KANSAS FOREST SERVICE
KANSAS STATE UNIVERSITY

K-STATE
Research and Extension

Kansas Forest Service
2013 Annual Report

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Joel Prince, National Association of State Foresters.

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Cover photo: Mike Blair

Carpe diem (Seize the Day)

Early in 2013, while staffing a Kansas Forest Service booth at a legislative function near the state capitol, a legislative leader approached the booth and asked "What are you doing here?"

This statement prompted two responses. First, a description of the agency's services as they related to the reception host, and second, an invitation to send him and other state leaders information concerning the subject at hand, the agency in general, and the state's forest and tree resources. In this process, we were able to acquaint newly elected legislative leaders and others to the agency and to the state's native and planted trees.

Unfortunately "Kansas Forest Service, What do you do?" "What are you doing here?" "How is the tree?" and "You must be the loneliness man in Kansas," are all too common. Many residents and visitors do not know that 10 percent of Kansas' 52 million acres is woodlands, windbreaks, shelterbelts, fence row, and community trees, and that these woodland and tree resources collectively provide more than $1 billion in products and environmental services including:

- 2,500 jobs harvesting and processing hardwood veneer and saw timber valued at $355 million, and 4,900 jobs in wood and paper product shipments valued at $1.065 billion,
- in Douglas County, the storage of 4.4 million tons of carbon valued at $91.9 million, and foliar absorption of 6,256 tons of air pollutants having a sequestration value of $47.4 million,
- the prevention of 1.6 cubic yards of sediment loss per linear foot from eroding stream banks saving approximately $56,000 per mile in future reservoir dredging costs,
- farmstead energy bill savings valued at $26 million annually,
- increased crop production on 708,000 acres valued at $20 million, and
- $10 million in livestock feed efficiency and calving successes.

Sustaining the agency's product and service values is central to the agency's *2010 – 2015 Kansas Forest Action Plan*. The plan was developed by a natural resources team in 2010 and subsequently vetted with the public, and it serves as the agency's programmatic and staffing guidepost. Through this plan, the agency is working to discontinue its long tradition of starting and stopping programs in response to federal funding opportunities rather than state needs.

Transitioning from chasing dollars to addressing contemporary needs based on local support is a better means of sustaining the vitality of the state's forest, tree, and other natural resources and a better means of sustaining long-term social, economic, and environmental vitality for the state.

Larry Biles
Kansas State Forester

- **4,900 Kansas jobs**
  in the wood and paper product industry valued at $1.065 billion
- **$147 million**
  in annual air quality benefits from trees in Douglas County alone
- **$56,000 per mile**
  saved through sediment retained from eroding stream banks by streamside forests
- **421 fire fighting vehicles**
  valued at $18 million deployed to rural Kansas fire departments by the Kansas Forest Service

Water Quality and Quantity Enhancement

Sediment and nutrients in Kansas' water reservoirs are a growing concern for Kansans. Studies show that several of the state's lakes and reservoirs have lost in excess of 40 percent of their storage capacity, and many frequently encounter algal blooms from nutrient loading from nearby cropland. Studies show:

- stream bank failure is the principle source of reservoir sedimentation,
- streamside forests outperform other land cover types in stabilizing stream banks and reducing sediment loading,
- streamside forest buffers could save more than $42 million annually in future reservoir dredging costs.

Deon van der Merwe, KSU

By reducing sediment, riparian forests also reduce phosphorus, which is a prime cause of toxic blue-green algal blooms in Kansas reservoirs.

Forest buffers also filter pollutants from stormwater runoff that flows across the buffers. These strips play an important role by absorbing up to 70 percent of the nutrients and pesticides and up to 60 percent of many pathogens (e.g. *E. coli* bacteria).

Each mile of properly functioning streamside forest prevents 550 tons of sediment-associated phosphorus from entering waterways annually.

In response to this concern, the Kansas Forest Service, through an agreement with the Kansas Department of Agriculture, Division of Conservation and the USDA's Natural Resources Conservation Service, is designing and installing streamside tree plantings throughout many of the state's highest risk watersheds.

