. Forest Service funding for forest health, forest stewardship, urban & community forestry, and fire. Annually, the division will submit work plans and grant proposals to the U.S. Forest Service. In addition, the division will look to the Forest Action Plan while allocating state funding and other resources to the priority issues and landscapes as appropriate.

On the horizon for the next decade, the Kentucky Division of Forestry will also continue to incorporate the implementation of the following new and emerging initiatives within this plan revision:

- "Shared Stewardship Across Landscapes"
- Good Neighbor Authority
- Newly codified Landscape Scale Restoration grant opportunities
- Keeping Forests as Forests
- Modernization of the Forest Stewardship Program
- The promotion of the importance of Kentucky's forests in maintaining high water quality for recreation and human consumption

PART 1: FORESTRY ISSUES
ISSUE 1: FOREST HEALTH

A. Introduction

The Kentucky Forest Health Task Force (KFHTF) has defined healthy forests as ones that "have the capacity for renewal, for recovery from a wide range of disturbances, and for retention of their ecological resiliency, while meeting societal needs for uses, products and services."[6] Under this definition, forest health and tree health are distinct. Individual dead, dying, decaying, insect-infested, or otherwise unhealthy trees can be components of a perfectly healthy forest depending upon the forest type, age, size, numbers, and distribution of dead and dying trees, as well as a variety of other factors.[7] Forest health is a broad term encompassing the evaluation of the entire forest ecosystem and its interactions, both in urban and rural forests.

Maintaining forest health is directly tied to proper forest management. Examples include reducing wild fires and managing the numerous invasive species that impact our forests. Unfortunately, continued globalization and rapid worldwide movement of goods have led to increases in the importation of exotic pathogens, plants, and insects. Many of the exotic species that are invasive can alter forest ecosystems and threaten the health of Kentucky's forests.[6] Because Kentucky native forests have little or no resistance to invaders, areas not managed will certainly be negatively impacted. Active management, as opposed to passive neglect, is important to improve and sustain forest health.[7] It is necessary to invest in Kentucky's forest health by conducting systematic aerial and ground surveys, detection surveys for invasive species, proper management, education of Kentucky's citizens, and restoration planting. Otherwise, the integrity of Kentucky's forests may be irreversibly altered.[6]

B. Public Benefits

Why is forest health important for Kentucky? Numerous public benefits from timber and non-timber related economies, recreational and aesthetic factors, air and water benefits, erosion control, and wildlife habitat are just a few of the many reasons why healthy forests are important to the citizens of Kentucky. For some of these benefits, an economic value can be quantified, but for many, the effect of healthy forests on the quality of life cannot be adequately priced.

1. Economics

While discussed more in depth in Issue 5, healthy forests provide more income to the economy than unhealthy forests. According to the 2017 Kentucky Forest Sector Economic Contribution Report, the total direct economic contribution of Kentucky's forests was equal to $8.5 billion, while the total economic contribution was equal to $13.5 billion with over 60,000 jobs in the forest sector.[8] These economic benefits show that healthy forests are important monetary assets for Kentucky forest landowners.

2. Recreation and Aesthetics

A healthy forest provides the quality aesthetics that the public expects from our forests. Many Kentucky landowners give aesthetics as a reason for owning forestland. Cities with increased greenspace and street trees, and neighborhoods with mature trees present a more desirable and welcoming façade than those lacking trees, or where the urban forests arise solely on abandoned, unmanaged areas. Whether in urban or rural areas, many landowners desire healthy trees rather than trees suffering from the effects of disease or insect infestation.

3. Clean Air and Water

Forests are an important factor in providing both clean air and water. Trees help improve air quality in numerous ways. In one year, an acre of mature trees can absorb an equivalent amount of carbon dioxide as a car driving 26,000 miles[9], as well as absorbing other pollutants including ozone, particulate matter, sulfur dioxide, nitrogen monoxide, and carbon monoxide. The health of the surrounding forestlands is vital to the integrity of water supply systems as well. Rainfall that passes through forests is cleaner than rainfall that drains from roads or disturbed lands, and groundwater that has passed through forested buffers is cleaner than water running directly off farm fields. Some of the forests' benefits to clean water include reducing pollution, erosion, and sedimentation. These benefits are examined more fully in Issue 2. Appropriate forest management improves the delivery of clean water and air, which in turn enhances the wellbeing of people and communities and reduces processing costs.[10]

4. Soil Erosion Control

Soil erosion can have a huge impact on the health of Kentucky's forests. Soil erosion is the wearing away of the land surface by running water, wind, ice or other geological agents.[11] Soil compaction, disturbance, and wildfires can lead to decreased tree growth, increased water runoff, and soil erosion. When eroded soil accumulates in stream systems, the habitat for many aquatic species is covered, reducing the stream water quality. The increased duff layer and deep root system of a healthy forest limits erosion from all sources.

5. Wildlife Habitat

Healthy forests yield quality wildlife habitat and provide both shelter and food supply. Forests that are too dense and unmanaged can create uncommon stress on the trees and make them more susceptible to insect and disease outbreaks that threaten wildlife. Invasive exotic species often provide poor food supplies and dominate the landscape such that the diversity of habitats is reduced. Wildfires (unplanned and uncontrolled fires) are also a threat to the health of the forest and subsequently to the forest wildlife species due to the destruction of habitat and food sources.

6. Carbon Sequestration

Trees are "sinks" for carbon dioxide (CO_2), the most abundant greenhouse gas emitted by human activities. Healthy, well-managed forests can enhance carbon storage in trees and soils, preserve existing tree and soil carbon, and reduce emissions of CO_2, methane (CH_4) and nitrous oxide (N_2O). The United States Environmental Protection Agency (USEPA) predicts that greenhouse gas concentrations in the atmosphere will continue to increase during the next century unless emissions are substantially decreased and sinks are increased from present levels.[12] Increased greenhouse gas concentrations are predicted to raise the Earth's average temperature, and influence precipitation and storm patterns. Such changes could also alter the ranges of flora and fauna species, and expand the spread of invasive exotic species.

C. Forest Resources

Healthy forests are important, but are Kentucky's forests healthy? This question is more difficult to answer because we have no absolute standard by which to judge. While threats to forest health such as pests, diseases, and wildfire impacts can be monitored, most indicators of forest health are somewhat subjective in nature.

1. Current and Historical Forest Area

We can say with confidence that Kentucky's forests are changing, and at times quite rapidly. Although 48%

of Kentucky is forested, nearly 680,000 acres of forest, primarily on private lands, were converted to other land uses in the last 15 years.[7] This land area is significant, representing an area nearly as large as the entire Daniel Boone National Forest, which is over 708,000 acres. While great losses have occurred over this time, the remaining timber is larger and the trees per acre increased such that for every one tree removed there are 1.5 trees growing.[11]

The Office of Kentucky Nature Preserves (OKNP) estimates that only 0.5% of Kentucky remains in a natural condition compared to what existed prior to European settlement.[13] Only about 5,000 acres of old-growth forest remain in Kentucky.[14] On federal lands, the Big Woods of Mammoth Cave National Park provides a remnant of upland tuliptree-oak-hickory forest, and the Rock Creek Research Natural Area in Laurel County displays a hemlock-mixed mesophytic forest. State-owned sites with significant old-growth forest include the 554 acre Lilley Cornett Woods, a registered national natural landmark in Letcher County, and the 2,350 acres in Blanton Forest in Harlan County, the largest stand of old-growth in the state. Another large stand (870 acres) of old-growth is found in the Letourneau Woods in the southwestern portion of the Obion Creek Wildlife Management Area (WMA) in Fulton County, Kentucky. Outside of these sites, the acreages of most other old-growth stands in Kentucky are relatively small with the Curtis Gates Lloyd WMA in Grant County amongst the largest.[14]

The forest regions of Kentucky have traditionally been divided into three regions associated with physiographic features: the Mixed Mesophytic Forest Region of the Appalachian Plateau, the Oak-Hickory Forest Region of the Interior Low Plateaus and eastern uplands of the Mississippi Embayment, and the small Southern Floodplain Forest Region along the Mississippi Bottoms of the Mississippi Embayment. The following discussion, from Jones 2005, gives a general overview of the dominant and common forest species in these regions.[14]

a. Mixed Mesophytic Forest Region

The Mixed Mesophytic Forest Region, which includes the eastern third of Kentucky, is characterized by a rich overstory dominated with deciduous tree species including American beech, cucumber magnolia, oaks (northern red and white), sugar maple, yellow-poplar, white ash, and the evergreen eastern hemlock. Big-leaf and umbrella magnolias are often present in the understory. White basswood and yellow buckeye serve as indicators of this forest type due to their consistent presence. The shrub and herbaceous layers are renowned for their diversity as one of the most biologically rich areas in the United States.

b. Oak-Hickory Forest Region

The Oak-Hickory Forest Region includes the greater part of Kentucky from the Appalachian Plateau in the east to the uplands of the Jackson Purchase. The forests are characterized by a wide number of overstory species, especially oaks (black, northern red, southern red, and white) and hickories (bitternut, pignut, and shagbark), but also American elm, American basswood, black cherry, black walnut, and white ash. Because of the limestone present in this area, species such as bur oak, chinkapin oak, Kentucky coffeetree, and rock elm are found in this forest type.

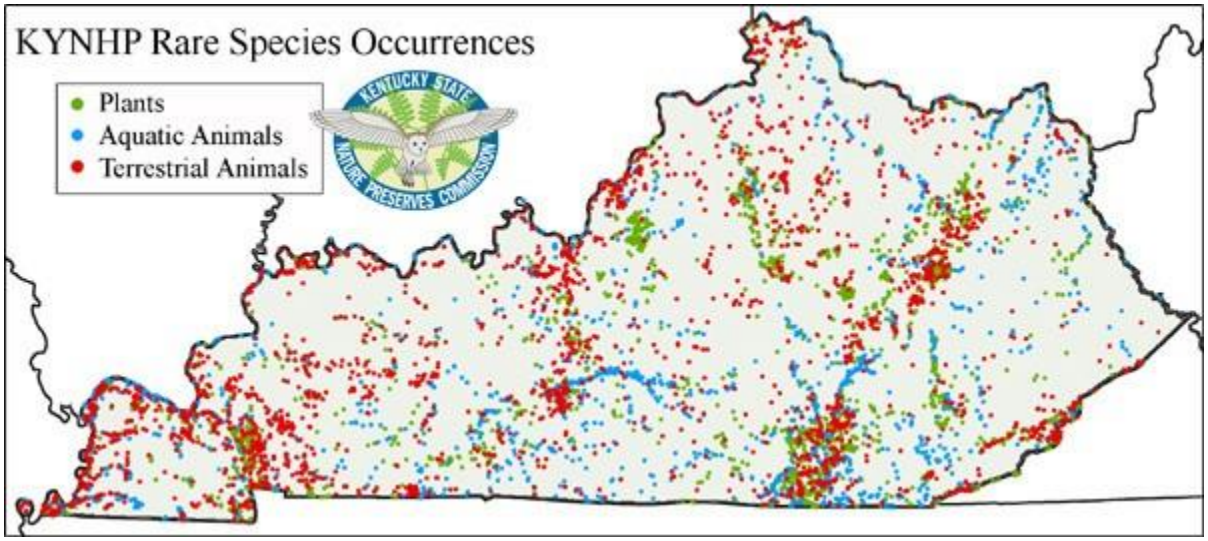
c. Southern Floodplain Forest Region

The Southern Floodplain Forest Region occupies only the small region along the floodplains of the Mississippi River and its tributaries. Amidst the few extensive forests in this region, bottomland hardwoods including oaks (cherrybark, overcup, swamp chestnut, and willow), sugarberry, and sweetgum are common. Scattered swamp communities dominated by bald cypress and water tupelo are found in this region.

Although the ranges and divisions of these forest regions in Kentucky have been similarly classified since the late 1940s and early 1950s, the relative species composition of these forests has changed over that time. In addition, the high number of exotic species and the shift in species dominance indicate that Kentucky's forest communities have changed and are continuing to change. The effect of these changes on forest health may be debatable. Other attributes of forests, such as the biodiversity, changes in the numbers of rare species, forest age, down woody material, and soil type can be used to evaluate the health of Kentucky's forests.

2. Biodiversity

The occurrences of rare or endangered biota of Kentucky are shown in Figure 3. The current Kentucky list of rare and extirpated biota names one lichen, 387 vascular plant and lesser taxa, and 347 animal taxa. The loss of so many species through Kentucky's history shows obvious impacts to all environments in Kentucky's past. However, the recent changes in these communities indicate that forest health, as well as the health of other habitats, continues to be impacted. Thirty-six natural communities are also considered to be rare. Of these communities, several are forest communities including the Appalachian pine-oak forest, Bluegrass mesophytic cane forest of the Inner Bluegrass, Cumberland Highlands forest of Black Mountain, and bald-cypress and bottomland hardwood swamps of the Mississippi Embayment area are examples.[14]



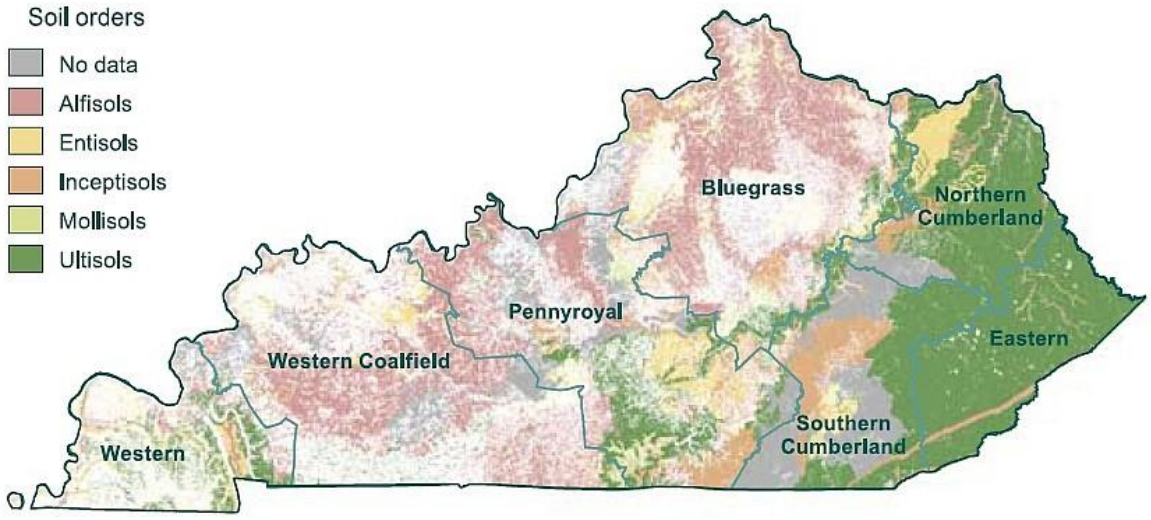
(Source: KSNPC)

FIGURE 3 – KENTUCKY NATURAL HERITAGE PROGRAM RARE SPECIES OCCURRENCES

3. Soils

Forest soils are substantial contributors to the forest ecosystem and forest health. The locations of soil types within Kentucky are shown in Figure 4. Soils in southern and eastern forests of Kentucky are primarily classified as Ultisols, which are often too nutrient poor to sustain agricultural production, but are well suited for forestry because of the leaf litter and woody detritus nutrient input. Alfisols are the primary soils in the northern and western forests of Kentucky. They are highly fertile, naturally forested soils that are often cultivated for agriculture, but also support broadleaf deciduous and mixed evergreen forests. The ability of the soil to hold nutrients tends to be greatest in the Bluegrass and Pennyroyal regions, and lowest in the

Western and Western Coalfield regions.[11] Limestone-derived soils tend to support more plant species and be more productive than sandstone soils.[15] Most soils in Kentucky are fairly compacted indicating that root growth and exchange of water and air may be difficult in much of the state.[11]



(Source: Turner et al., 2004)

FIGURE 4 – SOIL ORDERS OF KENTUCKY FORESTS

Because the forest ecosystem consists of aboveground and belowground components, the relationship between soil health and forest health is interactive. Trees depend on the soil for stability, nutrient cycling and intake, and water. Soils are composed of numerous components including organic and inorganic materials, microorganisms such as bacteria and fungi, insects, and burrowing animals, which are all affected by the growth of roots, organic inputs, and the transpiration of water associated with the surface vegetation. As such, changes to the forest surface have effects on the soil and the soils have long-term effects on the forests above. For instance, dormant season fires in hardwood forests have been found to affect root growth and microbial activity,[16] while severe fire can cause significant losses of soil nitrogen that affect subsequent forest growth.[17] Water content in non-forest soils is higher than in forest soils, as are stream flow and peak flows.[18] Thus, differences in soil moisture levels have been found to affect the rate of soil nitrogen cycling,[17] and thus the productivity of the site. Therefore, soil health is an important factor to consider when evaluating forest health.

D. Key Conditions

1. Native Species

One key condition to forest health is a prevalence of native species. The forest communities of Kentucky are complex ecosystems, with interdependent food webs involving trees, shrubs, and herbaceous plants as well as birds, insects, amphibians, reptiles, mammals, and other wildlife. Native communities of both plants and animals that have adapted to the local conditions, and have not been impacted by invasive exotic species, are more stable than impacted communities. Native species are also a natural heritage of the state.

Maintaining native forest species involves both encouraging the growth of native species and limiting the

growth of invasive species. The USFS defines an invasive species as one "that is non-native to the ecosystem under consideration, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health."[19] Many exotic (non-native) species have been deliberately introduced as erosion control (kudzu), agricultural crops (Johnson grass), and ornamental plants (purple loosestrife, burning bush) while others have been introduced accidentally (Emerald Ash Borer). Although most invasive species are exotic, native species, such as the southern pine beetle or the eastern tent caterpillar, can also be defined as invasive when they spread rapidly and cause extensive damage.

The Kentucky Terrestrial Nuisance Species Management Plan[20] lists some of the biological, socio- economic, and aesthetic impacts of invasive species as follows:

- Disruption of balanced food webs and nutrient cycling
- Degradation of native habitats
- Reduced abundance of native organisms due to increased competition
- Almost half of the federally threatened or endangered species in the U.S. are impacted by invasive species
- Decreased biodiversity
- Alteration of natural disturbance regimes
- Depletion of limited management resources
- Lost tourism dollars when recreational experiences such as hunting and hiking are no longer possible or pleasant
- Reduced property values resulting from invasive overgrowth and "smothering" of forests and opens spaces
- Decrease productivity and increase costs when terrestrial nuisance species interfere with commercial logging and agricultural operations
- Interference with transportation right-of-ways
- Annual damage and control costs of more than $138 billion in the U.S.
- Unquantifiable loss of aesthetic benefits

Thus, the preservation of native species and control of invasive species are key conditions for forest health.

2. Forest Structure and Diversity

When large areas are simplified into a few species, ages, or structural stages (as further discussed in Issue 3), disturbance has a greater likelihood of causing a widespread problem.

In relation to the importance of native species, structure and diversity are also key conditions for healthy forests. Structure refers to the complexity of the vertical and horizontal forest as well as the success of successional processes creating this complexity. Diversity refers to different types of forest communities as well as numbers of species within forests. Complexity of the forest structure with overstory, understory, shrub, and herbaceous cover similarly provides increased protection and food supplies to forest animals. A high diversity of tree species and communities allows for more abundant and diverse wildlife populations due to increased food sources and habitats. When the structure or diversity of a forest is decreased, it loses some of its function and, in many cases, could be considered less healthy.

Maintaining forest structure and diversity often requires management. The relationship between active management and healthy forests is strong, as detailed in Issue 4. For example, subdivision construction often

begins with the clearing of an entire site (removing all structure and diversity), and then creating ornamental landscapes with trees of similar ages and with a limited selection of species. However, by active planning to retain large portions of the existing vegetation, the impacts to the structure and diversity can be reduced. Active management in urban as well as rural environments must be practiced to retain or enhance the structure and diversity if we are to sustain healthy forests.

3. Fire Occurrence

Fire is a key condition because of its positive and negative effects on the forest resources of Kentucky. Beginning in the 1930s, fire suppression was initiated as a control measure to limit the negative impacts of fire on forest stands. Although seemingly necessary at the time, recent evidence suggests some negative effects on forest stand structure and species composition resulting from this policy of fire suppression.

Previous research is showing that the Daniel Boone National Forest is more crowded due to fire suppression.[21] In forests experiencing crowding in the midstory and understory, species that can tolerate more shade, such as red maples, can out compete oaks and other species that require more sun. Although the effects and benefits of fire are still under research, prescribed fire may be used to reduce forest density and promote the growth of shade intolerant species. It can also reduce the potential of catastrophic and destructive wildfires by lowering hazardous fuel loads, control invasive species, and reduce the incidence of disease and insect damage to forests. Prescribed fire releases nutrients, removes excess leaf litter that inhibits vegetative growth, releases seed for germination, and increases species diversity. According to the OKNP, "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... 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."[13]

Uncontrolled wildfires can be extremely dangerous and costly, both in terms of forest health and in terms of socioeconomic impacts. In regard to forest health, wildfires occurring in dry environments with large fuel sources, such as those created by the recent ice storms, can consume large quantities of timber resources and eliminate habitat for protected species. Kentucky has the highest rate of deliberately set wildland fires in the southern U.S. Data from the Kentucky Division of Forestry reported 12,422 wildland fires from 2008 to 2018 burned 371,782 acres of private land and cost over $8.5 million in suppression costs. From 2008 through 2018, arsonists started 65% of the 10,942 fires in Kentucky, predominantly in the eastern Kentucky area, as shown in Figure 5. The costs associated with arson fires are much greater than just dollars spent on suppression efforts. There are costs to the timber resource, the economy, the forest industry, the health of Kentucky citizens, and the personal costs to residents and firefighters dealing with the risks associated with smoke and fire.

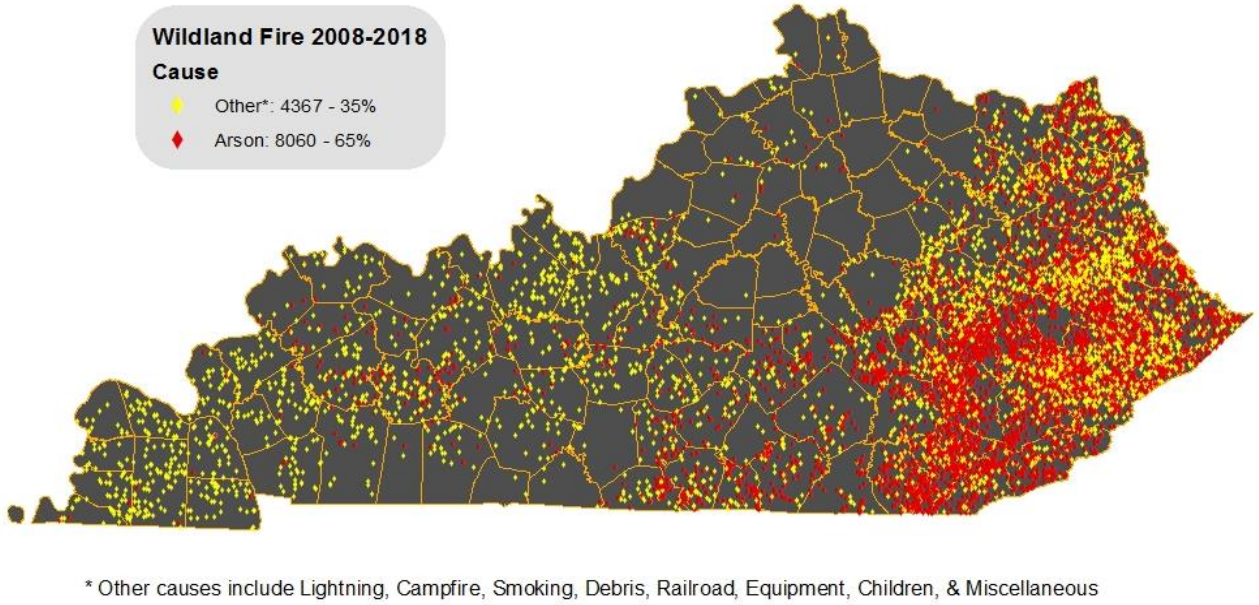


FIGURE 5 – WILDFIRE AND ARSON FIRES RESPONDED TO BY KDF FROM 2008-2018

Kentucky has identified communities at risk (CARs) in order to help ensure the protection of people and property from wildfires. The most recent CARs assessment was generated during the Southern Wildfire Risk Assessment. The Southern Wildfire Risk Assessment used population density and a wildfire susceptibility index to determine the CARs ratings of low, medium, high, and very high. The wildfire susceptibility index is calculated using the factors of probability of fire occurrence, estimated fire behavior, and fire suppression effectiveness. This assessment found over 800 CARs at high or very high risk from wildfires, all of which are located in the eastern part of the state. This is due to the wildfire susceptibility index factors of fire occurrence, estimated fire behavior, and fire suppression effectiveness.

E. Direct Threats

After forest loss, the most direct and extensive threats to Kentucky's forest health are invasive insects, plants, and diseases. However, a variety of factors can cause unhealthy forest conditions including weather pattern changes, pollution, landscaping practices, recreation, mismanagement, and coal mining. An overview of the ways in which these conditions impact forest health follows.

1. Threats from Insects, Plants, and Diseases

The threats to Kentucky's forests from invasive insects, plants, and diseases are numerous and threaten the health of forest communities regardless of the desired use. Although the complete list of invasive species threatening our forests is much longer than can be detailed in this document, some of the worst threats, summarized in Table 1, are discussed. Most of these threats are exotic with the exception of the native Southern Pine Beetle.

Because of the negative effects of invasive species, integrated pest management programs that set action thresholds, monitor and identify key pests, prevent invasion, and indicate control measures are important to

maintain forest health and limit the influence of these species. For further analysis of invasive species in Kentucky, readers should consult the Aquatic and Terrestrial Nuisance Species Management Plans produced by the KDFWR and the Kentucky Invasive Plant Council website (www.se-eppc.org/ky/).

TABLE 1 – PROMINENT THREATS FROM INSECTS, PLANTS, AND DISEASES

INSECTS	PLANTS	DISEASES
Emerald Ash Borer	Bush Honeysuckle	Laurel Wilt Disease
Hemlock Woolly Adelgid	Kudzu	Thousand Cankers Disease
Gypsy Moth	Japanese Honeysuckle	Sudden Oak Death
Southern Pine Beetle	Tree of Heaven	Beech Bark Disease
	Japanese Privet	
	Oriental Bittersweet	

a. Emerald Ash Borer

The Emerald Ash Borer (EAB), an invasive insect native to Asia, was discovered in southeast Michigan in 2002. Since then, it has destroyed tens of millions of ash trees in urban, rural, and forested settings across much of the eastern United States. EAB was first confirmed in Kentucky in 2009. An EAB quarantine of 20 counties located in the region between Louisville, Lexington, and northern Kentucky was initially established. In the following years, additional EAB infestations were found in nearby counties and the state quarantine was expanded accordingly. In April of 2014, the county quarantine system was rescinded and the entire state was added to the Animal and Plant Health Inspection Service (APHIS) list of regulated areas. EAB has since continued its spread through Kentucky and as of October 2019 has been confirmed in 92 counties (Figure 6).

Ash trees are prevalent throughout Kentucky and are an important part of Kentucky's forests. Because of the spread of EAB, many woodland owners and forest industries already are or will be impacted by this invasive insect. Based on current utilization rates for ash, it has been estimated that the EAB-induced ash disaster will cost landowners and forest industries nearly $100 million annually.[23]

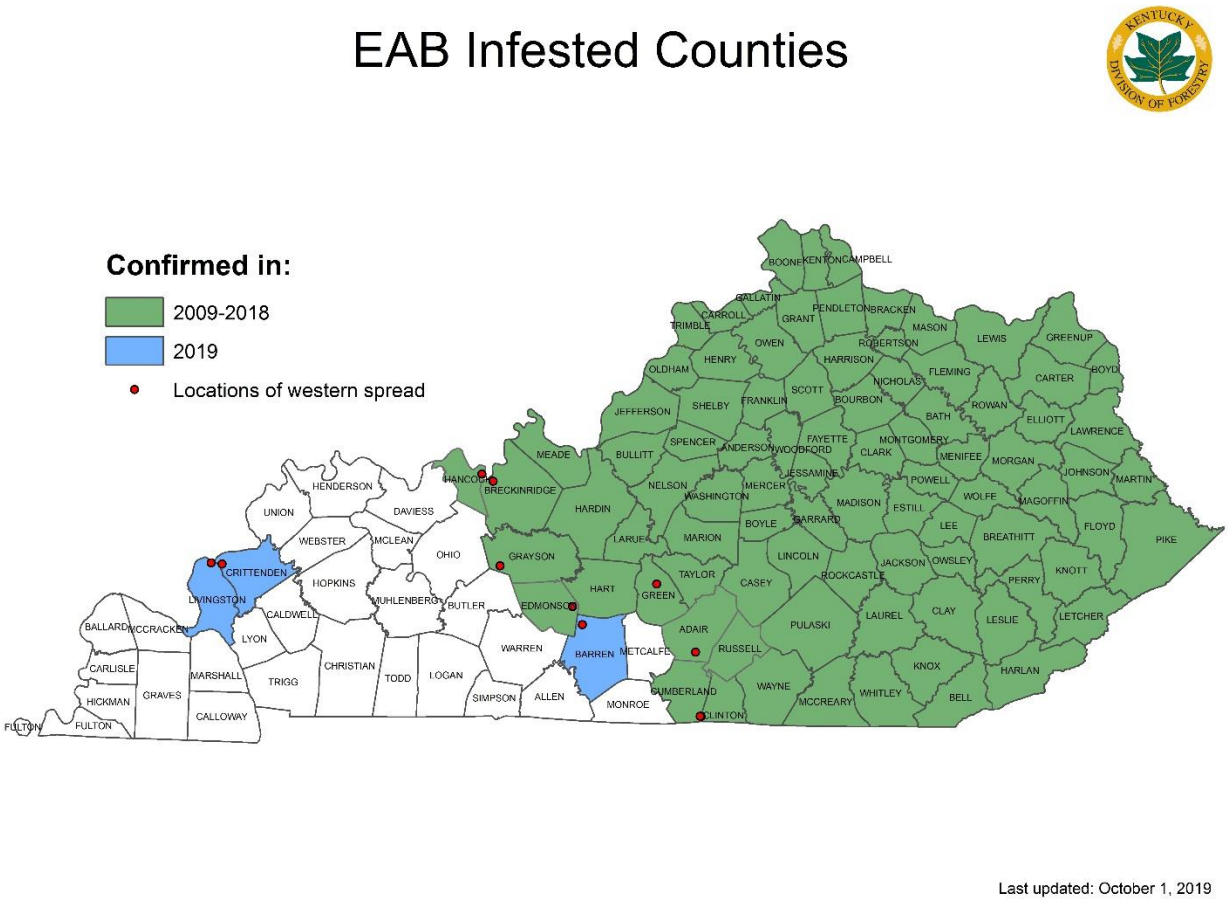


FIGURE 6 – EMERALD ASH BORER DISTRIBUTION AS OF OCTOBER 2019

b. Hemlock Woolly Adelgid

The hemlock woolly adelgid (HWA) is one of Kentucky's most significant ecological threats. It is a small, soft-bodied insect that feeds on hemlock trees by removing fluids from the needles. Originating in Japan, it was first reported in the eastern U.S. in 1951 near Richmond, Virginia.[24] In March 2006, the first occurrence in Kentucky was documented in Harlan County.[6] This insect attacks and kills eastern hemlocks of all ages, sizes, and conditions. The hallmark of a HWA infestation is the presence of white, cottony masses on the underside of hemlock needles. The insects conceal themselves and their eggs under these cottony masses. The potential loss of hemlocks in Kentucky will have major ecological and environmental effects on forest health including soil erosion, water quality, and biodiversity.[6]

The vast majority of Kentucky's hemlocks are found in the eastern third of the state and HWA can now be found in 31 of these counties (Figure 7). In response to the invasion of HWA, the Kentucky Division of Forestry began treating hemlocks on Division of Forestry managed properties in 2009 to conserve pockets of this ecologically significant tree. This work was developed into a treatment program in 2011 in which a dedicated crew was hired for treating hemlocks across additional state and federal properties. The program has continued its work into 2019, with over 160,000 treatments to date. Over 23,000 trees were treated in 2018 alone.

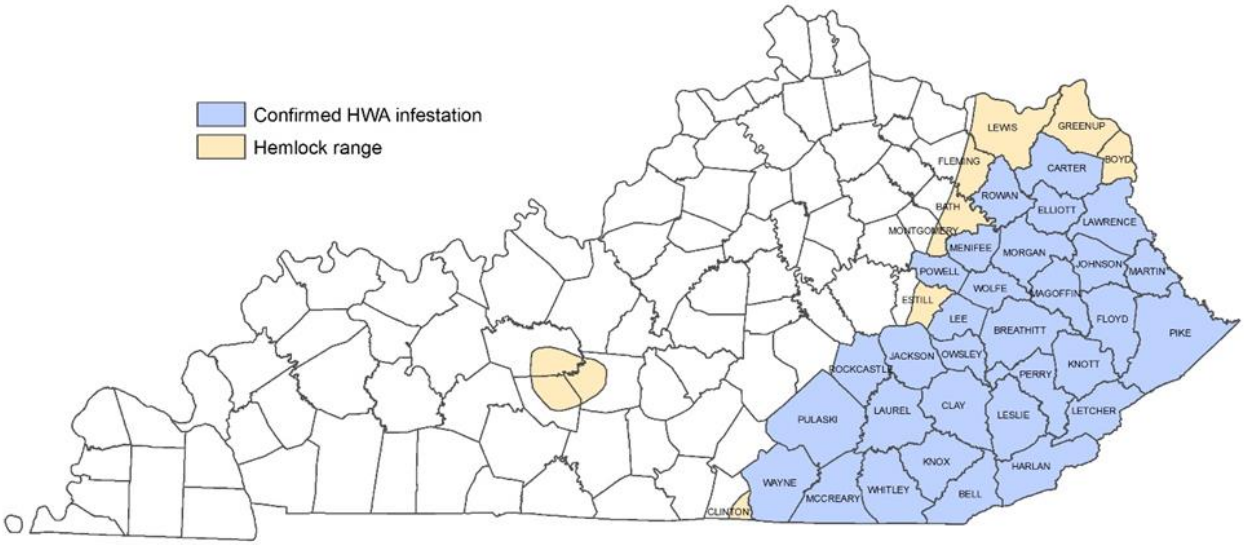


FIGURE 7 – HEMLOCK WOOLLY ADELGID DISTRIBUTION IN KENTUCKY

c. Bush Honeysuckle

Bush honeysuckle, an Asian native, was introduced to the U.S. in 1897. Escapes from ornamental plantings were recorded in the 1920s. Until the 1970s, the plant was promoted for conservation and wildlife uses.[25] It is currently widely distributed throughout Kentucky and the eastern U.S.

Although there are several species of bush honeysuckle, Amur honeysuckle is probably the single greatest invasive plant threat to forest biodiversity in Kentucky.[14] Amur honeysuckle is found throughout the northern, central, and western portions of the state, but is particularly abundant in the Bluegrass Region. It is known for its appeal as a backyard-landscaping shrub. It can establish itself practically anywhere the soil has been disturbed and is typically spread by birds. It competes especially well in canopy gaps and forestland edges and is moderately shade tolerant.[26] It rapidly colonizes these areas forming a dense shrub layer which can out-compete native species due to its prolonged growing season and suspected chemical inhibition of growth in other species.[27]

d. Kudzu

Kudzu is one of Kentucky's most important forest pests. It is a vine native to Japan and China and was first introduced to the U.S. in the late 1800s as an ornamental. It was later grown as a forage crop and promoted for erosion control. It is found throughout the southeastern U.S. and Kentucky. Kudzu can grow as much as a foot per day, and 60 feet per year, blanketing native vegetation with a thick mat that prevents photosynthesis. Its taproot can reach over six feet in length, seven inches in diameter, and weigh up to 400 pounds.[28] Additionally, kudzu is a host for soybean rust, which further increases the importance of proper control.

e. Japanese Honeysuckle

Japanese honeysuckle is also one of Kentucky's most important and widespread forest pests. It is a perennial, semi-evergreen twining vine native to Japan. It was brought to the U.S. in the early 1800s for use

as a groundcover and is still sold at garden centers. Because Japanese honeysuckle is shade tolerant, the plant can creep along the ground surface at moderate growth rates, but when forest openings occur, it aggressively expands, blocking sunlight with its thick growth and girdling trees as it tightly climbs up and over their canopies. It typically dominates disturbed habitats including roadsides, old fields, forest edges, bottomlands, and floodplains. Evidence also suggests that this species is allelopathic, inhibiting the growth of other plants.[29] Selective control of this species without damaging the native vegetation on which it grows is often impossible.

f. Laurel Wilt Disease

Laurel wilt is a new disease that was confirmed in Kentucky in 2019. The disease is known to impact certain members of the laurel family (Lauraceae). Decline related to this disease was first documented in Georgia in 2002 where large numbers of coastal Redbay trees began dying. Research has found that the fungus *Raffaellea lauricola* is responsible for tree death and that the non-native Redbay ambrosia beetle (*Xyleborus glabratus*) serves as the main vector for transmitting the disease to new trees.[30] As the Redbay ambrosia beetle bores into trees, it transmits the spores of the fungus to the tree. Over time, the fungus compromises the vascular system, which causes tree wilting and mortality.

Since 2002, laurel wilt has spread from coastal Georgia to 11 states across the southeastern US. In addition to range expansion, the disease has moved into a new host from the laurel family, sassafras. In 2019, pockets of sassafras decline were reported in southwestern Kentucky and lab tests soon confirmed laurel wilt in Christian, Todd and Logan counties (Figure 8). In Kentucky, sassafras will be the main species impacted but there is also potential for decline in spicebush, a common woodland shrub belonging to the laurel family. It can be expected that over time laurel wilt will move throughout the range of sassafras in Kentucky.

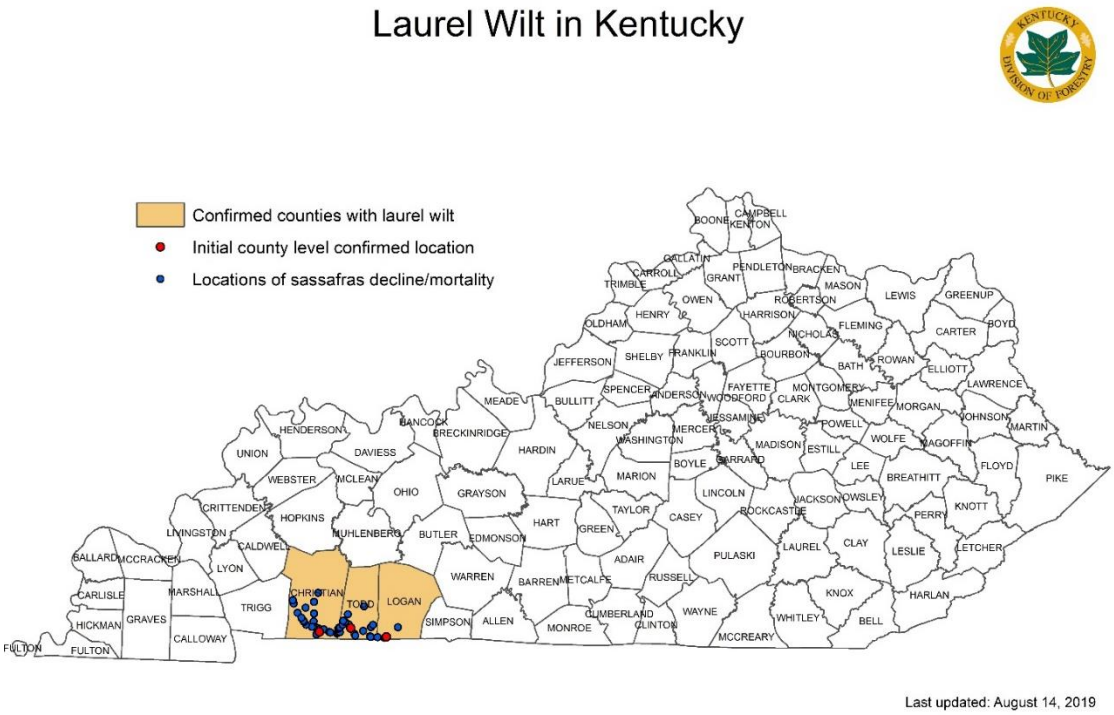


FIGURE 8 – LAUREL WILT DISTRIBUTION IN KENTUCKY

g. Other Important Invasive Threats

In addition to these most prominent threats, numerous other invasive plants, insects, and diseases could be listed. In the event gypsy moth becomes established in Kentucky, it will be a significant pest based on the destruction it has caused in other states. The Asian longhorned beetle is currently found in Ohio and would be a major pest of concern if it ever spread into Kentucky. Another pest not found in Kentucky but that is impacting nearby states is the spotted lanternfly. The native southern pine beetle caused so much damage during its last outbreak that much of the host material (pines) was killed. Another future outbreak would not be expected for another 12 to 17 years. Tree of heaven, Japanese privet, Japanese stiltgrass, and Oriental bittersweet are all expanding their ranges and impacts. Diseases such as sudden oak death, thousand cankers disease, and beech bark disease have caused significant losses outside of Kentucky and are potential threats.

2. Forest Loss and Fragmentation

Forest loss by conversion to another land use and forest fragmentation, the division of forest blocks into smaller units, are two distinct but interrelated phenomena. While both issues are discussed in depth in Issue 3, habitat loss is the most significant threat to forest health in Kentucky. Forest loss eliminates or decreases habitat for wildlife and protected species, and removes air and water quality benefits, as well as many other benefits provided by forests.

Fragmentation can lead to further forest loss or general decreases in forest health. The pressures of connecting or expanding human services by roadways, power lines, and pipelines often fragment rural forests. New corridors through forestlands are often less expensive than reconstructing existing corridors. While construction of such corridors results in the loss of some forest area, the impact is larger than just the loss. Soil is disturbed, the opportunity for the spread of invasives is increased, and wildlife populations are divided. Fragmentation creates smaller forest blocks with more edge habitat, which is beneficial to some wildlife such as deer, but it decreases habitat for populations of interior forest species.

3. Mismanagement of Forest

Forest health can suffer both from a lack of management as well as from active, but improper, management techniques. As discussed in Issue 4, the lack of management plans or activity amongst privately owned forests indicates potential for trees to become weak, unhealthy, and susceptible to disease and insect invasion. Further complicating the problem, the threat of invasive exotic species increases in these unmanaged or mismanaged forests. Even when the desired objective is preserving a forest ecosystem, such as an old-growth forest, active management including invasive species monitoring and resources inventories are important steps in planning how to preserve an area.

However, in an effort to protect, enhance, or restore forests, managers can unwittingly cause more problems than they solve. Mowers, construction equipment, and herbicide applicators can move invasive plant seeds to new locations. Similarly, other active management techniques such as timber harvesting in an area with extensive invasive plant coverage or seeding exotic invasive species for erosion control can lead to the decline of forests rather than their improvement.

4. Coal Mining

Because of the continuous need for low-cost electrical energy, coal mining is a valuable industry of Kentucky. However, surface mining removes the forests growing on top of the mountain to reach the coal supply. The forest impacts through loss and fragmentation are addressed through regulations, including the Surface

Mining Control and Reclamation Act of 1977, which requires reclamation of mining sites after projects have been completed. However, in the lag between the restoration and the impacts the forest benefits are lost. The reclaimed forests may also be of a different species composition and structure than the pre-mining forest. Invasive plants often invade reclaimed forests. The following data show the extent of the impact mining has had on Kentucky's forests:

- As of April 2019, approximately 4.3% of Kentucky's eastern coalfields (370,808 acres) are permitted for mining. In Kentucky's western coalfields, a total of 40,673 acres are permitted for mining (approximately 1.4%)[31]
- The mountaintop removal mining acreage currently permitted is 1% of the total surface mining area permitted in the Commonwealth[31]
- On average, mountaintop removal mining acreage represents less than 15% of the approved permit area on those mine sites where this type of reclamation is approved. Other types of mining such as area, contour, and finger-ridge removal mining, are also used on mountain areas[31]
- Since 2001 there have only been three mining permits approved with a mountaintop removal mining component, the last being issued in 2006[31]

5. Recreation/Aesthetics and Other Human Activities

Humans are perhaps the main contributor to the accelerated spread of insects, diseases, and invasive plant species, often due to recreational activities or aesthetic desires. Although recreation is an integral use of Kentucky's forests, frequent human travel into forests can increase the risk of carrying invasive plant seeds, insects such as gypsy moth, or other invasives into unaffected environments by their boats, trailers, cars, and trucks. For example, many are either unaware or ignore the firewood transportation restrictions, which allowed EAB to enter Kentucky. It is suspected that hikers or rock climbers may have brought HWA to the Red River Gorge. Airports and river ports can also be points of entry for invasive species, as was the case with the EAB. Kentuckians also continue to plant, likely without understanding the impacts, non- native invasive species on their landscapes. Many nurseries even encourage the planting of non-native invasive species (such as burning bush) because customers prefer their fall coloration and appearance.

Recreation activities can also negatively impact forests in other ways. All-terrain vehicle activities can cause erosion, injuries to trees, soil compaction, and the increased possibility of wildfires. Additionally, poorly designed hiking and horse trails can lead to significant erosion and impacts on plant and animal communities. Recreational activities must be available to the public, but with protective restrictions.

6. Weather and Climate Change

Weather plays a very important role in forest health. Weather events include but are not limited to drought, straight-line winds, ice and snow damage, and flooding. In the past decade, Kentucky's forests have suffered considerable damage from straight-line winds and ice damage. The damage has resulted in lost revenues from potential timber sales as well as losses in recreation and aesthetics. As a result of the damage, more light can reach the forest floor, which greatly increases the risk of non-native plants becoming established in the affected environments. Additionally, the stresses resulting from damage and drought can make trees more susceptible to insects and pathogens.

If changes in the temperature and weather patterns continue to increase, the hardiness zones and natural ranges of the plant species around the globe may also change. The direct impact of potential changing climate on Kentucky forests is unknown, but certain species may not be as suited under future conditions as they are now.

F. Opportunities

Although the threats to Kentucky's forest health are many and diverse, the opportunities for addressing these threats and improving health in other ways are also numerous and diverse. Bright spots such as the reintroduction of the American chestnut, the tree nurseries of Kentucky, heightened concern about wildfires, increased management use of prescribed fire, and the increased awareness of invasive exotic species indicate that much can be done to improve forest health.

1. Public Awareness

Outreach and education play a vital role in disseminating ecological and environmental information to landowners to promote sound forest management practices on private lands. Healthy forests play an important role in meeting the diverse cultural, recreational, and economic needs of the people of Kentucky. It is important to continue to develop innovative ways of communicating with the public and Kentucky's forest owners to help them to understand why and how insects, diseases, and non-native invasive plant species must be controlled. Otherwise, the current health and composition of Kentucky's forests could be irreversibly altered.

Increased public awareness of the effect of exotic invasive species may reduce the purchase of such species for ornamental planting, erosion control, or wildlife use. Also, public campaigns, such as stopping the spread of the EAB through firewood movement, may increase proactive management and prevention of the spread of invasive species.

The KDF promotes multiple educational programs for schools, clubs, and organizations including Project Learning Tree, Kentucky Envirothon, and forestry-related units of study for teachers, and Woodland Owner Short Courses for adults. They also produce issues of the *Kentucky Woodlands Magazine* and *Tree Line* newsletter each year. These programs, as well as others, are advancing the education of the Kentucky public on forestry-related issues. Other agencies, non-profits, and local governments have public awareness campaigns that may also be utilized to increase local awareness.

2. Reintroduction of American Chestnut

Chestnut blight has caused some of the most destructive impacts to Kentucky's forests. It is caused by the fungus *Cryphonectria parasitica*, which was introduced to the U.S. by imported Asian chestnut trees around 1900.[32] The American chestnut tree was an essential component of the forested ecosystems of the eastern U.S. At one time it composed 25% of the hardwood tree population within much of its range in the southern Appalachian Mountains, as shown in Figure 11.[33] However, by 1950, the American chestnut had been all but eliminated, with other hardwoods (such as oaks) filling the areas where chestnuts used to grow.[34] The blight destroyed 3.5 billion trees in the greatest devastation of a species in recorded history.[35] Indeed, the USDA has deemed the American chestnut to be functionally extinct due to the extent of the loss.[36] Yet many stakeholders are working together to bring this tree back to our forests.

Three approaches to restoring the American chestnut to a place of ecological and economic importance have been advanced. Thus far, this includes breeding, biotechnology, and biocontrol. The American Chestnut Cooperators' Foundation (ACCF) is continuing the traditional method of breeding with all-American wild-types from various regions of the tree's native range to achieve blight resistance.[37] Whereas, the American Chestnut Foundation (TACF) is crossbreeding Chinese chestnuts, which are less susceptible to blight, with American chestnuts in order to improve resistance. These hybridized chestnuts are essentially 94% American, displaying all the characteristics of native wild-types, with the addition of Chinese blight resistance.

Currently, there are 17 seed orchards being operated by various state chapters, and starting in 2011, the offspring of these hybrids were put to the test in restoration trials across the region.[36] Additional resistance selection is also underway for *Phytophthora cinnamomi*, the agent of ink disease, which has already stalled restoration efforts in some orchards. Meanwhile, the biotechnological aspects of the program are progressing rapidly. Researchers with the State University of New York's College of Environmental Science and Forestry have found a gene (OxO) within wheat that enhances resistance through an oxalate detoxifying enzyme. This enzyme attacks and eradicates oxalic acid, the primary weapon employed by the *Cryphonectria* fungus. Transgenic innovation has made it possible for the OxO gene to be successfully incorporated into American chestnuts resulting in trees that are 99.999% the same as their wild counterparts. These genetically modified trees are awaiting federal approval before they will be ready for public distribution within the next five years.[38] The final route to restoration is through biocontrol and it presents itself through hypovirulence. Several strains of the fungus contain viruses which hinder the fatal progression throughout the tree, thus giving the tree a better chance to defend itself. In the future, these specific strains will be unified into the overall plan for restoration.[36]

Here in our state the Kentucky Chapter of TACF has developed mother tree orchards in Adair, Carter, and Morgan counties. These mother tree orchards contain sprouts that were dug from the forest and transported to a location where they could be cared for and eventually pollinated and incorporated into TACF's breeding program. This will help to preserve more of the American chestnut's genetic diversity.[39] Two new orchards were established in April 2008: the Meades Landing Orchard in Oldham County and the Wilkins Orchard in Shelby County.[40] The first chestnut grove was started in 2011 at Jefferson Memorial Forest, and likewise in 2011, a breeding orchard located in Robinson Forest was the first to inoculate trees to check for blight resistance. We also have a regional seed orchard on EKU's campus in Madison County, which began in 2016, and has had approximately 3,000 seedlings planted to date.[36]

Successful planting efforts are also aiding in restoring the American chestnut. The Appalachian Regional Reforestation Initiative (ARRI), coal groups, and the KDF have worked with the TACF to incorporate American chestnut into surface mine reclamation efforts.[39, 40] In 2008, ARRI began a program to reforest mine lands with American chestnut. Thus far, Operation Springboard has been very successful, with 142,500 trees planted in 2009 and 2010,[41] and additional funding for 12 more sites on reclaimed mines, some of which are located in Kentucky.[42] It is hoped that similar restoration opportunities will continue to be pursued. The American chestnut is still considered endangered in Kentucky based on Kentucky Revised Statute (KRS) 146.610(2)(a) and 400 KAR 3:020, Section 3. Under KRS 149.015, the Energy and Environment Cabinet is required to establish and maintain propagation of blight resistant chestnut tree seedlings within their nurseries and provide them to landowners at reasonable cost.

It is the goal of all the stakeholders involved to insure the restoration and reforestation of the American chestnut. Yet, this achievement demands collaboration from all counterparts, and will most likely necessitate synergistic approaches. Moving forward, the program will have to take other factors into consideration. Indeed, other forest health concerns such as ambrosia beetles and gall wasps will need special attention.

3. Small Woodlot Management

Many of the small woodlot landowners have no interest in harvesting timber, instead preferring to maintain their property for the aesthetic value, recreation, and wildlife. Opportunities exist for small forests to provide big benefits to all Kentuckians. It is extremely difficult to manage these properties for long-term forest sustainability.

4. Certification

Forest certification, covered in more detail in Issue 4, is the process of determining if forest management on a given property meets predetermined environmental, economic, and social standards of good management. Certification may be accomplished through the Sustainable Forestry Initiative® (SFI), American Tree Farm System® (ATFS), or the Forest Stewardship Council (FSC). Forest certification provides credentials for the timber products grown on certified forests in an effort to promote sustainable forestry practices. There is a chain of custody process that tracks the products from the forest to the end use. Ensuring market access for certified wood products and improving forest management are the two primary objectives of forest certification. With these objectives, forest certification should provide forest owners a competitive advantage and increase wood profit over time. Certified forest products are produced in a manner that promotes environmental, social, and economic sustainability.

5. Kentucky Division of Forestry Tree Seedling Nurseries

Kentucky's interest in reforestation began in 1914 when the General Assembly authorized the establishment of two small nurseries, which were located in Frankfort and Louisville.

The KDF now operates two tree seedling nurseries:

- John P. Rhody Nursery located near Gilbertsville in western Kentucky, established in 1956
- Morgan County Nursery located near West Liberty in eastern Kentucky, established in 1960

The two nurseries grow 1-3 million seedlings annually, which are sold at a low cost to the public. Tree species include both hardwoods and pines.[43] The nurseries are important means of providing stock for afforestation and reforestation of the rural and urban areas of Kentucky.

6. Fire Prevention

As discussed earlier, Kentucky has the highest rate of deliberately set wildfires in the southern U.S.[22] Strong preventative measures must continue to be enforced to discourage arsonists. The Wildland Arson Task Force recommended a two-fold approach to address this problem. First, establish a KDF law enforcement unit with proper positions, funding, and equipment to investigate and prosecute wildland arson with increased penalties for offenders. Second, increase KDF funding to initiate a comprehensive media campaign, to increase the education of officials, and to develop a strong fire prevention program in Kentucky's schools.[22] Unfortunately, none of these recommendations were funded, so the arson problem persists. However in 2016, the KDF partnered with the KDFWR Law Enforcement Division to provide assistance to the KDF employees in investigating and prosecuting violations of burning laws. This partnership was made possible through a grant from the USFS.

Kentucky utilizes the Community Wildfire Protection Plan and Firewise USA® program to help reduce wildfire risk to communities. The Healthy Forests Restoration Act of 2003 authorized and defined CWPPs and outlined how they relate to hazardous fuel reduction funding. Key points for the CWPP include:

- Plans are generally developed by local government with assistance from state and federal agencies and other interested partners
- Plans can take a variety of forms and may be as simple or complex as necessary, based on the specific needs and desires of the local community or county

- Plans do not need to be complicated but they should effectively address local forest and range conditions, values-at-risk, and priorities for action

Currently, 50 Kentucky communities and six counties have developed CWPPs, as shown in Figure 9. Since 2016, seven plans have been developed for communities at high risk of wildfires, and six more plans are expected to be completed by 2020. Local, state, and federal officials, as appropriate, collaboratively developed these plans. They identify and prioritize areas for hazardous fuel reduction treatments to reduce the wildfire risk, and recommend measures that communities can take to reduce the ignitability of structures in the community. CWPPs incorporate an education component to prioritize teaching residents about wildfire safety, prevention, and risk reduction.

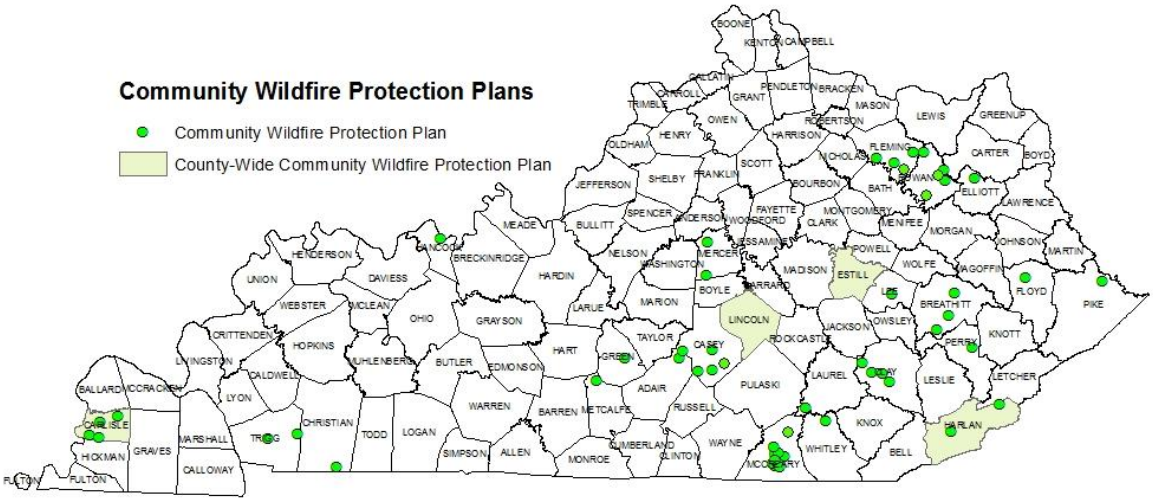


FIGURE 9 – KENTUCKY COMMUNITY WILDFIRE PROTECTION PLANS

Firewise USA® is a program that teaches residents actions they can accomplish to reduce wildfire risks around their homes and neighborhoods. It encourages communities to take ownership of their wildfire safety, and learn how to live harmoniously with wildfire. Developing a CWPP is a key component to Firewise USA® program in Kentucky. Kentucky currently has seven active Firewise Communities and nine that are working toward recognition.

Kentucky maintains a thriving Smokey Bear program, as well as other outreach activities, throughout the

year. Personnel across the state plan and participate in meetings, displays, classes, field days and other activities to educate the public about the many aspects of wildfire.

7. Prescribed Fire

Ongoing research throughout Kentucky is directed at understanding the potential for prescribed fire to accomplish forest management goals, which include the reduction in fire-sensitive species and tree density.[7] Fire has been an important disturbance agent in our forests for thousands of years, and is thought to have been integral to the long-term development of upland oak forests in the Appalachian region. Managers responsible for maintaining the diversity and productivity of southern Appalachian forests are increasingly turning to prescribed fire as a management tool in oak-dominated forests.[44]

The Kentucky Division of Forestry (KDF) began participating in prescribed fire implementation during the spring of 2018. From that season through June 30, 2019, the KDF has assisted the USFS Daniel Boone National Forest, Office of Kentucky Nature Preserves, The Nature Conservancy, U. S. Fish and Wildlife, and the Kentucky Department of Fish and Wildlife Resources in implementing approximately 15,000 acres of fuel reduction and ecological diversity. The KDF is making strides to improve the prescribed fire program within the agency by encouraging personnel to attend the Kentucky Certified Burn Boss trainings, participating in prescribed fires management, and participating on the Kentucky Prescribed Fire Council either as a member of the executive board, or on individual committees. With these strides, the agency will be able to offer prescribed fire to private landowners to help with hazardous fuel reduction in areas of wildland urban interface, and enhancing ecosystems in critical habitats.

ISSUE 2: WATER QUALITY AND QUANTITY

Kentucky's forests are a vital resource in and of themselves, but they also play a key role in protecting another major resource – water. Forests provide many helpful physical, chemical, and biological functions that improve the water quality and quantity in streams, rivers, lakes, and even the karst waterways of the Commonwealth. Some of these benefits include bank stabilization, reduction of sedimentation and undesirable nutrients, shading of streams, slowing the water velocity, and providing habitat and food for aquatic organisms.

These benefits are crucial considering the status of Kentucky's waterways. Of the streams and rivers assessed for the aquatic life designated use, statewide, 42% fully support this designated use, while 31% partially support and 27% do not support the aquatic life designated use, meaning 58% are impaired[45]. In particular, impacts to the forested area bordering streams and rivers, called the riparian zone, were frequently the direct or indirect cause of stream impairment. Thus, the loss of forested resources has significantly impacted Kentucky's streams.

Threats to forest resources are numerous, including human as well as natural factors. In order to maintain or increase the beneficial effects of forest resources upon the waters of Kentucky, the retention and expansion of forested areas in riparian zones, wetlands, around lake and pond borders, and above extensive karst features are key. Although threats to these resources remain, opportunities for conservation and restoration of these areas are increasing with increased public awareness of the beneficial influence of forests on water resources.

A. Current Status of Waters in Kentucky

Kentucky is home to over 90,000 miles of streams and rivers and over one million acres of lakes, ponds, and reservoirs, including some of the largest man-made lakes in the nation. These waterbodies provide boating, fishing, and swimming recreation, they support industry, generate energy, provide drinking water, and support numerous aquatic species. The karst groundwater system of Kentucky has formed the world's longest cave system at Mammoth Cave National Park. The waters of Kentucky are one of its most valuable resources.

Kentuckians withdraw water for a variety of uses. According to 2019 Division of Water data, 2,794 million gallons per day (MGD) of water are withdrawn from Kentucky waterways, with 1,863 MGD used for thermoelectric power, 553 MGD for public water supply, and 192 MGD for industrial use. A large number of Kentuckians also withdraw from the abundant groundwater present in the karst topography underlying 55% of Kentucky's lands. Groundwater is used for drinking water by an estimated 400,000 private landowners and over 1.5 million Kentuckians through public groundwater systems.

The waters of Kentucky are also home to a vast, interconnected web of life including mayflies and crayfish, trout, darters, bass, river otter, kingfishers, red-eared sliders, and mudpuppies. Of the 49 federally threatened and endangered species in Kentucky, 37 are strictly aquatic. Some of these species are found nowhere else in the world. The aquatic wildlife is important biologically, but it is also important economically. The total hunting and fishing economy of Kentucky contributes billions of dollars. Canoeing, kayaking, boating, swimming, and other recreational uses of Kentucky's lakes and rivers also bring important economic revenues to the state.

Both water quality and quantity have become a concern in many areas throughout Kentucky. Although only 14% of Kentucky's 90,961 miles of streams and rivers had been assessed by the Division of Water as of 2016, 58% were found to be impaired. These impaired waterbodies are shown in Figure 10. The leading causes of water pollution in Kentucky are 1) sedimentation, 2) pathogens, 3) nutrient/eutrophication biological indicators, 4) habitat disturbance, and 5) unknown causes. The leading sources of impairment are 1) habitat-related sources, 2) agriculture, 3) urban or municipal sources, 4) unknown sources, and 5) mining. Specifically, loss of riparian habitat, the forested area bordering streams and rivers, is the most common source of impairment, cited as the probable source of 1,334 miles or 21% of the listed impairments. Indirectly, loss of riparian habitat occurs frequently in impairments listed for agriculture, urban, municipal, and mining sources. Silviculture practices were cited on only 6% of impaired streams.

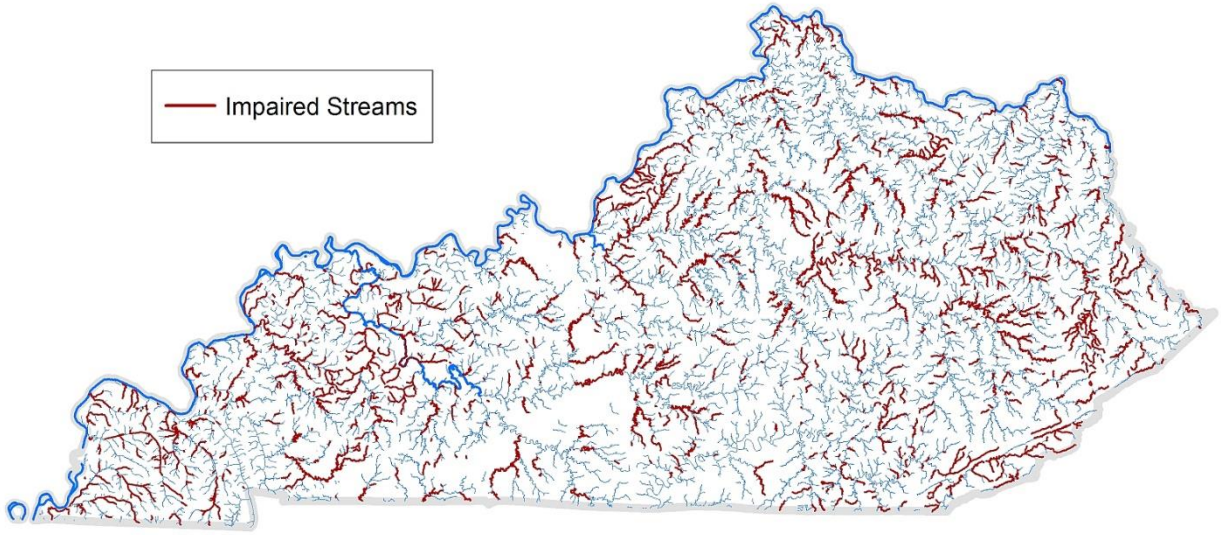


FIGURE 10 – IMPAIRED STREAMS OF KENTUCKY

Although 42% of Kentucky's lakes, ponds, and reservoirs by number and 27% by area show impairment, the causes and sources of impairment show much less correlation to forest resources. In these lakes, ponds, and reservoirs, methylmercury and mercury in fish tissue are by far the greatest causes of impairment according to the Kentucky Division of Water (KDOW).[45] The most common sources of impairment for ponds, lakes, and reservoirs are listed as 1) atmospheric deposition of toxics, 2) unknown sources, 3) upstream sources, 4) agriculture, and 5) industrial point source discharge.[45]

While many waterbodies are impaired, others with excellent water quality in the state are afforded various levels of special protection. Seven categories of "Special Use Waters" are identified under Kentucky Administration Regulations for such protection. These Special Use Waters include Cold Water Aquatic Habitat (CAH), Exceptional Waters, Reference Reach Waters, Outstanding State Resource Waters, Outstanding National Resource Waters (ONRW), State Wild Rivers, and Federal Wild and Scenic Rivers. These designations are due to the ability to support trout populations, uniqueness, exceptional water quality, and representativeness of primitive conditions. Specifically, the CAH designation indicates surface waters and associated substrate that will support indigenous aquatic life, or self-sustaining or reproducing trout populations, on a year-round basis (401 KAR 10:031, Section 4). The OSRW surface waters are designated by the cabinet pursuant to 401 KAR 10:031, Section 8, and includes certain unique waters of the Commonwealth. As shown in Figure 11 below, the watersheds surrounding the ONRW and CAH waters have

a mean percent forested area of 65% with some areas having as much as 97.7% forested areas. Much of the watersheds with less than 25% forested area are located in the Lower Cumberland Basin, which was historically prairie. Although each of these waterbodies is protected for different reasons, the high quality waters of Kentucky consistently feature watersheds with large areas of forestland.

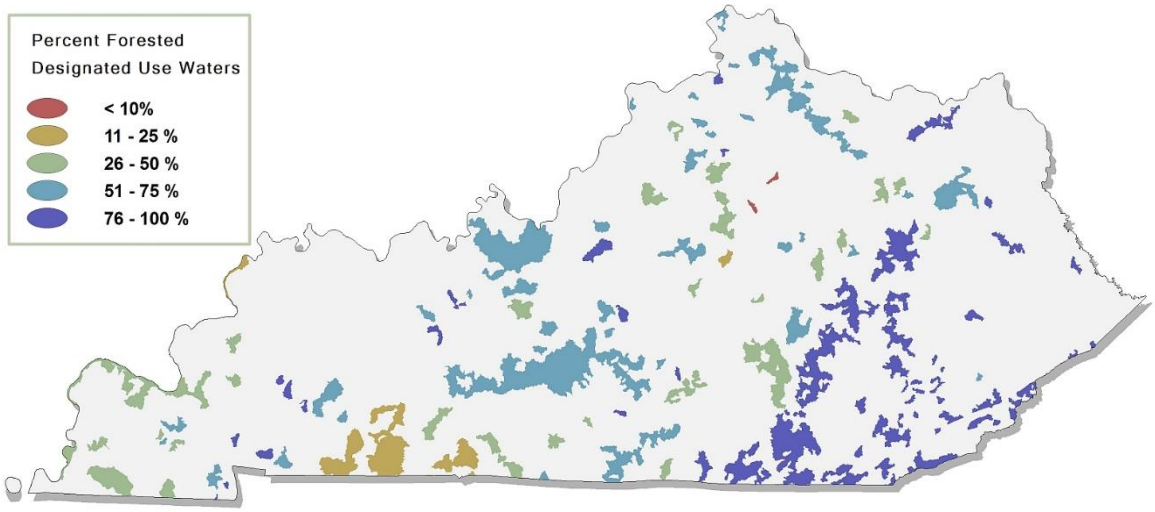


FIGURE 11 – PERCENT FORESTED COVERAGE OF OUTSTANDING NATIONAL RESOURCE WATERS AND COLD WATER AQUATIC HABITAT WATERSHEDS

While impairment is a problem with streams and rivers, loss is a problem associated with the state's wetlands. From the 1780s to the 1980s it is estimated that the 1,566,000 acres of wetland in Kentucky were reduced to 300,000 acres, an 81% reduction.[46] According to most recent estimates, of the 404,500 acres of wetland in Kentucky (National Wetland Inventory mapping) 85%, or almost 346,000 acres, are forested (based on overlays of Forest Class from the 2016 National Land Cover Dataset). The location of these wetlands is shown in Figure 12. Performing critical flood control, water storage, erosion reduction, and nutrient filtration functions, the loss of these wetland areas, particularly the forested wetlands, has been detrimental to the overall water quality of the Commonwealth.

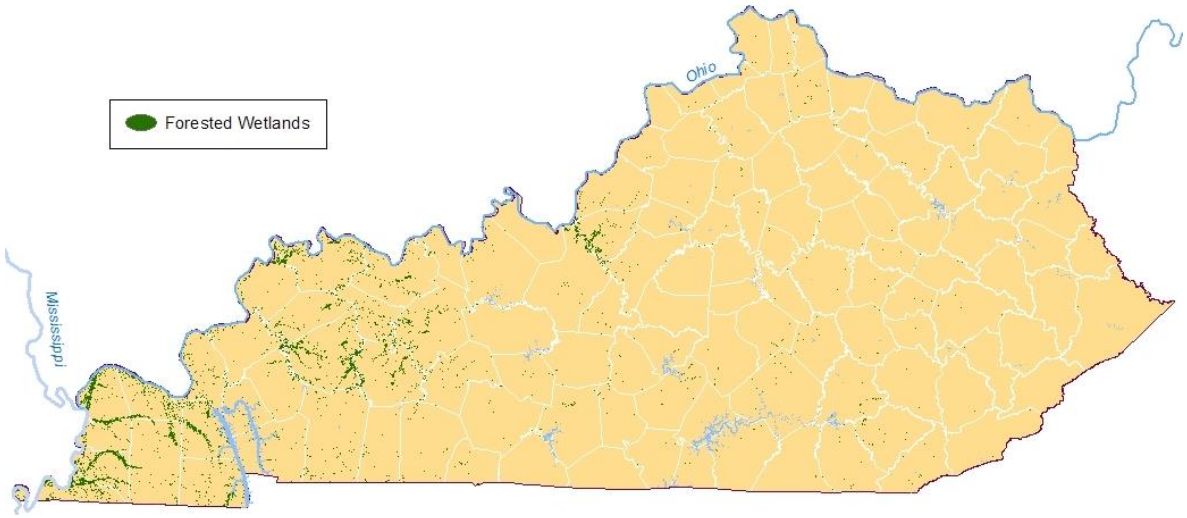


FIGURE 12 – FORESTED WETLANDS OF KENTUCKY

Thus, water quality assessments have found that impairments are often due to a lack of forest resources, while Special Use Waters consistently feature dense forest resources, which indicates a strong correlation between forestland and clean water. While natural occurrences such as tree falls can cause water quality impacts such as erosion or sedimentation, these impacts are typically short-lived and less extensive than impacts from other land uses.[47] Also, forest resources purify water and stabilize streambanks and aquatic habitat as well as the volume of water entering the stream system.

B. Forest Resource

Each individual tree is capable of providing important water quality and quantity benefits. One of the primary benefits is the reduction of nonpoint source pollution. Unlike water pollution from the end of a pipe, nonpoint source pollution comes from many sources such as polluted runoff and is the most common type of pollution.

Whether in an urban or rural setting, trees reduce nonpoint source pollution by decreasing runoff. They also increase groundwater flows by increasing infiltration and subsurface storage. Trees reduce sediment loads from landscape and channel erosion, reduce thermal shocks to streams through their cooling effects, and aid in cloud formation due to evapotranspiration. The organic matter in leaves serves as a food source to stream ecosystems and trees reduce pollution by root absorption of nutrients and chemicals. A tree in any area is capable of producing these benefits, but the greatest benefits are provided from riparian zones, forested wetlands, and large forested blocks.

1. Riparian Zones

Riparian zones are forested lands bordering streams and rivers that provide numerous water quality benefits. The canopy coverage provided by trees in riparian zones shades the stream, decreasing the water temperature. The shading also suppresses algal blooms, and the fish kills often associated with them, in areas where nutrient levels are high.

Exposed riparian tree roots provide a home for aquatic species and armor to stream banks against erosion and sedimentation impairments. Increased root depth, density, and surface cover decrease the amount of bank loss from erosion. When forest riparian vegetation is removed without proper best management practice (BMP) implementation or reforestation, streambanks often collapse and channels widen and/or deepen. Sequestration of nutrients such as nitrogen and phosphorus are also provided by riparian vegetation. Undeveloped riparian lands remove 50-95% of nutrients and pesticides, 60-96% of pathogens, and 75-95% of sediment approaching rivers or streams. These processes vary by the width of the riparian zone, its slope, its soil type, and the amount, density, and type of vegetation in the zone.[48]

2. Forested Wetlands

The effect of wetlands on water quality and quantity depends on location, elevation, vegetation abundance and type, soil type, root structure, and the local climate, among other factors. In general, wetlands provide benefits such as flood and stormwater storage, alterations of precipitation and evaporation levels, maintenance of water quality, and erosion reduction. Forested wetlands are particularly important due to the large volumes of water that the root systems are capable of uptaking and storing.

Acting as natural sponges, wetlands absorb water and slowly release it back into the stream or groundwater system. One estimate indicates that an acre of wetland can store as much as 1 - 1.5 million gallons of floodwater.[49] Historically, when bottomland hardwood wetland forests were more prevalent along the Mississippi River, they were capable of storing 60 days of floodwater, but now can store only 12 days,

resulting in more frequent flooding damage.[50] This absorptive capacity of wetlands reduces flood heights as well as water velocity. Wetlands also stabilize temperatures and affect weather patterns due to the moisture retention.

The water quality functions of wetlands are diverse. In streamside wetlands, vegetation slows the water velocity and allows sediments to settle, reducing siltation impacts to the stream. Biogeochemical reactions involving microbes, soils, and vegetation root systems can provide the benefits of lowered concentration of heavy metals, sulfur, nitrogen, and phosphorus. Wetlands have been found to remove 82% of sediment, 61% of total nitrogen, 62% of phosphorous, and 79% of metals (e.g., lead, zinc, iron) from the waters that flow into them.[48]

Lastly, the vegetation in wetlands, as in riparian areas, can decrease erosion and suspended sediment levels. The decreased water velocity in vegetated wetlands allows sediments from upstream sources to settle out instead of flowing downstream.

3. Large Standing Forest Blocks

Groundwater is water that is found underneath the soil surface. Most groundwater originates as rainfall that is absorbed into the soil and continues downward until it reaches a saturated zone called the water table. This groundwater typically moves towards surface waters, such as lakes, streams, and wetlands, recharging these areas in times of drought. However, when surface water levels are high the groundwater levels are also increased in what is called "groundwater recharge." In karst areas (areas containing caves, sinkholes, springs, or disappearing streams), surface water can quickly become groundwater, so groundwater is highly susceptible to pollution in these areas.

Forested land provides important benefits to both groundwater and surface water. Forested land absorbs rain, traps and filters pollutants, recharges groundwater, slows storm runoff, sustains late season flows, reduces flooding, maintains watershed stability and resilience, and provides critical habitat for fish and wildlife. Studies show that the percentage of forested land in a source water area is one of the most important factors in determining water quality. The more forested land in a source area, the better the water quality and lower the treatment costs. Watersheds with less forested land have higher water temperatures and also higher levels of fecal coliform, turbidity, and nutrients.[48]

C. Public Benefit

Forests and trees, whether urban or rural, should be utilized for the water quality benefits because no other land use can provide the widespread benefits that forest resources can. Trees also provide a recreational and aesthetic enhancement to the water resources, provide habitat for wildlife, increase the water supply, reduce runoff, and reduce the costs of treating polluted water.

1. Recreational and Aesthetic Water Benefits

The combination of forested canopy with clean waterways enhances the recreational value of waterways. In urban areas, these forested waterways can provide park-like areas with bike trails and walkways while on rural lands these areas may be used for hunting or wildlife observation. Often the aesthetic value of riparian corridors can increase real estate value and aesthetic quality, especially when showy, flowering tree species are present.

2. Wildlife Habitat Benefits

Riparian corridors and forested wetlands provide both aquatic and terrestrial habitat and food supply. Falling leaves and twigs are the energy supply for numerous aquatic macroinvertebrates, fish, bacteria, and aquatic fungi. Root wads and large fallen branches provide aquatic habitat. Nesting songbirds, kingfishers, wood ducks, herons, and bats inhabit the branches or protected stream corridors of riparian trees while small mammals, deer, fox, coyote, woodcock, and other animals utilize the terrestrial habitat for travel corridors or den and nesting sites. Fruits and flowers provide food for terrestrial insects and animals. Muskrats and beavers feed directly on riparian vegetation.

The importance of forests in providing aquatic wildlife habitat can be demonstrated through the objectives of the Southeastern Aquatic Habitat Plan.[52] The stated overall goal of this long-term, regional plan for the southeastern U.S., including Kentucky, is "to maintain, restore, and conserve the quantity and quality of freshwater, estuarine, and marine habitats to support healthy, sustainable fish and aquatic communities, and to sustain public use of water resources for the benefit of the citizens of the southeast region and the entire nation." The plan identifies eight primary objectives to accomplish this goal. Of these eight, five can be obtained either directly or indirectly by utilizing Kentucky's forest resources, including:

- Establish, improve, and maintain riparian zones
- Improve or maintain water quality
- Improve or maintain appropriate hydrologic conditions for the support of biota in aquatic systems
- Establish, improve, or maintain appropriate sediment flows
- Maintain and restore physical habitat in freshwater systems

Specific targets of this plan include ensuring "adequate rural/agricultural riparian habitat exists on at least 85% of the lands near rivers and streams" and reducing "the number of acres of freshwater wetlands drained or converted through development annually in the Southeast." The plan also recommends that communities maintain forests because "they save communities millions of dollars in stormwater treatment costs, air pollution, and energy costs."

Kentucky's State Wildlife Action Plan also indicates that forest resources are important for maintaining aquatic habitat. Forestry-related water quality action items in this plan include "Encourage and assist in using, developing, and implementing BMPs, including revision and evaluation as applied to aquatic systems" (Priority Conservation Action #159) and "Identify and implement shoreline and riparian zone habitat restoration projects (planting bottomland hardwood species, establishing riparian buffers)" (Priority Conservation Action #32).[53] Thus, forest resources provide key wildlife resources for the public benefit.

3. Stabilize Water Supply Benefit

Water and forest resources have always shown a strong relationship, recognized even by early settlers. The pioneer botanist F.A. Michaux accounted that in the dense forests of early Kentucky "… thick beds of leaves … [are] speedily converted into mold by the humidity that reigns in these forests."[2] In 1864, George Perkins Marsh wrote, "For when the earth was covered with the forest, perennial springs gushed from the foot of every hill; brooks flowed down the bed of every valley."[54] In 1911, the Weeks Act authorized the purchase of forestlands in the headwaters of navigable streams for the purpose of conserving forests and water supplies.[55] The relationship between forestland and a stable water supply remains clear today. The USFS indicates that 53% of the nation's current water supply originates on forestland versus 26% from agricultural land and 21% from all other land uses, despite the fact that forests occupy only 29% of the surface area.[51] As the need for water supply increases, so should the value of forest resources in providing this benefit.

4. Benefit of Reduced Stormwater Runoff

One nationwide study found that impervious cover reduces infiltration of groundwater (*i.e.,* recharge of aquifers) by 6.2 billion to 132.8 billion gallons of water annually per major metropolitan area. While a forestland would absorb this water, on impervious surfaces water moves as runoff at a rapid velocity toward stream channels. One study found that impervious surfaces multiply discharge rates by two to five times. This high velocity water discharge results in flash flooding and water surges, increasing flood damage and erosional scarring of streams. Forestland use has the greatest rainfall absorption capacity of any land use. Thus, the increase in forest cover will decrease the amount of stormwater runoff.

5. Water Quality Benefits and Reduced Treatment Costs

Costs of treating wastewater and stormwater in cities throughout the Commonwealth are escalating as the population increases. Forest-related water treatment options are often overlooked and undervalued as water utility managers focus on infrastructure-related treatment options. However, the value of forest resources as cost-effective water treatment options has been shown throughout the nation. One study estimated that the Congaree Bottomland Hardwood Swamp in South Carolina provided the equivalent filtration of a $5 million wastewater treatment plant.[50] The Southeast Watershed Forum[9] indicates that a 50% urban tree loss in Chattanooga, Tennessee resulted in a 17% increase of stormwater at a cost of $279 million while a 44% loss in Chamblee, Georgia resulted in $129 million in expenses. Tree canopy losses in Atlanta resulted in $240 million in sewer improvement expenses.

In northern Kentucky, a large-scale study in 2009 by Sanitation District No.1 examined water treatment alternatives to correct stream degradation due to sewer overflows. Their analysis compared traditional gray controls, such as water treatment plants, storage facilities, and pipe replacement, to green infrastructure and watershed controls, such as retention facilities, wetlands, riparian buffers, reforestation, tree boxes, and rain gardens among other methods. According to their findings, a model combining a low level of gray controls "with a moderate implementation of green and watershed controls yields greater overall benefits as compared to a gray-only program at a higher level of overflow control." They also concluded, "green and watershed controls can provide substantial improvements in water quality relative to their cost."[56]

With nearly $6 billion spent per year by the USDA on environmental restoration, enhancement, and stewardship (collectively known as conservation) in the agricultural community, there is a key opportunity today to protect sources of drinking water through working with existing USDA programs. The 2018 Farm Bill brought enhanced focus on source water protection, which is currently being implemented through the Natural Resources Conservation Service (NRCS).

The 2018 Farm Bill made the following enhancements to source water protection:

- Made source water protection a goal of farm bill conservation programs for the first time.
- Made it easier for water utilities to participate in state and local NRCS advisory groups developing conservation priorities.
- Authorized state NRCS offices to designate some practices beneficial to source water protection for up to 90% federal cost share.
- Request 10% of conservation program dollars to be dedicated to source water protection.

D. Key Conditions

In an effort to protect water resources, national and statewide environmental laws have been enacted. Sections 401 and 404 of the Clean Water Act make it necessary to obtain permits from DOW and the USACE,

prior to beginning most projects that affect streams and wetlands in the Commonwealth. Kentucky's floodplain laws (under KRS 151) are intended to provide proper floodplain management and reduce damages from flooding. Kentucky's Agricultural Water Quality Act was passed in 1994 in order to protect surface and groundwater resources from pollution as a result of agriculture and silviculture (forestry) activities. It applies to all landowners with 10 or more acres and requires that they have a written plan specifying silviculture and agricultural BMPs to be used on their property. The Kentucky Forest Conservation Act (KFCA) applies primarily to commercial timber-harvesting operators and BMP practices to be used in timber cut for commercial purposes. Together, these laws are intended to address some of the most direct threats to water quality and quantity in Kentucky.

However, many of the forest resources that provide the water quality benefits are not covered under jurisdictional law. If Kentucky's citizens value the benefits provided by forest resources on water quality and quantity, additional protection, management, or restoration measures should be taken to improve the conditions under which forest resources provide these benefits. Incentives for forest landowners could be offset by the savings realized in water treatment.

1. Riparian Areas

Although riparian zones produce many water quality benefits, these benefits are dependent on the width of the riparian area, the size of the stream that it borders, vegetative structure, and density.

Stream ordination is a system applied to designate the size and location of stream systems. One method of stream ordination, as shown in Figure 13, assigns all headwater perennial streams with an order of one, and increases the order at the confluence of streams of equal order. Thus, when two third-order streams combine, a fourth-order stream is produced. As shown in Figure 14, the water quality functions provided by the riparian zone vary by stream order. Riparian corridors on first- and second-order streams, which comprise the majority of Kentucky streams, provide the maximum nutrient removal, shading, and bank stabilization benefits.[57] Fish habitat and aquatic ecosystem benefits are typically greatest for third- and fourth-order streams while flood mitigation benefits of riparian corridors increase as the stream order increases. Sediment control benefits remain relatively constant for all stream orders.

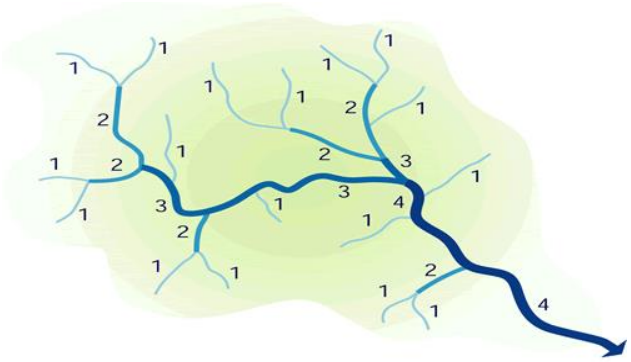


FIGURE 13 – STREAM ORDER DIAGRAM[58]

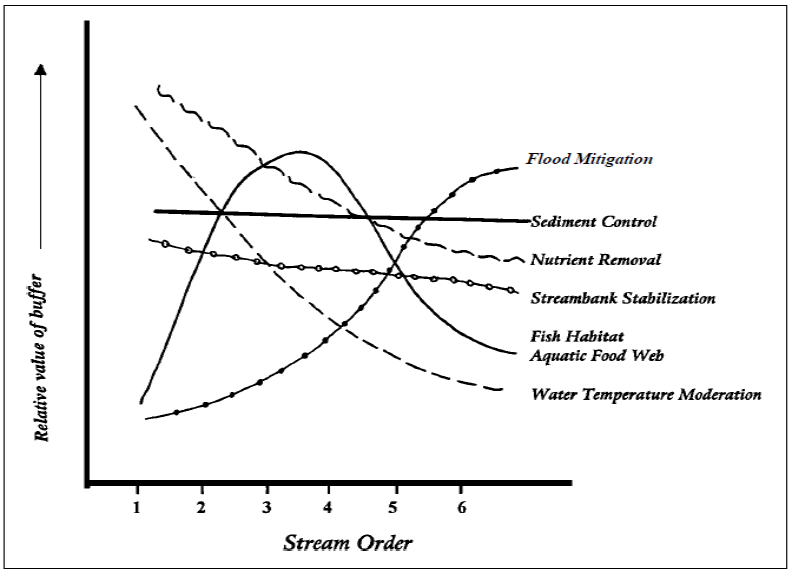


FIGURE 14 – GENERALIZED EFFECT OF STREAM ORDER ON FUNCTIONS IN THE RIPARIAN BUFFER[57]

The width of the riparian zone necessary to achieve these benefits varies depending on the desired use. According to USACE research[59], streambank stabilization, organic inputs (such as twigs and leaves as a habitat and food source), and water quality benefits may be achieved with relatively narrow riparian widths (typically 10-60 feet), while flood mitigation and habitat require much larger widths, usually greater than 100 feet. The minimum riparian width for some functions is summarized in Figure 15.

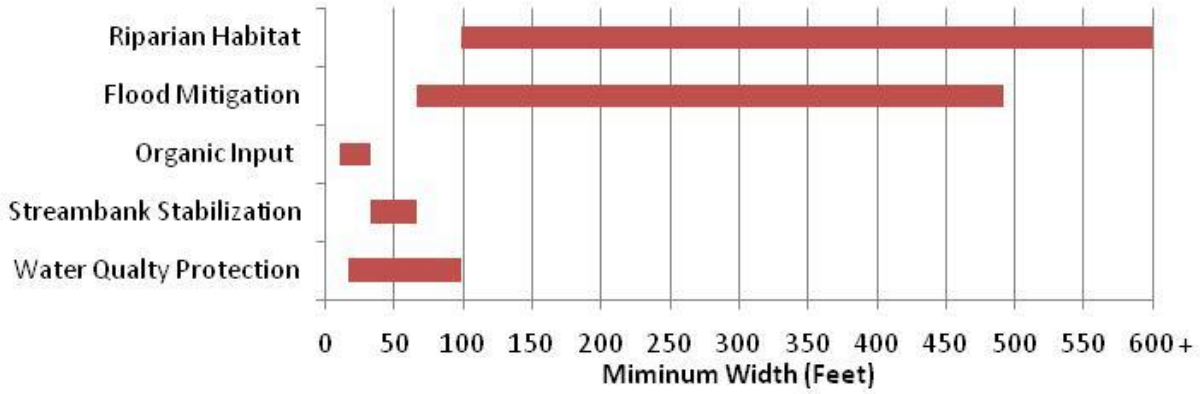


FIGURE 15 – MINIMUM RIPARIAN WIDTH BY DESIRED BENEFIT[59]

The structure of these riparian forested communities also has a lot to do with their functionality. Forest structure refers to the spatial organization of differing sizes, species, and communities of plants, both horizontally and vertically. For instance, mature trees with established root systems near streambanks provide greater stabilization than small trees or trees further from the streambank. Likewise, complex and diverse systems of overstory and understory trees, shrubs, and groundcover of differing heights, densities, and species can provide for far more wildlife habitat than just simple tree canopy cover.

2. Forested Wetlands

Forested wetlands of Kentucky are also critical to water quality and quantity benefits. KDFWR developed species "guilds" which relate wildlife species to particular habitat types. Forty-two species are grouped in the "forest wetland" habitat guild, which is more than the upland forest guild, despite the much smaller area occupied by forested wetland habitat.[53] Forested wetland habitats, such habitats as cypress swamps, tupelo swamps, bottomland hardwood communities and green ash swamps, can be found throughout Kentucky but are most common in western and central Kentucky. The larger river systems (Mississippi, Ohio, and Green rivers and their tributaries) harbor the most complex and extensive tracts of forested wetlands, but smaller tracts can be found even in the Appalachian corridors. KDFWR indicates that forested wetlands are one of the most severely impacted and endangered community types in Kentucky.[53] Increasing bottomland hardwood forest areas, protecting unique habitats, and minimizing impacts from mining and urban sprawl are some of the objectives for forested wetlands.

Particularly along the Mississippi and Ohio rivers, bottomland forest wetlands provide much needed protection against flooding. However, throughout the state they also provide important water filtration and supply stabilization benefits. Because the creation of forested wetlands in areas where they did not previously exist is extremely difficult, retention of the remaining wetlands is essential to maintaining their public benefit.

3. Urban Trees and Forests

Urban trees and forests are important for water benefits because of their value in reducing stormwater runoff, uptaking nutrients, aesthetic features and other benefits. Urban tree distribution and cover affect rainfall interception, which help to reduce stormwater runoff on pervious and impervious surfaces. Small, planted trees with restricted root systems and surrounded by pavement are clearly not as valuable as mature trees with extensive root systems located along an urban stream or beside a rain garden.

Urban canopy cover across Kentucky averages less than 31%, and has been impacted by variables such as invasive pests, storm damage, development, and old age. The previous national canopy cover recommendations of 40% is no longer the target, as years of research points to a more nuanced approach where cities and towns consider development densities, land use patterns, ordinances, and climate, and other parameters such as tree age, species diversity, tree condition, and distribution of trees across different socio-economic levels. Within these parameters and with more detailed municipal canopy coverage data, tree canopy goals can be developed to achieve specific objectives, such as reduced stormwater runoff, reduced erosion, or reduced heat island temperatures.

Soil compaction or paving can limit the amount of filtration and uptake by tree root systems, so maximizing the amount of growing space and understory vegetation around a tree maximizes the benefits. Also, trees planted in elevated, isolated parking lots, medians, or inserted into otherwise paved streetscapes provide very little water treatment when compared to trees in depressed stormwater catchments.

4. Key Geographic Areas

While riparian buffers, forested wetlands, and urban trees identify general areas throughout the state, certain geographic areas are also critical for maintaining water benefits.

From a water quality perspective, retention of the high density of forested areas surrounding the 'Special Use' Waters of Kentucky is essential to preserving the excellent water quality in these areas. Because many

of these locations have remained 'Outstanding' Waters because of the lack of disturbance to the forested landscape, preserving these waters is also dependent on retaining this forest coverage.

Another geographic area of importance is the karst region of Kentucky. Because groundwater resources are often used directly by private landowners without a municipal water treatment system, the protection provided by forest resources in areas in which domestic groundwater wells are abundant is critical. The risk of groundwater contamination is highest along the Mississippi Plateau region in western and south central Kentucky and in the Inner Bluegrass region of the state where karst is most abundant. Additional forested cover in these areas would aid in water filtration and improve the drinking water supply of well users. Well users with high risk for groundwater pollution are particularly abundant in north central Kentucky.

E. Direct Threats and Contributing Factors

Loss or disturbance of forest resources, whether due to land use conversion or impacts from wildfire or disease, is a direct threat to the quality and quantity of water resources available to Kentuckians. Once key forest resources are disturbed or lost, restoration of these benefits can take years and in some cases is impossible because of the impact of the land alteration.

1. Forestland Conversion or Loss

While discussed more in depth in Issue 3, impacts of water quality and quantity benefits are also due to the increase in parcelization, urban land use expansion, and a growing human population. Of the five counties that averaged at least 500 people per square mile of forestland, only Campbell, Kenton, and Boone remained at least 30% forested in 2010. Although most urban land use expansion by 2020 was predicted to occur at the expense of agricultural land use, every county is expected to increase in urban land use with some effects on forestland. Forestland is not forecasted to increase by more than 2% in any county, and in the 31 counties in which losses are predicted they are typically between 1 and 5%.[4]

The high percentages of impervious surfaces in urban lands or in surface mining can cause increased water yield and higher velocity surface runoff. Especially during active surface disturbance, the potential for water quality impacts are the greatest since sedimentation and erosion are increased during soil disturbance. Sites cleared of vegetation and replanted after development typically take years to redevelop and usually the community structure is vastly different than the original plant community.

