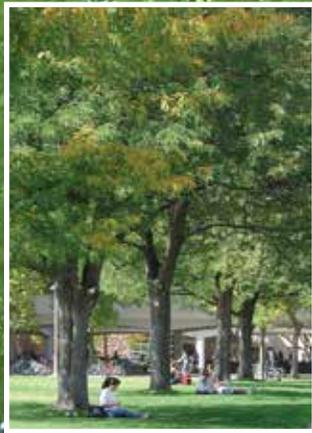


Kansas Forest Action Plan

Summary

National Priorities, Objectives, Strategies, and Plan Implementation



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Enhancing Public Benefits from Trees and Forests — Water Quality and Quantity

National Objectives Addressed	Protect and enhance water quality and quantity.
General Issue	Sustaining Water Quality and Quantity
Priority Landscapes	Loess and Glacial Hills; Flint Hills; I-70 Metro Corridor
Specific Issues in Kansas:	<ol style="list-style-type: none"> 1) Sedimentation of federal reservoirs – loss of water supply. 2) 90 percent of Kansas surface waters are impaired in rural and urban landscapes based on CWA Section 303(d) listing (TMDLs). 3) Compliance of municipalities with CWA stormwater NPDES permits.
Kansas Strategies	<ol style="list-style-type: none"> 1) Work through local Watershed Protection and Restoration Strategy (WRAPS) stakeholder groups in priority TMDL watersheds to protect, manage and establish riparian forests. 2) Classify functioning condition of riparian forests through local Watershed Protection and Restoration Strategy (WRAPS) stakeholder groups in priority TMDL watersheds with remote sensing and forest inventory. 3) Through local WRAPS groups landownership will be targeted based on priority areas identified in WRAPS plans. Landownership GIS data layers (create them when needed) will facilitate the process. 4) Forest Stewardship Management plans will guide implementation of BMPs on contiguous ownership within targeted watersheds. 5) Forest Legacy will be used to bring targeted riparian forests under protection. 6) KWO Kansas Water Plan Enhanced Stream Corridor and Wetland Management to Address Reservoir Sedimentation policy will guide strategy.
State and Private Forestry Applicable Programs	<ul style="list-style-type: none"> • Forest Stewardship Program • Urban and Community Forestry • Forest Legacy Program
Resources Required	Funding sources include Kansas Department of Wildlife, Parks and Tourism, CWA and KWO State Water Plan funding, KDHE’s WRAPS program, EPA Region 7 Wetland Developmental Grant, NRCS TSP, Kansas Department of Agriculture Division of Conservation, State and Private Forestry programs. Will fund positions for watershed forester and district foresters to provide technical services
Performance Measures	Acres and percent of priority watersheds where State and Private Forestry activities are enhancing or protecting water quality or quantity.



More than 15 miles of Kansas streambank tree plantings have been established since 2010.

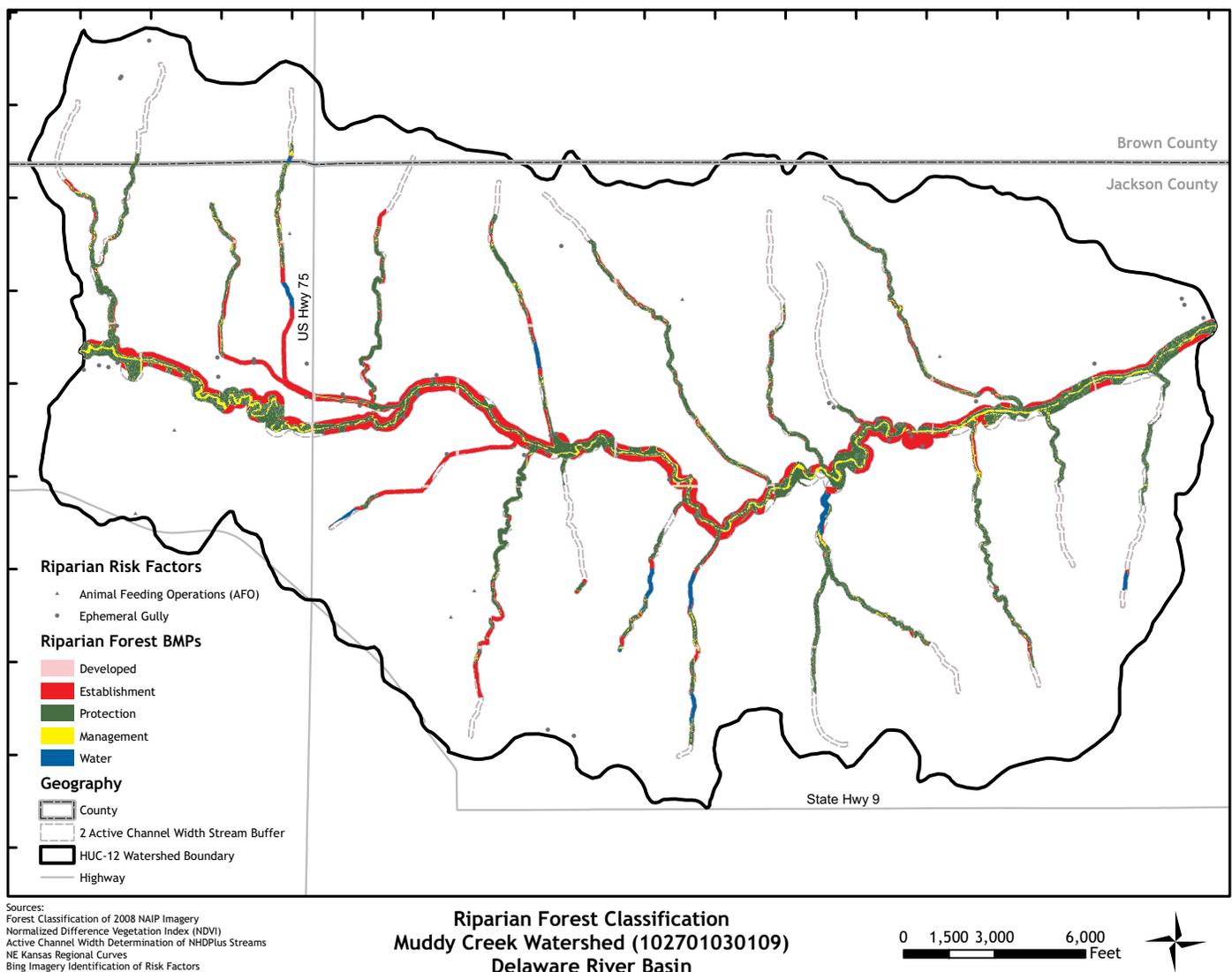
Accomplishment toward Sustaining Water Quality and Quantity

