

# KANSAS NONPOINT SOURCE POLLUTION MANAGEMENT PLAN 2010 UPDATE



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Kansas Department of Health and Environment  
Division of Environment  
Bureau of Water  
Suite 420  
1000 SW Jackson Street  
Topeka, Kansas 66612-1367



**KANSAS NONPOINT SOURCE POLLUTION MANAGEMENT PLAN  
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**TABLE OF CONTENTS**

	<u>Page</u>
A. INTRODUCTION AND HISTORY.....	1
B. CHAPTER ONE: Water Quality Conditions and Nonpoint Source Pollution Issues.....	5
C. CHAPTER TWO: Nonpoint Source Pollution Institutional and Partnership Framework.....	19
D. CHAPTER THREE: Strategy for Nonpoint Source Pollution Management.....	29
E. CHAPTER FOUR: Nonpoint Source Pollution Program Management and Administration.....	45
F. REFERENCES.....	54
G. APPENDICES (Separate Documents)	
1. EPA Nine Elements for State Nonpoint Source Pollution Programs	
2. Water Quality Assessments	
a. Kansas 2010 Integrated Water Quality Assessment (Executive Summary)	
b. Kansas 2010 Interim Water Quality Measures	
3. Total Maximum Daily Loads and 303(d) List of Impaired Waters	
4. Nonpoint Source Pollution Source Categories, Applicable Best Management Practices and Characteristics of Properly Functioning Watersheds	
5. State and Federal Nonpoint Source Pollution Related Programs and Authorities	
6. Acronyms	

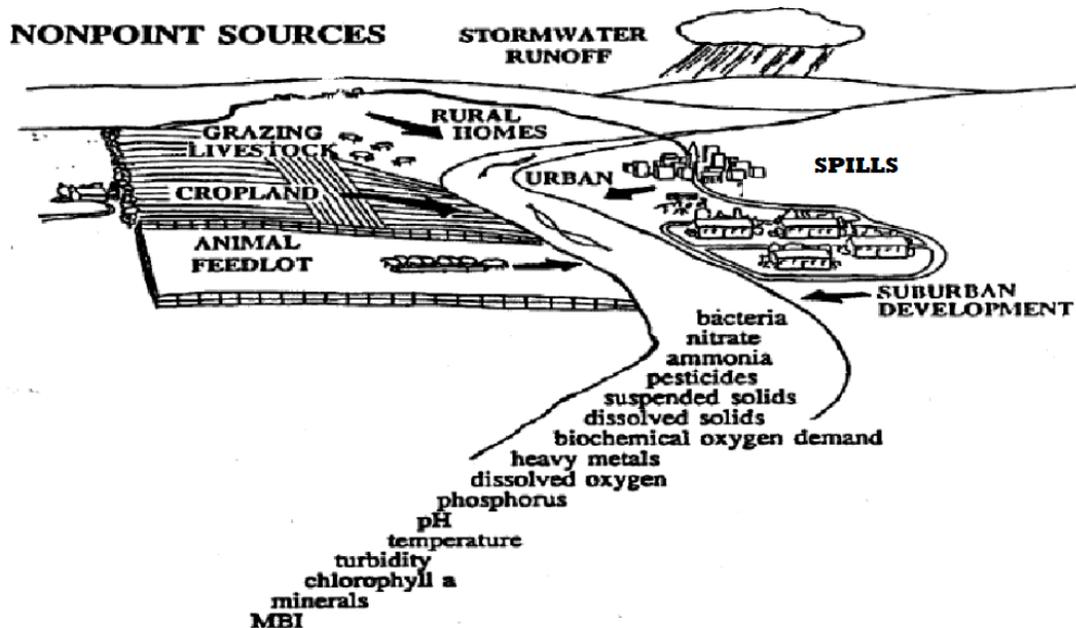


## INTRODUCTION AND HISTORY

Nonpoint source pollution refers to the transport of natural and man-made pollutants by rainfall or snowmelt moving over and through the land surface and entering lakes, rivers, streams, wetlands or ground water. Atmospheric deposition and hydrologic modification are also sources of nonpoint pollution (EPA, 2003). The Kansas Surface Water Quality Standards state:

**“Nonpoint Source”** means any activity that is not required to have a national pollutant discharge elimination system permit and that results in the release of pollutants to waters of the state. This release may result from precipitation runoff, aerial drift and deposition from the air, or the release of subsurface brine or other contaminated groundwaters to surface waters of the state.” -KAR 28-16-28b(00)

The following figure shows a conceptual diagram of common sources of nonpoint pollution and potential contaminants that can be transported to surface and ground waters.