Although little net change in the forestland of the mountains of eastern Kentucky is predicted, the direct threat of urban development on water quality is often particularly severe in this area because the expansion of urban development and agriculture typically occurs in the flat riparian corridors and bottomlands that are crucial for water quality benefits.

Also, as the urban population expands, the demand for water supplies also increases. This increased demand could cause impacts on aquatic ecosystems and water quality based on increased water withdrawals. The increased withdrawal demand could be compounded if the drought conditions are experienced in the future. Drought conditions would not only decrease the available water supply but would also increase the likelihood of wildfires, compounding losses to the water supply from burning of the forest resources.

2. BMP Implementation During Commercial Timber Harvesting

In accordance with the Kentucky Forest Conservation Act (KFCA) of 1998, timber harvesting operators are required to use appropriate BMPs, and a Kentucky Master Logger must be on site and in charge of all

commercial logging operations. The KDF is required to inspect all logging operations for compliance with both provisions and to follow a series of enforcement actions to deal with noncompliance. When necessary, a special order or emergency order can be issued to shut down a logging operation until compliance is achieved.

During inspections, the most frequent implementation problems identified were removal of tree tops from intermittent stream channels, revegetation of eroded or high erodible areas, improper implementation of water control structures, and improper spacing of the control structures.

Funding constraints have resulted in the reduction in the number of KDF forest ranger technicians inspecting timber harvesting operations to ensure appropriate use of BMPs. Without funding and staff to inspect harvest sites, increase logger education, and pursue enforcement actions, BMP use is dependent on the logger's and landowner's stewardship of the resource.

3. Hemlock Woolly Adelgid

Because the eastern hemlock is a dominant riparian species in the forests of eastern Kentucky, the HWA, discussed fully in Issue 1, is a particularly potent threat to the water quality benefits. Eastern hemlock is the most shade-tolerant tree species in the eastern U.S. and is able to survive in the understory with as little as 5% full sunlight, making it a unique species for wildlife habitat and water quality benefits. Hemlock-shaded streams have been found to have lower summer temperatures and are less likely to become dry.[60] As the infestation kills these streamside trees, the shading, nutrient and sediment uptake, and other benefits will be lost, impacting the entire aquatic ecosystem to an unknown extent.

4. Chemical Treatment in Riparian Corridor

Because stream corridors are one of the main avenues for the spread of invasive species, attempts to control the spread of these species is often focused on riparian areas. The most cost effective method for controlling these species is chemical control through the use of herbicides, but the attempted control can sometimes have a negative impact on water quality.

The control of HWA by pesticide is a perfect illustration of this threat. Imidacloprid, the pesticide that protects against HWA infestations, is highly toxic to aquatic invertebrates and should never be applied directly to water. However, because eastern hemlocks are dominant along stream riparian areas, this substance may affect stream water quality due to drift, runoff, or other mechanisms.

Herbicides may also affect stream health in a similar manner. Approved aquatic use herbicides, such as Rodeo™, are available on the market, but the degree to which these aquatic approved herbicides are used as opposed to aquatic restricted herbicides such as hexazinone, picloram, atrazine, or even gasoline is unknown. An applicator may not intend for a herbicide to reach the water resource, but unintended drift, runoff, or leaching may cause unintended stream impairment.

5. Wood Biomass Harvesting

Woody biomass harvesting for energy needs involves the extraction of woody materials including the wood, bark, and debris that remain from a commercial timber harvesting as well as the harvesting of low quality timber not suitable for timber and plantation forests established for biomass production. As energy demands increase, non-sustainable or improper woody biomass extraction may threaten water quality and quantity as well as forest resources. Particularly on the steep slopes in eastern Kentucky and other areas of the state

where soil instability is an issue, extraction of these resources may disturb the soil layer and cause significant erosion and sedimentation problems.[61] These water quality impacts may be long-term as reestablishment of vegetation on these slopes would be a challenge. The potential for a robust woody biomass market may increase the likelihood of clearcutting trees greater than three to four inches in diameter regardless of location. The habitat, nutrient removal, aesthetic, and water supply impacts of such removals are obvious, suggesting the need for consideration of additional protection of riparian areas through biomass harvesting BMPs or regulatory oversight.

F. Opportunities

Opportunities for the restoration, conservation, and protection of forest resources and their water quality benefits are numerous and diverse. In general, as public awareness about the economic value of forest resources for water quality and quantity benefits increases, opportunities for better management and expansion of forest resources improve. Also, as water quality and quantity become more of a state and federal issue, the cooperation between governmental agencies becomes increasingly important.

Through watershed based planning and increased enforcement actions, forest resources are increasingly being spotlighted as the most cost-effective features for improving water quality. Urban forestry programs are recognizing the public benefits of this resource, and tools are available for improved planning for incorporation of tree cover into urban settings. Multiple cost-share programs, mitigation funds, restoration groups, and even innovative funding sources such as water quality trading are offering ever more diverse opportunities for improving the water quality benefits of Kentucky's forests.

1. Watershed Based Plans

The collaborative efforts necessary to assemble watershed based plans throughout the state provide opportunities for better agency cooperation for utilizing forest resources to improve water quality and quantity. A statewide Watershed Steering Committee meets regularly to provide guidance, oversight, and communication to interagency/organizational activities. This committee includes state and federal agencies, universities, nonprofit advocacy groups, trade associations, and local government associations offering opportunities for watershed collaboration.

In many areas of the state, community organizations have developed watershed based plans to focus remedial efforts in these watersheds. Riparian and forested wetland restorations are frequently recommended in these reports. Twenty-seven watershed plans have been accepted for full or partial implementation with Clean Water Act Section 319(h) funding. Additional watershed plans are currently under development across the state.

2. Urban Forestry Programs

The *Reforest the Bluegrass* program, established in 1999, has been an extremely successful program through joint efforts of the Lexington-Fayette Urban County Government, commercial sponsor funding, and volunteer support. Similarly, the Northern Kentucky Urban and Community Forestry Council established the *Reforest Northern Kentucky* program in 2006, and the City of Frankfort began the *Reforest Frankfort* program. During these three events, volunteers planted over 11,250 seedlings in 2019. Such successful models of urban forestry should be encouraged throughout the state.

Urban forestry programs, such as these, could be linked with geographic information system (GIS)-based analyses in order to determine the ecosystem benefits of urban tree planting and to set goals for reforestation percentages in key areas. Urban tree canopy studies through CITYgreen or i-Tree, discussed more fully in Issue 4, can calculate the environmental benefits of urban trees. Future applications under development include i-Tree Hydro, which is designed to quantify and illustrate hourly and total changes in stream flow and water quality associated with community forests. Such tools could be utilized to promote the use of urban forests for water quality benefits as well as other ecosystem services.

3. Cost-Share Programs

Many cost-share programs are available as an economic incentive to encourage protection and restoration of forest habitat. Federal cost-share programs include the Natural Resources Conservation Service (NRCS) Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), the Wetlands Reserve Program (WRP), Wildlife Habitat Improvement Program (WHIP), Healthy Forest Reserve Program, Farm and Ranch Lands Protection Program, and the Kentucky Soil Erosion and Water Quality Cost-Share Program. Each of these programs specializes in funding for particular habitat restoration types, and is further described in Issue 4. The WRP program, for instance, offers private landowners an opportunity to protect and restore wetland habitats on their lands.

The award winning Green River Conservation Reserve Enhancement Program (CREP) is another example of a successful cost-share program. The Green River CREP, established in 2001, covers Adair, Allen, Barren, Butler, Edmonson, Grayson, Green, Hart, Logan, Metcalfe, Russell, Simpson, Taylor, and Warren counties. It currently includes over 97,000 acres dedicated towards the conservation and improvement of water quality and wildlife habitat in the Green River Watershed.

The Mississippi River Basin Healthy Watersheds Initiative looks to address nutrient loading through conservation practices that avoid, control, or trap nutrients and improve water quality. Funding is set aside annually for projects in focused watersheds with the twelve-state area, which includes Kentucky. The focused watersheds in Kentucky are the Licking River, Lower Green River, Bayou De Chien-Mayfield, Obion, and Red River watersheds, as shown in Figure 16.[62]

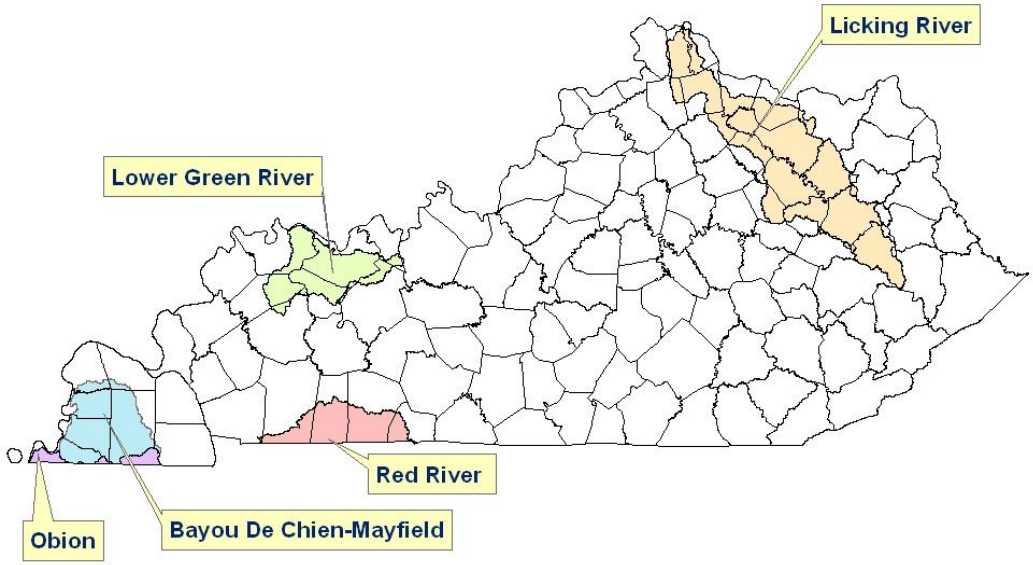


FIGURE 16 – MISSISSIPPI RIVER BASIN INITIATIVE FOCUSED WATERSHEDS IN KENTUCKY

4. Coal Mining Reclamation

In 2004, the Appalachian Regional Reforestation Initiative (ARRI) was established as a coalition of citizens, the coal industry, government, and other groups dedicated to restoring forests on coal mined lands in the eastern U.S. Using a technique known as the Forestry Reclamation Approach, one of the major objectives of the ARRI is to convert reclaimed mined land to highly productive forestland through tree planting and improved proper coal mining reclamation techniques.[63] ARRI and similar organizations present numerous opportunities for water quality improvements in coal regions of the state.

5. Wetland and Stream Mitigation Funds

Established in 2000 under KRS 150.255, the Kentucky Wetland and Stream Mitigation Fund provides opportunities for conservation and restoration through the KDFWR. Activities that permanently impact wetlands or streams require mitigation of some form under the requirements of USACE 404 permit and KDOW 401 Water Quality Certification. The Kentucky Wetland and Stream Mitigation Fund receives funding from entities who pay a fee in-lieu of implementing the mitigation themselves in what is called "fee in-lieu of" mitigation.

All KFDWR in-lieu fee projects are permanently protected through easements or ownership, so either landowners must be willing to donate a permanent conservation easement or the land must be available for purchase.

6. BMP – Recommendations for the Harvesting of Woody Biomass

The Kentucky Division of Forestry collaborated with partner state and federal agencies and the University of Kentucky Department of Forestry in October 2011 to develop recommendations for harvesting woody biomass to allow future state renewable energy portfolio needs to be met in a more sustainable manner in addressing soil erosion and wildlife habitat concerns.

ISSUE 3: FOREST LOSS AND FRAGMENTATION

Forest loss and fragmentation are distinct but related occurrences. Forest loss is the conversion of forestland to some other land use, while fragmentation is the process by which large continuous tracts of forestland are broken into smaller, disconnected units. Forest loss was greatest in the early 1900s due to agricultural conversion, but continues today most often from development and surface mining. The loss of forest acreage during fragmentation may not be great, but the impacts can have major implications for forest ecosystems, forest health, and forest sustainability.[64]

Fragmentation typically results from road construction, urban development, utility corridors, agriculture, and other human development or disturbance, as shown in Figure 17. As these non-forest patches expand over time, the forest is reduced to disconnected islands. The surrounding non-forest land uses threaten the function, health and value of the forest that remains.

FIGURE 17 – FOREST FRAGMENTATION OVER TIME
(Source: University of Connecticut Center for Land Use Education and Research)

Fragmentation can be further classified as temporary or permanent. Temporary loss can result from fire, natural disasters, or timber harvesting. Permanent fragmentation occurs when forestland is converted to a new and relatively permanent land use. It can also occur naturally through fire, ice storms, hurricanes, tornados, and landslides, or through human activities such as clearing for agriculture, surface mining, urban development, or the construction of highways, power lines, and pipelines. Natural fragmentation is usually less frequent, localized, and temporary, while human-caused fragmentation is usually permanent. This is not always the case. However, much of the eastern portion of Kentucky was either logged or cleared for agriculture, and has since been reclaimed by natural forest regeneration since the mid-twentieth century.

Parcelization, the dividing of forest property ownership, is a cause of fragmentation. Through inheritance, the division of large tracts into small units, or subdividing for development, the result can be the same: An increased number of forest landowners. Parcelization can lead to forest fragmentation, which complicates management and preservation of large forest tracts.

A. Current Status of Fragmentation and Loss in Kentucky

Kentucky's forests show signs of both fragmentation and loss. Rates of forest loss vary over time, but recent rates have increased slightly from past decades, as shown in Figure 18. From 2010 to 2016, 31,160 forested

acres, or approximately 0.1% of the forests of Kentucky, were lost. From 2010 to 2016, an estimated 12 acres of forest were lost every day in Kentucky due to conversion.[65]

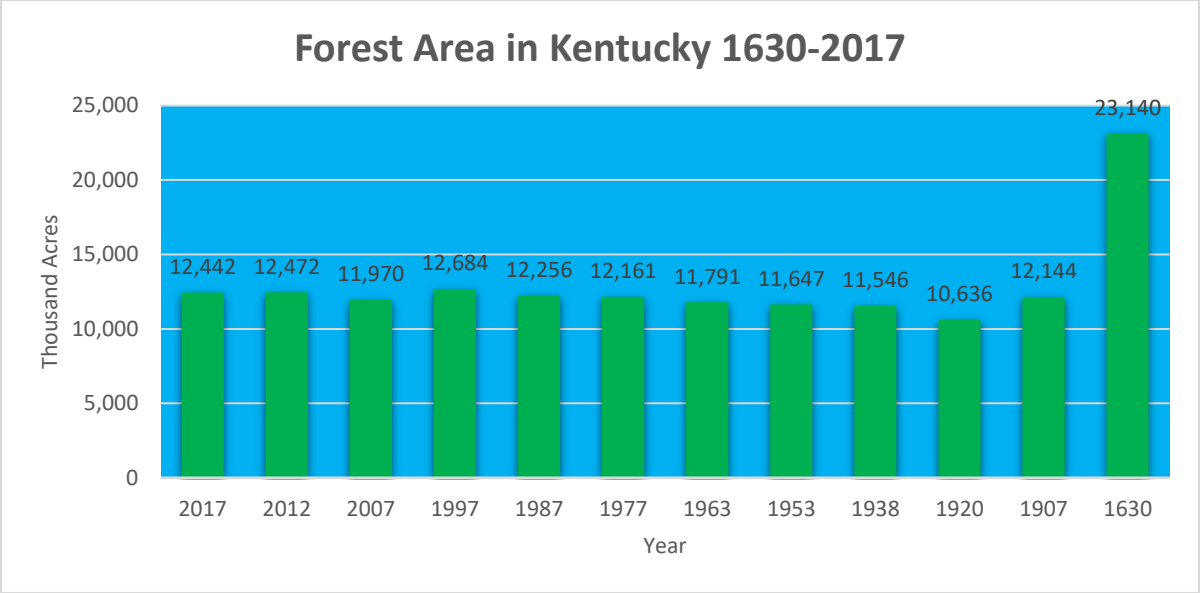


FIGURE 18 – FOREST AREA OF KENTUCKY

The areas of non-forest and the fragmentation patterns are strongly correlated with the physiology of Kentucky, as shown in Figure 19. In the Mississippi Embayment and Mississippi Plateau physiographic regions of the state, the amount of forestland is less an indication of loss rather than the geology and the historic dominance of prairie and wetland in these regions. However, in the eastern coalfield region and the Inner and Outer Bluegrass regions, the impacts of forest loss due to agricultural, urban, and mining land conversion are more apparent as this land was historically forested.

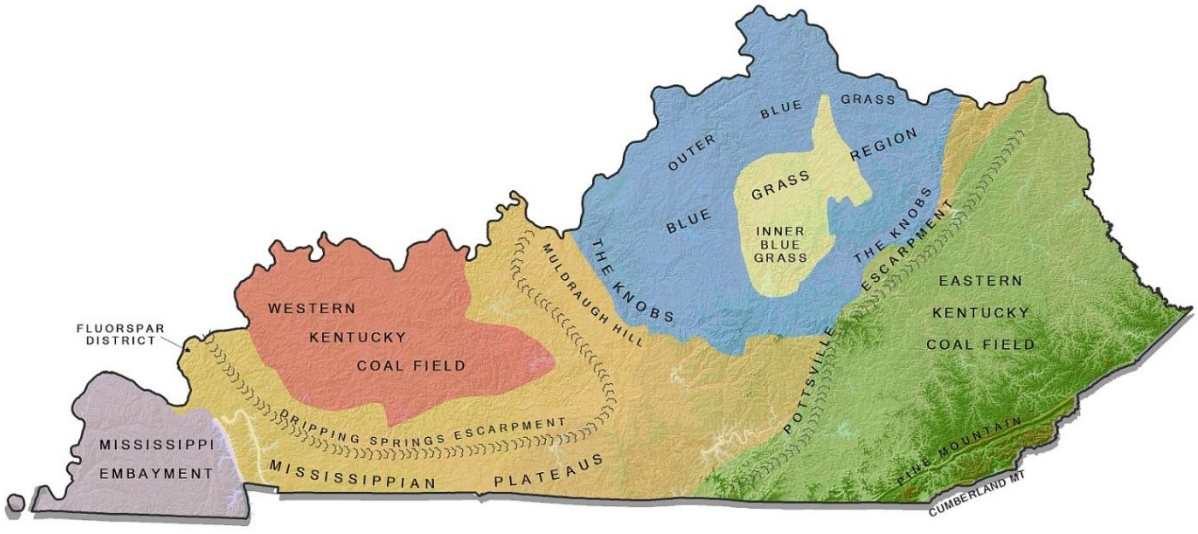


FIGURE 19 – PHYSIOGRAPHIC DIAGRAM OF KENTUCKY

In the Bluegrass Region, Western Kentucky Coalfields, Mississippi Plateau, and Mississippi Embayment, forests exist mostly in small patches except for protected areas such as wildlife refuges, wildlife management areas, recreation areas, and state parks. These small forestland patches resulted from the clearing of uplands for agricultural or urban development, and are usually narrow tracts that follow the path of streams and rivers. In the mountains of eastern Kentucky, however, the fragmentation pattern is reversed. Upland and high elevation areas remain heavily forested because of steep slopes. Forest loss and fragmentation mainly occurs along the bottomlands and stream borders where the land is flat enough to build roadways and small communities. Other sources of fragmentation and loss in this eastern region include wide-scale surface mining and urban and agricultural land conversion. Because of terrain and accessibility, most of the large tracts of interior forest are located in eastern Kentucky.

B. Key Conditions

The make-up and location of the forest are key factors in considering the effects of fragmentation and loss. The loss of forestland containing old-growth trees, endangered species populations, a high level of diversity, or stands of high quality timber has a higher impact than younger, small parcels of forest. The location of the resource is also important for recreational use as well as ecological or wildlife benefits. Forests near an urban area may be considered more desirable for recreational use and aesthetics than one in a remote area. Forests located along riparian zones can provide better water quality benefits than those on an upland slope.

The benefits provided by forests, however, are often dependent on the size, shape, configuration, slope, relative abundance of forest cover, and the resource benefits.[66] In general, the relative value of forest patches is higher on larger tracts with greater interior area, and in greater connectivity and proximity to other tracts.

1. Edge and Interior

Edge habitat is the margin where two or more different habitat types meet, and in natural areas, often occurs in a gradual transition from one habitat to another with a diversity of plants of differing heights and ages. When humans cause fragmentation and loss, forest edges are often abrupt. The potential wildlife value of edge habitat depends on the width, species diversity, and diversity of vertical structure in that habitat.[67]

2. Forest Size, Connectivity, and Relative Abundance

The relative size of a forest patch is important because larger forest patches contain greater interior area. Larger forest patches can also support a greater diversity of plant and animal populations. Small forest patches remain important, however, particularly when they are close to or connected to other small forest patches.

The importance of forest size, abundance, and connectivity extends beyond wildlife, and can include urban greenway connectivity, carbon storage, air quality and other human health effects, and timber harvesting economics. Forest management techniques that focus on maintaining large patches of forestland or expanding them through reforestation or restoration, are increasingly important as climate changes and populations expand.

C. Direct Threats and Contributing Factors

1. Effects and Threat of Forest Loss and Fragmentation

Forest loss and fragmentation are significant threats to forest health in Kentucky. When a roadway, power line, or pipeline dissects a large, forested landscape, for example, the disturbance can cause loss of interior forest habitat, barriers to plant and animal movement, increase in invasive species, reduction in water quality, and loss of diversity and health of the remaining forest. As interior forest habitat is fragmented, warmer and drier conditions can result. Windier and sunnier conditions change the decomposition rates of the ground leaf layer, decrease growth rates for shade-tolerant plants, and alter the habitat and gene distribution of plants, soil invertebrates, small mammals, amphibians, ground nesting birds, and other interior forest species. Fragmentation also provides an avenue for the introduction of exotic, invasive plant species, which can have long-term effects on the health and composition of forests.[68]

Conversion of rural to urban land use generally impacts both agricultural and forested areas. Since numerous fauna of Kentucky use the forest as their sole habitat, forest loss facilitates removal of that fauna from the environment. The forest also serves as a carbon sink, as trees absorb carbon dioxide through photosynthesis. Forest loss removes this avenue of carbon sequestration and negatively impacts the carbon balance in the atmosphere. Forests also absorb rainfall and help prevent flooding and soil erosion. Finally, forest loss contributes to the loss of overall biodiversity.

D. Opportunities

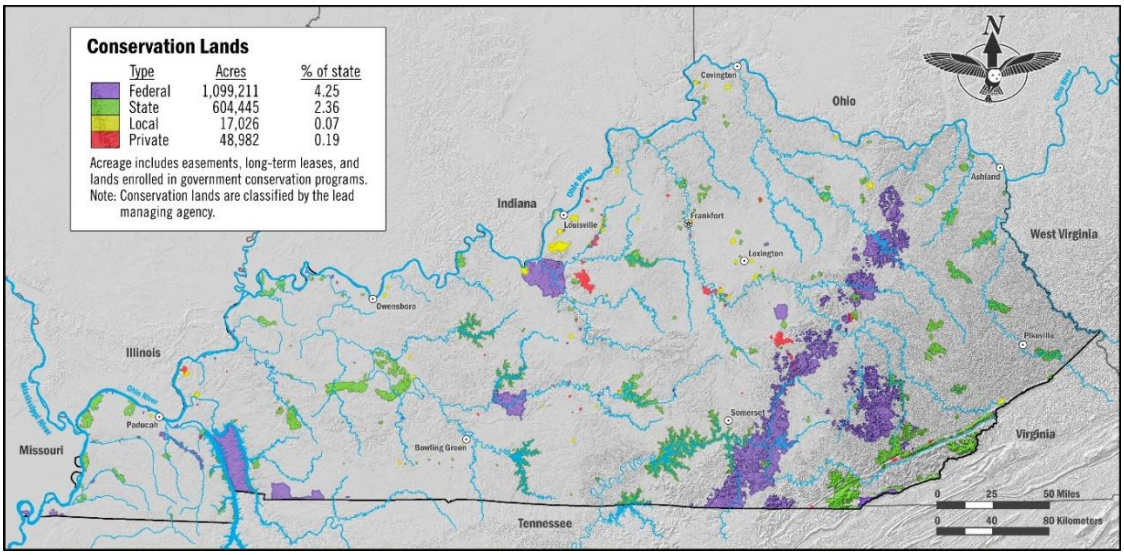
The two primary ways to mitigate forest loss and fragmentation are through prevention and restoration strategies. Prevention focuses on maintaining current large forested tracts, while restoration seeks to improve connectivity between forested areas, and to convert or restore other land uses into forest. Opportunities may focus on maintaining current public lands, acquiring additional lands, public education, smart growth policies, green infrastructure planning, climate change mitigation planning, or financial incentives to decrease fragmentation and loss in the state.

1. Publicly and Privately Owned Forest Lands

Forestland makes up approximately 48% of Kentucky's land area. Currently, federal, state, or other public institutions own 12% of Kentucky forests, as shown in Figure 20. Comparison of protected lands in the state with the large forested tracts reveals that state and national forests, national recreation areas, national parks, wildlife management areas, and nature preserves contain many of the largest contiguous blocks of forest. Approximately 88% of Kentucky's forestland is privately owned, and many large forested blocks are held in private ownership. Two conservation programs provide avenues for additional private land acquisition and management.

a. The Kentucky Heritage Land Conservation Fund

The Kentucky Heritage Land Conservation Fund (KHLCF) is the primary source of state funding for the purchase and management of natural areas. The KHLCF is used to purchase land for nature preserves, state parks, state forests, wildlife management areas, environmental education areas, wild rivers and wetlands. Revenue for the fund primarily comes from the sale of Kentucky nature license plates, unmined mineral tax on coal, and environmental fines. Since its establishment in 1990, over 90,000 acres of land have been conserved through the KHLCF.

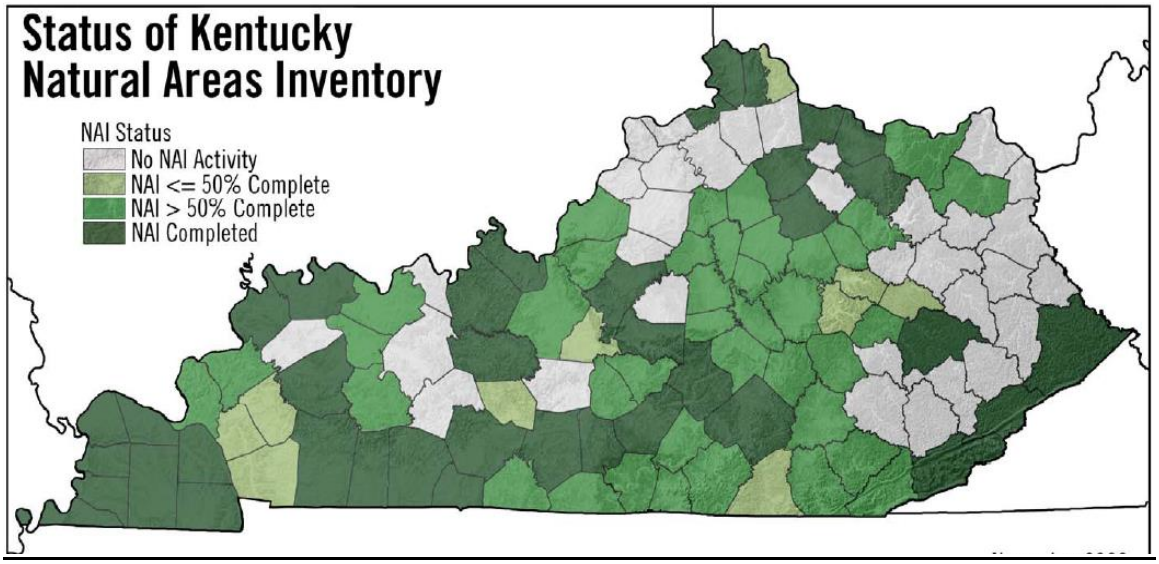


(Source: OKNP, 2010)[69]

FIGURE 20 – CONSERVATION LANDS OF KENTUCKY

b. Forest Legacy Program

The Forest Legacy Program (FLP) is a conservation program administered by the U.S. Forest Service in partnership with state agencies to protect privately-owned forestlands through land purchases or conservation easements. Managed by Kentucky Division of Forestry, the FLP allows for the purchase of forestland from private individuals with the goal of maintaining forests on the land. Through the FLP, the U.S. Forest Service will provide up to 75% of the purchase price of a property, and the State of Kentucky is required to match at least 25% of the cost. To qualify, private landowners must have a Forest Stewardship Plan for a property that is at least 75% forested and at least 25% within the designated forest legacy area. The first FLP Assessment of Need (Appendix 3), approved in 2003, was developed with public input to identify environmentally important forestlands for protection from conversion to non-forested uses. Landowners receive gains associated with the sale or donation of property rights and also benefit from reduced taxes. To date, Kentucky has received $ 13.1 million in FLP funding, which has been used to acquire the 1,540 acre Knobs State Forest and WMA in Bullitt County, the 1,955 acre Marrowbone State Forest and WMA in Metcalfe and Cumberland Counties, and the 6,725 acre Big Rivers State Forest and WMA in Union and Crittenden Counties. The priority areas developed as a result of this assessment will serve as new priority areas for the FLP. Since 1990, the FLP has conserved over 10,220 acres of land in Kentucky.



(Source: KNP, 2010)

FIGURE 21 – STATUS OF KENTUCKY NATURAL AREAS INVENTORY

2. Office of Kentucky Nature Preserves

The Office of Kentucky Nature Preserves (OKNP) was established in 2018 with the consolidation of the Kentucky State Nature Preserves Commission, the Kentucky Heritage Land Conservation Fund, and the Kentucky Wild Rivers System into one agency. OKNP seeks to protect the best remaining natural areas in the state, not only to preserve Kentucky's natural heritage, but also in recognition of the dependence of our well-being on healthy ecosystems. To identify and conserve those natural areas, OKNP participates in an international network of programs that monitors biodiversity, and acquires and preserves land by using species inventories, ecological analyses, and conservation planning. Currently, OKNP has assessed approximately 50% of the state, as shown in Figure 21. By using the forest patches data in conjunction with an inventory of plant and animal communities of Kentucky, criteria has been developed to prioritize both regions and blocks within regions for both restoration and protection. The HLCF or other funding sources can be used by OKNP in the purchase and maintenance of these critical areas.

3. Accredited Land Trusts

The following land trusts are accredited through the Land Trust Accreditation Commission, an organization that provides independent verification for land trusts to meet the high standards for land conservation, stewardship, and non-profit management. Many additional land trusts and conservation organizations exist throughout the state in addition to these accredited land trusts:

a. Bluegrass Land Conservancy

Bluegrass Trust and Limestone Land Trust merged to create Bluegrass Land Conservancy (BLC), which protects land in the Bluegrass Region through permanent conservation easements. Their work is accomplished through education and promoting the preservation of land for agriculture, historic and cultural heritage, wildlife habitat, natural resources, water quality, and scenic open space to sustain a high quality of life. BLT has protected over 21,000 acres throughout the Bluegrass Region.

b. Kentucky Natural Lands Trust

Kentucky Natural Lands Trust (KNLT) is a statewide land trust that works to protect, connect and restore wildlands, large forest tracts and migratory corridors through private, governmental, non-profit and corporate partnerships. KNLT's Pine Mountain Wildlands Corridor is the largest landscape-level project ever undertaken in the state, which aims to create a contiguous corridor from Virginia through southeastern Kentucky to Tennessee that can provide both suitable migration corridors and carbon sinks through forest preservation and conservation. KNLT has helped purchase and protect over 25,000 acres of wildland.

c. Louisville and Jefferson County Environmental Trust

The Louisville and Jefferson County Environmental Trust protects land for future generations through voluntary cooperative programs in parks, natural areas, greenways, historic sites and farmland. The Trust assists landowners, organizations, elected officials, developers, government agencies and the business community by helping them understand land preservation management options.

d. River Fields

River Fields protects, preserves and enhances natural and cultural resources, including agricultural and scenic resources, for the benefit of the public. River Fields has worked successfully with landowners and supporters to preserve more than 2,200 acres of open space, farms, woodlands and wetlands along the Ohio River Corridor through conservation easements and fee simple ownership.

e. Woods and Waters Land Trust

Woods and Waters Land Trust permanently protects forests and streams in the Lower Kentucky River Watershed to promote thriving natural lands and to connect large forest blocks to the Kentucky River and its tributaries. The Trust has protected over 30,000 feet of stream frontage through conservation easements.

4. Other Conservation Organizations and Initiatives

a. The Nature Conservancy – Kentucky Chapter

The Nature Conservancy (TNC) has identified the Central Appalachian Mountains, including Kentucky, as home to globally important forests and North America's most resilient and important corridor for wildlife and source water protection. The Conservancy's Working Woodlands program focuses on climate change strategies, wetland restoration efforts to help improve waterways, and the Green Heart Project, which studies urban greening to quantify the value of nature in communities and its relation to human health. TNC has helped protect over 50,000 acres of private and public land across Kentucky.

5 . Financial Incentives for Maintaining Forestland

While acquiring forestland may ensure long-term protection against fragmentation and loss, short-term protection may be provided through monetary incentives to private landowners.

Changes in property and estate taxes may incentivize landowners to keep tracts of forestland intact. Inconsistent property valuation methods can be a driver behind fragmentation. Because property taxes are often lower on forestlands than in urban areas, individuals may be driven to develop remote areas. However, as property values increase, heirs to these rural forestlands often sell or subdivide inherited land in order to pay property taxes.[70] The fluctuation in properties' values and taxes can therefore lead to an increase in fragmentation of land over time. A more consistent approach to property valuation may lead to decreased fragmentation.

Opportunities for financial gain from forestland interest may aid in the stabilization of property values and taxes. Low quality and waste wood has a market for use as woody biomass for energy production. Additional funds might be obtained by leasing hunting rights, recreational uses, or timber harvesting.

6. Wildland-Urban Interface

Although the goals of natural resource management and urban expansion are often conflicting, the two land uses need not be mutually exclusive. Through the use of green infrastructure, proper planning, and low impact development techniques, the impacts to forest resources may be minimized and the benefits of these resources enhanced.

Issue 4: Forest Management

Forests can provide an abundance of clean air and water, sustainably harvested wood, a diversity of wildlife habitat, and enhanced recreation and aesthetics with comprehensive forest management. In urban areas, managed forests mitigate temperature extremes, regulate stormwater, control noise pollution, enhance local economies, improve healthy wildlife populations, increase rainfall infiltration/groundwater recharge, improve mental and physical health, mitigate the heat island effect, and address tree canopy issues.

Despite the benefits provided by managed forests, forest management in rural and urban areas is not a common practice throughout Kentucky. Compared to a national average of 57%, private individuals own 88% of Kentucky's forest resources as shown in Figure 22.[4] Of the remaining forestland, 10% is owned by federal ownership, and 2% is owned by state and local agencies.

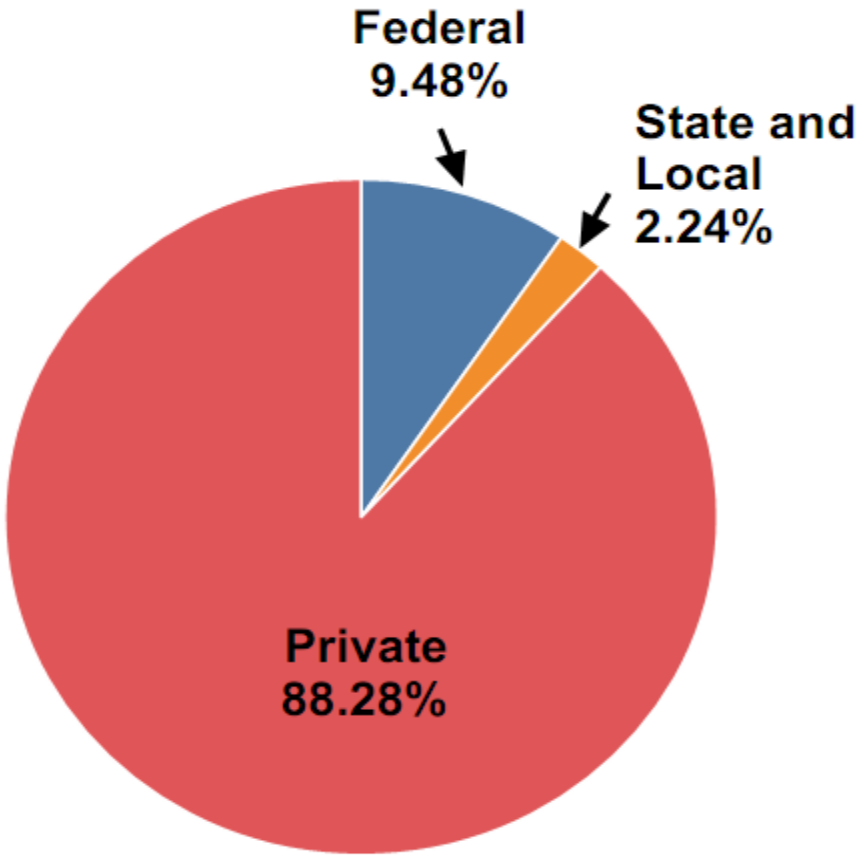


FIGURE 22 – KENTUCKY FOREST OWNERSHIP

As shown in Figure 23, private family-forest owners have many reasons for ownership with scenic beauty and natural diversity being amongst the top reasons cited. Interestingly, the reason for owning the land has little influence on whether or not timber harvesting is conducted. As shown in Figure 24, the reasons for timber harvesting are also similar regardless of the reason for ownership.

Typically, timber harvests are conducted because trees are mature, owners need money or wood for personal use, natural catastrophes have damaged trees, or in order to improve the quality of the remaining timber. Rarely is the harvest conducted because of a forest management plan, which indicates that efforts to increase public awareness of the importance of proper forest management remain a significant obstacle in Kentucky.

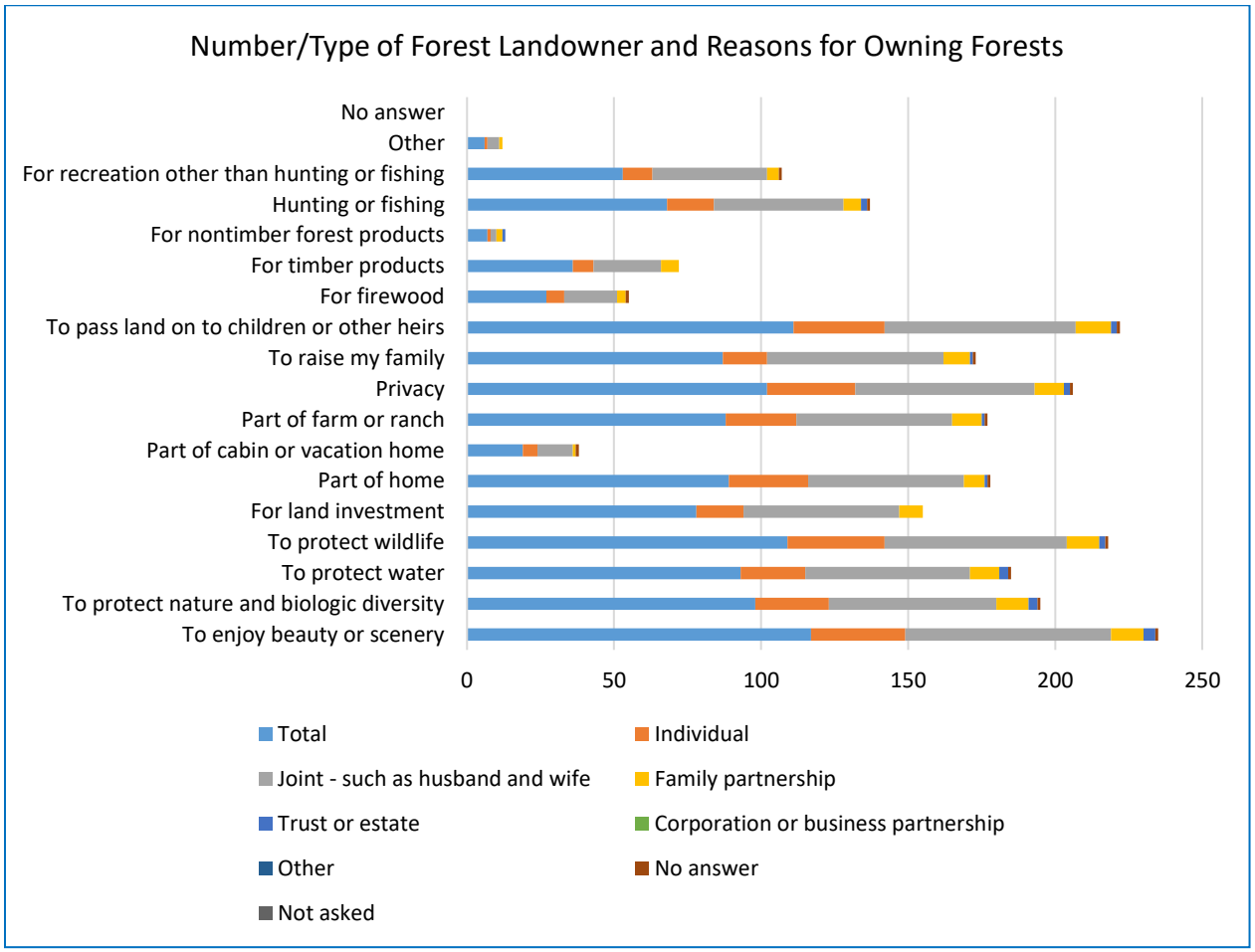


FIGURE 23 – KY PRIVATE FAMILY FOREST LANDOWNER REASONS FOR OWNING FORESTS

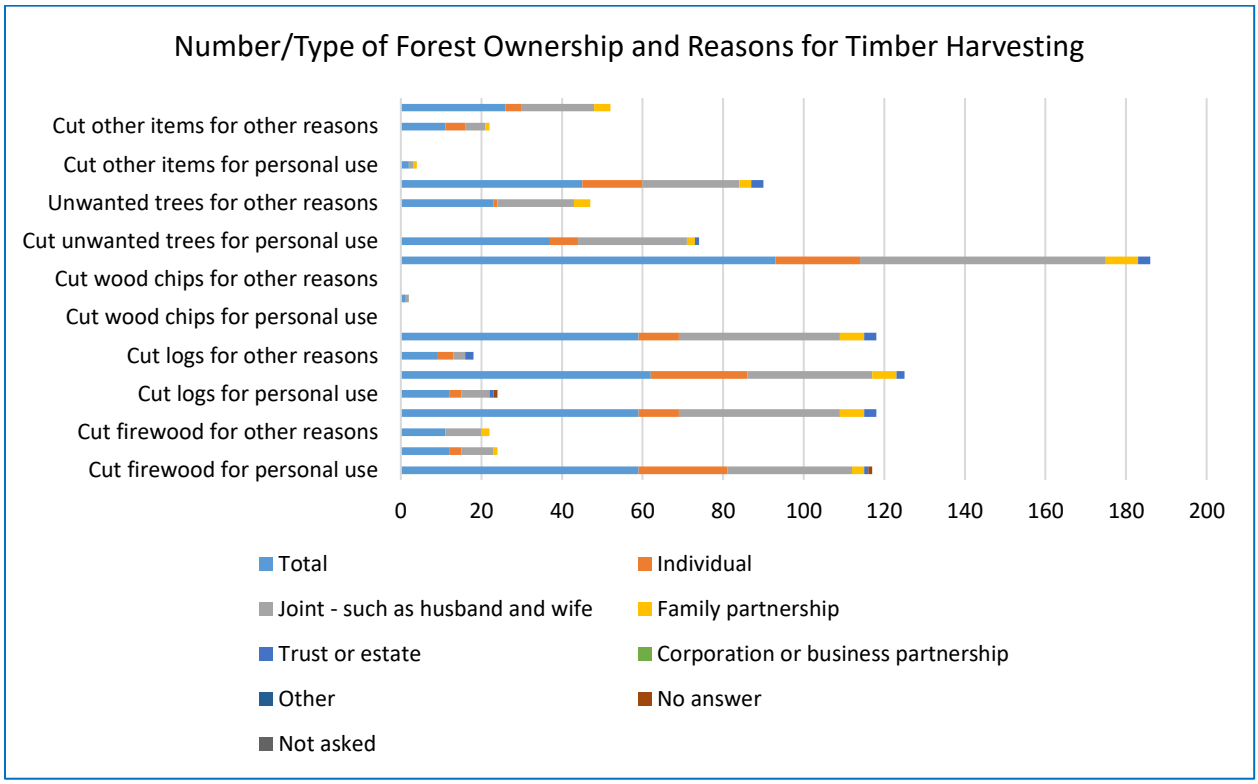


FIGURE 24 – KY PRIVATE FAMILY FOREST LANDOWNER REASONS FOR TIMBER HARVESTING

A. Current Status of Forest Management in Kentucky

Forest management can be conducted in many different ways according to the desired use of the land. In order to address how forests are managed in Kentucky, these management types have been divided into six categories for this report: "hands-off" management, preservation management, recreational management, wildlife management, sustainable forest management, and urban and community forest management. While these management types have been divided for ease of discussion, some areas may employ multiple management types in order to accomplish their objectives.

Forest management can occur on a landscape, stand, or individual tree level. Although landscape level management is desired, management of rural forested areas typically occurs at the stand-level in Kentucky due to ownership patterns. Stands are defined by human disturbance or by common species composition and structure. Stand-level management can be applied to many desired uses including wildlife, environmental concerns, or optimal tree production. However, management can also occur on the individual tree-level. Urban and community forest management ranges from management of individual street trees to city-wide tree canopy and heat island assessments. Many opportunities exist to expand urban forest management to the landscape level, which may include watershed-based planning, air quality mitigation, and other goals.

1. "Hands-Off" Management

Many Kentuckians support a "hands-off" approach to management. While some promote this approach out of a desire to allow forest succession to progress unhindered, many do so simply out of convenience and passive neglect. To those who see the "hands-off" approach as an attractive conservation strategy, the

Southern Forest Resource Assessment states that removal of all human disturbances would have profound effects on the region's biota. Certainly, "hands-off" management in one area will not necessarily counter-balance intensive management elsewhere. To avoid regional population declines and species losses, land managers must have the flexibility to promote active management. This flexibility should not extend to the other extreme of promoting intensive forestry for wildlife conservation, but it does suggest that some level of active management will be necessary to maintain many still extant but imperiled species, including many found on present or proposed set-aside lands. Even when landowners are opposed to timber harvesting or silvicultural management, active planning and management including inventories and invasive species monitoring, is recommended to promote the best use of the resource. However, based on the National Woodland Owner's Survey, many of Kentucky's private family forest landowners plan to follow the "hands-off" approach to management Figure 25.[71]

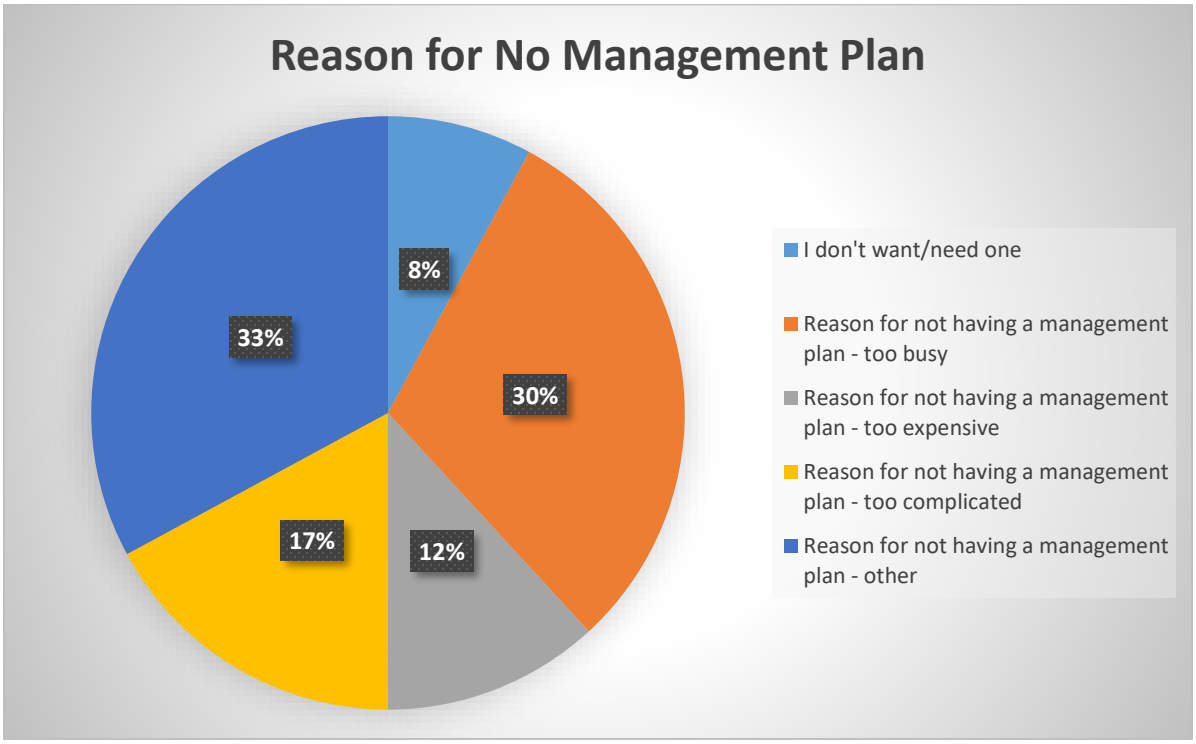


FIGURE 25 – REASONS FOR NO MANAGEMENT PLAN

2. Preservation Management

Preservation management is an active approach geared toward protecting unique and important resources and can include surveys of natural or historical resources, restoration of natural communities, enhancement of resources through invasive species removal, and ongoing maintenance.

The Office of Kentucky Nature Preserves (OKNP) protects and manages a diverse system of 41 state nature preserves and six state natural areas across the Commonwealth, from Mississippi River wetlands to Pine Mountain on the Virginia border, totaling over 25,000 acres. Activities center around several key focus areas: natural community restoration and management; rare species protection and enhancement; research and education; hiking trail maintenance; and the Registered Natural Areas Program. In areas with old-growth forest, rare or endangered species, or other unique natural resources, preservation management regimes

are used to protect these resources for future generations.

3. Recreational Management

Forest recreational use is widespread throughout Kentucky. Forest management may be focused on accommodating many types of recreation and minimizing the impacts of such use. Some active recreational uses, such as horseback and ATV riding, can be in competition with one another for trail utilization. Some passive recreational activities such as bird watching can compete against other interests. Therefore, managing for recreational use often involves active planning, proper trail design, and area use designations. Recreational trails also require regular maintenance due to the impacts of erosion and injury to surrounding vegetation caused by improper use, the spread of invasive species along the corridors, hazard tree removal, and maintenance of bridges or other human-made structures. Recreational managers may also enhance the aesthetic qualities of forests by planting along corridors or providing educational opportunities through interpretive signage. As the recreational use of Kentucky's forests expand, the need for increased management will also escalate.

4. Wildlife Management

Active forest management for wildlife in Kentucky is very common. The economic benefits for those willing to lease land for hunting or other recreational activities, aid in this popularity. Game species such as white-tailed deer, turkey, bobwhite quail, and waterfowl are primary management objectives. Forest management can be augmented with techniques to directly enhance wildlife habitat for these game species, and at the same time, non-game species. Wildlife management can be easily incorporated into existing forest management plans.

Wildlife can provide many aesthetic and recreational benefits to landowners such as wildlife viewing, hunting, and fishing. Some birds disperse acorns and other seeds while others consume insects that would otherwise damage trees. Bats reduce mosquito populations. Earthworms help to turn over the soil and recycle nutrients. Numerous other complex relationships between wildlife are present in forests.

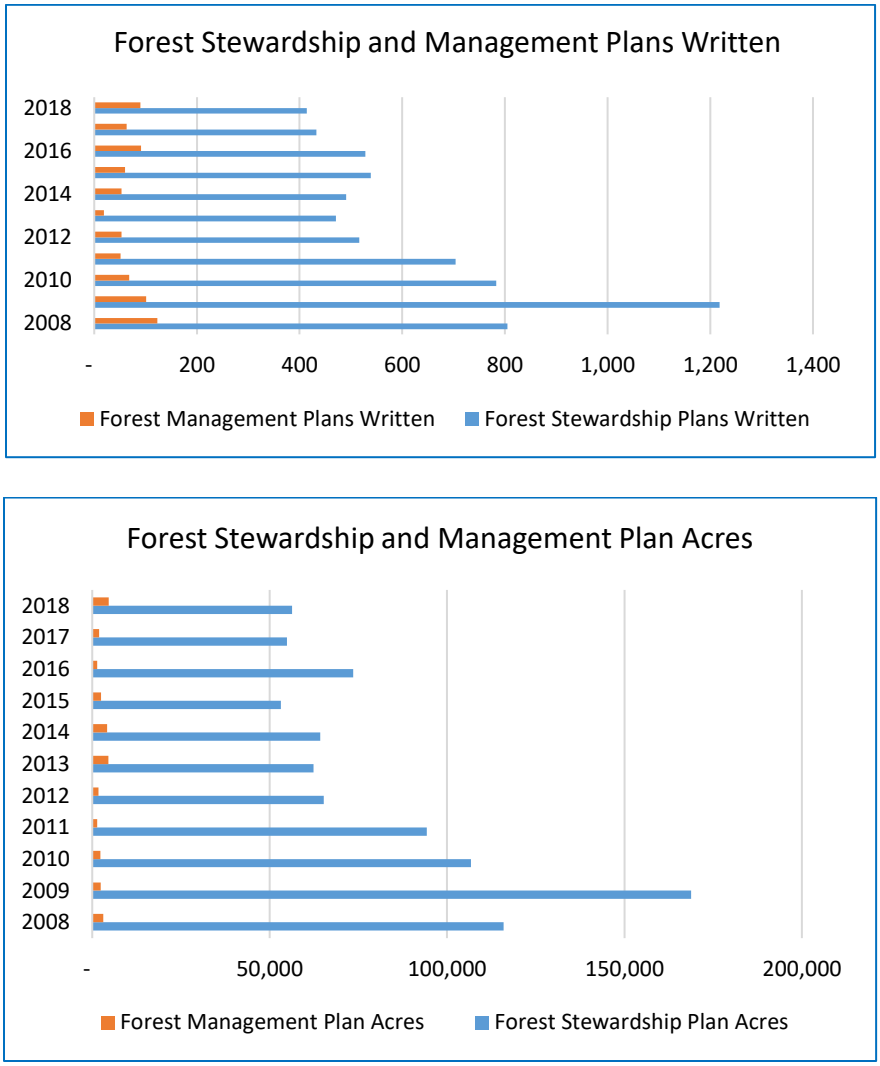
Specific actions to create a variety of wildlife habitat primarily relate to a diversity of timber harvesting. Examples of specific actions include leaving mature trees in a stand to enhance structural diversity, retaining a variety of species/age-structure trees, clearcutting in small areas, and retention of snags (standing dead trees) to provide nesting habitat. Additional wildlife benefits may be obtained with natural regeneration techniques such as seed tree cuts and shelterwoods, and with management practices such as mid-rotation thinning and prescribed burning. Management strategies such as these are commonplace to promote habitat for threatened and endangered federal and state listed species. In Kentucky, the most notable example is the Indiana bat.

5. Sustainable Forest Management

Sustainable forest management (SFM) can be described as the attainment of balance between society's increasing demands for forest products and benefits, and the conservation and maintenance of forest health and diversity. In Kentucky, SFM is the primary approach advocated by the KDF to assist private forest landowners, and is utilized on state-managed forestlands.

The Kentucky Forest Stewardship Program is one avenue by which the KDF promotes SFM to private forest owners. The service is provided for free to private forest owners who own ten or more acres of forestland and desire proper timber production, improved wildlife habitat, clean water, scenic beauty, or improved

recreational use. The distribution of Forest Stewardship and Forest Management plans and associated plan acres are shown on Figures 26A and 26B.



FIGURES 26A AND 26B – EXISTING FOREST STEWARDSHIP PLANS AND ACRES

State forests are also managed by the KDF and its partners using the sustainable management approach to ensure biological diversity and sustainable use. They are managed as working forests, and education demonstration areas exist in each. Figure 27 shows the location of the ten current state forests.

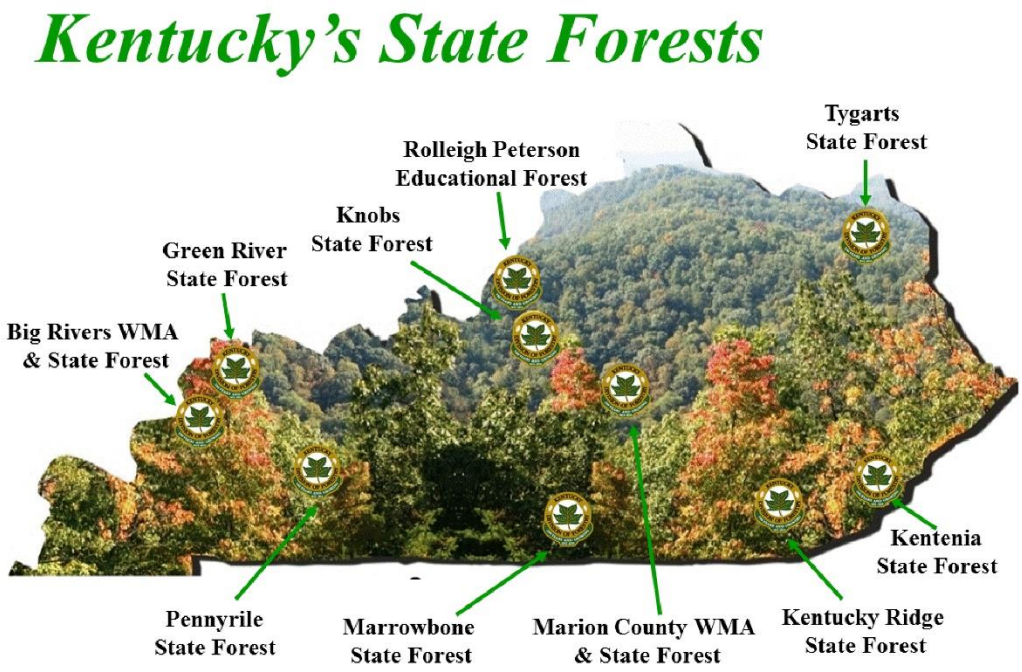


FIGURE 27 – KENTUCKY STATE FORESTS

6. Urban and Community Forest Management

Urban forests encompass all of the trees in a community. The numerous benefits provided by urban forests can be enhanced and sustained through active management, effective planning and ordinance development, strong municipal leadership, and community involvement.

In larger urban areas as well as smaller communities, trees help reduce temperature extremes and noise levels, conserve energy, improve mental and physical health, enhance economic development, increase property values, slow traffic patterns, improve air and water quality, and help mitigate stormwater runoff. Trees also add character to cities and towns by providing aesthetic buffers, softening the outline of human-made structures, and providing space definition and landscape continuity. Trees create feelings of relaxation and well-being, provide privacy and a place for recreation, provide a sense of solitude and security, enhance student's focus, increase workplace satisfaction and job performance, and have even been shown to shorten post-operative hospital stays when patients are given room views of trees and open spaces. Despite these advantages, communities suffer from improperly planted, poorly maintained, or neglected trees. Often urban forestry objectives are low priority in smaller communities and are unfunded.

The Kentucky Urban and Community Forestry Council, whose mission is to improve urban forest management, serves in an advisory role to the KDF on urban forestry-related issues throughout the state. The Council supports urban forestry work by providing a forum of learning and information distribution and by participating in active research to determine the most effective ways to manage urban forests.

In several larger Kentucky communities, cities have carried out tree canopy analyses to determine overall canopy coverage, areas most in need of tree canopy, and strategies for addressing low tree canopy areas. Invasive insects such as the Emerald Ash Borer have had a profound impact on tree canopy in Kentucky communities over the past ten years, and a tree canopy analysis can help prioritize planning, planting needs and opportunities. Additionally, Louisville conducted a heat island study to determine the dangers facing the city as a result of the urban heat island, and actions that the city, residents, and businesses can take to mitigate urban heat.

Non-profit organizations, educational institutions, and other urban forestry-related entities play a key role in addressing tree canopy issues, improving management of our urban forests, and engaging communities. Trees Louisville, Inc. and Louisville Grows are well-established organizations that service the Jefferson County area and work directly with public schools and communities. Trees Lexington is a newly established organization addressing Lexington's tree canopy issues. The Urban Forest Initiative (UFI), which is part of the University of Kentucky, is working to elevate the perception, value, and function of the urban forest on UK's campus, in Lexington, and in other areas of Kentucky. The Northern Kentucky Urban and Community Forestry Council (NKUCFC) works in northern Kentucky to improve the management of trees and greenspaces for the protection and enhancement for future generations. The Nature Conservancy of Kentucky, in cooperation with University of Louisville, the National Institutes for Health, Louisville Metro Government and other partners is carrying out the Green Heart project in Louisville, which examines the impact of urban greening on human health. Additionally, tree boards throughout the state play an important role in addressing communities' needs by working directly with municipal governments and local partners.

The Arbor Day Foundation's Tree City USA®, Tree Campus USA®, and Tree Line USA® programs, in cooperation with the USFS, the National Association of State Foresters, and state forestry agencies, provides direction, technical assistance, public attention, and national recognition for communities, colleges, and utilities that manage their urban forests and public trees. Communities, colleges, and utilities that participate in these certification programs follow a management framework to enhance, expand, and protect trees.

B. Direct Threats

While each of the forest health-related threats are also threats to forest management, forest management itself is threatened by the fact that management in the predominantly privately-owned forests of Kentucky (and the Southeast in general) is not commonplace. Part of this problem may also be a lack of awareness about the services available from the KDF and the Kentucky Association of Consulting Foresters. Many of the private landowners do not understand long-term investment opportunities associated with timber value and some may not understand that the timber has any value at all, particularly on small lots. Even when private landowners harvest their timber they seldom request the advice and services of consulting foresters or the KDF. Therefore, the only way to reach them may be through outreach programs, public notices and direct contact. Many such programs exist, but may require targeted expansion to particular regions, such as eastern Kentucky. In addition, the capacity reduction at the KDF has lengthened the time required to prepare a management plan, which may dissuade some forest landowners.

Others may know about the services available, but may not be interested due to the risks. Natural risks such as wildfire, wind damage, ice damage, and drought can damage the forest at any given time during the rotational period, which may range up to 80 to 100 years. Insects, diseases and non-native invasive plant species may also be expensive to manage and may result in substantial losses to the forest.

The risk of decreasing timber values may also deter landowners from management. The wood industry that produces products such as cabinets, hardwood flooring, millwork, cooperage, dimension components, hardwood pallets, crossties, etc., both in Kentucky and nationally, has experienced market fluctuations. The health of the secondary wood industry is directly connected to the national economy and specifically to housing starts and remodeling, for which many of the products produced by the industry in Kentucky are manufactured.

Others may be affected by the long-term commitment that forest management requires. Forest management is labor intensive and can be expensive. Many private forest landowners in Kentucky are 55 years of age or older. Many landowners may not be able to physically manage the manual labor or find help willing to aid in the work. The lack of market for woody debris and low quality trees makes such work undesirable for commercial loggers. Investments made today by landowners may not be recovered for several years and may not be recovered by the current landowner of the property. Considering the risks involved in long-term forest management previously discussed, some landowners are just not willing to invest the time and expense required. Although several cost-share programs are available to landowners, there still seems to be a lack of incentives attractive enough to encourage them to pursue forest management opportunities. Distance from the property may also be factor.

Other possible factors responsible for a lack of management include:

- Disconnect from the forests
- Multiple owners with competing interests
- Public perception with "ugly" harvesting
- Mistrust of government / technical advice / funding
- General lack of priority for landowners
- Change in demographics from rural to urban society with diverse values

C. Opportunities

1. Certification Programs

Certification programs promoting sustainable forest management continue to be an opportunity for Kentucky forest landowners to gain recognition and provide an avenue of certified forest products into the marketplace locally, regionally and nationally. Management plans developed by the Kentucky Division of Forestry and forestry consultants play a very integral part in all certification programs within the state.

a. American Tree Farm System® (ATFS)

ATFS certifies land management to the American Forest Foundation's Standards of Sustainability. Under these standards, private forest landowners must develop a management plan and pass an inspection by an ATFS inspecting forester.[72] As of 2019, the Kentucky state tree farm program had 619 certified tree farms encompassing 144,748 acres. ATFS reinforces its commitment to forest conservation through continuing education opportunities and outreach activities. ATFS certification is currently free for landowners.

b. Sustainable Forestry Initiative® (SFI)

Sustainable Forestry Initiative® (SFI) Inc. is a fully independent, non-profit organization dedicated to promoting sustainable forest management. Both SFI and ATFS are part of the international non-profit, non-governmental organization, *Programme for the Endorsement of Forest Certification* (PEFC). SFI works with

conservation groups, local communities, resource professionals, landowners, and countless other organizations and individuals who share its passion for responsible forest management. The SFI forest certification standard is based on principles that promote sustainable forest management, including measures to protect water quality, biodiversity, wildlife habitat, species at risk, and forests with exceptional conservation value.

The Kentucky SFI Committee is a subcommittee of the Kentucky Forest Industries Association (KFIA), and hosts an open meeting at the KFIA annual meeting to discuss on-going projects and to provide a general program update. The SFI committee has been a valuable financial sponsor and supporter of certifying Kentucky state forests and the KDF is a member of the committee.

c. The Forest Stewardship Council (FSC)

Forest Stewardship Council is a non-profit organization devoted to encouraging the responsible management of the world's forests. FSC sets high standards that ensure forestry is practiced in an environmentally responsible, socially beneficial, and economically viable way. Landowners and companies that sell timber or forest products seek certification as a way to verify to consumers that they have practiced forestry consistent with FSC standards. Independent certification organizations are accredited by FSC to carry out assessments of forest management to determine if standards have been met. These certifiers also verify that companies claiming to sell FSC certified products have tracked their supply back to FSC certified sources. This chain of custody certification assures that consumers can trust the FSC label.

FSC's model of certification allows products that flow from certified forests to enter the marketplace with a credential that is unique. Any FSC-labeled product can be traced back to a certified source. This aspect of the system is the basis for any credible certification system and is the link between consumer preference and responsible, on the ground forest management.

FSC certification within Kentucky has been accomplished by group certifiers under the auspices of the University of Kentucky, Center for Forest and Wood Certification, (CFWC). The CFWC reduces landowner costs by participating in group certification and also by having their forestland "dual" certified by FSC, ATFS and SFI.

2. Urban Forestry Programs

Urban forests provide economic, environmental, human health, and social benefits to communities. The KDF's urban and community forestry program helps communities develop long-term, self-sustaining programs to create stronger, healthier, more economically viable, and safer communities across Kentucky. These goals are accomplished through:

- Technical assistance to municipalities, nonprofit organizations, tree boards, educational institutions, and private landowners;
- Support for green infrastructure projects, community programs, and other urban and community forestry work through grant funding;
- Educational opportunities and support for the KDF field staff, communities, and institutions and related programs and events;
- Administration of Arbor Day Foundation certification programs.

a. Tree City USA®, Tree Campus USA®, and Tree Line USA® Programs

The Arbor Day Foundation's Tree City USA®, Tree Campus USA®, and Tree Line USA® programs,

administered by the KDF, provide a framework for communities, colleges and utility companies to manage and expand their public trees. Tree City USA® program provides direction, assistance and national recognition for communities that have a sustainable urban forestry program. Tree City USA® communities realize numerous benefits:

- Framework for action – provides direction for urban forestry programs.
- Financial benefits – reduced costs for energy and stormwater management, boosts property values.
- Education – connects communities to state forestry partners, organizations and individuals.
- Community pride – recognition promotes tree care, volunteer opportunities, and builds stronger ties in neighborhoods.
- Publicity – the Tree City USA® award and the celebration of Arbor Day show recognition for the valuable work carried out in the community.

The city of Lexington has the longest active enrollment in the Tree City USA® program in Kentucky totaling 31 years. Currently, 38 communities are recognized as a Tree City USA®.

The Tree Campus USA® program recognizes colleges and universities that use effective tree management programs, connect with the community to foster healthy urban forests, and engage the student body in campus urban forestry projects. To be recognized as a Tree Campus USA®, colleges must have a campus tree advisory committee, a tree care plan, a tree program with dedicated annual expenditures, an Arbor Day observance or event, and provide a service learning project according to the program standards. Currently, 11 campuses are recognized as a Tree Campus USA®.

The Tree Line USA® program recognizes utility companies that focus on best practices of quality tree care, annual worker training, and tree planting and education. Currently, three utility companies are recognized as a Tree Line USA®.

b. Arbor Days

Kentucky celebrated its 123rd Arbor Day in 2019. County Judge Executives across the Commonwealth signed proclamations for Arbor Day. A total of 199,740 tree seedlings were sold and distributed for Arbor Day and other spring events in 2019.

c. Community-Based Reforestation

Annually, three large community-based reforestation events occur in Kentucky. These events focus on expanding urban forests and protecting waterways through community tree planting, education, and improving the environment, economy, and quality of life in the region.

- Reforest the Bluegrass – 20th year in Lexington, where over 1,000 volunteers planted 8,000 trees.
- Reforest Northern Kentucky – 13th year in northern Kentucky, where 200 volunteers planted 2,000 trees.
- Reforest Frankfort – 11th year in Frankfort, where 800 volunteers planted 1,200 trees.

3. Cost Share and Grant Programs

The KDF partners with a variety of federal and state cost-share programs in order to help landowners finance the implementation of forest management practices. Table 22 lists some of the more common programs and their funding sources.

The Kentucky Heritage Land Conservation Fund (HLCF) also provides a source of funding for land

preservation and conservation.[73] The HLCF funding is generated through the Nature License Plate, unmined minerals tax, and environmental fines. Access to the HLCF is focused on:

- Natural areas that possess unique features such as habitat for rare and endangered species
- Areas important to migratory birds
- Areas that perform important natural functions that are subject to alteration or loss
- Areas to be preserved in their natural state for public use, outdoor recreation and education.

These funds are distributed 50% to local governments, colleges, universities, and other agencies, 10% to the KDFWR, 10% to the Department of Parks, 10% to KSNPC, 10% to the Kentucky Wild Rivers Program, and 10% to the KDF.

Although many such cost-share programs are available, they often require a Forest Stewardship Plan in order to receive the funding. The KDF currently lacks the number of foresters necessary to meet the increased public demand for providing stewardship and management plans.

TABLE 2 – COMMON COST-SHARE PROGRAMS FOR FORESTRY PRACTICES

COST-SHARE PROGRAM	PROGRAM OBJECTIVE	APPLICABILITY AND RATES
Conservation Reserve Program (CRP)	Restore riparian corridors in crop and pastureland; remove highly erodible cropland from production	50% over 10 to 15 years but with an annual rental payment based on site productivity
Environmental Quality Incentives Program (EQIP)	Promote agricultural production, forest management, and environmental quality to optimize environmental benefits	Incentive payments available to complete conservation improvements in 1 to 10 year contracts
Healthy Forest Reserve Program	Easement program to restore, enhance, and protect forest ecosystem functions	30-year contracts and 10-year cost share agreements; restricted to Cumberland River Basin Watershed
Conservation Stewardship Program	Conserve and enhance soil, water, air, and related natural resources	Annual payments on 5 year contracts for new and existing activities

4. Economic Incentives

Economic incentives are often the easiest way to promote new ideas. Due to the financial significance of forest-related products, Kentucky stands to benefit greatly from sustainable management. Traditionally, wood products have stimulated forest management, and practices such as agroforestry provide alternative ways to produce revenue on forestland. Currently, many policies are being discussed and developed nationally regarding carbon sequestration and biofuels for energy.

a. Wood Products

The U.S. is the world's leading producer of lumber and wood products used in residential construction, and in commercial wood products such as furniture and containers. Nationally, Kentucky continues to fluctuate between the third and fourth largest hardwood lumber producing state. As of 2019, Kentucky' forest economy contributes $13.5M to the Commonwealth's economy when all direct, indirect, and induced benefits are included. Forest product industries are found within 113 of Kentucky's 120 total counties[8].

Urban wood utilization provides municipalities and communities with an opportunity to reduce tree removal expenses to the landfill, especially after catastrophic mortality resulting from insect damage to community and street trees. Both traditional and local niche wood markets can also capitalize on urban wood utilization after windstorms or tornadoes, aiding communities in reducing clean-up costs and lessening impacts on local landfills. Communities such as Lexington, Louisville, and northern Kentucky have shown some interest in utilizing their hazard trees after insect infestation and storm related events into wood products in addition to providing mulch. Some loggers in the interface areas have shown interest in working with local tree service companies to salvage urban trees and the interest is expected to continue to increase. In some interface areas of the state, it is not uncommon for homeowners (hobbyists) or larger landowners to own and operate portable sawmills which is ideal to utilize urban wood.

Non-timber forest products (NTFP) derived from the forest include ginseng (most valuable, with annual harvests of several million dollars), bee products, native and exotic mushrooms, maple syrup, craft materials, fence posts, and fuel wood are examples of additional economic opportunities. A 2016, University of Kentucky, College of Agriculture publication on Ginseng by Cheryl Kaiser and Matt Ernst stated Kentucky led the nation in wild ginseng production. At that time Kentucky was one of 19 states with an approved wild ginseng export program. During the 2019-2020 ginseng season in Kentucky, state agriculture records have 95 individuals registered with a continued interest in ginseng harvest within the forests of the state.

b. Biofuels

Wood is a renewable resource that can be stored in various forms and is available in most of the U.S. Biomass is a term used to describe plant materials, especially those that can be converted to some form of energy or fuel. Biofuels (fuels from biomass) are attractive sources of energy because they are renewable. Biofuels are considered carbon-neutral which means that the carbon released when these materials are used for energy is absorbed at about the same rate by the plant materials grown to replace what initially was used.

The KDF has supported past forest biomass utilization research and efforts through membership of the "Statewide Wood Energy Team" (SWET) coordinated through the state Office of Energy Policy. Combined Heat and Power (CHP) development utilizing forest and industry residue in eastern Kentucky has been a focus with researchers of the University of Kentucky. Firing woody biomass with coal and other additives is also being researched and may have significant future implications upon the state forestry sector.

Research of sustainable harvesting techniques is particularly important due to the increased risk of soil erosion and impacts to water quality, as well as threats to forest communities. In preparation of the utilization of woody biomass into the future and protection of forest sustainability, the KDF formulated "**Recommendations for the Harvesting of Woody Biomass" (2011).** Development of woody biomass products is forecasted to provide future jobs and income, decrease energy costs, and provide landowners an opportunity to grow trees on a short rotation.

c. Agroforestry

Agroforestry is an integrated agricultural method that employs the interactive benefits of combining trees and shrubs with crops and/or livestock. It combines agricultural and forestry technologies to create more diverse, productive, profitable, healthy, and sustainable land use systems. Agroforestry provides many livelihood and environmental benefits, including:

- Enriching the asset base of poor households with farm-grown trees
- Enhancing soil fertility and livestock productivity on farms

- Linking economically challenged households to markets for high-value fruits, oils, cash crops and medicines
- Balancing improved productivity with the sustainable management of natural resources
- Maintaining or enhancing the supply of environmental services in agricultural landscapes, for water, soil health, carbon sequestration and biodiversity
- Some of the under-utilized agroforestry practice opportunities in Kentucky include managing for water quality via riparian plantings, (the most prevalent method), shelterbelts, windbreaks, silvopasturing systems and producing nut tree orchards in coordination with grazing opportunities. With nearly half of Kentucky's land base in agriculture, there exists a tremendous opportunity to promote agroforestry and its benefits to traditional landowners managing annual crops, and livestock.

d. Carbon Sequestration and Markets

The demand for carbon marketing has fluctuated over the last decade due to international, national, and state politics related to the Climate Action Plan, cap and trade legislation proposals, and the repeal of the 2017 Clean Power Plan. Recently, California's cap and trade legislation, along with increased interest in Oregon, have provided a catalyst of renewed interest by Kentucky forestland owners to participate in their carbon offset projects. Currently, three major carbon registries exist within the US: the **Climate Action Reserve Registry**, the **American Carbon Registry**, and the **Verra**. In 2021, the airline industry has plans to utilize the **Corsia** Registry (currently in development) to substitute the current taxing scheme of international flights being taxed differently between destination points. In an effort to treat all airlines fairly, the plan is to utilize the carbon-offset market uniformly over all international airspace to compensate for the taxing irregularities encountered between countries.

The Kentucky Chapter of the Nature Conservancy, which promotes the TNC's Working Woodlands Carbon Program, estimates approximately 170,000 acres of Kentucky forestland have carbon projects by private developers, (such as TIMO's), and other aggregators, under the California regulatory market as "Improved Forest Management" projects. There also exists to a much lesser extent, "volunteer" market carbon projects which are less financially lucrative than the "regulatory" markets. It is unknown how many acres of Kentucky forests are included within that market category. Overall, demand for forest carbon credits have been increasing, and projections suggest this demand will continue to rise in the near future.

To determine the extent and general location of forestry carbon marketing within the state, three different carbon registries were researched: the Climate Action Reserve, the American Carbon Registry, and Verra. Data retrieved from the carbon registries indicate that approximately 170,000 acres of Kentucky Forestland is currently under contract for carbon credits. (April 2019)

Kentucky's Berea College, which comprises approximately 7,500 forested acres in Madison County, has an Improved Forest Management Project financed by New Forest, and is registered with California's Climate Action Reserve Program. The carbon offset credits will be used for compliance in the Air Resources Board of California's greenhouse gas cap and trade program.

In addition to the Berea College project, information from the Climate Action Reserve Registry shows Improved Forest Management carbon projects for approximately 27,675 acres located in Bell, Knox and Whitley counties; 39,630 project acres located in Lewis, Greenup, Carter, Elliott, and Lee counties; and another 38,625 project acres located in Wayne, Pulaski, McCreary, Harlan, Letcher, Pike, Floyd, Magoffin, Johnson, Morgan, Lawrence and Martin counties.

The American Carbon Registry references two main forest carbon projects for an approximate total acres of 55,500 located within Bell, Breathitt, Clay, Estill, Harlan, Jackson, Knox, Lee, Leslie, Letcher, Magoffin, Owsley, Perry and Whitley counties. Robinson Forest, (Perry, Breathitt, and Knott counties) managed by the University of Kentucky's Department of Forestry, has approximately 10,000 acres of forestland enrolled under the *Working Woodlands Carbon Program*, of the Kentucky Chapter of the Nature Conservancy. Other known carbon aggregators working within Kentucky include:

- GreenTrees (CORSIA emerging market opportunity)
- Ducks Unlimited (CORSIA emerging market opportunity)
- FORECON Ecomarket Solutions, LLC

e. Tax Credits and Deductions

A reforestation tax credit and amortization deduction allows landowners to potentially deduct for qualifying reforestation expenses on qualifying property when reporting federal income taxes. Many forestry management costs and cost-sharing funds, including site preparation, seedlings or seeds, planting, tools, and depreciation on equipment could be included; however, landowners should always check with a certified public accountant or tax advisor to determine eligibility concerning tax laws since they can change on an annual basis.

5. Education

Education opportunities are an important part of increasing the amount of management occurring on Kentucky's forestlands. Some educational efforts on forest management include the woodland owners' short courses, carbon sequestration information, timber theft and trespass information, assessing storm damage, timber tax information, ATFS and Kentucky Woodland Owner's Association information, Kentucky Firewise Community Grants Program, and forestry education for the general public. One specific example of how educational efforts could be expanded is increased distribution of the *Kentucky Woodlands Magazine,* an important resource for non-industrial private forest owners.

The Woodland Owner Short Course is an excellent educational opportunity available for private forest landowners. Through a partnership of University of Kentucky Department of Forestry, KDF, and numerous other agencies and organizations, courses for children and adults of all experience levels aid in educating the public on how management goals may be achieved. The day-long courses are periodically available for minimal costs at select locations throughout the state. By expanding the geographic locations offering the courses as well as their frequency, the participation in this educational opportunity may be expanded.

ISSUE 5: FUNDING

Kentucky forests are home to invaluable resources from which a variety of benefits to Kentucky residents, both ecologic and economic, is derived. Our forests provide the basis for timber production, wildlife habitat, quality water, recreation opportunities, and aesthetic beauty for residents and tourists alike. Kentucky is among the largest hardwood-producing states, contributing over $13.5 billion in 2017 from the wood products manufacturing sector, and employing over 26,500 Kentuckians.[74] While financial gains from timber production are perhaps the most obvious, the abundant forested areas of Kentucky simultaneously provide woodland wildlife habitat and recreation opportunities, both of which can translate to tourism dollars derived annually from fishing, hunting, and wildlife watching in and adjacent to Kentucky forests.

To ensure proper management, the Commonwealth must work with many different individuals and entities to bring forests under a management plan. Kentucky forests are primarily owned by private individuals, and many own plots less than 50 acres in size.

TABLE 3 – DIVISION OF FORESTRY PROGRAM FUNDING SUPPORT, 2012 – 2018
(Thousands of Dollars)

FUNDING SOURCE	2018	2016	2014	2012
Federal	$ 2,335,300	$ 2,416,100	$ 3,592,100	$ 3,473,000
State	$ 13,779,000	$ 14,566,300	$ 12,826,000	$ 14,175,000
Product Sales Revenue	$ 378,800	$ 334,100	$ 407,919	$ 632,000
Other Revenue	$ 1,203,700	$ 674,000	$ 540,981	$ 524,000
Revenue Total	$ 1,582,500	$ 1,008,100	$ 948,900	$ 1,156,000
Total	**$ 17,696,800**	**$ 17,990,500**	**$ 17,367,000**	**$ 18,804,000**

(Source: http://www.stateforesters.org/publication-type/stats) State funds include reimbursements for wildfire fire suppression averaging more than $3.5 million annually. State funds for personnel and operating remain around $10 million.

A. Current Status of Kentucky Division of Forestry Funding

Funding for Kentucky forests should be driven by one goal – proper forest management that results in a healthy, productive forest ecosystem that is the source of long-term sustainable revenue and benefits to all of Kentucky. The economic benefits realized by landowners and industry will benefit Kentucky's economy as well as all citizens. While forest uses and their associated benefits are varied and necessary, proper forest management driven by sustainable development will lead to the creation of reliable income to landowners, and in turn increased tax revenues to the state and local communities, forestland wildlife habitat, improved water quality, and recreational opportunities from an aesthetically-pleasing forest.

The KDF is the primary state agency charged with providing for the protection and enhancement of the Commonwealth's vast forest resources. The sources of its funding, shown for 2012 to 2018 in Table 3, are primarily from state and federal funds, and to a lesser degree, agency revenues. These numbers indicate a gradual decrease in total available funding from 2012 to 2018. The KDF has seen a reduction in federal funds due to the decline of available federal funding for the Stewardship & Urban programs. Because of reduced general funds, the KDF underwent a reorganization in February 2013. This resulted in a reduction

of the work force from 188 to 154 employees. In 2016 and 2018, the Governor issued an executive order for state funding budget reductions, which resulted in 2.5% - 3.0% less or fewer funds appropriated to the agency. The current personnel cap for the division is set at 129 full-time employees.

In recent years, the agency has implemented new initiatives to increase revenues to offset the loss of funding. The slight increase in agency earned revenue is due to assisting with out-of-state all risk response with the Southern Compact and U.S. Forest Service nationwide. The KDF also assists other local state and federal agencies with prescribed fire burns to help mitigate the risk of wildfires.

Funding and staffing levels are a challenge for the KDF, and do not support the many programs and services mandated by KRS 149. Recent expenditures and staffing levels are shown in Tables 4 and 5 respectively. Personnel levels have steadily decreased and state funding for forestry programs is not likely to improve in the foreseeable future.

TABLE 4 – DIVISION OF FORESTRY EXPENDITURES, 2012 – 2018
(Thousands of Dollars)

PROGRAM	2018	2016	2014	2012
Fire Control / Protection/ Management	$ 6,655,200	$ 8,337,300	$ 7,954,837	$ 9,903,000
State Forest Management	$ 405,200	$ 360,700	$ 275,619	$ 463,000
Cooperative Forestry Management / Landowner Assistance				
State Programs (state funds spent on state landowner assistance programs including technical assistance & cost-share programs)	$ 2,540,000	$ 1,529,800	$ 1,628,408	$ 343,000
USFS Programs (Forest Stewardship, Forest Legacy, etc)	$ 306,000	$ 3,117,800	$ 221,622	$ 2,268,000
Farm Service Agency / NRCS Programs	$ 100,500	$ 24,300	$ 127,242	$ 483,000
Forest Products Utilization & Marketing	$ 111,800	$ 173,200	$ 157,913	$ 100,000
Forest Health	$ 515,700	$ 606,300	$ 357,262	$ 451,000
Urban & Community Forests	$ 278,300	$ 308,600	$ 277,873	$ 228,000
Nursery	$ 700,100	$ 760,400	$ 881,963	$ 960,000
Forest Recreation	N/A	N/A	N/A	$ 50,000
Forest Inventory and Analysis	$ 754,800	$ 756,000	$ 578,540	$ 716,000
Watershed / Water Quality Protection / BMP	$ 1,144,200	$ 915,600	$ 1,239,452	$ 754,000
Other	$ 4,185,000	$ 1,100,500	$ 3,666,269	$ 2,085,000
Total Expenditures	**$ 17,696,800**	**$ 17,990,500**	**$ 17,367,000**	**$ 18,804,000**

(Source: http://www.stateforesters.org)

TABLE 5 – DIVISION OF FORESTRY PROGRAM PERSONNEL, 2012 – 2018

STAFF CLASSIFICATION	2018	2016	2014	2012
Managerial	19	28	28	24
Professional	56	68	68	74
Technician	59	69	69	92
Administrative / Clerical	14	14	14	21
Seasonal / Temporary	157	108	108	106

(Source: http://www.stateforesters.org)

The lack of resources is illustrated with the timber harvesting requirements of the Kentucky Forest Conservation Act (KFCA) of 1998. Under this Act, commercial timber harvesting loggers and operators are required to use appropriate BMPs, and have a Kentucky Master Logger on site and in charge of all commercial logging operations. The KDF is required to inspect logging operations for compliance with both provisions. Although these actions are progressive, the General Assembly did not provide for an increase in staff or funds to the KDF for the inspection of commercial timber harvests. The KDF had to redirect personnel performing other duties to the commercial timber harvesting inspection and enforcement program. This program was and continues to be an unfunded mandate. The Act does provide for fines collected as a result of non-compliant commercial logging operations, to be placed in a dedicated Stewardship Incentives Fund. This fund is to be used by the division for cost-share programs that provide financial assistance to landowners for the development of stewardship plans, and for stewardship practices. However, fines collected by the division have not been substantial enough to implement a state cost-share program. An additional influx of funding would be necessary to begin a state cost-share program.

Increased funding levels are important, particularly because private landowners (including non-timber corporate owners), control approximately 88% of the forested land in Kentucky.[4] About one-third of these private holdings represent small plots of 50 acres or less. These smaller parcels are highly fragmented and more difficult to manage for timber and wildlife resources, as well as protecting watersheds. However, these small parcels have significant value. In 2016, privately-owned Kentucky forests created 5.7 jobs per 1,000 acres, and generated $223 in payroll per acre when the direct, indirect, and induced benefits are included. Per acre, these forests also contributed $170 to the GDP.[75] While these values are significant, they are below regional averages[75], and therefore could be improved with proper forest management.

Mismanaged, poorly managed, or unmanaged forests are less productive. Funding supporting education, outreach and development of management plans for these private landowners is crucial in positioning landowners to qualify and receive all federal funding opportunities contained in the Federal Farm Bill.

Funding is also important due to the high degree of fragmentation in Kentucky's forests. As discussed in Issue 3, large tracts of continuous forest lead to healthier, more productive forests that are more ecologically functional and aesthetically pleasing. Small, scattered tracts of forests are more difficult to manage and of limited value to wildlife and outdoor enthusiasts. Managing small, scattered forests requires more time and money (*e.g.,* traveling between sites, management plan development, etc.). Therefore, funding in the form of federal, state, and local programs must address these small forests to be effective in managing all of Kentucky's forest resources for the future.

As mentioned, many programs within the KDF would benefit from increased funding. In particular, funding could be targeted for forest assessments and monitoring, conservation assistance programs to landowners including the Forest Stewardship Program, cost-share programs, Kentucky HLCF, and the Urban and Community Forestry Program.

The KDF's reliance on unpredictable federal and state funds has resulted in the loss of personnel due to fund reductions. Opportunities to seek private or other funding must be seized at every opportunity. The KDF should enter into partnerships with non-profit organizations that can provide additional funding for forest conservation and enhancement. The KDF should train and make available employees for all-risk incident support within and outside of Kentucky. Prescribed fire assistance could also generate funds for the KDF.

B. Economic Overview of Kentucky's Timber and Non-Timber Industries

Kentucky's forests provide an essential revenue stream throughout all levels of the state and local economies. Proper forest management driven by sustainable development will lead to the creation of reliable income to landowners, as well as increased tax revenues to the state and local communities. Proper forest management does not happen in a vacuum. Funding is often needed to provide education and service programs to assist property owners in making the right decisions for their forestlands and to combat threats to the health of the forests. However, the prospect of increased economic returns due to forest management can be a promotional tool to accomplish these same ends. A brief overview of the importance of Kentucky's timber and non-timber forest products industries to the state's economy follows.

1. Timber Industry

Most Kentuckians do not realize the importance of the timber industry to the overall economy of the state. In 2018, more than 26,500 individuals were directly employed at wood-processing facilities, with a total annual payroll of $1.61 billion. When indirect and induced employment is included, the total employment numbers swell to over 60,000. The total economic contribution in 2018 was $13.51 billion. These facilities are spread throughout the state, as shown in Figure 28. Though timber production is often overlooked, it is a major component of the Kentucky economy.

The most common hardwood timber species in Kentucky for 2017 roundwood production include: red oak, white oak, (36%); yellow poplar (13%), ash (11%), black walnut (6%), hickory (5%). Other hardwood species included hard and soft maple, sweetgum, sycamore, and black cherry, black gum, beech and basswood.

Softwood timber production was primarily southern yellow pine (loblolly and shortleaf at 58%), and eastern red cedar (31%). The remaining documented softwood species utilized include cypress, hemlock, and white pine.

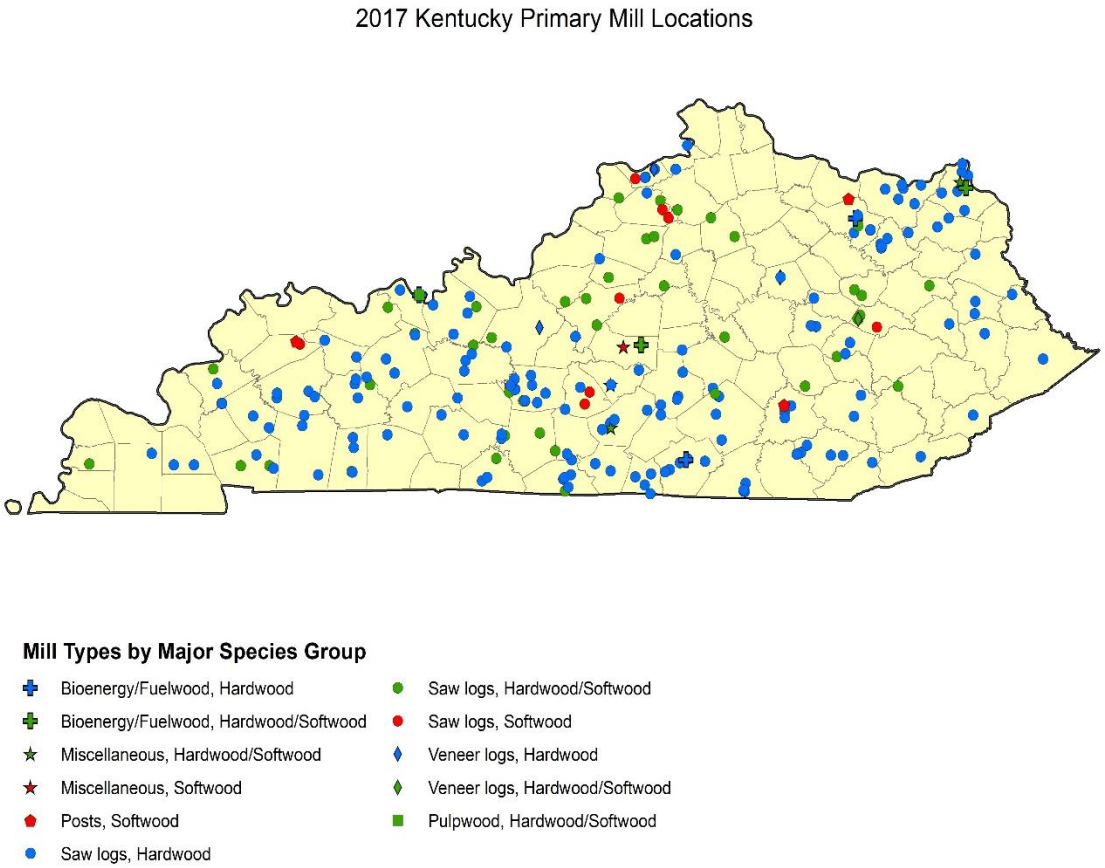


FIGURE 28 – PRIMARY WOOD-USING MILLS OF KENTUCKY, 2017

2. Non-Timber Forest Products

Kentucky's forests are rich in non-timber forest products (NTFP) such as herbs, roots, sap, bark, fruit, and wood gathered from, but not cut from, timber. Harvesting these products has been practiced for centuries, and it provided an important source of income for pioneer families. Renewed interest in herbal remedies and the herbal medicinal industry, as well as for ornamentals and food sources, has led to increased harvest of these resources by Kentuckians as well as non-residents. While the beneficial effects of some of these herbs remains anecdotal, demands are high for herbal remedies such as ginseng, black cohosh, bloodroot, coneflower, goldenseal, passionflower, slippery elm, and witch-hazel.