Since 2010, more than 15 miles of stream bank plantings have been planned and put in place. The Kansas Forest Service is currently working on 67 at-risk stream banks within the Delaware, Neosho, and Kansas River systems.

During fiscal year 2013, the Kansas Forest Service riparian forestry program, through on-the-ground efforts of two district foresters, has:

- consulted one-on-one with 95 riparian landowners.
- promoted the stabilization of more than 3.4 miles of stream bank in high-priority Kansas watersheds with an estimated savings of $192,000 in future dredging costs.
- worked to reinforce and extend the life of four rock-work stream bank stabilization structures (valued at $70,000 each and have 40 additional projects planned for fiscal years 2014 through 2016).
- protected 811 acres of riparian forest through forest stand improvement efforts. These forests, through stream bank stabilization, act to prevent 856,000 cubic yards of sediment from entering waterways annually, saving $5.7 million in future sediment dredging costs.
- participated in 29 water quality education events, which reached nearly 1,200 Kansans.
- assessed nearly 1,150 stream miles using GIS-based riparian forest assessment methodology.

In fiscal year 2013, nearly $5.7 million of future dredging costs were avoided through the work of Kansas Forest Service foresters to protect 3.4 miles of stream bank by planting tree buffers and protecting 811 acres of existing forest.

Lesser Prairie Chicken Habitat Management

The Kansas Forest Service is partnering with many individuals, groups, professional societies, and agencies to address the lesser prairie chicken habitat issue. The agency's principle functions are educational programs on:

- the habitat requirement of lesser prairie chickens,
- the benefits of prescribed fire to lesser prairie chicken habitat,
- conservation assistance programs available for achieving habitat enhancement, and
- the benefit of organizing for purposes of returning fire to the landscape.

It has been determined that the principle limiting factors of returning fire to the landscape are:

- lack of manpower,
- lack of proper equipment, and
- lack of adequate training to accomplish burns safely.

In regards to those shortcoming, the state's Prescribed Fire Council, Grazing Lands Coalition, Kansas Forest Service, and many other groups are proposing prescribed burn associations.

To date, through a host of partner groups, basic prescribed fire workshops have been provided to nearly 2,000 farmers, ranchers, and land managers. Beginning in 2014 an intermediate-level training workshop will be available.

In addition to indoor training, the Kansas Forest Service's Fire Management Team plays a key role in hands-on "demonstration burns." Landowners learn how to safely apply prescribed fire within undisturbed and more complex land units, such as those with oil, structural, or shelterbelt development. Because of the training and education provided by the Kansas Forest Service personnel, the track record for prescribed burns conducted by prescribed burn association members is virtually flawless.

Follow-up grant funding from partner groups facilitated the creation of a statewide prescribed burn coordinator position and a rangeland fire and wildlife ecologist position. These persons promote the use of prescribed fire in Farm Bill conservation programs, and provide education and outreach to the general public on how prescribed fire is an effective tool for healthy rangeland management, especially within lesser prairie chicken territory in western Kansas. These positions, made possible through visionary astuteness and partnership-building illustrate the agency's commitment to maintaining the integrity of the state's floral and faunal resources.

The Kansas Forest Service has:

- directed or assisted with the development of the state's Smoke Management Plan covering 16 counties,
- directed or assisted in the formation of 10 active prescribed burn associations, each having from five to 35 members,
- directed or assisted with prescribed burn workshops including demonstrations burns,
- staffed the statewide prescribed fire coordinator position, and
- hired a rangeland fire and wildlife ecologist to increase lesser prairie chicken populations.

Prescribed burn associations are thought to be especially helpful in western Kansas where rainfall is less abundant and fire is not as accepted in the local culture. Through a partnership with the NRCS and others, the Kansas Forest Service has been able to place a rangeland fire and wildlife ecologist position in western Kansas.

