

## Situation

### AIR QUALITY and SMOKE MANAGEMENT

There is pressure to improve air quality by better smoke management from prescribed burning. There is a need to burn the prairie and other grasslands for ecological and livestock production (economic) reasons. The constraint occurs due to negative air quality impacts downwind, particularly in urban areas, many times beyond Kansas' borders. The primary pollutant is ground-level ozone, and particulate matter.

### WATER

Water affects every facet of our lives, from drinking supplies to recreation. Its quality and quantity determines how and if it can be used. In Kansas, nearly 500 square miles are covered in water. In addition, there are more than 10,000 miles of streams and river in Kansas, most of which are privately owned.

In terms of quality, assessments from the Kansas Department of Health and Environment (KDHE) found many Kansas streams to be impaired by pollutants such as fecal coliform bacteria, herbicides, nitrogen, phosphorus and/or sediments. Pollutants come from a variety of sources including: substances discharged from factories, runoff from agricultural land or storm drains and yards in urban areas. Furthermore, bacteria, sediment, and excess nutrients from livestock and poultry waste have been shown to contaminate surface and groundwater and soils.

A primary source of this groundwater is the High Plains/Ogallala aquifer, which spans 225,000 square miles through portions of Kansas, Nebraska, Oklahoma, Texas, Colorado, South Dakota, Wyoming and New Mexico. Irrigation consumes more than 90 percent of the groundwater used in Kansas. In recent years, drawdown or depletion of the aquifer has greatly surpassed the rate of natural recharge, which illustrates the limitations of what was once thought to be a boundless resource.

A number of management practices are recognized to preserve or improve water quality including riparian buffer strips, reduced pesticide/herbicide use, vegetative filter strips, reduced tillage, fertilizer placement, and pesticide timing. Waste management projects have included research on the effects of land application of animal waste, wastewater recycling through irrigation systems, lagoons evaluations, filter strips to reduce water contamination and wetland cells constructed to treat dairy runoff. In addition, tools that reduce water usage such as irrigation management/scheduling and subsurface drip irrigation have gained momentum.

The need has never been greater for technical information and assistance. Producers will continue to face new and unprecedented challenges as water continues to be one of the most debated and sought-after resources. Timely results and recommendations from research projects and practice implementation will be important to the survival of agricultural operations.

### GRASSLAND

Kansas is a prairie state noted for its native grasslands, streams and wetlands, abundant blue skies and green grassland vistas. The native grasslands that exist throughout Kansas are one of the state's most important renewable natural resources. These grasslands help maintain the landscape and its watersheds and aid in maintaining the water quality in our streams and lakes. Grassland habitats are home to many of the state's rich diversity of native plants and wildlife species. These landscapes also provide scenic beauty, recreation, tourism, and contribute to cultural values.

Kansas grasslands are of prime economic importance to not only the state, but the entire nation. The state nationally ranks 12th in acres of pasture and rangeland. Of North America's 140 million presettlement tallgrass prairie acres, only 4% survives to this day and 80% is located in Kansas. Kansas presently has about 15.8 million total acres of native grasslands or rangelands, 2.5 million acres of pastureland, and at any given time, 3 to 6 million acres of annual forages. These grasslands are vital in supporting the state's largest agricultural commodity, beef cattle production. In 2009 cattle generated \$5.55 billion in cash receipts for the state.

For now and the future, Kansas grasslands encompass a host of rich natural resource opportunities and provide an equal number of resource management challenges. Numerous natural resource issues face our grassland managers which warrant the development and dissemination of sound research-based information. To meet the evolving needs of these managers, it is essential to provide access to a vast, rapidly expanding knowledge base to address topics such as invasive species, water quality, ecology and biodiversity, climate, and other emerging issues.

sericea lespedeza is an invasive weed of rangelands of the eastern half of Kansas. The most common current control method is chemical application, which is expensive and detrimental to non-target species. Current research has identified a novel, highly effective method of control. By burning infested rangeland in early September when seed pods are filling, sericea lespedeza populations have significantly declined without hurting native forage. To encourage adoption of this new technology, a coordinated outreach program will be conducted utilizing numerous methodologies and targeting several strategic audiences such as producers and volunteer fire department staff.

## FORESTRY

Although the Great Plains is not thought of as a forested region, Kansas' woodlands play an integral role in the environmental and economic well-being of the state. Approximately 2.2 million acres of the Kansas landscape are classified as forestland by the USDA. An additional 2.9 million acres are in the form of agroforestry resources (i.e. riparian forests, windbreaks, isolated trees). These acres, combined with the canopy found in urban and community settings, account for 10% of the total land area in the state. Kansas forests are steadily increasing in area. Since the first official inventory in 1936, Kansas forests have increased by 3.9 million acres (includes non-FIA forestland).