Working with multiple partners since 2010, more than 15 miles of Kansas streambank tree plantings have been established and 811 acres of forest improved. These accomplishments prevent 856,000 cubic yards of sediment from entering identified priority watersheds annually saving \$5.7 million in future dredging costs.

The Kansas Forest Service, Kansas Alliance of Wetlands and Streams (KAWS), and other partners worked closely with Watershed Protection and Restoration Strategy (WRAPS) stakeholder groups to complete assessments of the functioning condition of riparian forests. These assessments occurred in the Delaware, Tuttle Creek, and Spring River watersheds. Each of these watersheds has been identified as high-priority based on its history of exceeding total maximum daily loads (TMDL).

The Delaware assessment may be found on the Kansas Forest Service website at www.kansasforests.org/streamside_forestry/streamside_docs/Delaware_Watershed_Assessment_Final.pdf.

These geospatial assessments identify riparian forests in need of protection (properly functioning), in need of management (functioning at risk), and in need of establishment (nonfunctioning). Riparian forests in need of establishment represents 46 percent of the Delaware Watershed and are areas that contribute to the sedimentation of federal reservoirs and loss of water supply. The final GIS data layer added to the assessments included landowner parcel data. This landowner contact information enables a focused approach to strategically engage landowners with failing streambanks to implement forestry best management practices (BMPs).



Riparian Forest Classification Muddy Creek Watershed / Delaware River Basin.

Conserve Working Forestlands — Sustaining and Protecting Forests and Agroforests

National Objectives Addressed	<ul style="list-style-type: none"> • Actively and sustainably manage forests. • Identify and conserve high priority forest ecosystems and landscapes.
General Issue	Sustaining and Protecting Forest and Agroforestry Ecosystems
Priority Landscapes	Loess and Glacial Hills; Flint Hills; I-70 Metro Corridor; Missouri River Corridor; Wooded Plains; Cimarron Breaks; Western Ark River – Cimarron Grasslands; Eastern and Western Smoky Hills; Greater Wichita
Specific Issues in Kansas:	<ol style="list-style-type: none"> 1) 2.9 million acres of cultivated cropland (12 percent) of 24.6 million acres exceeds “tolerable limits” for erosion. 2) 44 percent of windbreaks (127,414 acres) are in fair to poor condition and in need of renovation. 3) 21 million acres (42 percent) of the Kansas landscape has the potential to benefit Kansans through forest stewardship (tree planting and management of existing rural forest and agroforestry resources). 4) Kansas urban and community forest is mature to over-mature with declining canopies. Average diameter is 13.6 inches with 48 percent of the population in fair to poor condition and 38 percent in 3 species – silver maple, Siberian elm and hackberry. 5) 46 percent of hardwood forests are classified as cull. 6) Fluvial geomorphic dynamics (declines in sandbars and active flood plains) and landuse conversions have reduced cottonwood regeneration, which is evidenced in the decline of trees in smaller diameter classes (1 to 3 inches) and the majority of volume occurring in larger diameter classes (17 inches and larger). 7) Though oak volume, tree numbers and density have all increased, oak forests are not replacing themselves, which is evidenced with the overwhelming proportion making up the overstory canopy.
Kansas Strategies	<ol style="list-style-type: none"> 1) The data set for agroforestry potential has identified 917,000 acres of cultivated cropland with a wind erodability index of 87 or higher (one of the requirements for CRP participation). Working through local RC&D’s and Conservation Districts, landowners will be identified in this area (GIS data layers created if needed) and contacted to promote the adoption of windbreak establishment. 2) The Coronado Crossing RC&D has just completed a remote sensing project to identify the condition and location of windbreaks within their 7 county area. This information will be used to identify landowners with windbreaks in fair to poor condition to promote windbreak renovation. EQIP will be the financial incentive program to promote adoption. 3) Landowners located in areas with high forest stewardship program potential/high priority resources will be invited to participate in the FSP. 4) The urban and community forest will be assessed through US Forest Service FIA. Other inventories will target defective and hazardous trees for removal. Mitigation pruning of defects from the canopy to prevent or delay trees from becoming hazardous and a tree planting program will be initiated to increase species diversity. Training will be provided on hazard tree identification, assessment, risk management, mitigation pruning, removals, utilization, tree selection and replacement. Technical assistance will be focused on smaller communities that lack resources to accomplish the strategy. 5) Exceptional promotion of forest stand improvement through EQIP for Forestland Health. Development of new biomass markets for cull material. Increasing the number of forestry contractors that provide forest stand improvement services. 6) Areas where river dynamics support the silvicultural conditions needed for cottonwood regeneration will be identified geospatially. An initiative to promote the regeneration of cottonwood in these target areas will be developed using existing USDA conservation programs. 7) The USDA Forest Service Northern Research Station (Daniel Dey) will assist with the refinement of silvicultural techniques to increase light through TSI and prescribed burning. KDWPT and NWF will be close partners. Areas of the state will be identified where oak regeneration efforts will be focused.
State and Private Forestry Applicable Programs	<ul style="list-style-type: none"> • Forest Stewardship Program • Urban and Community Forestry Program • Cooperative Fire Programs
Resources Required	<ul style="list-style-type: none"> • Will work closely with NRCS, National Agroforestry Center, University of Missouri Center for Agroforestry, USDA ARS Wind Erosion Research Unit, USDA Forest Service Northern Research Station, Tree Boards, Tree City USA, Kansas Arborists Association. • Status and Trend of Cottonwood Forests Along the Missouri will be used as a reference.
Performance Measures	<ul style="list-style-type: none"> • Number of forest acres being managed sustainably as defined by current Forest Stewardship Management Plans. • Acres of high priority forest ecosystems and landscapes protected from conversion. • Community Forestry Management Plans, Inventories, and CTAP • Acres of windbreaks managed sustainably