Breathing Life Back into Kansas Windbreaks

Following the Dust Bowl and drought of the 1930s more than 200 million trees and shrubs were planted throughout the Great Plains. These plantings established thousands of miles of windbreaks and shelterbelts for purposes of curbing wind-blown soil erosion. Unfortunately, since the Dust Bowl, many windbreaks and shelterbelts have been removed and the most recent inventories suggest that almost half of the remaining are in poor to fair condition.

In response, the Kansas Forest Service has launched the Windbreak/Shelterbelt Initiative to protect and manage the 43,436 miles of windbreaks and shelterbelts in Kansas and encourage the establishment of new breaks and belts. The initiative uses GIS and remote sensing to identify the location of windbreaks planted following the Dust Bowl that are in poor condition and in need of renovation.

Although most windbreaks and shelterbelts in Kansas were initially established to reduce windblown soil, research demonstrates they increase crop yields. Conventional wisdom suggests otherwise since the zone immediately adjacent to windbreaks and shelterbelts clearly exhibits reductions in crop yields. However, research shows that reductions immediately adjacent to these barriers are more than compensated for by increased yields in the rest of the field, the area that falls within the "protected zone" of the barriers. These yield increases, summarized at the First International Windbreak Conference documented 12 percent yield increases for corn, 8 percent for spring wheat, 23 percent for winter wheat, and 15 percent for soybeans.

In an attempt to check the validity of this long-standing research and hopefully discourage the removal of windbreaks and shelterbelts and encourage planting new ones, a Crop Yield Study is in process throughout the Great Plains. The study gathers information from yield monitors that allow producers to assess the effects of weather, soil properties, management, and in our case, windbreaks and shelterbelts on agricultural production. The concept behind this study is to compare multiple years of data from fields with and without windbreaks

In 2013, Kansas Forest Service foresters helped 57 Kansas farmers breathe new life into their shelterbelts by investing $381,359 from the Environmental Quality Incentives Program to replace dead or dying trees with new trees to provide protection to crop fields, livestock, and farmsteads for years to come.

Upon request, Kansas Forest Service foresters provide windbreak and shelterbelt design, establishment, and management advice to Kansas landowners.

over a large area and from many farmers. The key to this study is that the data already exists with farmers because many have crop yield monitors installed on their equipment. When combined with GPS, yield monitors can provide crop yield data for virtually every point in a field.

This study will update our knowledge of windbreak/crop yield interactions. In time, the study may reveal answers to other questions. For example, do windbreaks have greater, lesser, or no effect during times of drought? Are windbreaks more effective with some crops and less with others? Creating a database that spans several years and a wide region may potentially add value to agriculture production beyond the original purpose of the study.

Wind-generated dust storms continue to be an issue in Kansas as portrayed in this 2004 photo near Colby, Kan.

The Windbreak/Shelterbelt Initiative is engaging scientists, foresters, farmers, ranchers and natural resource professionals in the preservation, management, and re-introduction of shelterbelts and windbreaks as an integral conservation practice on the Kansas landscape.

Preserving Kansas One Tree at a Time

Calendar year 2013 marked the Kansas Forest Service's 57 consecutive year of providing seedlings and technical assistance for conservation plantings — windbreaks, wildlife habitat, streamside buffers, screenings, woodlots, and Christmas trees. Once established the trees and shrubs help to protect livestock, reduce heat from winter winds, clean rivers by stabilizing stream banks, feed and shelter wildlife and provide wood products. The output for 2013 was 301,300 seedlings reforesting 708 acres on 2,320 properties.

In addition, light is shining through the greenhouse brighter than ever after some much-needed, privately funded renovations. The whole greenhouse was re-glazed with new clear panels. The last time the greenhouse had new fiberglass was in 1993, so the new panels were much overdue. In addition, a new traveling irrigation boom was installed to provide more effective irrigation to the seedling crop, providing uniform growth. The renovations help the Conservation Tree Program continue to produce quality containerized tree seedlings for sale and distribution.

Thirty percent of the 2013 tree sales went to 10 Kansas counties: Reno, Marshall, Sedgwick, Johnson, Stafford, Dickinson, Pottawatomie, Riley, Rooks, and Bourbon.