C. Public Benefits

Funding of proper forest management that results in a healthy, productive forest ecosystem will provide many benefits to all Kentucky residents. Forests are a multifaceted renewable resource, yet they cannot be maintained without cost, nor should those who enjoy them expect that forests are self-sustaining. By maximizing a forest's sustainability for the numerous end users, a reliable long-term tax base can be generated. Taxes generated from the timber and tourism industries can have a synergistic effect, as funds are reinvested into forest management and land acquisition, resulting in larger, more functional, and more productive forests.

In addition to tax generation, there are additional benefits of forestry funding to be realized by local residents, especially forest landowners. Educational and outreach programs are often the first to be eliminated in a budget shortfall, yet they are perhaps the most important for the long-term benefit of Kentucky's forests. The need continues for program coordinators devoted to forestry education programs at district or regional levels to easily reach Kentucky's forest landowners. Educational outreach can help landowners develop a forest management plan and teach local residents the inherent value of their forests. Cost-share programs (*e.g.,* EQIP) can be used to help landowners implement forest management plans via several avenues such as removing exotic pest plants and planting valuable forest tree species. Additionally, living in and adjacent to forested areas often increases property values as residents tend to view them as more aesthetically pleasing. Property values associated with forested areas are typically higher than those that are not.

Kentucky is home to one national forest (DBNF), two national recreation areas (Big South Fork and Land Between the Lakes), three national parks (Mammoth Cave, Cumberland Gap, and Big South Fork), ten state forests (Green River, Kentenia, Kentucky Ridge, Pennyrile, Tygarts, Knobs, Marrowbone, Big Rivers, Marion and Rolleigh Peterson Educational Forest), 88 wildlife management areas, 41 state nature preserves, and six state natural areas. Most of these holdings are at least partially forested. Kentucky also has large public forested land on military grounds including the Blue Grass Army Depot, Fort Knox Military Reservation, and Fort Campbell Military Reservation. The benefit to Kentucky citizens of these public holdings is significant, and the importance of preserving their forestland is high.

Because hunting, fishing and wildlife watching are significant social and economic activities in Kentucky, their enhancement should continue. The importance of forests is noted in the Department of Fish and Wildlife Resources' *Wildlife Action Plan,* so too is the importance of wildlife in this *Forest Action Plan.* Residents and non-residents alike use Kentucky's federal- and state- owned forests, parks, and wildlife management areas extensively for hunting, fishing, wildlife viewing, camping, hiking, horseback riding, mountain biking, and numerous other recreational activities. These activities, as well as tourists visiting the forests, represent a significant economic benefit to the Commonwealth. These activities improve the quality of life for those who seek solitude or adventure in Kentucky's forests.

D. Direct Threats and Contributing Factors

The threats to the forests of Kentucky have been identified in each of the forest issues. Additional funding would be required to address many of these issues. Some threats, however, are more directly tied to funding or the traditional timber and NTFP industries and are discussed below.

1. Economic Pressures to the Timber Industry

Kentucky's timber industry is closely tied to the global markets. Forest industry in the United States comprises 17% of global roundwood production, and the nation has the highest intensity of industrial roundwood consumption per capita. The impact of the 2007 recession on wood product demand is still reflected in inventory data, with a 19% decline in Southern timber removals between 2006 and 2016. However, that trend should reverse as housing markets continue to recover. Implementation of forest management plans will improve existing stands to maximize income derived from the timber source.[76]

Conversely, a shift from traditional hardwood products to fuel sources derived from woody biomass has potential to alter how forests are harvested. Large-scale production of woody biomass for various types of fuel could alter the age class of forests, with more focus on rapidly growing softwood species at the

expense and loss of larger, more valuable timber. A change in species diversity in the forests due to harvesting targeted towards biomass production would also negatively impact certain terrestrial species' habitat.

2. Emerald Ash Borer

Threats of invasive species have been discussed in other sections of this Forest Assessment, particularly in Issue 1. Yet the Emerald Ash Borer (EAB) poses a direct threat to exports of Kentucky's ash harvest. Foresters can mitigate for the loss of ash trees by planting other species, yet this is a long-term process to recoup the investment. In the short term, foresters can harvest mature ash trees prior to the arrival of EAB. Yet all these decisions are difficult to make and benefit from assistance from county extension agents. Funding to preserve these services is essential to the health of the Kentucky timber industry.

Loss of mature ash trees will also negatively impact the urban forests of Kentucky, where the loss of these large trees will be more readily noted by the general population. Notwithstanding, the loss of aesthetic value that these beautiful trees represent, the cost to cities and counties to remove dying trees and replace them with other species, poses a daunting challenge for already stressed municipal budgets.

3. Unsustainable Harvest of NTFP

The long-term health of the traditional timber and Nontraditional Forest Products (NTFP) industries suggests an increase in technical assistance, regulation, and oversight. Current harvest of some NTFP species may already be at levels that will lead to extirpation in Kentucky's forests. Proper management will allow continued harvests while maintaining the species for the economic benefit of the Commonwealth. Because of Kentucky's long history of unregulated NTFP collection by rural communities, changing from a short-term benefit (immediate income) to a long-term vision (sustain income stream for decades to come) is difficult to understand. Education is an essential tool to changing this mindset. The funding needed for this effort is likely significant and, at the present time, not available.

4. Woody Biomass Harvesting

Woody biomass offers great economic promise as an alternative fuel source for vehicles and electrical power, particularly in the short-term. Industries that sell pulpwood and other low-value factory lumber could divert it to biomass production. However, over-harvesting and poor management resulting from the emergence of this sector could threaten Kentucky's forests, the sustainability of the emerging industry, and the existing forest industries. As the market for woody biomass grows, it may reduce the availability of lumber for production of pallets, charcoal, railway ties, etc. Long-term effects include the potential for reduction in quality sawtimber by short-term introduction of chip markets in traditional hardwood sawtimber territories. More intensive harvesting leads to younger timber lots and loss of the older, larger classes of timber. However, it is clear that a profitable, thriving woody biomass market may alter Kentucky's forest industry.[61]

5. Competition for Funding and Public Apathy

Competition for forestry funding is particularly strong in light of a global recession that has seen cutbacks in government budgets and spending in Kentucky, across the country, and around the world. As budgets have declined, public opinions have naturally shifted from support of line items providing a sense of well-being (*e.g.,* forest conservation, tree planting) to those providing a sense of security (*e.g.,* health care, job security). Public apathy towards forest management is also a result of the apparent abundance of forest, albeit with unhealthy conditions (*i.e.,* composed of invasive species, trees of low timber and wildlife value,

infested with pests and disease). These conditions are easily overlooked by someone unaware of the difference between a healthy, productive, functional forest and one that is of less value.

Further threatening forest funding is the nature of the investment. An investment in Kentucky's forest is a long-term investment. Human nature is prone to selecting options that provide the most immediate benefit even if an investment in something more long term will provide vastly greater benefits. This is so with Kentucky forests. Though the investment is high and long-term, the resource is renewable, reusable, sustainable, and can be enjoyed be a multitude of end users (*e.g.,* timber industry, wildlife, nature enthusiasts).

E. Opportunities

Investments in Kentucky forests are an investment in Kentucky's future. Kentucky is one of the largest hardwood lumber producing states. Non-traditional forest products derived from the forest include ginseng (most valuable, with annual harvests of several million dollars), bee products, native and exotic mushrooms, maple syrup, craft materials, fence posts, and fuel wood. The forest industry as a whole contributed $13.5 billion to the Commonwealth's economy.[4] Such economic benefits cannot be ignored. Forest users run the gamut from industrial to recreational and include timber companies, sportsmen, wildlife enthusiasts, hikers, and other outdoor recreational enthusiasts. Due to the great diversity in end users of forests and the variety of products derived from them, opportunities for investment in our forests are as abundant as the benefits they may yield.

The Division of Forestry has made strides in reducing expenditures while taking advantage of opportunities to bring in additional revenue. Like Kentucky, other states and the US Forest Service have had personnel reduction due to funding. As a result, the capacity to respond to wildfire and other natural disasters is limited. The division has been able to provide personnel and equipment during emergencies in other states. Division employees gain valuable experience and the agency realizes additional revenue by providing personnel and equipment use.

1. Cost-share and Education Opportunities for Private Forest Owners

While funding opportunities that support and maintain federal lands is important, it is critical that more of Kentucky's forestland be covered by management plans due to the predominance of privately-owned lands. Insect pests, invasive plants, infectious disease, and wildfire are a constant threat to the health of our forests. The KDF's programs currently in place provide assistance to forest landowners and education to the public on the consequences of exotic invasive plants and arson.

As previously mentioned, 88% of Kentucky's forests are owned by private individuals and by corporations. Currently, only an estimated 1% of the family landowners have a written management plan and only 12% have sought professional advice on proper forest management. Funding cost-share programs can help private landowners more effectively manage their forested lands. In order for landowners to take advantage of cost-share programs, technical assistance must be available from the state and other technical service providers.

Persuading private landowners to adopt management plans requires educational outreach. Funding for the KDF, UK and the NRCS district offices should be preserved and preferably enhanced. Utilizing the State Stewardship Coordination Committee's role as a subcommittee of the NRCS State Technical Committee may assist in the funding of forestry cost share and technical service providers in the public and private sector. Landowners who own and harvest small plots of forestland often do not realize the impacts of poor

management practices, fragmentation, and over harvesting. Because of the large number of these private landowners, the cumulative beneficial impact of educational outreach could be significant.

A properly managed forest will also produce more timber of better quality, provide better wildlife habitat, and be more appealing to outdoor enthusiasts, all of which has the potential to generate revenues for the state. More high quality timber will result in higher tax revenues. Enhanced wildlife habitat will lead to an increase in the number of hunters and wildlife enthusiasts visiting forested areas. License fees from hunters (and potentially wildlife enthusiasts), as well as money spent in communities within and adjacent to forested areas, will also generate revenue. Similarly, creation of regulated outdoor facilities (*e.g.,* ATV parks, equestrian and mountain biking trailheads) will generate revenue.

2. Ecosystem Services Markets

In addition to hunting fees, recreational tourism, and increased timber revenues, ecosystem service markets are emerging as an additional revenue stream.

The United States Department of Agriculture (USDA) was created in an effort to push forward the development of the ecosystem services markets legislated under Section 2709 of the Food, Conservation, and Energy Act of 2008. The Office of Environmental Markets was established to develop uniform standards and market infrastructure that will facilitate market-based approaches to agriculture, forest, and rangeland conservation.

The first ecosystem service examined by this new office was carbon sequestration, but other services such as wetland mitigation banking, biodiversity credits, renewable energy, sustainable timber, and water quality credits would be further developed as commodities. It proposes a portfolio approach to forest management where multiple streams of revenue are generated by traditional food and fiber products, eco-labeling such as forest certification, and woody biomass and alternative energy in addition to ecosystem markets for species habitat, standing carbon, water quality, and wetlands.

In Kentucky, some of these ecosystem markets have already been developed and could be further expanded. Although no water quality credits have been traded in Kentucky to date, multiple wetland mitigation banks have been established throughout the state driven by Section 404 of the Clean Water Act. The Kentucky Transportation Cabinet (KYTC) Stream and Wetland Mitigation Program is one such bank established in order to provide compensatory mitigation for unavoidable wetland impacts.

The KYTC has also successfully developed a conservation fund in order to comply with the Endangered Species Act. Through payment into an Indiana Bat Conservation Fund, mitigation for projects that adversely impact this endangered species can be directed towards projects that will aid in the recovery of the species.

Unlike the water, wetland, and biodiversity markets that are driven by regulatory protection, the carbon market is driven by voluntary participation. In order to ensure funds are available for landowners managing their forests for the benefits realized by all Kentuckians, it would be necessary to establish rates and payments for these services and using these funds as financial incentives for forest management.

3. Woody Biomass

Another emerging opportunity comes from the biofuels market. The trend towards reducing petroleum fuel use in vehicles in favor of ethanol also represents a potential benefit for Kentucky's wood industry.

Currently, ethanol is produced primarily from corn, but the resulting impacts on the price of corn for human and animal consumption are expected to make ethanol production from woody biomass a more cost-effective option. Although the technology to convert woody biomass to ethanol is not currently commercially viable, such a conversion would benefit Kentucky's forest owners. Sources for these biofuels include unextracted wood and bark from current timber harvest, debris from urban sources, woody material from thinning and other forest improvement treatments, and biomass energy plantings.[61]

While additional sources of revenue are needed, Kentucky's wood products industry must be watchful that a secondary effect of the "Green Revolution" – development of a commercially viable woody biomass industry – does not inflict long-term damage to the quality and sustainability of Kentucky's forests or negatively impact its water quality. Yet the opportunity to develop a new, clean industry using abundant renewable natural resources gives Kentucky an advantage over states with less abundant resources.

PART 2: FOREST PRIORITY AREAS

A. Introduction

The Cooperative Forestry Assistance Act (CFAA) provides the authorities for a broad range of state and private forestry programs. As amended by the 2008 Farm Bill, the CFAA requires each state forestry agency to develop a "Statewide Assessment and Strategies for Forest Resources," collectively referred to as State Forest Action Plan (SFAP), to be eligible to receive funds under the authorities of the Act. State forest assessments and strategies are updated every ten years based on requirements outlined in the CFAA.

Part 1 of this document evaluated the forest resources according to the five most important forestland issues for Kentuckians. This second part of the *Kentucky Statewide Assessment of Forest Resources* seeks to satisfy the CFFA.

The goal of identifying priority areas is to allow programs within Kentucky Division of Forestry (KDF) to focus implementation efforts where the need is the greatest. Defining the geographic extent of priority areas is not intended to restrict the implementation of strategies in non-priority forest areas. Rather, priority areas identify the most important regions for particular forest issues and the strategies that address these issues.

B. Priority Area Methodology

A modelling approach based on the framework developed by the Southern Forest Land Assessment (SFLA) was used for identifying forest priority areas.[77] The SFLA was a cooperative project of the Southern Group of State Foresters that identified priority landscapes for future forestry assistance. Through the SFLA project, a model based on 13 spatial data sets was created to generate the priority landscapes. The data sets included ten layers that were considered characteristics of resource richness and three layers representing threats to the forest resource.

The 13 layers developed for the original SFLA model are listed below. Descriptions of these layers are found in original SFLA report.[77]

Richness
Forestland
Riparian Areas
Public Drinking Water
Priority Watersheds
Forest Patches
Site Productivity
Forested Wetlands
Threatened and Endangered Species
Proximity to Public Land
Slope

Threat
Development Level
Wildfire Risk
Forest Health

In an effort to standardize the methodology by which each state generated their Forest Action Plan Priority Areas, the 13 layers from the original SFLA assessment were updated in 2016. These updated layers were

used in the SFLA's weighted model for the priority area analysis. The framework of the model allowed each state to weigh the level of importance of each of the 13 layers as it relates to their forestry priorities.

The Analytic Hierarchy Process (AHP) was used to generate the layer weights for Kentucky's model.[78] Using the AHP methodology, KDF program experts assessed each layer in pairs and then decided which of the two layers was more important in determining where future efforts in forestry assistance should be focused. After each of the 13 layers was compared against each other in this manner, the final layer weights of importance were calculated.

The 13 weighted layers generated from the AHP methodology were run through the SFLA model to generate a composite score index map of Kentucky. In order to create distinct management units across the state, the composite scores were totaled based on HUC 10 Level Watershed boundaries. Watersheds with the highest scores were deemed priority, and any federal property within these units were removed to produce Kentucky's Priority Areas (Figure 29).

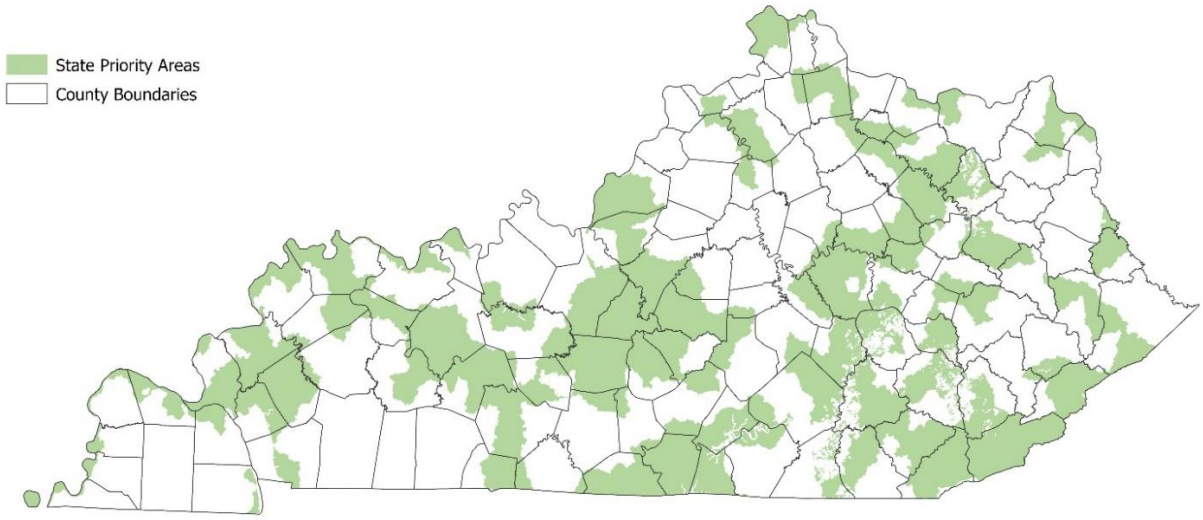


FIGURE 29 – KENTUCKY FOREST PRIORITY AREAS

C. Forest Stewardship Priority Areas

The Forest Stewardship Program, as the primary private forest landowner assistance program in the U.S., serves as a "gateway" through which landowners can gain access to a variety of assistance and programs including USDA cost-share, state tax abatement, and forest certification.

States were to develop and identify forest stewardship priority areas in order to deliver landowner assistance. Strategically, Kentucky will utilize federal assistance to address the following critical issues via the forest stewardship priority areas:

- Reducing wildfire risk to communities
- Protecting water resources
- Enhancing wildlife habitat
- Supporting jobs in the woods

Various geodatabases and other attribute tables were adopted, weighted and ranked to develop the final comprehensive forest stewardship priority layer represented in Figure 30. The white areas within the forest stewardship priority layer are public lands that are masked out. Figure 31 combines Kentucky's Forest Priority Areas with the Forest Stewardship Priority Areas. The following raster data layers and point data were normalized, summarized and grouped within census block group boundaries.

- Kentucky Division of Forestry - Fire Occurrence SQL database, population density and forest cover types
- Source Water Assessment and Protection Program (SWAPP) and Drinking Water Zones
- Wildlife Species Richness - Birds, Amphibians, Reptiles, Fish/lampreys, Mussels, and Mammals
- National Landcover Classification
- Current and Past Forest Stewardship Activities and Implementation on the Ground
- Primary and Secondary Wood Industry and Master Logger Program Data

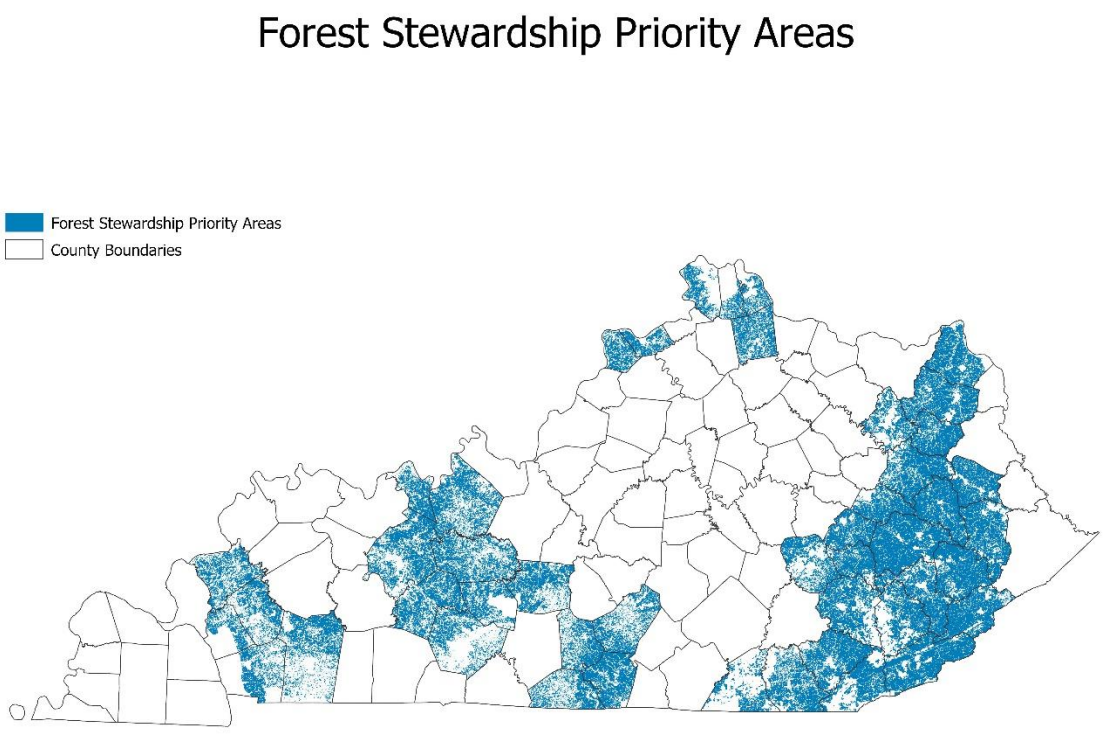


FIGURE 30 – FOREST STEWARDSHIP PRIORITY AREAS

Forest Stewardship Appendix Maps and Descriptions (Appendix 2)

A. **Wildfire Risk Map** – For reducing wildfire risk to communities, several factors were considered: Historical forest fire locations, population density, forest cover types, and the Kentucky Division of Forestry's Fire Occurrence SQL database.
B. **Source Water Protection Areas Map** – The Division of Water layer for Source Water Assessment and Protection Program (SWAPP) was used for drinking water protection areas. SWAPP areas were prioritized based on the zones 1-3.
C. **Wildlife Species Richness Map** – Wildlife Species Richness was used based on awareness of habitat needs and a species richness factor. These were birds, amphibians, reptiles, fish/lampreys, mussels, and mammals. Each layer was normalized and combined into a single layer.
D. **Forest Cover Map** – Forest Cover was determined using the 2016 National Landcover Classification. Woody vegetation included deciduous forest, evergreen forest, mixed forest, scrub/shrub, and woody wetlands. Normalization consisted of calculating the percent of pixels that were within the woody cover types.
E. **Forest Cover Map** – For supporting jobs in the woods, the spreadsheet contained columns including, latitude, longitude, and number of employees by the forestry industry type. This dataset described job locations, numbers of jobs in the primary and secondary wood industry and the master logger program.
F. **Forest Industry Job Density Map** – The forest stewardship activities and implementation on-the-ground accomplishments was queried from the Kentucky Division of Forestry stewardship geodatabases.
G. **Forest Stewardship Combined Priority Score Map** – The final analysis layer was a combination of the six normalized contributing layers described above.

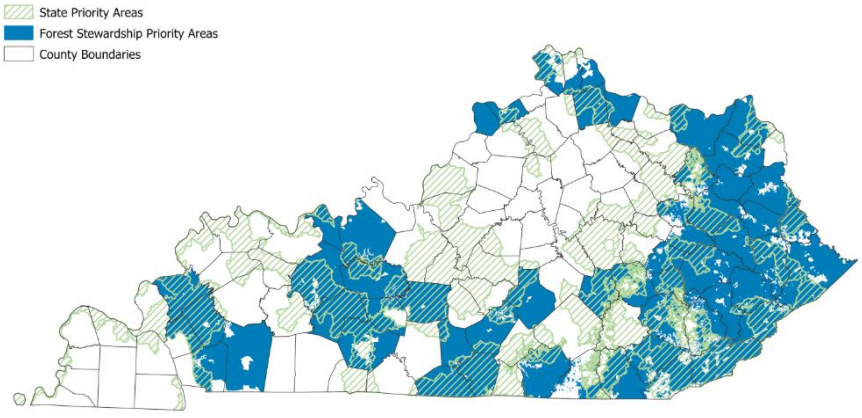


FIGURE 31 – STATE PRIORITY AREAS & FOREST STEWARDSHIP PRIORITY AREAS

D. Forest Legacy Areas

The Forest Legacy Areas (FLAs) are subsets within Kentucky's larger priority areas to provide a comprehensive identification of key forest resources in Kentucky. The FLAs were first developed in conjunction with the Forest Legacy Assessment of Need in 2003 to identify environmentally important forests for protection from conversion to non-forest uses. These legacy priority areas were narrowed and renamed in 2010 based on rare species abundance, threats to conversion, and connectivity to existing protected lands. The FLAs identified are located within ecologically significant areas of the state (Figure 32). In these areas, forestlands have a likely or imminent threat of being converted to non-forested uses, are part of a larger conservation effort by multiple state, federal, and private agencies, and/or have a large concentration of existing protected lands that would either be directly or indirectly enhanced by the protection of additional forestlands.

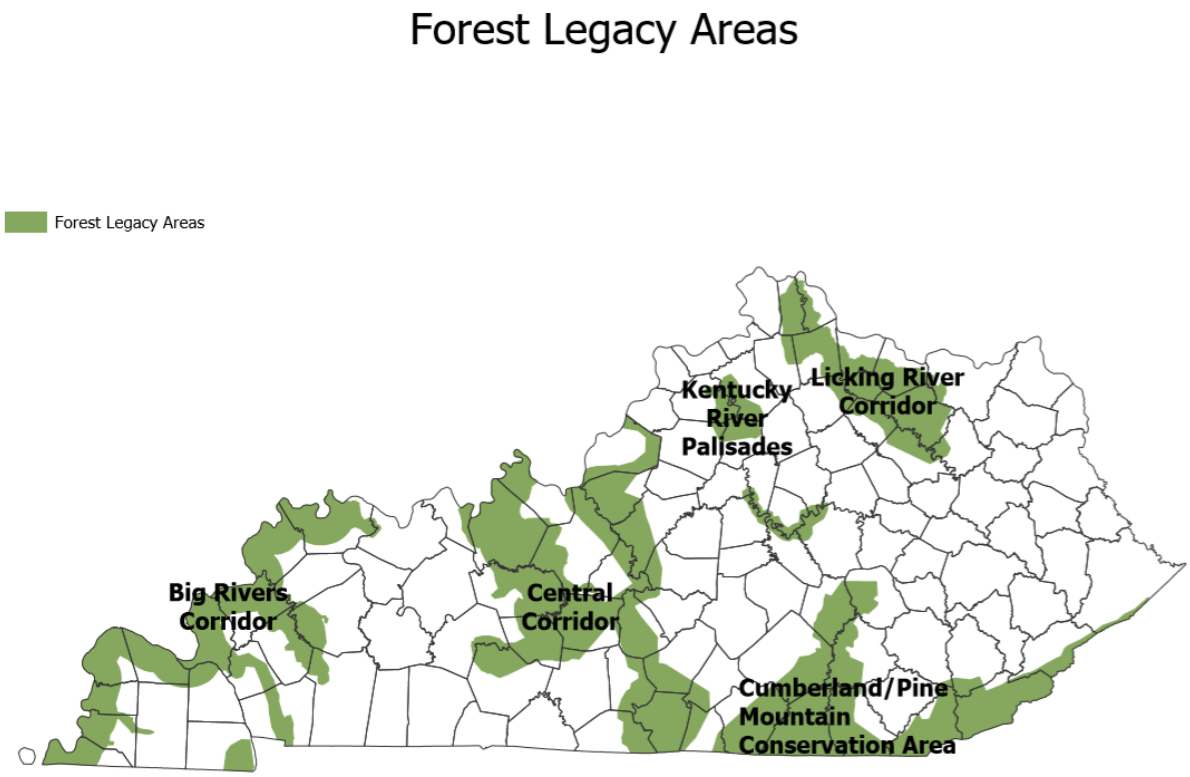


FIGURE 32 – FOREST LEGACY AREAS

1. Licking River Corridor
   - Mississippi River Initiative Focus Watershed.
   - Large number of mussel species, some of which are endangered.
   - Other threatened or endangered species including the Indiana bat, gray bat, and Short's goldenrod.
   - Contains unique archeological resources such as Blue Licks, Blue Licks Battlefield, and Indian Old Fields.
   - Threats and impairments caused primarily agriculture and urban land use.

2. Kentucky River Palisades
   - Last remaining large forested remnant in the Bluegrass area.
   - Large concentration of rare plants including the federally listed running buffalo clover and two other candidates for federal listing as threatened or endangered species.
   - Existing nature preserves, WMAs, Raven Run Nature Sanctuary, and Shakertown of Pleasant Hill.
   - Includes unique archaeological sites such as Big Bone Lick, Indian Old Fields, and buffalo hunting grounds.
   - Threat from urban expansion.

3. Cumberland / Pine Mountain Conservation Area
   - One of the major migratory corridors for neo-tropical birds including those federally listed threatened or endangered species.
   - Largest existing forest blocks in Kentucky.
   - Numerous threatened and endangered aquatic species.
   - Protected areas including Big South Fork National River and Recreational Area, Daniel Boone National Forest, WMAs, State Parks, Kentenia and Kentucky Ridge State Forests, Kentucky Natural Lands Trust protected areas, The Nature Conservancy protected areas, Cumberland Gap National Historic Park, Pine Mountain Trail.
   - Threats of mining and urban development along I-75 corridor.

4. Central Corridor
   - Unique barrens, caves, and knobs.
   - Numerous threatened and endangered species including Indiana bat, gray bat, and endemic cave species such as Kentucky cave shrimp.
   - Contains the most ecologically significant portion of the Green River, which is the most diverse region in the Ohio River basin including a significant number of mussels and threatened and endangered plants just in the Mammoth Cave region.
   - Existing protected areas including Mammoth Cave National Park, Fort Knox Military Reservation, Bernheim Arboretum and Research Forest, Jefferson Memorial Forest, Army Corp of Engineers property around Rough River, Nolin River Lake, and Dale Hollow.
   - Forest Legacy Projects at Knobs State Forest and WMA and at Marrowbone Creek State Forest and WMA.
   - Imminent threat to urban conversion in the Louisville metropolitan area and along the I-65 corridor.

5. Big Rivers Corridor
   - Numerous threatened and endangered species including Indiana bat, interior least tern, and copperbelly watersnake.
   - Kentucky's largest concentration of migratory waterfowl, shore, and wading birds.
   - Numerous protected areas including WMAs, Land Between the Lakes National Recreation Area, Shawnee National Forest, Fort Campbell Military Reservation, Clarks River National Wildlife Refuge, Reelfoot Lake National Wildlife Refuge, the proposed Green River National Wildlife Refuge, Pennyrile State Forest, and Green River State Forest.
   - Mississippi River Initiative Focus Watersheds.
   - Contains highest-quality remaining bottomland hardwood complexes in Kentucky.
   - Contains unique archeological resources such Wickliffe Mounds State Historic Site.

- Agricultural land use is the primary threat although some loss to urban and mining.

E. Urban Forest Priority Areas

To address urban forestry issues, an analysis of population and canopy cover was conducted. This analysis resulted in the identification of three priority areas: Urban Priority Area, Developing Interface Priority Area, and Rural Interface Priority Area (Figure 33).

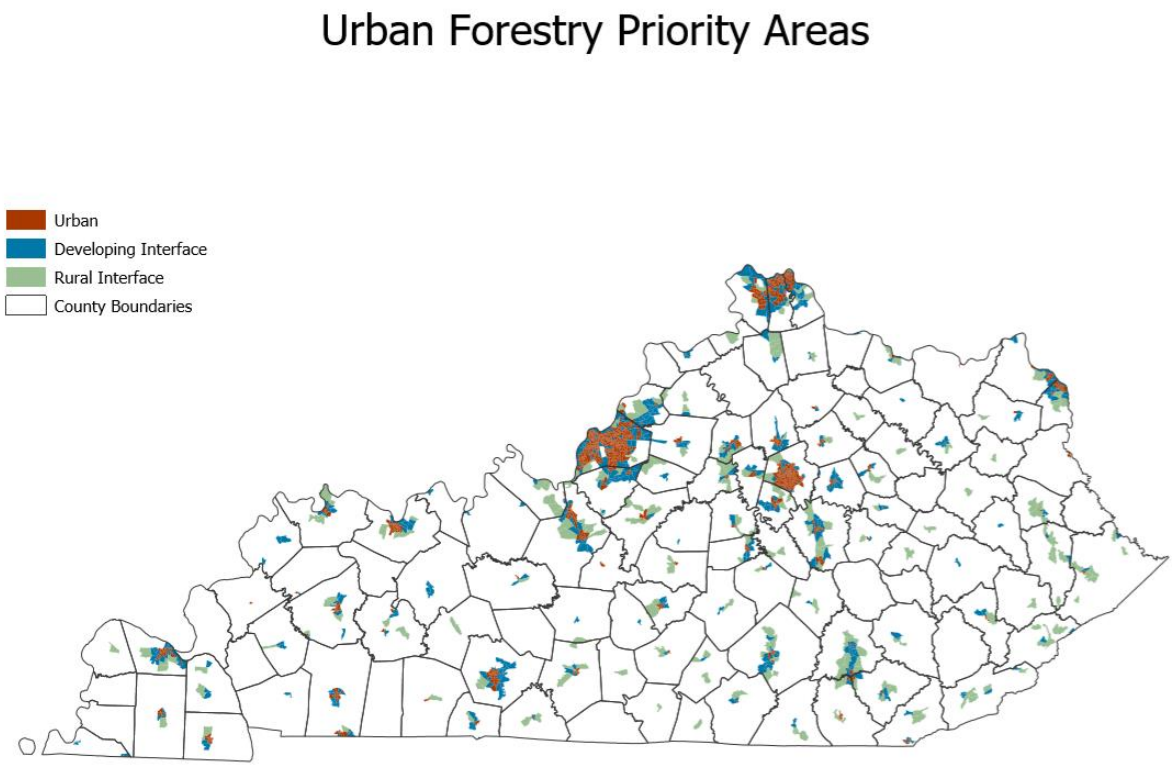


FIGURE 33 – URBAN FORESTRY PRIORITY AREAS

The **Urban Priority Area** is characterized by population greater than 1,000 residents per square mile. Average tree canopy cover is 18% in urban areas of Kentucky.

The **Developing Interface Priority Area** is characterized by population of 300 to 999 residents per square mile. These areas are typically located next to the Urban Priority Areas and are impacted by development pressures. Average tree canopy cover is 32% in these areas of Kentucky.

The **Rural Interface Priority Area** is characterized by population if 150 to 299 residents per square mile. These areas are typically located between the Developing Interface Priority Area and surrounding rural areas. Information about each of the three urban forestry priority areas is shown in Table 6 below.

Table 6 – Urban, Developing, and Rural Interface Priority Areas

Urban, Developing, and Rural Interface Priority Areas				
	Rural Interface	**Developing Interface**	**Urban**	**State Totals**
Population / sq. mi.*	150-299	300-999	>1,000	---
Area in Acres	1,003,888	754,771	431,481	2,190,140
Canopy Coverage (%)	42	32	18	---
State Area (%)	3.9	2.9	1.7	8.5
Population by Category *	317,439	602,819	1,818,949	2,739,207
State Population (%)*	7	13	41	61
***2018 c**ensus data				

F. Partner Focus Areas

Kentucky's Priority Areas were overlaid with partner focus areas to demonstrate possible areas of future collaboration (Figure 34). The Division of Forestry's Priority Areas display where future efforts in forestry assistance should be focused. The Daniel Boone National Forest has a number of project areas that were developed through their Integrated Resource Management Strategy. The Kentucky Division of Water Priority Watersheds represents the three top watersheds in each major river basin in which the division is prioritizing projects and resources. The Kentucky Department of Fish & Wildlife Resources' Wildlife Action Plan created Tier 1 Conservation Areas for focusing their conservation efforts to areas of most need.[79] Focus areas from these four agencies overlap in numerous areas across the state and can be referenced for future collaborative project assessment.

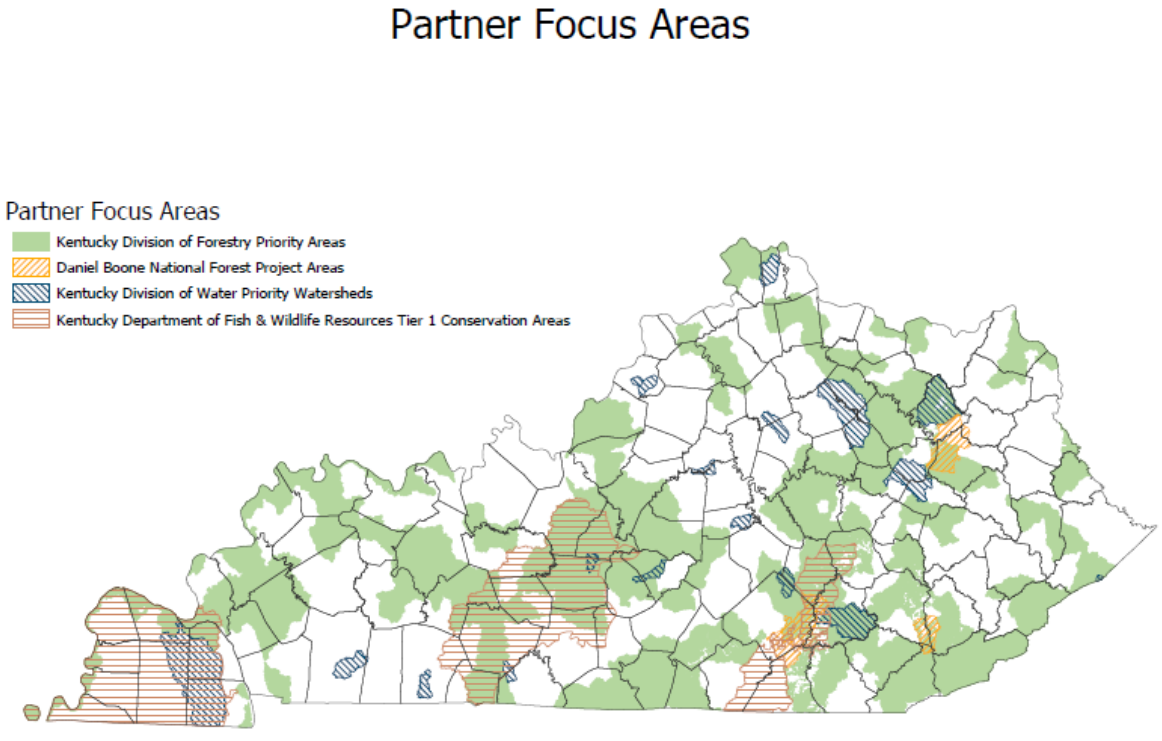


FIGURE 34 – PARTNER FOCUS AREAS

G. Multi-State Priority Areas

National guidance suggested states report priority areas that border or cross state lines. Figure 35 displays areas with neighboring states in which watersheds deemed priority by Kentucky cross state lines. These watersheds provide possible areas for collaboration in which Kentucky can work with neighboring states to compare priorities and implement projects that benefit both states.

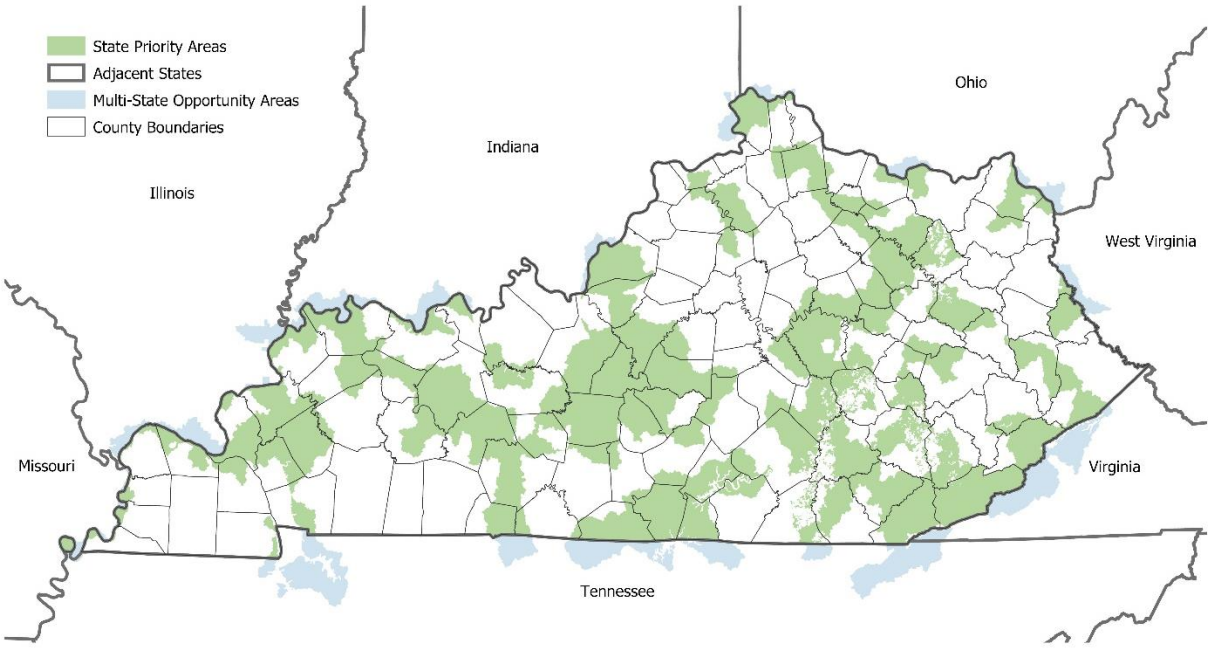


FIGURE 35 – MULTI-STATE PRIORITY AREAS

Part 3: Forest Resource Strategy

A. Introduction

The Food, Conservation, and Energy Act of 2008 requires that all states evaluate their forest resources, identify any areas or regions of the state that are a priority, develop strategies for addressing forestland issues, and include a description of resources needed to implement the strategy. Part 1 of this document evaluated the forest resources according to the five most important forestland issues, and Part 2 identified forest priority areas by utilizing the Southern Forest Land Assessment (SFLA) protocol to Kentucky. Stewardship priority areas were also identified utilizing specified program critical issues. The third part of this revised plan proposes a strategy to address threats to the forest resources in Kentucky.

The Forest Resource Strategy provides an outline for investing state, federal, and other resources to address the issues of importance to Kentucky's forests, as addressed in the Assessment. These issues incorporated the national themes of conserving working forest lands, protecting forests from harm, and enhancing public benefits from trees and forests. By using an issue-based approach to the Forest Resource Strategy, federal investment can be focused to most effectively stimulate or leverage desired action and engage multiple partners. The strategy also incorporates existing statewide forest and resource management plans, and provides the basis for future program, agency and partner coordination to address forest resource concerns and issues within Kentucky.

The strategy is organized according to the top five forest issues identified in the Assessment. Regarding each issue, a general textual overview of the strategy elements is provided with a detailed list of the goals, objectives, and performance measures for each issue. Goals convey the broad outcomes desired as a result of the strategy. Objectives are measurable methods used to achieve the goals. Regarding each objective, performance measures define how progress toward the goal may be measured. The text provides an overview of the goals of the forest resource strategy for each issue with the specific detail listed in a quick reference format at the end of the strategy section. Using this format, Kentucky's forest strategy provides a clear plan for forestry activities over the next five years and beyond.

The strategy was developed by focusing on the elements necessary to address the national themes of conserve, protect, and enhance. The status of resources, including staffing amongst primary agencies, partners, and funding, was not considered as the strategy was developed. The resources required to complete the strategy objectives could be of many different types including personnel, funding, materials, collaboration, memoranda of agreement, memoranda of understanding, public relations, or other types of resources. The sources of these resources may be state funding, federal funding, non-government organizations, partner collaboration, or other sources.

Some of the threats and opportunities addressed in the Forest Resource Strategy could be addressed under multiple issues. For instance, proper trail design and maintenance could be addressed as part of the forest health issue or the forest management issue. In order to avoid repetition of strategies under multiple headings, if a threat or opportunity is fully addressed under one issue, it is not addressed in an overlapping issue unless necessary.

Within the November 2015 Addendum to the 2010 Forest Action Plan, the five issues of Forest Health, Water Quality and Quantity, Forest Loss and Fragmentation, Forest Management, and Funding were discussed as being linked with the three national priorities: Conserve and Manage Working Forest Landscapes for Multiple

Values and Uses; Protect Forests from Threats; and Enhance Public Benefits from Trees and Forests. Almost all of the recommended strategies were linked to more than one national priority, and continue to be the case for this revision.

B. Issue 1: Forest Health Strategy

The numerous benefits and uses provided by Kentucky's forests are threatened by many direct and indirect pressures as summarized in Part 1 of this assessment. Forest loss due to conversion is the most direct threat to forest health. Numerous invasive pests and diseases including Emerald Ash Borer and Hemlock Woolly Adelgid have and will continue to cause significant destruction. As Kentucky needs further research on many forest health issues, funding of this research is a major part of the strategy. Prescribed fire use and forest stand age are among many topics that will require further research to properly manage. The highest rate of human-caused wildfires in the South threatens not only Kentucky's forests, but also many communities that are at risk. These are just a few of the threats facing the health of Kentucky's forests. Effective management strategies are necessary to make the public aware of the significance of such threats and to keep forests healthy.

The forest health strategy seeks to identify the goals, objectives, and performance measures associated with surveying, managing, and restoring forest health in Kentucky. Public awareness and education on these issues is also vital to the success of this strategy. Nine goals have been devised in order to address the threats to Kentucky's forest health. The specific objectives, and performance measures associated with each of these goals are listed in a quick reference format at the end of this section.

1. Reduce the impact of invasive plants, insects, and diseases through improved monitoring, management, and education. (Conserve and Protect)
2. Conduct research to improve forest health management techniques, and further assess the health of Kentucky's forests. (Conserve, Protect and Enhance)
3. Decrease the impacts on forests due to improper trail use, management, and design. (Conserve and Protect)
4. Utilize trees to decrease air pollution in urban areas. (Protect and Enhance)
5. Promote reforestation opportunities on post-mining land. (Conserve, and Enhance)
6. Enhance comprehensive wildfire prevention programs in Kentucky to reduce the number of human-caused wildfires. (Conserve and Protect)
7. Provide leadership, support, and coordination for educating the public about wildfires in Kentucky. (Conserve and Protect)
8. Enhance and improve wildfire law enforcement programs. (Conserve, Protect, and Enhance)
9. Maintain and enhance the statewide system of forest fire protection and suppression as required by KRS 149.520 (Conserve, Protect, and Enhance)

In order to reduce the impact and spread of the many forest pests and diseases, an educational component encompassing more extensive training on these pests for forestry staff and other resource managers as well as the general public is an important strategy. The strategy also develops a comprehensive monitoring, tracking, mapping, and threat classification system. The development of this database will allow landowners and resource managers to identify the greatest threats in their area and implement proper planning and treatment techniques. Since some invasive plants are still sold by garden shops, and other invasives such as exotic insects are transported through firewood, efforts to suppress the spread of these pests will focus on such actions. To encourage the effort toward suppression, cost-share opportunities for those engaging in

control techniques will continue to be offered, while searching for additional programs by which to extend such opportunities.

With the increased emphasis on recreational trail use, the forest health strategy also focuses on the proper management, design, and planning for these trails such that impacts to the forest will be limited. Tactics such as training trail enforcement officers on forest health monitoring and distributing trail educational materials should aid in minimizing the effects of trail impacts while encouraging the use of the forest resources.

Reforestation and afforestation in urban and post-mining areas provide opportunities to extend ecosystem services to previously impacted areas. Increasing the urban tree canopy coverage through tree planting will provide important air quality benefits along with the monetary incentives associated with the developing carbon market. Likewise, reclamation of previously mined land to forested land use provides an opportunity to restore the American chestnut and renews the timber resources, wildlife habitat, and aesthetic appeal of the land.

Four of the forest health goals focus on wildfire prevention, education, and enforcement. In order to reduce the high rate of arson, law enforcement is necessary. Increased arson investigation and courtroom training are also necessary, as well as a strong media campaign using all available mediums. To address the high-risk areas for wildfire damage, objectives and performance measures will focus on establishing or improving fire prevention plans for communities and providing materials to fight fires. Education on the scope of the damages caused by wildfires is proposed to reduce the needless impacts to our valuable forest resources. An overall fire suppression plan with improved equipment and staffing is needed to continue to suppress the high number of fires in the state.

The primary resources necessary for addressing the forest health strategy are listed as follows: Kentucky Division of Forestry, Forest Health Program, University of Kentucky Forestry Extension, The Forest Health Research and Education Center, Kentucky Invasive Plant Council, Kentucky Forest Health Task Force, Local Tree Boards and Rural Planners, Kentucky Department of Fish and Wildlife Resources, Office of Kentucky Nature Preserves. *(Please see full partners list at the end of this section.)*

Cumulatively, the nine recommended strategies for addressing the Forest Health Issue supports the national objectives to conserve, protect, and enhance the state's forest resources.

C. Issue 2: Water Quality and Quantity Strategy

Forest resources play a key role in improving water quality and stabilizing the water quantity in Kentucky. With 62% of the rivers and streams and 42% of the lakes, ponds, and reservoirs of Kentucky showing some sort of water quality impairment, there are numerous areas in which additional forest resources could improve the water quality of the Commonwealth. Forested riparian areas, forested wetlands, and large forest blocks provide the greatest opportunities to improve water quality, but every individual tree, particularly in urban settings, can provide important benefits to water quantity and quality benefits.

Five goals have been devised in order to capitalize on opportunities and combat the threats associated with the effects of forests on Kentucky's water resources:

1. Ensure timber harvesting operations employ measures to maximize water quality protection. (Conserve, Protect, and Enhance)

2. Improve Kentucky water quality through the protection, enhancement, and restoration of forested riparian areas. (Conserve, Protect, and Enhance)
3. Reduce rate of variation in stream flow and volume with forestry practices. (Conserve and Protect)
4. Improve Kentucky water quality through the protection, enhancement, and creation of forested wetlands. (Conserve, Protect, and Enhance)
5. Increase the public awareness of the relationship between forestland use and water quality and quantity. (Conserve and Protect)

Proper timber harvesting practices are important to limit the impairment caused to waterbodies when harvesting does occur. Under the Kentucky Forest Conservation Act of 1998, the KDF is required to inspect commercial timber harvesting operators for the appropriate use of BMPs. Because proper implementation rates are lower than desired, increased funding and staff will be necessary to increase the rate of inspection, increase logger education, and pursue enforcement actions.

Increasing the riparian forest resources of Kentucky will be a key part of the strategy to improve water quality through forested resources. Assessing the current width of the riparian areas against the ideal width based on the water use should aid in the targeting of funding to areas in the greatest need of improvement. Especially in urban areas, improvements in the riparian zone may greatly reduce the effects of stormwater runoff by slowing the water velocity and filtering pollutants.

Because forest loss and conversion are the greatest causes of stream flow and volume variations, efforts to stabilize the water quantity will focus on minimizing loss and increasing forested area through reforestation and afforestation.

Principally in the Big Rivers Corridor, Forest Legacy Area, but also in other areas, water quality may be improved through the increase in the forested wetland acreage. The strategy involves efforts to support the creation, restoration, enhancement, or protection of wetlands.

The last element of the water quality and quantity strategy focuses on education. Since many landowners, managers, and planners are unaware of the relationship between forests and water, public education should further the awareness of the need and the benefit of forest resources. The primary resources necessary for addressing the water quality and quantity strategy are listed as follows: Kentucky Division of Forestry's Timber Harvesting Compliance Program, Kentucky Best Management Practices Advisory Board, Kentucky Forest Industries Association, Kentucky Woodland Owners Association, Kentucky Division of Water, University of Kentucky Forestry Extension, Kentucky Division of Conservation, and the Kentucky Agriculture Water Quality Authority. *(Please see full partners list at the end of this section.)*
The five proposed strategies to address the Commonwealth's water quality and quantity issue support the national objectives to conserve, protect, and enhance the forest resources within the state.

D. Issue 3: Forest Loss and Fragmentation Strategy

Addressing forest loss is important to protecting the resources of the Commonwealth. Considering that only 28% of the forest resources are large interior forest blocks, strategies must also focus on preventing the further fragmentation of the remaining forest resources of Kentucky. In order to curtail fragmentation and loss in Kentucky, seven goals have been developed. These goals address the major causes of forest loss, including conversion to urban, agricultural, and mining as well as the process of fragmentation.

1. Reduce or minimize the impact of forest loss from urban development. (Conserve and Enhance)

2. Enhance and protect existing forested areas in the urban landscape. (Conserve, Protect, and Enhance)
3. Increase acres of forests in urban areas. (Conserve and Enhance)
4. Increase forest cover on reclaimed mined land. (Enhance)
5. Reduce or minimize the impact of forest loss and fragmentation due to agricultural conversion. (Enhance)
6. Increase acres of protected forestlands. (Conserve, Protect, and Enhance)
7. Protect or minimize the impact of fragmentation on large forest blocks. (Conserve, Protect, and Enhance)

Since urban development continues to expand along with population growth, three of the goals in this strategy are focused on urban loss and fragmentation. Particularly in wildland-urban interface areas, planning should incorporate the forest resources and the benefits they provide through forest canopy assessments and the use of LiDAR (Light Detection and Ranging) technology for measuring canopy cover and structure. Many urban areas in small and larger communities would benefit from inventories of existing resources and improved management. Increasing canopy cover in urban areas through planting, as well as maintaining large tree cover through best practices, will also be an important goal.

Much of the mined land in Kentucky is forested prior to removal of the mineral resources. Thus to prevent forest loss, a key goal is increasing the number of acres restored to forested land use as part of reclamation. Promotion of the Appalachian Regional Reforestation Initiative (ARRI) and the use of the Forestry Reclamation approach, a five step mine reclamation process for efficient reclamation, are important practices in accomplishing this goal.

To address the losses and impacts due to agricultural conversion, the strategy focuses on the promotion of economic advantages of conversion of marginal agricultural land to forested land. Additionally, restoration of agricultural lands to forest will be focused in areas in which connectivity between other forested areas is maximized. Minimizing agricultural conversion and increasing riparian forest buffers are also important objectives.

Two goals are aimed specifically at combating the threats of fragmentation. Protection of forestland through conservation easements and land acquisition aims to provide long-term connectivity of forestlands. Minimizing the extent of fragmentation aims to reduce the overall effect of fragmentation when it is inevitable.

The resources needed to address the forest loss and fragmentation strategy are listed as follows: Kentucky Division of Forestry Legacy Program, urban and rural planners, Urban Forestry Councils, Daniel Boone National Forest, Land between the Lakes, Kentucky Department of Fish and Wildlife Resources, municipal governments, non-profit tree planting organizations, and neighborhood associations. *(Please see full partners list at the end of this section.)*

The seven recommended strategies to address forest loss and fragmentation, support the national objectives to conserve, protect and enhance our forest resources.

E. Issue 4: Forest Management Strategy

Although forests cover about half of the land of Kentucky, the value of this resource is often overlooked or under-utilized. With a high percentage of private family ownership and a low percentage of these owners

engaging in purposeful management, the forest management strategy focuses on education, outreach, and encouragement of management for whatever use is desired by the owner. Five goals in forest management have been developed, with numerous measurable objectives and performance measures associated with each goal. Many of the objectives associated with these goals were developed at the Governor's Summit on Forestry, and thus include the plans of a broad scope of forestry stakeholders.

Forest Management Goals:

1. Publicize the value of Kentucky's forest resources and the benefits of proper management. (Conserve, Protect, and Enhance)
2. Promote the efficient, sustainable, and environmentally sound economic utilization of Kentucky's forest resources for forest products and environmental services. (Enhance)
3. Enable private family forest owners to enhance their stewardship potential through technical and financial assistance. (Conserve, Protect, and Enhance)
4. Establish and build local urban and community forestry programs. (Conserve, Protect, and Enhance)
5. Monitor forest management levels in Kentucky to identify trends, needs, benefits, and threats. (Conserve, Protect, and Enhance)

The low rate of private family forest management demonstrates a need to publicize the value of Kentucky's forests and how management increases these benefits. Through the development of a comprehensive communication message and delivery plan along with development of community-level forestry organizations, increasing education, and promoting achievers, it is anticipated that numerous owners will increase their management and planning.

As Kentuckians recognize the value of our forests, many landowners are expected to begin or increase management for economic gains from forest products or environmental services. Efforts will focus on encouraging such use through sustainable and environmentally sound practices, particularly in conjunction with the emerging demands for ecosystem services and alternative energy sources but also in other markets. The KDF and its partners will seek to increase the technical and financial assistance available to private family forest owners by increasing the forester capacity, cost-share assistance, and the access to native species for plantings.

Because urban land use is expanding, forest management in urban areas will become increasingly important in the future. Therefore, numerous performance measures are aimed at increasing the tree canopy coverage in urban areas and increasing or enhancing the management of these resources.

The last component of the forest management strategy focuses on monitoring the threats to management and the gains accomplished through management. Such monitoring will provide feedback to redirect future management efforts.

The main resources needed for the forest management strategy are listed as follows: University of Kentucky Forestry Extension, Kentucky Woodland Owners Association, NRCS, Kentucky Forest Industries Association, Kentucky Tree Farm Program, Kentucky Department of Fish and Wildlife Resources, Kentucky Association of Consulting Foresters, Kentucky Division of Conservation, urban forestry councils, and local tree boards. *(Please see full partners list at the end of this section.)*

The five recommended forest management goals support the national objectives of conserve, protect and enhance our forest resources.

F. Issue 5: Funding Strategy

Investments in Kentucky forests are an investment in Kentucky's future. In order for the Commonwealths' forest resources to continue to provide the vast environmental, economic, and social benefits for the state, the nation, and the world, investments must be made into our forests. With increasing demands on the resource for ecosystem services and the potential explosion of woody biomass needs, management of Kentucky's forests is paramount to ensure the sustainability of the resource.

Funding support should be driven by one goal – proper forest management that results in a healthy, productive forest ecosystem that is the source of long-term sustainable revenue and benefits to all of Kentucky. While the forest uses and their associated benefits are varied and necessary, proper forest management driven by sustainable development will lead to the creation of reliable income to landowners and in turn increased tax revenues. These revenues will promote woodland wildlife habitat, improved water quality, recreational opportunities from an aesthetically pleasing forest, and numerous other benefits to the state and local communities. Due to the great diversity in end-users of forests and the variety of products derived from them, opportunities for investment in our forests are as abundant as the benefits they may yield. Forest users run the gamut from industrial to recreational and include timber companies, sportsmen, wildlife enthusiasts, hikers, and other outdoor recreational enthusiasts.

Sufficient staffing levels will enable the KDF to address the need for more forests and the increased need to protect forests from exotic pests and diseases, wildland fire, mismanagement, and improper timber harvesting. Kentucky will need a strong Division of Forestry to educate landowners, the general public, and industry so they can make wise decisions for the future of our forest resources, recognize and respond to the threats, and provide technical assistance. Because forest funding is a long-term investment, tactics to address funding needs must include not just immediate needs but sustainable long term needs.

The funding required to address the threats, opportunities, and research needs associated with forest health, water quality and quantity, forest loss and fragmentation, and forest management have each been addressed. However, cumulatively these funding needs, combined with the funding required to accomplish other mandated responsibilities of KDF and its partners, limit their ability to meet the needs of Kentucky's forests and forest owners.

Financial assistance to forest landowners is often necessary to support proper management practices. Economic incentives are often the most effective way to promote new markets such as woody biomass and alternative energy markets. Cost share assistance programs target afforestation, reforestation, timber stand improvement, enhancement of poorly stocked stands, practices designed to improve seedling survival and growth, and other practices needed to sustain the long-term productivity of all forest resources while providing additional environmental benefits including improved water quality, air quality, and wildlife habitat. State and federal funding is necessary to continue the delivery of cost-share assistance and economic incentives.

Funding is also necessary to allow the KDF, other state agencies, organizations, and private individuals to provide technical assistance to forest landowners. Forester positions are essential to the division's mandate of providing for the protection and enhancement of private forestlands. Though KDF has experienced losses of funding and personnel, the total number of landowners continues to increase; more communities are requesting assistance with Firewise and urban forestry needs; the growing importance of forests for energy and other environmental benefits has become recognized; and more invasive forest insects, diseases, and plants threaten our borders. Thus, KDF's ability to provide effective one-on-one technical assistance to

address these needs becomes a greater challenge. With an expanding workload, the KDF has considered other partners such as the Kentucky Association of Consulting Foresters, University of Kentucky Cooperative Extension Service and Kentucky Department of Fish and Wildlife Resources, Division of Conservation, USDA Natural Resources Conservation Service, Kentucky Farm Bureau, Kentucky Woodland Owners Association, and others to reach the more than 467,000 forest landowners across the Commonwealth.

In addition to financial and technical assistance to landowners, funding is also necessary to provide for the protection of forestland and property from wildfires, acquisition of land for conservation, maintenance of land from the effects of natural disasters, and numerous other demands and mandates. While the demands for funding are numerous, the strategy to address funding involves only one goal: Provide sufficient and dedicated funding to ensure Kentucky's forests meet the diverse end-uses of its citizens through sustainable forest management. This single goal has been divided into three objectives based on funding sources: increase in federal funding, state funding, and funding from other sources. Establishing a financially stable forestry agency will certainly assist in meeting the national objectives of conserving, protecting, and enhancing the Commonwealth's forest resources.

G. Primary Agencies and Partners

In an effort to build collaboration on forestry issues with Kentucky, the forest resource strategy identifies numerous agencies and partners for collaboration on individual objectives. In order to conserve space, these agencies and organizations are identified by the following acronyms in the tables that follow:

ACCF	American Chestnut Cooperators' Foundation
ACE	United States Army Corps of Engineers
ADD	Area Development District
APA-KY	American Planning Association, Kentucky Chapter
APHIS	United States Department of Agriculture Animal and Plant Health Inspection Service
AgDB	Agriculture Development Board
ARRI	Appalachian Regional Reforestation Initiative
AWQA	Landowners under jurisdiction of Agricultural Water Quality Act
BLM	Bureau of Land Management
BMP Board	Forestry Best Management Practices Board
COT	Kentucky Commonwealth Office of Technology
DAH	Kentucky Division of Administrative Hearings
DAML	Kentucky Division of Abandoned Mine Lands
DAQ	Kentucky Division for Air Quality
DBNF*	Daniel Boone National Forest
DEP	Kentucky Department for Environmental Protection
DHS	United States Department of Homeland Security
DMRE	Kentucky Division of Mine Reclamation and Enforcement
DOC*	Kentucky Division of Conservation
DOD	United States Department of Defense
DOE	United States Department of Energy
DOI	United States Department of the Interior
EEC	Kentucky Energy and Environment Cabinet
EKU	Eastern Kentucky University
EPA	Environmental Protection Agency

FEMA	Federal Emergency Management Agency
FSA*	Farm Services Agency (US Department of Agriculture)
GOV*	Kentucky Office of the Governor – Agriculture Policy
HLCF	Kentucky Heritage Land Conservation Fund
IRS	Internal Revenue Service
KAA	Kentucky Arborist Association
KACD	Kentucky Association of Conservation Districts
KACF*	Kentucky Chapter of Association of Consulting Foresters
KACo	Kentucky Association of Counties
KCED	Kentucky Cabinet for Economic Development
KDAg*	Kentucky Department of Agriculture
KDE	Kentucky Department of Education
KDF	Kentucky Division of Forestry
KDFWR*	Kentucky Department of Fish and Wildlife Resources
KDOW*	Kentucky Division of Water
KDP	Kentucky Department of Parks
KDR	Kentucky Department of Revenue
KDT	Kentucky Department of Travel
KFA	Kentucky Firefighter's Association
KFB	Kentucky Farm Bureau
KFHTF	Kentucky Forest Health Task Force
KFIA*	Kentucky Forest Industries Association
KLC	Kentucky League of Cities
KML	Kentucky Master Loggers
KNLA	Kentucky Nursery & Landscape Association
KOEP	Kentucky Office of Energy Policy
KRC	The Kentucky Resources Council
KREC	Kentucky Rural Energy Consortium
KRTA	Kentucky Recreational Trail Authority
KSBA	Kentucky School Board Association
KSU*	Kentucky State University
KSP	Kentucky State Police
KTFC	Kentucky Tree Farm Committee
KUCFC	Kentucky Urban & Community Forestry Council
KWOA*	Kentucky Woodland Owners Association
KY-EPPC	Kentucky Exotic Pest Plant Council
KYTC	Kentucky Transportation Cabinet
LBL	Land Between the Lakes National Recreation Area
MACED	Mountain Association for Community Economic Development
NASF	National Association of State Foresters
NGO	Non-Government Organization
NKY-UCFC	Northern Kentucky Urban & Community Forestry Council
NPS	United States National Park Service
NRCS*	Natural Resources and Conservation Service
NWCG	National Wildfire Coordinating Group
OLS	Energy and Environment Cabinet - Office of Legal Services
OIG	Office of the Inspector General

OKNP*	Office of Kentucky Nature Preserves
OSBD	Office of State Budget Director
OSMRE*	Office of Surface Mining Reclamation and Enforcement
RD*	Rural Development (US Department of Agriculture)
PVA	Kentucky Property Valuation Administrator
SAF-KY*	Society of American Foresters, Kentucky Chapter
SGSF	Southern Group of State Foresters
SGSF-SUM	Southern Group of State Foresters Environmental Services, Utilization, and Marketing Committee
SKH	Save Kentucky's Hemlocks
TACF	The American Chestnut Foundation
TNC*	The Nature Conservancy
UK*	University of Kentucky
UL	University of Louisville
USFS*	United States Forest Service (US Department of Agriculture)
USFWS*	United States Fish and Wildlife Service

*	**Denotes Stewardship Coordinating Committee member within NRCS State Technical Committee**

2020 – 2030 Kentucky Forest Resources Strategy

Issues, Goals, Objectives, and Performance Measures

Issue 1: Forest Health Strategy

Goal 1: Reduce the spread of invasive plants, insects, and diseases through improved monitoring, management, and education.

- **Objective 1.1:** Develop training opportunities and provide educational materials on forest health issues for partners, natural resource managers, researchers, the general public, and agency staff
    - **Performance Measure 1:** Continue collaboration with partners to maximize efforts to educate others about forest health threats in Kentucky
    - **Performance Measure 2:** Seek unique opportunities and platforms to address forest health
- **Objective 1.2:** Encourage increased collaboration on forest health issues between state, federal and non-government agencies and industry in Kentucky.
    - **Performance Measure 1:** Support the Kentucky Forest Health Task Force and other partners in their forest health efforts
    - **Performance Measure 2:** Support meetings between various agencies in an effort to promote increased sharing of knowledge and advice on forest health management
- **Objective 1.3:** Monitor for invasive plants, insects, and diseases.
    - **Performance Measure 1:** Continue traditional surveying and monitoring efforts across the state while developing specialized projects for new or potential forest health threats
    - **Performance Measure 2.** Pursue additional tools and technologies to increase efficiency in monitoring and reporting forest health threats
    - **Performance Measure 3:** Encourage collaboration with other agencies to increase surveying efforts and sharing of data of issues across the state and on state owned land
    - **Performance Measure 4:** Collaborate with researchers to increase production of new methodologies for identifying and confirming forest health threats
    - **Performance Measure 5:** Pursue additional funding sources in an effort to increase forest health staffing and resources
- **Objective 1.4:** Further develop a database on forest health issues in Kentucky
    - **Performance Measure 1:** Increase data and knowledge transfer of forest health threat occurrences
    - **Performance Measure 2:** Increase the use of current invasive species distributions to inform future management decisions
- **Objective 1.5:** Promote and implement activities that reduce or slow pest movement

- **Performance Measure 1:** Continue educational opportunities that highlight the harm and negative impacts of spreading invasive species through moving firewood and other human activities
- **Performance Measure 2:** Engage in new and progressive options for limiting the sale of known invasive species
- **Performance Measure 3:** Work with partners to develop emergency action plans for new highly destructive invasive species that could possibly impact Kentucky
- **Performance Measure 4:** Work with partners to promote invasive plant lists and educate consumers about select invasive plants in an effort to reduce their sale
- **Performance Measure 5:** Seek innovative means of delivering information to the public regarding invasive species movement
- **Performance Measure 6:** Collaborate with partners to pursue policy development and outreach regarding restricted use and spread of invasive species

- **Objective 1.6:** Develop and continue cost share programs focusing on forest health management

  - **Performance Measure 1:** Pursue options for creating new cost share programs that target forest health issues
  - **Performance Measure 2:** Continue providing assistance to landowners who apply for cost share and develop forest health management recommendations for forest stewardship

- **Objective 1.7:** Develop a Kentucky forest health plan.

  - **Performance Measure 1:** Develop a plan with the Kentucky Forest Health Task Force that addresses current and potential threats, risk reduction measures, and continued management options.

Goal 2: Decrease the impacts on forests due to improper trail use, management, and design.

- **Objective 2.1:** Develop educational materials on proper design, management, and use and the effects of improper use on forest resources.

  - **Performance Measure 1:** Development of guidance and forest health educational materials concerning recreational management and trail development.

- **Objective 2.2:** Promote active planning and management of forests with recreational trail use

  - **Performance Measure 1:** Number of forestlands with recreational trail availability.
  - **Performance Measure 2:** Development of use classification standards and monitoring guidelines.
  - **Performance Measure 3:** Number of agencies and groups with trail oversight responsibilities trained to monitor forest health.

Goal 3: Reduce negative impacts of air pollution in urban areas.

- **Objective 3.1:** Address urban air pollution and promote urban tree plantings as a tool for mitigation

- **Performance Measure 1:** Promote the benefits of tree planting to improve air quality and to reduce the heat island effect, and guidelines for successful tree planting
- **Performance Measure 2:** Increase the urban tree canopy percentage with a focus on low tree canopy areas

Goal 4: Support forest health research projects.

- **Objective 4.1:** Pursue additional funding sources that could assist with research projects

- **Objective 4.2:** Assist in collaborative projects that aim to address specific forest health issues

  - **Performance Measure 1:** Promote relevant and under-studied forest health issues for research consideration among regional researchers
  - **Performance Measure 2:** Offer field assistance by helping to initiate and monitor research projects

- **Objective 4.3:** Promote and implement research findings into management activities within the agency

- **Performance Measure 1:** Increase awareness of forest health related research findings and share relevant management strategies with Branch offices

Goal 5: Promote reforestation opportunities on post-mining land.

- **Objective 5.1:** Restore previously mined land to healthy forest conditions using the Forest Reclamation Approach.

  - **Performance Measure 1:** Number of blight resistant American chestnut seedlings planted on reclamation sites annually
  - **Performance Measure 2:** Acres and percentage of reclamation plans that include ARRI reforestation as post-mining land use
  - **Performance Measure 3:** Maintain the Division of Forestry Tree Nurseries.

Goal 6: Enhance comprehensive wildfire mitigation efforts in Kentucky to lessen the impact of wildfires in Kentucky.

- **Objective 6.1:** Assist community leaders and community representatives with planning wildfire mitigation efforts.

  - **Performance Measure 1:** Number of community CWPP within state.
  - **Performance Measure 2:** Amount of sub-grants awarded for mitigation efforts.

- **Objective 6.2:** Coordinate and participate in hazardous fuel reduction efforts.

  - **Performance Measure 1:** Acreage mitigated by utilizing prescribed fire as a tool.
  - **Performance Measure 2:** Amount of control lines constructed for prescribed fire.

- **Performance Measure 3:** Number of structures protected.

Goal 7: Provide leadership, support, and coordination for educating the public about wildfires in Kentucky.

- **Objective 7.1:** Develop and implement educational wildfire mitigation programs geared toward the youth demographic.

  - **Performance Measure 1:** Number of school wildfire mitigation programs conducted.
  - **Performance Measure 2:** Number of youth attendance at wildfire mitigation programs.
  - **Performance Measure 3:** Amount of prevention material purchased.

- **Objective 7.2:** Develop and implement educational wildfire mitigation programs for communities.

  - **Performance Measure 1:** Number of community wildfire mitigation programs conducted.
  - **Performance Measure 2:** Number of citizens in attendance at wildfire mitigation programs.
  - **Performance Measure 3:** Amount of prevention material purchased.

Goal 8: Enhance and improve wildfire law enforcement programs.

- **Objective 8.1:** Partner with other state law enforcement agencies to bolster law enforcement resources.

  - **Performance Measure 1:** Number of employee hours paid for by Division of Forestry for partnering agencies assisting with law enforcement.
  - **Performance Measure 2:** Annual contract in place for law enforcement assistance from partnering agencies.

- **Objective 8.2:** Provide increased fire investigation and law enforcement training for Kentucky Division of Forestry employees and partnering agencies.

  - **Performance Measure 1:** Number of Division of Forestry employees trained in fire investigation, courtroom procedures, and/or law enforcement
  - **Performance Measure 2:** Number of partnering agency employees trained in fire investigation, courtroom procedures, and/or law enforcement

Goal 9: Maintain and enhance the statewide system of forest fire protection and suppression as required by KRS 149.520

- **Objective 9.1:** Provide KDF employees enhanced fire suppression and Incident Command System (ICS) training.

  - **Performance Measure 1:** Number of employees trained in fire suppression and ICS.
  - **Performance Measure 2:** Number of employees trained at TN/KY Academy.
  - **Performance Measure 3:** Number of KDF trainers delivering fire suppression trainings.

- **Objective 9.2:** Provide KDF employees ample opportunities to gain fire suppression and ICS experience outside of KDF operations to increase firefighter capabilities.

    - **Performance Measure 1:** Number of employees participating in fire suppression details outside of KDF operations.

- **Objective 9.3:** Upgrade and replace fire suppression equipment as identified and warranted.

    - **Performance Measure 1:** Regular upgrade and replacement of fire suppression equipment.

- **Objective 9.4:** Improve KDF fire operations to make them more effective and professional.

    - **Performance Measure 1:** Number of employees utilizing the latest digital programs for all aspects of fire suppression.
    - **Performance Measure 2:** Number of employees with mobile hardware to support latest digital programs.
    - **Performance Measure 3:** Number of drones deployed within the state to bolster wildfire intelligence.

Issue 2: Water Quality and Quantity Strategy

Goal 1: Ensure timber harvest operations employ measures to maximize water quality protection

- **Objective 1.1:** Achieve improved rate of timber harvest operation compliance, strengthen enforcement laws and promote the Kentucky Master Logger Program.

    - **Performance Measure 1:** Increased percentage of timber harvests inspected.
    - **Performance Measure 2:** Increase the number of inspectors.
    - **Performance Measure 3:** Strength Penalties incurred by repeat bad actors.

- **Objective 1.2:** Maintain statewide BMP implementation monitoring program

    - **Performance Measure 1:** Plan for continual BMP implementation monitoring.
    - **Performance Measure 2:** Identification of funding for BMP implementation monitoring, Increase emphasis on BMP implementation through continuing education programs.

- **Objective 1.3:** Continue and improve timber harvest inspector training to enhance effectiveness

    - **Performance Measure 1:** Revision of inspector training courses based on monitoring results to improve enforcement activities.

- **Objective 1.4:** Support the Agriculture Water Quality Authority

    - **Performance Measure 1:** Performance of BMP implementation study.
    - **Performance Measure 2:** Development of plan based on implementation results.

- **Objective 1.5:** Review Forestry Best Management Practices, strengthen the Kentucky Master Logger program and conduct additional SMZ studies.

    - **Performance Measure 1:** Report on findings and recommendations on BMP regulations

Goal 2: Improve Kentucky water quality through the protection, enhancement, and restoration of forested riparian areas.

- **Objective 2.1:** Increase acreage of rural forested riparian areas to enhance water quality.

    - **Performance Measure 1:** Assessment of current forested riparian resources.
    - **Performance Measure 2:** Development of water credit system.
    - **Performance Measure 3:** Acres of forested riparian area created, protected, or improved.
    - **Performance Measure 4:** Encourage the creation and improvement of forested riparian areas through cost-share programs.

- **Objective 2.2:** Reduce the degradation of the waters of the commonwealth caused by the occurrence of wildfires in riparian areas

    - **Performance Measure 1:** Number of wildfires in riparian zones
    - **Performance Measure 2:** Impact of fires on water quality degradation, minimize wildland fire suppression tactics and rehabilitation of fire lines using appropriate BMPs.

- **Objective 2.3:** Reduce the negative impact of urban and urban interface areas on water quality through the development and improvement of urban forests

    - **Performance Measure 1:** Development of guidelines for urban forested riparian area management
    - **Performance Measure 2:** Development of training program on riparian benefits on urban stormwater runoff.
    - **Performance Measure 3:** iTree Hydro analysis of an urban watershed
    - **Performance Measure 4:** Number of riparian tree plantings

Goal 3: Reduce the rate of variation in stream flow and volume with forestry practices.

- **Objective 3.1:** Minimize the conversion of forestland to non-forest uses.

    - **Performance Measure 1:** Number of conservation easements and facilitating the development of other revenue streams provided by forestland.
    - **Performance Measure 2:** Number of acres converted from forest to another land use

- **Objective 3.2:** Encourage reforestation and afforestation

    - **Performance Measure 1:** Number of conservation easements
    - **Performance Measure 2:** Forestland tax credit legislation
    - **Performance Measure 3:** Amount of cost-share funding available for forestation

- **Performance Measure 4:** Number of acres converted from another land use to forest

Goal 4: Improve Kentucky water quality through the protection, enhancement, and creation of forested wetlands.

- **Objective 4.1:** Increase acreage of forested wetlands

  - **Performance Measure 1:** Number of forested wetland acres
  - **Performance Measure 2:** Number of forested wetland acres created by cost-share programs, conservation easements and the planning of urban storm water planning/treatment by them.

Goal 5: Increase the public awareness of the relationship between forestland use and water quality and quantity.

- **Objective 5.1:** Target appropriate messages and education to the forest industry.
  - **Performance Measure 1:** Number of educational courses including water quality and quantity BMP implementation.
  - **Performance Measure 2:** Number of demonstration projects showing the benefits of proper implementation.

- **Objective 5.2:** Target appropriate messages and education to landowners and public officials.

  - **Performance Measure 1:** Number of urban forest management demonstration projects
  - **Performance Measure 2:** Development of educational materials for urban and rural landowners and public officials.

- **Objective 5.3:** Target appropriate messages and education to urban planners, watershed groups, and public works departments concerning water quality and quantity.

  - **Performance Measure 1:** Number of meetings with urban planners and watershed organizations
  - **Performance Measure 2:** Promote the use of green infrastructure.

Issue 3: Forest Fragmentation and Loss Strategy

Goal 1: Reduce or minimize the impact of Forest Loss from Urban Development

- **Objective 1.1:** Encourage and support urban planning that includes management of trees and forests within urban areas and those on the periphery.

  - **Performance Measure 1:** Number of Tree Canopy Assessments and Urban Tree Inventories.
  - **Performance Measure 2:** Number of urban tree assessments and community inventories.

Goal 2: Enhance, manage and protect existing trees and forested areas in the urban landscape.

- **Objective 2.1:** Assist communities in better managing their public trees and forested acres.

    - **Performance Measure 1:** Increase the number of communities with new or updated tree inventories.
    - **Performance Measure 2:** Increase the number of comprehensive plans or management plans that incorporate urban and community forests.

Goal 3: Increase acres of forests in urban areas

- **Objective 3.1:** Support and assist urban and community tree planting and reforestation events and awareness campaigns.
    - **Performance Measure 1:** Increase the number of urban or municipal acres reforested.

Goal 4: Increase forest cover on mined land.

- **Objective 4.1:** Promote innovative mine reclamation research, programs, and methods that include reforestation.

    - **Performance Measure 1:** Thirty percent annual increase in the number of acres reforested as part of mine reclamation.

Goal 5: Reduce or minimize the impact of forest loss and fragmentation due to agricultural conversion.

- **Objective 5.1:** Promote the conversion of marginal agricultural lands for woody biomass production and/or reforestation for carbon storage.

    - **Performance Measure 1:** Increase in the number of acres converted from agricultural classification to forest classification through tree planting.

- **Objective 5.2:** Maximize the benefits and success of reforestation efforts.

    - **Performance Measure 1:** Promote connectivity from one forested area to another.
    - **Performance Measure 2:** Prioritize support for larger-scale tree plantings.

- **Objective 5.3:** Minimize deforestation of forestlands for agricultural or herbaceous biomass production.
    - **Performance Measure 1:** Decrease in the number of acres converted from forestland classification to agricultural classification.

- **Objective 5.4:** Promote or enhance BMP regulations and incentives that result in a change of farming practices that protect or restore forest areas.

    - **Performance Measure 1:** Increase in forested buffer/riparian acres.

Goal 6: Increase acres of protected forestlands.

- **Objective 6.1: Work with partners to p**rotect or assist in the protection of forestlands identified in the Forest Legacy Areas.

    - **Performance Measure 1:** Number of acres protected via Forest Legacy Funds.

- **Objective 6.2:** Use existing funding sources such as Kentucky Heritage Land Conservation Funds (HCLF) or other sources to protect forestlands.

    - **Performance Measure 1:** Increase in forest acres protected with state funds

- **Objective 6.3:** Protect forestlands through the Agricultural Districts Program.

    - **Performance Measure 1:** Increase in forestlands enrolled in agricultural conservation programs.

- **Objective 6.4:** Expand funding mechanisms for forestland acquisition or conservation easements.

    - **Performance Measure 1:** Increase funds available for forestland acquisition and expand partnerships.

Goal 7: Protect or minimize the impact of fragmentation on large forest blocks.

- **Objective 7.1:** Reduce or minimize the impact of fragmentation.

    - **Performance Measure 1:** Reduction in forest land cleared for roads, utilities and other right of ways.
    - **Performance Measure 2:** Increase in right of ways converted to naturalized vegetation.

Issue 4: Forest Management Strategy

Goal 1: Publicize the value of Kentucky's forest resources and the benefits of proper management.

- **Objective 1.1:** Develop a unified public communication plan to publicize the value of Kentucky's forests on a state and regional level.
-
    - **Performance Measure 1:** Develop a Kentucky Forestry Initiative to serve as the unifying message in the promotion of forest management
    - **Performance Measure 2**: Inventory all existing forestry and forestry-allied communications and non-traditional partner platforms and work to incorporate the unified forestry messages in them
    - **Performance Measure 3:** Promote the development of a brand for Kentucky forest products
    - **Performance Measure 4:** Promote the value and opportunities of Kentucky's forest resources to interested industries within and outside of Kentucky

- **Objective 1.2:** Develop community-level forestry organizations to promote Kentucky's forests at a local level.

- **Performance Measure 1:** Number of local forestry organizations within the priority areas
- **Performance Measure 2:** Number of landowners participating in Forest Stewardship Program educational programs
- **Performance Measure 3:** Increase landowner participation in forest stewardship activities of publicly owned and privately owned forestlands by 10% over five years.
- **Performance Measure 4:** Continue to promote the Forest Stewardship Program and cost sharing opportunities

- **Objective 1.3:** Increase public education on forest management.

  - **Performance Measure 1:** Development of a forestry education curriculum component for public education.
  - **Performance Measure 2:** Number of demonstration forests on public lands.
  - **Performance Measure 3:** Incorporate forestry education in the school system by aligning it with a core part of the curriculum and making it a component of teacher education
  - **Performance Measure 4:** Promote the creation of "Demonstration Forests" to showcase interactive rural and urban forest stewardship and to heighten public awareness
  - **Performance Measure 5:** Utilize existing rural and urban demonstration forests in providing public education
  - **Performance Measure 6:** Address public information needs such as: economic impact of forestry for wood products and ecosystem services and demand for Kentucky wood products

- **Objective 1.4:** Recognize public and private forest management achievements.

  - **Performance Measure 1:** Promote the first annual Forestry Action Forum.
  - **Performance Measure 2:** Awarding of Forest Stewardship Award and Tree Farmer of the Year Award annually.

Goal 2: Promote the efficient, sustainable, and environmentally sound economic utilization of Kentucky's forest resources for forest products and environmental services.

- **Objective 2.1:** Promote the expansion of existing and development of new sustainable forest industries in Kentucky.

  - **Performance Measure 1:** Number of new forestry industries or firms in Kentucky
  - **Performance Measure 2:** Encourage the expansion of Kentucky's existing wood industry, concentrating on value-added industry, with mechanisms such as flexible financing opportunities, favorable insurance rates, market awareness, and tax incentives.
  - **Performance Measure 3:** Supply technical assistance to individual industries, specific segments of the industry, local, state and federal agencies, and to the general public in the following areas: Product marketing, timber resource availability, manufacturing residue management and utilization, equipment analysis, timber harvesting analysis and individual mill efficiency analysis
  - **Performance Measure 4:** Promote the value and opportunities of Kentucky's forest resources to interested industries within and outside of Kentucky.

- **Performance Measure 5:** Continue involvement in region wide marketing of forest sector and facilitation of ecosystem services for private landowners.

- **Objective 2.2:** Promote the diversification of Kentucky's forest economy to ensure economic and environmental sustainability while increasing the quality and quantity of wood products.

  - **Performance Measure 1:** Number of ecosystem service firms and amount of revenues
  - **Performance Measure 2:** Promote the regional 17 state white oak initiative.
  - **Performance Measure 3:** Promote tourism, outdoor recreation, biodiversity, clean air, clean water, wildlife habitat, and aesthetics.

- **Objective 2.3:** Promote the economic and environmental sustainability of Kentucky's forests for meeting renewable energy needs through certification systems, utilization of biomass, and monetizing of ecosystem services.

  - **Performance Measure 1:** Number of landowners or acres of land with American Tree Farm Certification within priority areas
  - **Performance Measure 2:** Number of landowners known to be engaged in the marketing of their ecosystem services within the priority areas.
  - **Performance Measure 3:** Promote harvesting, biomass removal, and forest management practices that enhance the value and the sustainability of Kentucky's forest resources
  - **Performance Measure 4:** Work to develop criteria for sustainable woody biomass.
  - **Performance Measure 5:** Promote opportunities for landowners and businesses to participate in the various certification systems and ecosystem services.

- **Objective 2.4:** Maintain and improve partnerships and communications with other state and federal agencies.

  - **Performance Measure 1:** Memoranda initiated between the KDF and other agencies.
  - **Performance Measure 2:** Number of joint forestry initiatives between Kentucky and its neighboring states.
  - **Performance Measure 3:** Pursue agreements with all state agencies that directly or indirectly affect forest resources to review and coordinate policies to ensure the viability of Kentucky's forest industry while protecting biodiversity, clean air, clean water, wildlife habitat, and outdoor recreation.
  - **Performance Measure 4:** Work with adjoining states in developing solutions for regional forest resource issues.

Goal 3: Enable private family forest owners to enhance their stewardship potential through technical and financial assistance.

- **Objective 3.1:** Provide the citizens of the Commonwealth information and education about the many environmental, social and economic benefits of managing the state's forests.

  - **Performance Measure 1:** Number of acres of priority forests conserved and managed as "Working Forest Lands" and have actively been managed by partnerships and many

stakeholders to mitigate major harm and threats to the forests in an effort to enhance the public benefits of the forest resource

- **Performance Measure 2:** Number of landowners and acres of land with new or revised stewardship management plans within priority areas
- **Performance Measure 3:** Number of new or revised Forest Stewardship Management Plans completed
- **Performance Measure 4:** Number of landowners and acres of land participating in the state's Forest Stewardship Incentives cost share program
- **Performance Measure 5:** Cumulative acres covered by current Forest Stewardship Management Plans
- **Performance Measure 6:** Cumulative acres in important forest resource areas covered by current Forest Stewardship Management Plans
- **Performance Measure 7:** Number of landowners receiving Forest Stewardship Program technical assistance
- **Performance Measure 8:** Develop and coordinate technical assistance to the citizens of the commonwealth through partnerships in implementing cost share programs:
- **Performance Measure 9:** Develop the administrative regulations for the state's Forest Stewardship Incentives Fund
- **Performance Measure 10:** Continue with the Division of Forestry marking program for timber harvest and timber stand improvement practices

- **Objective 3.2:** Enhance and increase forester capacity within the Division of Forestry and outside of the agency to meet landowner demand in providing forestry technical assistance and stewardship management plans entering into cost share and certification programs.

  - **Performance Measure 1:** Number of forester positions or forestry technical service providers.
  - **Performance Measure 2:** Number of new or revised Forest Stewardship Management Plans completed.
  - **Performance Measure 3:** Obtain 50/50 cost sharing through a Cooperative Agreement for the Division of Forestry to obtain forester positions with Natural Resources Conservation Service.
  - **Performance Measure 4:** Consider a federal grant proposal for employing Federally Funded Time Limited positions as foresters for priority forest areas to address lack of agency capacity

- **Objective 3.3:** Promote afforestation and reforestation opportunities within rural and urban interface areas.
  - **Performance Measure 1:** Number of blight resistant American chestnut seedlings planted annually
  - **Performance Measure 2:** Number of farms employing agroforestry techniques.
  - **Performance Measure 3:** Number of trees planted in urban and rural landscapes.
  - **Performance Measure 4:** Maintain the Division of Forestry Tree Nurseries ability to produce tree seedlings for afforestation, reforestation and mine reclamation to meet current and future demand

- **Performance Measure 5:** Facilitate agroforestry techniques for developing riparian forest buffers
- **Performance Measure 6:** Maintain the use of native species in urban landscape plantings.

Goal 4: Establish and build local urban and community forestry programs.

- **Objective 4.1:** Enhance forest management and increase tree canopy coverage in communities and wildland-urban interface areas

  - **Performance Measure 1:** Number of communities in Tree City USA® within the priority forest areas
  - **Performance Measure 2:** Number of municipal and rural electric cooperatives are participating in Tree Line USA® within the priority forested area
  - **Performance Measure 3:** Number of universities are participating in Tree Campus USA® within the priority forested area
  - **Performance Measure 4:** Number of Firewise Communities within the priority forested areas and number of mitigation practices accomplished
  - **Performance Measure 5:** Continue outreach efforts to communities, nonprofit organizations, educational institutions and private landowners to promote proper urban forestry management
  - **Performance Measure 6:** Promote agroforestry within municipal watersheds to maximize water quality and quantity through riparian buffer establishment.
  - **Performance Measure 7:** Promote urban forestry and agroforestry techniques that control storm water runoff, connect forest fragments and improve wildlife habitat
  - **Performance Measure 8:** Work with communities in wildland fire prone areas to address risks of wildfire

- **Objective 4.2:** Provide urban forestry technical and financial assistance to interface citizens and local communities to maintain or enhance the social, economic and environmental benefits of community forests

  - **Performance Measure 1:** Communities with inventories and management plans within the priority area
  - **Performance Measure 2:** Assist communities in obtaining urban forestry resources critical in planning, management and sustainability of urban forests
  - **Performance Measure 3:** Continue to utilize urban forestry program specialists to enhance communities' internal capacity and knowledge for planning and managing urban forests
  - **Performance Measure 4:** Support tree boards with networking resources and leadership training
  - **Performance Measure 5:** Continue to promote annual tree board seminar
  - **Performance Measure 6:** Encourage the public, landscape industry, and municipalities to utilize a diverse variety of proper tree species in urban plantings
  - **Performance Measure 7:** Designate key Division of Forestry personnel within each district to become involved in local planning and zoning issues to provide technical assistance related to forest resources in local processes

- **Performance Measure 8:** Partner with communities in developing or updating their comprehensive plans

Goal 5: Monitor forest management levels in Kentucky to identify trends, needs, benefits, and threats.

- **Objective 5.1:** Monitor the commonwealth's forests resource and management activities to ensure future sustainability and detect trends

  - **Performance Measure 1:** Maintain a positive growth-to-removal ratio while utilizing available forest resources for environmental, economic, and social benefits for all Kentuckians
  - **Performance Measure 2:** Increase the quality of Kentucky's forests based on distribution of tree grades as indicated in Kentucky's Forest Inventory and Analysis data
  - **Performance Measure 3:** Continue to support and utilize the Forest Inventory and Analysis program as a foundation of data for management performance
  - **Performance Measure 4:** Continue statewide monitoring of forest health threats and prioritize threats for funding opportunities
  - **Performance Measure 5:** Support forest stewardship plan monitoring and implementation to meet national forest stewardship program guidelines
  - **Performance Measure 6:** Promote the regional 17 state white oak initiative and develop demonstration areas.

Issue 5: Funding Strategy

Goal 1: Provide sufficient and dedicated funding to ensure Kentucky's forests meet the diverse end-uses of its citizens through sustainable forest management.

- **Objective 1.1:** Increase federal funding for Kentucky's forest resources

  - **Performance Measure 1:** The amount of funding distributed to landowners by NRCS and FSA for forestry practices.
  - **Performance Measure 2:** Percent increase of federal funding received by the KDF through the USFS compared to federal fiscal year 2018.
  - **Performance Measure 3:** Amount of funding paid by NRCS to technical service providers for forestry practices.
  - **Performance Measure 4:** Amount of federal funding received by the KDF not including the USFS

- **Objective 1.2:** Increase state funding for Kentucky's forest resources.

  - **Performance Measure 1:** Amount of state funds received for Kentucky Forest Stewardship Fund.
  - **Performance Measure 2:** Percentage of fines collected under the provisions of the Kentucky Forest Conservation Act.
  - **Performance Measure 3:** Amount of state funds distributed to forest landowners for the implementation of forestry practices.

- **Performance Measure 4:** Percent increase in state funds received by the KDF compared to state fiscal year 2018.
- **Performance Measure 5:** Percent increase in personnel by the KDF compared to state fiscal year 2018.
- **Performance Measure 6:** Percent increase in agency receipts by the KDF compared to state fiscal year 2018.
- **Performance Measure 7:** Incentives established to encourage landowners to retain and manage their forestland.

- **Objective 1.3:** Identify other funding opportunities

  - **Performance Measure 1:** Amount of foundation funds received by landowners and the KDF for sustainable forest management.
  - **Performance Measure 2:** Amount of funding received by landowners and the KDF from sources other than federal or state.