Accomplishments toward Sustaining and Protecting Forest and Agroforestry Ecosystems

Since 2010, more than 5 miles of shelterbelts have been renovated sustaining crop yield, wildlife and soil conservation benefits to more than 500 acres of cropland. These accomplishments occurred through the Environmental Quality Incentives Program (EQIP) and are the direct result of the implementation and expansion of a windbreak assessment strategy that began in Coronado Crossing RC & D (www.kansasforests.org/rural_forestry/rural_docs/KS%20WB%20Assessment.pdf).

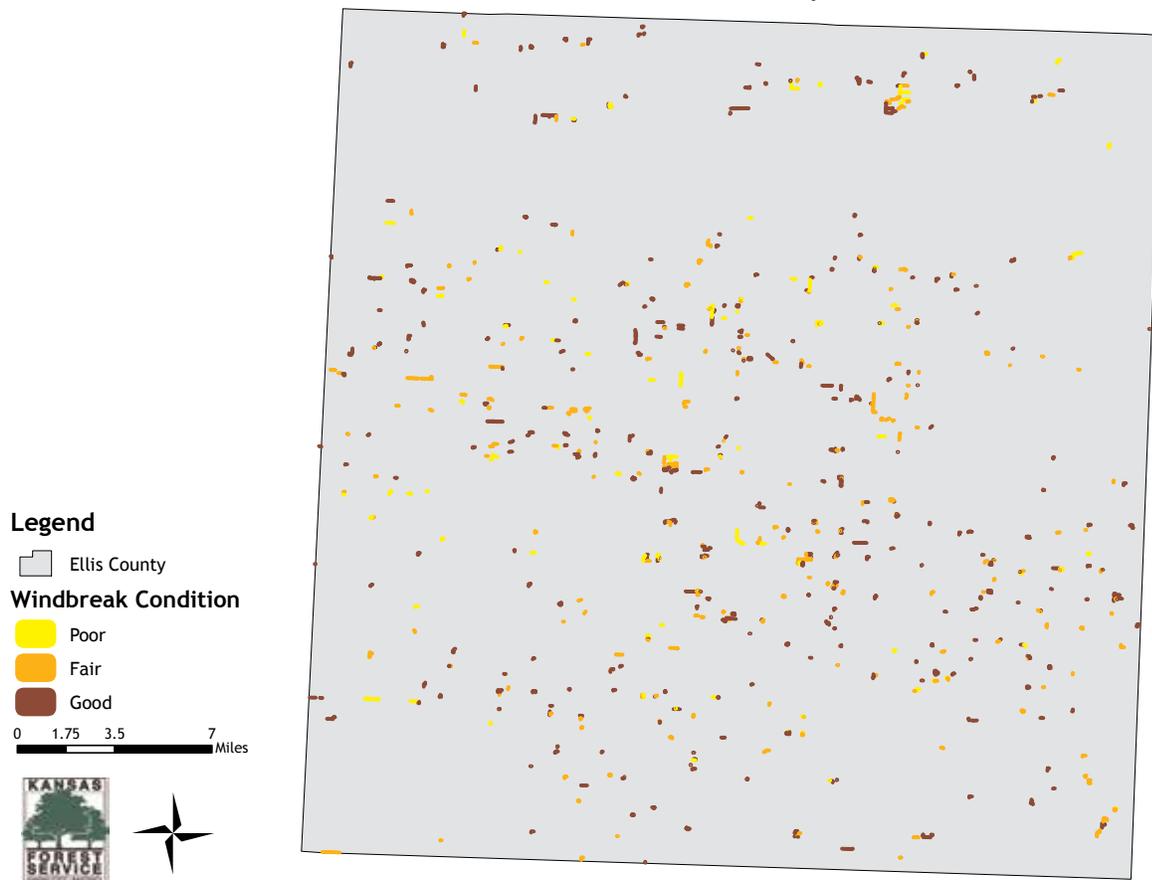
The assessment methodology has since been published as “*Identification of windbreaks in Kansas using object-based image analysis, GIS techniques and field survey.*”¹

Since 2010 the condition and location of windbreaks and shelterbelts in a 14-county area in Kansas and a two-county area in Colorado have been assessed and located geospatially using new GIS and remote sensing methodologies. Assessments are also underway in an additional seven-county area in south

central Kansas and a seven-county area in South Dakota. These assessments classify shelterbelts into good, fair, or poor condition classes based on criteria initially developed in the Great Plains Initiative (GPI). This same criteria was appropriated into Natural Resources Conservation Service (NRCS) Kansas Forestry Technical Note 11. In the technical note, shelterbelts classified in fair to poor condition qualify as a “Resource Concern” through the Environmental Quality Incentives Program (EQIP).

A GIS landowner parcel data layer was then used to identify farmers and ranchers with windbreaks in fair to poor condition. Direct mailings through local county conservation districts invited landowners to participate in EQIP. As a result, the number of windbreak renovation practices implemented in Kansas since 2010 has far exceeded any records of the historical implementation of the practice.

Windbreak Condition in Ellis County, Kansas



Identifying windbreak condition and location has increased the adoption of windbreak renovation practices.