Contract employees working on greenhouse renovations. The fiberglass to the left is new and to the right is the fiberglass from 1993.

Assessing, Protecting, and Sustaining Green Infrastructure

In recent years, the Kansas Forest Service helped many counties, towns, and cities inventory their public and private forest and tree resources.

Through these inventories, the Kansas Forest Service, in cooperation with the USDA Forest Service's Northern Research Station, quantified the value of forest and trees to Kansas communities.

The forest and tree resources in Douglas County and the cities of Lawrence and Eudora, were shown to have an air quality and energy reduction value of $6.2 billion.

If the forest and tree resources were compared to a factory in these communities, the annual financial outputs of this factory would total $147 million, not counting real estate and aesthetic values. The physical outputs are air pollutants removed and carbon stored or sequestered. On an annual basis, the county's forest and tree resources remove 1,781 tons of ozone; 1,269 tons of particulate matter less than 2.5 microns; 436 tons of nitrogen dioxide; 209 tons of sulfur dioxide; 115 tons of particulate matter greater than 2.5 microns; and 58 tons of carbon monoxide. The county's forest and tree resources store 1.7 million tons of carbon and sequester 82,000 tons. In addition, Douglas County's forest and trees save $2.9 million in building energy expenses.

After the inventory data gathering and analysis work, Douglas County and the city of Lawrence:

- established a green infrastructure forestry element within their comprehensive land-use plans,
- fostered communications among departments to ensure tree work is not overlooked or duplicated and procedures for tree planting and maintenance responsibilities are clearly identified, and
- ratified that proper tree care is an investment leading to substantial returns and that poorly maintained trees can be a liability.

Results of this project broaden the understanding of what trees and forests contribute to a growing Kansas population.

It also makes tree owners and managers aware of community tree canopy issues. Many community tree canopies lack age and species diversity and have been repetitively degraded by storms and drought.

In response to community forest and tree challenges, the Kansas Forest Service adopted the Arbor Day Foundation's Tree City, Tree Line, and Tree Campus programs as its principle means of promoting community forest management.

Now 40 years old, the state's Tree City USA program is one of the most robust in the nation. In 2012, 106 communities qualified for Tree City USA recognition. These communities:

- collectively spent $17.6 million managing their resource,
- collectively represent 70 percent of the state's population,
- have 548 tree board members and 1,220 volunteers who posted 18,462 hours of volunteer time,
- planted 11,920 trees,
- pruned 60,635 trees, and
- removed 12,245 trees.

The community forestry staff also provided 199 technical assists to Kansas communities and 44 educational events to 1,711 attendees.

Many of the technical assists and training events revolved around current and impending pest threats, storm response, and drought issues. All related to the further decline of the community forestry resource.

In 2012, 106 Kansas Tree City USA communities collectively spent $17.6 million managing their forest resource by planting 11,920 trees, pruning 60,635 trees, and removing 12,245 trees

Providing Life-Saving Equipment

The Kansas Forest Service's Fire Program, through an agreement with the Department of Defense, has provided vehicles for rural fire districts through the Federal Excess Personal Property Program since the 1960s. A number of changes and additions to that program occurred recently, and those changes resulted in more and better equipment reaching Kansas fire departments.

The principle change and addition to the equipment donation program is the Firefighter Property Program. This program has the advantage of being a higher screening priority within the excess property system, meaning that the Kansas Forest Service often gets vehicles and other equipment in outstanding condition.

In 2013, 53 vehicles worth $2.88 million new — and other major items were issued through these programs at little or no cost to the receiving fire districts. This is in addition to hundreds of small items such as hose, fire extinguishers, first-aid supplies, and other lower-cost items.

Additionally, the Kansas Forest Service obtained new and used parts worth just under $250 thousand, at no cost. These parts are used to refurbish, repair, and maintain the trucks obtained through the Federal Excess Personal Property and Firefighter Property programs, and results in direct savings to Kansas fire departments.

In comparison, a commercially manufactured, six-wheel-drive wildland fire engine with 1,000-gallon water capacity would cost more than $200,000.