The economic value of Kansas forest products will continue to grow along with size, quality and volume of forests. Ecosystem services are non-priced amenities or market goods. They may include water quality and quantity, carbon sequestration, forest certification, energy conservation or recreation.

Collectively, 95 percent of Kansas rural forestland is privately owned, which poses a defined need for programming and services that target the ownership and management of the majority of our woodland resources. These should address the threats that create wildfire risk, threaten Kansas forest health, and loss of Kansas forestland. At the same time, these programs and services should promote the benefits of sustaining water quality and quantity, protecting and restoring forest biodiversity and wildlife habitat, sustaining and protecting forest and agroforestry ecosystem, and maintaining and promoting livelihoods and the economic benefits of woodlands.

Kansas woodlands and agroforestry resources face a number of threats from nonnative invasive insects and diseases including the recent detections of Emerald Ash Borer in eastern Kansas counties, and Thousand Cankers Disease of walnuts in Colorado, and several eastern states.

## FISHERIES AND WILDLIFE

When Kansas was settled by Europeans, we had an abundance of fish and wildlife. As the state has become more populated it has had an effect on the fisheries and wildlife resources. The methods of farming, ranching, and other land utilization practices have caused some wildlife populations to diminish and others to thrive. Lack of understanding what causes those changes creates misinformation and dissatisfaction. Wildlife and outdoor recreation are important to the quality of life for most Kansans. Kansas is noted for its quality populations of bobwhite quail, ring-necked pheasants and white-tailed deer.

Fisheries and wildlife associated activities in Kansas provides values for recreation as well as economic returns to landowners. A recent survey found that 1.1 million Kansas residents and nonresidents 16 years of age or older fished, hunted or watched wildlife in Kansas. In 2006, state residents and nonresidents spent \$839 million on fisheries and wildlife recreation in Kansas.

Many of the issues that fish and wildlife face on private lands are related to habitat management. The management of rangeland, woodlands, water and cropland varies greatly depending upon the ultimate purpose for that habitat. Many landowners are starting to purchase lands for the primary purpose of recreation and are not concerned about economic returns from that land. Information, research and outreach efforts need to be developed that assist those land managers in Kansas who value outdoor recreation.

## MASTER NATURALIST PROGRAM

As part of the overall focus on natural resources and environmental management within KSRE, the selected topics of water, grasslands, forestry, fisheries and wildlife have been highlighted. It is essential we educate the Kansas populace and help improve their knowledge of environmental concepts and Kansas natural resources. As the majority of Kansas residents live within larger metro areas it is critical that we develop a way to educate these individuals about natural resources. Implementing a Kansas Master Naturalist (KMN) program, is one way to begin engaging citizens about the natural resources found in Kansas and how they are utilized, managed, enhanced and conserved.

## Public Value

The unique and productive prairie landscape will be maintained and enhanced on private holdings across Kansas.

The economic and physical health of all Kansans is dependent on understanding and wise management of our natural resources. The KMN program will result in:

- Active and engaged core of natural resource volunteers
- Improved physical and mental health through connection to natural resources
- Improved quality of life through environmentally informed decision making
- Improved physical and mental health through outdoor recreation and ecotourism
- Increased environmental resilience through proactive management and an environmentally informed public
- Enhanced ecosystem services and functionality, through proactive management and an environmentally informed public
- Natural resources agencies save federal, state, county and city funding dollars due to volunteer service.
- “Generational Impact” – participants pass along their passion and knowledge regarding the outdoors and the environment to their children, grandchildren, other family, friends and neighbors.

## Outputs

Activities: Support existing resources as well as develop, implement, and evaluate new programs, services, publications, and decision-making tools that bolster long-term sustainable management practices for natural resources and the environment. These may include, but are not limited to air quality and smoke management, water quality and quantity, invasive species management, wildlife habitat development, nutrient management, riparian and woodland preservation and enhancement, irrigation management, and soil conservation.

Specifically for smoke management:

Burn schools

Workshops on using the decision models and weather forecasts with the KSFire.org website.