Source: Adapted from the Kansas Nonpoint Source Pollution Management Plan, 2000 Update

### Milestones in the History of Kansas Nonpoint Source Pollution Management

A Kansas Water Quality Management Plan was developed by the Kansas Department of Health and Environment (KDHE) in the late 1970's, outlining a 20 year strategy for protecting the quality of surface and ground waters in Kansas, including control of nonpoint source (NPS) pollution. The plan was endorsed by then Governor John Carlin and approved by concurrent resolution of the Kansas Legislature (KDHE, 1979).

In 1986, a policy subsection of the *Kansas Water Plan* was adopted directing the KDHE to develop a statewide strategy to implement NPS pollution control programs consistent with federal guidelines and reflective of different river basin conditions and issues (*Kansas Water*

*Plan*, 1986). Interagency coordination was recognized as a key component for successful development and implementation of the strategy, particularly agencies with funding for implementation of best management practices (BMPs) including the State Conservation Commission (SCC) and the United States Department of Agriculture (USDA) Soil Conservation Service (now the Natural Resources Conservation Service). The SCC NPS Pollution Control Program was authorized in 1989 in collaboration with KDHE to support local NPS planning and provide additional funding for NPS BMP implementation through local conservation district programs (*Kansas Water Plan*, 1986).

Another policy subsection of the *Kansas Water Plan*, adopted in 1987, recommended an Environmental Protection Strategy to establish a partnership between the State and county governments to address environmental protection issues, including NPS related issues not addressed through other programs. The Local Environmental Protection Program (LEPP), administered by KDHE, was established in 1992 and provided annual grants to implement county environmental protection plans including adoption and implementation of county sanitary/environmental codes.

In 1987, Congress enacted Section 319 of the Clean Water Act (CWA), establishing a national program to control nonpoint sources of water pollution. The CWA Section 319 (h) established a program to provide grants to States and Tribes to implement state NPS management programs. The KDHE administers CWA Section 319 funding in Kansas. The KDHE was designated by the Governor as the lead state agency for NPS pollution in 1988 and the *Kansas NPS Pollution Management Plan* was approved by the Environmental Protection Agency (EPA) in 1989. This document outlined a state strategy for addressing NPS pollution in Kansas and was last updated in 2000.

In 1995, a multi-agency water quality initiative was established by then Governor Bill Graves to protect and restore the quality of Kansas surface waters with initial focus on the Kansas-Lower Republican River basin. Sediment, atrazine and bacteria were the primary pollutants of concern.

In 1998, the Clinton Administration initiated a Clean Water Action Plan to promote the restoration of impaired waters throughout the nation. A Unified Watershed Assessment was completed by each state to determine watershed conditions and provide information for prioritizing resources to address water quality issues. This initiative employed a watershed approach to water quality restoration and protection, and in 2003, additional CWA 319 funding was provided to states to develop and implement watershed based plans for restoration of impaired waters. Although a small number of watershed oriented projects had been initiated in the early 1990s to address NPS issues affecting Kansas lakes (Cheney Lake watershed and Hillsdale Lake watershed are example projects), this federally driven watershed based initiative provided the impetus for the Kansas Watershed Restoration and Protection Strategy (WRAPS) program, which was adopted as part of the Kansas Water Planning Process in 2004.

The current Kansas Total Maximum Daily Load (TMDL) Program was initiated in 1998 following settlement of a complaint filed in 1995 by the Kansas Natural Resource Council and the Sierra Club against the EPA, compelling it to enforce Section 303(d) of the Clean Water Act by establishing TMDLs. Kansas intervened in the litigation and a settlement was reached in

1998, laying out a schedule for the state to submit TMDLs for water quality limited stream segments and lakes in each of the 12 major river basins in Kansas. This process established a significant state water quality priority, which has been a primary focus of NPS efforts since that time.

### 2010 Update

The 2010 Update to the *Kansas NPS Pollution Management Plan* is intended to outline a strategic plan for NPS management in Kansas that addresses the nine key program elements required by EPA and provide a framework for coordination and collaboration among agencies and organizations involved in NPS related management activities. These nine key elements are outlined in Appendix 1. Considerable use has been made of web links and other references to provide access to additional information about specific agencies, programs and topics and to limit the amount of descriptive text included in this document.

Much has been accomplished toward achievement of the goals and strategies outlined in the 2000 update of the plan. The goals, objectives and strategies outlined in this 2010 update build on those contained in the previous plan and will provide the basis for NPS program activities in the future. Below are some highlights of NPS program accomplishments to date.