A fire department receiving a Kansas Forest Service vehicle will spend a few thousand dollars painting and adding a tank, pump, and some basic equipment. This allows a department to get a truck with capabilities similar to a new commercial vehicle at less than 5 percent of the cost.

Nearly all Kansas fire departments are struggling to meet operational needs, so the federal excess property programs can be the difference between having quality equipment, and having no equipment at all.

The Kansas Forest Service is proud to make a dramatic difference for Kansas fire departments. We continually strive to locate and obtain items for the small fire departments around the state, and we are always looking for ways we can do more to help them.

In 2013 the Kansas Forest Service issued nearly $3 million worth of vehicles to organized rural fire districts.

Excess equipment program manager, Eric Ward, standing in the midst of a fleet of recently acquired trucks for the Kansas Forest Service's Fire Management Program.

Protecting Forest Health — Tree Pests

Forest health is more than simply a response to the needs of trees in distress — it is the recognition that healthy trees and woodlands are vital to maintaining the high quality of living that Kansans enjoy, thanks to the multitude of benefits trees provide.

The rural and community forests of Kansas face diverse challenges to their health; from pine wilt all but eradicating pines from the eastern half of the state; to the rapidly increasing population of emerald ash borer that threatens community trees and native woodlands from Kansas City westward; and thousand cankers disease of black walnuts, which has not been detected in Kansas, but looms just across the Colorado border.

In 2013, the Kansas Forest Service's services included:

- statewide technical assistance on diagnosing tree and forest health problems including identifying invasive species,
- statewide technical assistance to public and private property owners and managers to help restore or enhance their trees and woodlands,
- training sessions that highlight pest issues for the public, municipalities, and arborists,
- statewide pest surveys,
- management and control counsel for diagnosed insect, disease and abiotic issues, and
- community forest assessments.

These services returned many benefits to Kansas and Kansans including:

- Healthier, more productive forests.
- Increasing tree pest knowledge of citizens, arborists, municipal foresters, and parks personnel.
- Establishing rapid-response methods for invasive species.
- Improving management strategies for forest and tree pests and diseases, and
- Increased community forest resilience toward diseases and pests through species diversity.

Accomplishments in 2013, many in cooperation with the Kansas Department of Agriculture, and community-based park and recreation departments include:

- more than 100 technical assists to landowners and municipal staffs,
- ten organized educational workshops for municipalities, landowners, and arborists dealing with emerald ash borer and drought issues,
- 117 statewide thousand cankers disease surveys in 25 counties in western Kansas,
- 140 firewood surveys involving more than 1,750 bundles and 20,000 pieces of firewood,
- the revising of one and publishing of two Kansas-specific publications on tree pests and diseases, and
- early detection surveys and subsequent management plans for emerald ash borer in Wyandotte, and Johnson counties.

Emerald ash borer larva and characteristic S-shaped feeding gallery can be seen just under the bark of this ash tree in Wyandotte County.

Addressing Trees as Pests

Eastern red cedar, Asian bush honeysuckle, and salt cedar encroachment on the forest, prairie, and streamside landscapes is an increasing concern in Kansas.

In the 40-year period between 1965 and 2005, it is estimated the volume of eastern red cedar increased more the 23,000 percent. While the acres impacted by Asian bush honeysuckle and salt cedar are not as accurately known, bush honeysuckle encroachment in the state's eastern woodlands and salt cedar encroachment in the state's southwest rivers systems are of great concern.

For bush-honey suckle, the concerns are both the impact on woodland regeneration and wildlife habitat values. For salt cedar the concerns are both degradation of the watercourses and water uptake at the expense of more beneficial prairie plants.

A demonstration plot shows treatment effectiveness against invasive Asian bush honeysuckle in this Topeka woodland. For comparison, the right-hand side of the photo shows an untreated infestation.

For eastern red cedar, the concerns are forage losses and wildfire risks. Before the early 1960s, eastern red cedar was confined to the shoulders of steep drainages. As a change in land management began excluding fire, eastern red cedar infestations became more widespread.