REFERENCES

1 Ralph R. Widner ed. 1968. "Forests and Forestry in the American States: A Reference Anthology" Compiled by the Association of State Foresters. "Chapter 49: Kentucky: Back From Scrub" by Gene L. Butcher, Director Department of Natural Resources.

2 Francois Andre Michaux. 1805. "Travels to the West of the Alleghany Mountains in the States of Ohio, Kentucky, and Tennessea, and Back to Charleston, by the Upper Carolines." London. p. 175.

3 Thomas Crittenden Cherry. 1935. "Kentucky; the pioneer state of the West." Boston, New York. D.C. Heath and Co.

4 USDA Forest Service. 2019. Forests of Kentucky, 2016. Resource Update FS-184. Asheville, NC: U.S. Department of Agriculture, Forest Service. 2p. https://doi.org/10.2737/FS-RU-184

5 Kentucky Environmental Quality Commission. 2005. "The Future of Kentucky's Forests: EQC Forestry Roundtable Summary and Actions." Kentucky Environmental Quality Commission (EQC).

6 John Obrycki. 2008. "An Annual Report Produced by the Kentucky Forest Health Task Force, Healthy Forests in Kentucky" University of Kentucky College of Agriculture, pp. 4.

7 Kentucky Forest Health Task Force (KFHTF). 2006. "Forest Health, An Assessment of the Health of Kentucky's Forests and Threats to Maintaining the Health of our Forests", Printed by University of Kentucky College of Agriculture, pp. 24.

8 "Kentucky Forest Sector Economic Contribution." *Kentucky Forest Sector Economic Contribution | Forestry and Natural Resources*, Department of Forestry and Natural Resources , forestry.ca.uky.edu/economic-report.

9 Southeast Watershed Forum. 2005. "The Value of Community Trees." Web site. Accessible online at www.southeastwatershedforum.org

10 USFS Northern Research Station. "Providing Clean Air and Water." Web site. Last modified on July 24, 2009. Accessible online at http://www.nrs.fs.fed.us/clean_air_water/

11 Jeffery A. Turner, Christopher M. Oswalt, James L. Chamberlain, Roger C. Conner, Tony G. Johnson, Sonja N. Oswalt, Kadonna C. Randolph. 2008. "Kentucky's Forests, 2004." USFS Southern Research Station. Resource Bulletin SRS-129.

12 "Future of Climate Change." EPA, Environmental Protection Agency, 27 Dec. 2016, 19january2017snapshot.epa.gov/climate-change-science/future-climate-change_.html.

13 Kentucky State Nature Preserves Commission (KSNPC). 2009. Biennial Report.

14 Ronald L. Jones. 2005. Plant life of Kentucky: an illustrated guide to the vascular flora. The University Press of Kentucky

15 Parker, George R.; Weaver, George T. 1989. Ecological principles: climate, physiography, soil, and vegetation. In: Hutchinson, Jay G., ed. Central hardwood notes. St. Paul, MN.: U.S. Dept. of Agriculture, Forest Service, North Central Forest Experiment Station. 2.01.

16 Boerner, Ralph 2000. Effects of Fire on the Ecology of the Forest Floor and Soil of Central Hardwood Forests. In: Yaussy, Daniel A., comp. 2000. Proceedings: workshop on fire, people, and the central hardwoods landscape; 2000 March 12-14; Richmond, KY. Gen. Tech. Rep. NE-274. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station: 56-63.

17 Williard, Karl W.J.; DeWalle, David R.; Edwards, Pamela J.; Sharpe, Peter J. 2004. Impacts of Historic Fire, Stand Age, and Nitrogen Saturation Status on Soil Nitrogen Cycling in Mid-Appalachian Forested Watersheds. In: Yaussy, Daniel A.; Hix, David M.; Long, Robert P.; Goebel, P. Charles, eds. Proceedings, 14th Central Hardwood Forest Conference; 2004 March 16-19; Wooster, OH. Gen. Tech. Rep. NE-316. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station: 224-231.

18 Patric, James H. 1973. Deforestation effects on soil moisture, streamflow, and water balance in the central Appalachians. Res. Pap. NE-259. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 12 p.

19 USFS. "Invasive Species." White paper. Accessible online at http://www.fs.fed.us/publications/policy-analysis/invasive-species-position-paper.pdf

20 Michael Mahala. 2008. "Kentucky Terrestrial Nuisance Species Management Plan. Kentucky Department of Fish and Wildlife.

21 USFS. 2008. "Prescribed Fire: An Ancient Practice for Today's Forests." Brochure produced by the USDA Forest Service Daniel Boone National Forest in conjunction with the University of Kentucky College of Agriculture Department of Forestry and the Joint Fire Science Program.

22 Governor's Task Force on Wildland Arson. "Final Report." October 31, 2006.

23 UK Department of Forestry and Natural Resources. 2017. 2017 White Paper on The Ash Disaster in Kentucky. http://forestry.ca.uky.edu/eab

24 USFS Northeastern Area. "Forest Health Protection – Hemlock Woolly Adelgid." Web site. Last modified Jan. 7, 2010. Accessible online at http://na.fs.fed.us/fhp/hwa/

25 Jeff Stringer, John Cox, Billy Thomas. "Forest Health, Kentucky Forest Health Task Force, Invasive Plant Hit List: Bush Honeysuckle." Kentucky Woodlands Magazine, Volume 3 Issue 3. p. 13.

26 KNSPC. "Invasive Species Fact Sheet." Web site. Accessible online at http://www.naturepreserves.ky.gov/

27 Kurt Hartman. 2005. "The Impacts, Invasibility, and Restoration Ecology of an Invasive Shrub (Lonicera maackii)." Dissertation for College of Arts and Sciences at Ohio University.

28 National Park Service. "Integrated Pest Management Manual." Web site. Accessible online at http://www.nature.nps.gov/biology/ipm/manual/exweeds1.cfm

29 Skulman et al. 2004. "Allelopathic interference of Japanese honeysuckle (Lonicera japonica) to loblolly and shortleaf pine regeneration." Weed Science. 52:433-439.

30 Cameron, R. Scott; Hanula, James; Fraedrich, Stephen; Bates, Chip. 2015. Progression and impact of laurel wilt disease within Redbay and Sassafras populations in Southeast Georgia. Southeastern Naturalist, Vol. 14(4): 25 pages.: 650-674. http://dx.doi.org/10.1656/058.014.0408

31 Gary Johnson, Division of Mine Permits. 2010. Permit information collected from the Division of Mine Permits permit application and inputted into the Surface Mining Information System (SMIS).

32 Boyce, J.S. 1961. "Forest Pathology." 3rd edition. McGraw-Hill. New York, New York. 572 pp.

33 The American Chestnut Foundation. "History of the American Chestnut Foundation." Web site. Accessible online at http://www.acf.org/history.php

34 USFS. 2003. "America's Forests, 2003 Health Update" May 2003. p. 12.

35 American Chestnut Cooperators' Foundation, Virginia Tech Department of Plant Pathology, Physiology and Weed Science. Web site. Accessible online at http://www.ppws.vt.edu/griffin/accf.html.

[36] Smith, Jules. "American Chestnut Foundation." The American Chestnut Foundation, 10 July 2019, www.acf.org/.

[37] Griffin, Lucille, et al. "American Chestnut Cooperators' Foundation." American Chestnut Cooperators' Foundation, 8 Oct. 2017, accf-online.org/.

[38] ESF Office of Communications. "Restoring the American Chestnut." ESF, www.esf.edu/chestnut/.

[39] American Chestnut Restoration in Kentucky. "Chestnuts in Surface Mining Restoration." Web site, http://www.kychestnut.org/kySurfaceMining.php.

[40] The Kentucky Railsplitter, Working to Restore the American Chestnut, Volume 7, Number 1, Spring 2008, p. 4-5., Web site. Accessible online at http://www.kychestnut.org/Newsletters/May%202008%20NewsletterA.pdf.

[41] Garrison, Lynn, et al. "American Chestnut: an Update for Kentucky Woodland Owners." Kentucky Woodlands Magazine, Apr. 2011, www.acf.org/wp-content/uploads/2016/08/KWM-Apr-2011-Chestnut-pg10-13.pdf.

[42] "ARRI - Operation Springboard: Rebirth of the American Chestnut." Appalachian Regional Reforestation Initiative (ARRI), arri.osmre.gov/AC/OS08.shtm.

[43] KDF. Brochure on the Kentucky Division of Forestry. June 2001; Kentucky's Nursery Situation – Abstract of paper presented at the Trees for Reclamation in the Eastern United States Symposium, Lexington, Kentucky, October 27-29, 1980, Raymond Swatzyna, Web site. Accessible online at http://nrs.fs.fed.us/pubs/gtr/gtr_ne61/gtr_ne61_025.pdf

[44] USDA Research Education and Economics Information System. "Prescribed Fire in the Southern Appalachians: Stand Structure, Oak Seedlings, and Fuel." Web site. Accessible online at http://www.reeis.usda.gov/web/crisprojectpages/204903.html

[45] Kentucky Division of Water. 2016. "Final 2016 Integrated Report to Congress on the Condition of Water Resources in Kentucky. Kentucky Environmental and Public Protection Cabinet, Division of Water.

[46] T.E. Dahl. 1990. Wetland Losses in the United States, 1780s to 1980s. U.S. Department of Interior, Fish and Wildlife Service, Washington DC. 21pp.

[47] Dissmeyer, G.E., ed. 2000. Drinking water from forests and grasslands: a synthesis of the scientific literature. Gen. Tech. Rep. SRS–39. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 246 p.

[48] Craig Anthony Arnold, Carol Norton, and Dustin Wallen. 2009. "Kentucky Wet Growth Tools for Sustainable Development." University of Louisville Center for Land Use and Environmental Responsibility. Web site. Accessible online at http://louisville.edu/land use/healthy-watersheds-land use-initiative.html

[49] USEPA. 2001. "Functions and Values of Wetlands." Office of Water, Office of Wetlands, Oceans, and Watersheds. EPA 843-F-01-002c.

[50] USEPA. 1995. "America's Wetlands: Our Vital Link Between Land and Water." Office of Water, Office of Wetlands, Oceans, and Watersheds

[51] USFS. 2007. "Interim Update of the 2000 Renewable Resources Planning Act Assessment." FS-874. 123pp.

[52] Southeast Watershed Forum. 2007. "Conserving our Southeastern Aquatic Habitat: the Southeast Aquatic Habitat Plan." Southeast Aquatic Resource Partnership (SARP).

[53] KDFWR. 2005. "Kentucky's Comprehensive Wildlife Conservation Strategy." Kentucky Department of Fish and Wildlife Resources. Web site. Last updated 9/21/2005. Accessible online at http://fw.ky.gov/kfwis/stwg/

[54] Marsh, G.P. 1864 [2003]. Man and nature. D. Lowenthal, ed. Seattle, WA: University of Washington Press.

[55] Richard C. Davis. 1983. "Encyclopedia of American Forest and Conservation History." New York: Macmillan. Vol. 2. p. 685.

[56] Sanitation District No. 1. 2009. "Watershed Plans For Northern Kentucky." Web site. Accessible online at www.sd1.org

[57] Palone, R.S. and A.H. Todd (editors.) 1997. Chesapeake Bay riparian handbook: a guide for establishing and maintaining riparian forest buffers. USDA Forest Service. NA-TP-02-97. Radnor, PA.

[58] Federal Interagency Stream Restoration Working Group (FISRWG). 1998. Stream Corridor Restoration: Principles, Processes, and Practices. GPO Item No. 0120-A; SuDocs No. A 57.6/2:EN 3/PT.653.

[59] Fischer, R. A., and Fischenich, J.C. 2000. "Design recommendations for riparian corridors and vegetated buffer strips," EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-24), U.S. Army Engineer Research and Development Center, Vicksburg, MS. Web site. Accessible online at www.wes.army.mil/el/emrrp

[60] USDA Forest Service. 2004. Eastern Hemlock Forests: Guidelines to Minimize the Impacts of Hemlock Woolly Adelgid. Northeastern Area State & Private Forestry NA-TP-03-04.

[61] Jeff Stringer. 2009. White Paper: Opportunities and Challenges Associated with the Development of Woody Biomass Markets in Kentucky. University of Kentucky, Department of Forestry.

[62] NRCS. Mississippi River Basin Healthy Watersheds Initiative factsheet. Focused watersheds from NRCS Web site available at http://www.nrcs.usda.gov/Programs/mrbi/mrbi_watersheds_maps_and_list_page.html

[63] Appalachian Regional Reforestation Initiative. 2009. Web site. Accessible online at http://www.arri.osmre.gov/AboutARRI.shtm

[64] Hurd, James, Emily Hoffhine, and Daniel L. Civco. 2002. Development of a forest fragmentation index to quantify the rate of forest change. ASPRS-ACSM Annual Conference and FIG XXII Congress.

[65] USDA Forest Service. 2019. "Forest Inventory and Analysis" Website. Accessible online at www.southeastwatershedforum.orghttps://www.fia.fs.fed.us/tools-data/index.php

[66] Barnes, Thomas G. Landscape Ecology and Ecosystem Management. FOR-76. Coop. Ext. Service, Univ. of Kentucky. 8pp.

[67] KDFWR. 2009. "Edge Feathering." Web Site. Accessible online at https://fw.ky.gov/Wildlife/Documents/edgefeathering.pdf

[68] Mortenson, David A, et. al.2009. Forest roads facilitate the spread of invasive plants. Invasive Plant Science and Management 2(3) 191-199.

[69] KSNPC. 2009. Conservation lands database. Unpublished data. Kentucky State Nature Preserves Commission, Frankfort, Kentucky, USA.

[70] Hermansen-Baez, L.Annie, Seitz, Jennifer, and Monroe, Martha . 2009. "Wildland-Urban Interface: Key Issues." Interface South of the Center for Urban and Interface Forestry, Southern

Resource Station, USFS, University of Florida, Institute of Food and Agricultural Sciences FOR202/FR264 Interface South. Web site. Accessible online at https://urbanforestrysouth.org/

71 USFS. Web site. Accessible online at http://www.fs.fed.us/

72 ATFS website. Accessible online at https://www.treefarmsystem.org

73 Kentucky Department for Natural Resources. "Heritage Land Conservation Fund." Web site. Accessible online at: http://www.dnr.ky.gov/heritageland/

74 FORFS 19-01 *Kentucky Forest Sector, Economic Contribution Report 2017 - 2018* Jeff Stringer, Billy Thomas, Bobby Ammerman, Chad Niman, Domena Agyeman, Kamana Poudel and Thomas Ochuodho http://forestry.ca.uky.edu/files/2018_ky_contribution_report_final.pdf

75 Forest2Market, Inc. April 14, 2016. "The Economic Impact of Privately-Owned Forests." Prepared for the National Alliance of Forest Owners.

76 Forest Resources of the United States, 2017, United States Department of Agriculture, A Technical Document Supporting the Forest Service 2020 RPA Assessment, Sonja N. Oswalt, W. Brad Smith, Patrick D. Miles, and Scott A. Pugh

77 Barber, Brad; J. Jacobs; and R. Srinivasan. 2008. Southern Forest Land Assessment. Southern Group of State Foresters.

78 Saaty, T. L. 1977. A scaling method for priorities in hierarchical structures. *Journal of Mathematical Psychology* **15**, 234-281

79 KDFWR. 2013. Kentucky's Comprehensive Wildlife Conservation Strategy. Kentucky Department of Fish and Wildlife Resources, #1 Sportsman's Lane, Frankfort, Kentucky 40601. http://fw.ky.gov/kfwis/stwg/ (Date updated 9/21/2005) Appendix 4.17 – Bird Conservation Areas (Forestland)

APPENDICES

Appendix 1 – National Priorities Addendum

Addendum to the
Kentucky Statewide Assessment of Forest Resources and Strategy, June 2010

NATIONAL PRIORITIES SECTION

November 2015

As stated on page 16 of the **Kentucky Statewide Assessment of Forest Resources and Strategy, June 2010** (also known as the **Kentucky Forest Action Plan**), the federal Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) required all states to evaluate their forests and develop strategies to address forest issues. The 2008 Farm Bill outlined the requirements that the assessment and strategy had to include. In August 2010, the USDA Forest Service approved Kentucky's plan as having met these assessment and strategy requirements.

The Kentucky Forest Action Plan was developed with a comprehensive team of stakeholders to address the issues determined by Kentucky's citizens to be the most critical in conserving, protecting, and enhancing Kentucky's trees and forests. These five critical issues are Forest Health, Water Quality and Quantity, Forest Loss and Fragmentation, Forest Management, and Funding.

This addendum serves as a record of some of the activities undertaken in Kentucky from June 1, 2010-September 30, 2015 to address the five issues discussed in detail in the Forest Action Plan. The purpose of this National Priorities Section is to show the link between Kentucky's five critical issues and the three national priorities: Conserve and Manage Working Forest Landscapes for Multiple Values and Uses, Protect Forests from Threats, and Enhance Public Benefits from Trees and Forests. Almost all of the activities undertaken are linked to more than one national priority. Pages 122-165 of the Kentucky Forest Action Plan contain the Forest Resources Strategy. Every tactic identifies the national theme or themes it covers in the right-hand column on each page.

- **Hemlock Woolly Adelgid Suppression Program:** The Hemlock Woolly Adelgid is one of Kentucky's most significant threats. It occurs across 28 counties in eastern Kentucky and will have major ecological and environmental impacts on forest health. The Division of Forestry established a suppression program to coordinate multi-agency projects with local county extension agents, local forestry organizations, state and federal agencies, non-government organizations, and interested civic groups. With a full time coordinator and crew, the division provides an extensive chemical treatment program and technical assistance to residential and municipal entities. In 2015, the division partnered with the Tennessee Division of Forestry to increase chemical treatments and develop new *Laricobius spp*. field insectaries in both states. Since 2010, the suppression program has created five positions within the division, chemically treated over 100,000 hemlock trees, and

brought in over $1.3 million in funding. Major partners include the U. S. Forest Service, Daniel Boone National Forest, Kentucky Department of Parks, Kentucky Heritage Land Conservation Fund, Kentucky Nature Preserves Commission, Steele-Reese Foundation, and Toyota Motor Manufacturing Kentucky.

Issue 1: Forest Health Strategy; Goal 1: Reduce the spread of invasive plants, insects, and diseased through improved monitoring, management, and education.

(Conserve and Protect)

- **Forest Health Research and Education Center**: A partnership between the Forest Service Southern Research Station, University of Kentucky Department of Forestry, and the Kentucky Division of Forestry began in 2013 to find solutions to health threats in hardwood forests. As a result of this partnership, the Forest Health Research and Education Center was formed to tackle forest health issues and improve the sustainability of the forests of the eastern U.S. using biological sciences, social sciences, and education and outreach

  Issue 1: Forest Health Strategy; Goal 4: Support and develop forest health research projects. **(Conserve, Protect and Enhance)**

- **Bloodhound Program for Wildland Arson:** Since the beginning of the new arson bloodhound program and public awareness campaign in 2014, the bloodhounds have been used on more than 20 suspected wildland arson cases in Southeast Kentucky. To date there have been two cases that have proven to be successful in netting a suspect. These individuals admitted to starting a fire that escaped their control, and agreed to pay suppression cost for the fire. The bloodhounds have been featured in several news stories, television advertisements, and some school programs about the work they do to combat wildland arson. The public awareness of the program seems to be bearing some fruit with lower than average arson fires in counties where the bloodhounds are working. We are in partnership with the Bell County Forestry Camp Correctional Facility and the Kentucky State Police Arson Investigation Unit. The Bell County Forestry Camp provides the bloodhounds and their handlers. The State Police provides assistance once a suspect has been identified.

  Issue 1: Forest Health Strategy; Goal 7: Provide leadership, support and coordination for educating the public about wildfires in Kentucky

  (Conserve and Protect)

  Issue 1: Forest Health Strategy; Goal 8: Enhance and improve wildfire law enforcement programs

  (Conserve, Protect, and Enhance)

- **Southern Appalachian Mixed-Mesophytic Reclamation Initiative:** The Kentucky Division of Forestry teamed up with the Kentucky Division of Abandoned Mine Lands, Appalachian Regional Reforestation Initiative, and the American Chestnut Foundation to reestablish 15,000 American chestnut and other hardwood seedlings on a 16 acre bond forfeiture coal mine site in Lawrence County, Kentucky within the Appalachian Forest Priority Area. The forfeited bond was not enough to restore the site, so using the bond money, federal funds, state funds, and in-kind contributions, the former mine site prepared and planted. The project also provided technical assistance to adjacent landowners to encourage forest management activities and improve forest health and water quality across the Appalachian region. The last site inventory recorded a 50% survival rate across the whole project area. This project was a multi-state competitive project between Kentucky and Virginia.

  Issue 1: Forest Health Strategy; Goal 5: Promote reforestation on post mining land

  (Conserve, Enhance)

- **Revisions to best management practice for streamside management zones:** Following a 10 year study by the University of Kentucky on timber harvesting in streamside management zones, the Kentucky Forestry Best Management Practices Board approved changes to the silviculture BMPs in 2015. The most significant change is the increase in minimum surface distance for roads, trails, and landings adjacent to perennial and intermittent streams. The BMP changes were approved by the Kentucky Agriculture Water Quality Authority and will be included in the Kentucky Agriculture Water Quality Plan.

  Issue 2: Water Quality and Quantity Strategy; Goal 1: Ensure timber harvest operations employ measures to maximize water quality protection.

  (Conserve, Protect, and Enhance)

- **Revisions to timber harvest compliance law to address repeat bad actors and bad actors that have not paid civil penalties or completed remediation:** Since 2000, loggers and operators in Kentucky have been required by law to use best management practices to protect the waters of the Commonwealth. In its 2015 session, the Kentucky General Assembly passed amendments to the timber harvest compliance statutes requiring bad actor loggers that have not paid their civil penalties or completed all correctives actions to provide prior notification of all their timber harvests to the Kentucky Division of Forestry until all penalties are paid and corrective action completed. In addition, the amendments give the Division of Forestry the authority to shut down all the timber harvests of loggers with three or more bad actor designations until they pay all outstanding civil penalties and complete all corrective action. Civil penalties from violations of timber harvest requirements are deposited into the Forest Stewardship Incentives Fund.

Issue 2: Water Quality and Quantity Strategy; Goal 1: Ensure timber harvest operations employ measures to maximize water quality protection.
(Conserve, Protect and Enhance)

- **Best Management Practices Implementation on Timber Harvests:** Between May 1, 2012 and August 30, 2013, 125 randomly selected timber harvests were audited for Best Management Practice (BMP) implementation. The results of this most recent audit, when compared to two previous audits, indicate that BMP implementation has improved from 47% in 2005 to 68% in 2008 and finally 74% in 2013. Implementation rates for the primary sediment producers on a timber harvest; roads, trails and landings, have improved from 57% to 71% while the implementation rates for Streamside Management Zones have improved from 67% to 79%. These increases in implementation rates indicate that nonpoint-source pollution resulting from timber harvesting operations within Kentucky is declining. Because Kentucky law does not require advanced notification of timber harvesting, only 42 of these harvest sites had been inspected for compliance; however, the trend towards proper use of appropriate BMPs continues to rise.

  Issue 2: Water Quality and Quantity Strategy; Goal 1: Ensure timber harvest operations employ measures to maximize water quality protection.

  (Conserve, Protect and Enhance)

- **Big Rivers Wildlife Management Area and State Forest and Marion County Wildlife Management Area and State Forest:** The Kentucky Division of Forestry and the Kentucky Department of Fish and Wildlife Resources jointly acquired 6,732 acres in Union and Crittenden counties at the confluence of the Ohio and Tradewater rivers. Using money from the Forest Legacy Program, the Kentucky Heritage Land Conservation Fund, The Nature Conservancy, Indiana Bat Conservation Funds, in-lieu-fee mitigation funds, and Kentucky Department of Fish and Wildlife agency funds, the state purchased phase I in 2012 and phase II in 2013. This property now known as the Big Rivers Wildlife Management Area and State Forest is within the Big Rivers Forest Priority Area and the Big Rivers Corridor Forest Legacy Area.

  The Marion County Wildlife Management Area and State Forest is a 1,293-acre tract of land located east of Lebanon, Kentucky. The property is strategically located between Green River Lake State Park, Perryville Battlefield State Historic Site, Old Fort Harrod State Park and the Lincoln Homestead State Park. The Kentucky Department of Fish and Wildlife Resources, Marion County Fiscal Court and the Kentucky Division of Forestry cooperatively own and manage the property. The property was purchased in June 2010 with funding from the Kentucky Heritage Land Conservation Fund, Wildlife Restoration Act and the Kentucky Fish and Game Fund. This wildlife management area and state forest is located in the Headwaters Forest Priority Area.

  Issue 3: Forest Fragmentation and Loss Strategy; Goal 6: Increase acres of protected forestlands

(Conserve, Protect and Enhance)

- **Kentucky's 20/20 Vision for Reforestation:** Although almost half of Kentucky is forested, there are about 2 million acres that have the potential to be reforested. In 2014, Kentucky's 20/20 Vision for Reforestation began with the goal to plant 20 million seedlings in 20 years. The project uses Boy Scouts, Girl Scouts, 4-H clubs, and volunteers to plant seedlings on private and public lands. The Division of Forestry's two tree nurseries will grow most of seedlings planted through this initiative. Over 1.1 million seedlings have been planted since January 1, 2014.

  Issue 3: Forest Fragmentation and Loss Strategy; Goal 4: Increase forest cover on mined land and Goal 5: Reduce or minimize the impact of forest loss and fragmentation due to agricultural conversion

  (Enhance)

- **Kentucky Community Tree Recovery Campaign:** In March 2012, tornadoes passed through Kentucky, leveling many businesses, homes, trees, and forests. The Kentucky Community Tree Recovery Campaign was created as a partnership between the Arbor Day Foundation, the Kentucky Division of Forestry, local conservation districts, and private businesses to assists communities with recovery efforts. The recovery campaign focused efforts in two ways – to replace trees lost in the tornadoes and to provide citizens an opportunity to participate in the recovery of Kentucky's forests through volunteer service.

  In 2014 and 2015, the campaign was implemented in ten counties in southeastern and northern Kentucky. Nine counties had public planting events, where citizens assisted in planting trees on a public space such as a school ground, park, or extension office. These planting events planted between 100-2,500 seedlings with 20-300 volunteers planting the trees. Representatives from the private companies who donated to the campaign were invited to participate as well. In addition to these planting events, seedlings were given away to the public through partnering with other local agencies such as county conservation districts, community centers and county extension agencies. Each county was allocated a total of 5,000 trees to be planted and given away for a total of 50,000 trees in a two year time period. Funds are available through the Community Tree Recovery Program to assist five more tornado counties plant 25,000 trees in the spring of 2016. The recovery program assisted counties and communities in the Bluegrass Rivers Forest Priority Area and the Appalachian Forest Priority Area.

  Issue 3: Forest Fragmentation and Loss Strategy; Goal 2: Enhance and protect existing forested areas in the urban landscape and Goal 3: Increase acres of traditional forests in urban areas.

  (Conserve and Enhance)

- **Rebuilding of Morgan County Nursery:** In 2012, a major tornado destroyed the Morgan County Nursery resulting in $3.2 million in damage to the buildings, furnishings, property, farm equipment, vehicles, and seedlings. Despite the loss, the Division of Forestry managed to continue the nursery's operations. After two years of working through insurance claims and reconstruction, Governor Steve Beshear cut the ribbon on the new packing and shipping building and cooler. Seedling production was down the first year after the storm, but is slowly returning to pre-storm levels.

  Issue 4: Forest Management Strategy; Goal 3: Enable private family forest owners to enhance their stewardship potential through technical and financial assistance.

  (Conserve and Enhance)

- **Triplett Creek Watershed Project:** This project was awarded funding from the Two Chiefs' Joint Landscape Restoration Partnership in 2014 as a collaborative effort between the Division of Forestry, the Daniel Boone National Forest, Natural Resources Conservation Service, Kentucky Department of Fish and Wildlife Resources, Kentucky Chapter of The Nature Conservancy, Rowan County Conservation District, Rowan County Firewise, and local volunteer fire department chiefs to project the Triplett Creek Watershed by activities to reduce wildfire and improve forest management. The Triplett Creek Watershed is located in the Appalachian Forest Priority Area.

  To address forest management needs, the Division of Forestry prepared forest stewardship plans and practice plans for landowners with the Triplett Creek Watershed who signed up to receive cost-share assistance from the EQIP program. The **p**ractices included afforestation, riparian buffers, timber stand improvement, and improvement on existing access trails and roads**.** Triplett Creek Project funds supported the Summer/Fall Volume 10 Issue 1 of the Kentucky Woodlands Magazine and supported the East Region Woodland Owners Short Course held September 26, 2015. The division piloted the first class of the Master Forest Stewards, a program to teach landowners to be mentors to other forest landowners.

  To reduce wildfire risks, the division signed agreements with the Rowan County Fiscal Court and the Rowan County Soil Conservation District to reimburse both volunteer fire departments and local homeowners for wildfire risk assessments and mitigation of wildfire risks to homes and property within the Triplett Creek Watershed. There have been numerous joint-agency and public meetings along with radio interviews and newspaper ads to alert the public to wildfire risks and the assistance available address these risks.

  Issue 1: Forest Health Strategy; Goal 6: Enhance comprehensive wildfire prevention programs in Kentucky to reduce the number of human-caused wildfires in Kentucky and Goal 7: Provide leadership, support and Coordination for educating the public about wildfires in Kentucky.

  (Conserve, Protect)

Issue 2: Water Quality and Quantity Strategy; Goal 2: Improve Kentucky water quality through the protection, enhancement, and restoration of forested riparian areas.

(Conserve, Protect)

Issue 4: Forest Management Strategy; Goal 3: Enable private family forest owners to enhance their stewardship potential through technical and financial assistance.

(Conserve, Protect, Enhance)

- **Kentucky Forestry Economic Impact Report:** In 2012 the University of Kentucky's College of Agriculture's (now known as the College of Agriculture, Food and the Environment) Department of Forestry and Forestry Extension published the *Kentucky Forestry Economic Impact Report 2012-2013* that for the first time quantified the financial contributions of state's forestry sector. The report was a partnership with the university, the Kentucky Division of Forestry, USDA Forest Service's Southern Research Station FIA Unit, and the Kentucky Forest Industries Association. The analysis revealed that the forestry sector was a major economic driver in the state providing total employment of 51,000 jobs and $9.99 billion in total impact ($6.36 billion in direct impact) to Kentucky's economy in 2012. The report provided insight to predicted performance in 2013.

  The second report for 2013-2014 revealed that economic impacts has increased to $8.3 billion in direct contributions (up 4.4%) and estimated that total impacts were $12.8 million. Total employment had increased to 57,700.

  Having this information has been invaluable in showcasing the importance of Kentucky's forest industries to elected official, forest landowners, Kentucky citizens, and the industries themselves.

  Issue 4: Forest Management; Goal 5: Monitor forest management levels in Kentucky to identify trends, needs, benefits, and threats

  (Conserve, Protect and Enhance)

- **Kentucky Roots Campaign:** The Kentucky Roots Campaign is the product of a 2012 Competitive Grant ($85,000) that was awarded to the Division of Forestry and passed through to the Northern Kentucky Urban and Community Forestry Council (NKUCFC). The NKUCFC had identified that there was a lack of educational materials available to low literacy adults about trees, specifically why the public should care about trees, and how they should care for their trees. Learning how everyone can be part of the solution to protect and enhance Kentucky's forest resources is a critical need because almost 90% of Kentucky forests are privately owned and most urban homeowners have trees.

  The NKUCFC contracted with a media relations firm to develop a campaign of simple messages with input from multiple target groups. This firm assisted the council in developing strategies to reach the

identified target audience effectively. Most of the grant money went towards developing the campaign, with about $15,000 remaining for implementation. As the NKUCFC began implementation with the campaign, the council was successful in securing sponsorship from a private utility company in 2014 and 2015 for an additional $35,000 of implementation funds. So far, the NKUCFC has implemented the campaign using radio ads, point of sale postcards, bus ads, pop up banners, promotional giveaway items, and sponsorship at sporting events. The marketing firm was successful in further leveraging the grant dollars by getting additional in-kind services from vendors, such as free interior bus ads with the purchase of exterior bus ads. The NKUCFC plans to continue implementing the campaign and continue to seek additional sponsorship.

Issue 1: Forest Health Strategy; Goal 3: Reduce negative impacts of air pollution in urban areas

(Protect and Enhance)

Issue 2: Water Quality and Quantity Strategy; Goal 5: Increase the public awareness of the relationship between forestland use and water quality and quantity.

(Conserve and Protect)

Issue 4: Forest Management Strategy; Goal 1: Publicize the value of Kentucky's forest resources and the benefits of proper management and Goal 4: Establish and build local urban and community forestry programs

(Conserve, Protect and Enhance)

- ***Recommendations for the Harvesting of Woody Biomass-October 2011:*** *These recommendations were developed to promote a well-managed environmentally conscious approach to utilizing forest slash, inferior quality trees, and dedicated production for bioenergy and also enabling Kentucky to diversify its energy portfolio while protecting water quality, improving air quality, creating jobs, increasing tax revenue, and improving our state's energy independence. More specifically, the recommendations are offered to assist landowners, loggers and the users of woody biomass in making sound decisions regarding biomass harvesting and removal while ensuring the sustainability of the forest resources.*

  Issue 4, Forest Management Strategy; Goal 2, Promote the efficient, sustainable, and environmentally sound economic utilization of Kentucky's forest resources for forest products and environmental services

  (Enhance)

- **Rural Community Wealth Project:** The Rural Community Wealth (RCW) project has been implemented in Kentucky using funds from two competitive grant cycles (FY 11 and FY14, $100,000 each year). The Community Design Assistance Center (CDAC) of Virginia Tech was contracted to work with communities in southeastern Kentucky. The purpose of the project is to develop conceptual greenspace plans for communities. Communities applied to participate in RCW through a competitive grant process that was administered by the division. The process of working with each community included an initial site visit, stakeholders meeting, and two community meetings before the final package is given to the communities. Fifth year landscape architect students from Virginia Tech are responsible for drafting the plans.

  A key feature of RCW is ensuring that multiple groups and interests are represented at the meetings. At the community meetings, participants are offered at least two design plans of each area and discussions about their likes, dislikes, ideas, and concerns are facilitated by CDAC. Finalized conceptual plans that represent a broad, collective voice are given to community. Communities are then able to begin implementing pieces of the plans. Six communities in Kentucky have completed plans and have implemented parts of their plans by attaining grants, donations of cash and in-kind services, and also through their own budgets. RCW has been successful in helping to leverage funds for the communities many times over the initial project amount.

  Issue 1: Forest Health Strategy; Goal 2: Decrease the impacts on forests due to improper trail use, management, and design

  (Conserve and Protect)

  Issue 2: Water Quality and Quantity Strategy; Goal 5: Increase the public awareness of the relationship between forestland use and water quality and quantity

  (Conserve and Protect)

  Issue 3: Forest Fragmentation and Loss Strategy; Goal 1: Reduce or minimize the impact of forest loss from urban development

  (Conserve, Protect and Enhance)

  Issue 4: Forest Management Strategy; Goal 4: Establish and build local urban and community forestry programs

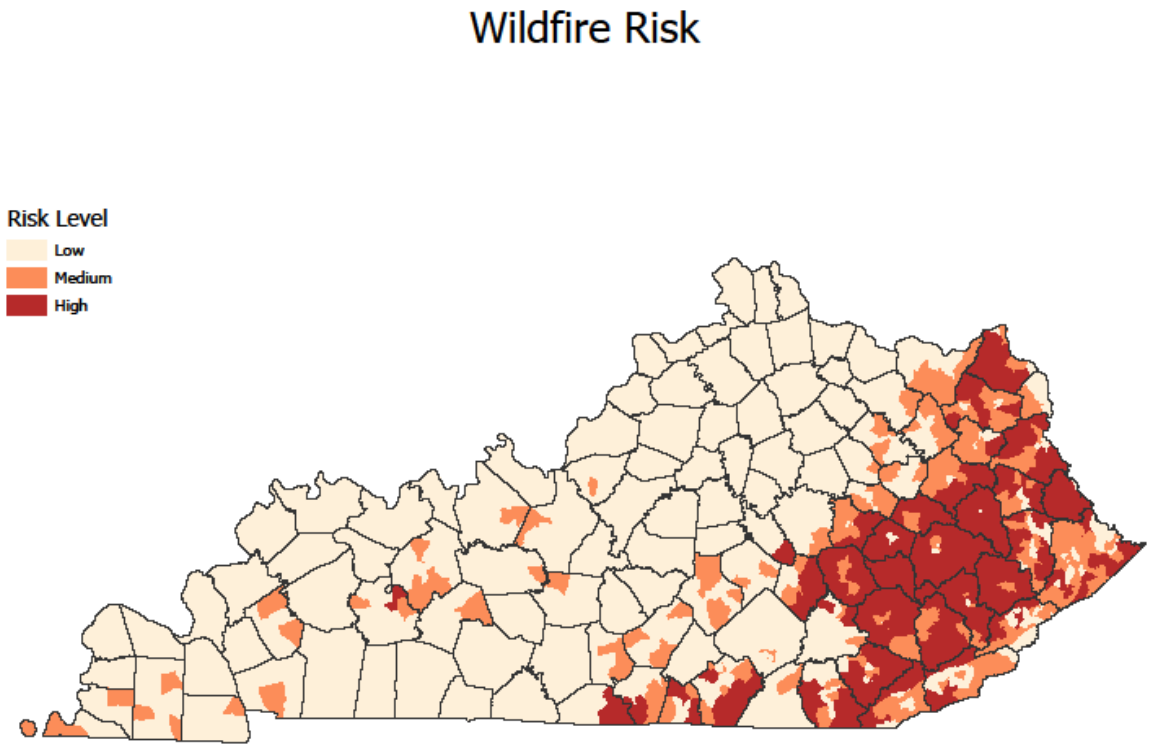
  (Conserve, Protect and Enhance)

Implementation Challenges

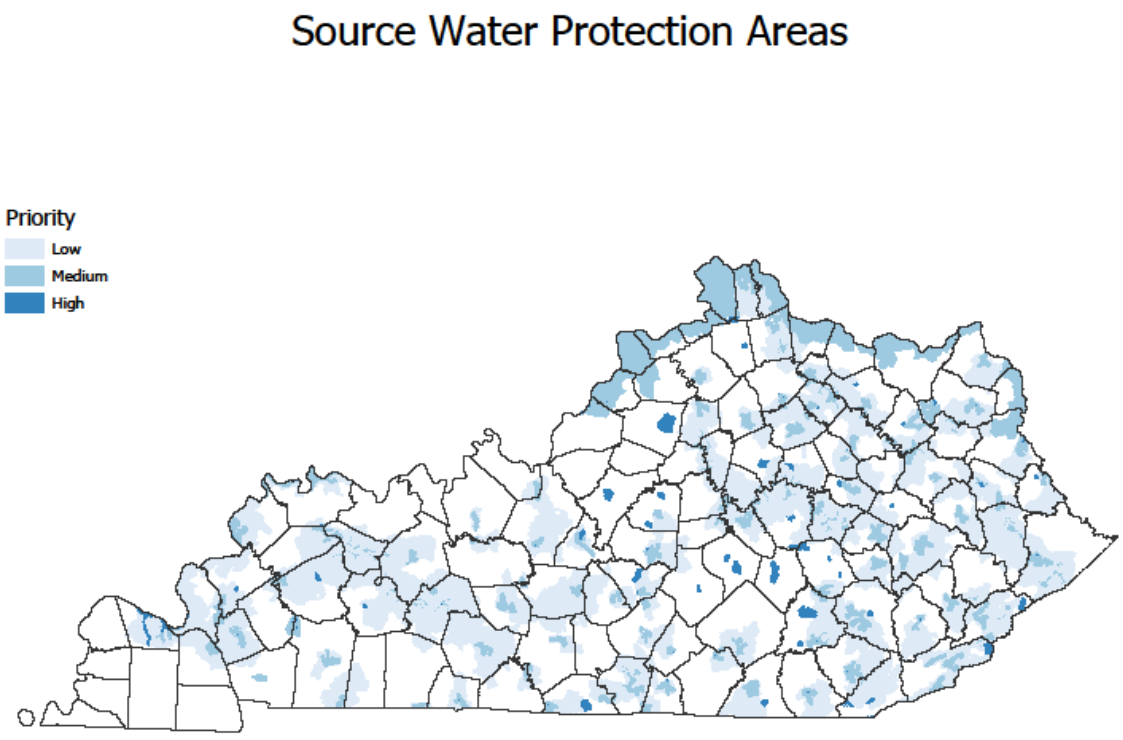
The greatest challenge to implementation of the Kentucky Forest Action Plan was the reduction in state and federal funds that forced the Division of Forestry to reorganize it structure and realign employees in 2013. The division consolidated field operations from nine districts into five regions. Four district offices were closed. Twenty-four employees were transferred to other state agencies. Several that remained elected to retire or resign because the changes in the location of their work assignments created a hardship for them. Field employees were busy for almost six months packing and moving to new offices resulting in a reduction in productivity on their forestry related job duties.

Appendix 2 – Forest Stewardship Maps

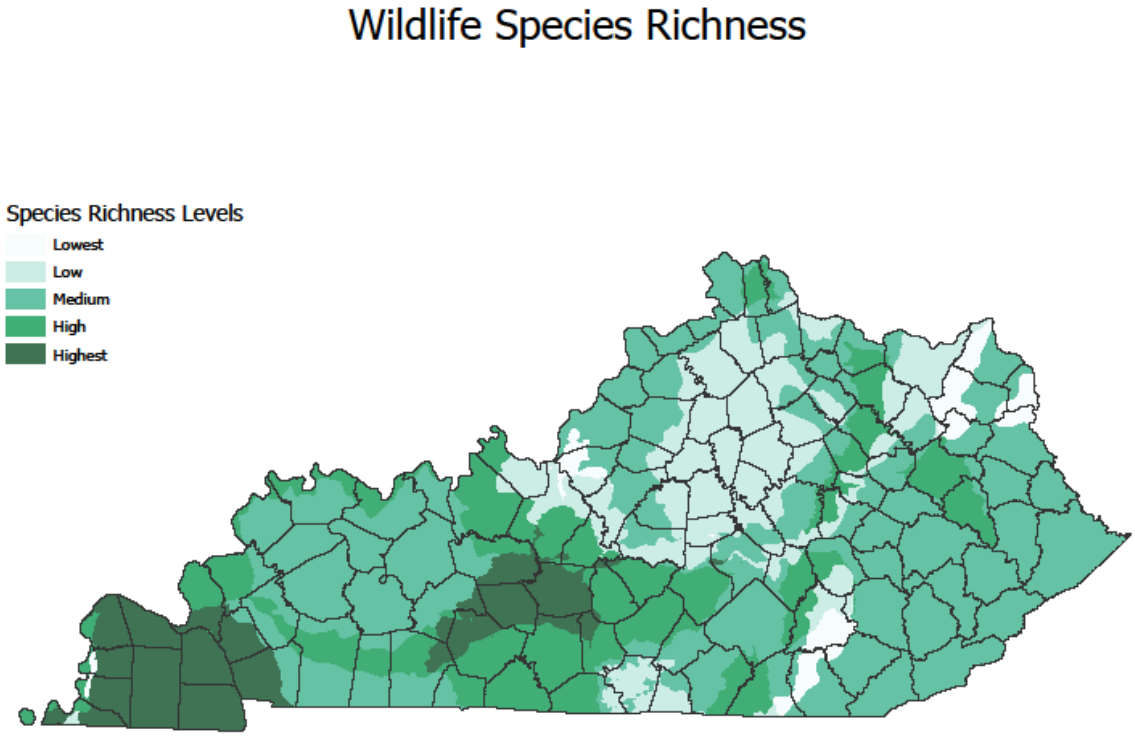
A. Wildfire Risk Map



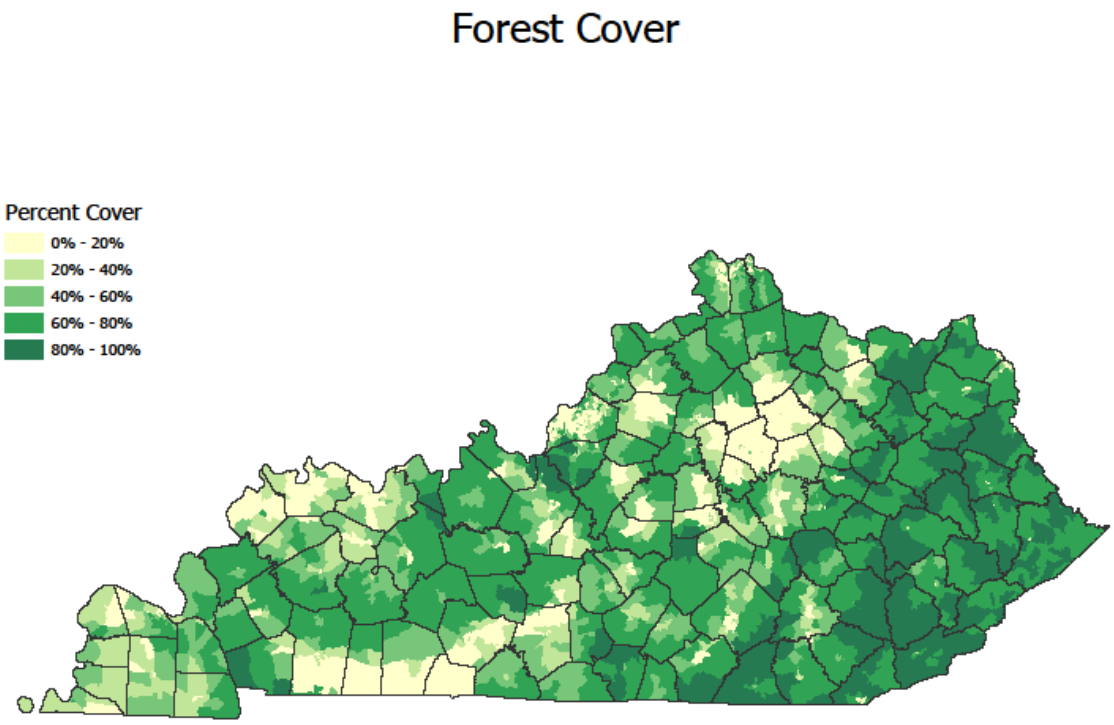
B. Source Water Protection Areas Map



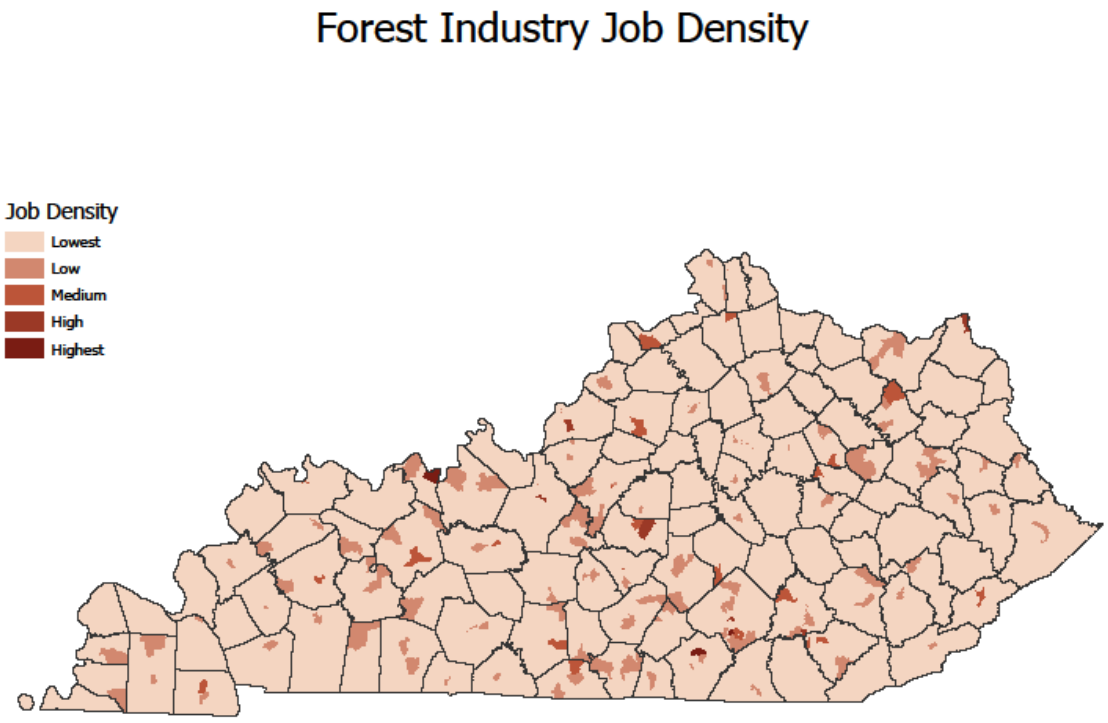
c. Wildlife Species Richness Map



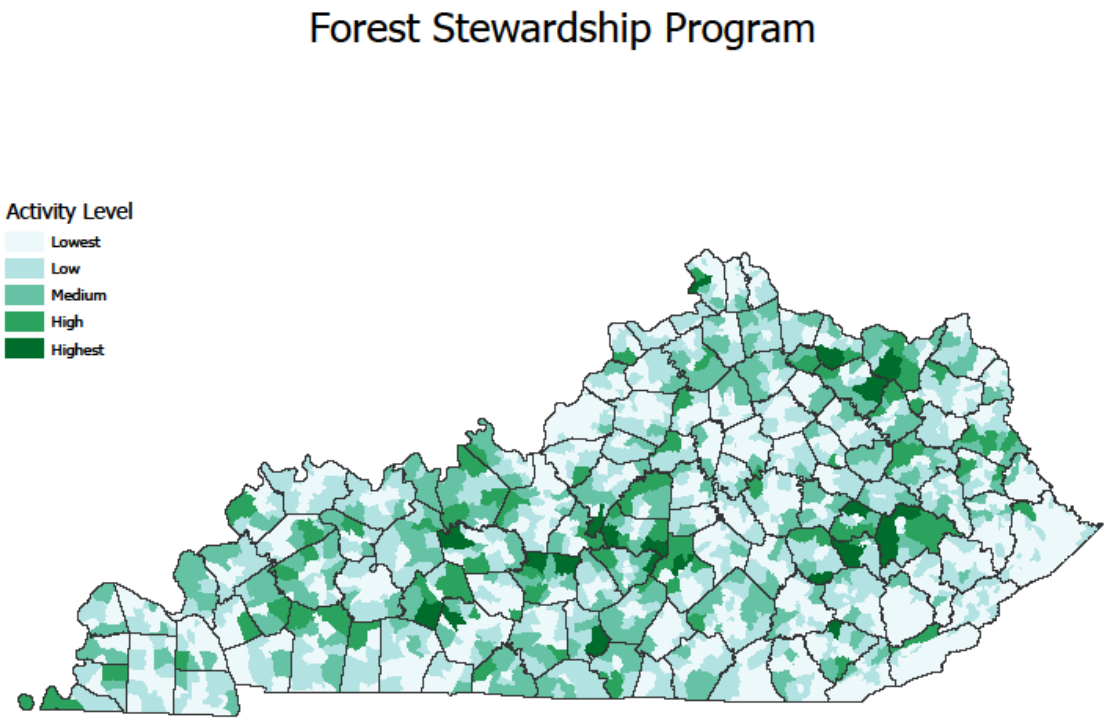
D. Forest Cover Map



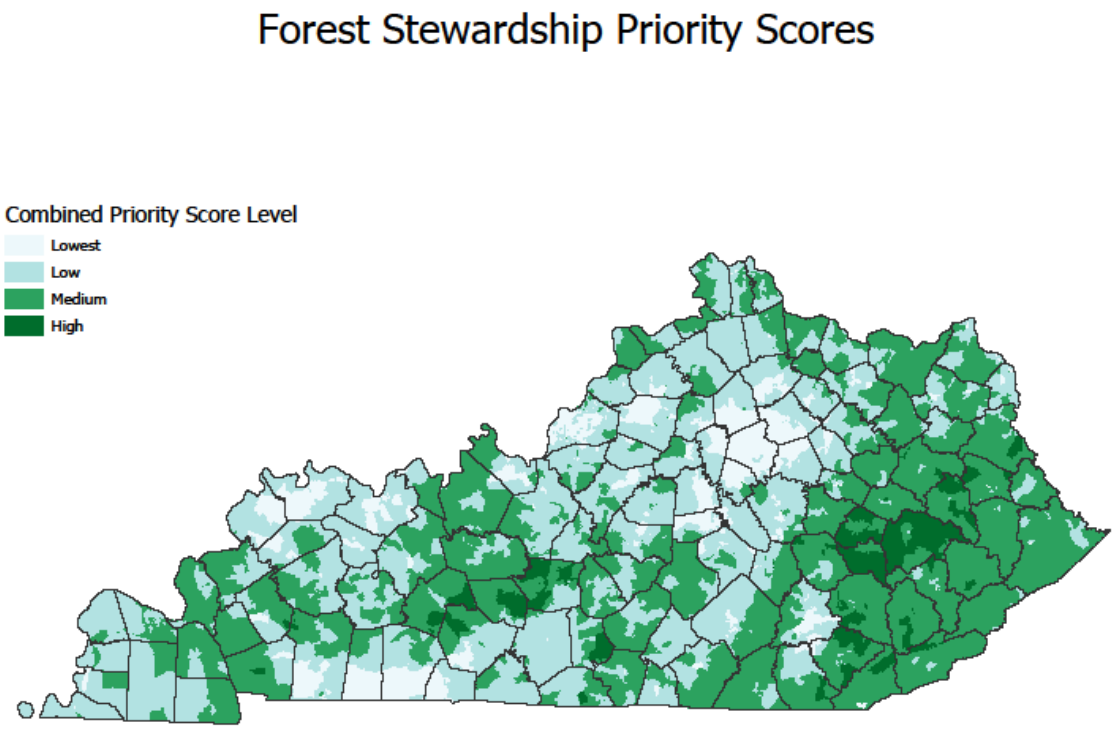
E. Forest Industry Job Density Map



F. Forest Stewardship Program Map



G. Forest Stewardship Priority Score Map



Appendix 3 – Forest Legacy Program Assessment of Need

KENTUCKY
FOREST LEGACY PROGRAM ASSESSMENT OF NEED

(See Attached Supporting Documentation)

KENTUCKY
FOREST LEGACY PROGRAM
ASSESSMENT OF NEED

Kentucky's
Forest Legacy Areas

ACKNOWLEDGEMENTS

Hugh N. Archer, Commissioner	Kentucky Department for Natural Resources
Benjamin T. Worthington, Forest Supervisor	USDA Forest Service, Daniel Boone National Forest
Leah W. MacSwords, Director	Kentucky Division of Forestry
Steven J. Kull, Assistant Director	Kentucky Division of Forestry
Diana Olszowy, Branch Manager	Kentucky Division of Forestry
Mark Q. Lee, Landowner Program Specialist	Kentucky Division of Forestry
Sarah Gracey, Urban and Community Forestry Program Specialist	Kentucky Division of Forestry
Roy Boggs, Geographic Information Systems Specialist	Kentucky Division of Forestry
Glenna Smith, Secretary	Kentucky Division of Forestry
Lori White, Secretary	Kentucky Division of Forestry
Dan Figert, Assistant Director	Kentucky Department of Fish and Wildlife Resources
Brian Smith, Grassland Systems Program	Kentucky Department of Fish and Coordinator Wildlife Resources
Chris Garland, Wildlife Biologist District	Kentucky Department of Fish and Wildlife Resources
Steven A. Coleman, Director	Kentucky Division of Conservation
Demetrio P. Zourarakis, Geographic Information Systems Specialist	Kentucky Division of Conservation
Donald S. Dott, Director	Kentucky State Nature Preserves Commission
Marc Evans, Ecologist	Kentucky State Nature Preserves Commission
James Aldrich, State Director	Kentucky Chapter of The Nature Conservancy
Jeff Sole, Director of Science and	Kentucky Chapter of The Nature Stewardship Conservancy
Julian Campbell, Inventory Coordinator	Kentucky Chapter of The Nature and Botanist Conservancy
Carey Tichenor, State Naturalist	Kentucky Department of Parks
Robert Miller	Kentucky Division of Water

TABLE OF CONTENTS

LIST OF MAPS

LIST OF TABLES

INTRODUCTION

AUTHORITY

The Cooperative Forestry Assistance Act of 1978, as amended, (16 U.S.C. 2103c et.seq.) provides authority for the U.S. Secretary of Agriculture to provide financial, technical, educational, and related assistance to states, communities, and private forest landowners. Section q217 of Title XII of the Food, Agriculture, Conservation and Trade Act of 1990 (P.L. 101-624: 104 stat.3359), also referred to as the 1990 Farm Bill, amended the Cooperative Forestry Assistance Act and allows the U.S. Secretary of Agriculture to establish the Forest Legacy Program to protect environmentally important forest areas that are threatened by conversion to non-forested uses. This authority continues indefinitely. Through the 1996 Farm Bill (Federal Agriculture Improvement and Reform Act of 1996; Public Law 104-127); Title III - Conservation; Subtitle G - Forestry; Section 374, Optional State Grants for Forest Legacy Program), the U.S. Secretary of Agriculture is authorized, at the request of a participating State, to make a grant to the state to carry out the Forest Legacy Program in the state, including the acquisition by the State of lands and interests in lands. The Commonwealth of Kentucky has requested the State Grant Option.

The Kentucky Division of Forestry is the lead agency for the Forest Legacy Program in the Commonwealth of Kentucky (Appendix 1). The Cooperative Forestry Assistance Act directs the U.S. Secretary of Agriculture to establish eligibility criteria for the designation of Forest Legacy Areas, in consultation with the Kentucky State Forest Stewardship Coordinating Committee (Appendix 2). These criteria are developed based upon the state lead agency's Assessment of Need for establishing a State Forest Legacy Program.

PURPOSE OF THE FOREST LEGACY PROGRAM

Since the majority of the nation's productive forestlands are in private ownership, these private landowners are facing increased pressure to convert their forestland to other uses. Greater population density and user demands are placing increased pressures on private lands to provide a wide variety of products and services including fish and wildlife habitat, aesthetic qualities, timber and recreation opportunities. However good stewardship of privately held forest lands requires a long-term commitment that can be fostered through a partnership of federal, state, and local government efforts.

In 1990, the Forest Legacy Program was one of several programs established to promote the long-term integrity of forestlands. The U.S. Secretary of Agriculture was directed to establish a Forest Legacy in cooperation with State, regional and other units of government. In carrying out this mandate, the U.S. Secretary of Agriculture is authorized to acquire lands and interests in lands in perpetuity for inclusion in the Forest Legacy Program. Landowner participation in the Forest Legacy Program, including the sale of lands and interests in lands, is entirely voluntary.

ASSESSMENT OF NEED (AON)

The purpose of the AON is:

1. To document the need for a Forest Legacy Program in Kentucky;
2. To identify and delineate the boundaries of forest areas meeting the eligibility requirements for designation as Forest Legacy Areas; and
3. To recommend areas to the USDA Forest Service /US Secretary of Agriculture for inclusion into the Forest Legacy Program.

EXECUTIVE SUMMARY

Kentucky's forests play as much a part in the state's history as Daniel Boone and other early pioneers. In Boone's time, the forest was home for wild game that existed in abundance, and the timber supplied materials for building homes and furniture. There were 25 million acres of forestland in Kentucky when settlers began establishing homesteads.

In 1870, Kentucky produced over 200 million board feet of lumber. By 1907, lumber production reached one billion board feet. Huge stands of yellow-poplar, oak, ash and maple were harvested to satisfy a growing industrial nation. Destructive logging practices and waste prevailed throughout the early lumbering days, and fire often followed logging. Trees were so plentiful that few recognized the need for conservation.

In the early 20th century, a few nationally prominent figures such as Teddy Roosevelt and Gifford Pinchot, the first chief of the USDA Forest Service, began to call attention to the need for conservation. In 1912, the Kentucky Legislature provided for establishment of a Board of Forestry which later lead to the creation of the Kentucky Division of Forestry. The initial emphasis for the division was to reduce the severity of wildfires in the state. Today, the mission of the Division of Forestry encompasses the entire forest spectrum. The mission reads:
To protect and enhance the forest resources of the Commonwealth through a public informed of the environmental and economic importance of these resources.

This forestland provides multiple benefits to the citizens of the Commonwealth, including timber production, wildlife habitat, recreation opportunities, quality water and aesthetic beauty. The passage of the Kentucky Forest Conservation Act (KFCA) mandated that the Natural Resources and Environmental Protection Cabinet's Division of Forestry ensure healthy, sustainable forests that are ecologically sound, provide economic opportunities, and benefit the overall quality of life for all Kentuckians. The Division of Forestry promotes the sustainability of Kentucky's forest ecosystem in the Forest Stewardship Program. The Division of Forestry is mandated by Kentucky Revised Statues Chapter 149 to provide for a system of wildland fire prevention, detection and suppression. The Division of Forestry provides technical assistance in Forest Stewardship, Urban and Community Forestry and Forest Health Program. The Division of Forestry operates two tree seedling nurseries.

In Kentucky, most of the fertile river bottoms and the uplands having gentle topography have been converted from forestland to agriculture and residential uses. Over much of the state, forests that once covered extensive areas are now confined to the steepest, rockiest or otherwise unfarmable terrain. In eastern and western Kentucky, surface mining has converted forests to pasture and other uses. Barrens (tall grass prairie) and savanna-woodland once covered an estimated two to three million acres in Kentucky. More than 80 percent of Kentucky's wetlands have been ditched, drained, and converted to other uses. Most often the driving force behind habitat loss and/or conversion is population density and urbanization.

There is no single motivating factor behind forest fragmentation in Kentucky. To lessen the rate of forest fragmentation and/or forest conversion in the Commonwealth of Kentucky depends upon the continued efforts from forest landowners, federal and state land conservation programs, population density; reducing urban sprawl, protecting physiographic regions, wildlife management and natural resource protection efforts, watershed protection, and restoration projects. In order to ensure and protect the Commonwealth of

Kentucky's critical forestland, the establishment of the Forest Legacy Program will help provide that forest conservation mechanism.

Eighty eight percent of the forestland is privately owned and by 2040, the population rate is estimated 4,745,599 people in the Commonwealth of Kentucky. Kentucky's land conversion rate is 172 acres per day changing to uses other than forestland. Current land use trends are medium to large farm and forestland tracts are being sold and broken up into parcels ranging 5-20 acres in size often referred to as hobby farms. Smaller forestland parcels are highly dissected, fragmented and are often more difficult to manage for timber and wildlife resources and protecting watersheds, and underground karst systems. As the complexities of forest management increase so does the demand for natural resources. An estimated 197 million cubic feet of total round wood output in 2017 came from non-industrial private forestlands. Round wood is defined as logs, bolts, or other round section cut form trees for industrial manufacture or consumer uses.

Currently, the Kentucky Division of Forestry along with the USDA Forest Service is involved in completing a statewide forestry inventory. A project completed by the Kentucky State Natures Preserves provided the breakdown of the percent of forest cover and the number of contiguous forest blocks by county. Some Kentucky counties still have a significant number of large contiguous forest blocks still remaining. The forested ecosystems, fish and wildlife resources, mineral resources, soils, watersheds, landowner assistance programs, land trusts, threatened and endangered species, state forest system and federal ownership were described to provide statewide natural resource information and land conservation efforts currently on-going and re-enforce the necessity of a Forest Legacy Program within the Commonwealth of Kentucky.

The ad hoc committee of the State Stewardship Coordinating Committee included representatives of public agencies and conservation organizations that have a working knowledge of forestry and timber production, fish and wildlife management, natural areas, threatened and endangered species, aquatic resources, watershed protection, and public resource conservation. This collaboration represents decades of natural resource knowledge and work brought forth to assist and designate the Northern, Eastern, Southern and Western Kentucky Forest Legacy Areas. County lines were used to simplify the geographical boundaries of the designated Forest Legacy Areas in combination with the Kentucky's major watershed boundaries. Kentucky Assessment of Need describes the authority, purpose, goals, and Forest Legacy Program administration.

KENTUCKY'S FOREST LEGACY - GOALS

The goals of the Kentucky Forest Legacy Program are to protect environmentally important forest areas that are threatened by conversion to non-forested uses and to promote working forests and other conservation opportunities. The **working forest concept** shall be defined as forestlands with specific objectives that follow forest stewardship principles. These principles address timber management, wildlife management, soil and water conservation, recreation, and aesthetics. The forest stewardship principles shall be defined by the landowner's goal(s) set forth in his/her Forest Stewardship Plan. A Forest Stewardship Plan or equivalent Forest Management Plan will be required when a landowner makes application to Kentucky's Forest Legacy Program

Environmentally important forest areas shall contain multiple combinations of the following important public values and shall be ranked through a system based on these values: (This list does not indicate or imply an order of importance.)

1. **Scenic resources**
2. **Public recreation opportunities**
3. **Public education opportunities**
4. **Riparian areas**
5. **Wetlands**
6. **Fish and Wildlife habitat**
7. **Native plant communities**
8. **Connectivity to other significant areas and other protected lands**
9. **Known threatened and endangered species**
10. **Known cultural resources**
11. **Other ecological values**

These forests should provide opportunities for the continuation of traditional forest uses, such as forest management, sustainable timber harvesting, and outdoor recreation.

At least 25 percent of the total acreage of the landowner's property must fall into a designated forest legacy area. Since many tracts may qualify for the Forest Legacy Program, eligibility criteria have been established in order to prioritize acquisition proposals. Landowner applications (fee simple or conservation easements) will only be accepted starting February 1 thru April 30 of each year. **This landowner application process is subject to change-based on recommendations from the Kentucky Forest Stewardship Coordinating Committee.** The Kentucky Forest Stewardship Coordinating Committee shall rank landowner applications (Appendix 3) by using a Kentucky's Forest Legacy Project Proposal Evaluation Form (Appendix 4).

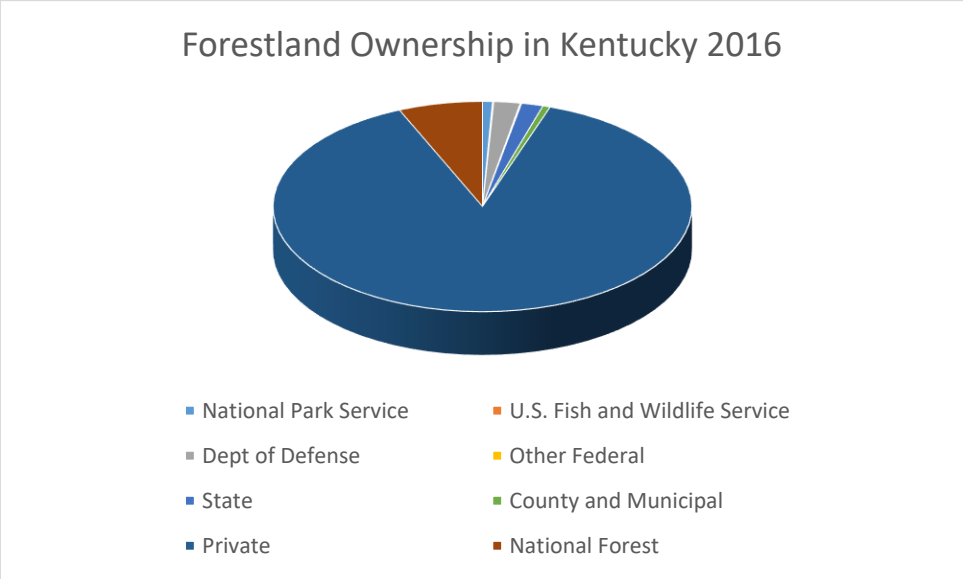
Lands and interest in lands identified within a Forest Legacy Area may be acquired under Forest Legacy Program authority by the Commonwealth of Kentucky, only on a willing seller/willing buyer basis. Lands acquired or conservations easements purchased under the Forest Legacy Program shall be held by the Commonwealth of Kentucky.

KENTUCKY FOREST RESOURCE - TRENDS AND THREATS

Kentucky's forests are highly variable in biological diversity, and are extremely complex in terms of their development and the associated ecological processes that keep a forest ecosystem functioning. Kentucky is in the geographic center of deciduous hardwood forests of eastern North America. Evergreen dominate only a small percentage of Kentucky forests.

Today Kentucky has 12.3 million acres of forestland. Eighty eight percent of this forest is privately owned by more than 467,000 landowners (Figure 1). It is estimated that less than 12 percent of Kentucky's annual timber harvest of more than 808 million board feet utilize a professional forester or have a forest management plan on the property. Such values indicate great potential benefits from managing young stands to improve our forests for the future.

Figure 1 – Forestland Ownership in Kentucky



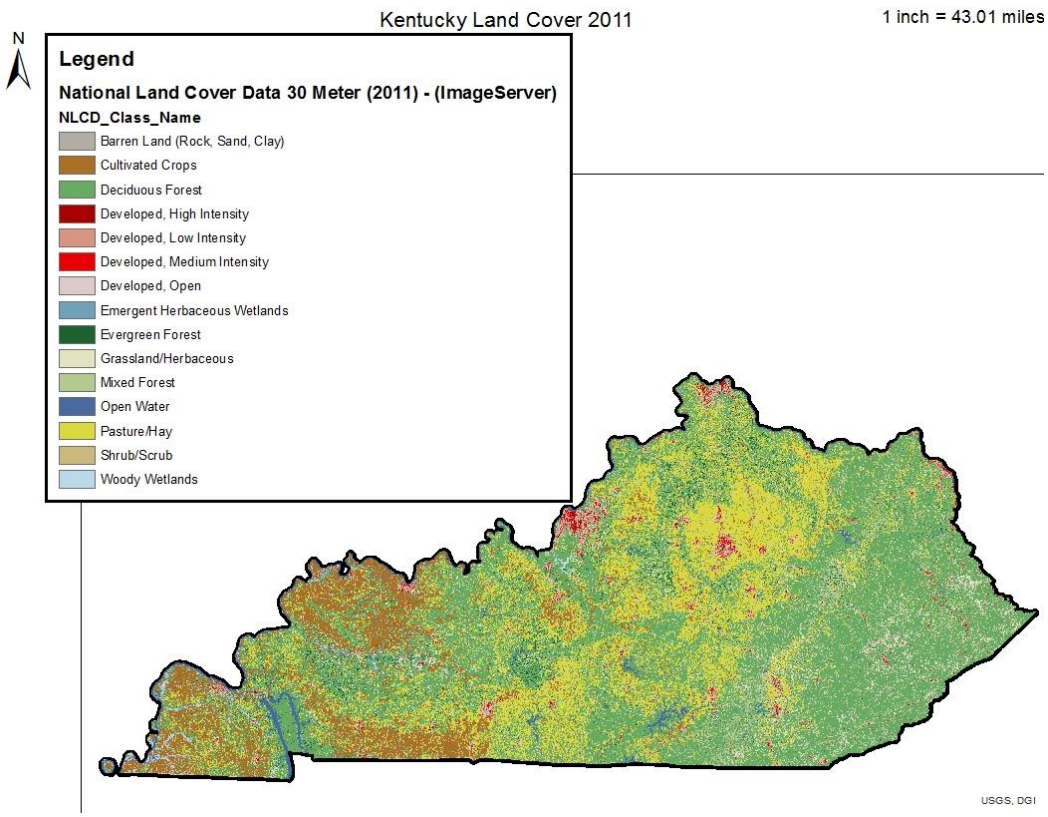
Today's forests vary considerably in age and composition due to various periods and types of clearing, logging, burning and grazing. Several hundred thousand acres of forests have developed as a result of abandonment of land that was formerly in crops or pastures. Forestland has increased in this century; however, the rate of urbanization, transportation corridors, impounded rivers and forest fragmentation has not declined.

Kentucky's five major timber types and percentage includes oak/hickory (76 percent), maple/beech/birch (8 percent), elm/ash/cottonwood (6 percent), loblolly/shortleaf pine (1.5 percent), oak/pine (4 percent) and other (3 percent).[1] Figure 2 provides the statewide perspective of land cover types/land use in Kentucky.

From 1982 to 1992, total agricultural land (cropland, pastureland, and forestland) decreased from 85.1 percent of the total land and water area to 82.3 percent. Between 1982 and 1992 more than 460,000 acres were converted to uses other than cropland, pastureland or forestland. Of this conversion, urban/built-up and roads increased by nearly 368,000 acres, water areas increased by over 18,000 acres. Federal land increased by about 74,000 acres. This conversion represents a rate of **126** acres per day changing to uses other than cropland, pastureland or forestland; and of this amount, conversion to urban/built-up and roads is about **101** acres per day.[2]

Some species have declined in importance due to their fluctuating commercial value and the change in forest condition, these include black walnut and black cherry. Other successional and pioneer species such as eastern redcedar and yellow-poplar have increased in importance, dominating a higher percentage of forest acreage. Some species have been virtually eliminated from our forest---notably, American chestnut and wolves ---but most forest species continue to exist in spite of the dramatic change from pre-settlement forest to the present.

Figure 2 – Land Cover/Land Use in Kentucky



Kentucky Timber-Industry Timber Product Output

An estimated 188 million cubic feet, or 87 percent, of the total round wood output in 2016 came from non-industrial private forest (NIPF) lands. Public land contributed 26 million cubic feet, or 12 percent output. Forest Industry lands made up the remaining 1 percent, or 2 million cubic feet. The red oak and white oak groups combined accounted for 89 million cubic feet or 45 percent of total hardwood output. Yellow-poplar and hickory accounted for 15 and 10 percent, respectively, of total hardwood output. Yellow pines provided more volume than any other softwood species group, accounting for 75 percent of the total softwood. The loblolly and shortleaf pine types accounted for 39 percent of the total softwood output.[3]

KENTUCKY'S FORESTED ECOSYSTEMS

Mixed Mesophytic Forests

The Mixed Mesophytic Forest Region of the Cumberland Plateau and Mountains is widely recognized as a center of the biological diversity of the world's temperate deciduous forests. The plateau is part of the rugged southern Appalachian region in portions of eight states including eastern Kentucky, southeastern Ohio, and most of West Virginia. The term "**mixed mesophytic**" refers to the mixture of dominant trees in the forest ecosystems of the prevailing, cool, moist, mountain environments. At least 10 commercially valuable tree species are important canopy trees: white oak, northern red oak, shagbark hickory, white ash, beech, sugar maple, black walnut, basswood, and yellow-poplar.[4 5 6]

Western Mesophytic (Oak-Hickory) Forests
West of the Cumberland Plateau and mountains of eastern Kentucky, is dominated by upland forest species like oak/hickory usually with hickory being the second most important species group. The composition of these forest communities and ecosystems also vary greatly depending on topography, soils, and land-use history. The possible forest communities (types) are numerous. Due to drier site conditions, diversity may be lower than in the mixed mesophytic forests of eastern Kentucky, but they are still rich in plant and animal species.[6]

These forests have been broadly classified as western mesophytic or oak-hickory forests. Western mesophytic is probably more appropriate because of the wide diversity of possible forest communities other than those strictly dominated by oaks and hickories (as in Missouri and Arkansas Ozarks). White oak is the major oak of these forests with chestnut oak, black oak, post oak, scarlet oak, southern red oak, and northern red oak as major contributors to the forest canopy. On limestone-derived soils, chinkapin oak and Shumard oak become more important. Shingle oak or blackjack oak are less frequent but widely distributed on selective sites. [4 6 7 8]

Major hickories are pignut, mockernut, red hickory, bitternut and shagbark, depending on site conditions and community history. Such species as red maple and blackgum become more important in young or selectively logged forests. On north facing slopes, ravines and other cool, moist environments, forests may be quite different with beech, sugar maple, white ash, black walnut, hackberry, and elm joining or completely replacing white oak and the other oaks as major species. [6]

Bottomland Hardwood Forests
In the major wetlands of Kentucky are the bottomland hardwood forests which are concentrated on the broad floodplains and poorly drained areas in the Coastal Plain and Shawnee Hills regions of western Kentucky. Wetlands do occur throughout the state, however. Forests along all of the major rivers and streams are the remnants of forests that occupied the associated floodplain.[6]

All of these forests are characterized by standing water that ranges from periods of brief flooding to permanent flooding. Old river scars, oxbows, and low places that are continuously flooded in western Kentucky are dominated by baldcypress and water tupelo. Areas that are subject to winter and spring flooding are usually dominated by pin oak, cherrybark oak, overcup oak, sweetgum, green ash and eastern hophornbeam.[9]

Upland swamp forests that exist in filled sinks, low places, and abandoned stream channels can have compositions with beech, white oak, sweetgum, red maple, pin oak, and swamp white oak. Forests along streams are characterized by sycamore, green ash, hackberry, slippery elm, boxelder, silver maple, and red maple. Successional forest wetlands, river sand bars, and poorly drained abandoned mine or agricultural lands may be dominated by willow, river birch, red maple, sycamore, and wetland shrubs such as button bush and other flood tolerant species.[6]

Evergreen Forests
Forest communities and ecosystems dominated by evergreens---pines, eastern hemlock, and eastern redcedar---constitute a relatively small portion of total forest acreage, but can be important to regional diversity.[6]

Eastern hemlock forests occur in gorges, ravines, and drainages in eastern Kentucky where they provide

watershed protection for headwater streams. Hemlock forests are usually relatively simple forest communities because of the high percentage of hemlock and a near continuous understory of a single shrub--rhododendron (big or white laurel). The two species provide heavy shade and promote development of acid soil conditions that exclude other species.[5] [6]

Pine forests or pine mixed with oak are major forest communities on thousands of acres of the most exposed, dry ridges and south-facing slopes in eastern Kentucky. Relative to the mixed mesophytic forests of the region, these forests of dry habitats have fewer, smaller and lower community diversity.[6]

Pitch, shortleaf and Virginia pines are the dominant species. White pine becomes more dominant in the central and northern parts of the Cumberland Plateau. Chestnut oak, white oak, and scarlet oak are components of these forests and may share dominance with the pines.[6]

Eastern redcedar communities are typically early successional. Mature forests of eastern redcedar exist as forest patches, especially on shallow soils of limestone outcrops. Old fields may also be invaded and dominated by Virginia and shortleaf pines if there is a seed source. These pine and cedar forests can exist for decades. Extensive areas have been planted to loblolly pine in western Kentucky as part of a reclamation efforts, or erosion control efforts.[6]

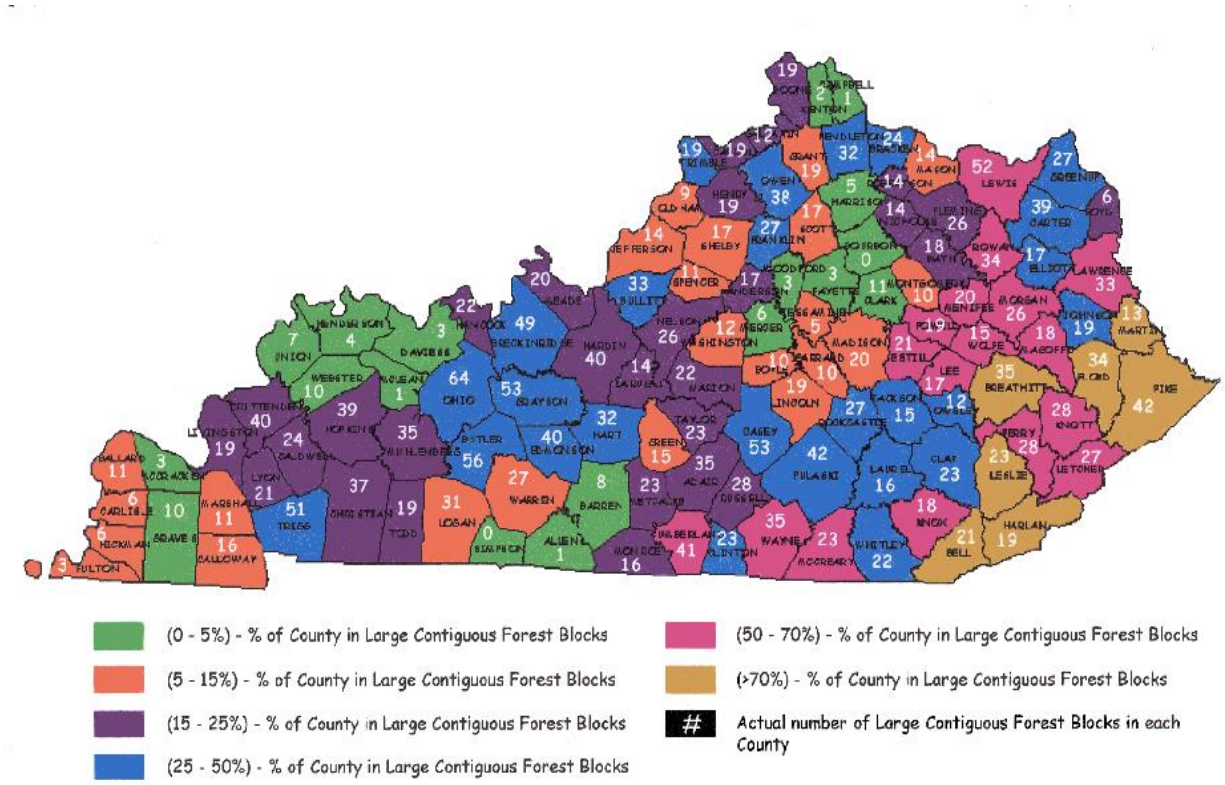
Savanna-Woodlands

E. Lucy Braun recognized the savanna-woodland of the Bluegrass Region as the most anomalous vegetation type of the eastern deciduous forest.[3] Unfortunately, the intact ecosystem seen at the time of settlement is described in general terms. There are numerous historical references to "caneland", open woods, and plentiful forage and wildlife, especially bison, elk, and deer. Based on the scattered remnants that still exist on several Bluegrass farms, these open forests were composed primarily of blue ash, chinkapin, Shumard and bur oaks, white ash, and shellbark hickory.[6]

The original understory of cane, wild rye grass, and other grasses along with legumes, served as forage for the large grazers and as fuel for fires. That understory has now been replaced by planted fescue and bluegrass, and the grazers are domesticated cattle, sheep, and horses.[6] [8]

Figure 3 – Kentucky State Nature Preserves—Large Forest Block Data

Marc Evans, botanist with the Kentucky State Nature Preserves Commission and Demetrio P. Zourarakis, Geographic Information Systems Specialist with the Kentucky Division of Conservation developed the Large Contiguous Forest Block Vegetation Data Layer for the Commonwealth of Kentucky based on data collected from the Geographic Analysis Project (GAP).



Large Forest Block Executive Summary

Habitat alteration and forest fragmentation is recognized as one of the primary causes in the decline of biological diversity. At the time of European settlement Kentucky was approximately 90% forested. After more than two hundred years of clearing and altering the landscape Kentucky is now about 50% forested. However the size and location of remaining contiguous forest areas was not known. In addition, forest size and shape is important for supporting viable populations of forest dependent species and this information for Kentucky was not known. This project was initiated to determine the size, shape and location of the remaining large forest blocks in the Commonwealth.

Large Forest Block Justification

Forest and landscape alteration and fragmentation is one of the primary causes of the decline of biological diversity. In Kentucky it is the backdrop against which biological diversity and forest ecosystem preservation and management decisions have to be made at the governmental and landowner level. The Kentucky State Nature Preserves Commission conducts inventories and manages areas with un-fragmented, undisturbed, natural ecosystems. The Kentucky Division of Conservation provides assistance to enhance the landowners' ability to protect areas with unique characteristics.

Large Forest Block Materials And Methods

To capture the largest and most ecologically significant forest blocks a minimum size of 900 acres was established for forests in all of Kentucky west of the Cumberland Plateau and a minimum size of 4,500 acres in the Cumberland Plateau and Cumberland Mountains.

At the time this project was undertaken, two data sets with information on land cover and habitat types existed for Kentucky. One was the land cover classification (1992 National Land Cover Data - United States Geological Survey) and the other one being the plant community classification.[23] The late-1990's Kentucky road network (i.e. local and Kentucky Transportation Cabinet road coverages) was used to eliminate smaller than-the-threshold areas[22]. Utilizing this "sieve", road-less areas were determined, potentially containing forest patches that possess certain properties of interest, such as threshold values for forest patch metrics (area; percentage of inclusions; area:perimeter ratio; etc.). Raster analysis was conducted, using a GIS to delineate continuous, forested regions.

Large Forest Block Results

A total of 1,892 contiguous forested areas were delineated, ranging in sizes from 360 to 26,300 hectares. Sixty percent of the forest blocks had a surface area of 970 hectares or less. Nine percent of the forest blocks were larger than 10,000 acres. Internal openings of 56 acres or less were found in 90 percent of the forest blocks. However, the percentage of area in internal openings ranged from less than 0.1 to 23.5 percent; 93 percent of the blocks had internal opening areas of 10 percent or less. Area:perimeter ratio values ranged from 110:1 to 2,130:1 with 75 percent falling below the 725:1 value. Multivariate spatial analysis is on going with the purpose of refining the metrics and providing a base map for future revisions.

KENTUCKY'S OTHER NATURAL RESOURCES

Wildlife Resources

Hunting and wildlife watching are very important social and economical activities in Kentucky. According to preliminary findings of the **2001 U.S. Fish and Wildlife Survey Report**, 323,000 hunting licenses were sold in Kentucky in 2001. Retail sales for hunting-related items equaled $506 million, and hunting had an overall economic impact of approximately $1 billion in Kentucky. In 1996 (from 1996 **U.S. Fish and Wildlife Survey Report**), hunting-related retail sales in Kentucky were $365 million, with an overall economic impact of $718 million and a total of 10,439 jobs.

Kentucky Department of Fish and Wildlife Resources (KDFWR) manages state-owned or leased wildlife management areas (WMAs) across Kentucky. Each WMA is managed for a suite of wildlife species and provides ample recreational opportunities for Kentucky's citizens. KDFWR owns or manages approximately 670,000 acres statewide, many of which occur within each of the forest legacy regions. Although Kentucky does not have a statewide WMA hunting or user permit requirement, they do require hunting permits on 2 of their WMAs. During the 2001-2002 hunting season, nearly 1,100 permits were sold for one WMA, and 15,210 permits were sold at the other. However, the number of permits sold represents a very small portion of annual visitors to these WMAs—they are visited extensively for bird watching, elk viewing, canoeing, etc. Residents and nonresidents of Kentucky use these state-owned lands extensively for hunting, fishing, wildlife viewing, camping, hiking, horseback riding, and numerous other recreational opportunities and offer a tremendous economic boost to our state.

The **2001 U.S. Fish and Wildlife Survey Report** illustrates the growing importance of public lands and wildlife-watching activities. In 2001, Kentucky had an estimated 1.23 million residential (within one mile of home) wildlife-watching participants and an additional 385,000 nonresidential participants (more than one mile from home). All-tolled, wildlife-watching expenditures in Kentucky in 2001 were approximately $812 million (up from $182 million in 1996). Total economic impact for 2001 has not been calculated yet, but a large increase from 1996's total of $275 million will be evident.[10] [11]

Fisheries Resources
Fishing is one of the most popular outdoors-related activities in Kentucky. In 2001, 780,000 resident and nonresident anglers purchased fishing licenses. Kentucky offers a diversity of freshwater fishery resources, including over 333 miles of trout streams, 49,100 miles of warm water streams (18,500 miles are perennial) and 293,400 acres of impoundments. Anglers spent over $600 million in 2001 (**2001 U.S. Fish and Wildlife Survey Report**) on fishing in Kentucky. In 1996, when anglers spent $517 million, fishing which generated an estimated 14,082 jobs and had a total economic impact of over $1 billion.[11]

Tourism and Forest-based Recreation
Tourism is Kentucky's third largest industry, contributing over $8.7 billion to the state's economy in 2001. Tourism is the second largest employer in Kentucky, accounting for over 160,200 jobs. Kentucky has 50 state parks with a trail system totaling nearly 250 miles, and 32 camping facilities with 2,645 sites. It also includes the newest state park, designated in 2002, the Pine Mountain Trail. The linear park, to be established as a long distance backpacking trail, will traverse the crest of Pine Mountain for over 100 miles. Kentucky is also home to one national forest, two national recreation areas, three national parks, and over 70 public wildlife management areas.

A large segment of this is forest-based recreation includes activities like hiking, camping, hunting, mountain biking, horseback riding, picnicking, birding and wildlife watching. Autumn in Kentucky brings in tourists by the tens of thousands to enjoy and observe the spectacular fall colors. The annual ColorFall program, sponsored by the Department of Travel and Kentucky State Parks, tracks the progression of foliage color each fall. This information is sent to the media in Kentucky and surrounding states each week through the fall season, reaching millions of fall travelers, pinpointing the best places to go to see the best colors. Because of better forest and wildlife management practices in recent years, two new wildlife-watching opportunities have created another tourist draw to the state. The comeback of the black bear and the reintroduction of elk in Kentucky have increased visitation to some state parks in eastern Kentucky.

Kentucky has a very diverse topography, which appeals to a wide variety of tourists. From the Cumberland Plateau physiographic regions of eastern Kentucky, to the bottomland forests and wetlands of western Kentucky, tourists have an opportunity to enjoy the most diverse forest types in the United States.[12]

Mineral Resources
In Kentucky, only two categories of mineral resources are important economically: fuels and industrial minerals. Coal, oil, and natural gas are mineral fuels, and the industrial minerals of significance are limestone, dolomite, sand, gravel, clay, and shale. Metals, particularly ores of zinc and lead and some limited amounts of silver were mined in the past, but no current mining of metals exists in Kentucky today.

Coal occurs in 57 of Kentucky's 120 counties. Coal is, or has been, mined in the western Kentucky coalfields in 20 counties and in 37 counties in the eastern Kentucky coalfields. In the western field it is primarily mined in large-area surface mines with numerous slope and shaft mines, but due to the mountainous topography of the east, contour surface mines and drift underground mines characterize mining. Kentucky continues to be one of the top three coal producers in the United States. Coal-fired power plants generate 95 percent of the electricity in Kentucky. The coal resource base is substantial and will support mining well into the future.

Oil and natural gas occur throughout much of western, south central, and eastern Kentucky. Drilled wells penetrate the reservoirs, and primary production recovery of oil and gas results from this flow or from what can be pumped to the surface. Only about one-third of the oil in place is obtained this way, the remaining

must be recovered by other means. Secondary recovery uses circulated water (and other chemicals or fluids) to displace additional oil and bring it to the surface. Kentucky ranks 21st nationally in volume of oil produced, and 19th nationally in volume of natural gas produced.

Industrial minerals furnish raw materials for construction, and agriculture, and chemical, manufacturing, and energy-related industries. Limestone and dolomite are at the surface in 25 percent of Kentucky, located mainly in central and western parts of the state. Sand and gravel, also used as a source of construction material, occur in deposits along the Ohio River Valley and in the Jackson Purchase Region of western Kentucky. Clay and shale are produced from deposits in the western and eastern coalfields, Jackson Purchase, the Knobs Region and the Ohio River Valley. In all, there are more than 130 quarries, pits, underground mines and dredges in operation in Kentucky. Most operate at the surface of the land, but there are 20 underground mines producing crushed stone. This is more than any other state in the Nation. The Reed Quarry in western Kentucky is one of the largest producers of crushed stone in the United States, shipping 80 percent of its stone by barge, 10 percent by rail and 10 percent by truck. The chief markets are in Louisiana and Mississippi. In 2000, Kentucky ranked 30th among the states in non-fuel mineral production.[13]

Soils and Soil Productivity

Most of the soils in Kentucky (except recent stream deposits) developed under a forest cover with roughly the same climate. Differences in soils are the result of differences in parent materials, topography, and the length of time the materials have been exposed to the soil-forming processes. The processes are: (1) climate, (2) living organisms (primarily vegetation), (3) parent materials, (4) topography, and (5) time.

The state of Kentucky is divided into 12 physiographic regions and major soil association areas. The areas are: (1) The Purchase – Mississippi River Flood Plain, (2) The Purchase – Thick Loess Belt, (3) The Cumberland – Tennessee River Section, (4) The Western Coal Fields – Low Hills and Valley Areas, (5) The Western Coal Fields – Hilly Uplands and the Sandstone-Shale-Limestone Area of the Western Pennyroyal, (6) The Western Pennyroyal – Limestone Area, (7) The Knobs, (8) The Outer Bluegrass, (9) The Hills of the Bluegrass, (10) The Inner Bluegrass, (11) The Eastern Pennyroyal, and (12) The Mountains and Eastern Coalfields.

Forests cover most soil types in the state. The amount of forest cover in regards to soil types varies according to the other uses in the geographical areas. For example, the better soils in relatively flat to rolling topography are utilized for pasture, crops other than trees, and are often being converted to non-agricultural land use. Timber quality on better soils is often times, better than timber quality on poor soils. However, in poorer soils and steeper areas of the state, better quality timber is more often associated with slope and aspect. The northern and eastern aspects often produce the best timber while, south and west facing sites generally produce lower quality timber.

Along drainage areas and on marginal land in many of the farming areas of the state, good timber is often found; however, it is usually not in large-acre tracts. These marginal areas are too steep for most equipment. They occur throughout the state but are often associated with the annual return of livestock and crops such as corn, soybean, tobacco, etc. With the rotational period of timber being in the decades, this leads many landowners to convert their acreage to alternative land-uses besides forests.

