

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

A handwritten signature in black ink, appearing to read 'Brandon K. Howard', written in a cursive style.

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.

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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.

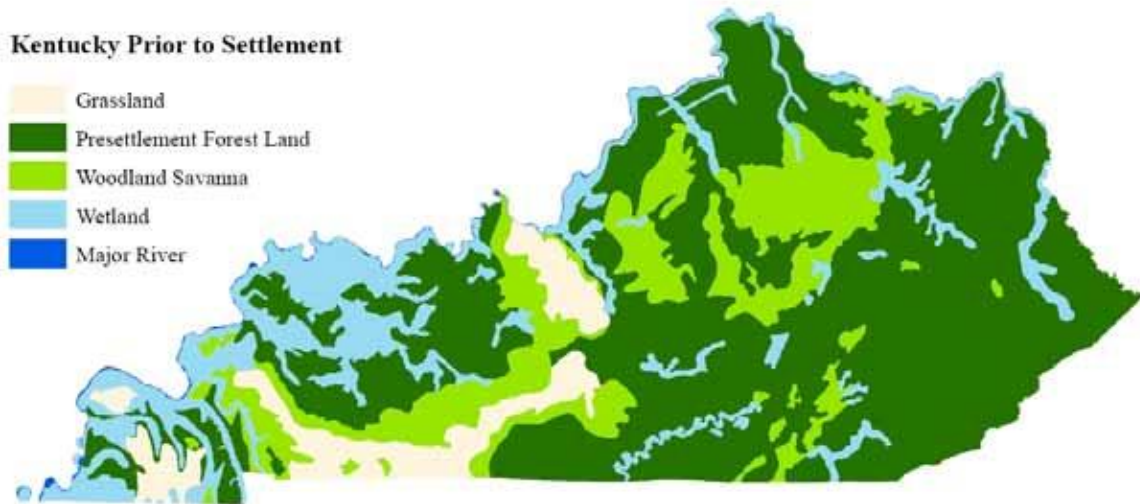


FIGURE 1 – KENTUCKY PRIOR TO SETTLEMENT

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

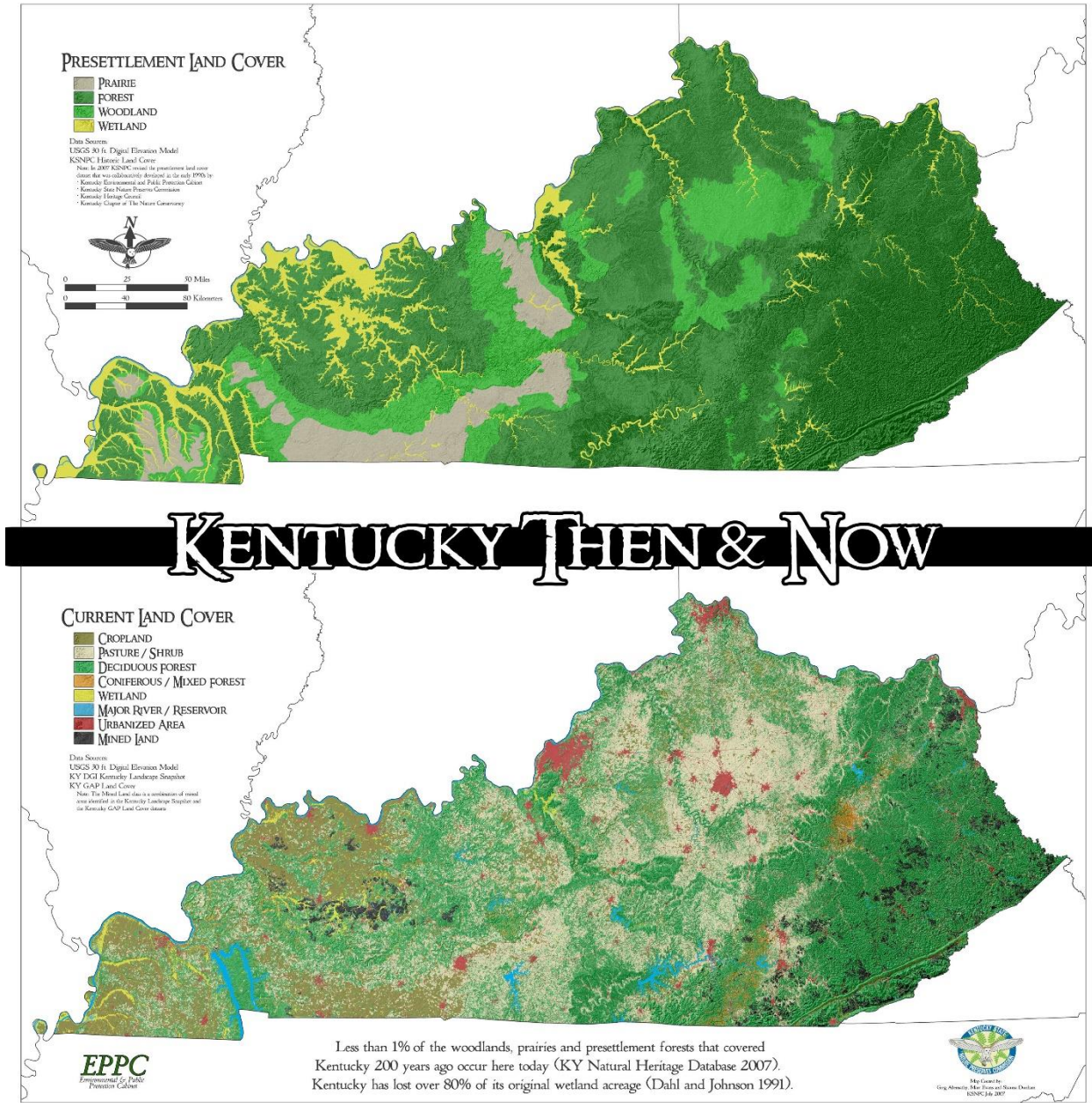


FIGURE 2 – KENTUCKY CURRENT LAND USE

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 exports⁵, 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