¹ Ghimire, K., M.W.Dulin., R.L.Arbison., D.G. Goodin and J.M. S. Hutchinson. 2014. *Agroforestry Systems*. 88(5). 865-875

Enhance Public Benefits from Trees and Forests — Wildlife and Fish Habitat

National Objectives Addressed	Protect, conserve and enhance wildlife and fish habitat.
General Issue	Protecting and Restoring Forest Bio-diversity and Wildlife Habitat
Priority Landscapes	Loess and Glacial Hills; Flint Hills; I-70 Metro Corridor; Missouri River Corridor; Wooded Plains; Cimarron Breaks; Western Ark River – Cimarron Grasslands; Eastern and Western Smoky Hills; Greater Wichita
Specific Issues in Kansas:	<ol style="list-style-type: none"> 1) In the Shortgrass and Central Mixed Grass Prairie ecosystems riparian forests and shrubs are declining due to a lowering water table from surface and groundwater withdraw. 2) In the Eastern Tall Grass Prairie there is lack of active management and conservation of Deciduous Forests and Floodplain Habitats. <p>Note: Issues come directly from the Kansas Comprehensive Wildlife Conservation Plan</p>
Kansas Strategies	<ol style="list-style-type: none"> 1) Riparian forest and shrub habitat will be conserved and established for priority species in priority habitats that have some dependency on forested areas or trees. In the Shortgrass Prairie Ecosystem, the focus is on the eastern spotted skunk(threatened) and barn owl while the Mixed Grass Prairie Ecosystem targets the eastern spotted skunk(threatened), red-spotted toad and pallid bat. 2) The Deciduous Forest and Floodplain is the 4th priority habitat in the Eastern Tall Grass Prairie Ecosystem. Forested habitat will be actively managed and protected in priority landscapes to sustain or increase populations of the following species. Birds: Rusty Blackbird, Cerulean Warbler, Lewis’s Woodpecker; Mammals: Spotted Skunk(threatened), Little Brown Myotis, Gray Myotis (Endangered), Southern Flying Squirrel; Reptiles: Timber Rattlesnake, Redbelly Snake(threatened), Smooth Earth Snake; Amphibians: Green Frog, Northern Cricket Frog, Oklahoma Salamander; Insect: Ozark Emerald (damselfly), American Burying Beetle (Endangered), Gray Petaltail (damselfly).
State and Private Forestry Applicable Programs	<ul style="list-style-type: none"> • Forest Stewardship Program • Forest Legacy Program
Resources Required	Will seek strong partnerships with Kansas Department of Wildlife, Parks and Tourism, Kansas Biological Survey, National Wild Turkey Federation, US Fish and Wildlife Service, Quality Deer Management, and Kansas Water Office to pursue State and Private Forestry Competitive Grant opportunities and State and Private Forestry forestry programs.
Performance Measures	<ul style="list-style-type: none"> • Acres and percent of priority habitat areas where State and Private Forestry activities are protecting, conserving and enhancing wildlife and fish habitat. • Acres of connected forests resulting from State and Private Forestry investments.

Accomplishments toward Protecting and Restoring Forest Biodiversity and Wildlife Habitat

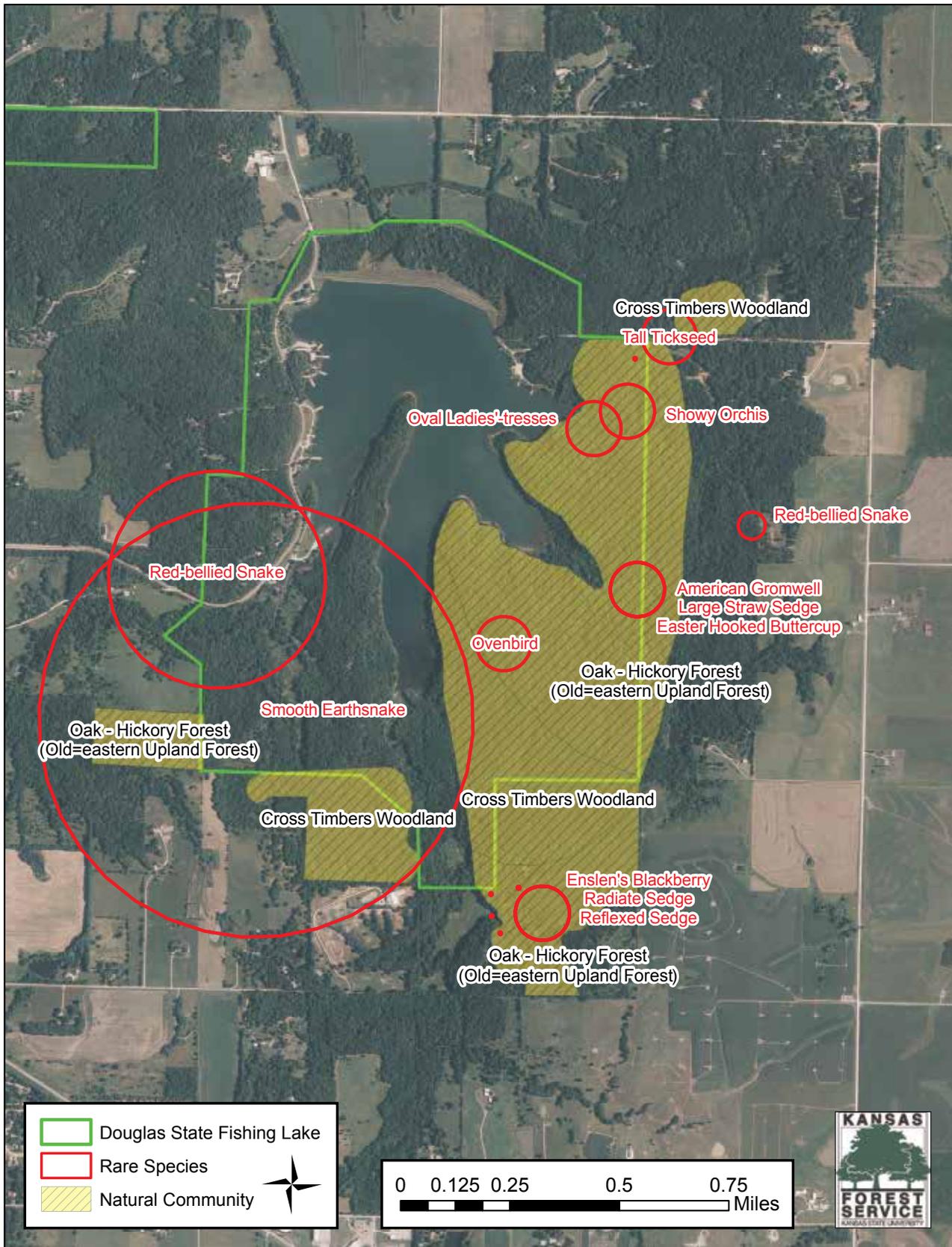
More than 1,000 acres of priority deciduous forest habitat for the redbelly and smooth earth snake and other threatened and rare species are being actively managed and protected through landscape forest stewardship planning and the Forest Legacy Program in the I-70 Metro Corridor priority landscape. The plan includes Douglas County State Fishing Lake and the Baldwin Woods Forest Legacy project.