On the more hilly, steep, and mountainous areas of the state, the primary use is forestland. Where acreage in these areas was cleared in the past, the marginal returns on pasture and rotational crops have seen most

of these areas return to forest cover. Eastern Kentucky is an area that has extensive forest cover, and in many counties area of the state, exceptional quality timber is harvested. Overall, the eastern part of Kentucky has the potential to be world renown in the hardwood timber industry. The primary reason for poor quality timber in this region is more a factor of uncontrolled wildland fires, than poor soils.[14]

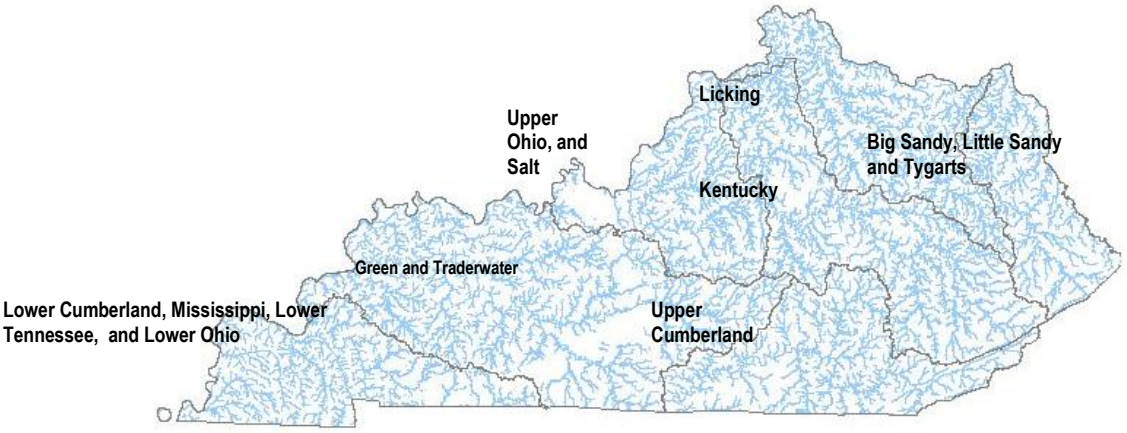
Watershed Criteria

Kentucky is divided into 11 river basins: Kentucky, Salt, Licking, Green, Big Sandy, Little Sandy, Tygarts, Upper Cumberland, Lower Cumberland, Tennessee and Tradewater. There are also numerous tributaries that drain directly into either the Ohio or Mississippi Rivers. Together these basins drain an estimated 89,431 miles of rivers and streams. In addition, Kentucky has over 228,000 acres of manmade lakes. The land around these lakes and streams is comprised of agricultural land (42 percent); forestland (42 percent); urban area (7 percent); federal lands (5 percent); with the remainder in other areas.

Topography in the watershed basins range from the rugged hill and valley terrain of the Cumberland Plateau in eastern Kentucky to the gently sloping floodplain of the Mississippi River Valley in western Kentucky. Waterways in the more rugged regions tend to have a higher gradient with narrow floodplains. Streams in the western regions generally have low gradient and wide floodplains. About 55 percent of Kentucky is underlain with a unique geologic feature known as karst. Karst is characterized by underground drainage and conduit-fed springs, and may include sinkholes, caves and sinking streams. Karst topography is most common in the gently rolling terrain of central Kentucky.

Water quality in Kentucky's streams varies from excellent to very poor depending on the level of disturbance in the watershed. Kentucky currently has assessed about 7,000 miles of its streams. About one-third of assessed stream miles are impaired and do not fully support designated uses such as recreation, aquatic life habitat and drinking water supplies. The main causes of water pollution are pathogens, siltation, nutrients and habitat alteration. The leading sources of this pollution are agriculture, resource extraction and sewage. A few watersheds have remained largely undisturbed and feed streams that contain excellent water quality and unique biota. There are over 100 miles of State Wild Rivers in Kentucky; and portions of the Red River, Big South Fork and Green River are designated as National Wild and Scenic Rivers. Kentucky rivers and streams are home to more than two dozen federally threatened or endangered aquatic species.[15]

Figure 4 – Kentucky Major River Basins



KENTUCKY LANDOWNER AND CONSERVATION ASSISTANCE PROGRAMS

Forest Stewardship Program
Conservation Reserve Program
Environmental Quality Incentives Program
Wetland Reserves Program
Wildlife Habitat Incentive Program
Kentucky Heritage Land Conservation Fund
Urban and Community Forestry Program

Forest Stewardship Program
The purpose of the forest stewardship program is to encourage the long-term stewardship of non-industrial private forest (NIPF) land. The program helps NIPF landowners, either individually or collectively with their NIPF neighbors to more actively manage their forests, watersheds, and related resources and keep those lands and watersheds in a productive and healthy condition for present and future generations. Participation in the forest stewardship program is voluntary.

Conservation Reserve Program
The USDA Farm Service Agency administers the program and the Natural Resource Conservation Service (NRCS) provides the technical assistance. This program provides incentives to landowners to convert highly erodible or other environmentally sensitive acreage to vegetative cover, such as native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Landowners receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices.

Environmental Quality Incentives Program
This cost-share program, administered by the NRCS, provides technical, educational, and financial assistance to landowners to address natural resource concerns in an environmentally beneficial and cost-effective manner. Payments can be made to implement practices including pest management, tree planting, and forestland management.

Wetlands Reserve Program
This program is administered by the NRCS, and offers financial support to landowners' wetlands restoration and protection projects. The Federal Government obtains voluntary conservation easements from landowners and provides cost-share payments for wetlands rehabilitation practices. Among other practices, Wetland Reserve Program allows and encourages tree plantings focused upon wetland rehabilitation.

Wildlife Habitat Incentive Program
This program is administered by the NRCS to provide cost-share assistance to private landowners to help them enhance wildlife habitat areas on their lands. This program compensates landowners for the lack of market incentive to invest in public goods, such as watershed and wildlife protection, and it encourages landowners to make long-term investments in maintaining the natural resource base. The program supports a wide range of habitat improvement, including tree planting.

Kentucky Heritage Land Conservation Fund
The Kentucky Heritage Land Conservation Fund was established to provide funding for:

1). Natural areas that possess unique feature such as habitat for rare and endangered species;
2). Areas important to migratory birds;
3). Areas that perform important natural functions that are subject to alteration or loss; and
4). Areas to be preserved in their natural state for public use, outdoor recreation and education.

Urban and Community Forestry Program

The Kentucky Division of Forestry's Urban and Community Forestry Program, in cooperation with the USDA Forest Service and the Kentucky Urban Forestry Council, administers the Kentucky Urban and Community Forestry Grant Program. The goal of this program is to encourage citizen involvement in creating and supporting long-term and sustained Urban and Community Forestry Programs. This grant program, as well as other outreach efforts of the program, seeks to enhance the technical skills of individuals involved in the planning and maintenance of the urban forests of Kentucky. Other outreach efforts include employee training, state urban forestry conferences, Arbor Day ceremonies, and meetings with city employees as well as private citizens.[16]

Kentucky's Land Trust

The following land trusts are active in conserving efforts in the state.

Bluegrass Conservancy
Civil War Preservation Trust
Clear Creek Conservation Trust
Elkhorn Land and Historic Trust
Future Fund, Inc.
Hillside Trust
Jefferson County Environmental Trust
Kentucky Natural Lands Trust
Mill Springs Battlefield Association
River Fields, Inc.
Southeastern Caves Conservancy
The Boone Conservancy
The Nature Conservancy

KENTUCKY STATE FOREST SYSTEM

The Kentucky Division of Forestry manages five state forests with a combined total of 31,350 acres. A forest ecosystem management plan that addresses biological diversity and sustainable use is being developed for each state forest. The Kentucky Heritage Land Conservation Fund provides funding to purchase state forest property. Revenue from the fund comes from a percentage of the state's portion of the unmined minerals tax, environmental penalties and state nature license plate sales. The division continues to seek new properties to add to the state forest program. The state forests are open to the public for hiking, fishing, camping and other activities.

Green River State Forest – Henderson, Kentucky

The Green River State Forest consists of 1,106 acres located five miles northeast of the town of Henderson in Henderson County. The property, which is now the Green River State Forest, was originally acquired by the Kentucky Center for Research in 1978 and 1981 to build a synthetic fuels research and production site. Due to several problems, the property was never used for its intended use. The property was transferred to the Division of Forestry in July 1998.

As part of the state forest system, Green River State Forest will be managed under the same general guidelines as the other state forests. It is to be managed for multiple uses and is open to the public for most recreational uses including hiking, hunting and fishing. Off-road use of ATVs is prohibited, as is any other use that would cause damage to the property. Special management goals are to re-establish as much

bottomland hardwood forest as possible, both for research purposes to maintain wildlife habitat, and to protect the unique habitat of the baldcypress swamp located near the river.

This is the only state forest that has significant amounts of bottomland, bottomland hardwoods, or swampland, so it is a valuable addition to the state forest system. This property is also important habitat for the rare copperbelly water snake. Part of the management of the property will be to improve and expand this habitat.

Kentenia State Forest – Harlan County
Kentenia is the oldest state-owned forest, acquired in 1919 as a gift from the Kentenia-Cantron Corporation. It is located in Harlan County along the south side of Pine Mountain in seven scattered tracts totaling 4,081 acres. The largest of these tracts is accessible by Little Shepherd Trail and contains Goss Park Camping Area on the crest of Pine Mountain. The forest is available for hunting within state seasons, and hiking is permitted.

Kentucky Ridge State Forest - Bell County
Kentucky Ridge State Forest was acquired by lease in 1930, as part of the Land Use and Resettlement Program. The lease was sustained until 1954 when the property was deeded by the federal government to the Commonwealth of Kentucky.
Kentucky Ridge State Forest contains Pine Mountain State Resort Park on Pine Mountain and is located on the south side of Pine Mountain and the north side of Log Mountain, encompassing Little Clear Creek Valley. The forest also contains Chenoa Lake, the Division of Forestry's Chenoa Service Center and Bell County Forestry Camp. Kentucky Ridge State Forest is managed for sustainable timber production. The forest is open to public hunting and fishing, subject to state fish and wildlife regulations, and is available for primitive camping, hiking and picnicking. The Kentucky Ridge State Forest encompasses 11,746 acres, while the Kentucky Ridge State Forest and Wildlife Management Area encompasses 3,505 acres.

Pennyrile State Forest – Christian, Hopkins and Caldwell Counties
In 1930, as part of the Land Use and Resettlement Program, the Division of Forestry acquired leases on land in Christian, Hopkins and Caldwell counties, which became the Pennyrile State Forest. It now includes 14,648 acres of forest. These leases were sustained until 1954, when the property was deeded (with certain reservations) by the federal government to the Commonwealth of Kentucky.

Pennyrile State Forest contains Pennyrile State Resort Park and borders Lake Beshear. Pennyrile State Forest is managed for sustainable timber production. The Kentucky Department of Fish and Wildlife Resources conducts a managed bonus deer hunt here each December in cooperation with the Division of Forestry. The Division of Forestry and the Department of Fish and Wildlife Resources have cooperated in numerous projects in the forests, including turkey and grouse restoration projects. The area is open to public hunting and fishing, subject to state fish and wildlife regulations, and is available for primitive camping, hiking and picnicking.

Tygarts State Forest - Carter County
The state bought Tygarts State Forest in Carter County in 1957. It is 946 acres in size and adjoins Carter Cave State Resort Park. The forest is open to public hunting (subject to fish and wildlife regulations), horseback riding and hiking.

Knobs State Forest and Wildlife Management Area – Bullitt County

The state purchased 1,500 acres in 2006 for the Knobs State Forest & WMA. An additional 500 acres was purchased in 2018 for a total of 2,035 acres. The majority of the funding for the forest came from the Forest legacy program. Funding was also provided by the Kentucky Dept. of Fish and Wildlife, making the property a Wildlife Management Area. State Forests and Wildlife Management Areas are good collaborators due to the closely aligned goals and mission. The forest is a good example of the Knobs geological region and topography. The property is open to hunting (Fish and Wildlife regulations, no modern gun) and hiking, no camping, no ATV's.

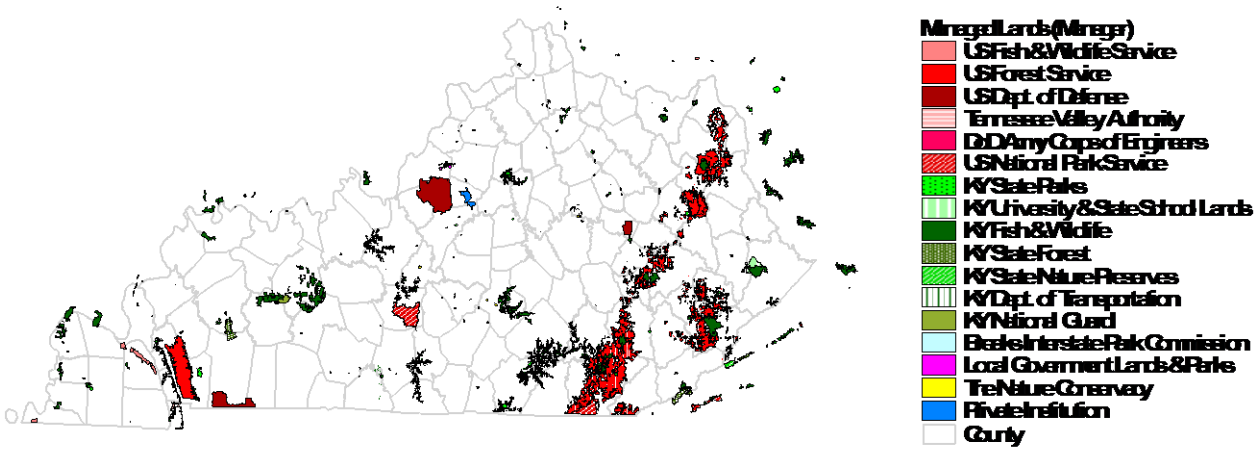
Marion County Wildlife Management Area and State Forest – Marion County
Marion Co State Forest & WMA was purchased in 2010, with funding from the Kentucky Heritage Land Conservation Fund, the Wildlife Restoration Act, the Kentucky Fish and Game Fund and the Marion Co Fiscal Court. The property is both a State Forest and a Wildlife Management Area. Hunting is permitted under general state hunting regulations. No camping or ATV's are permitted. The property has difficult and rough terrain, and is a good example of the Knobs geological region.

Big Rivers Wildlife Management Area and State Forest – Union and Crittenden Counties
The state purchased 6,732 acres in two phases from 2012 to 2013. The property was purchased using funding from the Forest Legacy Program, the Kentucky Heritage Land Conservation Fund, the Nature Conservancy, Indiana Bat Conservation Funds, in-lieu-fee mitigation funds, and Department of Fish and Wildlife agency funds. Hunting is permitted under general state hunting regulations. No camping or ATV's are allowed. The property is situated along the confluence of the Ohio and Tradewater Rivers and contains good examples of bottomland and riparian ecosystems.

Marrowbone State Forest and Wildlife Management Area – Metcalfe and Cumberland Counties
Marrowbone State Forest & WMA was purchased in 2008 using funding from the Kentucky Heritage Land Conservation Fund and Forest Legacy Program. The forest is 1,983 acres of oak/hickory upland hardwoods with small pockets of eastern red cedar and pine. Slade creek runs through the middle of the forest, named so due to high concentration of brittle slade rock. The property is open to the public for day use only unless hunting regulations specify extended hours. Allowable activities include regulated hunting, hiking and wildlife viewing. Off-road vehicles, including ATVs and horseback riding is prohibited.

Rolleigh Peterson Educational Forest – Jefferson County
The Peterson woods consists of 98 acres of bottomland that was converted to a walnut plantation. The property was purchased in 2008 with funding provided by the Kentucky Heritage Land Conservation Fund and the Louisville Metro Parks Foundation. The forest is co-owned between the Kentucky division of Forestry and Louisville-Metro Government. The property is noted for its conservation of the Floyd's Fork riparian zone and the black walnut plantation that was created by Mr. Peterson. Public access is limited to guiding tours by appointment. Fishing, hunting and all off-road vehicles, including ATVs are prohibited.

Figure 5 – Kentucky's Managed Lands



FEDERAL LAND OWNERSHIP

Daniel Boone National Forest[17]

Located in the mountains of eastern Kentucky, the Daniel Boone National Forest (DBNF) encompasses over 708,000 acres of land. This land is generally rugged and characterized by steep forested ridges, narrow valleys, and over 3,400 miles of cliffline. The forest contains two large lakes (Cave Run Lake and Laurel River Lake), many rivers and streams, two wilderness areas, and a 269-mile Sheltowee Trace National Recreation Trail that extends across the length of the forest. It is estimated that over 5 million visitors utilize the forest annually for backpacking, camping, fishing, boating, rock climbing, picnicking, and many other outdoor activities.

DBNF is located in the mixed mesophytic region of the eastern deciduous forest and is characterized by a wide variety of species both in the understory and overstory. This complex of species varies in composition with changes in aspect and relationship to water and soil. Among the species found in the canopy layer on north and east facing slopes and in coves are northern red oak, basswood, beech, yellow-poplar, sugar maple, birch, red maple, and hemlock. West-facing slopes contain yellow-poplar, northern red oak, white oak, and hickories. On south-facing slopes and ridgetops, where moisture becomes limiting, shortleaf pine, chestnut oak, black oak, white oak, and Virginia pine are common associates. Over 40 commercial species occur on the forest, and also present are at least as many non-commercial trees and shrubs.

Forty-nine percent of DBNF is composed of upland hardwood species, including various combinations of white oak, chestnut oak, northern red oak, black oak, scarlet oak, southern red oak, and hickories. Cove hardwoods occur on 24 percent of the sites, including northern red oak, white oak, basswood, yellow-poplar, hemlock, sugar maple, and beech with an occasional black cherry and black walnut. Pine species compose 15 percent of the forest; varieties include shortleaf, pitch, table mountain, Virginia and some planted loblolly pine. Twelve percent of DBNF is composed of mixed pine-hardwood forest types including, scarlet oak, chestnut oak, black oak, white oak, and hickory in combination with either shortleaf, pitch, table mountain, Virginia or white pine. Pure stands of eastern white pine comprise less than one percent of DBNF.

Common species found in the understory include rhododendron or fern-ephemerals on moist sites and mountain laurel or blueberry-huckleberry on dry sites. The woody component of other understories consists of many varieties of dogwood, sourwood, and blackgum in association with seedlings of the more tolerant species in the understory. Two species of plants, the white-haired goldenrod (found near the base of sandstone cliffs in the Red River Gorge Area) and a relic population of Canadian yew in Lee county will require special studies and consideration of management.

DBNF is located within a proclamation boundary that encompasses an area of 2,047,000 acres. Some of the six ranger districts have consolidated areas of national forest land while other districts have highly dispersed national forest lands intermingled with private land ownership. See Table 1 below for acreage breakdowns by county.

>>>DISTRICTS>>>>	Morehead	Stanton	London	Somerset	Stearns	Redbird	Totals
COUNTIES							
Bath	19,300						19,300
Clay						77,594	77,594
Estill		2,265	3,333				5,598
Harlan						803	803
Jackson			58,375				58,375
Knox						74	74
Laurel			62,478				62,478
Lee		5,822	2,765				8,587
Leslie						52,194	52,194
McCreary				41,048	101,074		142,122
Menifee	24,270	22,352					46,622
Morgan	12,948						12,948
Owsley			3,848			12,432	16,280
Perry						2,191	2,191
Powell		15,528					15,528
Pulaski			109	37,332			37,441
Rockcastle			14,793				14,793
Rowan	62,509						62,509
Wayne					642		642
Whitley			32,865		12,500		45,365
Wolfe		16,458					16,458
Totals	119,027	62,425	178,566	78,380	114,216	145,288	697, 902

DBNF uses land exchange and land purchase programs to acquire properties that benefit consolidation and resource management programs, (i.e. acquiring habitat for wildlife, providing recreation opportunities, protecting watersheds, and acquiring lands to restore impaired watersheds to more productive ecosystems). With such intermingled ownership patterns, DBNF must acquire right-of-ways through private lands in order to provide public access. DBNF has approximately 4,000 miles of public boundary lines and forest trespass continues to be a problem.

About forty percent of the National Forest overlies private mineral ownership. Development of the private mineral estate requires compliance with the terms of mineral severance deeds with respect of all parties of the rights enjoyed by the mineral owner and surface owner.

Big South Fork National River and Recreation Area[18]

The Big South Fork of the Cumberland River and its tributaries pass through 90 miles of scenic gorges and valleys containing a wide range of natural and historic features. The area offers a broad range of recreational opportunities including camping, whitewater rafting, kayaking, canoeing, hiking, horseback riding, mountain biking, hunting and fishing. The National Park Service maintains these lands and facility located in northcentral Tennessee and southeastern Kentucky in the Cumberland Plateau. Big South Fork encompasses approximately 125,000 acres of both rugged forested gorge and adjacent forested plateaus. State and federal lands share the north and western boundary, offering a variety of habitats for both plants and animals. Within the area many pristine streams both in Tennessee and Kentucky, have carved deep gorges and impressive cliffs and arches throughout the national area.

The general forest type is mixed oak with mixed mesophytic pockets. This is divided into an upland community on the plateau and a ravine community. The upland vegetation types range from red maple dominated stands on poorly drained flats to Virginia pine dominated stands on dry ridges and cliff edges. On the broad flats and gentle slopes are the mixed oaks with hickory. More mesic species including, beech, sugar maple, and birch dominate ravine communities with scattered oaks on the middle and lower slopes. Hemlock is prominent in the narrow gorges and along streams and river birch and sycamore are commonly found on the floodplains.

A wide variety of specialized habitats exist on the floodplains, in protected coves and ravines, on moist north-facing slopes, and on the sandstone caprock with dry, shallow soils. The rugged topography and moist, moderate climate combine to produce a great variety of microclimatic influences due to slope, orientation, and exposure. Due to logging practices in the early to mid 20th century, most of the forest areas are 2nd or 3rd generation growth. As a result, mature forests and groves of a particular scenic interest are rare. Due to inaccessibility, several small areas containing impressive examples of 2nd generation growth floodplain, mixed-mesic, and hemlock forests still exist, mostly in the more northern coves of the national area.

The variety of natural conditions combines to provide a high diversity of habitat. Sixty-eight species of fish, 215 taxa of macro invertebrates, and 23 species of mussels have been documented in recent surveys within the national area. Game fish include resident native channel catfish, longear sunfish, muskellunge, rock bass, and smallmouth bass. Walleye, striped bass, and white bass migrate upstream from Lake Cumberland; and brown and rainbow trout have been stocked in three streams by state agencies. Mammals hunted in the national area include white-tailed deer, raccoon, and gray squirrel. Game birds hunted include ruffed grouse, mourning dove, and turkey. Non-game species are plentiful and include a variety of salamanders, and various predators such as bobcat, gray fox, and the red-tailed hawk. Black bear have been re-introduced on an experimental basis, with analysis still continuing.

The Big South Fork watershed lies within the Cumberland Plateau physiographic province, which is the southern portion of the Appalachian Plateaus structural province. The geology of the national area is characterized by parallel, horizontally bedded sedimentary rock of Pennsylvanian age overlaying Mississippian age rock. The Pennsylvanian rocks are predominantly sandstone and shale, and include siltstone, conglomerate, and coal. Oil and gas deposits associated with the Mississippian age limestone are found in many areas within and outside the southern portion of the national area.

A dendritic drainage pattern and narrow, v-shaped gorges characterize the upstream topography of the region. The focal point of the area is the massive gorge with its many sheer bluffs at the gorge rim towering over wooded talus slopes and the naturally fluctuating river and tributaries below. The valleys are dotted with huge boulders broken from the cliff faces above. Streams include stretches of fast, rugged whitewater and quiet pools. Weathering processes have produced an impressive array of rock formations, including arches, mesas, chimneys, cracks, and rock shelters. Prior to national area establishment, Tennessee designated Twin Arches and the Honey Creek area as State Natural Areas because of their geological and other natural attributes. The gorge, as defined by the establishing legislation, is roughly one-half of the total acreage of the national area.

The Big South Fork River begins within the national area at the juncture of New River and Clear Fork and flows northward through the national area for approximately 49 miles, where it is free flowing for 37 miles until it is affected by the headwaters of Lake Cumberland.

Land Between the Lakes National Recreation Area[19]

Land Between the Lakes National Recreation Area (LBL) is located near I-24, about 90 miles north of Nashville, Tennessee. As a designated national recreation area under the management of the USDA Forest Service, the LBL is maintained for the public's enjoyment and safety. LBL offers all the outdoor recreation "basics", with some unique opportunities for environmental education and historic interpretation. Nestled in western Kentucky and Tennessee, the LBL welcomes on average, two million visitors each year from around the world.

The LBL's forest management activities support its recreation and education mission. Management tools include fire and disease protection, tree planting, harvesting and timber stand improvement (TSI) practices, and biosphere reserve creation. The Kentucky and Tennessee Divisions of Forestry provide the primary means of fire prevention at the LBL. In the biosphere reserves, natural fires are allowed to burn only if they pose no threat to visitors or the LBL's public use facilities. Integrated pest management surveys are performed annually to monitor for any significant insect or disease threat. Earlier forest management practices called for planting trees such as Virginia pine, oak and baldcypress to control erosion and provide winter wildlife cover. Today, LBL allows Mother Nature to do most of the tree planting. Before any forest management activities such as harvesting or TSI take place, ground surveys are conducted to ensure that sufficient numbers of advanced young trees are available to reforest the site. Within the LBL, 42,500 acres (25 percent) are set aside as a Biosphere Reserve. These protected areas are open to most public uses, but most timber harvesting and open land management is prohibited. The Biosphere Reserve recognizes and protects the LBL's unique natural resources and helps meet regional biodiversity needs.

Mammoth Cave National Park[20]

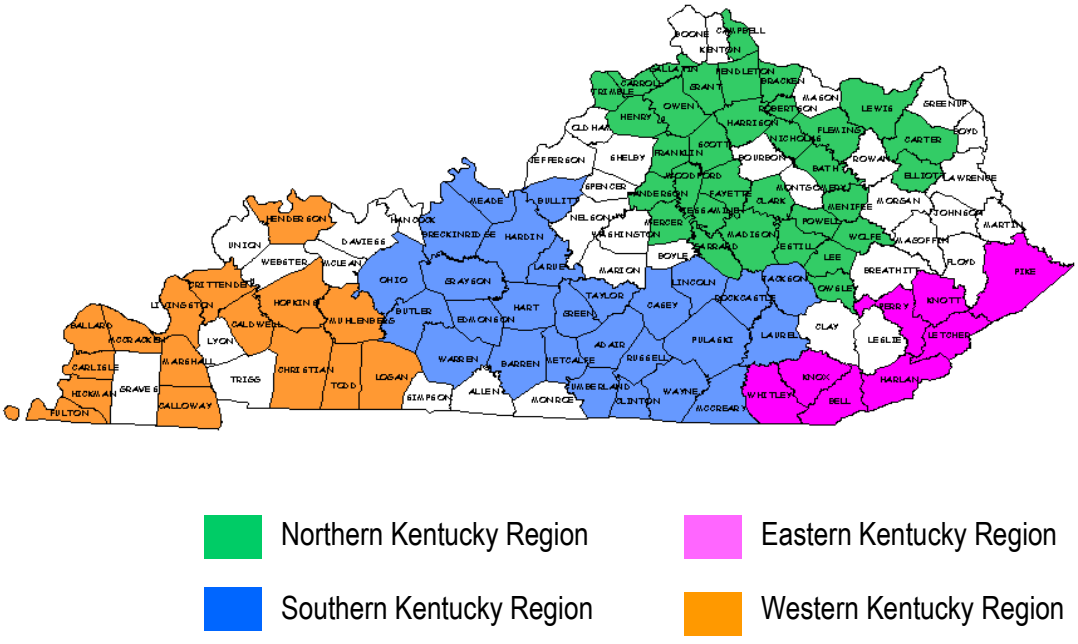
Mammoth Cave National Park was established in 1941 to preserve the cave system, including Mammoth Cave, the scenic river valleys of the Green and Nolin rivers, and a section of south central Kentucky. The Mammoth Cave system in Mammoth Cave National Park in Edmonson county is the most extensive in the world with 300 miles of surveyed passages. This immense subterranean environment supports one of the largest assemblages of cave organisms known. Approximately 200 species of plants and animals are found in the Mammoth Cave system and a number of them are recognized as rare, endangered, or threatened species such as the Kentucky cave shrimp and species of cave fish and crayfish. Their rarity and their existence on the brink of extinction result from their total confinement to a unique and fragile environment.

KENTUCKY'S DESIGNATED FOREST LEGACY AREAS

The director of the Kentucky Division of Forestry appointed an ad hoc committee of the State Forest Stewardship Coordinating Committee. Committee members included representatives of public agencies and conservation organizations that represent natural area selection and management, threatened and endangered species protection, game and non-game wildlife species management, aquatic resources, timber production, and public resource conservation interests.

The ad hoc committee considered nominations for Forest Legacy Areas (FLA). The nominations were prioritized and selected with respect to their threat to conversion, environmental importance or value for traditional uses. The ad hoc committee in conjunction with the director recommends the creation of four Forest Legacy Areas. They are as follows: 1) Northern Kentucky, 2) Eastern Kentucky, 3) Southern Kentucky, and 4) Western Kentucky. The main goal for all the designated areas will be to lessen forest conversion to non-forest uses.

Figure 6 – Kentucky Forest Legacy Areas



Northern Kentucky

- This area includes the physiographical regions of the Knobs, Inner Bluegrass and Outer Bluegrass.
- This area is experiencing excessive development pressures from the population growth of Lexington, Louisville and Cincinnati.
- This area is experiencing a higher increase in forest fragmentation, which diminishes the natural habitat corridors for wildlife such as songbirds, woodcocks, doves, turkey, grouse, squirrels, rabbit and deer.
- This area includes many federal and state-listed threatened and endangered flora and fauna species (Appendix 5).
- This area has numerous watersheds with varying water quality conditions (including surface and ground water).
- This area contains unique archaeological resources (buffalo hunting grounds, Indian Old Fields, Big Bone Lick).

Eastern Kentucky

- This area includes the Eastern Kentucky Coalfield physiographic region.
- This area contains the largest contiguous and existing forest blocks in Kentucky
- This area includes the Black Mountain system, which is the highest elevation in the state and has associated unique forest types.
- This area has less commercial or residential development pressures; however, mineral resource exploration and extraction pressures continue.
- This area contains a diverse number of forest communities and habitats for wildlife.
- This area has potential water quality problems and is in need of protection along the forested riparian buffers.
- This area has many federal and state listed threatened and endangered flora and fauna species (Appendix 5).
- This area contains unique archaeological resources (chert quarries, prehistoric crematory).

Southern Kentucky

- This area includes the physiographical regions of the Mississippi Plateau, eastern portion of the Western Kentucky Coalfield, and the Southern Knobs.
- This area is experiencing excessive development pressures from the population growth of Louisville, Bowling Green and Elizabethtown.
- This area has many federal and state listed and endangered flora and fauna species (Appendix 5).
- This area is inundated with cave systems, sink and blue holes, and water quality protection is a necessity.
- This area includes numerous wildlife management areas, and The Nature Conservancy has identified the Big Barrens as core focus areas for wildlife.
- This area contains a large region of the state's central hardwoods (oak-hickory forests).
- This area contains unique archaeological resources (Paleo-Indian sites, Mammoth Cave).

Western Kentucky

- This area includes the physiographic regions of the Mississippi Embayment and Western Mississippian Plateau.
- This area includes fragmented bottomland hardwood forest and linking and expanding the continuous forest blocks will develop new habitats for wildlife.
- This area has numerous watersheds with varying water quality conditions.
- This area has many federal and state listed and endangered flora and fauna species (Appendix 5).
- This area includes several wildlife management areas including the Peabody, White City, and Sloughs Wildlife Management Area. All wildlife management areas are used by the general public for recreation.
- This area has unique archaeological resources (Wickliffe Mounds, large Mississippian villages).

DETAILED FOREST LEGACY AREA DESCRIPTIONS

Northern Kentucky Forest Legacy Area

This region encompasses the counties of Anderson, Bath, Bracken, Campbell, Carroll, Carter, Clark, Elliot, Estill, Fayette, Fleming, Franklin, Gallatin, Garrard, Grant, Harrison, Henry, Jessamine, Lee, Lewis, Madison, Menifee, Mercer, Nicholas, Owen, Owsley, Pendleton, Powell, Robertson, Scott, Trimble, Wolfe, and Woodford.

Northern Kentucky is often referred as the Bluegrass Region. The highest population and urbanization areas in the state characterize this region (Louisville, Lexington and Cincinnati). The **Southern Forest Resource Assessment** quoted "at the periphery of the region in northern Kentucky and Virginia and along the gulf coast, FPD's (forest population density) were also relatively high in 1992".[21] Historically, this area attracted early settlers with its gently rolling topography, soils, canebrakes, and abundance of game. The Bluegrass Region is the center of the thoroughbred horse industry.

Physiographically, the northern Kentucky FLA covers the Inner and Outer Bluegrass region, the Knobs and the northern and eastern fringe of the Mississippian Plateau. This area is underlain with limestone and shales formed up to 450-500 million years ago. The number of known Kentucky caves is now estimated at over 6,700. These systems are excellent groundwater reservoirs, and they contribute to the rare, unusual, and unique elements of biodiversity. Cave systems are often simple ecosystems; however, they are vulnerable to pollutants that can be carried into the groundwater system from landfills, urban runoff, industrial urban and agricultural chemicals and sudden flushes of organic material from natural and human sources. This area encompasses the drainage basins of Tygarts and Little Sandy, Ohio, Licking, Salt and Kentucky River.

The open savanna-woodlands of blue ash, bur oak, and other trees were prominent with an understory of cane, wild grasses and legumes. Today, the savanna-woodlands as described by E.L. Braun have been reduced to a few remnants.[6] The riparian forests along slopes and ravines of the Kentucky, Salt and Licking rivers provide wildlife corridors and water quality protection. In the Licking River corridor, where globally imperiled aquatic fauna exist, the corridor could be enhanced by improved forest protection measures and along with the Kentucky River corridor and its significant tributaries.

Eastern Kentucky Forest Legacy Area

This region encompasses the counties of Bell, Harlan, Knott, Knox, Letcher, Perry, Pike, and Whitley.

The Eastern Kentucky FLA lies in the Eastern Coalfield physiographic region. It is the southern portion of the Appalachian Plateau (Cumberland Mountains) that extends from New York to Alabama. This is a highly dissected area with steep valley walls and narrow sinuous valleys. The shales and sandstones of the steep slopes date back 300 million years. Cliffs of resistant sandstone cap the ridges. Wooded mountain slopes extend to the horizon in all directions. This area contains some the most extensive forest blocks in the state, and the condition is fair to good at many sites. Most of the rich, mixed forest have been logged and are now in various stages of second and third growth. Subsurface and surface coal mining has been practiced for generations. The highest elevation in Kentucky is 4,150 feet at Black Mountain; major rivers are the Big Sandy, Licking, Kentucky and Cumberland.[6] Many endangered and threatened species occur here in terrestrial and subterranean systems, and some headwaters of Cumberland River, Kentucky River and Big Sandy River still have imperiled aquatic fauna.

Cumberland Gap was a key location along the Wilderness Trail of pioneers entering Kentucky. Settlement within these mountains has been largely restricted to valley bottoms and lower slopes. These settlements were mostly made by less wealthy people forging a subsistence based on small farms and forest resources, with little industry or trade. They made home sites on high benches in small remote hollows. The often farmed plots on steep slopes, though most of the land remained "unimproved".

Some parts of the outer mountain ranges—Pine Mountain and Cumberland Mountain are now owned and protected by the federal and state governments along with the Kentucky Chapter of The Nature Conservancy. Blanton Forest, a 1,075 acres old growth forest on the south slope of Pine Mountain in Harlan County is one of the Commonwealth's best examples of a protected old growth mixed mesophytic forest. The Eastern Kentucky FLA has the least amount of development and the largest contiguous forest stand. However, Black Mountain remains virtually without any land conservation protection efforts.

Southern Kentucky Forest Legacy Area

This region encompasses the counties of Adair, Barren, Breckinridge, Bullitt, Butler, Casey, Clinton, Cumberland, Edmonson, Grayson, Green, Hardin, Hart, Jackson, Larue, Laurel, Lincoln, Meade, McCreary, Metcalfe, Ohio, Pulaski, Rockcastle, Russell, Taylor, Warren, and Wayne.

The Southern Kentucky FLA lies mostly within the Pennyroyal physiographic region that has a complex mosaic of forests and farmland. This region consists of a limestone plain characterized by tens of thousands of sinkholes, sinking streams, streamless valleys, springs and caverns. The term "karst" is used to define this type of terrain. There was some delay in farming the karst plains because of initial doubts and problems in converting the barrens. Meanwhile, the barrens became invaded by trees as fire frequency declined.

This area is composed of 27 counties in the Mississippi Plateau, eastern portion of the Western Kentucky Coalfield, and Southern Knobs regions of Kentucky. From west to east these counties represent some of the most diverse habitats in the state. The Mississippi Plateau provides the best example of how forests change between the eastern third of the state and the drier oak-hickory forests found farther west. The area from east to west contains critical habitat for several neotropical forest-dwelling songbirds, wild turkeys, back bear, whitetail deer, eastern cottontail rabbit, American woodcock, wood ducks, swamp rabbits, and wintering waterfowl.

The Kentucky Department of Fish and Wildlife Resources and The Nature Conservancy have identified the Big Barrens as core focus areas for wildlife habitat management. Both portions of the proposed area (and some of the surrounding counties) also were identified as a North American Bird Conservation Initiative Bird

Conservation Area within the Central Hardwoods Bird Conservation Region (BCR) to focus on core forested habitat around large blocks of forest. The proposed Legacy Area includes counties participating in Kentucky's Conservation Reserve Enhancement Program (CREP) and the county (Edmonson) containing most of Mammoth Cave National Park.

Converting croplands back to hardwood forests will provide habitat for numerous species of songbirds, wild turkeys, and many species of mammals, both common (e.g., white-tailed deer) and rare (e.g., Indiana bat). Planting trees will provide food, shelter, and travel corridors within the proposed area. Increasing the size of core forest area around Bernheim Forest and other large tracts of forest will help meet the objectives of the North American Bird Conservation Initiative for the area.

There are several watersheds in this region: Rolling Fork, Salt River, Green River, Rockcastle River, South Fork, Cumberland River. Riparian buffers along streams in these watersheds will reduce soil erosion and chemical runoff into streams, improve water quality, and benefit both aquatic and terrestrial wildlife that is threatened, declining, or of federal, state, and local concern.

Western Kentucky Forest Legacy Area

This region encompasses the counties of Ballard, Caldwell, Calloway, Carlisle, Christian, Crittenden, Fulton, Henderson, Hickman, Hopkins, Livingston, Logan, Marshall, McCracken, Muhlenberg, and Todd.

The Western Kentucky FLA covers the Shawnee Hills (or Western Coal Field) and Upper East Gulf Coastal Plain (or Jackson Purchase). Most of this region was acquired by the United States from the Chickasaw Indians in 1818, as the "Jackson Purchase".[6] This is the only systematic, grid based land survey in the establishment of Kentucky.

The Shawnee Hills have been highly degraded by farming and mining. On the broad bottomlands of Green River and its tributaries, a huge amount of swamp forest has been cleared, drained and converted to cropland since 1950. In recent decades, there has been extensive surface mining on higher ground. The remaining upland forests have been heavily cut over and have almost disappeared from the deeper soils. There are good opportunities to reforest large sections of river corridors and wetland complexes in this region. In addition to diverse ecological conditions, it supports several endangered or threatened species, including the rare copperbelly watersnake and Price's Potato Bean.

The Upper East Coastal Plain is made up of cretaceous, tertiary and quaternary deposits that are easily eroded. This part of Kentucky is typically flat and has numerous lakes, ponds, sloughs and swamps. Local relief is generally 100 feet, and the lowest spot in the state is 260 feet above sea level. After 1850-1860, most of the grassy barrens on upland plains became brushy as fire frequency declined, and a majority of the land was cleared for farming. There is an example of a small un-plowed piece of wet native grassland that has survived within the Lake Barkley Airport, near Paducah.

In Marshall and surrounding counties lies the best example of flatwoods that occur on poorly drained soils. The remaining bottomland forests have been affected by channelized streams or drained and cleared for farming along the Obion River and Mississippi floodplain. Even though, Land Between Lakes is not included in the Western Kentucky FLA, it is the most extensive forested area left in this region. The Kentucky Department of Fish and Wildlife Resources manage several wildlife management areas (WMAs) in the FLA. The wetland systems and adjacent upland forests form part of a highly significant corridor for migrating waterfowl and neotropical migrant birds.

The Forest Legacy Area and description was amended for the 2010 "Kentucky Statewide Assessment of Forest Resources and Strategy". Below is the amended Forest Legacy Map and area descriptions:

Forest Legacy Areas

The Forest Legacy Areas (FLAs) are subsets within Kentucky's larger priority areas to provide a comprehensive identification of key forest resources in Kentucky. The FLAs were first developed in conjunction with the Forest Legacy Assessment of Need in 2003 to identify environmentally important forests for protection from conversion to non-forest uses. These legacy priority areas were narrowed and renamed in 2010 based on rare species abundance, threats to conversion, and connectivity to existing protected lands.

The FLAs identified are located within ecologically significant areas of the state. In these areas, forestlands have a likely or imminent threat of being converted to non-forested uses, are part of a larger conservation effort by multiple state, federal, and private agencies, and/or have a large concentration of existing protected lands that would either be directly or indirectly enhanced by the protection of additional forestlands.

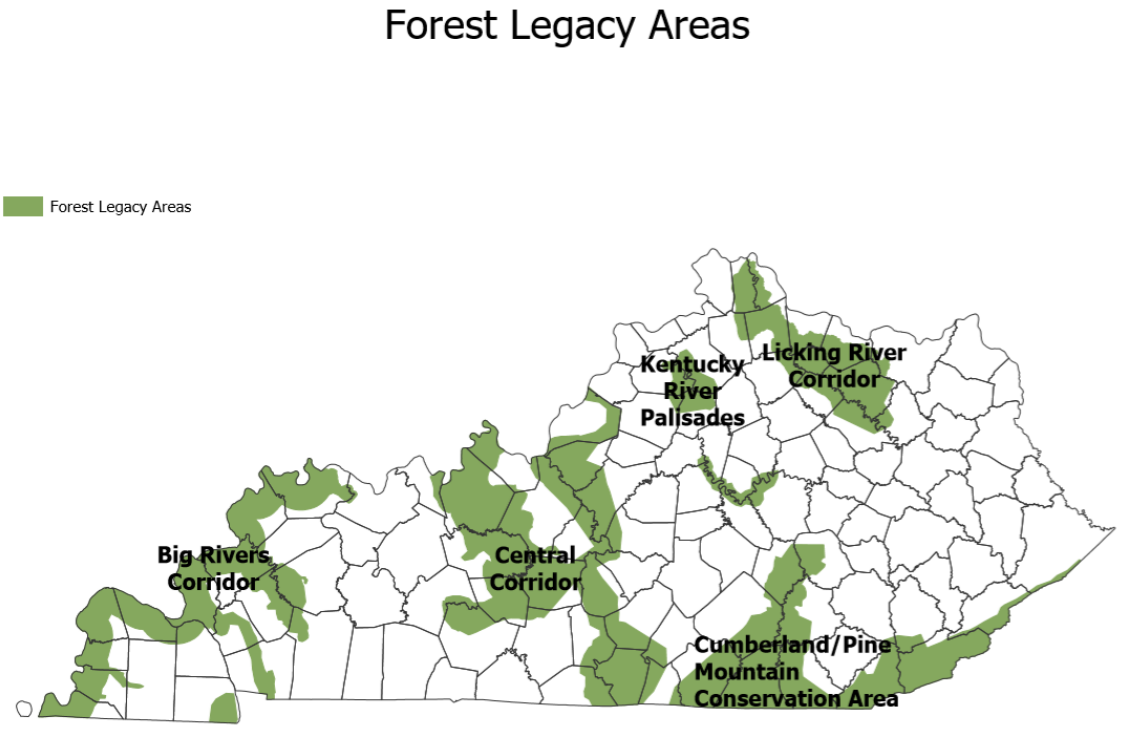


FIGURE 7 – FOREST LEGACY AREAS

1. Licking River Corridor
   - Mississippi River Initiative Focus Watershed.
   - Large number of mussel species (50 species, 11 of which are endangered).
   - Other threatened or endangered species including the Indiana bat, gray bat, and Short's goldenrod.

- Contains unique archeological resources such as Blue Licks, Blue Licks Battlefield, and Indian Old Fields.
- Threats and impairments caused primarily agriculture and urban land use.

2. Kentucky River Palisades
   - Last remaining large forested remnant in the Bluegrass area.
   - Large concentration of rare plants including the federally listed running buffalo clover and two other candidates for federal listing as threatened or endangered species.
   - Existing nature preserves, WMAs, Raven Run Nature Sanctuary, and Shakertown of Pleasant Hill.
   - Includes unique archaeological sites such as Big Bone Lick, Indian Old Fields, and buffalo hunting grounds.
   - Threat from urban expansion.

3. Cumberland / Pine Mountain Conservation Area
   - One of the major migratory corridors for neo-tropical birds including those that federally listed threatened or endangered species.
   - Largest existing forest blocks in Kentucky.
   - Numerous threatened and endangered aquatic species.
   - Protected areas including Big South Fork National River and Recreational Area, Daniel Boone National Forest, WMAs, State Parks, Kentenia and Kentucky Ridge State Forests, Kentucky Natural Lands Trust protected areas, The Nature Conservancy protected areas, Cumberland Gap National Historic Park, Pine Mountain Trail.
   - Threats of mining and urban development along I-75 corridor.

4. Central Corridor
   - Unique Barrens, Caves, and Knobs.
   - Numerous threatened and endangered species including Indiana bat, gray bat, and endemic cave species such as Kentucky cave shrimp.
   - Contains the most ecologically significant portion of the Green River which is the most diverse region in Ohio River basin including 11 species of mussels and 16 species of threatened and endangered plants just in the Mammoth Cave region.
   - Existing protected areas including Mammoth Cave National Park, Fort Knox Military Reservation, Bernheim Arboretum and Research Forest, Jefferson Memorial Forest, Army Corp of Engineers property around Rough River, Nolin River Lake, and Dale Hollow.
   - Forest Legacy Projects at Knobs State Forest and WMA and at Marrowbone Creek State Forest and WMA.
   - Imminent threat to urban conversion in the Louisville metropolitan area and along the I-65 corridor.

5. Big Rivers Corridor
   - Numerous threatened and endangered species including Indiana bat, interior least tern, and copperbelly watersnake.
   - Kentucky's largest concentration of migratory waterfowl, shore, and wading birds.
   - Numerous protected areas including WMAs, Land Between the Lakes National Recreation Area, Shawnee National Forest, Fort Campbell Military Reservation, Clarks River National Wildlife Refuge,

Reelfoot Lake National Wildlife Refuge, the proposed Green River National Wildlife Refuge, Pennyrile State Forest, and Green River State Forest.

- Mississippi River Initiative Focus Watersheds.
- Contains highest-quality remaining bottomland hardwood complexes in Kentucky.
- Contains unique archeological resources such Wickliffe Mounds State Historic Site.
- Agricultural land use is the primary threat although some loss to urban and mining.

FORESTRY LEGACY PROGRAM

ASSESSMENT OF NEED (AON) PUBLIC MEETINGS

***

DECEMBER 2, 2002
PULASKI COUNTY COOPERATIVE EXTENSION OFFICE
SOMERSET, KENTUCKY
6:00 PM – 8:00 PM E.S.T.

***

DECEMBER 3, 2002
SALATO WILDLIFE EDUCATION CENTER
KY DEPT OF FISH & WILDLIFE RESOURCES
FRANKFORT, KENTUCKY
6:00 PM – 8:00 PM E.S.T.

***

JANUARY 14, 2003
MUHLENBERG CO AGRICULTURE & CONVENTION CENTER
POWDERLY, KENTUCKY
6:00 PM – 8:00 PM C.S.T.

FOREST LEGACY PROGRAM
POLICY AND PROCEDURE FOR CONDUCTING PUBLIC MEETINGS

As the lead agency, Kentucky Division of Forestry followed the public meeting guidelines set forth by the Kentucky Natural Resources and Environmental Protection Cabinet in order to conduct three public meetings to discuss the proposed Forest Legacy Areas in the Commonwealth of Kentucky. The public meets were advertised in the Lexington-Herald Leader and The Courier-Journal Newspaper. Also, state wide public new releases were issued. A draft copy of the Assessment of Need will be placed on the Kentucky Division of Forestry website for further public input.

FOREST LEGACY PROGRAM AGENDA FOR ALL PUBLIC MEETINGS

I. INTRODUCTION OF SPEAKERS

A. Steven J. Kull, Assistant Director for Kentucky Division of Forestry
B. Pamela R. Snyder, Program Coordinator for Forest Legacy, Forest Stewardship, KDF

II. PURPOSE OF MEETING & INFORMATION ON FOREST LEGACY DISCUSSED

The purpose of this meeting is to gain input on the Forest Legacy Program that the State of Kentucky is embarking on. We hope to give you an insight on where the Stewardship committee is coming from and welcome your questions and comments concerning the development of the areas we will be discussing. In summary, at the end of this meeting, we want your input on anything you feel we may have missed, what things we may have overlooked, any comments, questions and suggestions. The more input we could get the more intelligent a decision we can make.

The Forestry Legacy program, established in 1995, is designed on a federal level to protect environmentally sensitive forested areas that are experiencing development pressures and are being threatened to convert to non-forest uses.

This voluntary program supports State & Federal efforts to protect environmentally important areas through direct acquisition and through conservation easements (purchased from willing landowners at fair market value) of partial interests in privately owned forestlands.

The federal government may fund up to 75 percent of program costs, with at least 25 percent coming from private or local sources.

In addition to gains associated with the sale or donation of property rights, many landowners may also benefit from reduced taxes associated with limits placed on land use.

Currently 31 states have adopted this program. Also current federal funding for this project is $60 million.

Each state wanting to participate in the Forest Legacy Program must develop an AON. Gov. Paul Patton has designated the Kentucky Division of Forestry (KDF) as the lead agency for the

State in the development of this program. KDF drafts the AON report with partnering agencies, the general public and state stewardship coordinating committee input. Partnering agencies include: USDA Forest Service, Natural Resources and Environmental Protection Cabinet, KY State Nature Preserves Commission, KY Department of Fish and Wildlife Resources, KY Division of Conservation, KY Nature Conservancy, KY Department of Parks, and KY Division of Water.

III. ELIGIBILITY CRITERIA AND PROPOSED AREAS

In determining those areas to be eligible, the following is considered: scenic resources, public recreation opportunities, public education opportunities, riparian areas, wetlands, fish & wildlife habitat, native plant communities, connectivity to other significant areas and other protected lands, known threatened and endangered species, known cultural resources, and other ecological values.

The Kentucky Forest Stewardship Coordinating Committee has compiled a map that is divided into 4 proposed regions that have been selected as proposed Forest Legacy areas. (Map is passed out to those in attendance along with proposed region descriptions). These areas have been selected based on information pertaining to the criteria listed previously.

IV. ATTENDEES' COMMENTS/ QUESTION AND ANSWER FORUM

Forest Legacy Public Meeting #1
Somerset, KY – December 2, 2002

Name	Organization
Brian Gray	Kentucky Department of Fish and Wildlife Resources (KDFWR)
Keenan Turner	Cooperative Extension Service (CES)
Steve Kull	Kentucky Division of Forestry (KDF)
Pam Snyder	KDF
Lori White	KDF
Jeff Sole	The Nature Conservatory (TNC)
Mike Strunk	TNC/Pulaski County Conservation District
Jack Stickney	Kentucky Wild Rivers Association (KRWA)
Ben Perry	Appalachian Science Public Interest (ASPI)
Steve Beam	KDFWR
Heather Weese	Kentucky State Nature Preserves (KSNPC)

MINUTES FROM DECEMBER 2, 2002 PUBLIC MEETING (Question and Answer Forum)

IS THIS ALL FOR PURCHASES IN THE FUTURE OR CAN ANYTHING BE LOOKED AT RETRO-ACTIVELY?

The funding mechanism-the way the federal government in Legacy works-you propose the project and they commit the funding to that, so while it needs to be protected now, our funding mechanism won't be available until we get the AON approved by the Secretary of the Department of Agriculture. It's not just making application to the program. We anticipate the committee will set up a time period to make application during the year, then we have a short time period to review all applicants. The State Stewardship Committee actually has to rank those applicants. Usually it's the top 3 or 4 projects that they rank which go to a regional ranking (which would be the southern region-region 8 in Atlanta). Those then go into a national ranking criteria with all the programs. Once it's ranked at the national level, Congress appropriates funding to the projects as funds are available.

SO IT SOUNDS LIKE WE'RE TALKING PRETTY MUCH ABOUT A MACRO-LEVEL OF PROPERTY, NOT 60 OR 70 SMALL PARCELS…

It could be a mega-site area with 2 or 3 land acquisitions or maybe 1 big project—it depends. We're not ruling out small areas whatsoever. There are some 2-acre tracts that need to be protected and so nothing will be ruled out whatsoever.

From what I know of projects that have been approved nationally, there are $10M projects over 5 years that have been approved and there are $500,000 projects that have been approved, so it's going to be the way it's written up and it's going to be the criteria used by the Stewardship committee. It will be difficult but not impossible. They don't simply divide $60M by 31 states and everyone automatically gets their share. We have to compete nationally and some will get more and some less.

THE STATE STEWARDSHIP COMMITTEE YOU'VE TALKED ABOUT—IS THAT FOR THE FOREST LEGACY ONLY?

Actually it was set up for our State Stewardship program but when Forest Legacy came in—and being of co-op forestry, and of state and private forestry, it is a companion program somewhat to stewardship because it is management of lands and protection of lands. Congress, in the law, designated the Stewardship Committee which is already established in states, as being the consultants for the Forest Legacy program.

SO THEY'RE GOING TO PRETTY MUCH BE THE DRIVING ENTITY IN WHAT AREAS ARE SELECTED.

Yes, this group will make it go. They will make the criteria and make the rankings.

SO THESE PEOPLE ARE ALL MEMBERS OF THE STATE STEWARDSHIP COMMITTEE? HOW MANY ARE THERE ON THE COMMITTEE?

Yes, each agency or organization has a designee, so around 18 members I think.

WILL RANKING CRITERIA BASICALLY ADD UP AS A SCORING SYSTEM?

Yes. We will have a basic score sheet type of a system that will get us started. This will give the committee kind of a first shot of which ones to look at first. Anyone can make application and take it to the Committee, but ranking will give it a score. Based upon resources and connectivity to the various things I showed you earlier that would make it eligible. I guess you could call that process the first cut.

They will also look to see if there are other easements or ties that would keep us from protecting it. Of course, the more variety of resources, the higher the ranking it will get.

BEARING IN MIND THE MORE CRITERIA, THE HIGHER THE RANKING, WHAT ABOUT A SMALL 2 ACRE AREA THAT MIGHT BE AN OLD INDIAN OR CIVIL WAR BURIAL GROUND?

Or that 2 acres may be between a State Nature Preserve and a Forest Service property and major conservancy piece of land. By getting that 2 acres, we can assure that it's all protected, it's certainly worth looking at.

SAY A NON-PROFIT GROUP PUTS UP 25 PERCENT AND 75 PERCENT IS FROM THE PROGRAM—WHOSE NAME IS IT IN WHEN IT IS ALL SAID AND DONE?

That has to be worked out. Division of Forestry, as the lead agency, we are the ones but management or agency or the right person or group to manage that property may in fact, not be us and it could be designated to those to manage that property. There would be paperwork detailing how it would be managed and by whom.

YOU SAID THE OTHER WAY TO PROTECT THE LAND WOULD BE CONSERVATION EASEMENTS. HAVE CONSERVATION EASEMENTS BEEN DONE?

Kentucky Division of Forestry has not entered into easements before. Forest Legacy would be our first time working with the conservation easements. There are a lot of challenges in conservation easements. Management and making sure heirs abide by the easement, etc. The idea is (1) we may not be able to get the property through the fee simple method, but it still needs to be protected and (2) with limited funding we may be able to stretch that over a larger area through conservation easements instead of acquisition. Both options (fee simple and conservation easements) are available through Forest Legacy. The end result depends on what the landowner wants to do. One of the requirements in this program is the landowner must have a forest stewardship plan written on their property and they must follow that plan.

CAN THERE BE SOMETHING LIKE A 5-YEAR RE-SUBMITTAL SHOULD AN AREA NOT INCLUDED IN THE PROPOSAL LATER BE ONE TO CONSIDER?

There is no particular time line by which you can amend your assessment of need. So if in fact we see it's not working for our State, the opportunity to amend it is there. We have taken input from the states already in the program and they have shared what worked and didn't work for them.

Forest Legacy Public Meeting #2
Frankfort, KY – December 3, 2002

Name	Organization
Steve Kull	KDF
Pam Snyder	KDF
Steve Bonney	KDFWR
Emily Salt	University of Kentucky student

Robert Aubick	Landowner
Frank Young Mood	Landowner
Hugh Archer	Department for Natural Resources (DNR)
Shelby E. Riggs	Landowner
Stewart West	Landowner
Don Dott	KSNPC
Clay Goebeler	Heartwood
Susan Makosky	Environmental Biologist
Gene Reynolds	Retired Forester
Tim Sheehan	KDF
Jeff Sole	TNC

MINUTES FROM DECEMBER 3, 2002 PUBLIC MEETING (Question and Answer Forum)

YOU SAID THE GOVERNOR DESIGNATED THE STATE DIVISION OF FORESTRY SERVICE AS THE LEAD AGENCY; IS THIS BASICALLY WHAT HAPPENS IN THE REST OF THE STATES ALSO—THE FOREST SERVICE IS DESIGNATED OR WHAT?

Not in 100 percent of the states, but in the majority however, other agencies can be designated as the lead agency.

ONCE THE LAND IS BOUGHT, WHOM DOES IT BELONG TO?

It is the Commonwealth of Kentucky that will hold the deed, however, it's our intention that the agency best able to manage that property for it's needs or intended use will be the caretaker of it. Whether it is Kentucky Department of Fish & Wildlife Resources, Nature Preserves Commission, depending on the values of that particular area and who's best able to see to those values.

YOU SAY YOU'RE BUYING IT TO PROTECT IT; TO KEEP IT A FORESTLAND, BUT WHEN YOU REFER TO A 'WORKING FOREST', I ASSUME YOU'RE TALKING ABOUT LOGGING, CORRECT?

The option is that it <u>can</u> be a working forest. It has to be a case by case basis—that is, what the need for the area is; timbering or logging is an option, depending on what management for this area entails.

I DON'T PARTICULARLY AGREE WITH THE WAY THE FOREST SERVICE IS RUNNING THE NATIONAL PARKS RIGHT NOW, I MEAN, IT SAYS UP TO 89 PERCENT OF THE LAND THEY HAVE IS SUITABLE FOR LOGGING AND THEN YOU'RE GONNA BUY THIS LAND AND PROTECT IT, WHEN YOU'RE NOT PROTECTING THE LAND YOU ALREADY HAVE.

We are <u>not</u> the U S Forest Service, we're State, however, I do understand your concern. Under the forest legacy program, the protection is from non-forest conversion, in other words, parking lots or whatever the situation may be. Management will be for the values associated with the property..

SO IT WOULD HAVE TO BE LAND THAT IS GOING TO BE DEVELOPED INTO SUBDIVISIONS OR SOMETHING LIKE THAT—NOT JUST WILD LAND?

The purpose of the Legacy program is protection of forestland from conversion, so we have to have that as a large part of the criteria on whether or not it's even eligible for the program. If a conservation easement is put on that property then it is up to the landowner and what his or her goals are. If they want to have a working forest component, they can put that actually in the deed, or if they want to set it aside for total preservation purposes—whether that's recreation or wildlife, it is up to them what goes into that deed restriction and that can also mean restricting development on that property. Conservation easements are another option landowner's have other than land acquisition.

IN ORDER TO BUY THE LAND UNDER THIS PROGRAM, IT DOESN'T HAVE TO BE LAND THAT IS IMMEDIATELY ABOUT TO BE DEVELOPED, DOES IT? I MEAN IT CAN JUST BE A NICE PIECE OF LAND THAT YOU JUST WANT TO PRESERVE, RIGHT?

Right, but the more threatened, the more priority it will have. It adds more points in the ranking process.

IS THIS A US FOREST PROGRAM THAT THE STATE IS JOINING?

It is a federal program that the money is funneled through the U S Forest Service through state and private forestry.

IN LOOKING AT THE PROPOSED FOREST LEGACY AREAS ON YOUR MAP, IT INCLUDES AREAS AROUND THE DANIEL BOONE NATIONAL FOREST IN EASTERN KENTUCKY. SURELY THE LEGACY PROGRAM DOESN'T APPLY TO FEDERALLY OWNED PROPERTIES, SO IS THERE PRIVATELY OWNED PROPERTIES NEAR THE NATIONAL FOREST?

Yes, there's a tremendous amount of private ownership within the national forest area. And the reason, there are areas in white (areas not included in the proposed Legacy Program) the U S Forest Service already has desires to acquire lands in this area from willing sellers, so there's already an opportunity for that forestland. The committee looked at it as there already being an opportunity to protect those areas, so Legacy funds could be concentrated in other areas.

OKAY, SO YOU'RE NOT TRYING TO COME UP WITH "A PROJECT" FOR THE WHOLE STATE OF KENTUCKY?

No sir, we're not looking to buy 2,000 acres in XYZ county. We're looking for projects across the state within these shaded areas on the map that need to be protected and are environmentally sensitive forested areas for various reasons.

SO, YOU'RE GOING TO PUT A BASKET OF THOSE TOGETHER AND PRESENT THAT IN WASHINGTON AS—THESE ARE THE 12 OR 20 OR WHATEVER TOP PROJECTS, CORRECT?

Yes. We will rank them 1,2,3,4,5… according to the most important to the State of Kentucky and we'll fight for funding for all 12 or 20 or however many the case may be.

HOW MUCH OF THE LAND MUST BE FORESTED?

Up to 25 percent of the property can be non-forested.

DO YOU HAVE AN ACRE LIMITATION ON IT?

We don't have a minimum or a maximum on the acreage.

IF YOU'RE RANKING UNDER ENVIRONMENTAL OR ECOLOGICAL PROBLEM, DO YOU STILL HAVE TO MEET THAT 25 PERCENT NON-FORESTED OR COULD IT BE SAY 80PERCENT OPEN? EVEN IF A SIGNIFICANT CULTURAL VALUE?

We have to stay within their guidelines. We will make a case if it's necessary for that type of thing and it may get approved or it may not.

WHO INITIATES THE ACTION TO GET THIS STARTED—THE LANDOWNER OR THE AGENCY?

Either one. We will have an application by which any individual, landowner or agency can make application to the Stewardship committee. They will judge that particular area; but anybody can make application.

To clarify, there will be a time frame that the Stewardship committee will have to set; probably early spring till maybe May to accept applications. We have to have enough time to be able to go out and do field visits and site inspections. Then the Stewardship committee has to meet and rank them. All this needs to be done before September or so, before they have to go to regional ranking in Atlanta. About 1½ years ahead, you need to know what projects you want for that upcoming federal fiscal year.

ARE YOU PLANNING ON PUTTING OUT MORE PUBLICITY ABOUT THIS?

This is our initial thrust for public input. We're going to draft up an assessment of need and put it out on the Web and make it as available as possible for the public to make comments on and get their input.

IS THIS LIKE THE WETLAND RESERVE PROGRAM WHERE THE LANDOWNER WILL RETAIN THE TITLE TO THE LAND?

Well, one portion of it can be if they do a conservation easement. They can retain title and just donate or sell off rights to that property to protect the forest. There's also provisions by which the landowner can sell the property outright.

DO YOU HAVE ANY IDEA OF HOW MUCH YOU'RE GONNA HAVE TO HAVE PER ACRE, LIKE SO MUCH PER ACRE?

No, there's no limit. The process has to meet federal guidelines and it has to be fair market value. They can ask for more than it's worth, but the Forest Legacy program, once the appraisals are done, will not be able to offer more that it's worth basically.

THE SITE I'M INTERESTED IN IS A LARUE CO. UNION ARMY LOCATION SITE BECAUSE IT IS A PART OF A CIVIL WAR CAMP WHICH IS ABOUT 50 ACRES AND OVER THE YEARS HAS BECOME MOSTLY FORESTED. WOULD THIS PROPERTY BE ELIGIBLE FOR THIS PROGRAM?

It has the cultural resources and other significance that can enable you to make application to this program. If you are suggesting the need to demonstrate that area for the value that it has, that some of

the site be cleared to show the battle site. That would have to be worked out as the application is made.

WELL, RIGHT NOW IT BELONGS TO A 90-SOMETHING YEAR OLD WOMAN AND I FEEL IT WILL PROBABLY BE UP FOR SALE IN THE NEAR FUTURE. SO THAT'S WHY I'M HERE TONIGHT TO GET INFORMATION.

I understand it's an important resource that needs to be taken care of. There are other opportunities or resources you may want to explore to retain this property until such time that the Legacy funds would become available.

BUT IT COULD BE POSSIBLE TO QUALIFY THIS PROPERTY UNDER LEGACY GUIDELINES AT THAT TIME?

It is possible. Just bear in mind the ranking process and how it all works. The more criteria the area meets the higher the ranking.

YOU SAID THE GROUND COULDN'T BE OVER 25 PERCENT OPEN LAND. IS THAT A HARD AND FAST RULE?

That's the current rule.

COULD YOU GET AN EXCEPTION?

We haven't been involved enough to know yet whether you could, but we would certainly make the argument if we thought it was valuable enough for the State of Kentucky.

DOES THE FORESTRY HAVE THE FINAL SAY?

No, the committee has the final say. The Stewardship committee makes the decisions. They do the rankings, submit the applications on a regional level and so on.

WHEN ARE WE GONNA KNOW WHO THE COMMITTEE IS?

Presently the Stewardship committee is represented by the various agencies discussed at the beginning of this meeting, along with some private individuals and non-profits organizations.

WOULDN'T THE DEPARTMENT OF PARKS BE CONCERNED WITH THE PROPERTY I INQUIRED ABOUT IN LARUE COUNTY, AS WELL AS THE LEGACY PROGRAM ITSELF?

Yes, and they are a member of the Stewardship committee but they also participate in the Heritage Land Conservation Fund program. They have abilities through other avenues as well, to be interested in property such as you described.

IS AN EASEMENT AN ALL OR NOTHING PROPOSITION? IF YOU HAVE AN EASEMENT ON YOUR PROPERTY, DOES THAT FLAT OUT PROHIBIT CONSTRUCTION?

An easement is a very individual type of document. It's between the stewardship committee and the landowner, values that Legacy wants to protect and what the landowner wants to do on the property has to mesh. It's very much an individualized document.

One of the things the program requires, which falls in line with the easement, is a Forest Stewardship Plan, a multi-resource management plan that can encompass wildlife management, forest management, recreation, watershed—all depends on what the landowner's interests are. Once it's written, the landowner must adhere to that plan. It can be upgraded as time goes by. Stewardship plans and Legacy go hand in hand. They compliment each other to benefit the land.

ARE THESE EASEMENTS IN PERPETUITY?

Yes. We couldn't say it's protected unless that happened.

SO IF ANYONE WANTED TO BREAK THE DEED, IT WOULD END UP IN COURT?

Yes.

WHEN WILL YOU ACTUALLY BE LOOKING FOR PROJECTS AND BE READY TO SUBMIT?

Depending on how long it takes to get approval from the Secretary of Agriculture; we'll start looking for projects this time next year we hope.

Forest Legacy Public Meeting #3
Powderly, KY – January 14, 2003

Name	Organization
Steve Kull	KDF
Pam Snyder	KDF
Lori White	KDF
Scott Harp	KDFWR
Eric Williams	KDFWR
Chuck White	---
Heather Weese	KSNPC
Katie Wilding	KDF
Jeff Sole	TNC
Jim Aldrich	TNC

MINUTES FROM JANUARY 14, 2003 PUBLIC MEETING (Question & Answer Forum)

COULDN'T YOU USE FIA DATA TO GATHER INFORMATION?

Part of the reason we can't use FIA data is because all 5 panels are not completed so the statistical analysis won't be correct.

Technically, under Federal guidelines that were revised in 1996, the whole property does not have to be in forested condition. It could be 25 percent not forested, which means that portions could be planted back to trees. It all depends on what goes into the forest stewardship plan, which they require for each property that comes into the program.

HOW MUCH ACREAGE ARE WE REALLY TALKING ABOUT ON A PER YEAR BASIS AND WHAT'S THE GOAL?

It depends totally on Congress. We could turn in a multi-thousand acre project or we could turn in 10 projects. The project could be funded all at once or the full 10 projects funded. There is no set formula; it's project specific.

SO THEY ACTUALLY PICK WHAT GETS DONE?

Well, the rankings help.

THE RANKING IS NATIONWIDE AND NOT JUST IN KENTUCKY?

We rank ours in Kentucky. Those then go to regional ranking in Atlanta and from there they are nationally ranked. Bottom line is, the more that the property can offer based on the eligible criteria the better it's gonna rank. If you try to apply for a single interest, you're not going to rank very high. Traditionally, lands that have been located next to public lands, whether they were state or federal, tended to rank higher nationally because Congress is looking at how much the public can use the property.

WHAT RIGHTS ARE YOU PURCHASING IN CONSERVATION EASEMENTS?

It will be deed specific. Basically negotiations between us and the seller. There are 2 separate applications--#1 fee simple, which is straight out land acquisition and #2 Conservation easement and it asks what rights you want to retain. Most landowners typically want to keep the land in a forested condition. They want to keep it protected from development.

HERE IN THE WESTERN PART OF THE STATE, WE REALLY DON'T HAVE ANYONE PURCHASING CONSERVATION EASEMENTS. THEY'RE ALL LOOKING AT CRITICAL HABITAT AND I'VE TALKED TO SEVERAL LANDOWNERS THAT HAVE WOODLANDS THAT WOULD LOVE TO HAVE A CONSERVATION EASEMENT, BUT NOBODY'S WILLING TO PURCHASE IT. I THINK IT WOULD BE A MISTAKE TO DOWNGRADE THAT SIDE OF THE PROGRAM JUST BECAUSE, EVERYBODY WANTS TO BUY PROPERTY AND PROTECT IT OURSELVES. CONSERVATION EASEMENTS ARE JUST AS IMPORTANT.

You're right, and we certainly didn't want to rule that out. If it's threatened for conversion, a conservation easement is the way to get it, then there's certainly opportunity to do that.

ARE THERE GOING TO BE ANY ACREAGE CAPS? I MEAN, ARE THEY FOLLOWING THE USUAL GUIDELINES THAT YOU CAN'T PAY ANY MORE THAN THE APPRAISED VALUE?

That's right, no more than the appraised value; but there are no caps on acreage.

YOU MENTIONED THAT TAKING SOME TIMBER OUT OF THE AREAS COULD BE AN OPTION; IS THAT AN OPTION THAT YOU WOULD DISCUSS WITH THE WHOLE COMMITTEE?

Yes, the idea is that it's a working forest. Harvesting is not conversion.

IT SEEMS LIKE YOUR ARGUMENT FOR WHY SPECIFIC AREAS ARE CHOSEN FOR THIS PROGRAM ARE POPULATION GROWTH, DEVELOPMENT AND HIGHWAYS AND HYPOTHETICALLY YOU COULD PICK ANY FIVE COUNTIES AND 2 OF THOSE FIVE WOULD PROBABLY QUALIFY UNDER THAT SAME CRITERIA I WOULD THINK.

The Committee looked at census data and what we know of our land cover and resources. The whole state could not be included, some areas had to be left out.

IF WE'RE LOOKING ON SMALL PARCELS, EVEN DOWN TO A ¼ ACRE; IF YOU'RE WILLING TO GO THAT SMALL WHY CAN'T YOU GO THAT SMALL WITHIN EACH COUNTY? I KNOW WEBSTER COUNTY AND HANCOCK COUNTY COULD USE A LOT OF WORK AND WOULD BENEFIT FROM THIS PROGRAM.

ARE YOU SUGGESTING WITHIN A COUNTY, THERE BE A ¼ TO A ½ THAT HAS A PRIORITY AREA?

Yes, exactly. I know it would be an administrative nightmare to designate that but it would be possible.

WILL YOU HAVE A COMMENT PERIOD?

The Assessment of Need is being placed on the web site and has received no comments.

APPENDIX 1 **FOREST LEGACY PROGRAM**
Letters of Authorization

COMMONWEALTH OF KENTUCKY
OFFICE OF THE GOVERNOR

PAUL E. PATTON
GOVERNOR

700 CAPITOL AVENUE
SUITE 100
FRANKFORT, KY 40601
(502) 564-2611
FAX: (502) 564-2517

May 25, 2001

Mr. Dale Bosworth
Chief, U. S. Department of Agriculture Forest Service
P. O. Box 96090
Washington, D.C. 20090-6090

Dear Mr. Bosworth:

The Commonwealth of Kentucky will participate in the U. S. Department of Agriculture's Forest Legacy Program authorized under Section 1217 of Title XII of the Food, Agriculture, Conservation and Trade Act of 1990.

I have designated the Natural Resources and Environmental Protection Cabinet's Division of Forestry as the lead agency to represent the Commonwealth of Kentucky. Please forward information and other pertinent materials to the Director, Division of Forestry, 627 Comanche Trail, Frankfort, Kentucky 40601. The telephone number is (502) 564-4496.

I am pleased that Kentucky will be part of this important forest conservation effort. Thank you for your support of state and private forestry programs.

Sincerely,

Paul E. Patton

c: James E. Bickford

EDUCATION PAYS

COMMONWEALTH OF KENTUCKY
OFFICE OF THE GOVERNOR

PAUL E. PATTON
GOVERNOR

700 CAPITOL AVENUE
SUITE 100
FRANKFORT, KY 40601
(502) 564-2611
FAX: (502) 564-2517

May 25, 2001

James E. Bickford, Secretary
Natural Resources and
Environmental Protection Cabinet
Capital Plaza Tower, 5th Floor
Frankfort, KY 40601

Dear Secretary Bickford:

The Commonwealth of Kentucky will participate in the U. S. Department of Agriculture's Forest Legacy Program authorized under Section 1217 of Title XII of the Food, Agriculture, Conservation and Trade Act of 1990.

I hereby designate the Natural Resources and Environmental Protection Cabinet's Division of Forestry as the lead agency for the Forest Legacy Program.

Sincerely,

Paul E. Patton

APPENDIX 2 STATE FOREST STEWARDSHIP COORDINATING COMMITTEE

Leah MacSwords, Director	KY Division of Forestry
C. Thomas Bennett, Commissioner Dan Figert, Ass't Director, Division of Wildlife Brian W. Smith, Grasslands Program Coordinator	KY Department of Fish & Wildlife Resources
David Sawyer, State Conservationist Tom Marcum, State Resource Conservationist	USDA Natural Resources Conservation Service
Steve Coleman, Director Sheila Vaughan, Financial Assistance Manager Shelly Graves, Grants and Contract Specialist	KY Division of Conservation
Dr. Jeff Stringer, Extension Specialist	UK Department of Forestry
Don Dott, Director	KY State Natures Preserves Commission
Benjamin Worthington, Forest Supervisor Marie Walker, Public Affairs Officer	Daniel Boone Nat'l. Forest
Jeff Hall, State Executive Director Joyce Hobbs, Conservation Program Specialist	USDA Farm Service Agency
Leslie Cole, Executive Director Erik Seigel, Ass't Executive Director Lola Lyle, Research Analyst	KY Environmental Quality Commission
Jody Lassiter, Commissioner	KY Department of Local Government
Bob Bauer, Executive Director	KY Forest Industries Association
Jerry Crow, Hardwood District Forester	MeadWestvaco Corp.
Rowland V. Beers, President	League of Kentucky Sportsmen
Peter T. McNeil	Forest Landowner
Dick Brantigan, President Chris Will, Secretary/Treasurer	KY Association of Consulting Foresters
Pat Henderson, President	KY Association of Conservation Districts
Joe Ball, President Herb Loyd	KY Woodland Owners Association
Judith McCandless	KY Conservation Committee
Jeff Pratt, Director Corrine Wells, Program Coordinator, Nonpoint Source Pollution	KY Division of Water

APPENDIX 3

Landowner Applications, Landowner Inspection Consent Form and Landowner Application Checklist

LANDOWNER APPLICATION
Phase 1 – Initial contract document

KENTUCKY'S FOREST LEGACY PROGRAM
FEE SIMPLE APPLICATION

SITE NAME:_____ TOTAL ACREAGE: _____

COUNTY: _____

LANDOWNER(S):_____

_____

ADDRESS:_____

CITY:_____ STATE:_____ ZIP CODE:_____

TELEPHONE:_____ E-MAIL:_____

PROPERTY INFORMATION:

Legal Description:_____ Agent:_____
County:_____ Tax Map #:_____

Assessor's Plat and Lot Numbers:_____

Deed Reference (Book and Page Number):_____

Current Local Zoning Where Property Is Located: _____

(Include minimum lot size and road frontage requirements):_____

_____

_____

Current tax valuation or recent appraisal (attach if available)

Property's Total Forested Acres:_____

Forested Acres of Tract Offered for Forest Legacy:_____

Acres of Cleared/Open Land:_____

Directions to Property:_____

_____

FOREST TYPES: (Check all that apply)

Bottomland Hardwoods:	_____	Upland Hardwoods	_____
Natural Pine:	_____	Pine Plantation:	_____
Mixed Pine/Hardwoods:	_____	Other:	_____

WATER RESOURCES: (Check all that apply)

Rivers and Creeks	_____	Names:	_____
Lakes and Ponds	_____	Sizes:	_____
Wetlands	_____	Sizes:	_____
Others:	_____	List:	_____

LANDOWNER APPLICATION
Phase 1 – Initial contract document

KENTUCKY'S FOREST LEGACY PROGRAM
FEE SIMPLE APPLICATION

ENVIRONMENTALLY IMPORTANT FEATURES: (Use additional sheets if needed)

NATURAL COMMUNITIES:_____

_____

RARE PLANT OR ANIMAL SPECIES:_____

_____

UNUSUAL LANDFORMS:_____

_____

SCENIC FEATURES/PUBLIC RESOURCES_____

_____

ADJACENT LAND OWNERSHIPS:
FEDERAL __ STATE __ FOREST INDUSTRY __ PRIVATE __ OTHER_____

LANDOWNER EVALUATION QUESTIONS: (Use additional sheets if needed). The Forest Stewardship Coordinating Committee evaluates and scores each landowner application. The landowner evaluation questions should be filled out to provide the Forest Stewardship Coordinating Committee further property details.

1) Are you willing to sell your property?_____
2) Do you have clear title to your property (No outstanding partial Interest Rights)?_____

   _____
3) How would you rate the threat of conversion of your forestland?_____
4) How would you describe the county population change in the last 5 years?_____
5) How would you rate the conversion of forestland in your county in the last 10 years?_____
6) Does your property fall within a high development area i.e. highway corridor, waterfront or mountain top?_____
7) Do you currently manage your timber/forestland?_____
8) Do you currently manage your wildlife resources on your property?_____
9) What are the soil and water resources on your property i.e. wetlands, highly erodible soils present?_____
10) Does your property have any significant recreational assets i.e. lake or hunting?_____

    _____
11) Does your property have any significant cultural or historical resources?_____
12) How would you describe the ecosystem integrity of your property?_____
    a) size and connectivity of forestland tract?_____
    b) threats to forest health (exotic species, diseases and fire)?_____
    c) Late Successional Species Present?_____

LIENS AND ENCUMBRANCES
List any and all liens and encumbrances on the property proposed for enrollment in the Forest Legacy Program. Examples: mineral rights, utility easements (gas lines, power line), public rights of way, water flow or use restrictions, septic systems or water easements, deed restrictions, tax liens, etc.
The information provided above is true to the best of my/our knowledge and belief.

ALL TITLEHOLDERS MUST SIGN.

PRINT NAME(S)	SIGNATURE	DATE

Disclaimer: All property accepted into the Forest Legacy Program is based on appraisal values meeting federal standards. At least 25 percent of the total acreage of the landowner's property must fall into a designated forest legacy area.

Send this Fee Simple Application, Landowner Inspection Consent Agreement, and Landowner Application Check List Material (aerial photograph, Maps etc.)
To:
Kentucky's Forest Legacy Program
Kentucky Division of Forestry
300 Sower Blvd, 4th Floor
Frankfort, KY 40601

FOR OFFICE USE ONLY

Received by:_____ **Application Number:**_____

Date:_____

COMMONWEALTH OF KENTUCKY
FOREST LEGACY PROGRAM

Landowner Inspection Consent Agreement

I, _____ as the landowner or the landowner's authorized agent (proof of authorization must accompany this document) agree to allow inspection, appraisal, and survey of my property being offered for consideration under the Forest Legacy Program. I agree to allow members of the Kentucky Division of Forestry or their designated staff to inspect the property as may be required at any time. I shall be notified in advance of all inspection visits.

_____ _____

_____ _____

_____ _____

_____ _____

Signature of Landowner(s) or Agent Date

_____ _____

Kentucky Division of Forestry Date

_____

Title

FOR OFFICE USE ONLY

Received by:_____ **Application Number:**_____

Date:_____

COMMONWEALTH OF KENTUCKY
FOREST LEGACY PROGRAM

Landowner Application Check List

With your Fee Simple application or Conservation easement application, please submit four copies of the following for each contiguous parcel:

_____ Completed fee simple application or conservation easement application

_____ Name(s) and address(es) of other owner(s) of record for this tract

_____ Signed Landowner Inspection Consent agreement

_____ **Copy** of road map indicating property location

_____ **Copy** of plat or survey map of the property

_____ **Copy** of Aerial photo (may be obtained through your local Farm Services Agency County Office)

_____ Legal Description (if available)

_____ List of existing permanent improvements on the property, including houses, barns, lakes, ponds, dams, wells, roads, and other structures, and the total number of acres occupied by improvements.

_____ Map identifying all dams, dumps, or waste disposal sites on the property (if available).

_____ Forest Stewardship Plan or Forest Management Plan

Disclaimer: All materials submitted with application are not returnable. Disclosure of this information is voluntary: however, failure to comply may result in this form not being processed.

FOR OFFICE USE ONLY

Received by:_____ **Application Number:**_____

Date:_____

LANDOWNER APPLICATION
Phase 1 – Initial contract document

KENTUCKY'S FOREST LEGACY PROGRAM
CONSERVATION EASEMENT APPLICATION

SITE NAME:_____ TOTAL ACREAGE: _____

COUNTY: _____

LANDOWNER(S):_____

_____

ADDRESS:_____

CITY:_____ STATE:_____ ZIP CODE:_____

TELEPHONE:_____ E-MAIL:_____

PROPERTY INFORMATION:

Legal Description:_____ Agent:_____
County:_____ Tax Map #:_____

Assessor's Plat and Lot Numbers:_____

Deed Reference (Book and Page Number):_____

Current Local Zoning Where Property Is Located: _____

(Include minimum lot size and road frontage requirements):_____

_____

_____

Current tax valuation or recent appraisal (attach if available)

Property's Total Forested Acres:_____

Forested Acres of Tract Offered for Forest Legacy:_____

Acres of Cleared/Open Land:_____

Directions to Property:_____

_____

FOREST TYPES: (Check all that apply)

Bottomland Hardwoods:	_____	Upland Hardwoods	_____
Natural Pine:	_____	Pine Plantation:	_____
Mixed Pine/Hardwoods:	_____	Other:	_____

WATER RESOURCES: (Check all that apply)

Rivers and Creeks	_____	Names:	_____
Lakes and Ponds	_____	Sizes:	_____
Wetlands	_____	Sizes:	_____
Others:	_____	List:	_____

LANDOWNER APPLICATION
Phase 1 – Initial contract document

KENTUCKY'S FOREST LEGACY PROGRAM
CONSERVATION EASEMENT APPLICATION

ENVIRONMENTALLY IMPORTANT FEATURES: (Use additional sheets if needed)

NATURAL COMMUNITIES:_____

_____

RARE PLANT OR ANIMAL SPECIES:_____

_____

UNUSUAL LANDFORMS:_____

_____

SCENIC FEATURES/PUBLIC RESOURCES:_____

_____

ADJACENT LAND OWNERSHIPS:
FEDERAL __ STATE __ FOREST INDUSTRY __ PRIVATE __ OTHER_____

It is important that the following section be carefully and fully completed. The information you supply will directly affect the desirability of the property as well as its appraised value and therefore, the ranking. Note that checking "YES" does not limit your ability to negotiate price and options in the future; it merely assists the State Forest Stewardship Coordinating Committee when evaluating your property. Indicate which of the following interests you desire to retain. Note by checking "YES" should indicate the rights you as the landowner(s) want to retain.

YES	**MAYBE**	**NO**	
_____	_____	_____	Timber and wood product rights
_____	_____	_____	No public access
_____	_____	_____	Hunting
_____	_____	_____	Fishing
_____	_____	_____	Camping
_____	_____	_____	Hiking or other passive recreation
_____	_____	_____	Bicycling
_____	_____	_____	Horseback riding
_____	_____	_____	Construction of roads
_____	_____	_____	Motorized access

LANDOWNER APPLICATION
Phase 1 – Initial contract document

KENTUCKY'S FOREST LEGACY PROGRAM
CONSERVATION EASEMENT APPLICATION

YES	MAYBE	NO	
_____	_____	_____	Expansion of existing improvements
_____	_____	_____	Mushroom/Ginseng/Craft Material Collection
_____	_____	_____	Other:_____

LANDOWNER EVALUATION QUESTIONS: (Use additional sheets if needed). The Forest Stewardship Coordinating Committee evaluates and scores each landowner application. The landowner evaluation questions should be filled out to provide the Forest Stewardship Coordinating Committee further property details.

1) Are you willing to place a conservation easement on your property?_____
2) Do you have clear title to your property (No outstanding partial Interest Rights)?_____
   _____
3) How would you rate the threat of conversion of your forestland?_____
4) How would you describe the county population change in the last 5 years?_____
5) How would you rate the conversion of forestland in your county in the last 10 years?_____
6) Does your property fall within a high development area i.e. highway corridor, waterfront or mountain top?_____
7) Do you currently manage your timber/forestland?_____
8) Do you currently manage your wildlife resources on your property?_____
9) What are the soil and water resources on your property i.e. wetlands, highly erodible soils present?_____
10) Does your property have any significant recreational assets i.e. lake or hunting?_____
    _____
11) Does your property have any significant cultural or historical resources?_____
12) How would you describe the ecosystem integrity of your property?_____
    a) size and connectivity of forestland tract?_____
    b) threats to forest health (exotic species, diseases and fire)?_____
    c) Late Successional Species Present?_____

LIENS AND ENCUMBRANCES
List any and all liens and encumbrances on the property proposed for enrollment in the Forest Legacy Program. Examples: mineral rights, utility easements (gas lines, power line), public rights of way, water flow or use restrictions, septic systems or water easements, deed restrictions, tax liens, etc.
The information provided above is true to the best of my/our knowledge and belief.

ALL TITLEHOLDERS MUST SIGN.

PRINT NAME(S)	SIGNATURE	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____

Disclaimer: All property accepted into the Forest Legacy Program is based on appraisal values meeting federal standards. At least 25 percent of the total acreage of the landowner's property must fall into a designated forest legacy area.

Send this Conservation Easement Application, Landowner Inspection Consent Agreement, and Landowner Application Check List Material (aerial photograph, Maps etc.)

To:

Kentucky's Forest Legacy Program
Kentucky Division of Forestry
300 Sower Blvd, 4th Floor
Frankfort, KY 40601

FOR OFFICE USE ONLY

Received by:_____ **Application Number:**_____

Date:_____

APPENDIX 4

FOREST LEGACY PROGRAM
PROJECT PROPOSAL EVALUATION FORM
DIRECTIONS

Members of the State Forest Stewardship Coordinating Committee will complete the Project Proposal Evaluation form for every proposed tract. The selected tracts will be submitted to the U.S. Forest Service for funding based on readiness, threatened, strategic and confirmation of important values.

Reviewers responsible for completing the Evaluation Form should have access to aerial photos, plats, topo maps, property descriptions, and the landowner to aid in the evaluation process. Following is an explanation of how to complete the evaluation form.

Application Number – Use the number found on the original application.

Forest Legacy Area – Name the Legacy Area in which the evaluated tract is located.
The Form is divided into 4 Primary Categories and Definitions:

I. **Readiness - Indicates level of commitment and likelihood that project can be completed in a predictable timeline. Include elements such as an appraisal, purchase and sale agreement, an option to purchase, anticipated cost-share level, contributing partners and indications of local support.**
II. **Threatened – Conversion to non-forest uses is likely or imminent and will result in a loss of forest values and public benefits.**
III. **Important – The public benefits gained from the protection of the property including the ecological assets and the economic and social aspects.**
IV. **Strategic – Fits with a larger conservation plan strategy, initiative and enhances previous conservation investments.**

Category **III. Important** is further divided into 8 sub-categories:

A. **Timber Management/Productivity**
B. **Wildlife Resources**
C. **Protected Species/Endangered Communities**
D. **Soil & Water Resources**
E. **Public Recreation Opportunities**
F. **Scenic Resources**
G. **Cultural Resources**
H. **Ecosystem Integrity**

Each Category (except for **Important**) and sub-Category listed above has an associated point total range and a list of considerations to be taken into account by the reviewer when assigning points to that category/sub-category. The reviewer should account for each of the considerations when deciding on the point total for each category/sub-category but be aware that each consideration does not have an assigned point value. This allows for flexibility on the part of the reviewer if a tract is outstanding in relation to particular considerations but is lacking in others.

Under **Ready** an answer of "No" to the first consideration automatically disqualifies the application and the reviewer can end the evaluation.

For the other 3 categories, the reviewer can use the "Comments" column to make whatever notes necessary to help in scoring and points associated with any consideration can be placed in the "Score" column. Total points for any category should be placed in the highlighted box within the "Score" column. For example, up to 90 total points for the **Threatened** category should be placed in the highlighted box under the "Score" column**.** For the Category **III.**

Important, total points for each sub-category should be placed in the "Score" column in the highlighted box at the end of each sub-category. For example, in the sub-category **A. Timber Management/Productivity,** up to 15 points should be placed in the highlighted box**.**

All subtotal boxes (**II. Subtotal – IV. Subtotal**) then will be summed to get the **Total Score** at the bottom of the page.