Press releases on the need for burning

Specifically for KMN

Curriculum book

Participants and Stakeholders

- Producers, Operators, and Land Managers
- Agricultural Landowners
- Local, State, and Federal Government Agency Personnel
- Agricultural and Environmental Advisors and Consultants
- Local, State, and National Media
- Agricultural, Natural Resource, Environmental, and Industry Organizations
- Local, State, and Federal Government Officials

KMN Participants and stakeholders

- Public
- K-State Research and Extension
- County and City Parks and Rec Department
- Nature Centers and Wildlife Areas
- Kansas Department of Wildlife, Parks and Tourism
- State, Federal, County and City Agencies

## Short-Term (Knowledge)

Target audiences will become aware of both existing and emerging natural resource issues. Participants will gain an understanding of:

- Increased awareness of the public about the need for and the benefits of prescribed burning.
- Increased awareness about the weather conditions needed for safe prescribed burning and smoke management.
- Improved knowledge of environmental concepts and Kansas natural resources

- Increased knowledge and skill development in the area of interpretation and leadership
- Why environmental issues are of interest or concern
- Who/what is impacted by these environmental issues
- Which research-based methods could be employed to address and ultimately resolve the issues

Audiences will increase their knowledge base regarding economically and environmentally sustainable practices that will prevent future problems. Stakeholders will recognize and appreciate the importance of their role in the process of collaboration and resolution of natural resource issues.

Addressing water quality and quantity issues are the focus of this year's plan, and evaluation tools are being developed to improve the reporting of program impacts in this area. This should lead to collaboration with other teams, such as Horticulture for landscape water management, and Crops for soil and water conservation.

#### Indicators

- Increased participation in Burn Schools.
- Complete evaluation instruments are available on the K-PICS website for water and grassland management programming.
- Have you tested your well water to determine it's suitability for intended uses?
- Have you developed a cropping plan in response to limited water supply?
- After participating in this program, I gained increased understanding about \_\_\_\_\_ .
- Increased outreach & service to the community in the area of natural resource management, conservation and environmental education.
- Continued enrollment within the Kansas Master Naturalist Program.

### **Medium-Term (Behavior)**

Stakeholders and participants will develop long-range strategic plans and implement best management practices as they relate to the sustainable management of grasslands, water, forestry, energy, wildlife, and air. Partnerships will be made among stakeholders to work collaboratively to alleviate and prevent environmental concerns throughout Kansas.

Specific to the air quality and smoke management programs:

- Improved utilization of the KSFire.org website, including decision models, and smoke management guidelines.
- Support research on alternative season burning on livestock performance.
- Continue widening of the burn window in early spring and late summer (for lespedeza control).

Specific to the Kansas Master Naturalist program:

- Participants model and teach environmental stewardship and wise natural resource management.
- Increased number of hours of service to the community in the area of natural resource management, conservation and environmental education.
- Increased interest in continuing education in the areas of science, environment, ecology, interpretation, leadership, wildlife, native plants, range management, etc.

#### Indicators

- What BMPs, if any, do you plan to make based on what you have learned at this meeting?
- How has your management changed to address water quality and quantity issues?
- What changes, if any, have you implemented to reduce livestock impact on stream water quality?

Specific to the air quality and smoke management programs:

- Fewer complaints to environmental agencies on smoke issues (ozone and particulate matter).
- Increased number and activity of burn cooperatives.

Specific to the KMN program

- Increased number of hours of service to the community in the area of natural resource management, conservation and environmental education.
- Increased interest in continuing education in the areas of science, environment, ecology, interpretation, leadership, wildlife, native plants, range management, etc.

- Additional counties implement the KMN program
- Low turnover rate for KMN participants

## Long-Term (Change in Condition)

Target audiences will benefit from measurable improvements in existing natural resource concerns and mitigation of emerging threats. Kansas citizenry will be environmentally literate and will make sound decisions regarding natural resources. Participants and their associated interests will become economically viable and environmentally sustainable. KDHE water quality monitoring data will show measurable improvement, similar to what has been shown in Clarks Creek, Grouse-Silver Creek, and the Cheney reservoir. The water footprint for the production of crops and livestock, and the maintenance of home landscapes and gardens has been reduced.

Specific to the air quality and smoke management programs:

- Fire is retained as a range management tool.
- Better public support for fire use and management.

Specific to the KMN program

Participants:

- Natural resources agencies save federal, state, county and city funding dollars due to volunteer service.
- “Generational Impact” – participants pass along their passion and knowledge regarding the outdoors and the environment to their children, grandchildren, other family, friends and neighbors.

Program

- The KMN program is self-sustaining and financially sound.

Community

- Increased perceived value for Kansas Natural Resources.
- Families regularly choose outdoor activities over indoor entertainment and technology.
- Increased community interest in nature and the environment.

Indicators

- Less out-of-state EPA air pollutant exceedances.
- How has your lawn management changed in response to water conservation concerns?
- How has your irrigation practices changed due to the availability of the 5 year flexible account?
- Which BMPs have you implemented?
- What economic impact (dollars saved or increased dollars earned) on a per head or per acre basis can you attribute to your participation in this program?
- Tax dollars saved by Natural resources agencies due to volunteer service
- Expansion of the KMN program to 6 urban counties.