Kansas Department of Wildlife, Parks and Tourism; U.S. Forest Service; Conservation Fund; University of Kansas; Kansas

Land Trust; and private forestland owners are protecting this important landscape through a mix of conservation easements and fee simple agreements.

Public meetings have solicited input and participation in the project and the landscape forest stewardship plan. Forest stand improvement practices have been implemented on public and private lands.

Douglas County State Fishing Lake and the Baldwin Woods Forest Legacy Project



The landscape forest stewardship plan protects a variety of rare and threatened species.

Enhance Public Benefits from Trees and Forests — Socioeconomic Benefits

National Objectives Addressed	Maintain and enhance the economic benefits and values of trees and forests.
General Issue	Sustaining and Enhancing Socioeconomic Benefits of Forests and Agroforests
Priority Landscapes	I-70 Metro Corridor; Wooded Plains; Greater Wichita
Specific Issues in Kansas:	<ol style="list-style-type: none"> 1) Currently only one-third of green woody biomass produced annually by wood manufacturing is available for use as a wood energy feedstock or biobased product feedstock. 2) Ecosystem service values must be assigned to forest and agroforestry resources. 3) Develop a biomass market for the utilization of eastern redcedar.
Kansas Strategies	<ol style="list-style-type: none"> 1) Conduct feasibility studies in areas surrounding Kansas City Topeka, Wichita and Pittsburg targeting public boiler systems 40 years or older for conversion to woody biomass. 2) Conduct annual or periodic forest inventory of communities, riparian forest and windbreaks in priority landscapes and assign ecosystem service values. 3) A community of interest and support for utilization of eastern redcedar biomass will be developed with Kansas Legislature Natural Resource and Utilities Committees, State Departments of Commerce, Energy, Labor and Health and Environment – Air Quality Division, Kansas Association of Conservation Districts, Kansas Water Office, Kansas Livestock Association, Tall Grass Legacy Alliance, State Conservation Commission, Natural Resource Conservation Service, Rural Development and Kansas State University's Center of Engagement and Community Development. Forest inventory will be intensified to improve data quality for feasibility studies.
State and Private Forestry Applicable Programs	<ul style="list-style-type: none"> • Urban and Community Forestry Program • Forest Stewardship Program
Resources Required	USDA Forest Service FIA, GPI, Kansas Legislature Natural Resource and Utilities Committees, State Departments of Commerce, Energy, Labor and Health and Environment – Air Quality Division, Kansas Association of Conservation Districts, Kansas Water Office, Kansas Livestock Association, Tall Grass Legacy Alliance, NRCS, Rural Development and K-State's Center for Engagement and Community Development
Performance Measures	<ul style="list-style-type: none"> • Number of communities and percent population served under an active urban and community forest management plan. • Number of total jobs (direct, indirect, and induced) sustained or maintained in the economy annually due to State and Private Forestry investments. • Total value of resources leveraged through partnerships with states and other partners.



Restoring grasslands and processing eastern redcedar into biomass.

Accomplishments toward Sustaining and Enhancing Socioeconomic Benefits of Forests and Agroforests

The Kansas Forest Service and the Kansas Wood & Bio-Based Interest Group is recruiting and sustaining biomass processing facilities through the following activities:

- Measuring the movement of woody by-product by county from timber harvests and waste wood from primary and secondary wood processors, municipalities, utilities, and commercial arborists. See *Kansas State-wide Woody Biomass Supply & Utilization Assessment* (www.kansasforests.org/forest_products/forest_product_docs/woodybiomass.pdf).
- Biannual educational programs and wood harvesting equipment demonstration field days.
- Transportation cost studies based on road miles and bridge crossings from harvest to processing sites.
- Development of the *Kansas Wood Supply* business plan for Biochar Now.
- Collaborative competitive grant proposal writing activities central to joint interests in restoring grasslands by removing eastern red cedar.
- Business related confidentiality agreements and the filing of wood-based business and wood-volume data by Kansas Department of Health & Environment. These agreements are associated with the potential composting to dispose of millions of chickens and turkeys resulting from the bird flu epidemic.
- The Center for Engagement and Community Development will serve to enhance industrial collaboration between the Kansas Forest Service and other public and private partners.
- The development of the Kansas City Utilization District to network on the processing, use and sale of lumber and mulch from the 3 million ash trees located in the Kansas City Metro area as a result of potential mortality from emerald ash borer.



Recruiting and sustaining biomass processing facilities.