Phase 2 – Detailed Application and Evaluation Form Instruction Sheet

FOREST LEGACY PROGRAM
PROJECT PROPOSAL EVALUATION FORM
Page 1 of 2

Application Number: _____
Forest Legacy Area:

I. READY	**"No" answer to the first question disqualifies application**	
Willing Seller(s)	Yes	No
25% Matching Funds Available	Yes	No
Clear Title(No outstanding partial Interest Rights)	Yes	No
Does proposed property satisfy the criteria used to establish the FLA containing the tract	Yes	No
Relative Costs		
Price (Per Acre & Total)		
Other Matching Funds Available	Yes	No
If yes, what percentage		
II. THREATENED (0-90 Points)	**Comments**	**Score**
Parcel Currently for Sale on the Open Market		
% Change in County Population Last 5 Years		
% Change in Per Acre Real Estate Value Last 5 Years		
% Change in Forested Land in County Last 10 Years		
High Development Potential (e.g. highway corridor, waterfront, mountain top)		
III. IMPORTANT (0-90 Points)	**Comments**	**Score**
A. Timber Management/Productivity (0-15 Points)		
Soil productivity will produce quality timber products		
Growing timber stock present		
Forest products can be easily transported to user		
Timber is accessible		
Diversity of age classes & timber type		
B. Wildlife Resources (0-15 Points)		
Diversity of habitats on property		
Significant habitats and/or species present		
Wetlands present		
Active management to enhance wildlife habitat		

Connectivity		
C. Protected Species/Endangered Communities (0-15 Points)		
Known occurrence of RTE communities or species of plants &/or animals		
Habitats suitable for reoccupation by, or harboring of, RTE species present		
D. Soil & Water Resources (0-15 Points)		
Total # of acres of bottomland/wetland forest		
Total length of forest/wetland interface		
Steep slopes &/or highly erodible soils present		
E. Public Recreation Opportunities (0-5 Points)		
Public has access		
Proximity to a population center		
Significant recreational assets (e.g. lake, hunting available)		
F. Scenic Resources (0-5 Points)		
Public visibility		
Unique/unusual features		
G. Cultural Resources (0-5 Points)		
Site contains significant cultural or historical resources		
H. Ecosystem Integrity (0-15 Points)		
Size of tract		
Connectivity to other protected lands		
Threats to Forest Health (exotic species, diseases, fire)		
Late Successional Species Present		
IV. STRATEGIC (0-20 Points)	**Comments**	**Score**
25% Matching Funds donated by willing seller		
Synergy of primary categories		
Potential for initiating other conservation projects		
Cost-sharing or bargain sale		
Manageability		
Educational opportunities		
Fee simple purchase		
TOTAL SCORE		

APPENDIX 5

Endangered, Threatened and Special Concern Plants, Animals, and Natural Communities of Forest Legacy Areas

Region	Countyname	ELCLASS	Sname	COMMONNAME	STATUSES	RANKS
Eastern	Bell	BIRDS	WILSONIA CANADENSIS	CANADA WARBLER	S	G5/S3B
Eastern	Bell	BIRDS	EMPIDONAX MINIMUS	LEAST FLYCATCHER	E	G5/S1B
Eastern	Bell	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Bell	BIRDS	VERMIVORA CHRYSOPTERA	GOLDEN-WINGED WARBLER	T	G4/S2B
Eastern	Bell	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Eastern	Bell	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Eastern	Bell	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Eastern	Bell	BIRDS	PHEUCTICUS LUDOVICIANUS	ROSE-BREASTED GROSBEAK	S	G5/S3S4B
Eastern	Bell	BIRDS	CORVUS CORAX	COMMON RAVEN	E	G5/S1
Eastern	Bell	BIVALVES	ANODONTOIDES DENIGRATUS	CUMBERLAND PAPERSHELL	E	G1/S1
Eastern	Bell	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Eastern	Bell	CRUSTACEANS	CAMBARUS PARVOCULUS	A CRAYFISH	E	G4/S1
Eastern	Bell	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Eastern	Bell	GASTROPODS	PATERA PANSELENUS	VIRGINIA BLADETOOTH	S	G3G4/S1
Eastern	Bell	GASTROPODS	ANGUISPIRA RUGODERMA	PINE MOUNTAIN TIGERSNAIL	T	G?/S2
Eastern	Bell	GASTROPODS	FUMONELIX WETHERBYI	CLIFTY COVERT	S	G?/S2
Eastern	Bell	INSECTS	POLYGONIA FAUNUS	GREEN COMMA	H	G5/SH
Eastern	Bell	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Eastern	Bell	INSECTS	CALLOPHRYS IRUS	FROSTED ELFIN	S	G3/S1
Eastern	Bell	INSECTS	LYTROSIS PERMAGNARIA	A GEOMETRID MOTH	E	G3G4/S1
Eastern	Bell	INSECTS	EPHEMERELLA INCONSTANS		H	G3/SH
Eastern	Bell	INSECTS	CALOPTERYX DIMIDIATA	SPARKLING JEWELWING	N	G5/SH
Eastern	Bell	INSECTS	CHEUMATOPSYCHE HELMA	HELMA'S NET-SPINNING CADDISFLY	H	G1G3/SH
Eastern	Bell	INSECTS	PSEUDANOPHTHALMUS FRIGIDUS	ICEBOX CAVE BEETLE	T	G1G2/S1
Eastern	Bell	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Eastern	Bell	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Eastern	Bell	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Eastern	Bell	MAMMALS	CLETHRIONOMYS GAPPERI MAURUS	KENTUCKY RED-BACKED VOLE	S	G5T3T4/S3
Eastern	Bell	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Eastern	Bell	MAMMALS	SOREX CINEREUS	CINEREUS SHREW	S	G5/S3
Eastern	Bell	NONVASCULAR PLANTS	POLYTRICHUM PALLIDISETUM	A HAIR CAP MOSS	T	G4/S2?
Eastern	Bell	PALUSTRINE COMMUNITIES	APPALACHIAN ACID SEEP		N	S2
Eastern	Bell	REPTILES	EUMECES ANTHRACINUS ANTHRACINUS	NORTHERN COAL SKINK	T	G5T5/S2
Eastern	Bell	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Eastern	Bell	VASCULAR PLANTS	HOUSTONIA SERPYLLIFOLIA	MICHAUX'S BLUETS	E	G4?/S1
Eastern	Bell	VASCULAR PLANTS	MELANTHIUM PARVIFLORUM	APPALACHIAN BUNCHFLOWER	E	G4?/S1
Eastern	Bell	VASCULAR PLANTS	MELAMPYRUM LINEARE VAR LATIFOLIUM	AMERICAN COWWHEAT	T	G5T5/S2
Eastern	Bell	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Eastern	Bell	VASCULAR PLANTS	MAIANTHEMUM CANADENSE	WILD LILY-OF-THE-VALLEY	T	G5/S2
Eastern	Bell	VASCULAR PLANTS	LISTERA SMALLII	KIDNEY-LEAF TWAYBLADE	T	G4/S2
Eastern	Bell	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3

Eastern	Bell	VASCULAR PLANTS	HYPERICUM PSEUDOMACULATUM	LARGE SPOTTED ST. JOHN'S-WORT	H	G5?/SH
Eastern	Bell	VASCULAR PLANTS	MONOTROPSIS ODORATA	SWEET PINESAP	T	G3/S2
Eastern	Bell	VASCULAR PLANTS	GNAPHALIUM HELLERI VAR MICRADENIUM	SMALL RABBIT TOBACCO	H	G4G5T3?/SH
Eastern	Bell	VASCULAR PLANTS	WOODSIA APPALACHIANA	APPALACHIAN WOODSIA	E	G4/S1
Eastern	Bell	VASCULAR PLANTS	VITIS RUPESTRIS	SAND GRAPE	T	G3/S2
Eastern	Bell	VASCULAR PLANTS	LATHYRUS VENOSUS	SMOOTH VEINY PEAVINE	S	G5/S2S3
Eastern	Bell	VASCULAR PLANTS	ORONTIUM AQUATICUM	GOLDEN CLUB	T	G5/S2
Eastern	Bell	VASCULAR PLANTS	POLYGALA NUTTALLII	NUTTALL'S MILKWORT	H	G5/SH
Eastern	Bell	VASCULAR PLANTS	SALVIA URTICIFOLIA	NETTLE-LEAF SAGE	E	G5/S1
Eastern	Bell	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Eastern	Bell	VASCULAR PLANTS	SILENE OVATA	OVATE CATCHFLY	E	G2G3/S1S2
Eastern	Bell	VASCULAR PLANTS	SOLIDAGO CURTISII	CURTIS' GOLDENROD	T	G5T4T5/S2S3
Eastern	Bell	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Eastern	Bell	VASCULAR PLANTS	SOLIDAGO ROANENSIS	ROAN MOUNTAIN GOLDENROD	T	G4G5/S1S2
Eastern	Bell	VASCULAR PLANTS	STACHYS EPLINGII	EPLING'S HEDGENETTLE	E	G5/S1
Eastern	Bell	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Eastern	Bell	VASCULAR PLANTS	GENTIANA DECORA	SHOWY GENTIAN	S	G4?/S3
Eastern	Bell	VASCULAR PLANTS	TRILLIUM UNDULATUM	PAINTED TRILLIUM	T	G5/S2
Eastern	Bell	VASCULAR PLANTS	CONVALLARIA MONTANA	AMERICAN LILY-OF-THE-VALLEY	E	G4/S1
Eastern	Bell	VASCULAR PLANTS	HEXASTYLIS HETEROPHYLLA	VARIABLE-LEAVED HEARTLEAF	S	G4G5Q/S3
Eastern	Bell	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Eastern	Bell	VASCULAR PLANTS	ADLUMIA FUNGOSA	ALLEGHENY-VINE	E	G4/S1
Eastern	Bell	VASCULAR PLANTS	AMIANTHIUM MUSCITOXICUM	FLY POISON	T	G4G5/S1S2
Eastern	Bell	VASCULAR PLANTS	DISPORUM MACULATUM	NODDING MANDARIN	S	G3G4/S3?
Eastern	Bell	VASCULAR PLANTS	DESCHAMPSIA FLEXUOSA	CRINKLED HAIRGRASS	T	G5/S2
Eastern	Bell	VASCULAR PLANTS	CORYDALIS SEMPERVIRENS	ROCK HARLEQUIN	S	G4G5/S3?
Eastern	Bell	VASCULAR PLANTS	BAPTISIA TINCTORIA	YELLOW WILD INDIGO	T	G5/S1S2
Eastern	Bell	VASCULAR PLANTS	CHELONE OBLIQUA VAR OBLIQUA	RED TURTLEHEAD	E	G4T3T4/S1
Eastern	Bell	VASCULAR PLANTS	CAREX HYSTERICINA	PORCUPINE SEDGE	H	G5/SH
Eastern	Bell	VASCULAR PLANTS	CALAMAGROSTIS PORTERI SSP PORTERI	PORTER'S REEDGRASS	T	G4T4/S2S3
Eastern	Bell	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Eastern	Bell	VASCULAR PLANTS	CHRYSOSPLENIUM AMERICANUM	AMERICAN GOLDEN-SAXIFRAGE	E	G5/S1
Eastern	Harlan	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Harlan	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Eastern	Harlan	BIRDS	FALCO PEREGRINUS	PEREGRINE FALCON	E	G4/S1B,SZN
Eastern	Harlan	BIRDS	VERMIVORA CHRYSOPTERA	GOLDEN-WINGED WARBLER	T	G4/S2B
Eastern	Harlan	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Eastern	Harlan	BIRDS	DENDROICA FUSCA	BLACKBURNIAN WARBLER	T	G5/S1S2B

Eastern	Harlan	BIRDS	JUNCO HYEMALIS	DARK-EYED JUNCO	S	G5/S2S3B ,S5N
Eastern	Harlan	BIRDS	PHEUCTICUS LUDOVICIANUS	ROSE-BREASTED GROSBEAK	S	G5/S3S4B
Eastern	Harlan	BIRDS	WILSONIA CANADENSIS	CANADA WARBLER	S	G5/S3B
Eastern	Harlan	BIRDS	CORVUS CORAX	COMMON RAVEN	E	G5/S1
Eastern	Harlan	BIRDS	EMPIDONAX MINIMUS	LEAST FLYCATCHER	E	G5/S1B
Eastern	Harlan	FISHES	ETHEOSTOMA NIGRUM SUSANAE	JOHNNY DARTER	E/C	G2/S1
Eastern	Harlan	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Eastern	Harlan	GASTROPODS	ANGUISPIRA RUGODERMA	PINE MOUNTAIN TIGERSNAIL	T	G?/S2
Eastern	Harlan	GASTROPODS	VERTIGO BOLLESIANA	DELICATE VERTIGO	E	G3/S1
Eastern	Harlan	GASTROPODS	PILSBRYNA SP 1	A SNAIL	E	G?/S1
Eastern	Harlan	GASTROPODS	VITRINIZONITES LATISSIMUS	GLASSY GRAPESKIN	T	G4/S1
Eastern	Harlan	GASTROPODS	NEOHELIX DENTIFERA	BIG-TOOTH WHITELIP	T	G4/S2
Eastern	Harlan	GASTROPODS	GLYPHYALINIA RHOADSI	SCULPTED GLYPH	T	G5/S1
Eastern	Harlan	GASTROPODS	VERTIGO CLAPPI	CUPPED VERTIGO	E	G2/S1
Eastern	Harlan	GASTROPODS	MESOMPHIX RUGELI	WRINKLED BUTTON	T	G3G4/S2
Eastern	Harlan	INSECTS	PSEUDANOPHTHALMUS SCHOLASTICUS	SCHOLARLY CAVE BEETLE	T	G1G2/S1
Eastern	Harlan	INSECTS	AMPHIAGRION SAUCIUM	EASTERN RED DAMSEL	N	G5/S1
Eastern	Harlan	INSECTS	ERORA LAETA	EARLY HAIRSTREAK	S	G3G4/S1
Eastern	Harlan	INSECTS	PYRGUS WYANDOT	APPALACHIAN GRIZZLED SKIPPER	T	G2/S1
Eastern	Harlan	INSECTS	PSEUDANOPHTHALMUS ROGERSAE	ROGERS' CAVE BEETLE	T	G1G2/S1
Eastern	Harlan	INSECTS	CALLOPHRYS IRUS	FROSTED ELFIN	S	G3/S1
Eastern	Harlan	INSECTS	POLYGONIA PROGNE	GRAY COMMA	H	G5/SH
Eastern	Harlan	INSECTS	PHYCIODES BATESII	TAWNY CRESCENT	H	G4/SH
Eastern	Harlan	MAMMALS	CLETHRIONOMYS GAPPERI MAURUS	KENTUCKY RED-BACKED VOLE	S	G5T3T4/S 3
Eastern	Harlan	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Eastern	Harlan	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Eastern	Harlan	MAMMALS	SOREX CINEREUS	CINEREUS SHREW	S	G5/S3
Eastern	Harlan	MAMMALS	SOREX DISPAR BLITCHI	LONG-TAILED SHREW	E	G4T3?/S1
Eastern	Harlan	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Eastern	Harlan	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Eastern	Harlan	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Eastern	Harlan	NONVASCULAR PLANTS	NECKERA PENNATA		T	G5/S2?
Eastern	Harlan	NONVASCULAR PLANTS	HERZOGIELLA TURFACEA		E	G4G5/S1?
Eastern	Harlan	NONVASCULAR PLANTS	POLYTRICHUM STRICTUM		E	G5/S1?
Eastern	Harlan	NONVASCULAR PLANTS	ONCOPHORUS RAUI		E	G3/S1?
Eastern	Harlan	NONVASCULAR PLANTS	ENTODON BREVISETUS		E	G4?/S1?
Eastern	Harlan	NONVASCULAR PLANTS	ANOMODON RUGELII		T	G5/S2?
Eastern	Harlan	PALUSTRINE COMMUNITIES	APPALACHIAN ACID SEEP		N	S2
Eastern	Harlan	REPTILES	EUMECES ANTHRACINUS ANTHRACINUS	NORTHERN COAL SKINK	T	G5T5/S2
Eastern	Harlan	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Eastern	Harlan	TERRESTRIAL COMMUNITIES	XERIC ACIDIC FOREST		N	S5
Eastern	Harlan	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Eastern	Harlan	TERRESTRIAL COMMUNITIES	APPALACHIAN PINE-OAK FOREST		N	S5
Eastern	Harlan	TERRESTRIAL COMMUNITIES	PINE SAVANNA-WOODLAND		N	S1
Eastern	Harlan	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Eastern	Harlan	TERRESTRIAL COMMUNITIES	CUMBERLAND HIGHLANDS FOREST		N	S2

Eastern	Harlan	TERRESTRIAL COMMUNITIES	CUMBERLAND MOUNTAINS XERIC VIRGINIA PINE WOODLAND			
Eastern	Harlan	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Eastern	Harlan	VASCULAR PLANTS	ADLUMIA FUNGOSA	ALLEGHENY-VINE	E	G4/S1
Eastern	Harlan	VASCULAR PLANTS	ACER SPICATUM	MOUNTAIN MAPLE	E	G5/S1S2
Eastern	Harlan	VASCULAR PLANTS	HYPERICUM PSEUDOMACULATUM	LARGE SPOTTED ST. JOHN'S-WORT	H	G5?/SH
Eastern	Harlan	VASCULAR PLANTS	EUPATORIUM MACULATUM	SPOTTED JOE-PYE WEED	H	G5/SH
Eastern	Harlan	VASCULAR PLANTS	MELAMPYRUM LINEARE VAR LATIFOLIUM	AMERICAN COWWHEAT	T	G5T5/S2
Eastern	Harlan	VASCULAR PLANTS	MAIANTHEMUM CANADENSE	WILD LILY-OF-THE-VALLEY	T	G5/S2
Eastern	Harlan	VASCULAR PLANTS	LYCOPODIUM INUNDATUM	NORTHERN BOG CLUBMOSS	E	G5/S1S2
Eastern	Harlan	VASCULAR PLANTS	LYCOPODIUM CLAVATUM	RUNNING PINE	E	G5/S1?
Eastern	Harlan	VASCULAR PLANTS	LYCOPODIELLA APPRESSA	SOUTHERN BOG CLUBMOSS	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3
Eastern	Harlan	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Eastern	Harlan	VASCULAR PLANTS	MINUARTIA GLABRA	APPALACHIAN SANDWORT	T	G4/S1S2
Eastern	Harlan	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Eastern	Harlan	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Eastern	Harlan	VASCULAR PLANTS	HEXASTYLIS HETEROPHYLLA	VARIABLE-LEAVED HEARTLEAF	S	G4G5Q/S3
Eastern	Harlan	VASCULAR PLANTS	HERACLEUM LANATUM	COW-PARSNIP	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	HELIANTHEMUM CANADENSE	CANADA FROSTWEED	E	G5/S1?
Eastern	Harlan	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Eastern	Harlan	VASCULAR PLANTS	GENTIANA DECORA	SHOWY GENTIAN	S	G4?/S3
Eastern	Harlan	VASCULAR PLANTS	EUPATORIUM STEELEI	STEELE'S JOE-PYE WEED	E	G4/S1?
Eastern	Harlan	VASCULAR PLANTS	LATHYRUS VENOSUS	SMOOTH VEINY PEAVINE	S	G5/S2S3
Eastern	Harlan	VASCULAR PLANTS	SAXIFRAGA MICHAUXII	MICHAUX'S SAXIFRAGE	T	G4G5/S2
Eastern	Harlan	VASCULAR PLANTS	AGRIMONIA GRYPOSEPALA	TALL HAIRY GROOVEBUR	T	G5/S1S2
Eastern	Harlan	VASCULAR PLANTS	VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	S	G5/S3
Eastern	Harlan	VASCULAR PLANTS	TRILLIUM UNDULATUM	PAINTED TRILLIUM	T	G5/S2
Eastern	Harlan	VASCULAR PLANTS	STREPTOPUS ROSEUS VAR PERSPECTUS	ROSY TWISTED-STALK	E	G5T5?/S1
Eastern	Harlan	VASCULAR PLANTS	STACHYS EPLINGII	EPLING'S HEDGENETTLE	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	SOLIDAGO ROANENSIS	ROAN MOUNTAIN GOLDENROD	T	G4G5/S1S2
Eastern	Harlan	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Eastern	Harlan	VASCULAR PLANTS	SOLIDAGO CURTISII	CURTIS' GOLDENROD	T	G5T4T5/S2S3
Eastern	Harlan	VASCULAR PLANTS	MELANTHIUM PARVIFLORUM	APPALACHIAN BUNCHFLOWER	E	G4?/S1
Eastern	Harlan	VASCULAR PLANTS	SAXIFRAGA MICRANTHIDIFOLIA	LETTUCE-LEAF SAXIFRAGE	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	OENOTHERA OAKESIANA	EVENING PRIMROSE	H	G4G5Q/SH
Eastern	Harlan	VASCULAR PLANTS	SAMBUCUS RACEMOSA SSP PUBENS	RED ELDERBERRY	E	G5T4T5/S1S2
Eastern	Harlan	VASCULAR PLANTS	RUBUS CANADENSIS	SMOOTH BLACKBERRY	E	G5/S1?

Eastern	Harlan	VASCULAR PLANTS	PYROLA AMERICANA	AMERICAN WINTERGREEN	H	G5/SH
Eastern	Harlan	VASCULAR PLANTS	PRENANTHES ALBA	WHITE RATTLESNAKE-ROOT	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Eastern	Harlan	VASCULAR PLANTS	PLATANTHERA PSYCODES	SMALL PURPLE-FRINGED ORCHID	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	SILENE OVATA	OVATE CATCHFLY	E	G2G3/S1S2
Eastern	Harlan	VASCULAR PLANTS	CYMOPHYLLUS FRASERIANUS	FRASER'S SEDGE	E	G4/S1
Eastern	Harlan	VASCULAR PLANTS	CAREX ROANENSIS		E	G2/S1
Eastern	Harlan	VASCULAR PLANTS	CASTANEA DENTATA	AMERICAN CHESTNUT	E	G4/S1?
Eastern	Harlan	VASCULAR PLANTS	CHELONE OBLIQUA VAR OBLIQUA	RED TURTLEHEAD	E	G4T3T4/S1
Eastern	Harlan	VASCULAR PLANTS	CHRYSOSPLENIUM AMERICANUM	AMERICAN GOLDEN-SAXIFRAGE	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	CAREX APPALACHICA	APPALACHIAN SEDGE	T	G4/S2?
Eastern	Harlan	VASCULAR PLANTS	CORALLORHIZA MACULATA	SPOTTED CORALROOT	E	G5/S1
Eastern	Harlan	VASCULAR PLANTS	CAREX AESTIVALIS	SUMMER SEDGE	E	G4/S1
Eastern	Harlan	VASCULAR PLANTS	CORYDALIS SEMPERVIRENS	ROCK HARLEQUIN	S	G4G5/S3?
Eastern	Harlan	VASCULAR PLANTS	BOYKINIA ACONITIFOLIA	BROOK SAXIFRAGE	T	G4/S2
Eastern	Harlan	VASCULAR PLANTS	CAREX LEPTONERVIA	FINELY-NERVED SEDGE	E	G4/S1
Eastern	Harlan	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Eastern	Harlan	VASCULAR PLANTS	CAREX AUSTROCAROLINIANA	TARHEEL SEDGE	S	G4/S3
Eastern	Harlan	VASCULAR PLANTS	PARONYCHIA ARGYROCOMA	SILVERLING	E	G4/S1
Eastern	Harlan	VASCULAR PLANTS	ANGELICA TRIQUINATA	FILMY ANGELICA	E	G4/S1S2
Eastern	Harlan	VASCULAR PLANTS	BOTRYCHIUM ONEIDENSE	BLUNT-LOBE GRAPE-FERN	E	G4Q/S1
Eastern	Harlan	VASCULAR PLANTS	ERIOPHORUM VIRGINICUM	TAWNY COTTON-GRASS	E	G5/S1?
Eastern	Harlan	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Eastern	Harlan	VASCULAR PLANTS	AMIANTHIUM MUSCITOXICUM	FLY POISON	T	G4G5/S1S2
Eastern	Harlan	VASCULAR PLANTS	ASTER ACUMINATUS VAR ACUMINATUS	WHORLED ASTER	T	G5T5?/S2S3
Eastern	Harlan	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Eastern	Harlan	VASCULAR PLANTS	DISPORUM MACULATUM	NODDING MANDARIN	S	G3G4/S3?
Eastern	Harlan	VASCULAR PLANTS	DESCHAMPSIA FLEXUOSA	CRINKLED HAIRGRASS	T	G5/S2
Eastern	Harlan	VASCULAR PLANTS	BAPTISIA TINCTORIA	YELLOW WILD INDIGO	T	G5/S1S2
Eastern	Knott	BIRDS	CORVUS CORAX	COMMON RAVEN	E	G5/S1
Eastern	Knott	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Knott	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Eastern	Knott	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Eastern	Knott	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3
Eastern	Knott	VASCULAR PLANTS	SILPHIUM WASIOTENSE	APPALACHIAN ROSIN-WEED	S	G3?/S3?
Eastern	Knott	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Eastern	Knox	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Eastern	Knox	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Knox	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3

Eastern	Knox	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Eastern	Knox	BIVALVES	ANODONTOIDES DENIGRATUS	CUMBERLAND PAPERSHELL	E	G1/S1
Eastern	Knox	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Eastern	Knox	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Eastern	Knox	INSECTS	POLYGONIA PROGNE	GRAY COMMA	H	G5/SH
Eastern	Knox	INSECTS	POLYGONIA FAUNUS	GREEN COMMA	H	G5/SH
Eastern	Knox	INSECTS	SPEYERIA IDALIA	REGAL FRITILLARY	H	G3/SH
Eastern	Knox	PALUSTRINE COMMUNITIES	RIPARIAN FOREST		N	S5
Eastern	Knox	VASCULAR PLANTS	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	T	G4G5/S2
Eastern	Knox	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Eastern	Knox	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Eastern	Knox	VASCULAR PLANTS	SOLIDAGO CURTISII	CURTIS' GOLDENROD	T	G5T4T5/S2S3
Eastern	Knox	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2
Eastern	Knox	VASCULAR PLANTS	SABATIA CAMPANULATA	SLENDER MARSH PINK	E	G5/S1
Eastern	Knox	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Eastern	Knox	VASCULAR PLANTS	BOYKINIA ACONITIFOLIA	BROOK SAXIFRAGE	T	G4/S2
Eastern	Knox	VASCULAR PLANTS	GRATIOLA VISCIDULA	SHORT'S HEDGEHYSSOP	S	G4G5/S3
Eastern	Knox	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Eastern	Knox	VASCULAR PLANTS	ACONITUM UNCINATUM	BLUE MONKSHOOD	T	G4/S2
Eastern	Knox	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Eastern	Letcher	AMPHIBIANS	PLETHODON WEHRLEI	WEHRLE'S SALAMANDER	E	G5/S1
Eastern	Letcher	BIRDS	CORVUS CORAX	COMMON RAVEN	E	G5/S1
Eastern	Letcher	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Eastern	Letcher	BIRDS	PHEUCTICUS LUDOVICIANUS	ROSE-BREASTED GROSBEAK	S	G5/S3S4B
Eastern	Letcher	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Letcher	BIRDS	EMPIDONAX MINIMUS	LEAST FLYCATCHER	E	G5/S1B
Eastern	Letcher	CRUSTACEANS	CAMBARUS PARVOCULUS	A CRAYFISH	E	G4/S1
Eastern	Letcher	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Eastern	Letcher	FISHES	ETHEOSTOMA NIGRUM SUSANAE	JOHNNY DARTER	E/C	G2/S1
Eastern	Letcher	GASTROPODS	PATERA PANSELENUS	VIRGINIA BLADETOOTH	S	G3G4/S1
Eastern	Letcher	GASTROPODS	GLYPHYALINIA RHOADSI	SCULPTED GLYPH	T	G5/S1
Eastern	Letcher	INSECTS	LITOBRANCHA RECURVATA	A BURROWING MAYFLY	S	G5/S1
Eastern	Letcher	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Eastern	Letcher	INSECTS	ERORA LAETA	EARLY HAIRSTREAK	S	G3G4/S1
Eastern	Letcher	MAMMALS	SOREX DISPAR BLITCHI	LONG-TAILED SHREW	E	G4T3?/S1
Eastern	Letcher	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Eastern	Letcher	MAMMALS	SOREX CINEREUS	CINEREUS SHREW	S	G5/S3
Eastern	Letcher	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Eastern	Letcher	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Eastern	Letcher	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Eastern	Letcher	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Eastern	Letcher	MAMMALS	CLETHRIONOMYS GAPPERI MAURUS	KENTUCKY RED-BACKED VOLE	S	G5T3T4/S3
Eastern	Letcher	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Eastern	Letcher	NONVASCULAR PLANTS	SPHAGNUM QUINQUEFARIUM	A SPHAGNUM MOSS	E	G5/S1?
Eastern	Letcher	NONVASCULAR PLANTS	ONCOPHORUS RAUI		E	G3/S1?

Eastern	Letcher	NONVASCULAR PLANTS	POLYTRICHUM STRICTUM		E	G5/S1?
Eastern	Letcher	NONVASCULAR PLANTS	POLYTRICHUM PALLIDISETUM	A HAIR CAP MOSS	T	G4/S2?
Eastern	Letcher	NONVASCULAR PLANTS	ENTODON BREVISETUS		E	G4?/S1?
Eastern	Letcher	NONVASCULAR PLANTS	ANOMODON RUGELII		T	G5/S2?
Eastern	Letcher	NONVASCULAR PLANTS	CIRRIPHYLLUM PILIFERUM		T	G5/S2?
Eastern	Letcher	NONVASCULAR PLANTS	NECKERA PENNATA		T	G5/S2?
Eastern	Letcher	NONVASCULAR PLANTS	DICRANODONTIUM ASPERULUM		E	G4G5/S1?
Eastern	Letcher	PALUSTRINE COMMUNITIES	APPALACHIAN ACID SEEP		N	S2
Eastern	Letcher	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Eastern	Letcher	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Eastern	Letcher	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Eastern	Letcher	VASCULAR PLANTS	LEUCOTHOE RECURVA	REDTWIG DOGHOBBLE	E	G4G5/S1
Eastern	Letcher	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Eastern	Letcher	VASCULAR PLANTS	HOUSTONIA SERPYLLIFOLIA	MICHAUX'S BLUETS	E	G4?/S1
Eastern	Letcher	VASCULAR PLANTS	HEXASTYLIS HETEROPHYLLA	VARIABLE-LEAVED HEARTLEAF	S	G4G5Q/S3
Eastern	Letcher	VASCULAR PLANTS	HEXASTYLIS CONTRACTA	SOUTHERN HEARTLEAF	E	G3/S1
Eastern	Letcher	VASCULAR PLANTS	GENTIANA DECORA	SHOWY GENTIAN	S	G4?/S3
Eastern	Letcher	VASCULAR PLANTS	EUPATORIUM STEELEI	STEELE'S JOE-PYE WEED	E	G4/S1?
Eastern	Letcher	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Eastern	Letcher	VASCULAR PLANTS	SAXIFRAGA MICRANTHIDIFOLIA	LETTUCE-LEAF SAXIFRAGE	E	G5/S1
Eastern	Letcher	VASCULAR PLANTS	SAXIFRAGA MICHAUXII	MICHAUX'S SAXIFRAGE	T	G4G5/S2
Eastern	Letcher	VASCULAR PLANTS	SANGUISORBA CANADENSIS	CANADA BURNET	E	G5/S1
Eastern	Letcher	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Eastern	Letcher	VASCULAR PLANTS	ORONTIUM AQUATICUM	GOLDEN CLUB	T	G5/S2
Eastern	Letcher	VASCULAR PLANTS	OENOTHERA PERENNIS	SMALL SUNDROPS	E	G5/S1S2
Eastern	Letcher	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Eastern	Letcher	VASCULAR PLANTS	SOLIDAGO ROANENSIS	ROAN MOUNTAIN GOLDENROD	T	G4G5/S1S2
Eastern	Letcher	VASCULAR PLANTS	MONOTROPSIS ODORATA	SWEET PINESAP	T	G3/S2
Eastern	Letcher	VASCULAR PLANTS	CYMOPHYLLUS FRASERIANUS	FRASER'S SEDGE	E	G4/S1
Eastern	Letcher	VASCULAR PLANTS	LISTERA SMALLII	KIDNEY-LEAF TWAYBLADE	T	G4/S2
Eastern	Letcher	VASCULAR PLANTS	POGONIA OPHIOGLOSSOIDES	ROSE POGONIA	E	G5/S1
Eastern	Letcher	VASCULAR PLANTS	BAPTISIA TINCTORIA	YELLOW WILD INDIGO	T	G5/S1S2
Eastern	Letcher	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Eastern	Letcher	VASCULAR PLANTS	DISPORUM MACULATUM	NODDING MANDARIN	S	G3G4/S3?
Eastern	Letcher	VASCULAR PLANTS	TRILLIUM UNDULATUM	PAINTED TRILLIUM	T	G5/S2
Eastern	Letcher	VASCULAR PLANTS	BOTRYCHIUM MATRICARIIFOLIUM	MATRICARY GRAPE-FERN	E	G5/S1
Eastern	Letcher	VASCULAR PLANTS	CAREX APPALACHICA	APPALACHIAN SEDGE	T	G4/S2?

Eastern	Letcher	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Eastern	Letcher	VASCULAR PLANTS	BOYKINIA ACONITIFOLIA	BROOK SAXIFRAGE	T	G4/S2
Eastern	Letcher	VASCULAR PLANTS	CAREX AESTIVALIS	SUMMER SEDGE	E	G4/S1
Eastern	Letcher	VASCULAR PLANTS	ASTER ACUMINATUS VAR ACUMINATUS	WHORLED ASTER	T	G5T5?/S2S3
Eastern	Letcher	VASCULAR PLANTS	CORYDALIS SEMPERVIRENS	ROCK HARLEQUIN	S	G4G5/S3?
Eastern	Letcher	VASCULAR PLANTS	ADLUMIA FUNGOSA	ALLEGHENY-VINE	E	G4/S1
Eastern	Letcher	VASCULAR PLANTS	ANGELICA TRIQUINATA	FILMY ANGELICA	E	G4/S1S2
Eastern	Letcher	VASCULAR PLANTS	SOLIDAGO CURTISII	CURTIS' GOLDENROD	T	G5T4T5/S2S3
Eastern	Letcher	VASCULAR PLANTS	CIRCAEA ALPINA	SMALL ENCHANTER'S NIGHTSHADE	S	G5/S3
Eastern	Perry	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Perry	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Eastern	Perry	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Eastern	Perry	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Eastern	Perry	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Eastern	Perry	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Eastern	Perry	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Eastern	Perry	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Eastern	Perry	VASCULAR PLANTS	SILPHIUM WASIOTENSE	APPALACHIAN ROSIN-WEED	S	G3?/S3?
Eastern	Perry	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Eastern	Perry	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Eastern	Pike	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Eastern	Pike	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Pike	CRUSTACEANS	CAMBARUS VETERANUS	A CRAYFISH	S	G3G4/S1
Eastern	Pike	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Eastern	Pike	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Eastern	Pike	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Eastern	Pike	FISHES	RHINICHTHYS CATARACTAE	LONGNOSE DACE	E	G5/S1
Eastern	Pike	GASTROPODS	GLYPHYALINIA RHOADSI	SCULPTED GLYPH	T	G5/S1
Eastern	Pike	GASTROPODS	PATERA PANSELENUS	VIRGINIA BLADETOOTH	S	G3G4/S1
Eastern	Pike	INSECTS	PSEUDANOPHTHALMUS HYPOLITHOS	ASHCAMP CAVE BEETLE	T	G1G2/S2
Eastern	Pike	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Eastern	Pike	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Eastern	Pike	VASCULAR PLANTS	ADLUMIA FUNGOSA	ALLEGHENY-VINE	E	G4/S1
Eastern	Pike	VASCULAR PLANTS	CORYDALIS SEMPERVIRENS	ROCK HARLEQUIN	S	G4G5/S3?
Eastern	Pike	VASCULAR PLANTS	SOLIDAGO SQUARROSA	SQUARROSE GOLDENROD	H	G4?/SH
Eastern	Pike	VASCULAR PLANTS	SPIRAEA ALBA	NARROW-LEAVED MEADOW-SWEET	E	G5/S1
Eastern	Pike	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3
Eastern	Pike	VASCULAR PLANTS	THUJA OCCIDENTALIS	NORTHERN WHITE CEDAR	T	G5/S2S3
Eastern	Pike	VASCULAR PLANTS	HEXASTYLIS HETEROPHYLLA	VARIABLE-LEAVED HEARTLEAF	S	G4G5Q/S3
Eastern	Pike	VASCULAR PLANTS	DISPORUM MACULATUM	NODDING MANDARIN	S	G3G4/S3?
Eastern	Pike	VASCULAR PLANTS	CHRYSOSPLENIUM AMERICANUM	AMERICAN GOLDEN-SAXIFRAGE	E	G5/S1

Eastern	Pike	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Eastern	Pike	VASCULAR PLANTS	BOYKINIA ACONITIFOLIA	BROOK SAXIFRAGE	T	G4/S2
Eastern	Pike	VASCULAR PLANTS	TRILLIUM UNDULATUM	PAINTED TRILLIUM	T	G5/S2
Eastern	Pike	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Eastern	Pike	VASCULAR PLANTS	AGRIMONIA GRYPOSEPALA	TALL HAIRY GROOVEBUR	T	G5/S1S2
Eastern	Pike	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Eastern	Pike	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Eastern	Whitley	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Eastern	Whitley	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Eastern	Whitley	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Eastern	Whitley	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Eastern	Whitley	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Eastern	Whitley	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Eastern	Whitley	BIVALVES	ALASMIDONTA ATROPURPUREA	CUMBERLAND ELKTOE	E/LE	G1G2/S1
Eastern	Whitley	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Eastern	Whitley	BIVALVES	ANODONTOIDES DENIGRATUS	CUMBERLAND PAPERSHELL	E	G1/S1
Eastern	Whitley	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Eastern	Whitley	BIVALVES	EPIOBLASMA CAPSAEFORMIS	OYSTER MUSSEL	E/LE	G1/S1
Eastern	Whitley	CRUSTACEANS	CAMBARUS PARVOCULUS	A CRAYFISH	E	G4/S1
Eastern	Whitley	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Eastern	Whitley	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Eastern	Whitley	FISHES	ETHEOSTOMA NIGRUM SUSANAE	JOHNNY DARTER	E/C	G2/S1
Eastern	Whitley	GASTROPODS	FUMONELIX WETHERBYI	CLIFTY COVERT	S	G?/S2
Eastern	Whitley	INSECTS	POLYGONIA FAUNUS	GREEN COMMA	H	G5/SH
Eastern	Whitley	INSECTS	POLYGONIA PROGNE	GRAY COMMA	H	G5/SH
Eastern	Whitley	INSECTS	MANOPHYLAX BUTLERI	A LIMNEPHILID CADDISFLY	S	G2/S2
Eastern	Whitley	INSECTS	LYTROSIS PERMAGNARIA	A GEOMETRID MOTH	E	G3G4/S1
Eastern	Whitley	INSECTS	AMPHIAGRION SAUCIUM	EASTERN RED DAMSEL	N	G5/S1
Eastern	Whitley	INSECTS	SPEYERIA IDALIA	REGAL FRITILLARY	H	G3/SH
Eastern	Whitley	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Eastern	Whitley	INSECTS	PSEUDANOPHTHALMUS CALCAREUS	LIMESTONE CAVE BEETLE	T	G1G2/S1
Eastern	Whitley	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Eastern	Whitley	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Eastern	Whitley	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Eastern	Whitley	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Eastern	Whitley	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Eastern	Whitley	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Eastern	Whitley	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Eastern	Whitley	PALUSTRINE COMMUNITIES	RIPARIAN FOREST		N	S5
Eastern	Whitley	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Eastern	Whitley	REPTILES	OPHISAURUS ATTENUATUS LONGICAUDUS	EASTERN SLENDER GLASS LIZARD	T	G5T5/S2
Eastern	Whitley	REPTILES	LAMPROPELTIS TRIANGULUM ELAPSOIDES	SCARLET KINGSNAKE	S	G5T5/S3
Eastern	Whitley	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Eastern	Whitley	RIVERINE COMMUNITIES	CUMBERLAND PLATEAU GRAVEL/COBBLE BAR		N	S2
Eastern	Whitley	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Eastern	Whitley	TERRESTRIAL COMMUNITIES	APPALACHIAN PINE-OAK FOREST		N	S5

Eastern	Whitley	TERRESTRIAL COMMUNITIES	XEROHYDRIC FLATWOODS		N	S1
Eastern	Whitley	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Eastern	Whitley	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Eastern	Whitley	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Eastern	Whitley	VASCULAR PLANTS	HOUSTONIA SERPYLLIFOLIA	MICHAUX'S BLUETS	E	G4?/S1
Eastern	Whitley	VASCULAR PLANTS	SOLIDAGO GRACILLIMA	SOUTHERN BOG GOLDENROD	S	G4?/S2?
Eastern	Whitley	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Eastern	Whitley	VASCULAR PLANTS	SCLERIA CILIATA VAR CILIATA	FRINGED NUTRUSH	E	G5T?/S1?
Eastern	Whitley	VASCULAR PLANTS	SABATIA CAMPANULATA	SLENDER MARSH PINK	E	G5/S1
Eastern	Whitley	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Eastern	Whitley	VASCULAR PLANTS	EUPATORIUM SEMISERRATUM	SMALL-FLOWER THOROUGHWORT	E	G5/S1?
Eastern	Whitley	VASCULAR PLANTS	RHYNCHOSIA TOMENTOSA	HAIRY SNOUTBEAN	E	G5/S1
Eastern	Whitley	VASCULAR PLANTS	GRATIOLA PILOSA	SHAGGY HEDGE HYSSOP	T	G5?/S2
Eastern	Whitley	VASCULAR PLANTS	PLATANTHERA INTEGRILABIA	WHITE FRINGELESS ORCHID	T/C	G2G3/S1S2
Eastern	Whitley	VASCULAR PLANTS	GRATIOLA VISCIDULA	SHORT'S HEDGEHYSSOP	S	G4G5/S3
Eastern	Whitley	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Eastern	Whitley	VASCULAR PLANTS	HEXASTYLIS CONTRACTA	SOUTHERN HEARTLEAF	E	G3/S1
Eastern	Whitley	VASCULAR PLANTS	BAPTISIA TINCTORIA	YELLOW WILD INDIGO	T	G5/S1S2
Eastern	Whitley	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Eastern	Whitley	VASCULAR PLANTS	LATHYRUS PALUSTRIS	VETCHLING PEAVINE	T	G5/S2
Eastern	Whitley	VASCULAR PLANTS	LATHYRUS VENOSUS	SMOOTH VEINY PEAVINE	S	G5/S2S3
Eastern	Whitley	VASCULAR PLANTS	LEIOPHYLLUM BUXIFOLIUM	SAND-MYRTLE	H	G4/SH
Eastern	Whitley	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Eastern	Whitley	VASCULAR PLANTS	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	T	G4G5/S2
Eastern	Whitley	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Eastern	Whitley	VASCULAR PLANTS	POLYGALA CRUCIATA	CROSSLEAF MILKWORT	E	G5/S1
Eastern	Whitley	VASCULAR PLANTS	ORONTIUM AQUATICUM	GOLDEN CLUB	T	G5/S2
Eastern	Whitley	VASCULAR PLANTS	CORYDALIS SEMPERVIRENS	ROCK HARLEQUIN	S	G4G5/S3?
Eastern	Whitley	VASCULAR PLANTS	GYMNOPOGON AMBIGUUS	BEARDED SKELETONGRASS	S	G4/S2S3
Eastern	Whitley	VASCULAR PLANTS	ASTER RADULA	ROUGH-LEAVED ASTER	E	G5/S1?
Eastern	Whitley	VASCULAR PLANTS	TEPHROSIA SPICATA	SPIKED HOARY-PEA	E	G4G5/S1S2
Eastern	Whitley	VASCULAR PLANTS	AGALINIS OBTUSIFOLIA	TEN-LOBE FALSE FOXGLOVE	E	G4G5Q/S1
Eastern	Whitley	VASCULAR PLANTS	AGERATINA LUCIAE-BRAUNIAE	LUCY BRAUN'S WHITE SNAKEROOT	S	G3/S3
Eastern	Whitley	VASCULAR PLANTS	VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	S	G5/S3
Eastern	Whitley	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Eastern	Whitley	VASCULAR PLANTS	PLATANTHERA CRISTATA	YELLOW-CRESTED ORCHID	T	G5/S1S2
Eastern	Whitley	VASCULAR PLANTS	COREOPSIS PUBESCENS	STAR TICKSEED	S	G5?/S2S3

Eastern	Whitley	VASCULAR PLANTS	SPIRAEA VIRGINIANA	VIRGINIA SPIRAEA	T/LT	G2/S2
Eastern	Whitley	VASCULAR PLANTS	ASTER CONCOLOR	EASTERN SILVERY ASTER	T	G4?/S2
Eastern	Whitley	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Eastern	Whitley	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Eastern	Whitley	VASCULAR PLANTS	COLLINSONIA VERTICILLATA	WHORLED HORSE-BALM	E	G3/S1?
Eastern	Whitley	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Eastern	Whitley	VASCULAR PLANTS	CALYCANTHUS FLORIDUS VAR GLAUCUS	EASTERN SWEETSHRUB	T	G5T5/S2
Eastern	Whitley	VASCULAR PLANTS	CHRYSOSPLENIUM AMERICANUM	AMERICAN GOLDEN-SAXIFRAGE	E	G5/S1
Eastern	Whitley	VASCULAR PLANTS	SOLIDAGO SIMPLEX SSP RANDII	RAND'S GOLDENROD	S	G5T5?/S3
Eastern	Whitley	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Northern	Anderson	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Anderson	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Anderson	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Anderson	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Anderson	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Anderson	VASCULAR PLANTS	VIBURNUM MOLLE	SOFTLEAF ARROW-WOOD	T	G5/S3?
Northern	Anderson	VASCULAR PLANTS	STELLARIA FONTINALIS	WATER STITCHWORT	T	G3/S2
Northern	Anderson	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Anderson	VASCULAR PLANTS	LONICERA RETICULATA	GRAPE HONEYSUCKLE	E	G5/S1
Northern	Anderson	VASCULAR PLANTS	MUHLENBERGIA CUSPIDATA	PLAINS MUHLY	T	G4/S2
Northern	Bath	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Bath	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Bath	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Bath	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Bath	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Northern	Bath	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Bath	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Bath	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Bath	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Bath	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Bath	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Bath	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Northern	Bath	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Bath	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Northern	Bath	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Northern	Bath	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Bath	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Northern	Bath	FISHES	PERCOPSIS OMISCOMAYCUS	TROUT-PERCH	S	G5/S3
Northern	Bath	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Northern	Bath	INSECTS	HABROPHLEBIODES CELETERIA		H	G2/SH
Northern	Bath	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Northern	Bath	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Bath	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3

Northern	Bath	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Northern	Bath	PALUSTRINE COMMUNITIES	APPALACHIAN ACID SEEP		N	S2
Northern	Bath	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Northern	Bath	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Northern	Bath	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Northern	Bath	VASCULAR PLANTS	CAREX SEORSA	WEAK STELLATE SEDGE	S	G4/S2S3
Northern	Bath	VASCULAR PLANTS	POA SALTUENSIS	DROOPING BLUEGRASS	E	G5/S1S2
Northern	Bath	VASCULAR PLANTS	DICHANTHELIUM BOREALE	NORTHERN WITCHGRASS	S	G5/S2S3
Northern	Bath	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Bath	VASCULAR PLANTS	POTAMOGETON PULCHER	SPOTTED PONDWEED	T	G5/S1S2
Northern	Bath	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Northern	Bath	VASCULAR PLANTS	PRENANTHES ALBA	WHITE RATTLESNAKE-ROOT	E	G5/S1
Northern	Bath	VASCULAR PLANTS	ERIOPHORUM VIRGINICUM	TAWNY COTTON-GRASS	E	G5/S1?
Northern	Bath	VASCULAR PLANTS	CAREX JUNIPERORUM	CEDAR SEDGE	E	G2/S1S2
Northern	Bath	VASCULAR PLANTS	CAREX APPALACHICA	APPALACHIAN SEDGE	T	G4/S2?
Northern	Bath	VASCULAR PLANTS	RANUNCULUS AMBIGENS	WATERPLANTAIN SPEARWORT	S	G4/S3
Northern	Bath	VASCULAR PLANTS	SABATIA CAMPANULATA	SLENDER MARSH PINK	E	G5/S1
Northern	Bath	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Northern	Bath	VASCULAR PLANTS	XYRIS DIFFORMIS	CAROLINA YELLOW-EYED-GRASS	E	G5/S1?
Northern	Bath	VASCULAR PLANTS	LESPEDEZA CAPITATA	ROUND-HEAD BUSH-CLOVER	S	G5/S3
Northern	Bath	VASCULAR PLANTS	GRATIOLA VISCIDULA	SHORT'S HEDGEHYSSOP	S	G4G5/S3
Northern	Bath	VASCULAR PLANTS	CALAMAGROSTIS PORTERI SSP PORTERI	PORTER'S REEDGRASS	T	G4T4/S2S3
Northern	Bracken	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Bracken	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Bracken	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Bracken	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Bracken	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Bracken	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Bracken	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Northern	Bracken	FISHES	ATRACTOSTEUS SPATULA	ALLIGATOR GAR	E	G3G4/S1
Northern	Bracken	VASCULAR PLANTS	SCIRPUS MICROCARPUS	SMALL-FRUIT BULRUSH	E	G5/S1
Northern	Bracken	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Northern	Bracken	VASCULAR PLANTS	SIDA HERMAPHRODITA	VIRGINIA MALLOW	S	G2/S2S3
Northern	Bracken	VASCULAR PLANTS	HETERANTHERA DUBIA	GRASSLEAF MUD-PLANTAIN	S	G5/S3
Northern	Bracken	VASCULAR PLANTS	SPARGANIUM EURYCARPUM	LARGE BUR-REED	E	G5/S1?
Northern	Campbell	AMPHIBIANS	PLETHODON CINEREUS	REDBACK SALAMANDER	S	G5/S3
Northern	Campbell	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Campbell	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Campbell	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Campbell	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN

Northern	Campbell	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Northern	Campbell	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Campbell	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Northern	Campbell	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Campbell	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Campbell	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Northern	Campbell	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Northern	Campbell	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Campbell	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Campbell	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Campbell	FISHES	PERCOPSIS OMISCOMAYCUS	TROUT-PERCH	S	G5/S3
Northern	Campbell	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Northern	Campbell	FISHES	ATRACTOSTEUS SPATULA	ALLIGATOR GAR	E	G3G4/S1
Northern	Campbell	FISHES	NOTROPIS HUDSONIUS	SPOTTAIL SHINER	S	G5/SU
Northern	Campbell	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Northern	Campbell	REPTILES	CLONOPHIS KIRTLANDII	KIRTLAND'S SNAKE	T	G2/S2
Northern	Campbell	VASCULAR PLANTS	OENOTHERA TRILOBA	STEMLESS EVENING-PRIMROSE	T	G4/S1S2
Northern	Campbell	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Northern	Campbell	VASCULAR PLANTS	SIDA HERMAPHRODITA	VIRGINIA MALLOW	S	G2/S2S3
Northern	Campbell	VASCULAR PLANTS	EUPATORIUM MACULATUM	SPOTTED JOE-PYE WEED	H	G5/SH
Northern	Carroll	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Carroll	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Carroll	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Northern	Carroll	BIRDS	IXOBRYCHUS EXILIS	LEAST BITTERN	T	G5/S1S2B
Northern	Carroll	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Carroll	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Northern	Carroll	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Carroll	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Carroll	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Northern	Carroll	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Northern	Carroll	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Northern	Carroll	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Northern	Carter	AMPHIBIANS	PLETHODON CINEREUS	REDBACK SALAMANDER	S	G5/S3
Northern	Carter	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Carter	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Carter	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Carter	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Carter	BIVALVES	LASMIGONA COMPRESSA	CREEK HEELSPLITTER	E	G5/S1
Northern	Carter	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Carter	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Northern	Carter	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Carter	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Northern	Carter	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Northern	Carter	FISHES	PERCOPSIS OMISCOMAYCUS	TROUT-PERCH	S	G5/S3
Northern	Carter	GASTROPODS	GLYPHYALINIA RADERI	MARYLAND GLYPH	S	G2/S1
Northern	Carter	INSECTS	CALOPTERYX DIMIDIATA	SPARKLING JEWELWING	N	G5/SH
Northern	Carter	INSECTS	MANOPHYLAX BUTLERI	A LIMNEPHILID CADDISFLY	S	G2/S2
Northern	Carter	INSECTS	OPHIOGOMPHUS HOWEI	PYGMY SNAKETAIL	S	G3/S1S2
Northern	Carter	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3

Northern	Carter	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Carter	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Carter	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Carter	OTHER TYPES	HESPERONEMASTOMA INOPS		S	G1G2/S1S2
Northern	Carter	OTHER TYPES	PSEUDOTREMIA CARTERENSIS		S	G1G2/S1S2
Northern	Carter	TERRESTRIAL COMMUNITIES	PINE SAVANNA-WOODLAND		N	S1
Northern	Carter	TERRESTRIAL COMMUNITIES	VIRGINIA PINE FOREST		N	S5
Northern	Carter	VASCULAR PLANTS	THASPIUM PINNATIFIDUM	CUTLEAF MEADOW-PARSNIP	T	G2G3/S2S3
Northern	Carter	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Northern	Carter	VASCULAR PLANTS	LATHYRUS PALUSTRIS	VETCHLING PEAVINE	T	G5/S2
Northern	Carter	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Northern	Carter	VASCULAR PLANTS	LONICERA DIOICA VAR ORIENTALIS	WILD HONEYSUCKLE	H	G5T?Q/SH
Northern	Carter	VASCULAR PLANTS	MAIANTHEMUM STELLATUM	STARFLOWER FALSE SOLOMON'S-SEAL	E	G5/S1
Northern	Carter	VASCULAR PLANTS	VIOLA WALTERI	WALTER'S VIOLET	T	G4G5/S2
Northern	Carter	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2
Northern	Carter	VASCULAR PLANTS	TAXUS CANADENSIS	CANADIAN YEW	T	G5/S2S3
Northern	Carter	VASCULAR PLANTS	TOXICODENDRON VERNIX	POISON SUMAC	E	G5/S1
Northern	Carter	VASCULAR PLANTS	NAJAS GRACILLIMA	THREAD-LIKE NAIAD	S	G5?/S2S3
Northern	Carter	VASCULAR PLANTS	ERYTHRONIUM ROSTRATUM	YELLOW TROUTLILY	S	G5/S2S3
Northern	Carter	VASCULAR PLANTS	SPIRANTHES OCHROLEUCA	YELLOW NODDING LADIES'-TRESSES	S	G4/S3?
Northern	Carter	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Northern	Carter	VASCULAR PLANTS	CAREX RUGOSPERMA	UMBEL-LIKE SEDGE	T	G5/S2?
Northern	Carter	VASCULAR PLANTS	CASTILLEJA COCCINEA	SCARLET INDIAN PAINTBRUSH	E	G5/S1
Northern	Carter	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Northern	Carter	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Carter	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Northern	Carter	VASCULAR PLANTS	ACER SPICATUM	MOUNTAIN MAPLE	E	G5/S1S2
Northern	Clark	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Clark	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Clark	BIRDS	DOLICHONYX ORYZIVORUS	BOBOLINK	S	G5/S2S3B
Northern	Clark	BIRDS	NYCTICORAX NYCTICORAX	BLACK-CROWNED NIGHT-HERON	T	G5/S1S2B
Northern	Clark	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Clark	CRUSTACEANS	CAMBARUS VETERANUS	A CRAYFISH	S	G3G4/S1
Northern	Clark	INSECTS	SPEYERIA IDALIA	REGAL FRITILLARY	H	G3/SH
Northern	Clark	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Clark	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Clark	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Northern	Clark	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Northern	Clark	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Northern	Clark	VASCULAR PLANTS	RUBUS WHARTONIAE	WHARTON'S DEWBERRY	T	G2Q/S2
Northern	Clark	VASCULAR PLANTS	SALIX AMYGDALOIDES	PEACH-LEAVED WILLOW	H	G5/SH

Northern	Clark	VASCULAR PLANTS	SCHIZACHNE PURPURASCENS	PURPLE OAT	T	G5/S2
Northern	Clark	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Northern	Clark	VASCULAR PLANTS	STELLARIA FONTINALIS	WATER STITCHWORT	T	G3/S2
Northern	Clark	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3
Northern	Clark	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Northern	Clark	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Clark	VASCULAR PLANTS	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	T/LE	G3/S2S3
Northern	Clark	VASCULAR PLANTS	VIOLA WALTERI	WALTER'S VIOLET	T	G4G5/S2
Northern	Clark	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Northern	Elliott	BIRDS	EMPIDONAX MINIMUS	LEAST FLYCATCHER	E	G5/S1B
Northern	Elliott	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Elliott	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Elliott	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Elliott	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Elliott	BIVALVES	LASMIGONA COMPRESSA	CREEK HEELSPLITTER	E	G5/S1
Northern	Elliott	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Northern	Elliott	FISHES	PERCOPSIS OMISCOMAYCUS	TROUT-PERCH	S	G5/S3
Northern	Elliott	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Elliott	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Northern	Elliott	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Elliott	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Elliott	NONVASCULAR PLANTS	POLYTRICHUM PALLIDISETUM	A HAIR CAP MOSS	T	G4/S2?
Northern	Elliott	NONVASCULAR PLANTS	CIRRIPHYLLUM PILIFERUM		T	G5/S2?
Northern	Elliott	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Northern	Elliott	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Northern	Elliott	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Northern	Elliott	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Northern	Elliott	VASCULAR PLANTS	JUNCUS ARTICULATUS	JOINTED RUSH	S	G5/S2S3
Northern	Elliott	VASCULAR PLANTS	HYDROCOTYLE AMERICANA	AMERICAN WATER-PENNYWORT	E	G5/S1
Northern	Elliott	VASCULAR PLANTS	ERYTHRONIUM ROSTRATUM	YELLOW TROUTLILY	S	G5/S2S3
Northern	Elliott	VASCULAR PLANTS	ELEOCHARIS OLIVACEA	BRIGHT GREEN SPIKERUSH	S	G5/S1?
Northern	Elliott	VASCULAR PLANTS	CIRCAEA ALPINA	SMALL ENCHANTER'S NIGHTSHADE	S	G5/S3
Northern	Elliott	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Elliott	VASCULAR PLANTS	ACER SPICATUM	MOUNTAIN MAPLE	E	G5/S1S2
Northern	Estill	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Estill	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Estill	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Estill	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Northern	Estill	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Estill	CRUSTACEANS	CAMBARUS VETERANUS	A CRAYFISH	S	G3G4/S1
Northern	Estill	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Northern	Estill	INSECTS	PSEUDANOPHTHALMUS EXOTICUS	EXOTIC CAVE BEETLE	H	G1G2/SH
Northern	Estill	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3

Northern	Estill	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Estill	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Estill	MAMMALS	CORYNORHINUS TOWNSENDII VIRGINIANUS	VIRGINIA BIG-EARED BAT	E/LE	G4T2/S1
Northern	Estill	NONVASCULAR PLANTS	TORTULA NORVEGICA	TORTULA	E	G5/S1?
Northern	Estill	NONVASCULAR PLANTS	ABIETINELLA ABIETINA		T	G4G5/S2?
Northern	Estill	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Northern	Estill	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Northern	Estill	TERRESTRIAL COMMUNITIES	CALCAREOUS SUB-XERIC FOREST		N	S5
Northern	Estill	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Northern	Estill	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Northern	Estill	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Northern	Estill	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Estill	VASCULAR PLANTS	GRATIOLA VISCIDULA	SHORT'S HEDGEHYSSOP	S	G4G5/S3
Northern	Estill	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Northern	Estill	VASCULAR PLANTS	JUNCUS ARTICULATUS	JOINTED RUSH	S	G5/S2S3
Northern	Estill	VASCULAR PLANTS	LATHYRUS VENOSUS	SMOOTH VEINY PEAVINE	S	G5/S2S3
Northern	Estill	VASCULAR PLANTS	MUHLENBERGIA CUSPIDATA	PLAINS MUHLY	T	G4/S2
Northern	Estill	VASCULAR PLANTS	VIBURNUM RAFINESQUIANUM VAR RAFINESQUIANUM	DOWNY ARROWWOOD	T	G5T4T5/S2?
Northern	Estill	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Northern	Estill	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2
Northern	Estill	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Northern	Estill	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Northern	Estill	VASCULAR PLANTS	SYMPHORICARPOS ALBUS	SNOWBERRY	E	G5/S1
Northern	Estill	VASCULAR PLANTS	THASPIUM PINNATIFIDUM	CUTLEAF MEADOW-PARSNIP	T	G2G3/S2S3
Northern	Estill	VASCULAR PLANTS	POA SALTUENSIS	DROOPING BLUEGRASS	E	G5/S1S2
Northern	Estill	VASCULAR PLANTS	DICHANTHELIUM BOREALE	NORTHERN WITCHGRASS	S	G5/S2S3
Northern	Estill	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Estill	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Northern	Estill	VASCULAR PLANTS	PRENANTHES ALBA	WHITE RATTLESNAKE-ROOT	E	G5/S1
Northern	Estill	VASCULAR PLANTS	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA	S	G5/S3?
Northern	Estill	VASCULAR PLANTS	CALAMAGROSTIS PORTERI SSP INSPERATA	REED BENT GRASS	E	G4T3/S1S2
Northern	Fayette	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Fayette	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Fayette	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Fayette	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Fayette	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Fayette	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Northern	Fayette	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Northern	Fayette	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Fayette	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Northern	Fayette	BIRDS	DOLICHONYX ORYZIVORUS	BOBOLINK	S	G5/S2S3B

Northern	Fayette	INSECTS	NICROPHORUS AMERICANUS	AMERICAN BURYING BEETLE	H/LE	G2G3/SH
Northern	Fayette	INSECTS	NEHALENNIA IRENE	SEDGE SPRITE	N	G5/S1
Northern	Fayette	INSECTS	PSEUDANOPHTHALMUS HORNI HORNI	GARMAN'S CAVE BEETLE	S	G3T3/S2S3
Northern	Fayette	INSECTS	SATYRIUM FAVONIUS ONTARIO	NORTHERN HAIRSTREAK	S	G4T4/S1
Northern	Fayette	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Fayette	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Fayette	VASCULAR PLANTS	OENOTHERA TRILOBA	STEMLESS EVENING-PRIMROSE	T	G4/S1S2
Northern	Fayette	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP HISPIDISSIMUM	HAIRY FALSE GROMWELL	E	G4G5T4/S1
Northern	Fayette	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Fayette	VASCULAR PLANTS	PRENANTHES CREPIDINEA	NODDING RATTLESNAKE-ROOT	T	G3G4/S2
Northern	Fayette	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2
Northern	Fayette	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Northern	Fayette	VASCULAR PLANTS	STELLARIA FONTINALIS	WATER STITCHWORT	T	G3/S2
Northern	Fayette	VASCULAR PLANTS	VIBURNUM MOLLE	SOFTLEAF ARROW-WOOD	T	G5/S3?
Northern	Fayette	VASCULAR PLANTS	VIOLA WALTERI	WALTER'S VIOLET	T	G4G5/S2
Northern	Fayette	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Northern	Fayette	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Northern	Fayette	VASCULAR PLANTS	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	T/LE	G3/S2S3
Northern	Fayette	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Northern	Fayette	VASCULAR PLANTS	LONICERA RETICULATA	GRAPE HONEYSUCKLE	E	G5/S1
Northern	Fayette	VASCULAR PLANTS	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA	S	G5/S3?
Northern	Fayette	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Fayette	VASCULAR PLANTS	DESCHAMPSIA FLEXUOSA	CRINKLED HAIRGRASS	T	G5/S2
Northern	Fayette	VASCULAR PLANTS	ANEMONE CANADENSIS	CANADA ANEMONE	H	G5/SH
Northern	Fayette	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Fayette	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Northern	Fleming	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Fleming	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Fleming	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Fleming	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Fleming	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Fleming	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Fleming	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Fleming	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Northern	Fleming	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Fleming	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Northern	Fleming	INSECTS	DRYOBIUS SEXNOTATUS	SIXBANDED LONGHORN BEETLE	T	G?/S1
Northern	Fleming	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Northern	Fleming	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Northern	Fleming	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Fleming	VASCULAR PLANTS	SOLIDAGO SHORTII	SHORT'S GOLDENROD	E/LE	G1/S1

Northern	Franklin	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Franklin	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Franklin	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Franklin	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Franklin	BIRDS	ACTITIS MACULARIA	SPOTTED SANDPIPER	E	G5/S1B
Northern	Franklin	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Franklin	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Franklin	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Franklin	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Northern	Franklin	BIRDS	GALLINULA CHLOROPUS	COMMON MOORHEN	T	G5/S1S2B
Northern	Franklin	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Northern	Franklin	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Franklin	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Franklin	FISHES	NOCOMIS BIGUTTATUS	HORNYHEAD CHUB	S	G5/SU
Northern	Franklin	INSECTS	DRYOBIUS SEXNOTATUS	SIXBANDED LONGHORN BEETLE	T	G?/S1
Northern	Franklin	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Franklin	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Franklin	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Northern	Franklin	VASCULAR PLANTS	ARABIS PERSTELLATA	BRAUN'S ROCKCRESS	T/LE	G2/S2
Northern	Franklin	VASCULAR PLANTS	LONICERA RETICULATA	GRAPE HONEYSUCKLE	E	G5/S1
Northern	Franklin	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Franklin	VASCULAR PLANTS	PHILADELPHUS INODORUS	MOCK ORANGE	T	G4G5/S1S2
Northern	Franklin	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Franklin	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP OCCIDENTALE	WESTERN FALSE GROMWELL	E	G4G5T4?/S1
Northern	Franklin	VASCULAR PLANTS	PERIDERIDIA AMERICANA	EASTERN EULOPHUS	T	G4/S2
Northern	Franklin	VASCULAR PLANTS	MELANTHIUM WOODII	WOOD BUNCHFLOWER	T	G5/S2
Northern	Franklin	VASCULAR PLANTS	OENOTHERA TRILOBA	STEMLESS EVENING-PRIMROSE	T	G4/S1S2
Northern	Franklin	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Northern	Franklin	VASCULAR PLANTS	STELLARIA FONTINALIS	WATER STITCHWORT	T	G3/S2
Northern	Franklin	VASCULAR PLANTS	VIBURNUM MOLLE	SOFTLEAF ARROW-WOOD	T	G5/S3?
Northern	Franklin	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP HISPIDISSIMUM	HAIRY FALSE GROMWELL	E	G4G5T4/S1
Northern	Gallatin	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Gallatin	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Gallatin	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Gallatin	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Gallatin	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Gallatin	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Gallatin	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Northern	Gallatin	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Gallatin	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Northern	Gallatin	PALUSTRINE COMMUNITIES	RIPARIAN FOREST		N	S5
Northern	Gallatin	VASCULAR PLANTS	SIDA HERMAPHRODITA	VIRGINIA MALLOW	S	G2/S2S3
Northern	Garrard	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B

Northern	Garrard	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Garrard	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Garrard	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Garrard	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Garrard	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Garrard	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Garrard	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Northern	Garrard	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Garrard	VASCULAR PLANTS	VIBURNUM MOLLE	SOFTLEAF ARROW-WOOD	T	G5/S3?
Northern	Garrard	VASCULAR PLANTS	VIOLA SEPTEMLOBA VAR EGGLESTONII	EGGLESTON'S VIOLET	S	G4/S3
Northern	Garrard	VASCULAR PLANTS	SCHIZACHNE PURPURASCENS	PURPLE OAT	T	G5/S2
Northern	Garrard	VASCULAR PLANTS	PHLOX BIFIDA SSP STELLARIA	CLEFT PHLOX	T	G5?T3/S2
Northern	Garrard	VASCULAR PLANTS	MUHLENBERGIA CUSPIDATA	PLAINS MUHLY	T	G4/S2
Northern	Garrard	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Garrard	VASCULAR PLANTS	AGRIMONIA GRYPOSEPALA	TALL HAIRY GROOVEBUR	T	G5/S1S2
Northern	Garrard	VASCULAR PLANTS	DESCHAMPSIA CESPITOSA SSP GLAUCA	TUFTED HAIRGRASS	E	G5T5/S1S2
Northern	Grant	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Grant	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Grant	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Grant	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Grant	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Grant	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Grant	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Grant	TERRESTRIAL COMMUNITIES	DEEP SOIL MESOPHYTIC FOREST		N	S5
Northern	Grant	VASCULAR PLANTS	PHILADELPHUS INODORUS	MOCK ORANGE	T	G4G5/S1S2
Northern	Harrison	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Harrison	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Harrison	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Harrison	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Harrison	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Harrison	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Harrison	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Harrison	BIRDS	DOLICHONYX ORYZIVORUS	BOBOLINK	S	G5/S2S3B
Northern	Harrison	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Harrison	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Harrison	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Harrison	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Harrison	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Northern	Harrison	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Northern	Harrison	INSECTS	PSEUDANOPHTHALMUS DESERTUS MAJOR	BEAVER CAVE BEETLE	T	G3T1T2/S1
Northern	Harrison	INSECTS	NEHALENNIA IRENE	SEDGE SPRITE	N	G5/S1
Northern	Harrison	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Northern	Harrison	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Harrison	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Harrison	TERRESTRIAL COMMUNITIES	BLUEGRASS SAVANNA-WOODLAND		N	S1

Northern	Harrison	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Northern	Harrison	VASCULAR PLANTS	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	T/LE	G3/S2S3
Northern	Henry	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Henry	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Henry	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Henry	BIRDS	DOLICHONYX ORYZIVORUS	BOBOLINK	S	G5/S2S3B
Northern	Henry	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Henry	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Northern	Henry	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B ,S2S3N
Northern	Henry	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Henry	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S 4N
Northern	Henry	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Henry	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Henry	FISHES	LOTA LOTA	BURBOT	S	G5/SU
Northern	Henry	INSECTS	NICROPHORUS AMERICANUS	AMERICAN BURYING BEETLE	H/LE	G2G3/SH
Northern	Henry	INSECTS	PSEUDANOPHTHALMUS TENEBROSUS	STEVENS CREEK CAVE BEETLE	T	G1G2/S2
Northern	Henry	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Northern	Henry	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Henry	VASCULAR PLANTS	AESCULUS PAVIA	RED BUCKEYE	T	G5/S2S3
Northern	Henry	VASCULAR PLANTS	SALIX DISCOLOR	PUSSY WILLOW	H	G5/SH
Northern	Henry	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP HISPIDISSIMUM	HAIRY FALSE GROMWELL	E	G4G5T4/S 1
Northern	Henry	VASCULAR PLANTS	ARABIS PERSTELLATA	BRAUN'S ROCKCRESS	T/LE	G2/S2
Northern	Henry	VASCULAR PLANTS	MELANTHIUM WOODII	WOOD BUNCHFLOWER	T	G5/S2
Northern	Jessamine	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Jessamine	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S 4N
Northern	Jessamine	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Jessamine	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Jessamine	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Northern	Jessamine	BIRDS	DOLICHONYX ORYZIVORUS	BOBOLINK	S	G5/S2S3B
Northern	Jessamine	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B ,S2S3N
Northern	Jessamine	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Jessamine	INSECTS	PSEUDANOPHTHALMUS HORNI ABDITUS	CONCEALED CAVE BEETLE	T	G3T3/S2
Northern	Jessamine	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Jessamine	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Jessamine	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Northern	Jessamine	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Jessamine	TERRESTRIAL COMMUNITIES	CALCAREOUS SUB-XERIC FOREST		N	S5
Northern	Jessamine	VASCULAR PLANTS	VIOLA SEPTEMLOBA VAR EGGLESTONII	EGGLESTON'S VIOLET	S	G4/S3
Northern	Jessamine	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP MOLLE	SOFT FALSE GROMWELL	E	G4G5T3/S 1
Northern	Jessamine	VASCULAR PLANTS	PERIDERIDIA AMERICANA	EASTERN EULOPHUS	T	G4/S2
Northern	Jessamine	VASCULAR PLANTS	SCHIZACHNE PURPURASCENS	PURPLE OAT	T	G5/S2
Northern	Jessamine	VASCULAR PLANTS	STELLARIA FONTINALIS	WATER STITCHWORT	T	G3/S2
Northern	Jessamine	VASCULAR PLANTS	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	T/LE	G3/S2S3
Northern	Jessamine	VASCULAR PLANTS	TRILLIUM NIVALE	SNOW TRILLIUM	E	G4/S1

Northern	Jessamine	VASCULAR PLANTS	VIBURNUM RAFINESQUIANUM VAR RAFINESQUIANUM	DOWNY ARROWWOOD	T	G5T4T5/S2?
Northern	Jessamine	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP HISPIDISSIMUM	HAIRY FALSE GROMWELL	E	G4G5T4/S1
Northern	Jessamine	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2
Northern	Jessamine	VASCULAR PLANTS	VIOLA WALTERI	WALTER'S VIOLET	T	G4G5/S2
Northern	Jessamine	VASCULAR PLANTS	VIBURNUM MOLLE	SOFTLEAF ARROW-WOOD	T	G5/S3?
Northern	Jessamine	VASCULAR PLANTS	DESCHAMPSIA CESPITOSA SSP GLAUCA	TUFTED HAIRGRASS	E	G5T5/S1S2
Northern	Jessamine	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Northern	Jessamine	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Jessamine	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Jessamine	VASCULAR PLANTS	PHLOX BIFIDA SSP STELLARIA	CLEFT PHLOX	T	G5?T3/S2
Northern	Lee	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Lee	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Lee	INSECTS	DRYOBIUS SEXNOTATUS	SIXBANDED LONGHORN BEETLE	T	G?/S1
Northern	Lee	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Lee	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Northern	Lee	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Lee	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Northern	Lee	MAMMALS	CORYNORHINUS TOWNSENDII VIRGINIANUS	VIRGINIA BIG-EARED BAT	E/LE	G4T2/S1
Northern	Lee	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Northern	Lee	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Lee	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Northern	Lee	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Northern	Lee	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Northern	Lee	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Northern	Lee	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Northern	Lee	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Northern	Lee	VASCULAR PLANTS	SCIRPUS VERECUNDUS	BASHFUL BULRUSH	E	G4G5/S1?
Northern	Lee	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Lee	VASCULAR PLANTS	JUNCUS ARTICULATUS	JOINTED RUSH	S	G5/S2S3
Northern	Lee	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Northern	Lee	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Northern	Lee	VASCULAR PLANTS	TAXUS CANADENSIS	CANADIAN YEW	T	G5/S2S3
Northern	Lee	VASCULAR PLANTS	TRILLIUM UNDULATUM	PAINTED TRILLIUM	T	G5/S2
Northern	Lewis	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Lewis	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Lewis	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Lewis	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Lewis	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Northern	Lewis	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Lewis	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Northern	Lewis	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1

Northern	Lewis	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Northern	Lewis	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Lewis	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Northern	Lewis	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Lewis	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Northern	Lewis	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Lewis	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Lewis	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Northern	Lewis	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Northern	Lewis	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Lewis	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Northern	Lewis	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Northern	Lewis	FISHES	PERCOPSIS OMISCOMAYCUS	TROUT-PERCH	S	G5/S3
Northern	Lewis	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Northern	Lewis	INSECTS	SATYRIUM FAVONIUS ONTARIO	NORTHERN HAIRSTREAK	S	G4T4/S1
Northern	Lewis	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Northern	Lewis	TERRESTRIAL COMMUNITIES	KNOBS SHALE BARRENS		N	S2S3
Northern	Lewis	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Northern	Lewis	VASCULAR PLANTS	CYPRIPEDIUM CANDIDUM	SMALL WHITE LADY'S-SLIPPER	E	G4/S1
Northern	Lewis	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Northern	Lewis	VASCULAR PLANTS	RANUNCULUS AMBIGENS	WATERPLANTAIN SPEARWORT	S	G4/S3
Northern	Lewis	VASCULAR PLANTS	LIATRIS CYLINDRACEA	SLENDER BLAZING-STAR	T	G5/S2S3
Northern	Lewis	VASCULAR PLANTS	MAIANTHEMUM STELLATUM	STARFLOWER FALSE SOLOMON'S-SEAL	E	G5/S1
Northern	Lewis	VASCULAR PLANTS	PYCNANTHEMUM ALBESCENS	WHITELEAF MOUNTAINMINT	E	G5/S1
Northern	Lewis	VASCULAR PLANTS	POA SALTUENSIS	DROOPING BLUEGRASS	E	G5/S1S2
Northern	Lewis	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Lewis	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Northern	Lewis	VASCULAR PLANTS	PRENANTHES ALBA	WHITE RATTLESNAKE-ROOT	E	G5/S1
Northern	Lewis	VASCULAR PLANTS	CAREX TETANICA	RIGID SEDGE	E	G4G5/S1?
Northern	Lewis	VASCULAR PLANTS	CAREX RUGOSPERMA	UMBEL-LIKE SEDGE	T	G5/S2?
Northern	Lewis	VASCULAR PLANTS	CAREX JUNIPERORUM	CEDAR SEDGE	E	G2/S1S2
Northern	Lewis	VASCULAR PLANTS	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA	S	G5/S3?
Northern	Lewis	VASCULAR PLANTS	CASTILLEJA COCCINEA	SCARLET INDIAN PAINTBRUSH	E	G5/S1
Northern	Lewis	VASCULAR PLANTS	SPIRAEA VIRGINIANA	VIRGINIA SPIRAEA	T/LT	G2/S2
Northern	Lewis	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Lewis	VASCULAR PLANTS	AGALINIS AURICULATA	EARLEAF FOXGLOVE	E	G3/S1
Northern	Lewis	VASCULAR PLANTS	ACONITUM UNCINATUM	BLUE MONKSHOOD	T	G4/S2
Northern	Madison	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Madison	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Madison	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Northern	Madison	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Madison	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Madison	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B

Northern	Madison	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Northern	Madison	INSECTS	PSEUDANOPHTHALMUS CATORYCTOS	LESSER ADAMS CAVE BEETLE	E	G1G2/S1
Northern	Madison	INSECTS	PSEUDANOPHTHALMUS PHOLETER	GREATER ADAMS CAVE BEETLE	E	G1G2/S1
Northern	Madison	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Madison	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Madison	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Northern	Madison	REPTILES	EUMECES ANTHRACINUS ANTHRACINUS	NORTHERN COAL SKINK	T	G5T5/S2
Northern	Madison	TERRESTRIAL COMMUNITIES	BLUEGRASS MESOPHYTIC CANE FOREST		N	S1
Northern	Madison	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Northern	Madison	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Northern	Madison	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Northern	Madison	VASCULAR PLANTS	RUBUS WHARTONIAE	WHARTON'S DEWBERRY	T	G2Q/S2
Northern	Madison	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Madison	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Northern	Madison	VASCULAR PLANTS	ELODEA NUTTALLII	WESTERN WATERWEED	H	G5/SH
Northern	Madison	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Northern	Madison	VASCULAR PLANTS	RANUNCULUS AMBIGENS	WATERPLANTAIN SPEARWORT	S	G4/S3
Northern	Madison	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Northern	Madison	VASCULAR PLANTS	SCIRPUS FLUVIATILIS	RIVER BULRUSH	E	G5/S1S2
Northern	Madison	VASCULAR PLANTS	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	T/LE	G3/S2S3
Northern	Madison	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Madison	VASCULAR PLANTS	VIBURNUM RAFINESQUIANUM VAR RAFINESQUIANUM	DOWNY ARROWWOOD	T	G5T4T5/S2?
Northern	Madison	VASCULAR PLANTS	SYMPHORICARPOS ALBUS	SNOWBERRY	E	G5/S1
Northern	Menifee	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Menifee	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Menifee	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Northern	Menifee	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Menifee	BIRDS	PODILYMBUS PODICEPS	PIED-BILLED GREBE	E	G5/S1B,S4N
Northern	Menifee	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Northern	Menifee	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Menifee	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Menifee	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Northern	Menifee	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Northern	Menifee	INSECTS	ERORA LAETA	EARLY HAIRSTREAK	S	G3G4/S1
Northern	Menifee	INSECTS	DRYOBIUS SEXNOTATUS	SIXBANDED LONGHORN BEETLE	T	G?/S1
Northern	Menifee	INSECTS	MANOPHYLAX BUTLERI	A LIMNEPHILID CADDISFLY	S	G2/S2
Northern	Menifee	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Menifee	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Menifee	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Northern	Menifee	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Northern	Menifee	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Menifee	MAMMALS	CORYNORHINUS TOWNSENDII VIRGINIANUS	VIRGINIA BIG-EARED BAT	E/LE	G4T2/S1
Northern	Menifee	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Northern	Menifee	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3

Northern	Menifee	NONVASCULAR PLANTS	ONCOPHORUS RAUI		E	G3/S1?
Northern	Menifee	NONVASCULAR PLANTS	NECKERA PENNATA		T	G5/S2?
Northern	Menifee	NONVASCULAR PLANTS	HERZOGIELLA TURFACEA		E	G4G5/S1?
Northern	Menifee	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Northern	Menifee	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Northern	Menifee	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Northern	Menifee	VASCULAR PLANTS	THASPIUM PINNATIFIDUM	CUTLEAF MEADOW-PARSNIP	T	G2G3/S2S3
Northern	Menifee	VASCULAR PLANTS	MAIANTHEMUM CANADENSE	WILD LILY-OF-THE-VALLEY	T	G5/S2
Northern	Menifee	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Northern	Menifee	VASCULAR PLANTS	SAMBUCUS RACEMOSA SSP PUBENS	RED ELDERBERRY	E	G5T4T5/S1S2
Northern	Menifee	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Menifee	VASCULAR PLANTS	PLATANTHERA PSYCODES	SMALL PURPLE-FRINGED ORCHID	E	G5/S1
Northern	Menifee	VASCULAR PLANTS	OENOTHERA PERENNIS	SMALL SUNDROPS	E	G5/S1S2
Northern	Menifee	VASCULAR PLANTS	JUNIPERUS COMMUNIS VAR DEPRESSA	GROUND JUNIPER	T	G5T5/S2
Northern	Menifee	VASCULAR PLANTS	DISPORUM MACULATUM	NODDING MANDARIN	S	G3G4/S3?
Northern	Menifee	VASCULAR PLANTS	MONOTROPSIS ODORATA	SWEET PINESAP	T	G3/S2
Northern	Menifee	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Northern	Menifee	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Northern	Menifee	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Northern	Menifee	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Menifee	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Northern	Menifee	VASCULAR PLANTS	SCUTELLARIA ARGUTA	HAIRY SKULLCAP	T	G2?Q/S2?
Northern	Menifee	VASCULAR PLANTS	CIRCAEA ALPINA	SMALL ENCHANTER'S NIGHTSHADE	S	G5/S3
Northern	Menifee	VASCULAR PLANTS	CALAMAGROSTIS PORTERI SSP PORTERI	PORTER'S REEDGRASS	T	G4T4/S2S3
Northern	Menifee	VASCULAR PLANTS	SOLIDAGO ALBOPILOSA	WHITE-HAIRED GOLDENROD	T/LT	G2/S2
Northern	Menifee	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Northern	Menifee	VASCULAR PLANTS	ACONITUM UNCINATUM	BLUE MONKSHOOD	T	G4/S2
Northern	Menifee	VASCULAR PLANTS	ACER SPICATUM	MOUNTAIN MAPLE	E	G5/S1S2
Northern	Menifee	VASCULAR PLANTS	TAXUS CANADENSIS	CANADIAN YEW	T	G5/S2S3
Northern	Mercer	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Mercer	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Mercer	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Mercer	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Mercer	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Mercer	BIRDS	DOLICHONYX ORYZIVORUS	BOBOLINK	S	G5/S2S3B
Northern	Mercer	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Mercer	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Mercer	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Northern	Mercer	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1

Northern	Mercer	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Mercer	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Northern	Mercer	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Mercer	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Northern	Mercer	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Mercer	INSECTS	CALLOPHRYS IRUS	FROSTED ELFIN	S	G3/S1
Northern	Mercer	INSECTS	PSEUDANOPHTHALMUS PUTEANUS	OLD WELL CAVE BEETLE	T	G1G2/S2
Northern	Mercer	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Northern	Mercer	TERRESTRIAL COMMUNITIES	BLUEGRASS SAVANNA-WOODLAND		N	S1
Northern	Mercer	VASCULAR PLANTS	ARABIS HIRSUTA VAR PYCNOCARPA	CREAMFLOWER ROCKCRESS	N	G5T5/S1?
Northern	Mercer	VASCULAR PLANTS	VIBURNUM MOLLE	SOFTLEAF ARROW-WOOD	T	G5/S3?
Northern	Mercer	VASCULAR PLANTS	TRILLIUM NIVALE	SNOW TRILLIUM	E	G4/S1
Northern	Mercer	VASCULAR PLANTS	STELLARIA FONTINALIS	WATER STITCHWORT	T	G3/S2
Northern	Mercer	VASCULAR PLANTS	SCHIZACHNE PURPURASCENS	PURPLE OAT	T	G5/S2
Northern	Mercer	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Mercer	VASCULAR PLANTS	PHLOX BIFIDA SSP STELLARIA	CLEFT PHLOX	T	G5?T3/S2
Northern	Mercer	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Mercer	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Northern	Nicholas	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Nicholas	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Nicholas	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Nicholas	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Nicholas	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Nicholas	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Nicholas	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Nicholas	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Nicholas	FISHES	LOTA LOTA	BURBOT	S	G5/SU
Northern	Nicholas	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Northern	Nicholas	VASCULAR PLANTS	GENTIANA FLAVIDA	YELLOW GENTIAN	E	G4/S1S2
Northern	Nicholas	VASCULAR PLANTS	SOLIDAGO SHORTII	SHORT'S GOLDENROD	E/LE	G1/S1
Northern	Owen	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Owen	AMPHIBIANS	PLETHODON CINEREUS	REDBACK SALAMANDER	S	G5/S3
Northern	Owen	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Owen	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Owen	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Owen	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Owen	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Northern	Owen	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Owen	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Owen	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Owen	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Owen	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Owen	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Owen	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Northern	Owen	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1

Northern	Owen	FISHES	LOTA LOTA	BURBOT	S	G5/SU
Northern	Owen	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Owen	VASCULAR PLANTS	MELANTHIUM WOODII	WOOD BUNCHFLOWER	T	G5/S2
Northern	Owen	VASCULAR PLANTS	ARABIS PERSTELLATA	BRAUN'S ROCKCRESS	T/LE	G2/S2
Northern	Owen	VASCULAR PLANTS	LONICERA RETICULATA	GRAPE HONEYSUCKLE	E	G5/S1
Northern	Owsley	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Owsley	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Owsley	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Northern	Owsley	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Northern	Owsley	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Northern	Owsley	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Northern	Owsley	INSECTS	STENONEMA BEDNARIKI	A HEPTAGENIID MAYFLY	S	G3/S2
Northern	Owsley	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Northern	Owsley	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Northern	Owsley	VASCULAR PLANTS	TAXUS CANADENSIS	CANADIAN YEW	T	G5/S2S3
Northern	Owsley	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Owsley	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Pendleton	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Pendleton	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Pendleton	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Pendleton	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Pendleton	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Pendleton	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Pendleton	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Northern	Pendleton	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Pendleton	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Northern	Pendleton	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Pendleton	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Northern	Pendleton	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Northern	Pendleton	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Pendleton	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Northern	Pendleton	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Northern	Pendleton	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Pendleton	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Pendleton	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Northern	Pendleton	FISHES	NOTURUS EXILIS	SLENDER MADTOM	E	G5/S1
Northern	Pendleton	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Northern	Pendleton	GASTROPODS	LEPTOXIS PRAEROSA	ONYX ROCKSNAIL	S	G5/S3S4
Northern	Pendleton	VASCULAR PLANTS	GENTIANA FLAVIDA	YELLOW GENTIAN	E	G4/S1S2
Northern	Pendleton	VASCULAR PLANTS	OROBANCHE LUDOVICIANA	LOUISIANA BROOMRAPE	H	G5/SH
Northern	Powell	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Powell	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Northern	Powell	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Northern	Powell	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Powell	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Powell	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3

Northern	Powell	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Northern	Powell	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Powell	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Powell	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Northern	Powell	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Northern	Powell	GASTROPODS	RHODACME ELATIOR	DOMED ANCYLID	S	G1/S1
Northern	Powell	INSECTS	MANOPHYLAX BUTLERI	A LIMNEPHILID CADDISFLY	S	G2/S2
Northern	Powell	INSECTS	DRYOBIUS SEXNOTATUS	SIXBANDED LONGHORN BEETLE	T	G?/S1
Northern	Powell	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Northern	Powell	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Northern	Powell	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Northern	Powell	MAMMALS	CORYNORHINUS TOWNSENDII VIRGINIANUS	VIRGINIA BIG-EARED BAT	E/LE	G4T2/S1
Northern	Powell	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Northern	Powell	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Powell	NONVASCULAR PLANTS	POLYTRICHUM PILIFERUM		E	G5/S1?
Northern	Powell	PALUSTRINE COMMUNITIES	RIPARIAN FOREST		N	S5
Northern	Powell	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Northern	Powell	REPTILES	EUMECES ANTHRACINUS ANTHRACINUS	NORTHERN COAL SKINK	T	G5T5/S2
Northern	Powell	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Northern	Powell	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Northern	Powell	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Northern	Powell	VASCULAR PLANTS	NAJAS GRACILLIMA	THREAD-LIKE NAIAD	S	G5?/S2S3
Northern	Powell	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Northern	Powell	VASCULAR PLANTS	PRENANTHES ALBA	WHITE RATTLESNAKE-ROOT	E	G5/S1
Northern	Powell	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Powell	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3
Northern	Powell	VASCULAR PLANTS	LYCOPODIUM CLAVATUM	RUNNING PINE	E	G5/S1?
Northern	Powell	VASCULAR PLANTS	MONOTROPSIS ODORATA	SWEET PINESAP	T	G3/S2
Northern	Powell	VASCULAR PLANTS	POA SALTUENSIS	DROOPING BLUEGRASS	E	G5/S1S2
Northern	Powell	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Northern	Powell	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2
Northern	Powell	VASCULAR PLANTS	POLYGALA CRUCIATA	CROSSLEAF MILKWORT	E	G5/S1
Northern	Powell	VASCULAR PLANTS	SILENE OVATA	OVATE CATCHFLY	E	G2G3/S1S2
Northern	Powell	VASCULAR PLANTS	PLATANTHERA PSYCODES	SMALL PURPLE-FRINGED ORCHID	E	G5/S1
Northern	Powell	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Northern	Powell	VASCULAR PLANTS	SOLIDAGO ALBOPILOSA	WHITE-HAIRED GOLDENROD	T/LT	G2/S2
Northern	Powell	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Northern	Powell	VASCULAR PLANTS	DICHANTHELIUM BOREALE	NORTHERN WITCHGRASS	S	G5/S2S3
Northern	Powell	VASCULAR PLANTS	SABATIA CAMPANULATA	SLENDER MARSH PINK	E	G5/S1
Northern	Robertson	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Robertson	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Robertson	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B

Northern	Robertson	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Robertson	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Robertson	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Robertson	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Robertson	FISHES	LOTA LOTA	BURBOT	S	G5/SU
Northern	Robertson	VASCULAR PLANTS	GENTIANA FLAVIDA	YELLOW GENTIAN	E	G4/S1S2
Northern	Robertson	VASCULAR PLANTS	SPIRANTHES MAGNICAMPORUM	GREAT PLAINS LADIES'-TRESSES	T	G4/S2
Northern	Robertson	VASCULAR PLANTS	SOLIDAGO SHORTII	SHORT'S GOLDENROD	E/LE	G1/S1
Northern	Scott	AMPHIBIANS	RANA PIPIENS	NORTHERN LEOPARD FROG	S	G5/S3
Northern	Scott	BIRDS	DOLICHONYX ORYZIVORUS	BOBOLINK	S	G5/S2S3B
Northern	Scott	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Scott	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Northern	Scott	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Northern	Scott	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Scott	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Scott	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Scott	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Scott	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Northern	Scott	FISHES	NOCOMIS BIGUTTATUS	HORNYHEAD CHUB	S	G5/SU
Northern	Scott	INSECTS	PSEUDANOPHTHALMUS HORNI HORNI	GARMAN'S CAVE BEETLE	S	G3T3/S2S3
Northern	Scott	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Scott	VASCULAR PLANTS	LESQUERELLA GLOBOSA	LESQUEREUX'S BLADDERPOD	T/C	G2/S2
Northern	Scott	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Northern	Scott	VASCULAR PLANTS	PERIDERIDIA AMERICANA	EASTERN EULOPHUS	T	G4/S2
Northern	Scott	VASCULAR PLANTS	PHILADELPHUS INODORUS	MOCK ORANGE	T	G4G5/S1S2
Northern	Trimble	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Trimble	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Northern	Trimble	BIRDS	FALCO PEREGRINUS	PEREGRINE FALCON	E	G4/S1B,SZN
Northern	Trimble	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Northern	Trimble	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Northern	Wolfe	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Wolfe	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Wolfe	BIRDS	SITTA CANADENSIS	RED-BREASTED NUTHATCH	E	G5/S1B,SZN
Northern	Wolfe	BIRDS	EMPIDONAX MINIMUS	LEAST FLYCATCHER	E	G5/S1B
Northern	Wolfe	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Northern	Wolfe	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Northern	Wolfe	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Northern	Wolfe	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Northern	Wolfe	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Northern	Wolfe	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Northern	Wolfe	INSECTS	MANOPHYLAX BUTLERI	A LIMNEPHILID CADDISFLY	S	G2/S2
Northern	Wolfe	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Northern	Wolfe	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Northern	Wolfe	MAMMALS	CORYNORHINUS TOWNSENDII VIRGINIANUS	VIRGINIA BIG-EARED BAT	E/LE	G4T2/S1

Northern	Wolfe	NONVASCULAR PLANTS	HERZOGIELLA TURFACEA		E	G4G5/S1?
Northern	Wolfe	NONVASCULAR PLANTS	POLYTRICHUM PALLIDISETUM	A HAIR CAP MOSS	T	G4/S2?
Northern	Wolfe	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Northern	Wolfe	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Northern	Wolfe	TERRESTRIAL COMMUNITIES	APPALACHIAN PINE-OAK FOREST		N	S5
Northern	Wolfe	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Northern	Wolfe	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Northern	Wolfe	VASCULAR PLANTS	MELAMPYRUM LINEARE VAR PECTINATUM	AMERICAN COW-WHEAT	E	G5T5/S1
Northern	Wolfe	VASCULAR PLANTS	MAIANTHEMUM CANADENSE	WILD LILY-OF-THE-VALLEY	T	G5/S2
Northern	Wolfe	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3
Northern	Wolfe	VASCULAR PLANTS	MONOTROPSIS ODORATA	SWEET PINESAP	T	G3/S2
Northern	Wolfe	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Northern	Wolfe	VASCULAR PLANTS	PLATANTHERA PSYCODES	SMALL PURPLE-FRINGED ORCHID	E	G5/S1
Northern	Wolfe	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Northern	Wolfe	VASCULAR PLANTS	SOLIDAGO ALBOPILOSA	WHITE-HAIRED GOLDENROD	T/LT	G2/S2
Northern	Wolfe	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Northern	Wolfe	VASCULAR PLANTS	TAXUS CANADENSIS	CANADIAN YEW	T	G5/S2S3
Northern	Wolfe	VASCULAR PLANTS	TRIENTALIS BOREALIS	NORTHERN STARFLOWER	E	G5/S1
Northern	Wolfe	VASCULAR PLANTS	GNAPHALIUM HELLERI VAR MICRADENIUM	SMALL RABBIT TOBACCO	H	G4G5T3?/SH
Northern	Wolfe	VASCULAR PLANTS	JUNCUS ARTICULATUS	JOINTED RUSH	S	G5/S2S3
Northern	Wolfe	VASCULAR PLANTS	STELLARIA LONGIFOLIA	LONGLEAF STITCHWORT	S	G5/S2S3
Northern	Wolfe	VASCULAR PLANTS	CIRCAEA ALPINA	SMALL ENCHANTER'S NIGHTSHADE	S	G5/S3
Northern	Wolfe	VASCULAR PLANTS	AGERATINA LUCIAE-BRAUNIAE	LUCY BRAUN'S WHITE SNAKEROOT	S	G3/S3
Northern	Wolfe	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Northern	Wolfe	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Northern	Wolfe	VASCULAR PLANTS	CAREX RUGOSPERMA	UMBEL-LIKE SEDGE	T	G5/S2?
Northern	Wolfe	VASCULAR PLANTS	ACER SPICATUM	MOUNTAIN MAPLE	E	G5/S1S2
Northern	Wolfe	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Northern	Wolfe	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Northern	Woodford	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Northern	Woodford	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Northern	Woodford	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Northern	Woodford	BIRDS	POOECETES GRAMINEUS	VESPER SPARROW	E	G5/S1B,SZN
Northern	Woodford	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Northern	Woodford	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Northern	Woodford	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Northern	Woodford	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Northern	Woodford	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Northern	Woodford	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1