### 2010 Kansas NPS Pollution Management Program Highlights

- Development of watershed-based Total Maximum Daily Loads (TMDLs) for impaired water bodies through the Kansas TMDL program
- Establishment of a targeted component of the SCC Cost-Share programs to address high priority TMDL watersheds and development of the Kansas Water Quality Buffer Initiative
- Development of the Kansas Surface Water Nutrient Reduction Plan
- Completion of a statewide Source Water Assessment for public water supplies
- Development and Implementation of the Kansas Watershed Restoration and Protection Strategy (KS-WRAPS) Program
  - Organization of a KS-WRAPS Interagency Work Group and Watershed Partnership
  - Establishment of a \$2 million KS-WRAPS fund utilizing EPA Section 319 and Kansas Water Plan funds to support development and implementation of WRAPS in priority watersheds on an annual basis
  - Establishment of 38 WRAPS Stakeholder Leadership Teams addressing about 50% of Kansas' surface area actively conducting watershed assessment, planning and implementation projects
  - Achievement of two 319 Program Watershed Success Stories – i.e. restoration of impaired water bodies in Clarks Creek (bacteria impairments) and Banner Creek (nutrient-related eutrophication impairment) watersheds
  - Establishment of Kansas guidance for development of 9-Element compliant watershed plans and initiation of plan development and revisions for individual WRAPS projects
  - Completion and approval of four EPA compliant 9-Element watershed plans
  - Initiation of a targeted WRAPS monitoring program through collaboration with the KDHE Bureau of Water Watershed Management and Watershed Planning Sections, and the Bureau of Environmental Field Services Technical Services Section.,
  - Organization of a WRAPS conference held every 12-18 months

- 105 counties implementing state approved Local Nonpoint Source Pollution Management Plans through conservation district programs
- 104 counties implementing state approved county sanitary/environmental codes and Local Environmental Protection Plans through participation in the LEPP
- Development and implementation of a NPS pollution control project component of the Kansas Water Pollution Control Revolving Fund
- Establishment of a Buffer Coordinator and Technical Assistance Partnership with federal and state agencies and conservation organizations to facilitate implementation of NPS BMPs throughout the state
- Incorporation of state TMDL, Source Water Protection (SWP) and WRAPS water quality priorities into ranking criteria for applicable USDA Farm Bill programs
- Coordination and implementation of a Missouri-Kansas bi-state Targeted Watershed Grant for the Marais Des Cygnes river basin
- Interstate coordination efforts with Oklahoma to address water quality issues affecting Grand Lake and Oologah water supply reservoirs
- Completion of over 100 Source Water Protection Plans in addition to WRAPS plans
- Approximately 5,300 CWA Section 401 water quality certifications issued in conjunction with the US Army Corps of Engineers CWA Section 404 nationwide permits and 400 water quality certifications issued for individual 404 permits
- Implementation of several State Wetland Development grants to enhance wetland and riparian area management
- Completion of a Kansas Reference Stream study and initiation of an EPA Healthy Watersheds Initiative grant
- The estimated annual pollutant load reductions resulting from the implementation of NPS best management practices during Federal Fiscal Year 2010 (October 1, 2009 – September 30, 2010) as reported to KDHE were as follows:
  - 357,798 pounds of nitrogen
  - 160,134 pounds of phosphorus
  - 70,242 tons of sediment