Protect Forests from Harm — Threats to Forest Health

National Objectives Addressed	Identify, manage, and reduce threats to forest and ecosystem health
General Issue	Issues that Threaten Kansas Forest Health
Priority Landscapes	<ul style="list-style-type: none"> • All Priority Landscapes for emerald ash borer and thousand cankers disease. • Smoky Hill and Cimarron Breaks for Pine Wilt, Tamarisk and Russian Olive. • Greater Wichita, Flint Hills, Loess and Glacial Drift Hills, Missouri River Corridor, I-70 Metro Corridor, Wooded Plains for bush honeysuckle.
Specific Issues in Kansas:	<ol style="list-style-type: none"> 1) Thousand Cankers Disease is an imminent threat to black walnut. Found as close as Eads, Colorado, the complex has the potential to create over \$160 million dollar loss to the Kansas economy and a loss of environmental benefits as well. 2) Emerald Ash Borer is an imminent threat to white and green ash. It was first found in Wyandotte County Kansas in 2012, Johnson County in 2013, and Leavenworth County in 2014. All these counties are under federal and state quarantines. 3) Pine Wilt was first discovered in Kansas in 1979 in Cherokee County. It has since moved west at approximately 10 miles per year killing thousands of Scotch pines and to a lesser extent Austrian. It is now present in the eastern half of Kansas. 4) Exotic invasive plants have threatened the health and biodiversity of Kansas forests. The main three threats include bush honeysuckle in the eastern third and tamarisk and Russian olive in the south central and southwestern parts of the state.
Kansas Strategies	<ol style="list-style-type: none"> 1) A state quarantine will be established to regulate the movement of black walnut into the state. A systematic monitoring and trapping program will be established to ensure early detection of the disease complex along with a First Detectors program. An educational program for the general public will be continued and annual training of natural resource professionals in Colorado where the disease may be observed first-hand. The Kansas Readiness Response Plan for Emerald Ash Borer will serve as a guide should thousand cankers disease be discovered in state. Registration of forest industry, firewood distributors and other appropriate groups that handle raw wood products will occur and come under compliance agreements. 2) Annual trapping and monitoring for emerald ash borer will continue along with public education and awareness campaigns. The Readiness Response Plan will be updated as needed and Community Response Plans developed. Inventories of both ash and walnut tree populations in communities will occur through CTAP and economic loss estimates provided. 3) The focus of the Pine Wilt Initiative will be to limit, delay and mitigate the movement of the disease in the western half of the state by surveillance, outreach, communication, direct intervention and best management practices. Details of the Initiative are located in the Appendix. 4) The 10 Year Strategic Plan for the Comprehensive Control of Tamarisk and Other Non-native Phreatophytes, such as Russian Olive, is found in the Appendix and will guide the strategies of this plan. Southwestern Kansas will be the focus of Tamarisk control along the mainstem and tributaries of the Arkansas and Cimarron Rivers. Additional inventory is needed to identify target areas for Russian olive control, though Stafford County is an obvious location. Management will include inventory/mapping, control, regeneration, monitoring and maintenance. EQIP for Forestland Health will provide financial assistance to control bush honeysuckle in eastern Kansas. 5) An Exotic Invasive Species Committee for plants should be appointed by the Governor's Natural Resource Subcabinet to develop policy and guidelines to address invasive plant issues.
State and Private Forestry Applicable Programs	<ul style="list-style-type: none"> • Forest Health Management • Forest Stewardship Program • Urban and Community Forestry Program
Resources Required	Kansas Department of Agriculture's Plant Protection and Weed Control is a crucial partner for monitoring, trapping, quarantine development and education. The Kansas Water Office provides important leadership through by leading the 10 year strategic plan for tamarisk and Russian olive control. K-State Research and Extension pathologists and entomologists will provide diagnostics and education. Additional inventories are needed to better geographically identify species at risk and those targeted for control and eradication.
Performance Measures	<ul style="list-style-type: none"> • Number and percent of forest acres restored and or protected from invasive and native insects and diseases annually. • Case studies and success stories will be developed.

Accomplishments toward Issues that Threaten Kansas Forest Health

Working closely with the Secretary of the Kansas Department of Agriculture (KDA), the Kansas Forest Service assisted with the establishment of a statewide quarantine in 2010 to prevent and suppress the spread of Thousand Cankers Disease of Walnut. (<https://agriculture.ks.gov/divisions-programs/plant-protect-weed-control/thousand-cankers-disease>).

In partnership with KDA-Plant Protection and Weed Control, a systematic trapping and monitoring program and First Detectors Program began in 2009 and has continued to date. The primary high-risk areas of concern occur in central and eastern Kansas where walnut is common and anthropogenic pathways a concern.

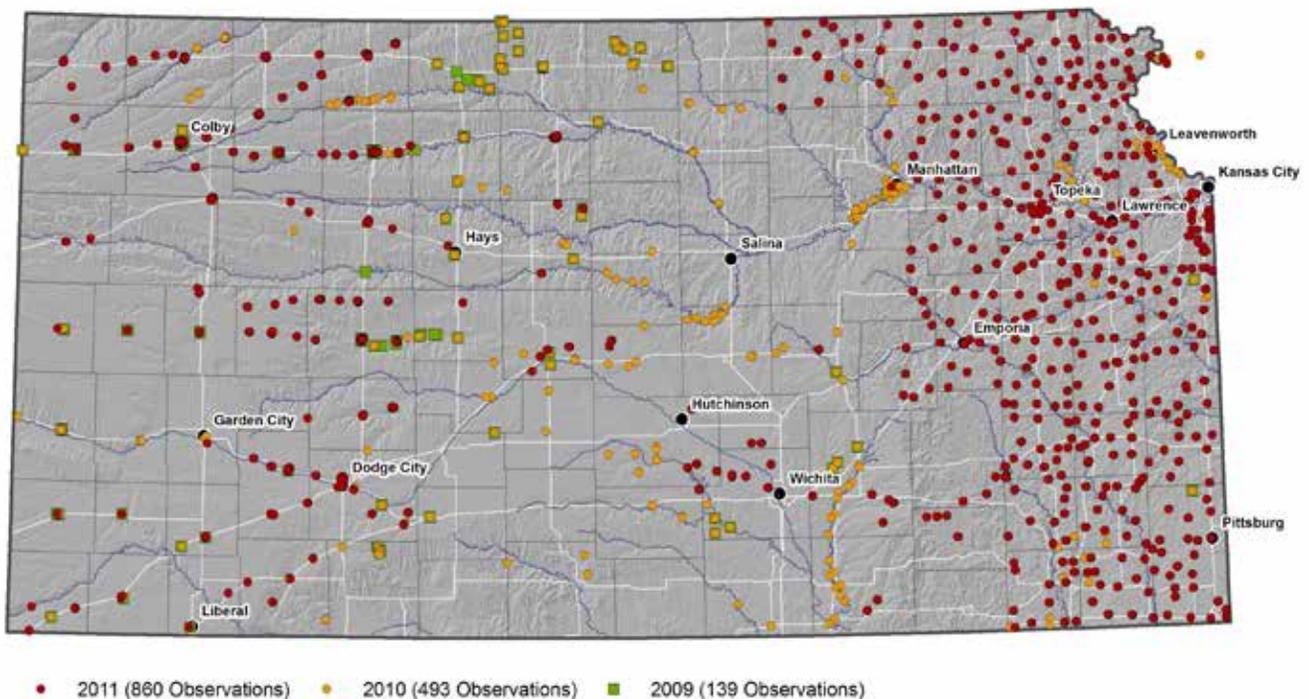
A secondary area of risk is western Kansas because of the most recent discovery of the disease in Eads, Colorado, 40 miles west of Tribune, Kansas. In eastern and central Kansas, five sites are monitored for a 60-day cycle at transportation hubs, parking areas, wood debris collection points, camping sites, wood utilization businesses. In western Kansas a sentinel site program monitors 20 traps May through October.