Northern	Woodford	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Northern	Woodford	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Northern	Woodford	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Northern	Woodford	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Northern	Woodford	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Northern	Woodford	CRUSTACEANS	CAECIDOTEA BARRI	CLIFTON CAVE ISOPOD	E	G1G3/S1
Northern	Woodford	FISHES	NOCOMIS BIGUTTATUS	HORNYHEAD CHUB	S	G5/SU
Northern	Woodford	INSECTS	PSEUDANOPHTHALMUS HORNI CAECUS	CLIFTON CAVE BEETLE	T	G3T1T2/S1
Northern	Woodford	INSECTS	PSEUDANOPHTHALMUS HORNI ABDITUS	CONCEALED CAVE BEETLE	T	G3T3/S2
Northern	Woodford	MAMMALS	MUSTELA NIVALIS	LEAST WEASEL	S	G5/S2S3
Northern	Woodford	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD SWAMP		N	S3
Northern	Woodford	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Northern	Woodford	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Northern	Woodford	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Northern	Woodford	VASCULAR PLANTS	VIBURNUM MOLLE	SOFTLEAF ARROW-WOOD	T	G5/S3?
Northern	Woodford	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP HISPIDISSIMUM	HAIRY FALSE GROMWELL	E	G4G5T4/S1
Northern	Woodford	VASCULAR PLANTS	STELLARIA FONTINALIS	WATER STITCHWORT	T	G3/S2
Northern	Woodford	VASCULAR PLANTS	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	T/LE	G3/S2S3
Northern	Woodford	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3
Northern	Woodford	VASCULAR PLANTS	VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	S	G5/S3
Northern	Woodford	VASCULAR PLANTS	SPIRANTHES ODORATA	SWEETSCENT LADIES'-TRESSES	E	G5/S1
Southern	Adair	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Adair	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Adair	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Adair	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Adair	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Adair	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Adair	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Adair	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Adair	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Southern	Adair	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Adair	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Southern	Adair	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Southern	Adair	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	Adair	INSECTS	ALLOCAPNIA CUNNINGHAMI		H	G1/SH
Southern	Adair	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Adair	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Adair	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Adair	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Southern	Adair	OTHER TYPES	PSEUDOTREMIA MEROPS		T	G1G2/S1S2
Southern	Adair	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Southern	Adair	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Southern	Adair	VASCULAR PLANTS	HETERANTHERA DUBIA	GRASSLEAF MUD-PLANTAIN	S	G5/S3
Southern	Adair	VASCULAR PLANTS	ELYMUS SVENSONII	SVENSON'S WILDRYE	S	G2G3/S3

Southern	Adair	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Southern	Adair	VASCULAR PLANTS	PARNASSIA GRANDIFOLIA	LARGE-LEAVED GRASS-OF-PARNASSUS	E	G3/S1
Southern	Adair	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Adair	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Southern	Adair	VASCULAR PLANTS	ACER SPICATUM	MOUNTAIN MAPLE	E	G5/S1S2
Southern	Barren	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Barren	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Barren	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Barren	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Barren	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Barren	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Barren	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Southern	Barren	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Barren	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Barren	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Barren	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Barren	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Barren	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Barren	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Barren	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Barren	CRUSTACEANS	PALAEMONIAS GANTERI	MAMMOTH CAVE SHRIMP	E/LE	G1/S1
Southern	Barren	CRUSTACEANS	ORCONECTES PELLUCIDUS	A CRAYFISH	S	G3/S3
Southern	Barren	CRUSTACEANS	STYGOBROMUS VITREUS	AN AMPHIPOD	S	G3G4/S1
Southern	Barren	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Barren	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Southern	Barren	FISHES	THOBURNIA ATRIPINNIS	BLACKFIN SUCKER	S	G2/S2
Southern	Barren	FISHES	TYPHLICHTHYS SUBTERRANEUS	SOUTHERN CAVEFISH	S	G4/S2S3
Southern	Barren	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Southern	Barren	GASTROPODS	HELICODISCUS NOTIUS SPECUS	A SNAIL	T	G5T?/S1
Southern	Barren	GASTROPODS	PLEUROCERA ALVEARE	RUGGED HORNSNAIL	S	G3G4/S3S4
Southern	Barren	GASTROPODS	ANTROSELATES SPIRALIS	SHAGGY CAVESNAIL	S	G2/S2
Southern	Barren	INSECTS	PSEUDANOPHTHALMUS PUBESCENS INTREPIDUS	A CAVE BEETLE	T	G3T3/S2
Southern	Barren	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Barren	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Barren	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Barren	OTHER TYPES	KLEPTOCHTHONIUS HUBRICHTI		T	G1G2/S1S2
Southern	Barren	PALUSTRINE COMMUNITIES	DEPRESSION SWAMP		N	S2
Southern	Barren	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Southern	Barren	REPTILES	OPHISAURUS ATTENUATUS LONGICAUDUS	EASTERN SLENDER GLASS LIZARD	T	G5T5/S2
Southern	Barren	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Southern	Barren	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Southern	Barren	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Southern	Barren	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Southern	Barren	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Southern	Barren	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2

Southern	Barren	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Barren	VASCULAR PLANTS	CASTANEA DENTATA	AMERICAN CHESTNUT	E	G4/S1?
Southern	Barren	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Southern	Barren	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Southern	Barren	VASCULAR PLANTS	LESPEDEZA CAPITATA	ROUND-HEAD BUSH-CLOVER	S	G5/S3
Southern	Barren	VASCULAR PLANTS	CYPRIPEDIUM REGINAE	SHOWY LADY'S-SLIPPER	H	G4/SH
Southern	Barren	VASCULAR PLANTS	HELIANTHEMUM BICKNELLII	PLAINS FROSTWEED	T	G5/S2?
Southern	Barren	VASCULAR PLANTS	LESPEDEZA STUEVEI	TALL BUSH-CLOVER	S	G4?/S3?
Southern	Barren	VASCULAR PLANTS	SPOROBOLUS CLANDESTINUS	ROUGH DROPSEED	T	G5/S2S3
Southern	Barren	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Southern	Barren	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Barren	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3
Southern	Barren	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Southern	Barren	VASCULAR PLANTS	VIBURNUM NUDUM	POSSUMHAW	E	G5/S1
Southern	Barren	VASCULAR PLANTS	GLYCERIA ACUTIFLORA	SHARP-SCALED MANNA-GRASS	T	G5/S2
Southern	Breckinridge	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Breckinridge	AMPHIBIANS	HYLA VERSICOLOR	GRAY TREEFROG	S	G5/S2S3
Southern	Breckinridge	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Southern	Breckinridge	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Breckinridge	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Breckinridge	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Breckinridge	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Breckinridge	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Breckinridge	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Breckinridge	CRUSTACEANS	ORCONECTES INERMIS INERMIS		S	G4T3T4/S3
Southern	Breckinridge	CRUSTACEANS	ORCONECTES AUSTRALIS PACKARDI	A CRAYFISH	T	G4T3/S2S3
Southern	Breckinridge	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Southern	Breckinridge	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Southern	Breckinridge	FISHES	AMBLYOPSIS SPELAEA	NORTHERN CAVEFISH	S	G3/S3
Southern	Breckinridge	GASTROPODS	ANTROSELATES SPIRALIS	SHAGGY CAVESNAIL	S	G2/S2
Southern	Breckinridge	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Breckinridge	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Southern	Breckinridge	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Breckinridge	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Southern	Breckinridge	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Breckinridge	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Breckinridge	REPTILES	MACROCLEMYS TEMMINCKII	ALLIGATOR SNAPPING TURTLE	T	G3G4/S2
Southern	Breckinridge	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Southern	Breckinridge	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Breckinridge	VASCULAR PLANTS	OENOTHERA LINIFOLIA	THREAD-LEAF SUNDROPS	E	G5/S1S2
Southern	Breckinridge	VASCULAR PLANTS	LESPEDEZA CAPITATA	ROUND-HEAD BUSH-CLOVER	S	G5/S3
Southern	Breckinridge	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3

Southern	Breckinridge	VASCULAR PLANTS	DRABA CUNEIFOLIA	WEDGE-LEAF WHITLOW-GRASS	E	G5/S1
Southern	Bullitt	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Bullitt	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Bullitt	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Bullitt	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Bullitt	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Southern	Bullitt	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Bullitt	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Bullitt	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Bullitt	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Bullitt	CRUSTACEANS	ORCONECTES JEFFERSONI	LOUISVILLE CRAYFISH	E	G1/S1
Southern	Bullitt	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Southern	Bullitt	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Bullitt	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Bullitt	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Southern	Bullitt	TERRESTRIAL COMMUNITIES	DOLOMITE GLADE		N	S2
Southern	Bullitt	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Bullitt	VASCULAR PLANTS	SPIRANTHES OCHROLEUCA	YELLOW NODDING LADIES'-TRESSES	S	G4/S3?
Southern	Bullitt	VASCULAR PLANTS	JUNCUS FILIPENDULUS	RINGSEED RUSH	T	G5/S2?
Southern	Bullitt	VASCULAR PLANTS	LEAVENWORTHIA EXIGUA VAR LACINIATA	GLADE CRESS	T	G4T1T2/S1S2
Southern	Bullitt	VASCULAR PLANTS	OENOTHERA TRILOBA	STEMLESS EVENING-PRIMROSE	T	G4/S1S2
Southern	Bullitt	VASCULAR PLANTS	RUBUS WHARTONIAE	WHARTON'S DEWBERRY	T	G2Q/S2
Southern	Bullitt	VASCULAR PLANTS	SPIRANTHES MAGNICAMPORUM	GREAT PLAINS LADIES'-TRESSES	T	G4/S2
Southern	Bullitt	VASCULAR PLANTS	SPOROBOLUS HETEROLEPIS	NORTHERN DROPSEED	E	G5/S1
Southern	Bullitt	VASCULAR PLANTS	ISOETES MELANOPODA	BLACKFOOT QUILLWORT	E	G5/S1
Southern	Bullitt	VASCULAR PLANTS	VIOLA SEPTEMLOBA VAR EGGLESTONII	EGGLESTON'S VIOLET	S	G4/S3
Southern	Bullitt	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Southern	Bullitt	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3
Southern	Bullitt	VASCULAR PLANTS	HEDEOMA HISPIDUM	ROUGH PENNYROYAL	T	G5/S2
Southern	Bullitt	VASCULAR PLANTS	AGRIMONIA GRYPOSEPALA	TALL HAIRY GROOVEBUR	T	G5/S1S2
Southern	Bullitt	VASCULAR PLANTS	STELLARIA LONGIFOLIA	LONGLEAF STITCHWORT	S	G5/S2S3
Southern	Bullitt	VASCULAR PLANTS	ASTER DRUMMONDII VAR TEXANUS	TEXAS ASTER	T	G5T?/S2
Southern	Bullitt	VASCULAR PLANTS	CAREX CRAWEI	CRAWE'S SEDGE	S	G5/S2S3
Southern	Bullitt	VASCULAR PLANTS	CHEILANTHES FEEI	FEE'S LIPFERN	E	G5/S1
Southern	Bullitt	VASCULAR PLANTS	FIMBRISTYLIS PUBERULA	HAIRY FIMBRISTYLIS	T	G5/S2
Southern	Butler	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Butler	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Southern	Butler	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Butler	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Butler	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Butler	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Butler	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Butler	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1

Southern	Butler	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Butler	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Butler	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Butler	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Butler	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Butler	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Southern	Butler	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Butler	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Butler	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Butler	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Butler	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Southern	Butler	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Southern	Butler	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Southern	Butler	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Butler	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Southern	Butler	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Butler	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Southern	Casey	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Casey	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Casey	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Casey	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Casey	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Casey	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Casey	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Casey	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Casey	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Southern	Casey	FISHES	PERCOPSIS OMISCOMAYCUS	TROUT-PERCH	S	G5/S3
Southern	Casey	INSECTS	STYLURUS SCUDDERI	ZEBRA CLUBTAIL	N	G4/SH
Southern	Casey	INSECTS	OPHIOGOMPHUS MAINENSIS	MAINE SNAKETAIL	N	G4/S1
Southern	Casey	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Southern	Casey	VASCULAR PLANTS	TRILLIUM PUSILLUM	LEAST TRILLIUM	E	G3/S1
Southern	Casey	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Southern	Casey	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Southern	Clinton	BIRDS	RALLUS ELEGANS	KING RAIL	E	G4G5/S1B
Southern	Clinton	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Southern	Clinton	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Clinton	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Clinton	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Clinton	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Clinton	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Clinton	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Clinton	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Clinton	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Clinton	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Clinton	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	Clinton	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Southern	Clinton	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Clinton	PALUSTRINE COMMUNITIES	DEPRESSION SWAMP		N	S2
Southern	Clinton	PALUSTRINE COMMUNITIES	CALCAREOUS SEEP		N	S1

Southern	Clinton	PALUSTRINE COMMUNITIES	SINKHOLE/DEPRESSION MARSH		N	S1S2
Southern	Clinton	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Southern	Clinton	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Southern	Clinton	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Southern	Clinton	VASCULAR PLANTS	EUPHORBIA MERCURIALINA	MERCURY SPURGE	T	G4/S1S2
Southern	Clinton	VASCULAR PLANTS	PARNASSIA ASARIFOLIA	KIDNEYLEAF GRASS-OF-PARNASSUS	E	G4/S1
Southern	Clinton	VASCULAR PLANTS	PARNASSIA GRANDIFOLIA	LARGE-LEAVED GRASS-OF-PARNASSUS	E	G3/S1
Southern	Clinton	VASCULAR PLANTS	THASPIUM PINNATIFIDUM	CUTLEAF MEADOW-PARSNIP	T	G2G3/S2S3
Southern	Clinton	VASCULAR PLANTS	HELIANTHUS SILPHIOIDES	SILPHIUM SUNFLOWER	E	G3G4/S1
Southern	Clinton	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Southern	Clinton	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Clinton	VASCULAR PLANTS	POTAMOGETON PULCHER	SPOTTED PONDWEED	T	G5/S1S2
Southern	Cumberland	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Cumberland	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Cumberland	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Cumberland	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Cumberland	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Cumberland	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Cumberland	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Cumberland	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Cumberland	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Cumberland	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Cumberland	BIVALVES	EPIOBLASMA BREVIDENS	CUMBERLANDIAN COMBSHELL	E/LE	G1/S1
Southern	Cumberland	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Cumberland	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Cumberland	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Cumberland	BIVALVES	EPIOBLASMA CAPSAEFORMIS	OYSTER MUSSEL	E/LE	G1/S1
Southern	Cumberland	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Southern	Cumberland	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Cumberland	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Southern	Cumberland	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Cumberland	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Cumberland	FISHES	NOTROPIS ALBIZONATUS	PALEZONE SHINER	E/LE	G2/S1
Southern	Cumberland	FISHES	ERIMYSTAX INSIGNIS	BLOTCHED CHUB	E	G3G4/S1
Southern	Cumberland	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Southern	Cumberland	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	Cumberland	INSECTS	ALLOCAPNIA CUNNINGHAMI		H	G1/SH
Southern	Cumberland	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Cumberland	VASCULAR PLANTS	PHILADELPHUS PUBESCENS	HOARY MOCK ORANGE	E	G5?/S1
Southern	Cumberland	VASCULAR PLANTS	MATELEA CAROLINENSIS	CAROLINA ANGLEPOD	E	G4/S1?
Southern	Cumberland	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Cumberland	VASCULAR PLANTS	PHILADELPHUS INODORUS	MOCK ORANGE	T	G4G5/S1S2
Southern	Edmonson	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Southern	Edmonson	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3

Southern	Edmonson	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Edmonson	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Southern	Edmonson	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Edmonson	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Southern	Edmonson	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Edmonson	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Edmonson	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Edmonson	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Edmonson	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Edmonson	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Edmonson	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Edmonson	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Edmonson	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Edmonson	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Edmonson	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Edmonson	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Southern	Edmonson	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Edmonson	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Edmonson	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Edmonson	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Edmonson	CRUSTACEANS	PALAEMONIAS GANTERI	MAMMOTH CAVE SHRIMP	E/LE	G1/S1
Southern	Edmonson	CRUSTACEANS	ORCONECTES PELLUCIDUS	A CRAYFISH	S	G3/S3
Southern	Edmonson	CRUSTACEANS	STYGOBROMUS VITREUS	AN AMPHIPOD	S	G3G4/S1
Southern	Edmonson	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Edmonson	FISHES	TYPHLICHTHYS SUBTERRANEUS	SOUTHERN CAVEFISH	S	G4/S2S3
Southern	Edmonson	FISHES	AMMOCRYPTA CLARA	WESTERN SAND DARTER	E	G3/S1
Southern	Edmonson	FISHES	AMBLYOPSIS SPELAEA	NORTHERN CAVEFISH	S	G3/S3
Southern	Edmonson	FISHES	NOTURUS EXILIS	SLENDER MADTOM	E	G5/S1
Southern	Edmonson	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Southern	Edmonson	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Edmonson	GASTROPODS	HELICODISCUS PUNCTATELLUS	PUNCTATE COIL	S	G?/S1
Southern	Edmonson	GASTROPODS	ANTROSELATES SPIRALIS	SHAGGY CAVESNAIL	S	G2/S2
Southern	Edmonson	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Edmonson	INSECTS	LYTROSIS PERMAGNARIA	A GEOMETRID MOTH	E	G3G4/S1
Southern	Edmonson	INSECTS	PSEUDOSINELLA ESPANITA	A CAVE SPRINGTAIL	S	G1G2/S1S2
Southern	Edmonson	INSECTS	PSEUDANOPHTHALMUS INEXPECTATUS	SURPRISING CAVE BEETLE	T	G3/S2
Southern	Edmonson	INSECTS	PSEUDANOPHTHALMUS AUDAX	BOLD CAVE BEETLE	T	G3/S1
Southern	Edmonson	INSECTS	CELITHEMIS VERNA	DOUBLE-RINGED PENNANT	S	G5/S1
Southern	Edmonson	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Southern	Edmonson	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Southern	Edmonson	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Edmonson	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Southern	Edmonson	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Edmonson	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Edmonson	OTHER TYPES	TYRANNOCHTHONIUS HYPOGEUS		S	G1G2/S1S2
Southern	Edmonson	OTHER TYPES	KLEPTOCHTHONIUS CERBERUS		S	G1G2/S1S2
Southern	Edmonson	OTHER TYPES	KLEPTOCHTHONIUS HAGENI		S	G1G2/S1S2
Southern	Edmonson	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Southern	Edmonson	REPTILES	OPHISAURUS ATTENUATUS LONGICAUDUS	EASTERN SLENDER GLASS LIZARD	T	G5T5/S2
Southern	Edmonson	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2

Southern	Edmonson	REPTILES	LAMPROPELTIS TRIANGULUM ELAPSOIDES	SCARLET KINGSNAKE	S	G5T5/S3
Southern	Edmonson	REPTILES	EUMECES ANTHRACINUS ANTHRACINUS	NORTHERN COAL SKINK	T	G5T5/S2
Southern	Edmonson	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Southern	Edmonson	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Southern	Edmonson	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Southern	Edmonson	VASCULAR PLANTS	POTAMOGETON PULCHER	SPOTTED PONDWEED	T	G5/S1S2
Southern	Edmonson	VASCULAR PLANTS	SAGITTARIA RIGIDA	SESSILE-FRUITED ARROWHEAD	E	G5/S1
Southern	Edmonson	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Southern	Edmonson	VASCULAR PLANTS	CYPRIPEDIUM REGINAE	SHOWY LADY'S-SLIPPER	H	G4/SH
Southern	Edmonson	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2
Southern	Edmonson	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Southern	Edmonson	VASCULAR PLANTS	SCLERIA CILIATA VAR CILIATA	FRINGED NUTRUSH	E	G5T?/S1?
Southern	Edmonson	VASCULAR PLANTS	POLYGALA CRUCIATA	CROSSLEAF MILKWORT	E	G5/S1
Southern	Edmonson	VASCULAR PLANTS	GLANDULARIA CANADENSIS	ROSE MOCK VERVAIN	T	G5/S2S3
Southern	Edmonson	VASCULAR PLANTS	GNAPHALIUM HELLERI VAR MICRADENIUM	SMALL RABBIT TOBACCO	H	G4G5T3?/SH
Southern	Edmonson	VASCULAR PLANTS	HELIANTHEMUM BICKNELLII	PLAINS FROSTWEED	T	G5/S2?
Southern	Edmonson	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Edmonson	VASCULAR PLANTS	SILENE REGIA	ROYAL CATCHFLY	E	G3/S1
Southern	Edmonson	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Southern	Edmonson	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3
Southern	Edmonson	VASCULAR PLANTS	LUDWIGIA HIRTELLA	HAIRY LUDWIGIA	E	G5/S1
Southern	Edmonson	VASCULAR PLANTS	MELANTHIUM WOODII	WOOD BUNCHFLOWER	T	G5/S2
Southern	Edmonson	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Southern	Edmonson	VASCULAR PLANTS	AGRIMONIA GRYPOSEPALA	TALL HAIRY GROOVEBUR	T	G5/S1S2
Southern	Edmonson	VASCULAR PLANTS	AGALINIS SKINNERIANA	PALE FALSE FOXGLOVE	E	G3/S1S2
Southern	Edmonson	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Southern	Edmonson	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Southern	Edmonson	VASCULAR PLANTS	VIOLA WALTERI	WALTER'S VIOLET	T	G4G5/S2
Southern	Edmonson	VASCULAR PLANTS	VIBURNUM NUDUM	POSSUMHAW	E	G5/S1
Southern	Edmonson	VASCULAR PLANTS	APIOS PRICEANA	PRICE'S POTATO-BEAN	E/LT	G2/S1
Southern	Edmonson	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Southern	Edmonson	VASCULAR PLANTS	ARISTIDA RAMOSISSIMA	BRANCHED THREE-AWN GRASS	H	G5/SH
Southern	Edmonson	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Edmonson	VASCULAR PLANTS	CAREX DECOMPOSITA	EPIPHYTIC SEDGE	T	G3/S2
Southern	Edmonson	VASCULAR PLANTS	SPOROBOLUS CLANDESTINUS	ROUGH DROPSEED	T	G5/S2S3
Southern	Edmonson	VASCULAR PLANTS	CIRCAEA ALPINA	SMALL ENCHANTER'S NIGHTSHADE	S	G5/S3
Southern	Grayson	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Grayson	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Grayson	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B

Southern	Grayson	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Grayson	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Grayson	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Grayson	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Grayson	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Grayson	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Grayson	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Southern	Grayson	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Grayson	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Southern	Grayson	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Grayson	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Grayson	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Grayson	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Southern	Grayson	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Grayson	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Grayson	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Grayson	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Southern	Grayson	TERRESTRIAL COMMUNITIES	XEROHYDRIC FLATWOODS		N	S1
Southern	Grayson	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Southern	Grayson	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Southern	Grayson	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Southern	Grayson	TERRESTRIAL COMMUNITIES	LIMESTONE PRAIRIE		N	S1
Southern	Grayson	TERRESTRIAL COMMUNITIES	DEEP SOIL MESOPHYTIC FOREST		N	S5
Southern	Grayson	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Southern	Grayson	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Grayson	TERRESTRIAL COMMUNITIES	LIMESTONE FLAT ROCK GLADE		N	S1
Southern	Grayson	TERRESTRIAL COMMUNITIES	CALCAREOUS SUB-XERIC FOREST		N	S5
Southern	Grayson	TERRESTRIAL COMMUNITIES	XERIC ACIDIC FOREST		N	S5
Southern	Grayson	VASCULAR PLANTS	SPIRANTHES MAGNICAMPORUM	GREAT PLAINS LADIES'-TRESSES	T	G4/S2
Southern	Grayson	VASCULAR PLANTS	LESPEDEZA CAPITATA	ROUND-HEAD BUSH-CLOVER	S	G5/S3
Southern	Grayson	VASCULAR PLANTS	HIERACIUM LONGIPILUM	HAIRY HAWKWEED	T	G4G5/S2
Southern	Grayson	VASCULAR PLANTS	PRENANTHES ASPERA	ROUGH RATTLESNAKE-ROOT	E	G4?/S1
Southern	Grayson	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Grayson	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Southern	Grayson	VASCULAR PLANTS	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	T	G5T?/S2
Southern	Grayson	VASCULAR PLANTS	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	S	G4G5T4T5/S3
Southern	Grayson	VASCULAR PLANTS	CAREX CRAWEI	CRAWE'S SEDGE	S	G5/S2S3
Southern	Green	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Green	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Green	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Green	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Green	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Green	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1

Southern	Green	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Green	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Green	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Green	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Green	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Green	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Green	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Southern	Green	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Green	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Green	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Green	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Green	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Green	CRUSTACEANS	ORCONECTES PELLUCIDUS	A CRAYFISH	S	G3/S3
Southern	Green	CRUSTACEANS	ORCONECTES INERMIS INERMIS		S	G4T3T4/S3
Southern	Green	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Southern	Green	FISHES	AMMOCRYPTA CLARA	WESTERN SAND DARTER	E	G3/S1
Southern	Green	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Green	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Southern	Green	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Southern	Green	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Southern	Green	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Southern	Green	INSECTS	ERORA LAETA	EARLY HAIRSTREAK	S	G3G4/S1
Southern	Green	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Green	INSECTS	OPHIOGOMPHUS ASPERSUS	BROOK SNAKETAIL	H	G3G4/SH
Southern	Green	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Green	PALUSTRINE COMMUNITIES	SINKHOLE/DEPRESSION POND		N	S2S3
Southern	Green	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Southern	Green	TERRESTRIAL COMMUNITIES	XEROHYDRIC FLATWOODS		N	S1
Southern	Green	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Green	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Southern	Green	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Southern	Green	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Southern	Green	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Hardin	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Hardin	AMPHIBIANS	HYLA VERSICOLOR	GRAY TREEFROG	S	G5/S2S3
Southern	Hardin	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Hardin	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Hardin	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Hardin	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Hardin	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Hardin	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Hardin	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Hardin	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Hardin	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Hardin	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Hardin	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Hardin	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2

Southern	Hardin	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Hardin	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Hardin	CRUSTACEANS	ORCONECTES INERMIS INERMIS		S	G4T3T4/S3
Southern	Hardin	FISHES	LOTA LOTA	BURBOT	S	G5/SU
Southern	Hardin	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Southern	Hardin	FISHES	AMBLYOPSIS SPELAEA	NORTHERN CAVEFISH	S	G3/S3
Southern	Hardin	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Hardin	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Southern	Hardin	GASTROPODS	ANTROSELATES SPIRALIS	SHAGGY CAVESNAIL	S	G2/S2
Southern	Hardin	INSECTS	PAPAIPEMA ERYNGII	RATTLESNAKE-MASTER BORER MOTH	E	G1G2/S1
Southern	Hardin	INSECTS	SATYRIUM FAVONIUS ONTARIO	NORTHERN HAIRSTREAK	S	G4T4/S1
Southern	Hardin	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Southern	Hardin	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Hardin	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Hardin	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Southern	Hardin	PALUSTRINE COMMUNITIES	ALLUVIAL FOREST		N	S5
Southern	Hardin	REPTILES	OPHISAURUS ATTENUATUS LONGICAUDUS	EASTERN SLENDER GLASS LIZARD	T	G5T5/S2
Southern	Hardin	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Southern	Hardin	TERRESTRIAL COMMUNITIES	SANDSTONE BARRENS		N	S1
Southern	Hardin	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Hardin	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Southern	Hardin	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Southern	Hardin	VASCULAR PLANTS	SPIRANTHES MAGNICAMPORUM	GREAT PLAINS LADIES'-TRESSES	T	G4/S2
Southern	Hardin	VASCULAR PLANTS	PSORALIDIUM TENUIFLORUM	FEW-FLOWERED SCURF-PEA	E	G5/S1
Southern	Hardin	VASCULAR PLANTS	FIMBRISTYLIS PUBERULA	HAIRY FIMBRISTYLIS	T	G5/S2
Southern	Hardin	VASCULAR PLANTS	PONTEDERIA CORDATA	PICKEREL WEED	T	G5/S1S2
Southern	Hardin	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Southern	Hardin	VASCULAR PLANTS	GLYCERIA ACUTIFLORA	SHARP-SCALED MANNA-GRASS	T	G5/S2
Southern	Hardin	VASCULAR PLANTS	GYMNOPOGON AMBIGUUS	BEARDED SKELETONGRASS	S	G4/S2S3
Southern	Hardin	VASCULAR PLANTS	HELIANTHEMUM BICKNELLII	PLAINS FROSTWEED	T	G5/S2?
Southern	Hardin	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Hardin	VASCULAR PLANTS	HIERACIUM LONGIPILUM	HAIRY HAWKWEED	T	G4G5/S2
Southern	Hardin	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Southern	Hardin	VASCULAR PLANTS	LONICERA RETICULATA	GRAPE HONEYSUCKLE	E	G5/S1
Southern	Hardin	VASCULAR PLANTS	PYCNANTHEMUM MUTICUM	BLUNT MOUNTAIN MINT	T	G5/S2?
Southern	Hardin	VASCULAR PLANTS	LESPEDEZA CAPITATA	ROUND-HEAD BUSH-CLOVER	S	G5/S3
Southern	Hardin	VASCULAR PLANTS	LIATRIS CYLINDRACEA	SLENDER BLAZING-STAR	T	G5/S2S3
Southern	Hardin	VASCULAR PLANTS	PHILADELPHUS PUBESCENS	HOARY MOCK ORANGE	E	G5?/S1
Southern	Hardin	VASCULAR PLANTS	NAJAS GRACILLIMA	THREAD-LIKE NAIAD	S	G5?/S2S3
Southern	Hardin	VASCULAR PLANTS	POLYGALA CRUCIATA	CROSSLEAF MILKWORT	E	G5/S1
Southern	Hardin	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2

Southern	Hardin	VASCULAR PLANTS	VIOLA WALTERI	WALTER'S VIOLET	T	G4G5/S2
Southern	Hardin	VASCULAR PLANTS	SILPHIUM PINNATIFIDUM	PRAIRIE-DOCK	S	G3Q/S3S4
Southern	Hardin	VASCULAR PLANTS	VIOLA SEPTEMLOBA VAR EGGLESTONII	EGGLESTON'S VIOLET	S	G4/S3
Southern	Hardin	VASCULAR PLANTS	SILPHIUM LACINIATUM VAR LACINIATUM	COMPASS PLANT	E	G5T?/S1S2
Southern	Hardin	VASCULAR PLANTS	SILENE REGIA	ROYAL CATCHFLY	E	G3/S1
Southern	Hardin	VASCULAR PLANTS	SEDUM TELEPHIOIDES	ALLEGHENY STONECROP	T	G4/S2
Southern	Hardin	VASCULAR PLANTS	SCLERIA CILIATA VAR CILIATA	FRINGED NUTRUSH	E	G5T?/S1?
Southern	Hardin	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Southern	Hardin	VASCULAR PLANTS	THASPIUM PINNATIFIDUM	CUTLEAF MEADOW-PARSNIP	T	G2G3/S2S3
Southern	Hardin	VASCULAR PLANTS	CYPRIPEDIUM CANDIDUM	SMALL WHITE LADY'S-SLIPPER	E	G4/S1
Southern	Hardin	VASCULAR PLANTS	ASTER DRUMMONDII VAR TEXANUS	TEXAS ASTER	T	G5T?/S2
Southern	Hardin	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3
Southern	Hardin	VASCULAR PLANTS	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	S	G4G5T4T5/S3
Southern	Hardin	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Southern	Hardin	VASCULAR PLANTS	CAREX CRAWEI	CRAWE'S SEDGE	S	G5/S2S3
Southern	Hardin	VASCULAR PLANTS	RANUNCULUS AMBIGENS	WATERPLANTAIN SPEARWORT	S	G4/S3
Southern	Hardin	VASCULAR PLANTS	LEAVENWORTHIA TORULOSA	NECKLACE GLADECRESS	T	G4/S2
Southern	Hart	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Hart	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Hart	BIRDS	CIRCUS CYANEUS	NORTHERN HARRIER	T	G5/S1S2B,S4N
Southern	Hart	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Hart	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Southern	Hart	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Hart	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Hart	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Southern	Hart	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Hart	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Hart	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Hart	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Hart	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Hart	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Hart	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Hart	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Hart	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Hart	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Hart	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Hart	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Hart	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Southern	Hart	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Hart	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Southern	Hart	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Southern	Hart	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Hart	CRUSTACEANS	BRYOCAMPTUS MORRISONI ELEGANS	A COPEPOD	T	G3G4T3T4/S1
Southern	Hart	CRUSTACEANS	STYGOBROMUS VITREUS	AN AMPHIPOD	S	G3G4/S1

Southern	Hart	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Hart	CRUSTACEANS	PALAEMONIAS GANTERI	MAMMOTH CAVE SHRIMP	E/LE	G1/S1
Southern	Hart	CRUSTACEANS	ORCONECTES INERMIS INERMIS		S	G4T3T4/S3
Southern	Hart	CRUSTACEANS	ORCONECTES PELLUCIDUS	A CRAYFISH	S	G3/S3
Southern	Hart	CRUSTACEANS	ORCONECTES AUSTRALIS PACKARDI	A CRAYFISH	T	G4T3/S2S3
Southern	Hart	FISHES	TYPHLICHTHYS SUBTERRANEUS	SOUTHERN CAVEFISH	S	G4/S2S3
Southern	Hart	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Southern	Hart	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Hart	FISHES	HYBOPSIS AMNIS	PALLID SHINER	H	G4/SH
Southern	Hart	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Southern	Hart	FISHES	AMBLYOPSIS SPELAEA	NORTHERN CAVEFISH	S	G3/S3
Southern	Hart	GASTROPODS	RHODACME ELATIOR	DOMED ANCYLID	S	G1/S1
Southern	Hart	GASTROPODS	ANTROSELATES SPIRALIS	SHAGGY CAVESNAIL	S	G2/S2
Southern	Hart	INSECTS	PSEUDANOPHTHALMUS AUDAX	BOLD CAVE BEETLE	T	G3/S1
Southern	Hart	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Hart	INSECTS	PSEUDANOPHTHALMUS SIMULANS	CUB RUN CAVE BEETLE	T	G1G2/S1
Southern	Hart	INSECTS	PSEUDANOPHTHALMUS GLOBICEPS	ROUND-HEADED CAVE BEETLE	T	G1G2/S1
Southern	Hart	INSECTS	CELITHEMIS VERNA	DOUBLE-RINGED PENNANT	S	G5/S1
Southern	Hart	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Hart	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Southern	Hart	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Hart	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Hart	PALUSTRINE COMMUNITIES	SINKHOLE/DEPRESSION POND		N	S2S3
Southern	Hart	REPTILES	OPHISAURUS ATTENUATUS LONGICAUDUS	EASTERN SLENDER GLASS LIZARD	T	G5T5/S2
Southern	Hart	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Southern	Hart	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Southern	Hart	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Southern	Hart	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Hart	TERRESTRIAL COMMUNITIES	LIMESTONE PRAIRIE		N	S1
Southern	Hart	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Southern	Hart	VASCULAR PLANTS	RHYNCHOSPORA MACROSTACHYA	TALL BEAKED-RUSH	E	G4/S1
Southern	Hart	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Hart	VASCULAR PLANTS	LIATRIS CYLINDRACEA	SLENDER BLAZING-STAR	T	G5/S2S3
Southern	Hart	VASCULAR PLANTS	PONTEDERIA CORDATA	PICKEREL WEED	T	G5/S1S2
Southern	Hart	VASCULAR PLANTS	POTAMOGETON PULCHER	SPOTTED PONDWEED	T	G5/S1S2
Southern	Hart	VASCULAR PLANTS	GRATIOLA VISCIDULA	SHORT'S HEDGEHYSSOP	S	G4G5/S3
Southern	Hart	VASCULAR PLANTS	SILENE REGIA	ROYAL CATCHFLY	E	G3/S1
Southern	Hart	VASCULAR PLANTS	SILPHIUM PINNATIFIDUM	PRAIRIE-DOCK	S	G3Q/S3S4
Southern	Hart	VASCULAR PLANTS	SPOROBOLUS CLANDESTINUS	ROUGH DROPSEED	T	G5/S2S3
Southern	Hart	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Southern	Hart	VASCULAR PLANTS	GLYCERIA ACUTIFLORA	SHARP-SCALED MANNA-GRASS	T	G5/S2
Southern	Hart	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Southern	Hart	VASCULAR PLANTS	VIOLA SEPTEMLOBA VAR EGGLESTONII	EGGLESTON'S VIOLET	S	G4/S3
Southern	Hart	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3

Southern	Hart	VASCULAR PLANTS	CAREX DECOMPOSITA	EPIPHYTIC SEDGE	T	G3/S2
Southern	Hart	VASCULAR PLANTS	CAREX STRAMINEA	STRAW SEDGE	T	G5/S2?
Southern	Hart	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Hart	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Southern	Hart	VASCULAR PLANTS	CIRCAEA ALPINA	SMALL ENCHANTER'S NIGHTSHADE	S	G5/S3
Southern	Jackson	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Jackson	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Jackson	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Jackson	BIVALVES	ALASMIDONTA ATROPURPUREA	CUMBERLAND ELKTOE	E/LE	G1G2/S1
Southern	Jackson	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Jackson	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Jackson	BIVALVES	ANODONTOIDES DENIGRATUS	CUMBERLAND PAPERSHELL	E	G1/S1
Southern	Jackson	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Southern	Jackson	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Southern	Jackson	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Southern	Jackson	FISHES	ICHTHYOMYZON FOSSOR	NORTHERN BROOK LAMPREY	T	G4/S2
Southern	Jackson	FISHES	ETHEOSTOMA CINEREUM	ASHY DARTER	S	G2G3/S3
Southern	Jackson	FISHES	PERCINA SQUAMATA	OLIVE DARTER	E	G3/S1
Southern	Jackson	INSECTS	HABROPHLEBIODES CELETERIA		H	G2/SH
Southern	Jackson	INSECTS	OPHIOGOMPHUS HOWEI	PYGMY SNAKETAIL	S	G3/S1S2
Southern	Jackson	INSECTS	TIMPANOGA PROVONSHAI		H	G1/SH
Southern	Jackson	MAMMALS	CORYNORHINUS TOWNSENDII VIRGINIANUS	VIRGINIA BIG-EARED BAT	E/LE	G4T2/S1
Southern	Jackson	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Southern	Jackson	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Jackson	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Southern	Jackson	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Jackson	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Southern	Jackson	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Southern	Jackson	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Southern	Jackson	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Southern	Jackson	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Southern	Jackson	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Southern	Jackson	VASCULAR PLANTS	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	T/LE	G3/S2S3
Southern	Jackson	VASCULAR PLANTS	TAXUS CANADENSIS	CANADIAN YEW	T	G5/S2S3
Southern	Jackson	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Southern	Jackson	VASCULAR PLANTS	SAXIFRAGA MICRANTHIDIFOLIA	LETTUCE-LEAF SAXIFRAGE	E	G5/S1
Southern	Jackson	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2
Southern	Jackson	VASCULAR PLANTS	LIPARIS LOESELII	LOESEL'S TWAYBLADE	T	G5/S2S3
Southern	Jackson	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Southern	Jackson	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Southern	Jackson	VASCULAR PLANTS	AGERATINA LUCIAE-BRAUNIAE	LUCY BRAUN'S WHITE SNAKEROOT	S	G3/S3
Southern	Jackson	VASCULAR PLANTS	CASTILLEJA COCCINEA	SCARLET INDIAN PAINTBRUSH	E	G5/S1
Southern	Jackson	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1

Southern	Larue	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Larue	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Larue	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Larue	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Larue	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Larue	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Larue	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Larue	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Southern	Larue	INSECTS	STENONEMA BEDNARIKI	A HEPTAGENIID MAYFLY	S	G3/S2
Southern	Larue	INSECTS	PSEUDANOPHTHALMUS CNEPHOSUS	A CAVE BEETLE	T	G1G2/S1S2
Southern	Larue	INSECTS	CALEPHELIS MUTICA	SWAMP METALMARK	S	G3G4/S2
Southern	Larue	REPTILES	ELAPHE GUTTATA GUTTATA	CORN SNAKE	S	G5T5/S3
Southern	Larue	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Southern	Larue	TERRESTRIAL COMMUNITIES	CALCAREOUS SUB-XERIC FOREST		N	S5
Southern	Larue	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Southern	Larue	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Larue	VASCULAR PLANTS	MYRIOPHYLLUM HETEROPHYLLUM	BROADLEAF WATER-MILFOIL	S	G5/S3?
Southern	Larue	VASCULAR PLANTS	SPIRANTHES MAGNICAMPORUM	GREAT PLAINS LADIES'-TRESSES	T	G4/S2
Southern	Larue	VASCULAR PLANTS	NAJAS GRACILLIMA	THREAD-LIKE NAIAD	S	G5?/S2S3
Southern	Larue	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Southern	Larue	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3
Southern	Larue	VASCULAR PLANTS	CASTILLEJA COCCINEA	SCARLET INDIAN PAINTBRUSH	E	G5/S1
Southern	Larue	VASCULAR PLANTS	CAREX CRAWEI	CRAWE'S SEDGE	S	G5/S2S3
Southern	Laurel	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Southern	Laurel	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Laurel	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Southern	Laurel	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Laurel	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Laurel	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Laurel	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Laurel	BIRDS	FALCO PEREGRINUS	PEREGRINE FALCON	E	G4/S1B,SZN
Southern	Laurel	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Southern	Laurel	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Laurel	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Southern	Laurel	BIVALVES	ALASMIDONTA ATROPURPUREA	CUMBERLAND ELKTOE	E/LE	G1G2/S1
Southern	Laurel	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Laurel	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Laurel	BIVALVES	ANODONTOIDES DENIGRATUS	CUMBERLAND PAPERSHELL	E	G1/S1
Southern	Laurel	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Laurel	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Southern	Laurel	BIVALVES	EPIOBLASMA CAPSAEFORMIS	OYSTER MUSSEL	E/LE	G1/S1
Southern	Laurel	BIVALVES	EPIOBLASMA BREVIDENS	CUMBERLANDIAN COMBSHELL	E/LE	G1/S1
Southern	Laurel	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Laurel	FISHES	ETHEOSTOMA CINEREUM	ASHY DARTER	S	G2G3/S3
Southern	Laurel	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Southern	Laurel	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3

Southern	Laurel	FISHES	PERCINA SQUAMATA	OLIVE DARTER	E	G3/S1
Southern	Laurel	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Southern	Laurel	GASTROPODS	LEPTOXIS PRAEROSA	ONYX ROCKSNAIL	S	G5/S3S4
Southern	Laurel	GASTROPODS	FUMONELIX WETHERBYI	CLIFTY COVERT	S	G?/S2
Southern	Laurel	GASTROPODS	PLEUROCERA CURTA	SHORTSPIRE HORNSNAIL	S	G2/S2
Southern	Laurel	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Laurel	INSECTS	SPEYERIA IDALIA	REGAL FRITILLARY	H	G3/SH
Southern	Laurel	INSECTS	OPHIOGOMPHUS HOWEI	PYGMY SNAKETAIL	S	G3/S1S2
Southern	Laurel	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Southern	Laurel	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Southern	Laurel	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Laurel	NONVASCULAR PLANTS	POLYTRICHUM PALLIDISETUM	A HAIR CAP MOSS	T	G4/S2?
Southern	Laurel	NONVASCULAR PLANTS	NECKERA PENNATA		T	G5/S2?
Southern	Laurel	PALUSTRINE COMMUNITIES	APPALACHIAN ACID SEEP		N	S2
Southern	Laurel	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Southern	Laurel	PALUSTRINE COMMUNITIES	RIPARIAN FOREST		N	S5
Southern	Laurel	REPTILES	EUMECES ANTHRACINUS ANTHRACINUS	NORTHERN COAL SKINK	T	G5T5/S2
Southern	Laurel	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Southern	Laurel	RIVERINE COMMUNITIES	CUMBERLAND PLATEAU GRAVEL/COBBLE BAR		N	S2
Southern	Laurel	TERRESTRIAL COMMUNITIES	APPALACHIAN PINE-OAK FOREST		N	S5
Southern	Laurel	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Southern	Laurel	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Southern	Laurel	VASCULAR PLANTS	POTAMOGETON ILLINOENSIS	ILLINOIS PONDWEED	S	G5/S2
Southern	Laurel	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Southern	Laurel	VASCULAR PLANTS	CYPRIPEDIUM PARVIFLORUM	SMALL YELLOW LADY'S-SLIPPER	T	G5/S2
Southern	Laurel	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Southern	Laurel	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Southern	Laurel	VASCULAR PLANTS	VITIS RUPESTRIS	SAND GRAPE	T	G3/S2
Southern	Laurel	VASCULAR PLANTS	POTAMOGETON PULCHER	SPOTTED PONDWEED	T	G5/S1S2
Southern	Laurel	VASCULAR PLANTS	GRATIOLA PILOSA	SHAGGY HEDGE HYSSOP	T	G5?/S2
Southern	Laurel	VASCULAR PLANTS	GRATIOLA VISCIDULA	SHORT'S HEDGEHYSSOP	S	G4G5/S3
Southern	Laurel	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Southern	Laurel	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Southern	Laurel	VASCULAR PLANTS	POLYGALA PAUCIFOLIA	GAYWINGS	E	G5/S1?
Southern	Laurel	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Southern	Laurel	VASCULAR PLANTS	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	T	G4G5/S2
Southern	Laurel	VASCULAR PLANTS	SAXIFRAGA MICHAUXII	MICHAUX'S SAXIFRAGE	T	G4G5/S2
Southern	Laurel	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Southern	Laurel	VASCULAR PLANTS	CEANOTHUS HERBACEUS	PRAIRIE REDROOT	T	G5/S2
Southern	Laurel	VASCULAR PLANTS	PLATANTHERA INTEGRILABIA	WHITE FRINGELESS ORCHID	T/C	G2G3/S1S2
Southern	Laurel	VASCULAR PLANTS	LYCOPODIELLA APPRESSA	SOUTHERN BOG CLUBMOSS	E	G5/S1

Southern	Laurel	VASCULAR PLANTS	ASTER CONCOLOR	EASTERN SILVERY ASTER	T	G4?/S2
Southern	Laurel	VASCULAR PLANTS	SOLIDAGO GRACILLIMA	SOUTHERN BOG GOLDENROD	S	G4?/S2?
Southern	Laurel	VASCULAR PLANTS	CAREX GIGANTEA	LARGE SEDGE	T	G4/S2
Southern	Laurel	VASCULAR PLANTS	ERIOPHORUM VIRGINICUM	TAWNY COTTON-GRASS	E	G5/S1?
Southern	Laurel	VASCULAR PLANTS	AGERATINA LUCIAE-BRAUNIAE	LUCY BRAUN'S WHITE SNAKEROOT	S	G3/S3
Southern	Laurel	VASCULAR PLANTS	SOLIDAGO SIMPLEX SSP RANDII	RAND'S GOLDENROD	S	G5T5?/S3
Southern	Laurel	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Southern	Laurel	VASCULAR PLANTS	ASTER SAXICASTELLII	ROCKCASTLE ASTER	T	G1G2/S1S2
Southern	Laurel	VASCULAR PLANTS	COMPTONIA PEREGRINA	SWEET FERN	E	G5/S1
Southern	Laurel	VASCULAR PLANTS	VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	S	G5/S3
Southern	Laurel	VASCULAR PLANTS	ACONITUM UNCINATUM	BLUE MONKSHOOD	T	G4/S2
Southern	Laurel	VASCULAR PLANTS	SOLIDAGO CURTISII	CURTIS' GOLDENROD	T	G5T4T5/S2S3
Southern	Laurel	VASCULAR PLANTS	PLATANTHERA CRISTATA	YELLOW-CRESTED ORCHID	T	G5/S1S2
Southern	Laurel	VASCULAR PLANTS	SPIRAEA VIRGINIANA	VIRGINIA SPIRAEA	T/LT	G2/S2
Southern	Laurel	VASCULAR PLANTS	VITIS LABRUSCA	NORTHERN FOX GRAPE	S	G5/S2S3
Southern	Lincoln	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Lincoln	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Southern	Lincoln	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Lincoln	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Lincoln	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Lincoln	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Lincoln	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Lincoln	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Southern	Lincoln	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Lincoln	TERRESTRIAL COMMUNITIES	KNOBS SHALE BARRENS		N	S2S3
Southern	Lincoln	VASCULAR PLANTS	POLYGALA CRUCIATA	CROSSLEAF MILKWORT	E	G5/S1
Southern	Lincoln	VASCULAR PLANTS	LONICERA RETICULATA	GRAPE HONEYSUCKLE	E	G5/S1
Southern	Lincoln	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Southern	Lincoln	VASCULAR PLANTS	PRENANTHES ALBA	WHITE RATTLESNAKE-ROOT	E	G5/S1
Southern	Lincoln	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP HISPIDISSIMUM	HAIRY FALSE GROMWELL	E	G4G5T4/S1
Southern	Lincoln	VASCULAR PLANTS	NEMOPHILA APHYLLA	SMALL-FLOWER BABY-BLUE-EYES	T	G5/S2?
Southern	Lincoln	VASCULAR PLANTS	VIOLA SEPTEMLOBA VAR EGGLESTONII	EGGLESTON'S VIOLET	S	G4/S3
Southern	Lincoln	VASCULAR PLANTS	HYDROPHYLLUM VIRGINIANUM	EASTERN WATERLEAF	S	G5/S3
Southern	Lincoln	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Southern	Lincoln	VASCULAR PLANTS	CAREX CRAWEI	CRAWE'S SEDGE	S	G5/S2S3
Southern	Lincoln	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Southern	Lincoln	VASCULAR PLANTS	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA	S	G5/S3?
Southern	McCreary	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	McCreary	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N

Southern	McCreary	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Southern	McCreary	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	McCreary	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Southern	McCreary	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	McCreary	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	McCreary	BIVALVES	EPIOBLASMA CAPSAEFORMIS	OYSTER MUSSEL	E/LE	G1/S1
Southern	McCreary	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Southern	McCreary	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	McCreary	BIVALVES	EPIOBLASMA BREVIDENS	CUMBERLANDIAN COMBSHELL	E/LE	G1/S1
Southern	McCreary	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	McCreary	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	McCreary	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	McCreary	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Southern	McCreary	BIVALVES	ANODONTOIDES DENIGRATUS	CUMBERLAND PAPERSHELL	E	G1/S1
Southern	McCreary	BIVALVES	ALASMIDONTA ATROPURPUREA	CUMBERLAND ELKTOE	E/LE	G1G2/S1
Southern	McCreary	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	McCreary	CRUSTACEANS	CAMBARUS PARVOCULUS	A CRAYFISH	E	G4/S1
Southern	McCreary	CRUSTACEANS	ORCONECTES AUSTRALIS PACKARDI	A CRAYFISH	T	G4T3/S2S3
Southern	McCreary	FISHES	ETHEOSTOMA MICROLEPIDUM	SMALLSCALE DARTER	E	G2G3/S1
Southern	McCreary	FISHES	ETHEOSTOMA PERCNURUM	DUSKYTAIL DARTER	E/LE	G1/S1
Southern	McCreary	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Southern	McCreary	FISHES	NOTROPIS SP 4	SAWFIN SHINER	E	G4/S1
Southern	McCreary	FISHES	ETHEOSTOMA NIGRUM SUSANAE	JOHNNY DARTER	E/C	G2/S1
Southern	McCreary	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Southern	McCreary	FISHES	NOTROPIS ALBIZONATUS	PALEZONE SHINER	E/LE	G2/S1
Southern	McCreary	FISHES	ERIMYSTAX INSIGNIS	BLOTCHED CHUB	E	G3G4/S1
Southern	McCreary	FISHES	PERCINA SQUAMATA	OLIVE DARTER	E	G3/S1
Southern	McCreary	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Southern	McCreary	FISHES	ETHEOSTOMA CINEREUM	ASHY DARTER	S	G2G3/S3
Southern	McCreary	GASTROPODS	APPALACHINA CHILHOWEENSIS	QUEEN CRATER	S	G?/S1
Southern	McCreary	GASTROPODS	PLEUROCERA CURTA	SHORTSPIRE HORNSNAIL	S	G2/S2
Southern	McCreary	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Southern	McCreary	GASTROPODS	FUMONELIX WETHERBYI	CLIFTY COVERT	S	G?/S2
Southern	McCreary	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	McCreary	INSECTS	STYLURUS SCUDDERI	ZEBRA CLUBTAIL	N	G4/SH
Southern	McCreary	INSECTS	MANOPHYLAX BUTLERI	A LIMNEPHILID CADDISFLY	S	G2/S2
Southern	McCreary	INSECTS	HABROPHLEBIODES CELETERIA		H	G2/SH
Southern	McCreary	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	McCreary	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Southern	McCreary	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	McCreary	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	McCreary	MAMMALS	SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK	S	G5/S2S3
Southern	McCreary	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Southern	McCreary	NONVASCULAR PLANTS	ORTHOTRICHUM DIAPHANUM		E	G5/S1?
Southern	McCreary	NONVASCULAR PLANTS	DICRANODONTIUM ASPERULUM		E	G4G5/S1?
Southern	McCreary	NONVASCULAR PLANTS	CIRRIPHYLLUM PILIFERUM		T	G5/S2?
Southern	McCreary	NONVASCULAR PLANTS	ANOMODON RUGELII		T	G5/S2?
Southern	McCreary	NONVASCULAR PLANTS	BRYUM MINIATUM		E	G3G4/S1?
Southern	McCreary	PALUSTRINE COMMUNITIES	APPALACHIAN ACID SEEP		N	S2

Southern	McCreary	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Southern	McCreary	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Southern	McCreary	REPTILES	OPHISAURUS ATTENUATUS LONGICAUDUS	EASTERN SLENDER GLASS LIZARD	T	G5T5/S2
Southern	McCreary	REPTILES	LAMPROPELTIS TRIANGULUM ELAPSOIDES	SCARLET KINGSNAKE	S	G5T5/S3
Southern	McCreary	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Southern	McCreary	REPTILES	EUMECES ANTHRACINUS ANTHRACINUS	NORTHERN COAL SKINK	T	G5T5/S2
Southern	McCreary	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Southern	McCreary	RIVERINE COMMUNITIES	CUMBERLAND PLATEAU GRAVEL/COBBLE BAR		N	S2
Southern	McCreary	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Southern	McCreary	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Southern	McCreary	TERRESTRIAL COMMUNITIES	APPALACHIAN PINE-OAK FOREST		N	S5
Southern	McCreary	TERRESTRIAL COMMUNITIES	SILTSTONE/SHALE GLADE		N	SU
Southern	McCreary	VASCULAR PLANTS	ORONTIUM AQUATICUM	GOLDEN CLUB	T	G5/S2
Southern	McCreary	VASCULAR PLANTS	MATELEA CAROLINENSIS	CAROLINA ANGLEPOD	E	G4/S1?
Southern	McCreary	VASCULAR PLANTS	MELANTHIUM PARVIFLORUM	APPALACHIAN BUNCHFLOWER	E	G4?/S1
Southern	McCreary	VASCULAR PLANTS	MINUARTIA CUMBERLANDENSIS	CUMBERLAND SANDWORT	E/LE	G2/S1
Southern	McCreary	VASCULAR PLANTS	MINUARTIA GLABRA	APPALACHIAN SANDWORT	T	G4/S1S2
Southern	McCreary	VASCULAR PLANTS	MONOTROPSIS ODORATA	SWEET PINESAP	T	G3/S2
Southern	McCreary	VASCULAR PLANTS	OENOTHERA PERENNIS	SMALL SUNDROPS	E	G5/S1S2
Southern	McCreary	VASCULAR PLANTS	PARNASSIA ASARIFOLIA	KIDNEYLEAF GRASS-OF-PARNASSUS	E	G4/S1
Southern	McCreary	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2
Southern	McCreary	VASCULAR PLANTS	PHILADELPHUS INODORUS	MOCK ORANGE	T	G4G5/S1S2
Southern	McCreary	VASCULAR PLANTS	OENOTHERA LINIFOLIA	THREAD-LEAF SUNDROPS	E	G5/S1S2
Southern	McCreary	VASCULAR PLANTS	MARSHALLIA GRANDIFLORA	BARBARA'S BUTTONS	E	G2/S1
Southern	McCreary	VASCULAR PLANTS	VITIS RUPESTRIS	SAND GRAPE	T	G3/S2
Southern	McCreary	VASCULAR PLANTS	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	T	G4G5/S2
Southern	McCreary	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Southern	McCreary	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Southern	McCreary	VASCULAR PLANTS	LATHYRUS PALUSTRIS	VETCHLING PEAVINE	T	G5/S2
Southern	McCreary	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Southern	McCreary	VASCULAR PLANTS	HYDROCOTYLE AMERICANA	AMERICAN WATER-PENNYWORT	E	G5/S1
Southern	McCreary	VASCULAR PLANTS	HEXASTYLIS CONTRACTA	SOUTHERN HEARTLEAF	E	G3/S1
Southern	McCreary	VASCULAR PLANTS	PLATANTHERA CRISTATA	YELLOW-CRESTED ORCHID	T	G5/S1S2
Southern	McCreary	VASCULAR PLANTS	SPHENOPHOLIS PENSYLVANICA	SWAMP WEDGESCALE	S	G4/S1S2
Southern	McCreary	VASCULAR PLANTS	GYMNOPOGON AMBIGUUS	BEARDED SKELETONGRASS	S	G4/S2S3
Southern	McCreary	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Southern	McCreary	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Southern	McCreary	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Southern	McCreary	VASCULAR PLANTS	MAIANTHEMUM CANADENSE	WILD LILY-OF-THE-VALLEY	T	G5/S2

Southern	McCreary	VASCULAR PLANTS	GRATIOLA PILOSA	SHAGGY HEDGE HYSSOP	T	G5?/S2
Southern	McCreary	VASCULAR PLANTS	VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	S	G5/S3
Southern	McCreary	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Southern	McCreary	VASCULAR PLANTS	TOXICODENDRON VERNIX	POISON SUMAC	E	G5/S1
Southern	McCreary	VASCULAR PLANTS	THUJA OCCIDENTALIS	NORTHERN WHITE CEDAR	T	G5/S2S3
Southern	McCreary	VASCULAR PLANTS	TEPHROSIA SPICATA	SPIKED HOARY-PEA	E	G4G5/S1S2
Southern	McCreary	VASCULAR PLANTS	TALINUM TERETIFOLIUM	ROUNDLEAF FAMEFLOWER	T	G4/S2
Southern	McCreary	VASCULAR PLANTS	STENANTHIUM GRAMINEUM	EASTERN FEATHERBELLS	T	G4G5/S2S3
Southern	McCreary	VASCULAR PLANTS	SPOROBOLUS CLANDESTINUS	ROUGH DROPSEED	T	G5/S2S3
Southern	McCreary	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Southern	McCreary	VASCULAR PLANTS	SILENE REGIA	ROYAL CATCHFLY	E	G3/S1
Southern	McCreary	VASCULAR PLANTS	SOLIDAGO SIMPLEX SSP RANDII	RAND'S GOLDENROD	S	G5T5?/S3
Southern	McCreary	VASCULAR PLANTS	PLATANTHERA INTEGRILABIA	WHITE FRINGELESS ORCHID	T/C	G2G3/S1S2
Southern	McCreary	VASCULAR PLANTS	SCLERIA CILIATA VAR CILIATA	FRINGED NUTRUSH	E	G5T?/S1?
Southern	McCreary	VASCULAR PLANTS	SCHWALBEA AMERICANA	CHAFFSEED	H/LE	G2/SH
Southern	McCreary	VASCULAR PLANTS	SCHISANDRA GLABRA	BAY STARVINE	E	G3/S1
Southern	McCreary	VASCULAR PLANTS	SAXIFRAGA MICHAUXII	MICHAUX'S SAXIFRAGE	T	G4G5/S2
Southern	McCreary	VASCULAR PLANTS	SALVIA URTICIFOLIA	NETTLE-LEAF SAGE	E	G5/S1
Southern	McCreary	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Southern	McCreary	VASCULAR PLANTS	RHYNCHOSIA TOMENTOSA	HAIRY SNOUTBEAN	E	G5/S1
Southern	McCreary	VASCULAR PLANTS	PRENANTHES CREPIDINEA	NODDING RATTLESNAKE-ROOT	T	G3G4/S2
Southern	McCreary	VASCULAR PLANTS	POTAMOGETON ILLINOENSIS	ILLINOIS PONDWEED	S	G5/S2
Southern	McCreary	VASCULAR PLANTS	POLYGALA POLYGAMA	RACEMED MILKWORT	T	G5/S2
Southern	McCreary	VASCULAR PLANTS	POLYGALA CRUCIATA	CROSSLEAF MILKWORT	E	G5/S1
Southern	McCreary	VASCULAR PLANTS	PODOSTEMUM CERATOPHYLLUM	THREADFOOT	S	G5/S3
Southern	McCreary	VASCULAR PLANTS	SPIRAEA VIRGINIANA	VIRGINIA SPIRAEA	T/LT	G2/S2
Southern	McCreary	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Southern	McCreary	VASCULAR PLANTS	COREOPSIS PUBESCENS	STAR TICKSEED	S	G5?/S2S3
Southern	McCreary	VASCULAR PLANTS	CAREX JOORII	CYPRESS-SWAMP SEDGE	E	G4G5/S1S2
Southern	McCreary	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Southern	McCreary	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Southern	McCreary	VASCULAR PLANTS	CALYCANTHUS FLORIDUS VAR GLAUCUS	EASTERN SWEETSHRUB	T	G5T5/S2
Southern	McCreary	VASCULAR PLANTS	DESCHAMPSIA FLEXUOSA	CRINKLED HAIRGRASS	T	G5/S2
Southern	McCreary	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Southern	McCreary	VASCULAR PLANTS	CYPERUS PLUKENETII	PLUKENET'S CYPERUS	H	G5/SH
Southern	McCreary	VASCULAR PLANTS	CEANOTHUS HERBACEUS	PRAIRIE REDROOT	T	G5/S2
Southern	McCreary	VASCULAR PLANTS	CHRYSOGONUM VIRGINIANUM	GREEN-AND-GOLD	E	G5/S1

Southern	McCreary	VASCULAR PLANTS	COMPTONIA PEREGRINA	SWEET FERN	E	G5/S1
Southern	McCreary	VASCULAR PLANTS	CONRADINA VERTICILLATA	CUMBERLAND ROSEMARY	E/LT	G3/S1
Southern	McCreary	VASCULAR PLANTS	DICHANTHELIUM BOREALE	NORTHERN WITCHGRASS	S	G5/S2S3
Southern	McCreary	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	McCreary	VASCULAR PLANTS	EUPHORBIA MERCURIALINA	MERCURY SPURGE	T	G4/S1S2
Southern	McCreary	VASCULAR PLANTS	ACONITUM UNCINATUM	BLUE MONKSHOOD	T	G4/S2
Southern	McCreary	VASCULAR PLANTS	AGALINIS OBTUSIFOLIA	TEN-LOBE FALSE FOXGLOVE	E	G4G5Q/S1
Southern	McCreary	VASCULAR PLANTS	AGERATINA LUCIAE-BRAUNIAE	LUCY BRAUN'S WHITE SNAKEROOT	S	G3/S3
Southern	McCreary	VASCULAR PLANTS	CAREX AESTIVALIS	SUMMER SEDGE	E	G4/S1
Southern	McCreary	VASCULAR PLANTS	ASTER SAXICASTELLII	ROCKCASTLE ASTER	T	G1G2/S1S2
Southern	McCreary	VASCULAR PLANTS	CAREX GIGANTEA	LARGE SEDGE	T	G4/S2
Southern	McCreary	VASCULAR PLANTS	BAPTISIA TINCTORIA	YELLOW WILD INDIGO	T	G5/S1S2
Southern	McCreary	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Southern	McCreary	VASCULAR PLANTS	BERBERIS CANADENSIS	AMERICAN BARBERRY	E	G3/SR
Southern	McCreary	VASCULAR PLANTS	BOYKINIA ACONITIFOLIA	BROOK SAXIFRAGE	T	G4/S2
Southern	McCreary	VASCULAR PLANTS	ASTER CONCOLOR	EASTERN SILVERY ASTER	T	G4?/S2
Southern	Meade	AMPHIBIANS	HYLA VERSICOLOR	GRAY TREEFROG	S	G5/S2S3
Southern	Meade	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Meade	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Southern	Meade	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Meade	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Meade	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Meade	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Meade	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Meade	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Meade	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Meade	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Meade	CRUSTACEANS	ORCONECTES INERMIS INERMIS		S	G4T3T4/S3
Southern	Meade	CRUSTACEANS	GAMMARUS BOUSFIELDI	BOUSFIELD'S AMPHIPOD	E	G1/S1
Southern	Meade	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Southern	Meade	FISHES	LOTA LOTA	BURBOT	S	G5/SU
Southern	Meade	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Southern	Meade	FISHES	AMBLYOPSIS SPELAEA	NORTHERN CAVEFISH	S	G3/S3
Southern	Meade	INSECTS	CALEPHELIS MUTICA	SWAMP METALMARK	S	G3G4/S2
Southern	Meade	INSECTS	POLYGONIA FAUNUS	GREEN COMMA	H	G5/SH
Southern	Meade	INSECTS	DRYOBIUS SEXNOTATUS	SIXBANDED LONGHORN BEETLE	T	G?/S1
Southern	Meade	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Meade	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Meade	OTHER TYPES	PSEUDOTREMIA AMPHIORAX		T	G1G2/S1S2
Southern	Meade	REPTILES	LAMPROPELTIS TRIANGULUM ELAPSOIDES	SCARLET KINGSNAKE	S	G5T5/S3
Southern	Meade	TERRESTRIAL COMMUNITIES	DEEP SOIL MESOPHYTIC FOREST		N	S5
Southern	Meade	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Meade	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3

Southern	Meade	VASCULAR PLANTS	SILPHIUM LACINIATUM VAR LACINIATUM	COMPASS PLANT	E	G5T?/S1S2
Southern	Meade	VASCULAR PLANTS	RANUNCULUS AMBIGENS	WATERPLANTAIN SPEARWORT	S	G4/S3
Southern	Meade	VASCULAR PLANTS	MYRIOPHYLLUM HETEROPHYLLUM	BROADLEAF WATER-MILFOIL	S	G5/S3?
Southern	Meade	VASCULAR PLANTS	TRILLIUM NIVALE	SNOW TRILLIUM	E	G4/S1
Southern	Meade	VASCULAR PLANTS	SEDUM TELEPHIOIDES	ALLEGHENY STONECROP	T	G4/S2
Southern	Meade	VASCULAR PLANTS	NAJAS GRACILLIMA	THREAD-LIKE NAIAD	S	G5?/S2S3
Southern	Meade	VASCULAR PLANTS	SPIRANTHES MAGNICAMPORUM	GREAT PLAINS LADIES'-TRESSES	T	G4/S2
Southern	Meade	VASCULAR PLANTS	SCUTELLARIA SAXATILIS	ROCK SKULLCAP	T	G3/S2S3
Southern	Meade	VASCULAR PLANTS	MELANTHIUM WOODII	WOOD BUNCHFLOWER	T	G5/S2
Southern	Meade	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Southern	Meade	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2
Southern	Meade	VASCULAR PLANTS	STACHYS EPLINGII	EPLING'S HEDGENETTLE	E	G5/S1
Southern	Meade	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Southern	Metcalfe	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Metcalfe	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Metcalfe	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Metcalfe	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Metcalfe	FISHES	THOBURNIA ATRIPINNIS	BLACKFIN SUCKER	S	G2/S2
Southern	Metcalfe	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Metcalfe	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Southern	Metcalfe	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	Metcalfe	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Southern	Metcalfe	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Metcalfe	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Metcalfe	PALUSTRINE COMMUNITIES	SHRUB SWAMP		N	S5
Southern	Metcalfe	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Southern	Metcalfe	VASCULAR PLANTS	LUDWIGIA HIRTELLA	HAIRY LUDWIGIA	E	G5/S1
Southern	Metcalfe	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Metcalfe	VASCULAR PLANTS	GLYCERIA ACUTIFLORA	SHARP-SCALED MANNA-GRASS	T	G5/S2
Southern	Metcalfe	VASCULAR PLANTS	POLYGALA NUTTALLII	NUTTALL'S MILKWORT	H	G5/SH
Southern	Metcalfe	VASCULAR PLANTS	POTAMOGETON PULCHER	SPOTTED PONDWEED	T	G5/S1S2
Southern	Ohio	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Ohio	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Southern	Ohio	BIRDS	ASIO FLAMMEUS	SHORT-EARED OWL	E	G5/S1B,S2N
Southern	Ohio	BIRDS	CIRCUS CYANEUS	NORTHERN HARRIER	T	G5/S1S2B,S4N
Southern	Ohio	BIRDS	GALLINULA CHLOROPUS	COMMON MOORHEN	T	G5/S1S2B
Southern	Ohio	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Ohio	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Ohio	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Ohio	BIRDS	VIREO BELLII	BELL'S VIREO	S	G5/S2S3B
Southern	Ohio	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Ohio	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1

Southern	Ohio	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Ohio	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Ohio	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Southern	Ohio	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Ohio	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Ohio	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Ohio	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Ohio	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Ohio	FISHES	HYBOPSIS AMNIS	PALLID SHINER	H	G4/SH
Southern	Ohio	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Southern	Ohio	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Southern	Ohio	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Southern	Ohio	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Southern	Ohio	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Southern	Ohio	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Southern	Ohio	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Southern	Ohio	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Southern	Ohio	VASCULAR PLANTS	CARYA AQUATICA	WATER HICKORY	T	G5/S2S3
Southern	Ohio	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Southern	Pulaski	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Pulaski	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Pulaski	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Pulaski	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Pulaski	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Pulaski	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Southern	Pulaski	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Pulaski	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Pulaski	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Southern	Pulaski	BIVALVES	ALASMIDONTA ATROPURPUREA	CUMBERLAND ELKTOE	E/LE	G1G2/S1
Southern	Pulaski	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Southern	Pulaski	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Pulaski	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Pulaski	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Southern	Pulaski	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Southern	Pulaski	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Pulaski	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Pulaski	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Pulaski	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Pulaski	BIVALVES	EPIOBLASMA BREVIDENS	CUMBERLANDIAN COMBSHELL	E/LE	G1/S1
Southern	Pulaski	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Pulaski	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Southern	Pulaski	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Pulaski	BIVALVES	VILLOSA VANUXEMENSIS	MOUNTAIN CREEKSHELL	T	G4/S2
Southern	Pulaski	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Pulaski	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Pulaski	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Pulaski	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Pulaski	BIVALVES	EPIOBLASMA CAPSAEFORMIS	OYSTER MUSSEL	E/LE	G1/S1

Southern	Pulaski	CRUSTACEANS	ORCONECTES AUSTRALIS PACKARDI	A CRAYFISH	T	G4T3/S2S3
Southern	Pulaski	FISHES	HYBOPSIS AMNIS	PALLID SHINER	H	G4/SH
Southern	Pulaski	FISHES	ETHEOSTOMA MICROLEPIDUM	SMALLSCALE DARTER	E	G2G3/S1
Southern	Pulaski	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Southern	Pulaski	FISHES	TYPHLICHTHYS SUBTERRANEUS	SOUTHERN CAVEFISH	S	G4/S2S3
Southern	Pulaski	FISHES	NOTROPIS SP 4	SAWFIN SHINER	E	G4/S1
Southern	Pulaski	FISHES	ETHEOSTOMA CINEREUM	ASHY DARTER	S	G2G3/S3
Southern	Pulaski	FISHES	PHOXINUS CUMBERLANDENSIS	BLACKSIDE DACE	T/LT	G2/S2
Southern	Pulaski	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	Pulaski	GASTROPODS	PLEUROCERA ALVEARE	RUGGED HORNSNAIL	S	G3G4/S3S4
Southern	Pulaski	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Southern	Pulaski	GASTROPODS	FUMONELIX WETHERBYI	CLIFTY COVERT	S	G?/S2
Southern	Pulaski	GASTROPODS	LEPTOXIS PRAEROSA	ONYX ROCKSNAIL	S	G5/S3S4
Southern	Pulaski	INSECTS	STENONEMA BEDNARIKI	A HEPTAGENIID MAYFLY	S	G3/S2
Southern	Pulaski	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Pulaski	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Southern	Pulaski	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Pulaski	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Pulaski	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Southern	Pulaski	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Southern	Pulaski	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Pulaski	OTHER TYPES	PSEUDOTREMIA SPIRA		T	G1G2/S1S2
Southern	Pulaski	PALUSTRINE COMMUNITIES	ACID SEEP		N	S3S4
Southern	Pulaski	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Southern	Pulaski	PALUSTRINE COMMUNITIES	DEPRESSION SWAMP		N	S2
Southern	Pulaski	REPTILES	EUMECES INEXPECTATUS	SOUTHEASTERN FIVE-LINED SKINK	S	G5/S3
Southern	Pulaski	RIVERINE COMMUNITIES	CUMBERLAND PLATEAU GRAVEL/COBBLE BAR		N	S2
Southern	Pulaski	TERRESTRIAL COMMUNITIES	XEROHYDRIC FLATWOODS		N	S1
Southern	Pulaski	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Southern	Pulaski	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Southern	Pulaski	TERRESTRIAL COMMUNITIES	APPALACHIAN PINE-OAK FOREST		N	S5
Southern	Pulaski	TERRESTRIAL COMMUNITIES	HEMLOCK-MIXED FOREST		N	S5
Southern	Pulaski	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Southern	Pulaski	VASCULAR PLANTS	LUDWIGIA HIRTELLA	HAIRY LUDWIGIA	E	G5/S1
Southern	Pulaski	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2
Southern	Pulaski	VASCULAR PLANTS	PHILADELPHUS INODORUS	MOCK ORANGE	T	G4G5/S1S2
Southern	Pulaski	VASCULAR PLANTS	MUHLENBERGIA CUSPIDATA	PLAINS MUHLY	T	G4/S2
Southern	Pulaski	VASCULAR PLANTS	VITIS RUPESTRIS	SAND GRAPE	T	G3/S2
Southern	Pulaski	VASCULAR PLANTS	LYCOPODIELLA APPRESSA	SOUTHERN BOG CLUBMOSS	E	G5/S1
Southern	Pulaski	VASCULAR PLANTS	LONICERA DIOICA VAR ORIENTALIS	WILD HONEYSUCKLE	H	G5T?Q/SH
Southern	Pulaski	VASCULAR PLANTS	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	T	G4G5/S2
Southern	Pulaski	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Southern	Pulaski	VASCULAR PLANTS	LESPEDEZA CAPITATA	ROUND-HEAD BUSH-CLOVER	S	G5/S3

Southern	Pulaski	VASCULAR PLANTS	PHILADELPHUS PUBESCENS	HOARY MOCK ORANGE	E	G5?/S1
Southern	Pulaski	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Southern	Pulaski	VASCULAR PLANTS	SOLIDAGO SIMPLEX SSP RANDII	RAND'S GOLDENROD	S	G5T5?/S3
Southern	Pulaski	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Southern	Pulaski	VASCULAR PLANTS	GYMNOPOGON BREVIFOLIUS	SHORTLEAF SKELETONGRASS	E	G5/S1
Southern	Pulaski	VASCULAR PLANTS	JUNIPERUS COMMUNIS VAR DEPRESSA	GROUND JUNIPER	T	G5T5/S2
Southern	Pulaski	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Southern	Pulaski	VASCULAR PLANTS	GYMNOPOGON AMBIGUUS	BEARDED SKELETONGRASS	S	G4/S2S3
Southern	Pulaski	VASCULAR PLANTS	MINUARTIA GLABRA	APPALACHIAN SANDWORT	T	G4/S1S2
Southern	Pulaski	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Southern	Pulaski	VASCULAR PLANTS	TRAGIA URTICIFOLIA	NETTLE-LEAF NOSEBURN	E	G5/S1?
Southern	Pulaski	VASCULAR PLANTS	THUJA OCCIDENTALIS	NORTHERN WHITE CEDAR	T	G5/S2S3
Southern	Pulaski	VASCULAR PLANTS	TAXUS CANADENSIS	CANADIAN YEW	T	G5/S2S3
Southern	Pulaski	VASCULAR PLANTS	SAXIFRAGA MICHAUXII	MICHAUX'S SAXIFRAGE	T	G4G5/S2
Southern	Pulaski	VASCULAR PLANTS	SPOROBOLUS CLANDESTINUS	ROUGH DROPSEED	T	G5/S2S3
Southern	Pulaski	VASCULAR PLANTS	PLATANTHERA CRISTATA	YELLOW-CRESTED ORCHID	T	G5/S1S2
Southern	Pulaski	VASCULAR PLANTS	SPIRAEA VIRGINIANA	VIRGINIA SPIRAEA	T/LT	G2/S2
Southern	Pulaski	VASCULAR PLANTS	SOLIDAGO GRACILLIMA	SOUTHERN BOG GOLDENROD	S	G4?/S2?
Southern	Pulaski	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Southern	Pulaski	VASCULAR PLANTS	RHYNCHOSIA TOMENTOSA	HAIRY SNOUTBEAN	E	G5/S1
Southern	Pulaski	VASCULAR PLANTS	POTAMOGETON ILLINOENSIS	ILLINOIS PONDWEED	S	G5/S2
Southern	Pulaski	VASCULAR PLANTS	PLATANTHERA INTEGRILABIA	WHITE FRINGELESS ORCHID	T/C	G2G3/S1S2
Southern	Pulaski	VASCULAR PLANTS	TALINUM TERETIFOLIUM	ROUNDLEAF FAMEFLOWER	T	G4/S2
Southern	Pulaski	VASCULAR PLANTS	ASTER CONCOLOR	EASTERN SILVERY ASTER	T	G4?/S2
Southern	Pulaski	VASCULAR PLANTS	DROSERA BREVIFOLIA	DWARF SUNDEW	E	G5/S1
Southern	Pulaski	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Pulaski	VASCULAR PLANTS	CEANOTHUS HERBACEUS	PRAIRIE REDROOT	T	G5/S2
Southern	Pulaski	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Southern	Pulaski	VASCULAR PLANTS	CALOPOGON TUBEROSUS	GRASS PINK	E	G5/S1
Southern	Pulaski	VASCULAR PLANTS	ASTER SAXICASTELLII	ROCKCASTLE ASTER	T	G1G2/S1S2
Southern	Pulaski	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Southern	Pulaski	VASCULAR PLANTS	AGERATINA LUCIAE-BRAUNIAE	LUCY BRAUN'S WHITE SNAKEROOT	S	G3/S3
Southern	Pulaski	VASCULAR PLANTS	AGALINIS OBTUSIFOLIA	TEN-LOBE FALSE FOXGLOVE	E	G4G5Q/S1
Southern	Pulaski	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Southern	Pulaski	VASCULAR PLANTS	ACER SPICATUM	MOUNTAIN MAPLE	E	G5/S1S2
Southern	Pulaski	VASCULAR PLANTS	CAREX JOORII	CYPRESS-SWAMP SEDGE	E	G4G5/S1S2
Southern	Rockcastle	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3

Southern	Rockcastle	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Rockcastle	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Rockcastle	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Rockcastle	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Rockcastle	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Southern	Rockcastle	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Southern	Rockcastle	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Rockcastle	BIVALVES	ALASMIDONTA ATROPURPUREA	CUMBERLAND ELKTOE	E/LE	G1G2/S1
Southern	Rockcastle	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Rockcastle	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Rockcastle	BIVALVES	EPIOBLASMA BREVIDENS	CUMBERLANDIAN COMBSHELL	E/LE	G1/S1
Southern	Rockcastle	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Rockcastle	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Rockcastle	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Southern	Rockcastle	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Rockcastle	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Rockcastle	CRUSTACEANS	ORCONECTES AUSTRALIS PACKARDI	A CRAYFISH	T	G4T3/S2S3
Southern	Rockcastle	FISHES	PERCINA SQUAMATA	OLIVE DARTER	E	G3/S1
Southern	Rockcastle	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Rockcastle	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Southern	Rockcastle	FISHES	ETHEOSTOMA CINEREUM	ASHY DARTER	S	G2G3/S3
Southern	Rockcastle	GASTROPODS	PLEUROCERA CURTA	SHORTSPIRE HORNSNAIL	S	G2/S2
Southern	Rockcastle	INSECTS	OPHIOGOMPHUS HOWEI	PYGMY SNAKETAIL	S	G3/S1S2
Southern	Rockcastle	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Rockcastle	INSECTS	OPHIOGOMPHUS MAINENSIS	MAINE SNAKETAIL	N	G4/S1
Southern	Rockcastle	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Rockcastle	MAMMALS	CORYNORHINUS TOWNSENDII VIRGINIANUS	VIRGINIA BIG-EARED BAT	E/LE	G4T2/S1
Southern	Rockcastle	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Rockcastle	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Southern	Rockcastle	OTHER TYPES	PSEUDOTREMIA UNCA		T	G1G2/S1S2
Southern	Rockcastle	RIVERINE COMMUNITIES	CUMBERLAND PLATEAU GRAVEL/COBBLE BAR		N	S2
Southern	Rockcastle	TERRESTRIAL COMMUNITIES	APPALACHIAN MESOPHYTIC FOREST		N	S5
Southern	Rockcastle	TERRESTRIAL COMMUNITIES	APPALACHIAN PINE-OAK FOREST		N	S5
Southern	Rockcastle	TERRESTRIAL COMMUNITIES	APPALACHIAN SUB-XERIC FOREST		N	S5
Southern	Rockcastle	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Southern	Rockcastle	VASCULAR PLANTS	CAREX HYSTERICINA	PORCUPINE SEDGE	H	G5/SH
Southern	Rockcastle	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Southern	Rockcastle	VASCULAR PLANTS	LILIUM PHILADELPHICUM	WOOD LILY	T	G5/S2S3
Southern	Rockcastle	VASCULAR PLANTS	HEDEOMA HISPIDUM	ROUGH PENNYROYAL	T	G5/S2
Southern	Rockcastle	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Southern	Rockcastle	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Southern	Rockcastle	VASCULAR PLANTS	CYPRIPEDIUM KENTUCKIENSE	KENTUCKY LADY'S-SLIPPER	S	G3/S2S3
Southern	Rockcastle	VASCULAR PLANTS	SPIRAEA VIRGINIANA	VIRGINIA SPIRAEA	T/LT	G2/S2
Southern	Rockcastle	VASCULAR PLANTS	OENOTHERA PERENNIS	SMALL SUNDROPS	E	G5/S1S2
Southern	Rockcastle	VASCULAR PLANTS	VITIS LABRUSCA	NORTHERN FOX GRAPE	S	G5/S2S3

Southern	Rockcastle	VASCULAR PLANTS	PRENANTHES CREPIDINEA	NODDING RATTLESNAKE-ROOT	T	G3G4/S2
Southern	Rockcastle	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Southern	Rockcastle	VASCULAR PLANTS	CASTILLEJA COCCINEA	SCARLET INDIAN PAINTBRUSH	E	G5/S1
Southern	Russell	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Russell	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Southern	Russell	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Russell	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Russell	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Russell	BIVALVES	EPIOBLASMA BREVIDENS	CUMBERLANDIAN COMBSHELL	E/LE	G1/S1
Southern	Russell	BIVALVES	EPIOBLASMA CAPSAEFORMIS	OYSTER MUSSEL	E/LE	G1/S1
Southern	Russell	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Russell	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Russell	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Russell	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Southern	Russell	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Russell	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Russell	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Russell	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Russell	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Russell	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Southern	Russell	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Russell	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Southern	Russell	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Russell	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Russell	BIVALVES	VILLOSA VANUXEMENSIS	MOUNTAIN CREEKSHELL	T	G4/S2
Southern	Russell	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Russell	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Russell	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Russell	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Russell	GASTROPODS	PLEUROCERA CURTA	SHORTSPIRE HORNSNAIL	S	G2/S2
Southern	Russell	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Southern	Russell	GASTROPODS	LEPTOXIS PRAEROSA	ONYX ROCKSNAIL	S	G5/S3S4
Southern	Russell	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	Russell	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Southern	Russell	VASCULAR PLANTS	THUJA OCCIDENTALIS	NORTHERN WHITE CEDAR	T	G5/S2S3
Southern	Russell	VASCULAR PLANTS	POLYGALA CRUCIATA	CROSSLEAF MILKWORT	E	G5/S1
Southern	Russell	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Southern	Russell	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Southern	Russell	VASCULAR PLANTS	PHILADELPHUS INODORUS	MOCK ORANGE	T	G4G5/S1S2
Southern	Russell	VASCULAR PLANTS	TRILLIUM PUSILLUM	LEAST TRILLIUM	E	G3/S1
Southern	Russell	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Taylor	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Taylor	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Taylor	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Taylor	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Taylor	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B

Southern	Taylor	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Taylor	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Taylor	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Taylor	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Taylor	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Taylor	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Southern	Taylor	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Taylor	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Taylor	FISHES	NOTURUS EXILIS	SLENDER MADTOM	E	G5/S1
Southern	Taylor	INSECTS	DRYOBIUS SEXNOTATUS	SIXBANDED LONGHORN BEETLE	T	G?/S1
Southern	Taylor	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Taylor	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Taylor	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Taylor	TERRESTRIAL COMMUNITIES	XEROHYDRIC FLATWOODS		N	S1
Southern	Taylor	TERRESTRIAL COMMUNITIES	SILTSTONE/SHALE GLADE		N	SU
Southern	Taylor	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Taylor	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Southern	Taylor	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Warren	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Southern	Warren	BIRDS	PODILYMBUS PODICEPS	PIED-BILLED GREBE	E	G5/S1B,S4N
Southern	Warren	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Southern	Warren	BIRDS	GALLINULA CHLOROPUS	COMMON MOORHEN	T	G5/S1S2B
Southern	Warren	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Southern	Warren	BIRDS	FULICA AMERICANA	AMERICAN COOT	H	G5/SHB,SZN
Southern	Warren	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Southern	Warren	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Southern	Warren	BIRDS	ANAS CLYPEATA	NORTHERN SHOVELER	E	G5/S1
Southern	Warren	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Southern	Warren	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Southern	Warren	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Warren	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Warren	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Southern	Warren	BIRDS	ANAS DISCORS	BLUE-WINGED TEAL	E	G5/S1S2B
Southern	Warren	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Warren	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Warren	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Warren	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Warren	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Warren	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Warren	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Warren	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Warren	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Southern	Warren	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Warren	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Warren	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Southern	Warren	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Warren	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Southern	Warren	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2

Southern	Warren	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Warren	BIVALVES	VILLOSA FABALIS	RAYED BEAN	E	G1G2/S1
Southern	Warren	BIVALVES	EPIOBLASMA TORULOSA RANGIANA	NORTHERN RIFFLESHELL	E/LE	G2T2/S1
Southern	Warren	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Southern	Warren	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Southern	Warren	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Warren	CRUSTACEANS	BARBICAMBARUS CORNUTUS	BOTTLEBRUSH CRAYFISH	S	G3G4/S2
Southern	Warren	CRUSTACEANS	PALAEMONIAS GANTERI	MAMMOTH CAVE SHRIMP	E/LE	G1/S1
Southern	Warren	CRUSTACEANS	ORCONECTES PELLUCIDUS	A CRAYFISH	S	G3/S3
Southern	Warren	FISHES	TYPHLICHTHYS SUBTERRANEUS	SOUTHERN CAVEFISH	S	G4/S2S3
Southern	Warren	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Southern	Warren	FISHES	PHENACOBIUS URANOPS	STARGAZING MINNOW	S	G4/S2S3
Southern	Warren	FISHES	ETHEOSTOMA MACULATUM	SPOTTED DARTER	T	G2/S2
Southern	Warren	FISHES	HYBOPSIS AMNIS	PALLID SHINER	H	G4/SH
Southern	Warren	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Southern	Warren	GASTROPODS	RABDOTUS DEALBATUS	WHITEWASHED RABDOTUS	T	G?/S1
Southern	Warren	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Warren	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Warren	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Southern	Warren	OTHER TYPES	KLEPTOCHTHONIUS MICROPHTHALMUS		T	G1G2/S1S2
Southern	Warren	TERRESTRIAL COMMUNITIES	LIMESTONE PRAIRIE		N	S1
Southern	Warren	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Southern	Warren	TERRESTRIAL COMMUNITIES	SANDSTONE BARRENS		N	S1
Southern	Warren	TERRESTRIAL COMMUNITIES	SHAWNEE HILLS SANDSTONE GLADE		N	S2
Southern	Warren	TERRESTRIAL COMMUNITIES	SANDSTONE PRAIRIE		N	S1
Southern	Warren	VASCULAR PLANTS	XEROPHYLLUM ASPHODELOIDES	EASTERN TURKEYBEARD	H	G4/SH
Southern	Warren	VASCULAR PLANTS	ISOETES MELANOPODA	BLACKFOOT QUILLWORT	E	G5/S1
Southern	Warren	VASCULAR PLANTS	DELPHINIUM CAROLINIANUM	CAROLINA LARKSPUR	T	G5/S1S2
Southern	Warren	VASCULAR PLANTS	LEAVENWORTHIA TORULOSA	NECKLACE GLADECRESS	T	G4/S2
Southern	Warren	VASCULAR PLANTS	ISOETES BUTLERI	BLACKFOOT QUILLWORT	E	G4/S1
Southern	Warren	VASCULAR PLANTS	LOBELIA APPENDICULATA VAR GATTINGERI	GATTINGER'S LOBELIA	E	G4G5T4/S1
Southern	Warren	VASCULAR PLANTS	LONICERA RETICULATA	GRAPE HONEYSUCKLE	E	G5/S1
Southern	Warren	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Southern	Warren	VASCULAR PLANTS	HYPERICUM CRUX-ANDREAE	ST. PETER'S-WORT	T	G5/S2S3
Southern	Warren	VASCULAR PLANTS	HIERACIUM LONGIPILUM	HAIRY HAWKWEED	T	G4G5/S2
Southern	Warren	VASCULAR PLANTS	HELIANTHUS EGGERTII	EGGERT'S SUNFLOWER	T/LT	G3/S2
Southern	Warren	VASCULAR PLANTS	HEDEOMA HISPIDUM	ROUGH PENNYROYAL	T	G5/S2
Southern	Warren	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Southern	Warren	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Southern	Warren	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Southern	Warren	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Southern	Warren	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Southern	Warren	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2

Southern	Warren	VASCULAR PLANTS	GENTIANA FLAVIDA	YELLOW GENTIAN	E	G4/S1S2
Southern	Warren	VASCULAR PLANTS	VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	S	G5/S3
Southern	Warren	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Southern	Warren	VASCULAR PLANTS	TRILLIUM PUSILLUM	LEAST TRILLIUM	E	G3/S1
Southern	Warren	VASCULAR PLANTS	SOLIDAGO SQUARROSA	SQUARROSE GOLDENROD	H	G4?/SH
Southern	Warren	VASCULAR PLANTS	SILPHIUM PINNATIFIDUM	PRAIRIE-DOCK	S	G3Q/S3S4
Southern	Warren	VASCULAR PLANTS	SOLIDAGO PUBERULA	DOWNY GOLDENROD	S	G5/S2
Southern	Warren	VASCULAR PLANTS	SILENE OVATA	OVATE CATCHFLY	E	G2G3/S1S2
Southern	Warren	VASCULAR PLANTS	MYRIOPHYLLUM HETEROPHYLLUM	BROADLEAF WATER-MILFOIL	S	G5/S3?
Southern	Warren	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Southern	Warren	VASCULAR PLANTS	PERIDERIDIA AMERICANA	EASTERN EULOPHUS	T	G4/S2
Southern	Warren	VASCULAR PLANTS	PEDICULARIS LANCEOLATA	SWAMP LOUSEWORT	H	G5/SH
Southern	Warren	VASCULAR PLANTS	OXALIS PRICEAE	PRICE'S YELLOW WOOD SORREL	H	G3G5/SH
Southern	Warren	VASCULAR PLANTS	OENOTHERA TRILOBA	STEMLESS EVENING-PRIMROSE	T	G4/S1S2
Southern	Warren	VASCULAR PLANTS	NAJAS GRACILLIMA	THREAD-LIKE NAIAD	S	G5?/S2S3
Southern	Warren	VASCULAR PLANTS	SILENE REGIA	ROYAL CATCHFLY	E	G3/S1
Southern	Warren	VASCULAR PLANTS	APIOS PRICEANA	PRICE'S POTATO-BEAN	E/LT	G2/S1
Southern	Warren	VASCULAR PLANTS	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA	S	G5/S3?
Southern	Warren	VASCULAR PLANTS	CALAMAGROSTIS PORTERI SSP PORTERI	PORTER'S REEDGRASS	T	G4T4/S2S3
Southern	Warren	VASCULAR PLANTS	CAREX GIGANTEA	LARGE SEDGE	T	G4/S2
Southern	Warren	VASCULAR PLANTS	CASTANEA PUMILA	ALLEGHENY CHINKAPIN	T	G5/S2
Southern	Warren	VASCULAR PLANTS	CASTILLEJA COCCINEA	SCARLET INDIAN PAINTBRUSH	E	G5/S1
Southern	Warren	VASCULAR PLANTS	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	S	G4G5T4T5/S3
Southern	Warren	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Warren	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3
Southern	Warren	VASCULAR PLANTS	ASTER PILOSUS VAR PRICEAE	WHITE HEATH ASTER	T	G5T3T5/S2
Southern	Warren	VASCULAR PLANTS	DIDIPLIS DIANDRA	WATER-PURSLANE	S	G5/S2S3
Southern	Warren	VASCULAR PLANTS	FORESTIERA LIGUSTRINA	UPLAND PRIVET	T	G4G5/S2S3
Southern	Warren	VASCULAR PLANTS	DRYOPTERIS LUDOVICIANA	SOUTHERN SHIELD WOOD FERN	H	G4/SH
Southern	Warren	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Southern	Wayne	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Southern	Wayne	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Southern	Wayne	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Southern	Wayne	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Southern	Wayne	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Southern	Wayne	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Southern	Wayne	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Southern	Wayne	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Southern	Wayne	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Southern	Wayne	BIVALVES	VILLOSA VANUXEMENSIS	MOUNTAIN CREEKSHELL	T	G4/S2