Once eastern red cedar moved into fencerows, upland wasteland and pastures, the problem grew rapidly. Exacerbating the red cedar encroachment explosion is the reduced application of controlled burning because of smoke issues in and around metropolitan areas. This issue has caused landowners and managers to reduce their use of fire as a woody encroachment land management tool. Consequently, large areas in the wildland/urban interface now have up to 221 tons of fuel per acre. A wind-driven fire in these areas could cause the loss of many homes and potential loss of life. This shift, from 3 to 5 tons of fuel per acre to an average of 35 tons per acre in some counties, demands a new mindset for Kansas firefighters addressing wildland fires. Suppression efforts in these areas have to move from the direct approach to an indirect attack and extended mop up to prevent fires from rekindling. Firefighters engaging a wildland fire in an eastern red cedar forest need training comparable to the skills that have been taught in traditional forest fire suppression.

The Kansas Forest Service is providing new suppression techniques to fire departments who are encountering eastern red cedar wildland fires. This past year, a detailed technical publication was published and a new training course is under development.

Our active role in the development of the Kansas Prescribed Fire Council and Burn Cooperatives has taken the message to fire departments, land managers, farmers, and ranchers that prescribed burning can be a safe and effective means of controlling eastern red cedar and other woody invasive species. The use of fire returns the landscape to a fire-adapted ecosystem, improving rangeland productivity as well as improving wildlife habitat.

- **The Kansas Forest Service developed and demonstrated treatment recommendations and strategies for effective economical control of Asian bush honeysuckle.**
- **A training course and technical publication on fighting fire in eastern red cedar forests were developed.**

2013 Outstanding Stewards of Kansas Forests, Woodlands, and Windbreaks

The following people have worked to improve public and private forests and tree resources in Kansas. For their dedication, and determination the Kansas Forest Service and its partners proudly bestow the following awards.

Kansas Agroforestry Award

Dave and Mary Hendricks are known throughout western Kansas for their significant wildlife habitat and conservation achievements including renovating windbreaks and establishing native grass and wildflower plantings. The couple received the 2013 Kansas Agroforestry Award from the Kansas Forestry Association at the Kansas Agroforestry Field Day held on their farm close to WaKeeney. The award is presented to landowners who do an exceptional job implementing agroforestry practices on their property such as riparian forest buffers and shelterbelts. In addition to the sign and plaque, the couple received a $200 gift certificate from STIHL.

Forest Stewardship Tree Farmer of the Year

On behalf of the American Tree Farm System and the US Forest Service State and Private Forest Stewardship Program, John and Pat Head were presented the 2013 Forest Stewardship Tree Farmer of the Year award. Their Neosho County woodlands have met the standards for Tree Farm certification for the last 5 years. The Heads have planted thousands of black walnut and bur oak and have improved the health of their woodlands through thinning and pruning. The Heads are also active members of the Walnut Council. In addition to the sign and plaque, the Heads also received a $200 gift certificate from STIHL.

Kansas Wildlife Federation Forest Conservationists of the Year

Paul Dean, his family, and friends have done an exceptional job managing the rangeland and woodlands on their Greenwood County tree farm through tree planting, timber harvests, timber-stand improvement projects, and native grass buffer establishment. Paul has milled logs left over from timber harvests, dried the lumber in a kiln he built, and used the wood in a variety of projects. Additionally, Paul has donated his legal expertise assisting the Kansas Forestry Association with their articles of incorporation as a nonprofit. Paul was also awarded the 2012 Forest Stewardship Tree Farmer of the Year.

State Forester's Community Forestry Award

John Barbur has the unique distinction of being the only recipient of the State Forester's Award involved in the formation of community forestry programs in two communities: Fort Riley, where John serves in the Conservation/Restoration Branch and Abilene, where John and his family live. Through John's leadership Abilene has maintained Tree City USA certification for 21 years and Fort Riley for 26. John is recognized as a Certified Forester by the Society of American Foresters and also has a Bachelor of Science in Forestry from the University of Missouri.

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