Several Kansas Forest Service foresters and KDA-Plant Protection and K-State Research and Extension entomologists and pathologists attended on-site training in Colorado in identification and diagnosis of the disease. A registry for forestry industry, firewood distributors, and other appropriate groups that use black walnut is being maintained and compliance

agreements developed as necessary (<https://agriculture.ks.gov/docs/default-source/pp-application-center/kansas-walnut-registry-application4352d2002e6262e1aa5bfff0000620720.pdf?sfvrsn=0>). Several publications have been developed including *Economic Loss Associated with the Introduction of Thousand Cankers Disease of Black Walnut to Kansas*, *Thousand Cankers Disease and Walnuts*, and *State of Kansas Thousand Cankers Disease of Walnut Strategic Plan* (www.kansasforests.org/forest_health/emerging_threats/thousandcankerdisease.html).



Professionals receiving training in TCD diagnosis from Colorado State University.



Trapping and monitoring thousand cankers disease in Kansas.

Protect Forests from Harm — Reducing Wildfire Risk

National Objectives Addressed	Restore fire- adapted lands and reduce wildfire impacts
General Issue	Wildfire Risk
Priority Landscapes	<ul style="list-style-type: none"> • Flint Hills • Cimarron Breaks • I-70 Metro Corridor • Wooded Plains • Greater Wichita
Specific Issues in Kansas:	<ol style="list-style-type: none"> 1) Lack of fire occurrence in Kansas grasslands is one factor that has caused eastern redcedar volume to increase by 23,000 percent over the last 45 years invading grasslands and adversely affecting the populations of a variety of species identified in the Comprehensive Wildlife Conservation Plan as the “top species of greatest conservation need”. Other woody plants such as Osage orange and honeylocust are also problematic. 2) Conversion of rural land to residential, expansion of urban areas and dramatic increase in eastern redcedar forest type has created potential wildland urban interface issues where fire can move readily between structural and vegetative fuels. 3) Lack of data on fire occurrence, weather and fuels.
Kansas Strategies	<ol style="list-style-type: none"> 1) Whenever possible, identify areas in which fire exclusion has lead to an increase in Eastern Redcedar and other fire-prone species. Identify areas of concern on Community Wildfire Protection Plans, Master Fire Plans, and other information being provided to counties. Include information on fighting fires in cedar and timber in training programs offered to rural firefighters around the state. Continue to support and encourage efforts to use prescribed fire safely and appropriately as a management and prevention tool in affected areas. 2) Emphasize this concern in Community Wildfire Protection Plans, and identify areas of danger to local stakeholders. Provide training and information on management of cedar and other invasives via prescribed fire and other suitable means at every opportunity. Emphasize FireWise and similar fire prevention programs in both fire and other programs’ information (e.g. community forestry) when writing plans and sharing information with landowners, community groups, and other stakeholders 3) Continue to work with the Kansas State Fire Marshall to try to improve fire occurrence data – and its timely availability – on wildfires statewide. Continue to work with the National Weather Service to develop the weather station network that is already in progress. Ultimately, integrate fire occurrence and weather data in a manner that can provide long term historic data correlating fire and weather, which can be used in the future for identifying fire trends, danger, and forecasts.
State and Private Forestry Applicable Programs	<ul style="list-style-type: none"> • Cooperative Fire Programs • Urban and Community Forestry
Resources Required	<ol style="list-style-type: none"> 1) fire departments, RC&D’s, emergency managers, landowners, conservation districts, Kansas State Firefighters’ Assoc., public land management agencies, rural/suburban development and/or residential improvement district homeowners associations 2) county governments, RC&D’s, local Emergency Planning Committees and Emergency Managers, and contractors developing hazard mitigation plans, rural/suburban development and/or residential improvement district homeowners associations 3) State Fire Marshall, NWS, KSU/State Climatologist, and whoever else is pursuing the weather network
Performance Measures	<ul style="list-style-type: none"> • Number of acres treated to restore fire-adapted ecosystems are moved toward and maintained in desired conditions. • Total acres treated to reduce hazardous fuels on state and private lands through the State Fire Assistance Program. • Percent of at-risk communities who increase suppression capacity by increasing the number of trained/ certified fire fighters; upgrading fire suppression equipment or formation of a new department or expansion of existing ones.

Accomplishments toward Reducing Wildfire Risk

In the preceding 5 years, Kansas Forest Service has provided assistance in prescribed burning of 11,280 acres of public and private land. Many of these acres lay within the urban interface and serve as an illustration of the benefits of fuel reduction to life safety and property survivability in the event of a wildfire.

The fire program continues to advocate the development of community wildfire protection plans, master plans, or similar documents to provide guidance to communities in the development of fire-resistant areas. If a community receives prescribed fire services provided by the Kansas Forest Service, it must participate in some form of guidance planning. Because

the fire return interval for eastern redcedar is approximately 5 years, land managers are encouraged to include this schedule in their fire management plans.