Southern	Wayne	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Southern	Wayne	BIVALVES	PLEUROBEMA PLENUM	ROUGH PIGTOE	E/LE	G1/S1
Southern	Wayne	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Southern	Wayne	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Southern	Wayne	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Southern	Wayne	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Southern	Wayne	BIVALVES	VILLOSA TRABALIS	CUMBERLAND BEAN	E/LE	G1/S1
Southern	Wayne	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Southern	Wayne	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Southern	Wayne	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Southern	Wayne	BIVALVES	EPIOBLASMA CAPSAEFORMIS	OYSTER MUSSEL	E/LE	G1/S1
Southern	Wayne	BIVALVES	EPIOBLASMA BREVIDENS	CUMBERLANDIAN COMBSHELL	E/LE	G1/S1
Southern	Wayne	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Southern	Wayne	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Southern	Wayne	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Southern	Wayne	CRUSTACEANS	ORCONECTES AUSTRALIS PACKARDI	A CRAYFISH	T	G4T3/S2S3
Southern	Wayne	FISHES	ETHEOSTOMA CINEREUM	ASHY DARTER	S	G2G3/S3
Southern	Wayne	FISHES	AMMOCRYPTA CLARA	WESTERN SAND DARTER	E	G3/S1
Southern	Wayne	FISHES	ERIMYSTAX INSIGNIS	BLOTCHED CHUB	E	G3G4/S1
Southern	Wayne	FISHES	HYBOPSIS AMNIS	PALLID SHINER	H	G4/SH
Southern	Wayne	FISHES	PERCINA MACROCEPHALA	LONGHEAD DARTER	T	G3/S2
Southern	Wayne	FISHES	ICHTHYOMYZON GREELEYI	MOUNTAIN BROOK LAMPREY	T	G3G4/S2
Southern	Wayne	FISHES	NOTROPIS ALBIZONATUS	PALEZONE SHINER	E/LE	G2/S1
Southern	Wayne	FISHES	NOTROPIS SP 4	SAWFIN SHINER	E	G4/S1
Southern	Wayne	GASTROPODS	PLEUROCERA CURTA	SHORTSPIRE HORNSNAIL	S	G2/S2
Southern	Wayne	GASTROPODS	APPALACHINA CHILHOWEENSIS	QUEEN CRATER	S	G?/S1
Southern	Wayne	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Southern	Wayne	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Southern	Wayne	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Southern	Wayne	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Southern	Wayne	MAMMALS	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	T	G3/S2
Southern	Wayne	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Southern	Wayne	MAMMALS	URSUS AMERICANUS	AMERICAN BLACK BEAR	S	G5/S2
Southern	Wayne	OTHER TYPES	KLEPTOCHTHONIUS EREBICUS		T	G1G2/S1S2
Southern	Wayne	PALUSTRINE COMMUNITIES	DEPRESSION SWAMP		N	S2
Southern	Wayne	PALUSTRINE COMMUNITIES	SINKHOLE/DEPRESSION MARSH		N	S1S2
Southern	Wayne	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Southern	Wayne	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Southern	Wayne	TERRESTRIAL COMMUNITIES	ACIDIC SUB-XERIC FOREST		N	S5
Southern	Wayne	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Southern	Wayne	VASCULAR PLANTS	RHYNCHOSPORA MACROSTACHYA	TALL BEAKED-RUSH	E	G4/S1
Southern	Wayne	VASCULAR PLANTS	THUJA OCCIDENTALIS	NORTHERN WHITE CEDAR	T	G5/S2S3
Southern	Wayne	VASCULAR PLANTS	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES	T	G5/S2S3
Southern	Wayne	VASCULAR PLANTS	EUPHORBIA MERCURIALINA	MERCURY SPURGE	T	G4/S1S2
Southern	Wayne	VASCULAR PLANTS	SALVIA URTICIFOLIA	NETTLE-LEAF SAGE	E	G5/S1
Southern	Wayne	VASCULAR PLANTS	PAXISTIMA CANBYI	CANBY'S MOUNTAIN-LOVER	T	G2/S2

Southern	Wayne	VASCULAR PLANTS	GLYCERIA ACUTIFLORA	SHARP-SCALED MANNA-GRASS	T	G5/S2
Southern	Wayne	VASCULAR PLANTS	NESTRONIA UMBELLULA	CONJURER'S NUT	E	G4/S1
Southern	Wayne	VASCULAR PLANTS	HETERANTHERA DUBIA	GRASSLEAF MUD-PLANTAIN	S	G5/S3
Southern	Wayne	VASCULAR PLANTS	POTAMOGETON ILLINOENSIS	ILLINOIS PONDWEED	S	G5/S2
Southern	Wayne	VASCULAR PLANTS	LONICERA DIOICA VAR ORIENTALIS	WILD HONEYSUCKLE	H	G5T?Q/SH
Southern	Wayne	VASCULAR PLANTS	MUHLENBERGIA CUSPIDATA	PLAINS MUHLY	T	G4/S2
Southern	Wayne	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Southern	Wayne	VASCULAR PLANTS	DISPORUM MACULATUM	NODDING MANDARIN	S	G3G4/S3?
Southern	Wayne	VASCULAR PLANTS	GRATIOLA VISCIDULA	SHORT'S HEDGEHYSSOP	S	G4G5/S3
Southern	Wayne	VASCULAR PLANTS	CEANOTHUS HERBACEUS	PRAIRIE REDROOT	T	G5/S2
Southern	Wayne	VASCULAR PLANTS	CAREX AESTIVALIS	SUMMER SEDGE	E	G4/S1
Southern	Wayne	VASCULAR PLANTS	VITIS RUPESTRIS	SAND GRAPE	T	G3/S2
Southern	Wayne	VASCULAR PLANTS	BAPTISIA TINCTORIA	YELLOW WILD INDIGO	T	G5/S1S2
Southern	Wayne	VASCULAR PLANTS	CAREX CRAWEI	CRAWE'S SEDGE	S	G5/S2S3
Southern	Wayne	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Southern	Wayne	VASCULAR PLANTS	VALLISNERIA AMERICANA	EEL-GRASS	S	G5/S2S3
Southern	Wayne	VASCULAR PLANTS	TRILLIUM PUSILLUM	LEAST TRILLIUM	E	G3/S1
Western	Ballard	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	Ballard	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Ballard	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Ballard	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B
Western	Ballard	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Ballard	BIRDS	STERNA ANTILLARUM ATHALASSOS	INTERIOR LEAST TERN	E/LE	G4T2Q/S2B
Western	Ballard	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Ballard	BIRDS	ARDEA ALBA	GREAT EGRET	E	G5/S1B
Western	Ballard	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Western	Ballard	BIRDS	IXOBRYCHUS EXILIS	LEAST BITTERN	T	G5/S1S2B
Western	Ballard	BIRDS	CERTHIA AMERICANA	BROWN CREEPER	E	G5/S1S2B,S4S5N
Western	Ballard	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Western	Ballard	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Western	Ballard	BIRDS	PHALACROCORAX AURITUS	DOUBLE-CRESTED CORMORANT	H	G5/SHB,SZN
Western	Ballard	BIRDS	ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE	S	G5/S2B
Western	Ballard	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Western	Ballard	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Western	Ballard	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Western	Ballard	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Western	Ballard	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Western	Ballard	BIVALVES	POTAMILUS PURPURATUS	BLEUFER	E	G5/S1
Western	Ballard	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Western	Ballard	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Western	Ballard	CRUSTACEANS	ORCONECTES LANCIFER	A CRAYFISH	E	G5/S1
Western	Ballard	CRUSTACEANS	ORCONECTES PALMERI PALMERI	A CRAYFISH	E	G5T5/S1
Western	Ballard	CRUSTACEANS	PROCAMBARUS VIAEVIRIDIS	A CRAYFISH	T	G5/S1

Western	Ballard	CRUSTACEANS	CAMBARELLUS SHUFELDTII	CAJUN DWARF CRAYFISH	S	G5/S2
Western	Ballard	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Western	Ballard	FISHES	NOTROPIS MACULATUS	TAILLIGHT SHINER	T	G5/S2S3
Western	Ballard	FISHES	PLATYGOBIO GRACILIS	FLATHEAD CHUB	S	G5/S1
Western	Ballard	FISHES	NOTROPIS HUDSONIUS	SPOTTAIL SHINER	S	G5/SU
Western	Ballard	FISHES	SCAPHIRHYNCHUS ALBUS	PALLID STURGEON	E/LE	G1/S1
Western	Ballard	FISHES	MENIDIA BERYLLINA	INLAND SILVERSIDE	T	G5/S2
Western	Ballard	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Western	Ballard	FISHES	MACRHYBOPSIS MEEKI	SICKLEFIN CHUB	H/C	G3/SH
Western	Ballard	FISHES	MACRHYBOPSIS GELIDA	STURGEON CHUB	H/C	G3/SH
Western	Ballard	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Western	Ballard	FISHES	CYPRINELLA VENUSTA	BLACKTAIL SHINER	S	G5/S3
Western	Ballard	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	Ballard	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Ballard	FISHES	ETHEOSTOMA PROELIARE	CYPRESS DARTER	T	G5/S2
Western	Ballard	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Western	Ballard	FISHES	HYBOGNATHUS HAYI	CYPRESS MINNOW	E	G5/S1
Western	Ballard	FISHES	ESOX NIGER	CHAIN PICKEREL	S	G5/S3
Western	Ballard	FISHES	ATRACTOSTEUS SPATULA	ALLIGATOR GAR	E	G3G4/S1
Western	Ballard	FISHES	HYBOGNATHUS PLACITUS	PLAINS MINNOW	S	G4/S1
Western	Ballard	GASTROPODS	LITHASIA VERRUCOSA	VARICOSE ROCKSNAIL	S	G3G4/S3S4
Western	Ballard	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Ballard	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	Ballard	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Ballard	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Western	Ballard	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Ballard	PALUSTRINE COMMUNITIES	CYPRESS SWAMP		N	S3
Western	Ballard	REPTILES	FARANCIA ABACURA REINWARDTII	WESTERN MUD SNAKE	S	G5T5/S3
Western	Ballard	REPTILES	THAMNOPHIS PROXIMUS PROXIMUS	WESTERN RIBBON SNAKE	T	G5T5/S1S2
Western	Ballard	REPTILES	MACROCLEMYS TEMMINCKII	ALLIGATOR SNAPPING TURTLE	T	G3G4/S2
Western	Ballard	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Ballard	VASCULAR PLANTS	HYPERICUM ADPRESSUM	CREEPING ST. JOHN'S-WORT	H	G2G3/SH
Western	Ballard	VASCULAR PLANTS	SALIX AMYGDALOIDES	PEACH-LEAVED WILLOW	H	G5/SH
Western	Ballard	VASCULAR PLANTS	RUDBECKIA SUBTOMENTOSA	SWEET CONEFLOWER	E	G5/S1
Western	Ballard	VASCULAR PLANTS	MUHLENBERGIA BUSHII	BUSH'S MUHLY	E	G5/S1S2
Western	Ballard	VASCULAR PLANTS	POTAMOGETON ILLINOENSIS	ILLINOIS PONDWEED	S	G5/S2
Western	Ballard	VASCULAR PLANTS	LYSIMACHIA TERRESTRIS	SWAMP CANDLES	E	G5/S1
Western	Ballard	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Western	Ballard	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	Ballard	VASCULAR PLANTS	HETEROTHECA SUBAXILLARIS VAR LATIFOLIA	BROAD-LEAF GOLDEN-ASTER	T	G5T5/S2
Western	Ballard	VASCULAR PLANTS	JUNCUS ELLIOTTII	BOG RUSH	H	G4G5/SH
Western	Ballard	VASCULAR PLANTS	PHACELIA RANUNCULACEA	BLUE SCORPION-WEED	S	G3G4/S3
Western	Ballard	VASCULAR PLANTS	HYDROLEA UNIFLORA	ONE-FLOWER FIDDLELEAF	S	G5/S3?
Western	Ballard	VASCULAR PLANTS	OLDENLANDIA UNIFLORA	CLUSTERED BLUETS	E	G5/S1

Western	Ballard	VASCULAR PLANTS	LIMNOBIUM SPONGIA	AMERICAN FROG'S-BIT	T	G4/S2S3
Western	Ballard	VASCULAR PLANTS	CABOMBA CAROLINIANA	CAROLINA FANWORT	T	G3G5/S2
Western	Ballard	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Western	Ballard	VASCULAR PLANTS	DIDIPLIS DIANDRA	WATER-PURSLANE	S	G5/S2S3
Western	Ballard	VASCULAR PLANTS	TRIPLASIS PURPUREA	PURPLE SANDGRASS	H	G4G5/SH
Western	Ballard	VASCULAR PLANTS	TORREYOCHLOA PALLIDA	PALE MANNA GRASS	E	G5?/S1
Western	Ballard	VASCULAR PLANTS	SPIRAEA ALBA	NARROW-LEAVED MEADOW-SWEET	E	G5/S1
Western	Ballard	VASCULAR PLANTS	ARMORACIA LACUSTRIS	LAKECRESS	T	G4?/S1S2
Western	Ballard	VASCULAR PLANTS	CLEMATIS CRISPA	BLUE JASMINE LEATHER-FLOWER	T	G5/S2
Western	Ballard	VASCULAR PLANTS	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	T	G5T?/S2
Western	Ballard	VASCULAR PLANTS	PONTEDERIA CORDATA	PICKEREL WEED	T	G5/S1S2
Western	Ballard	VASCULAR PLANTS	CALAMAGROSTIS CANADENSIS VAR MACOUNIANA	BLUE-JOINT REEDGRASS	E	G5T5?/S1
Western	Ballard	VASCULAR PLANTS	MIRABILIS ALBIDA	PALE UMBRELLA-WORT	E	G5/S1
Western	Ballard	VASCULAR PLANTS	CAREX BUXBAUMII	BUXBAUM'S SEDGE	H	G5/SH
Western	Ballard	VASCULAR PLANTS	CAREX GIGANTEA	LARGE SEDGE	T	G4/S2
Western	Ballard	VASCULAR PLANTS	CAREX LANUGINOSA	WOOLLY SEDGE	E	G5/S1S2
Western	Ballard	VASCULAR PLANTS	CARYA AQUATICA	WATER HICKORY	T	G5/S2S3
Western	Ballard	VASCULAR PLANTS	SCIRPUS FLUVIATILIS	RIVER BULRUSH	E	G5/S1S2
Western	Caldwell	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Caldwell	AMPHIBIANS	HYLA GRATIOSA	BARKING TREEFROG	S	G5/S3
Western	Caldwell	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Western	Caldwell	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Caldwell	BIRDS	ANAS DISCORS	BLUE-WINGED TEAL	E	G5/S1S2B
Western	Caldwell	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Caldwell	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Caldwell	BIVALVES	TOXOLASMA TEXASIENSIS	TEXAS LILLIPUT	E	G4/S1
Western	Caldwell	BIVALVES	VILLOSA VANUXEMENSIS	MOUNTAIN CREEKSHELL	T	G4/S2
Western	Caldwell	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	Caldwell	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Caldwell	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Caldwell	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Caldwell	TERRESTRIAL COMMUNITIES	ACIDIC MESOPHYTIC FOREST		N	S5
Western	Caldwell	VASCULAR PLANTS	SOLIDAGO BUCKLEYI	BUCKLEY'S GOLDENROD	S	G4/S2S3
Western	Caldwell	VASCULAR PLANTS	SEDUM TELEPHIOIDES	ALLEGHENY STONECROP	T	G4/S2
Western	Caldwell	VASCULAR PLANTS	CAREX STIPATA VAR MAXIMA	STALKGRAIN SEDGE	S	G5T?/S2?
Western	Caldwell	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	Caldwell	VASCULAR PLANTS	CIMICIFUGA RUBIFOLIA	APPALACHIAN BUGBANE	T	G3/S2
Western	Calloway	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Calloway	AMPHIBIANS	EURYCEA GUTTOLINEATA	THREE-LINED SALAMANDER	T	G5/S2
Western	Calloway	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	Calloway	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N

Western	Calloway	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Calloway	BIRDS	PANDION HALIAETUS	OSPREY	T	G5/S1S2B
Western	Calloway	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Western	Calloway	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Calloway	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Calloway	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Western	Calloway	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Western	Calloway	CRUSTACEANS	ORCONECTES BURRI	A CRAYFISH	T	G2G3/S2
Western	Calloway	CRUSTACEANS	PROCAMBARUS VIAEVIRIDIS	A CRAYFISH	T	G5/S1
Western	Calloway	FISHES	ATRACTOSTEUS SPATULA	ALLIGATOR GAR	E	G3G4/S1
Western	Calloway	FISHES	UMBRA LIMI	CENTRAL MUDMINNOW	T	G5/S2S3
Western	Calloway	FISHES	NOTURUS EXILIS	SLENDER MADTOM	E	G5/S1
Western	Calloway	FISHES	ICHTHYOMYZON GAGEI	SOUTHERN BROOK LAMPREY	H	G5/SH
Western	Calloway	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Western	Calloway	FISHES	ETHEOSTOMA PROELIARE	CYPRESS DARTER	T	G5/S2
Western	Calloway	FISHES	ETHEOSTOMA PARVIPINNE	GOLDSTRIPE DARTER	E	G4G5/S1
Western	Calloway	FISHES	ESOX NIGER	CHAIN PICKEREL	S	G5/S3
Western	Calloway	FISHES	ERIMYSTAX INSIGNIS	BLOTCHED CHUB	E	G3G4/S1
Western	Calloway	GASTROPODS	LITHASIA VERRUCOSA	VARICOSE ROCKSNAIL	S	G3G4/S3S4
Western	Calloway	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Calloway	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Calloway	PALUSTRINE COMMUNITIES	CRETACEOUS HILLS FORESTED ACID SEEP		N	S2
Western	Calloway	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Western	Calloway	PALUSTRINE COMMUNITIES	BOTTOMLAND MARSH		N	S1S2
Western	Calloway	PALUSTRINE COMMUNITIES	ACID SEEP		N	S3S4
Western	Calloway	REPTILES	THAMNOPHIS PROXIMUS PROXIMUS	WESTERN RIBBON SNAKE	T	G5T5/S1S2
Western	Calloway	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Calloway	REPTILES	SISTRURUS MILIARIUS STRECKERI	WESTERN PYGMY RATTLESNAKE	T	G5T5/S2
Western	Calloway	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Western	Calloway	REPTILES	EUMECES ANTHRACINUS PLUVIALIS	SOUTHERN COAL SKINK	E	G5T5/S1
Western	Calloway	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Western	Calloway	VASCULAR PLANTS	ERYNGIUM INTEGRIFOLIUM	BLUE-FLOWER COYOTE-THISTLE	E	G5/S1
Western	Calloway	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Western	Calloway	VASCULAR PLANTS	PTILIMNIUM COSTATUM	EASTERN BISHOP-WEED	S	G3G4/S3?
Western	Calloway	VASCULAR PLANTS	PTILIMNIUM CAPILLACEUM	MOCK BISHOP'S-WEED	T	G5/S1S2
Western	Calloway	VASCULAR PLANTS	PHLOX BIFIDA SSP BIFIDA	CLEFT PHLOX	T	G5?T5?/S1S2
Western	Calloway	VASCULAR PLANTS	PASPALUM BOSCIANUM	BULL PASPALUM	S	G5/S2S3
Western	Calloway	VASCULAR PLANTS	GYMNOPOGON AMBIGUUS	BEARDED SKELETONGRASS	S	G4/S2S3
Western	Calloway	VASCULAR PLANTS	PTILIMNIUM NUTTALLII	NUTTALL'S MOCK BISHOP'S-WEED	E	G5?/S1S2
Western	Calloway	VASCULAR PLANTS	HELIANTHUS SILPHIOIDES	SILPHIUM SUNFLOWER	E	G3G4/S1
Western	Calloway	VASCULAR PLANTS	HIERACIUM LONGIPILUM	HAIRY HAWKWEED	T	G4G5/S2
Western	Calloway	VASCULAR PLANTS	HYDROLEA OVATA	OVATE FIDDLELEAF	E	G5/S1
Western	Calloway	VASCULAR PLANTS	PYCNANTHEMUM ALBESCENS	WHITELEAF MOUNTAINMINT	E	G5/S1
Western	Calloway	VASCULAR PLANTS	VIBURNUM NUDUM	POSSUMHAW	E	G5/S1

Western	Calloway	VASCULAR PLANTS	SCLERIA CILIATA VAR CILIATA	FRINGED NUTRUSH	E	G5T?/S1?
Western	Calloway	VASCULAR PLANTS	LYCOPODIELLA APPRESSA	SOUTHERN BOG CLUBMOSS	E	G5/S1
Western	Calloway	VASCULAR PLANTS	MELANTHIUM VIRGINICUM	VIRGINIA BUNCHFLOWER	E	G5/S1
Western	Calloway	VASCULAR PLANTS	MUHLENBERGIA GLABRIFLORIS	HAIR GRASS	S	G4?/S2S3
Western	Calloway	VASCULAR PLANTS	OENOTHERA PERENNIS	SMALL SUNDROPS	E	G5/S1S2
Western	Calloway	VASCULAR PLANTS	OLDENLANDIA UNIFLORA	CLUSTERED BLUETS	E	G5/S1
Western	Calloway	VASCULAR PLANTS	SPHENOPHOLIS PENSYLVANICA	SWAMP WEDGESCALE	S	G4/S1S2
Western	Calloway	VASCULAR PLANTS	OENOTHERA LINIFOLIA	THREAD-LEAF SUNDROPS	E	G5/S1S2
Western	Calloway	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Western	Calloway	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Western	Calloway	VASCULAR PLANTS	AESCULUS PAVIA	RED BUCKEYE	T	G5/S2S3
Western	Calloway	VASCULAR PLANTS	TREPOCARPUS AETHUSAE	TREPOCARPUS	T	G4G5/S2
Western	Calloway	VASCULAR PLANTS	STELLARIA LONGIFOLIA	LONGLEAF STITCHWORT	S	G5/S2S3
Western	Calloway	VASCULAR PLANTS	SPIRANTHES ODORATA	SWEETSCENT LADIES'-TRESSES	E	G5/S1
Western	Calloway	VASCULAR PLANTS	CAREX ATLANTICA SSP CAPILLACEA	PRICKLY BOG SEDGE	E	G5T5?/S1S2
Western	Calloway	VASCULAR PLANTS	ARABIS MISSOURIENSIS	MISSOURI ROCKCRESS	E	G4G5Q/S1
Western	Calloway	VASCULAR PLANTS	COREOPSIS PUBESCENS	STAR TICKSEED	S	G5?/S2S3
Western	Calloway	VASCULAR PLANTS	ASTER CONCOLOR	EASTERN SILVERY ASTER	T	G4?/S2
Western	Calloway	VASCULAR PLANTS	ASTER DRUMMONDII VAR TEXANUS	TEXAS ASTER	T	G5T?/S2
Western	Calloway	VASCULAR PLANTS	ASTER HEMISPHERICUS	TENNESSEE ASTER	E	G4T4?/S1
Western	Calloway	VASCULAR PLANTS	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	T	G5T?/S2
Western	Calloway	VASCULAR PLANTS	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	S	G4G5T4T5/S3
Western	Calloway	VASCULAR PLANTS	BARTONIA VIRGINICA	YELLOW SCREWSTEM	T	G5/S2
Western	Calloway	VASCULAR PLANTS	RHYNCHOSPORA RECOGNITA	GLOBE BEAKED-RUSH	S	G5?/S3
Western	Calloway	VASCULAR PLANTS	CAREX RENIFORMIS	RENIFORM SEDGE	E	G4?/S1?
Western	Calloway	VASCULAR PLANTS	RHODODENDRON CANESCENS	HOARY AZALEA	E	G5/S1
Western	Calloway	VASCULAR PLANTS	APIOS PRICEANA	PRICE'S POTATO-BEAN	E/LT	G2/S1
Western	Carlisle	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	Carlisle	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Carlisle	BIRDS	STERNA ANTILLARUM ATHALASSOS	INTERIOR LEAST TERN	E/LE	G4T2Q/S2B
Western	Carlisle	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B
Western	Carlisle	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Western	Carlisle	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Western	Carlisle	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Western	Carlisle	BIRDS	ARDEA ALBA	GREAT EGRET	E	G5/S1B
Western	Carlisle	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Carlisle	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Carlisle	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Western	Carlisle	BIRDS	ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE	S	G5/S2B
Western	Carlisle	BIVALVES	TOXOLASMA TEXASIENSIS	TEXAS LILLIPUT	E	G4/S1

Western	Carlisle	BIVALVES	POTAMILUS CAPAX	FAT POCKETBOOK	E/LE	G1/S1
Western	Carlisle	CRUSTACEANS	CAMBARELLUS SHUFELDTII	CAJUN DWARF CRAYFISH	S	G5/S2
Western	Carlisle	CRUSTACEANS	ORCONECTES PALMERI PALMERI	A CRAYFISH	E	G5T5/S1
Western	Carlisle	CRUSTACEANS	ORCONECTES LANCIFER	A CRAYFISH	E	G5/S1
Western	Carlisle	FISHES	ESOX NIGER	CHAIN PICKEREL	S	G5/S3
Western	Carlisle	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Carlisle	FISHES	HYBOGNATHUS HAYI	CYPRESS MINNOW	E	G5/S1
Western	Carlisle	FISHES	ETHEOSTOMA MICROLEPIDUM	SMALLSCALE DARTER	E	G2G3/S1
Western	Carlisle	FISHES	CYPRINELLA VENUSTA	BLACKTAIL SHINER	S	G5/S3
Western	Carlisle	FISHES	NOTROPIS MACULATUS	TAILLIGHT SHINER	T	G5/S2S3
Western	Carlisle	GASTROPODS	LITHASIA VERRUCOSA	VARICOSE ROCKSNAIL	S	G3G4/S3S4
Western	Carlisle	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Carlisle	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Western	Carlisle	MAMMALS	PEROMYSCUS GOSSYPINUS	COTTON MOUSE	T	G5/S2
Western	Carlisle	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Carlisle	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	Carlisle	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Carlisle	PALUSTRINE COMMUNITIES	CYPRESS SWAMP		N	S3
Western	Carlisle	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Carlisle	REPTILES	MACROCLEMYS TEMMINCKII	ALLIGATOR SNAPPING TURTLE	T	G3G4/S2
Western	Carlisle	REPTILES	CHRYSEMYS PICTA DORSALIS	SOUTHERN PAINTED TURTLE	T	G5T5/S2
Western	Carlisle	TERRESTRIAL COMMUNITIES	COASTAL PLAIN MESOPHYTIC CANE FOREST		N	S2S3
Western	Carlisle	VASCULAR PLANTS	CAREX DECOMPOSITA	EPIPHYTIC SEDGE	T	G3/S2
Western	Carlisle	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Western	Carlisle	VASCULAR PLANTS	MELANTHERA NIVEA	SNOW MELANTHERA	S	G5/S3?
Western	Carlisle	VASCULAR PLANTS	HETEROTHECA SUBAXILLARIS VAR LATIFOLIA	BROAD-LEAF GOLDEN-ASTER	T	G5T5/S2
Western	Carlisle	VASCULAR PLANTS	DIDIPLIS DIANDRA	WATER-PURSLANE	S	G5/S2S3
Western	Carlisle	VASCULAR PLANTS	PHACELIA RANUNCULACEA	BLUE SCORPION-WEED	S	G3G4/S3
Western	Carlisle	VASCULAR PLANTS	CLEMATIS CRISPA	BLUE JASMINE LEATHER-FLOWER	T	G5/S2
Western	Carlisle	VASCULAR PLANTS	CABOMBA CAROLINIANA	CAROLINA FANWORT	T	G3G5/S2
Western	Carlisle	VASCULAR PLANTS	UTRICULARIA MACRORHIZA	GREATER BLADDERWORT	E	G5/S1
Western	Carlisle	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	Christian	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Western	Christian	AMPHIBIANS	HYLA GRATIOSA	BARKING TREEFROG	S	G5/S3
Western	Christian	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Christian	BIRDS	ANAS DISCORS	BLUE-WINGED TEAL	E	G5/S1S2B
Western	Christian	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Christian	BIRDS	PODILYMBUS PODICEPS	PIED-BILLED GREBE	E	G5/S1B,S4N
Western	Christian	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Christian	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Western	Christian	BIRDS	ANAS CLYPEATA	NORTHERN SHOVELER	E	G5/S1
Western	Christian	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Western	Christian	BIVALVES	VILLOSA VANUXEMENSIS	MOUNTAIN CREEKSHELL	T	G4/S2
Western	Christian	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Western	Christian	CRUSTACEANS	ORCONECTES PELLUCIDUS	A CRAYFISH	S	G3/S3

Western	Christian	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Christian	FISHES	TYPHLICHTHYS SUBTERRANEUS	SOUTHERN CAVEFISH	S	G4/S2S3
Western	Christian	FISHES	ETHEOSTOMA MICROLEPIDUM	SMALLSCALE DARTER	E	G2G3/S1
Western	Christian	FISHES	ETHEOSTOMA TECUMSEHI	SHAWNEE DARTER	T	G1/S2
Western	Christian	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Christian	INSECTS	PAPAIPEMA ERYNGII	RATTLESNAKE-MASTER BORER MOTH	E	G1G2/S1
Western	Christian	INSECTS	CALEPHELIS MUTICA	SWAMP METALMARK	S	G3G4/S2
Western	Christian	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	Christian	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Christian	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Christian	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Christian	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Western	Christian	VASCULAR PLANTS	MUHLENBERGIA GLABRIFLORIS	HAIR GRASS	S	G4?/S2S3
Western	Christian	VASCULAR PLANTS	OENOTHERA LINIFOLIA	THREAD-LEAF SUNDROPS	E	G5/S1S2
Western	Christian	VASCULAR PLANTS	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	T	G5T?/S2
Western	Christian	VASCULAR PLANTS	RUDBECKIA SUBTOMENTOSA	SWEET CONEFLOWER	E	G5/S1
Western	Christian	VASCULAR PLANTS	ZIZANIOPSIS MILIACEA	SOUTHERN WILD RICE	T	G5/S1S2
Western	Christian	VASCULAR PLANTS	TRILLIUM PUSILLUM	LEAST TRILLIUM	E	G3/S1
Western	Christian	VASCULAR PLANTS	SILENE REGIA	ROYAL CATCHFLY	E	G3/S1
Western	Christian	VASCULAR PLANTS	DRABA CUNEIFOLIA	WEDGE-LEAF WHITLOW-GRASS	E	G5/S1
Western	Christian	VASCULAR PLANTS	SCHOENOPLECTUS HALLII	HALL'S BULRUSH	E	G2/S1
Western	Christian	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Western	Christian	VASCULAR PLANTS	LESPEDEZA CAPITATA	ROUND-HEAD BUSH-CLOVER	S	G5/S3
Western	Christian	VASCULAR PLANTS	HIERACIUM LONGIPILUM	HAIRY HAWKWEED	T	G4G5/S2
Western	Christian	VASCULAR PLANTS	ECHINODORUS PARVULUS	DWARF BURHEAD	E	G3Q/S1
Western	Christian	VASCULAR PLANTS	CYPRIPEDIUM CANDIDUM	SMALL WHITE LADY'S-SLIPPER	E	G4/S1
Western	Christian	VASCULAR PLANTS	CASTILLEJA COCCINEA	SCARLET INDIAN PAINTBRUSH	E	G5/S1
Western	Christian	VASCULAR PLANTS	CAREX ALATA	BROADWING SEDGE	T	G5/S1S2
Western	Christian	VASCULAR PLANTS	BAPTISIA AUSTRALIS VAR MINOR	BLUE WILD INDIGO	S	G5T4/S2S3
Western	Christian	VASCULAR PLANTS	PHACELIA RANUNCULACEA	BLUE SCORPION-WEED	S	G3G4/S3
Western	Christian	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Western	Crittenden	AMPHIBIANS	HYLA GRATIOSA	BARKING TREEFROG	S	G5/S3
Western	Crittenden	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Crittenden	BIRDS	VIREO BELLII	BELL'S VIREO	S	G5/S2S3B
Western	Crittenden	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Crittenden	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Crittenden	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Western	Crittenden	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Crittenden	BIVALVES	POTAMILUS CAPAX	FAT POCKETBOOK	E/LE	G1/S1
Western	Crittenden	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Western	Crittenden	CRUSTACEANS	ORCONECTES BISECTUS	CRITTENDEN CRAYFISH	T	G2/S1
Western	Crittenden	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3

Western	Crittenden	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Western	Crittenden	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Crittenden	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Western	Crittenden	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Crittenden	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Crittenden	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Western	Crittenden	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP OCCIDENTALE	WESTERN FALSE GROMWELL	E	G4G5T4?/S1
Western	Crittenden	VASCULAR PLANTS	HIERACIUM LONGIPILUM	HAIRY HAWKWEED	T	G4G5/S2
Western	Crittenden	VASCULAR PLANTS	SPIRANTHES MAGNICAMPORUM	GREAT PLAINS LADIES'-TRESSES	T	G4/S2
Western	Crittenden	VASCULAR PLANTS	SOLIDAGO BUCKLEYI	BUCKLEY'S GOLDENROD	S	G4/S2S3
Western	Crittenden	VASCULAR PLANTS	SCIRPUS HETEROCHAETUS	SLENDER BULRUSH	E	G5/S1
Western	Crittenden	VASCULAR PLANTS	PHILADELPHUS PUBESCENS	HOARY MOCK ORANGE	E	G5?/S1
Western	Crittenden	VASCULAR PLANTS	GYMNOPOGON AMBIGUUS	BEARDED SKELETONGRASS	S	G4/S2S3
Western	Crittenden	VASCULAR PLANTS	SPOROBOLUS HETEROLEPIS	NORTHERN DROPSEED	E	G5/S1
Western	Crittenden	VASCULAR PLANTS	SEDUM TELEPHIOIDES	ALLEGHENY STONECROP	T	G4/S2
Western	Crittenden	VASCULAR PLANTS	THASPIUM PINNATIFIDUM	CUTLEAF MEADOW-PARSNIP	T	G2G3/S2S3
Western	Crittenden	VASCULAR PLANTS	AESCULUS PAVIA	RED BUCKEYE	T	G5/S2S3
Western	Crittenden	VASCULAR PLANTS	SPOROBOLUS CLANDESTINUS	ROUGH DROPSEED	T	G5/S2S3
Western	Crittenden	VASCULAR PLANTS	MUHLENBERGIA GLABRIFLORIS	HAIR GRASS	S	G4?/S2S3
Western	Crittenden	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Western	Crittenden	VASCULAR PLANTS	CIMICIFUGA RUBIFOLIA	APPALACHIAN BUGBANE	T	G3/S2
Western	Crittenden	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Western	Crittenden	VASCULAR PLANTS	FIMBRISTYLIS PUBERULA	HAIRY FIMBRISTYLIS	T	G5/S2
Western	Fulton	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Fulton	AMPHIBIANS	AMPHIUMA TRIDACTYLUM	THREE-TOED AMPHIUMA	E	G5/S1
Western	Fulton	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Fulton	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Fulton	BIRDS	STERNA ANTILLARUM ATHALASSOS	INTERIOR LEAST TERN	E/LE	G4T2Q/S2B
Western	Fulton	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Western	Fulton	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Fulton	BIRDS	ARDEA ALBA	GREAT EGRET	E	G5/S1B
Western	Fulton	BIRDS	ANAS DISCORS	BLUE-WINGED TEAL	E	G5/S1S2B
Western	Fulton	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Western	Fulton	BIRDS	BUBULCUS IBIS	CATTLE EGRET	S	G5/S1S2B
Western	Fulton	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Western	Fulton	BIRDS	ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE	S	G5/S2B
Western	Fulton	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Fulton	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Western	Fulton	BIRDS	IXOBRYCHUS EXILIS	LEAST BITTERN	T	G5/S1S2B
Western	Fulton	BIRDS	PHALACROCORAX AURITUS	DOUBLE-CRESTED CORMORANT	H	G5/SHB,SZN
Western	Fulton	BIRDS	PODILYMBUS PODICEPS	PIED-BILLED GREBE	E	G5/S1B,S4N
Western	Fulton	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B

Western	Fulton	BIRDS	RALLUS ELEGANS	KING RAIL	E	G4G5/S1B
Western	Fulton	BIVALVES	POTAMILUS PURPURATUS	BLEUFER	E	G5/S1
Western	Fulton	BIVALVES	TOXOLASMA TEXASIENSIS	TEXAS LILLIPUT	E	G4/S1
Western	Fulton	CRUSTACEANS	PROCAMBARUS VIAEVIRIDIS	A CRAYFISH	T	G5/S1
Western	Fulton	CRUSTACEANS	ORCONECTES LANCIFER	A CRAYFISH	E	G5/S1
Western	Fulton	CRUSTACEANS	CAMBARELLUS SHUFELDTII	CAJUN DWARF CRAYFISH	S	G5/S2
Western	Fulton	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Fulton	FISHES	NOTROPIS MACULATUS	TAILLIGHT SHINER	T	G5/S2S3
Western	Fulton	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Western	Fulton	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Western	Fulton	FISHES	LEPOMIS MARGINATUS	DOLLAR SUNFISH	E	G5/S1
Western	Fulton	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Western	Fulton	FISHES	MENIDIA BERYLLINA	INLAND SILVERSIDE	T	G5/S2
Western	Fulton	FISHES	ALOSA ALABAMAE	ALABAMA SHAD	E/C	G3/S1
Western	Fulton	FISHES	HYBOGNATHUS HAYI	CYPRESS MINNOW	E	G5/S1
Western	Fulton	FISHES	UMBRA LIMI	CENTRAL MUDMINNOW	T	G5/S2S3
Western	Fulton	FISHES	PLATYGOBIO GRACILIS	FLATHEAD CHUB	S	G5/S1
Western	Fulton	FISHES	FUNDULUS CHRYSOTUS	GOLDEN TOPMINNOW	E	G5/S1
Western	Fulton	FISHES	ATRACTOSTEUS SPATULA	ALLIGATOR GAR	E	G3G4/S1
Western	Fulton	FISHES	ETHEOSTOMA PROELIARE	CYPRESS DARTER	T	G5/S2
Western	Fulton	FISHES	ETHEOSTOMA FUSIFORME	SWAMP DARTER	E	G5/S1
Western	Fulton	FISHES	ESOX NIGER	CHAIN PICKEREL	S	G5/S3
Western	Fulton	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	Fulton	FISHES	CYPRINELLA VENUSTA	BLACKTAIL SHINER	S	G5/S3
Western	Fulton	FISHES	HYBOGNATHUS PLACITUS	PLAINS MINNOW	S	G4/S1
Western	Fulton	FISHES	FUNDULUS DISPAR	STARHEAD TOPMINNOW	E	G4/S1
Western	Fulton	GASTROPODS	WEBBHELIX MULTILINEATA	STRIPED WHITELIP	T	G?/S2
Western	Fulton	INSECTS	EUPHYES DUKESI	DUKES' SKIPPER	S	G3/S1
Western	Fulton	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Fulton	MAMMALS	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	S	G3G4/S3
Western	Fulton	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Fulton	PALUSTRINE COMMUNITIES	CYPRESS SWAMP		N	S3
Western	Fulton	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Western	Fulton	PALUSTRINE COMMUNITIES	COASTAL PLAIN SLOUGH		N	S2S3
Western	Fulton	PALUSTRINE COMMUNITIES	BOTTOMLAND MARSH		N	S1S2
Western	Fulton	REPTILES	NERODIA CYCLOPION	GREEN WATER SNAKE	E	G5/S1
Western	Fulton	REPTILES	NERODIA FASCIATA CONFLUENS	BROAD-BANDED WATER SNAKE	E	G5T5/S1
Western	Fulton	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Fulton	REPTILES	CHRYSEMYS PICTA DORSALIS	SOUTHERN PAINTED TURTLE	T	G5T5/S2
Western	Fulton	REPTILES	FARANCIA ABACURA REINWARDTII	WESTERN MUD SNAKE	S	G5T5/S3
Western	Fulton	REPTILES	THAMNOPHIS PROXIMUS PROXIMUS	WESTERN RIBBON SNAKE	T	G5T5/S1S2
Western	Fulton	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Fulton	VASCULAR PLANTS	IRIS FULVA	COPPER IRIS	E	G5/S1
Western	Fulton	VASCULAR PLANTS	POLYMNIA LAEVIGATA	TENNESSEE LEAFCUP	E	G3/S1S2
Western	Fulton	VASCULAR PLANTS	SEDUM TELEPHIOIDES	ALLEGHENY STONECROP	T	G4/S2
Western	Fulton	VASCULAR PLANTS	SCIRPUS FLUVIATILIS	RIVER BULRUSH	E	G5/S1S2
Western	Fulton	VASCULAR PLANTS	CLEMATIS CRISPA	BLUE JASMINE LEATHER-FLOWER	T	G5/S2

Western	Fulton	VASCULAR PLANTS	LYSIMACHIA RADICANS	TRAILING LOOSESTRIFE	H	G4G5/SH
Western	Fulton	VASCULAR PLANTS	PONTEDERIA CORDATA	PICKEREL WEED	T	G5/S1S2
Western	Fulton	VASCULAR PLANTS	ECHINODORUS BERTEROI	BURHEAD	T	G5/S2
Western	Fulton	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	Fulton	VASCULAR PLANTS	GLEDITSIA AQUATICA	WATER LOCUST	S	G5/S3?
Western	Fulton	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Western	Fulton	VASCULAR PLANTS	HETEROTHECA SUBAXILLARIS VAR LATIFOLIA	BROAD-LEAF GOLDEN-ASTER	T	G5T5/S2
Western	Fulton	VASCULAR PLANTS	CAREX HYSTERICINA	PORCUPINE SEDGE	H	G5/SH
Western	Fulton	VASCULAR PLANTS	NEMOPHILA APHYLLA	SMALL-FLOWER BABY-BLUE-EYES	T	G5/S2?
Western	Fulton	VASCULAR PLANTS	SAGITTARIA PLATYPHYLLA	DELTA ARROWHEAD	T	G5/S2?
Western	Fulton	VASCULAR PLANTS	MYRIOPHYLLUM HETEROPHYLLUM	BROADLEAF WATER-MILFOIL	S	G5/S3?
Western	Fulton	VASCULAR PLANTS	LIMNOBIUM SPONGIA	AMERICAN FROG'S-BIT	T	G4/S2S3
Western	Fulton	VASCULAR PLANTS	PHACELIA RANUNCULACEA	BLUE SCORPION-WEED	S	G3G4/S3
Western	Fulton	VASCULAR PLANTS	TRICHOSTEMA SETACEUM	NARROWLEAF BLUECURLS	E	G5/S1
Western	Fulton	VASCULAR PLANTS	ZIZANIA PALUSTRIS VAR INTERIOR	INDIAN WILD RICE	H	G4G5T4T5/SH
Western	Fulton	VASCULAR PLANTS	CAREX GIGANTEA	LARGE SEDGE	T	G4/S2
Western	Fulton	VASCULAR PLANTS	ZIZANIOPSIS MILIACEA	SOUTHERN WILD RICE	T	G5/S1S2
Western	Fulton	VASCULAR PLANTS	ARMORACIA LACUSTRIS	LAKECRESS	T	G4?/S1S2
Western	Fulton	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2
Western	Fulton	VASCULAR PLANTS	UTRICULARIA MACRORHIZA	GREATER BLADDERWORT	E	G5/S1
Western	Fulton	VASCULAR PLANTS	TREPOCARPUS AETHUSAE	TREPOCARPUS	T	G4G5/S2
Western	Fulton	VASCULAR PLANTS	CABOMBA CAROLINIANA	CAROLINA FANWORT	T	G3G5/S2
Western	Fulton	VASCULAR PLANTS	CALYLOPHUS SERRULATUS	YELLOW EVENING PRIMROSE	H	G5/SH
Western	Fulton	VASCULAR PLANTS	BERCHEMIA SCANDENS	SUPPLE-JACK	T	G5/S1S2
Western	Henderson	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	Henderson	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Henderson	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Henderson	BIRDS	RALLUS ELEGANS	KING RAIL	E	G4G5/S1B
Western	Henderson	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Western	Henderson	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Western	Henderson	BIRDS	GALLINULA CHLOROPUS	COMMON MOORHEN	T	G5/S1S2B
Western	Henderson	BIRDS	ARDEA ALBA	GREAT EGRET	E	G5/S1B
Western	Henderson	BIRDS	ACTITIS MACULARIA	SPOTTED SANDPIPER	E	G5/S1B
Western	Henderson	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Henderson	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Henderson	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Western	Henderson	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B
Western	Henderson	BIRDS	PHALACROCORAX AURITUS	DOUBLE-CRESTED CORMORANT	H	G5/SHB,SZN
Western	Henderson	BIRDS	CERTHIA AMERICANA	BROWN CREEPER	E	G5/S1S2B,S4S5N
Western	Henderson	BIRDS	ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE	S	G5/S2B
Western	Henderson	BIRDS	IXOBRYCHUS EXILIS	LEAST BITTERN	T	G5/S1S2B

Western	Henderson	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Western	Henderson	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Western	Henderson	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Western	Henderson	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Western	Henderson	BIVALVES	POTAMILUS CAPAX	FAT POCKETBOOK	E/LE	G1/S1
Western	Henderson	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Western	Henderson	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Western	Henderson	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Western	Henderson	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Western	Henderson	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Western	Henderson	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Western	Henderson	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	Henderson	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Western	Henderson	INSECTS	TRAVERELLA LEWISI	A LEPTOPHLEBIID MAYFLY	H	G2/SH
Western	Henderson	INSECTS	NICROPHORUS AMERICANUS	AMERICAN BURYING BEETLE	H/LE	G2G3/SH
Western	Henderson	MAMMALS	SOREX CINEREUS	CINEREUS SHREW	S	G5/S3
Western	Henderson	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Henderson	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	Henderson	PALUSTRINE COMMUNITIES	BOTTOMLAND MARSH		N	S1S2
Western	Henderson	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Western	Henderson	PALUSTRINE COMMUNITIES	FLOODPLAIN SLOUGH		N	S2S3
Western	Henderson	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Henderson	REPTILES	MACROCLEMYS TEMMINCKII	ALLIGATOR SNAPPING TURTLE	T	G3G4/S2
Western	Henderson	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Henderson	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Henderson	VASCULAR PLANTS	HYDROCOTYLE RANUNCULOIDES	FLOATING PENNYWORT	E	G5/S1S2
Western	Henderson	VASCULAR PLANTS	LYSIMACHIA TERRESTRIS	SWAMP CANDLES	E	G5/S1
Western	Henderson	VASCULAR PLANTS	NEMOPHILA APHYLLA	SMALL-FLOWER BABY-BLUE-EYES	T	G5/S2?
Western	Henderson	VASCULAR PLANTS	PHACELIA RANUNCULACEA	BLUE SCORPION-WEED	S	G3G4/S3
Western	Henderson	VASCULAR PLANTS	POLYMNIA LAEVIGATA	TENNESSEE LEAFCUP	E	G3/S1S2
Western	Henderson	VASCULAR PLANTS	PONTEDERIA CORDATA	PICKEREL WEED	T	G5/S1S2
Western	Henderson	VASCULAR PLANTS	RANUNCULUS AMBIGENS	WATERPLANTAIN SPEARWORT	S	G4/S3
Western	Henderson	VASCULAR PLANTS	SAGITTARIA GRAMINEA	GRASSLEAF ARROWHEAD	T	G5/S1S2
Western	Henderson	VASCULAR PLANTS	SCIRPUS FLUVIATILIS	RIVER BULRUSH	E	G5/S1S2
Western	Henderson	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Western	Henderson	VASCULAR PLANTS	SPARGANIUM EURYCARPUM	LARGE BUR-REED	E	G5/S1?
Western	Henderson	VASCULAR PLANTS	SAXIFRAGA PENSYLVANICA	SWAMP SAXIFRAGE	H	G5/SH
Western	Henderson	VASCULAR PLANTS	CAREX DECOMPOSITA	EPIPHYTIC SEDGE	T	G3/S2
Western	Henderson	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	Henderson	VASCULAR PLANTS	ECHINODORUS BERTEROI	BURHEAD	T	G5/S2
Western	Hickman	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Hickman	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Hickman	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	Hickman	AMPHIBIANS	AMPHIUMA TRIDACTYLUM	THREE-TOED AMPHIUMA	E	G5/S1

Western	Hickman	BIRDS	STERNA ANTILLARUM ATHALASSOS	INTERIOR LEAST TERN	E/LE	G4T2Q/S2B
Western	Hickman	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Western	Hickman	BIRDS	ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE	S	G5/S2B
Western	Hickman	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Western	Hickman	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Western	Hickman	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Hickman	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Hickman	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Hickman	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Western	Hickman	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Western	Hickman	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B
Western	Hickman	BIRDS	ARDEA ALBA	GREAT EGRET	E	G5/S1B
Western	Hickman	BIVALVES	TOXOLASMA TEXASIENSIS	TEXAS LILLIPUT	E	G4/S1
Western	Hickman	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Western	Hickman	CRUSTACEANS	CAMBARELLUS SHUFELDTII	CAJUN DWARF CRAYFISH	S	G5/S2
Western	Hickman	CRUSTACEANS	ORCONECTES PALMERI PALMERI	A CRAYFISH	E	G5T5/S1
Western	Hickman	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Western	Hickman	FISHES	UMBRA LIMI	CENTRAL MUDMINNOW	T	G5/S2S3
Western	Hickman	FISHES	SCAPHIRHYNCHUS ALBUS	PALLID STURGEON	E/LE	G1/S1
Western	Hickman	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Hickman	FISHES	LEPOMIS MARGINATUS	DOLLAR SUNFISH	E	G5/S1
Western	Hickman	FISHES	NOTROPIS MACULATUS	TAILLIGHT SHINER	T	G5/S2S3
Western	Hickman	FISHES	ETHEOSTOMA PROELIARE	CYPRESS DARTER	T	G5/S2
Western	Hickman	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	Hickman	FISHES	CYPRINELLA VENUSTA	BLACKTAIL SHINER	S	G5/S3
Western	Hickman	FISHES	ETHEOSTOMA CHIENENSE	RELICT DARTER	E/LE	G1/S1
Western	Hickman	FISHES	FUNDULUS DISPAR	STARHEAD TOPMINNOW	E	G4/S1
Western	Hickman	FISHES	CYPRINELLA CAMURA	BLUNTFACE SHINER	E	G5/S1
Western	Hickman	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Western	Hickman	FISHES	HYBOGNATHUS HAYI	CYPRESS MINNOW	E	G5/S1
Western	Hickman	FISHES	ESOX NIGER	CHAIN PICKEREL	S	G5/S3
Western	Hickman	GASTROPODS	WEBBHELIX MULTILINEATA	STRIPED WHITELIP	T	G?/S2
Western	Hickman	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Hickman	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	Hickman	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Hickman	PALUSTRINE COMMUNITIES	COASTAL PLAIN SLOUGH		N	S2S3
Western	Hickman	PALUSTRINE COMMUNITIES	CYPRESS SWAMP		N	S3
Western	Hickman	PALUSTRINE COMMUNITIES	SHRUB SWAMP		N	S5
Western	Hickman	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Western	Hickman	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Hickman	REPTILES	NERODIA CYCLOPION	GREEN WATER SNAKE	E	G5/S1
Western	Hickman	REPTILES	FARANCIA ABACURA REINWARDTII	WESTERN MUD SNAKE	S	G5T5/S3
Western	Hickman	REPTILES	CHRYSEMYS PICTA DORSALIS	SOUTHERN PAINTED TURTLE	T	G5T5/S2
Western	Hickman	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Hickman	VASCULAR PLANTS	PTILIMNIUM NUTTALLII	NUTTALL'S MOCK BISHOP'S-WEED	E	G5?/S1S2
Western	Hickman	VASCULAR PLANTS	ZIZANIOPSIS MILIACEA	SOUTHERN WILD RICE	T	G5/S1S2
Western	Hickman	VASCULAR PLANTS	GLANDULARIA CANADENSIS	ROSE MOCK VERVAIN	T	G5/S2S3

Western	Hickman	VASCULAR PLANTS	GLEDITSIA AQUATICA	WATER LOCUST	S	G5/S3?
Western	Hickman	VASCULAR PLANTS	HEDEOMA HISPIDUM	ROUGH PENNYROYAL	T	G5/S2
Western	Hickman	VASCULAR PLANTS	HELIANTHUS SILPHIOIDES	SILPHIUM SUNFLOWER	E	G3G4/S1
Western	Hickman	VASCULAR PLANTS	HETEROTHECA SUBAXILLARIS VAR LATIFOLIA	BROAD-LEAF GOLDEN-ASTER	T	G5T5/S2
Western	Hickman	VASCULAR PLANTS	HYDROLEA UNIFLORA	ONE-FLOWER FIDDLELEAF	S	G5/S3?
Western	Hickman	VASCULAR PLANTS	IRIS FULVA	COPPER IRIS	E	G5/S1
Western	Hickman	VASCULAR PLANTS	LISTERA AUSTRALIS	SOUTHERN TWAYBLADE	E	G4/S1
Western	Hickman	VASCULAR PLANTS	ERYNGIUM INTEGRIFOLIUM	BLUE-FLOWER COYOTE-THISTLE	E	G5/S1
Western	Hickman	VASCULAR PLANTS	LYSIMACHIA RADICANS	TRAILING LOOSESTRIFE	H	G4G5/SH
Western	Hickman	VASCULAR PLANTS	CAREX CREBRIFLORA	COASTAL PLAIN SEDGE	T	G4/S1?
Western	Hickman	VASCULAR PLANTS	NEMOPHILA APHYLLA	SMALL-FLOWER BABY-BLUE-EYES	T	G5/S2?
Western	Hickman	VASCULAR PLANTS	OLDENLANDIA UNIFLORA	CLUSTERED BLUETS	E	G5/S1
Western	Hickman	VASCULAR PLANTS	PASPALUM BOSCIANUM	BULL PASPALUM	S	G5/S2S3
Western	Hickman	VASCULAR PLANTS	PHACELIA RANUNCULACEA	BLUE SCORPION-WEED	S	G3G4/S3
Western	Hickman	VASCULAR PLANTS	PTILIMNIUM CAPILLACEUM	MOCK BISHOP'S-WEED	T	G5/S1S2
Western	Hickman	VASCULAR PLANTS	PYCNANTHEMUM ALBESCENS	WHITELEAF MOUNTAINMINT	E	G5/S1
Western	Hickman	VASCULAR PLANTS	ULMUS SEROTINA	SEPTEMBER ELM	S	G4/S3
Western	Hickman	VASCULAR PLANTS	VITIS LABRUSCA	NORTHERN FOX GRAPE	S	G5/S2S3
Western	Hickman	VASCULAR PLANTS	ECHINODORUS BERTEROI	BURHEAD	T	G5/S2
Western	Hickman	VASCULAR PLANTS	POLYMNIA LAEVIGATA	TENNESSEE LEAFCUP	E	G3/S1S2
Western	Hickman	VASCULAR PLANTS	DIDIPLIS DIANDRA	WATER-PURSLANE	S	G5/S2S3
Western	Hickman	VASCULAR PLANTS	CLEMATIS CRISPA	BLUE JASMINE LEATHER-FLOWER	T	G5/S2
Western	Hickman	VASCULAR PLANTS	BERCHEMIA SCANDENS	SUPPLE-JACK	T	G5/S1S2
Western	Hickman	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	Hickman	VASCULAR PLANTS	AESCULUS PAVIA	RED BUCKEYE	T	G5/S2S3
Western	Hickman	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Western	Hickman	VASCULAR PLANTS	CAREX DECOMPOSITA	EPIPHYTIC SEDGE	T	G3/S2
Western	Hopkins	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Hopkins	BIRDS	IXOBRYCHUS EXILIS	LEAST BITTERN	T	G5/S1S2B
Western	Hopkins	BIRDS	VERMIVORA CHRYSOPTERA	GOLDEN-WINGED WARBLER	T	G4/S2B
Western	Hopkins	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Hopkins	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Hopkins	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Western	Hopkins	BIRDS	PODILYMBUS PODICEPS	PIED-BILLED GREBE	E	G5/S1B,S4N
Western	Hopkins	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Western	Hopkins	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Western	Hopkins	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Hopkins	BIRDS	CIRCUS CYANEUS	NORTHERN HARRIER	T	G5/S1S2B,S4N
Western	Hopkins	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Western	Hopkins	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B

Western	Hopkins	BIRDS	BOTAURUS LENTIGINOSUS	AMERICAN BITTERN	H	G4/SHB
Western	Hopkins	BIVALVES	TOXOLASMA TEXASIENSIS	TEXAS LILLIPUT	E	G4/S1
Western	Hopkins	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Hopkins	FISHES	HYBOGNATHUS HAYI	CYPRESS MINNOW	E	G5/S1
Western	Hopkins	FISHES	ETHEOSTOMA TECUMSEHI	SHAWNEE DARTER	T	G1/S2
Western	Hopkins	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	Hopkins	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Hopkins	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Hopkins	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Western	Hopkins	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Hopkins	REPTILES	FARANCIA ABACURA REINWARDTII	WESTERN MUD SNAKE	S	G5T5/S3
Western	Hopkins	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Hopkins	VASCULAR PLANTS	LESPEDEZA STUEVEI	TALL BUSH-CLOVER	S	G4?/S3?
Western	Hopkins	VASCULAR PLANTS	CARYA AQUATICA	WATER HICKORY	T	G5/S2S3
Western	Hopkins	VASCULAR PLANTS	LIMNOBIUM SPONGIA	AMERICAN FROG'S-BIT	T	G4/S2S3
Western	Hopkins	VASCULAR PLANTS	MUHLENBERGIA BUSHII	BUSH'S MUHLY	E	G5/S1S2
Western	Hopkins	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Western	Hopkins	VASCULAR PLANTS	DIDIPLIS DIANDRA	WATER-PURSLANE	S	G5/S2S3
Western	Livingston	AMPHIBIANS	HYLA GRATIOSA	BARKING TREEFROG	S	G5/S3
Western	Livingston	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Livingston	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	Livingston	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Livingston	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Western	Livingston	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Western	Livingston	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Livingston	BIRDS	PANDION HALIAETUS	OSPREY	T	G5/S1S2B
Western	Livingston	BIRDS	STERNA ANTILLARUM ATHALASSOS	INTERIOR LEAST TERN	E/LE	G4T2Q/S2B
Western	Livingston	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Western	Livingston	BIRDS	CISTOTHORUS PLATENSIS	SEDGE WREN	S	G5/S3B
Western	Livingston	BIRDS	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	S	G5/S2S3B,S2S3N
Western	Livingston	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B
Western	Livingston	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Livingston	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Western	Livingston	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Western	Livingston	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Western	Livingston	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Western	Livingston	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Western	Livingston	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Western	Livingston	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Western	Livingston	BIVALVES	SIMPSONAIAS AMBIGUA	SALAMANDER MUSSEL	T	G3/S2S3
Western	Livingston	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Western	Livingston	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Western	Livingston	BIVALVES	POTAMILUS CAPAX	FAT POCKETBOOK	E/LE	G1/S1
Western	Livingston	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Western	Livingston	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Western	Livingston	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Western	Livingston	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2

Western	Livingston	FISHES	ETHEOSTOMA PROELIARE	CYPRESS DARTER	T	G5/S2
Western	Livingston	FISHES	ALOSA ALABAMAE	ALABAMA SHAD	E/C	G3/S1
Western	Livingston	FISHES	ESOX NIGER	CHAIN PICKEREL	S	G5/S3
Western	Livingston	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Western	Livingston	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Western	Livingston	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Western	Livingston	FISHES	ATRACTOSTEUS SPATULA	ALLIGATOR GAR	E	G3G4/S1
Western	Livingston	FISHES	MENIDIA BERYLLINA	INLAND SILVERSIDE	T	G5/S2
Western	Livingston	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Western	Livingston	GASTROPODS	LITHASIA SALEBROSA	MUDDY ROCKSNAIL	S	G3G4/S3S4
Western	Livingston	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Western	Livingston	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Livingston	GASTROPODS	LITHASIA VERRUCOSA	VARICOSE ROCKSNAIL	S	G3G4/S3S4
Western	Livingston	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Livingston	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	Livingston	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Livingston	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Livingston	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Livingston	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Western	Livingston	TERRESTRIAL COMMUNITIES	SHAWNEE HILLS SANDSTONE GLADE		N	S2
Western	Livingston	TERRESTRIAL COMMUNITIES	SANDSTONE BARRENS		N	S1
Western	Livingston	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Western	Livingston	VASCULAR PLANTS	MYRIOPHYLLUM PINNATUM	CUTLEAF WATER-MILFOIL	H	G5/SH
Western	Livingston	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Western	Livingston	VASCULAR PLANTS	HETERANTHERA DUBIA	GRASSLEAF MUD-PLANTAIN	S	G5/S3
Western	Livingston	VASCULAR PLANTS	HYDROLEA UNIFLORA	ONE-FLOWER FIDDLELEAF	S	G5/S3?
Western	Livingston	VASCULAR PLANTS	JUGLANS CINEREA	WHITE WALNUT	S	G3G4/S3
Western	Livingston	VASCULAR PLANTS	KOELERIA MACRANTHA	PRAIRIE JUNEGRASS	E	G5/S1
Western	Livingston	VASCULAR PLANTS	MONARDA PUNCTATA	SPOTTED BEE-BALM	H	G5/SH
Western	Livingston	VASCULAR PLANTS	MYRIOPHYLLUM HETEROPHYLLUM	BROADLEAF WATER-MILFOIL	S	G5/S3?
Western	Livingston	VASCULAR PLANTS	OENOTHERA LINIFOLIA	THREAD-LEAF SUNDROPS	E	G5/S1S2
Western	Livingston	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP OCCIDENTALE	WESTERN FALSE GROMWELL	E	G4G5T4?/S1
Western	Livingston	VASCULAR PLANTS	PHILADELPHUS PUBESCENS	HOARY MOCK ORANGE	E	G5?/S1
Western	Livingston	VASCULAR PLANTS	PTILIMNIUM COSTATUM	EASTERN BISHOP-WEED	S	G3G4/S3?
Western	Livingston	VASCULAR PLANTS	PTILIMNIUM NUTTALLII	NUTTALL'S MOCK BISHOP'S-WEED	E	G5?/S1S2
Western	Livingston	VASCULAR PLANTS	SEDUM TELEPHIOIDES	ALLEGHENY STONECROP	T	G4/S2
Western	Livingston	VASCULAR PLANTS	TORREYOCHLOA PALLIDA	PALE MANNA GRASS	E	G5?/S1
Western	Livingston	VASCULAR PLANTS	SOLIDAGO BUCKLEYI	BUCKLEY'S GOLDENROD	S	G4/S2S3
Western	Livingston	VASCULAR PLANTS	GLEDITSIA AQUATICA	WATER LOCUST	S	G5/S3?
Western	Livingston	VASCULAR PLANTS	SPOROBOLUS CLANDESTINUS	ROUGH DROPSEED	T	G5/S2S3
Western	Livingston	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3

Western	Livingston	VASCULAR PLANTS	FIMBRISTYLIS PUBERULA	HAIRY FIMBRISTYLIS	T	G5/S2
Western	Livingston	VASCULAR PLANTS	SPOROBOLUS HETEROLEPIS	NORTHERN DROPSEED	E	G5/S1
Western	Livingston	VASCULAR PLANTS	APIOS PRICEANA	PRICE'S POTATO-BEAN	E/LT	G2/S1
Western	Livingston	VASCULAR PLANTS	ARMORACIA LACUSTRIS	LAKECRESS	T	G4?/S1S2
Western	Livingston	VASCULAR PLANTS	CIMICIFUGA RUBIFOLIA	APPALACHIAN BUGBANE	T	G3/S2
Western	Livingston	VASCULAR PLANTS	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	S	G4G5T4T5/S3
Western	Logan	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Western	Logan	AMPHIBIANS	HYLA GRATIOSA	BARKING TREEFROG	S	G5/S3
Western	Logan	BIRDS	CIRCUS CYANEUS	NORTHERN HARRIER	T	G5/S1S2B,S4N
Western	Logan	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Western	Logan	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Logan	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Western	Logan	BIVALVES	VILLOSA ORTMANNI	KENTUCKY CREEKSHELL	T	G2/S2
Western	Logan	BIVALVES	ALASMIDONTA MARGINATA	ELKTOE	T	G4/S2
Western	Logan	BIVALVES	PLEUROBEMA OVIFORME	TENNESSEE CLUBSHELL	E	G3/S1
Western	Logan	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Western	Logan	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Western	Logan	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Western	Logan	BIVALVES	VILLOSA VANUXEMENSIS	MOUNTAIN CREEKSHELL	T	G4/S2
Western	Logan	BIVALVES	EPIOBLASMA TRIQUETRA	SNUFFBOX	S	G3/S3
Western	Logan	BIVALVES	LEXINGTONIA DOLABELLOIDES	SLABSIDE PEARLYMUSSEL	H/C	G2/SH
Western	Logan	CRUSTACEANS	ORCONECTES PELLUCIDUS	A CRAYFISH	S	G3/S3
Western	Logan	FISHES	NOTURUS EXILIS	SLENDER MADTOM	E	G5/S1
Western	Logan	FISHES	HYBOPSIS AMNIS	PALLID SHINER	H	G4/SH
Western	Logan	FISHES	ERIMYSTAX INSIGNIS	BLOTCHED CHUB	E	G3G4/S1
Western	Logan	FISHES	ETHEOSTOMA CINEREUM	ASHY DARTER	S	G2G3/S3
Western	Logan	FISHES	ETHEOSTOMA MICROLEPIDUM	SMALLSCALE DARTER	E	G2G3/S1
Western	Logan	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Logan	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Western	Logan	GASTROPODS	RABDOTUS DEALBATUS	WHITEWASHED RABDOTUS	T	G?/S1
Western	Logan	GASTROPODS	PLEUROCERA CURTA	SHORTSPIRE HORNSNAIL	S	G2/S2
Western	Logan	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Logan	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Logan	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	Logan	PALUSTRINE COMMUNITIES	SINKHOLE/DEPRESSION POND		N	S2S3
Western	Logan	PALUSTRINE COMMUNITIES	DEPRESSION SWAMP		N	S2
Western	Logan	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Logan	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Logan	TERRESTRIAL COMMUNITIES	LIMESTONE BARRENS		N	S2
Western	Logan	TERRESTRIAL COMMUNITIES	LIMESTONE SLOPE GLADE		N	S2S3
Western	Logan	VASCULAR PLANTS	MUHLENBERGIA CUSPIDATA	PLAINS MUHLY	T	G4/S2
Western	Logan	VASCULAR PLANTS	MALVASTRUM HISPIDUM	HISPID FALSEMALLOW	T	G3G5/S2?
Western	Logan	VASCULAR PLANTS	LIATRIS CYLINDRACEA	SLENDER BLAZING-STAR	T	G5/S2S3
Western	Logan	VASCULAR PLANTS	LEAVENWORTHIA TORULOSA	NECKLACE GLADECRESS	T	G4/S2

Western	Logan	VASCULAR PLANTS	ISOETES BUTLERI	BLACKFOOT QUILLWORT	E	G4/S1
Western	Logan	VASCULAR PLANTS	SILPHIUM PINNATIFIDUM	PRAIRIE-DOCK	S	G3Q/S3S4
Western	Logan	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Western	Logan	VASCULAR PLANTS	FORESTIERA LIGUSTRINA	UPLAND PRIVET	T	G4G5/S2S3
Western	Logan	VASCULAR PLANTS	JUNCUS FILIPENDULUS	RINGSEED RUSH	T	G5/S2?
Western	Logan	VASCULAR PLANTS	OENOTHERA TRILOBA	STEMLESS EVENING-PRIMROSE	T	G4/S1S2
Western	Logan	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP MOLLE	SOFT FALSE GROMWELL	E	G4G5T3/S1
Western	Logan	VASCULAR PLANTS	PASPALUM BOSCIANUM	BULL PASPALUM	S	G5/S2S3
Western	Logan	VASCULAR PLANTS	PERIDERIDIA AMERICANA	EASTERN EULOPHUS	T	G4/S2
Western	Logan	VASCULAR PLANTS	SALVIA URTICIFOLIA	NETTLE-LEAF SAGE	E	G5/S1
Western	Logan	VASCULAR PLANTS	TALINUM CALCARICUM	LIMESTONE FAMEFLOWER	E	G3/S1
Western	Logan	VASCULAR PLANTS	VIOLA SEPTEMLOBA VAR EGGLESTONII	EGGLESTON'S VIOLET	S	G4/S3
Western	Logan	VASCULAR PLANTS	GENTIANA FLAVIDA	YELLOW GENTIAN	E	G4/S1S2
Western	Logan	VASCULAR PLANTS	FIMBRISTYLIS PUBERULA	HAIRY FIMBRISTYLIS	T	G5/S2
Western	Logan	VASCULAR PLANTS	PRENANTHES ASPERA	ROUGH RATTLESNAKE-ROOT	E	G4?/S1
Western	Logan	VASCULAR PLANTS	DELPHINIUM CAROLINIANUM	CAROLINA LARKSPUR	T	G5/S1S2
Western	Logan	VASCULAR PLANTS	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA	S	G5/S3?
Western	Logan	VASCULAR PLANTS	CHEILANTHES ALABAMENSIS	ALABAMA LIPFERN	E	G4G5/S1
Western	Logan	VASCULAR PLANTS	BAPTISIA AUSTRALIS VAR MINOR	BLUE WILD INDIGO	S	G5T4/S2S3
Western	Logan	VASCULAR PLANTS	AUREOLARIA PATULA	SPREADING FALSE FOXGLOVE	S	G3/S3
Western	Logan	VASCULAR PLANTS	CAREX GIGANTEA	LARGE SEDGE	T	G4/S2
Western	Logan	VASCULAR PLANTS	DALEA PURPUREA	PURPLE PRAIRIE-CLOVER	S	G5/S3?
Western	Logan	VASCULAR PLANTS	ASTER PILOSUS VAR PRICEAE	WHITE HEATH ASTER	T	G5T3T5/S2
Western	Logan	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Western	Logan	VASCULAR PLANTS	ADIANTUM CAPILLUS-VENERIS	SOUTHERN MAIDENHAIR-FERN	T	G5/S2
Western	Logan	VASCULAR PLANTS	ASTER PRATENSIS	BARRENS SILKY ASTER	S	G?/S3
Western	Marshall	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	Marshall	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Marshall	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	Marshall	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Western	Marshall	BIRDS	ARDEA ALBA	GREAT EGRET	E	G5/S1B
Western	Marshall	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Western	Marshall	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Marshall	BIRDS	CERTHIA AMERICANA	BROWN CREEPER	E	G5/S1S2B,S4S5N
Western	Marshall	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B
Western	Marshall	BIRDS	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E/LT	G4/S1S2B,S2S3N
Western	Marshall	BIRDS	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	T	G5/S2B
Western	Marshall	BIVALVES	PLEUROBEMA CLAVA	CLUBSHELL	E/LE	G2/S1
Western	Marshall	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Western	Marshall	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Western	Marshall	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1

Western	Marshall	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Western	Marshall	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Western	Marshall	BIVALVES	TOXOLASMA TEXASIENSIS	TEXAS LILLIPUT	E	G4/S1
Western	Marshall	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Western	Marshall	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Western	Marshall	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Western	Marshall	BIVALVES	CUMBERLANDIA MONODONTA	SPECTACLECASE	E	G2G3/S1
Western	Marshall	CRUSTACEANS	PROCAMBARUS VIAEVIRIDIS	A CRAYFISH	T	G5/S1
Western	Marshall	FISHES	ALOSA ALABAMAE	ALABAMA SHAD	E/C	G3/S1
Western	Marshall	FISHES	LEPOMIS MARGINATUS	DOLLAR SUNFISH	E	G5/S1
Western	Marshall	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Western	Marshall	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Western	Marshall	FISHES	UMBRA LIMI	CENTRAL MUDMINNOW	T	G5/S2S3
Western	Marshall	FISHES	HYBOPSIS AMNIS	PALLID SHINER	H	G4/SH
Western	Marshall	FISHES	ETHEOSTOMA PROELIARE	CYPRESS DARTER	T	G5/S2
Western	Marshall	FISHES	LAMPETRA APPENDIX	AMERICAN BROOK LAMPREY	T	G4/S2
Western	Marshall	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Marshall	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Western	Marshall	GASTROPODS	LITHASIA SALEBROSA	MUDDY ROCKSNAIL	S	G3G4/S3S4
Western	Marshall	GASTROPODS	LITHASIA VERRUCOSA	VARICOSE ROCKSNAIL	S	G3G4/S3S4
Western	Marshall	INSECTS	EUPHYES DUKESI	DUKES' SKIPPER	S	G3/S1
Western	Marshall	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Marshall	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Marshall	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Western	Marshall	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Marshall	REPTILES	PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE	T	G4T4/S2
Western	Marshall	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	Marshall	REPTILES	FARANCIA ABACURA REINWARDTII	WESTERN MUD SNAKE	S	G5T5/S3
Western	Marshall	VASCULAR PLANTS	HIERACIUM LONGIPILUM	HAIRY HAWKWEED	T	G4G5/S2
Western	Marshall	VASCULAR PLANTS	SCLERIA CILIATA VAR CILIATA	FRINGED NUTRUSH	E	G5T?/S1?
Western	Marshall	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Western	Marshall	VASCULAR PLANTS	HETERANTHERA LIMOSA	BLUE MUD-PLANTAIN	S	G5/S2S3
Western	Marshall	VASCULAR PLANTS	HYDROLEA OVATA	OVATE FIDDLELEAF	E	G5/S1
Western	Marshall	VASCULAR PLANTS	LYSIMACHIA FRASERI	FRASER'S LOOSESTRIFE	E	G2/S1
Western	Marshall	VASCULAR PLANTS	LYSIMACHIA TERRESTRIS	SWAMP CANDLES	E	G5/S1
Western	Marshall	VASCULAR PLANTS	SOLIDAGO BUCKLEYI	BUCKLEY'S GOLDENROD	S	G4/S2S3
Western	Marshall	VASCULAR PLANTS	OENOTHERA PERENNIS	SMALL SUNDROPS	E	G5/S1S2
Western	Marshall	VASCULAR PLANTS	GYMNOPOGON AMBIGUUS	BEARDED SKELETONGRASS	S	G4/S2S3
Western	Marshall	VASCULAR PLANTS	PTILIMNIUM NUTTALLII	NUTTALL'S MOCK BISHOP'S-WEED	E	G5?/S1S2
Western	Marshall	VASCULAR PLANTS	CABOMBA CAROLINIANA	CAROLINA FANWORT	T	G3G5/S2
Western	Marshall	VASCULAR PLANTS	STELLARIA LONGIFOLIA	LONGLEAF STITCHWORT	S	G5/S2S3
Western	Marshall	VASCULAR PLANTS	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	S	G4G5T4T5/S3
Western	Marshall	VASCULAR PLANTS	AGRIMONIA GRYPOSEPALA	TALL HAIRY GROOVEBUR	T	G5/S1S2
Western	Marshall	VASCULAR PLANTS	TREPOCARPUS AETHUSAE	TREPOCARPUS	T	G4G5/S2

Western	Marshall	VASCULAR PLANTS	CAREX DECOMPOSITA	EPIPHYTIC SEDGE	T	G3/S2
Western	Marshall	VASCULAR PLANTS	CAREX HYSTERICINA	PORCUPINE SEDGE	H	G5/SH
Western	Marshall	VASCULAR PLANTS	CARYA AQUATICA	WATER HICKORY	T	G5/S2S3
Western	McCracken	AMPHIBIANS	AMPHIUMA TRIDACTYLUM	THREE-TOED AMPHIUMA	E	G5/S1
Western	McCracken	AMPHIBIANS	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	S	G4T4/S3
Western	McCracken	AMPHIBIANS	HYLA CINEREA	GREEN TREEFROG	S	G5/S3
Western	McCracken	BIRDS	TYTO ALBA	BARN OWL	S	G5/S3
Western	McCracken	BIRDS	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	S	G5/S3B,S4N
Western	McCracken	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	McCracken	BIRDS	AIMOPHILA AESTIVALIS	BACHMAN'S SPARROW	E	G3/SX?B
Western	McCracken	BIRDS	CORVUS OSSIFRAGUS	FISH CROW	S	G5/S3B
Western	McCracken	BIRDS	LOPHODYTES CUCULLATUS	HOODED MERGANSER	T	G5/S1S2B,S3S4N
Western	McCracken	BIRDS	VIREO BELLII	BELL'S VIREO	S	G5/S2S3B
Western	McCracken	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Western	McCracken	BIRDS	ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE	S	G5/S2B
Western	McCracken	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Western	McCracken	BIVALVES	LAMPSILIS ABRUPTA	PINK MUCKET	E/LE	G2/S1
Western	McCracken	BIVALVES	QUADRULA CYLINDRICA CYLINDRICA	RABBITSFOOT	T	G3T3/S2
Western	McCracken	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Western	McCracken	BIVALVES	FUSCONAIA SUBROTUNDA SUBROTUNDA	LONGSOLID	S	G3T3/S3
Western	McCracken	BIVALVES	PLETHOBASUS COOPERIANUS	ORANGEFOOT PIMPLEBACK	E/LE	G1/S1
Western	McCracken	BIVALVES	PLETHOBASUS CYPHYUS	SHEEPNOSE	S	G3/S3
Western	McCracken	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Western	McCracken	BIVALVES	POTAMILUS CAPAX	FAT POCKETBOOK	E/LE	G1/S1
Western	McCracken	BIVALVES	POTAMILUS PURPURATUS	BLEUFER	E	G5/S1
Western	McCracken	CRUSTACEANS	ORCONECTES LANCIFER	A CRAYFISH	E	G5/S1
Western	McCracken	CRUSTACEANS	CAMBARELLUS PUER	A DWARF CRAYFISH	E	G4G5/S1
Western	McCracken	FISHES	MENIDIA BERYLLINA	INLAND SILVERSIDE	T	G5/S2
Western	McCracken	FISHES	NOTROPIS MACULATUS	TAILLIGHT SHINER	T	G5/S2S3
Western	McCracken	FISHES	UMBRA LIMI	CENTRAL MUDMINNOW	T	G5/S2S3
Western	McCracken	FISHES	NOTURUS STIGMOSUS	NORTHERN MADTOM	S	G3/S2S3
Western	McCracken	FISHES	ATRACTOSTEUS SPATULA	ALLIGATOR GAR	E	G3G4/S1
Western	McCracken	FISHES	LOTA LOTA	BURBOT	S	G5/SU
Western	McCracken	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	McCracken	FISHES	ICTIOBUS NIGER	BLACK BUFFALO	S	G5/S3
Western	McCracken	FISHES	CYPRINELLA VENUSTA	BLACKTAIL SHINER	S	G5/S3
Western	McCracken	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	McCracken	FISHES	ESOX NIGER	CHAIN PICKEREL	S	G5/S3
Western	McCracken	FISHES	ICHTHYOMYZON CASTANEUS	CHESTNUT LAMPREY	S	G4/S2
Western	McCracken	FISHES	ACIPENSER FULVESCENS	LAKE STURGEON	E	G3/S1
Western	McCracken	FISHES	ETHEOSTOMA PROELIARE	CYPRESS DARTER	T	G5/S2
Western	McCracken	FISHES	HYBOGNATHUS HAYI	CYPRESS MINNOW	E	G5/S1
Western	McCracken	GASTROPODS	LITHASIA VERRUCOSA	VARICOSE ROCKSNAIL	S	G3G4/S3S4
Western	McCracken	GASTROPODS	LITHASIA GENICULATA	ORNATE ROCKSNAIL	S	G3G4/S1
Western	McCracken	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	McCracken	GASTROPODS	LEPTOXIS PRAEROSA	ONYX ROCKSNAIL	S	G5/S3S4
Western	McCracken	INSECTS	SATYRIUM FAVONIUS ONTARIO	NORTHERN HAIRSTREAK	S	G4T4/S1
Western	McCracken	INSECTS	EUPHYES DUKESI	DUKES' SKIPPER	S	G3/S1
Western	McCracken	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3

Western	McCracken	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	McCracken	MAMMALS	MYOTIS SODALIS	INDIANA BAT	E/LE	G2/S1S2
Western	McCracken	PALUSTRINE COMMUNITIES	FLOODPLAIN RIDGE/TERRACE FOREST		N	S1
Western	McCracken	PALUSTRINE COMMUNITIES	WET PRAIRIE		N	S1
Western	McCracken	REPTILES	APALONE MUTICA MUTICA	MIDLAND SMOOTH SOFTSHELL	S	G5T5/S3
Western	McCracken	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	McCracken	REPTILES	MACROCLEMYS TEMMINCKII	ALLIGATOR SNAPPING TURTLE	T	G3G4/S2
Western	McCracken	VASCULAR PLANTS	LESPEDEZA STUEVEI	TALL BUSH-CLOVER	S	G4?/S3?
Western	McCracken	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	McCracken	VASCULAR PLANTS	PRENANTHES ASPERA	ROUGH RATTLESNAKE-ROOT	E	G4?/S1
Western	McCracken	VASCULAR PLANTS	HALESIA TETRAPTERA	MOUNTAIN SILVER-BELL	E	G5/S1S2
Western	McCracken	VASCULAR PLANTS	HETEROTHECA SUBAXILLARIS VAR LATIFOLIA	BROAD-LEAF GOLDEN-ASTER	T	G5T5/S2
Western	McCracken	VASCULAR PLANTS	HYDROLEA UNIFLORA	ONE-FLOWER FIDDLELEAF	S	G5/S3?
Western	McCracken	VASCULAR PLANTS	HYPERICUM ADPRESSUM	CREEPING ST. JOHN'S-WORT	H	G2G3/SH
Western	McCracken	VASCULAR PLANTS	MUHLENBERGIA GLABRIFLORIS	HAIR GRASS	S	G4?/S2S3
Western	McCracken	VASCULAR PLANTS	MELANTHERA NIVEA	SNOW MELANTHERA	S	G5/S3?
Western	McCracken	VASCULAR PLANTS	LILIUM SUPERBUM	TURK'S CAP LILY	T	G5/S1S2
Western	McCracken	VASCULAR PLANTS	ASTER DRUMMONDII VAR TEXANUS	TEXAS ASTER	T	G5T?/S2
Western	McCracken	VASCULAR PLANTS	CARYA AQUATICA	WATER HICKORY	T	G5/S2S3
Western	McCracken	VASCULAR PLANTS	LATHYRUS PALUSTRIS	VETCHLING PEAVINE	T	G5/S2
Western	McCracken	VASCULAR PLANTS	RUDBECKIA SUBTOMENTOSA	SWEET CONEFLOWER	E	G5/S1
Western	McCracken	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Western	McCracken	VASCULAR PLANTS	AESCULUS PAVIA	RED BUCKEYE	T	G5/S2S3
Western	McCracken	VASCULAR PLANTS	SOLIDAGO BUCKLEYI	BUCKLEY'S GOLDENROD	S	G4/S2S3
Western	McCracken	VASCULAR PLANTS	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	T	G5T?/S2
Western	McCracken	VASCULAR PLANTS	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	S	G4G5T4T5/S3
Western	McCracken	VASCULAR PLANTS	ARISTIDA RAMOSISSIMA	BRANCHED THREE-AWN GRASS	H	G5/SH
Western	McCracken	VASCULAR PLANTS	CAREX HYSTERICINA	PORCUPINE SEDGE	H	G5/SH
Western	Muhlenberg	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Western	Muhlenberg	AMPHIBIANS	HYLA AVIVOCA	BIRD-VOICED TREEFROG	T	G5/S2S3
Western	Muhlenberg	BIRDS	PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E/LE	G3/S1
Western	Muhlenberg	BIRDS	RIPARIA RIPARIA	BANK SWALLOW	S	G5/S3B
Western	Muhlenberg	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Muhlenberg	BIRDS	AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	S	G4/S3B
Western	Muhlenberg	BIRDS	GALLINULA CHLOROPUS	COMMON MOORHEN	T	G5/S1S2B
Western	Muhlenberg	BIRDS	ARDEA HERODIAS	GREAT BLUE HERON	S	G5/S3B,S4N
Western	Muhlenberg	BIRDS	ASIO FLAMMEUS	SHORT-EARED OWL	E	G5/S1B,S2N
Western	Muhlenberg	BIRDS	ASIO OTUS	LONG-EARED OWL	E	G5/S1B,S1S2N
Western	Muhlenberg	BIRDS	CIRCUS CYANEUS	NORTHERN HARRIER	T	G5/S1S2B,S4N
Western	Muhlenberg	BIRDS	VIREO BELLII	BELL'S VIREO	S	G5/S2S3B
Western	Muhlenberg	BIRDS	IXOBRYCHUS EXILIS	LEAST BITTERN	T	G5/S1S2B

Western	Muhlenberg	BIVALVES	EPIOBLASMA OBLIQUATA OBLIQUATA	CATSPAW	E/LE	G1T1/S1
Western	Muhlenberg	BIVALVES	VILLOSA LIENOSA	LITTLE SPECTACLECASE	S	G5/S3S4
Western	Muhlenberg	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Western	Muhlenberg	BIVALVES	PLEUROBEMA RUBRUM	PYRAMID PIGTOE	E	G2/S1
Western	Muhlenberg	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Western	Muhlenberg	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Muhlenberg	FISHES	ERIMYZON SUCETTA	LAKE CHUBSUCKER	T	G5/S2
Western	Muhlenberg	INSECTS	STYLURUS NOTATUS	ELUSIVE CLUBTAIL	H	G3/SH
Western	Muhlenberg	MAMMALS	MYOTIS GRISESCENS	GRAY MYOTIS	E/LE	G3/S2
Western	Muhlenberg	MAMMALS	MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	E	G3G4/S1S2
Western	Muhlenberg	MAMMALS	NYCTICEIUS HUMERALIS	EVENING BAT	T	G5/S2S3
Western	Muhlenberg	PALUSTRINE COMMUNITIES	CYPRESS SWAMP		N	S3
Western	Muhlenberg	PALUSTRINE COMMUNITIES	BOTTOMLAND HARDWOOD FOREST		N	S2
Western	Muhlenberg	REPTILES	NERODIA ERYTHROGASTER NEGLECTA	COPPERBELLY WATER SNAKE	S	G5T2T3/S3
Western	Muhlenberg	REPTILES	THAMNOPHIS SAURITUS SAURITUS	EASTERN RIBBON SNAKE	S	G5T5/S3
Western	Muhlenberg	VASCULAR PLANTS	CARYA AQUATICA	WATER HICKORY	T	G5/S2S3
Western	Muhlenberg	VASCULAR PLANTS	MALUS ANGUSTIFOLIA	SOUTHERN CRABAPPLE	S	G5?/S3
Western	Muhlenberg	VASCULAR PLANTS	DRYOPTERIS CARTHUSIANA	SPINULOSE WOOD FERN	S	G5/S3
Western	Muhlenberg	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Western	Muhlenberg	VASCULAR PLANTS	DIDIPLIS DIANDRA	WATER-PURSLANE	S	G5/S2S3
Western	Muhlenberg	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Western	Muhlenberg	VASCULAR PLANTS	CHELONE OBLIQUA VAR SPECIOSA	ROSE TURTLEHEAD	S	G4T3/S3
Western	Muhlenberg	VASCULAR PLANTS	ZIZANIOPSIS MILIACEA	SOUTHERN WILD RICE	T	G5/S1S2
Western	Todd	AMPHIBIANS	HYLA GRATIOSA	BARKING TREEFROG	S	G5/S3
Western	Todd	AMPHIBIANS	CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS	EASTERN HELLBENDER	S	G4T4/S3
Western	Todd	BIRDS	THRYOMANES BEWICKII	BEWICK'S WREN	S	G5/S3B
Western	Todd	BIRDS	CHONDESTES GRAMMACUS	LARK SPARROW	T	G5/S2S3B
Western	Todd	BIVALVES	PTYCHOBRANCHUS SUBTENTUM	FLUTED KIDNEYSHELL	E/C	G2G3/S1
Western	Todd	BIVALVES	PEGIAS FABULA	LITTLEWING PEARLYMUSSEL	E/LE	G1/S1
Western	Todd	BIVALVES	OBOVARIA RETUSA	RING PINK	E/LE	G1/S1
Western	Todd	BIVALVES	TOXOLASMA LIVIDUS	PURPLE LILLIPUT	E	G2/S1
Western	Todd	BIVALVES	LAMPSILIS OVATA	POCKETBOOK	E	G5/S1
Western	Todd	BIVALVES	CYPROGENIA STEGARIA	FANSHELL	E/LE	G1/S1
Western	Todd	BIVALVES	VILLOSA VANUXEMENSIS	MOUNTAIN CREEKSHELL	T	G4/S2
Western	Todd	FISHES	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	T	G5/S2
Western	Todd	FISHES	ETHEOSTOMA TECUMSEHI	SHAWNEE DARTER	T	G1/S2
Western	Todd	GASTROPODS	LITHASIA ARMIGERA	ARMORED ROCKSNAIL	S	G3G4/S3S4
Western	Todd	GASTROPODS	RABDOTUS DEALBATUS	WHITEWASHED RABDOTUS	T	G?/S1
Western	Todd	TERRESTRIAL COMMUNITIES	LIMESTONE PRAIRIE		N	S1
Western	Todd	TERRESTRIAL COMMUNITIES	CALCAREOUS MESOPHYTIC FOREST		N	S5
Western	Todd	VASCULAR PLANTS	LEAVENWORTHIA TORULOSA	NECKLACE GLADECRESS	T	G4/S2
Western	Todd	VASCULAR PLANTS	ONOSMODIUM MOLLE SSP HISPIDISSIMUM	HAIRY FALSE GROMWELL	E	G4G5T4/S1
Western	Todd	VASCULAR PLANTS	GENTIANA PUBERULENTA	DOWNY GENTIAN	E	G4G5/S1
Western	Todd	VASCULAR PLANTS	PERIDERIDIA AMERICANA	EASTERN EULOPHUS	T	G4/S2

Western	Todd	VASCULAR PLANTS	DODECATHEON FRENCHII	FRENCH'S SHOOTING STAR	S	G3/S3
Western	Todd	VASCULAR PLANTS	BAPTISIA TINCTORIA	YELLOW WILD INDIGO	T	G5/S1S2
Western	Todd	VASCULAR PLANTS	OENOTHERA LINIFOLIA	THREAD-LEAF SUNDROPS	E	G5/S1S2
Western	Todd	VASCULAR PLANTS	TRIFOLIUM REFLEXUM	BUFFALO CLOVER	E	G5/S1S2
Western	Todd	VASCULAR PLANTS	MELANTHIUM WOODII	WOOD BUNCHFLOWER	T	G5/S2
Western	Todd	VASCULAR PLANTS	CAREX ALATA	BROADWING SEDGE	T	G5/S1S2
Western	Todd	VASCULAR PLANTS	DELPHINIUM CAROLINIANUM	CAROLINA LARKSPUR	T	G5/S1S2
Western	Todd	VASCULAR PLANTS	BAPTISIA AUSTRALIS VAR MINOR	BLUE WILD INDIGO	S	G5T4/S2S3
Western	Todd	VASCULAR PLANTS	AMIANTHIUM MUSCITOXICUM	FLY POISON	T	G4G5/S1S2
Western	Todd	VASCULAR PLANTS	AGALINIS SKINNERIANA	PALE FALSE FOXGLOVE	E	G3/S1S2
Western	Todd	VASCULAR PLANTS	SALVIA URTICIFOLIA	NETTLE-LEAF SAGE	E	G5/S1

APPENDIX 6

Literature Cited

[1]Alerich, Carol L. 1990. Forest Statistics for Kentucky—1975 and 1988. United States Department of Agriculture-Forest Service Northeastern Forest Experiment Station Resource Bulletin NE-117.

[2]United States Department of Agriculture. Natural Resources Conservation Service. 1992. Kentucky's Land Resources Conditions and Trends.

[3]Johnson, Tony G.; Lowe, Larry. 1999. Kentucky's timber industry—an assessment of timber product output and use, 1999. Resource. Bulletin SRS-71. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. p. 10

[4] Braun, E.L. 1950. Deciduous Forests of Eastern North America. Philadelphia: Blakiston Co.

[5]Hinkle, C.R., W.C. McComb, J.M. Safley Jr., and P.A. Schmalzer. 1993. Mixed Mesophytic Forests in W.H. Martin, S.G. Boyce, and A.C. Echternacht (eds.), Biodiversity of the Southeastern United States: Upland Terrestrial Communities. New York: John Wiley. pp203-254.

[6]Taylor, Diana J. (editor). 1995. Kentucky Alive! A Report of the Kentucky Biodiversity Task Force.

[7]Kuchler, A.W. 1964. Potential Natural Vegetation of the Conterminous United States. American Geographic Society, Special Publication 36.

[8]Bryant, W.S., W.C. McComb, and J.S. Fralish. 1993. Oak-hickory forests (western mesophytic) oak-hickory forests. In W.H. Martin, S.G. Boyce, and A.C. Echternacht, (eds.), Biodiversity of the Southeastern United States: Upland Terrestrial Communities. New York: John Wiley. pp.143-201.

[9]Sharitz, R.R. and W.J. Mitsch. 1993. Southern floodplain forests. In W.H. Martin, W.G. Boyce, and A.C. Echternact, (eds.), Biodiversity of the Southeastern United States: Upland Terrestrial Communities. New York: John Wiley. pp.311-372.

[10]Smith, Brian. 2002. Kentucky Department of Fish and Wildlife Resource, Tourism Development Cabinet.

[11]U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census. 2002. 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: State Overview, Preliminary Findings. 28 p.

[12]Tichenor, Carey. 2002. Department of Parks, Tourism Development Cabinet.

[13]Lee, Mark Q. 2002. Kentucky Geological Survey Web Site.

[14]Lee, Mark Q. 2002. Information gathered from Soils Handbook, Misc. 383, University of Kentucky, Cooperative Extension Service, Agriculture and Home Economics.

[15]Miller, Robert. 2002. Kentucky Division of Water, Natural Resources and Environmental Protection Cabinet.

[16]Gracey, Sarah. 2002. Kentucky Division of Forestry, Urban Forestry Coordinator.

[17]US Forest Service-Daniel Boone National Forest Web Site.

[18]National Park Service-Big South Fork National River & Recreation Area Web Site.

[19]US Forest Service-Land Between The Lakes National Recreation Area Web Site.

[20]National Park Service-Mammoth Cave National Park Web Site.

[21]Wear, David N., John G. Greis (eds.). 2002. Southern Forest Resource Assessment.

[22]Bates, Ken. 1998. Personal communication.

[23]Wethington, K., T. Derting, T. Kind, and H. Whiteman. 2003. A Gap Analysis of Kentucky: Final Report. U.S. Department of the Interior, U.S. Geological Survey, Kentucky Department of Fish and Wildlife Resources, Frankfort, KY.

It is the mission of the Kentucky Division of Forestry to protect, conserve, and enhance the forest resources of the Commonwealth through a public informed of the environmental, social, and economic importance of these resources.

Commonwealth of Kentucky
Energy and Environment Cabinet
Department for Natural Resources
Kentucky Division of Forestry
300 Sower Boulevard, 4th Floor
Frankfort, Kentucky 40601
https://eec.ky.gov/Natural-Resources/Forestry