Through the combined efforts of the Office of the State Fire Marshal, State Weather Data Library at Kansas State University, and Kansas Forest Service, fire reporting through the National Fire Incident Reporting System has become much more complete and accurate. In cooperation with the National Weather Service, we are beginning to be able to align high fire occurrence and weather patterns to provide pre-burn information to land managers.



Kansas Forest Service has offered specific prescribed fire training in the management of eastern red cedar and other invasives.

Conserve Working Forest Lands — Reducing Loss of Kansas Forestland

National Objectives Addressed	Identify and conserve high priority forest ecosystems and landscapes
General Issue	Loss of Kansas Forestland
Priority Landscapes	<ul style="list-style-type: none"> • I-70 Metro Corridor • Greater Wichita • Wooded Plains
Specific Issues in Kansas:	<ol style="list-style-type: none"> 1) Each year an estimated 1 million acres of forestland is lost to development nationally. Since 1992 urban areas in Kansas have expanded by 170,000 acres permanently converting significant areas of forestland to other uses. Conversion of forestland to development will continue with an estimated increase of our national population by 120 million in the next 50 years. The Kansas City Metro area alone is projected to increase by 350,000 people in the next 20 years converting an estimated 400,000 acres of land to urban use. 2) Riparian forests are generally located in areas where the most valuable agricultural crops are grown. Though no good trend data exists experience suggests that significant areas of riparian forest are converted to cropland each year adversely impacting water quality, aquatic and terrestrial species and other benefits riparian forests provide.
Kansas Strategies	<ol style="list-style-type: none"> 1) Forest inventory will be conducted to identify areas in need of protection and ecosystem service values will be assigned to forestland as a catalyst for protection policy development. The i-TREE ECO and i-TREE HYDRO models will predict values. GROW OUT and PAINT THE TOWN models will be employed to predict future trends. The Natural Resource Inventory developed by the Mid-America Regional Council (MARC) will be used to target forests with high ecological values in the KC Metro area for protection. Tree preservation ordinances and GI conservation strategies will be integrated into municipal land use, parks, transportation and watershed master plans. Forest Stewardship and urban forestry plans will be developed for these areas to sustain forest health by thinning and tree planting. Trees will be integrated into engineering and site design for watershed management, erosion control and energy conservation. Long-term goals are the adoption of planning guidelines, principles, specifications, and ordinances that facilitate GI conservation. 2) The Kansas Water Plan, Enhanced Stream Corridor and Wetland Management to Address Reservoir Sedimentation policy (Appendix) will guide long-term strategy. Specifically, a comprehensive wetland and riparian area protection program will be developed using conservation easements, tax incentives and possible regulation. This will require increased funding and state participation.
State and Private Forestry Applicable Programs	<ul style="list-style-type: none"> • Forest Legacy Program • Forest Stewardship Program • Urban and Community Forestry Program
Resources Required	The Kansas Water Office, KDHE Water Bureau and MARC are key partnerships. Legislative authority to create effective regulation and their funding to support the establishment and maintenance of easements is necessary. Forest Legacy and the Healthy Forest Reserve Program also have potential to support the strategy along with EQIP, WRP and CCRP.
Performance Measures	<ul style="list-style-type: none"> • Acres of high priority forest ecosystems and landscapes protected from conversion. • Forest Legacy Program success stories • Areas protected as a result of Forest Stewardship or Urban and Community Forestry Management Plans • Rates of policy adoption by municipalities.

Accomplishments toward Reducing Loss of Kansas Forestland

There are more than 249 million trees in the urban forest in the greater Kansas City metro area. These trees provide a structural value of \$93.4 billion, mitigating 37,000 tons of air pollution annually and providing \$14 million of energy savings each year. This is just a sample of the information that is guiding local leaders, planners, and residents to help reduce the conversion of forestland to development in an area projecting a conversion of 400,000 acres in the next 20 years.

Beginning in 2010 a nine-county wide forest inventory was conducted in partnership with the Kansas Forest Service,

Mid-America Regional Council, the Davey Resource Group, and the Missouri Department of Conservation. Data from 340 randomly selected plots was analyzed using the U.S. Forest Service's i-Tree modeling software and ecosystem service values assigned.

This regional initiative creates a framework to improve long-term management planning and policies that will protect and preserve the urban forest for future generations.

Greater Kansas City Regional Forest Summary

Feature	Measure
Number of trees	249,450,000
Tree and shrub cover	28.3%
Tree cover	18.6%
Most common species	American elm, northern hackberry, Osage orange, honey locust, eastern red cedar
Percentage of trees < 6-inches	71.0%
Pollution removal – trees & shrubs	37,000 tons/year (\$286 million/year)
Ozone	23,040 tons/year (\$207 million/year)
Particulate matter	8,380 tons/year (\$50 million/year)
Sulfur dioxide	3,300 tons/year (\$7.3 million/year)
Nitrogen dioxide	2,300 tons/year (\$21 million/year)
Carbon monoxide	310 tons/year (\$392,000/year)
Carbon storage	19.9 million tons (\$411 million)
Carbon sequestration	1.0 million tons/year (\$20.7 million/year)
Building energy reduction	\$14.0 million/year
Reduced carbon emissions	\$500,800/year
Structural value	\$93.4 billion

Affecting Policy Change in Urban Development in the Kansas City Metro Area

Task 1: Policy Survey	A survey of local and national ordinances will provide a basis for the development of locally tailored ordinances.
Task 2: Forestry Focus Group	A focus group of planners, public works officials and other city leaders will identify critical issues and concerns.
Task 3: Training Session	A training session with recognized topical experts will target public works, planning, parks and forestry officials.
Task 4: Stakeholder Workshop	A stakeholder workshop will build agreement on priority opportunities, barriers and next steps.
Task 5: Policy Guide	Based on stakeholder input, a policy guide will be developed to elaborate on priority strategies that local governments can embrace to enhance forest cover in commercial areas.
Task 6: Planning & Education	Demonstration tree planting and community education projects will be conducted with partners to show alternative models of community-based forestry efforts.

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