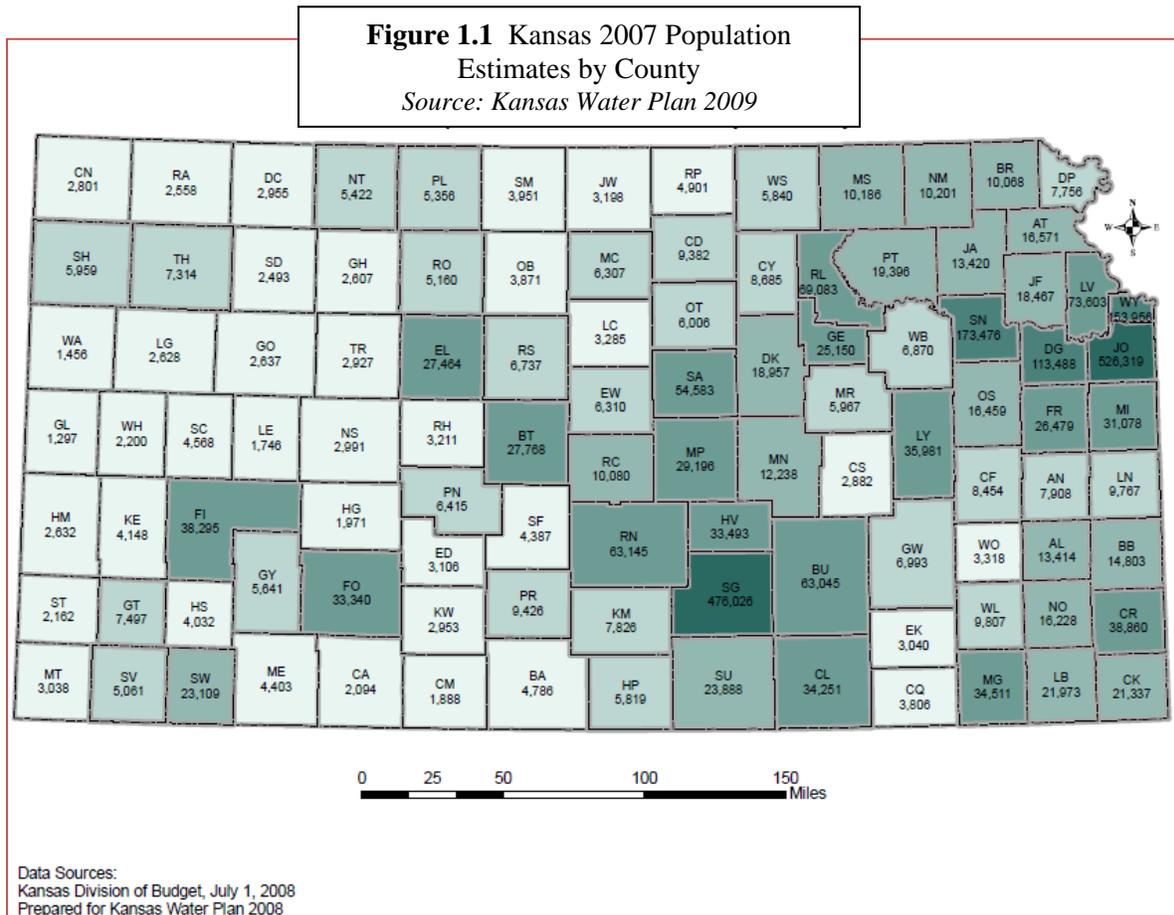
# CHAPTER ONE

## KANSAS WATER QUALITY CONDITIONS AND NONPOINT SOURCE ISSUES

### Social and Physical Setting

#### Population

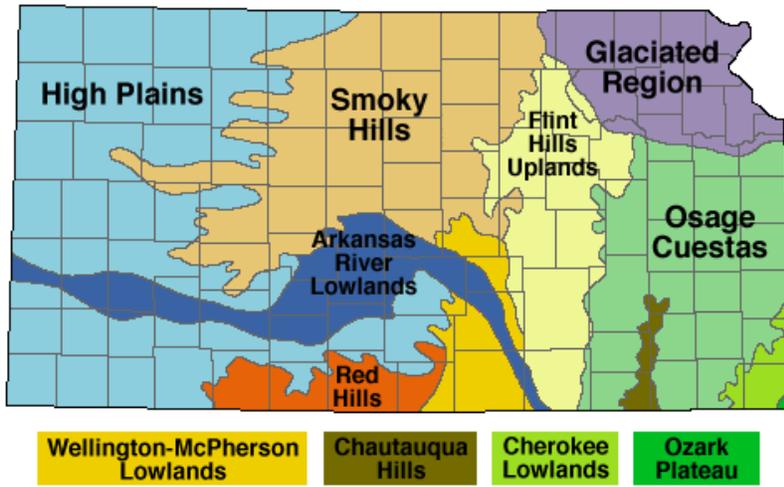
Kansas is comprised of 105 counties with a 2008 population estimated at 2,802,134 (U.S. Census Bureau). Figure 1.1 shows a map of county population based on 2007 estimates with the lightest colored counties having the least amount of people and the darkest colored counties having the greatest population. Major population centers are located in the northeast and south central portions of the state with Sedgwick and Johnson counties being the most populated.



#### Physiography

The physical characteristics of the state can be grouped into eleven distinct physiographic regions. Figure 1.2 shows the general boundaries of these regions (Source: Kansas Geological Survey). Each region represents a unique set of topographic, hydrologic and cultural characteristics. Elevation varies across the state from less than 700 feet above sea level in the southern part of the Osage Cuestas in southeast Kansas to over 4,000 feet in the High Plains of western Kansas.

**Figure 1.2**  
**Generalized Physiographic Map of Kansas**



Source: Kansas Geological Survey

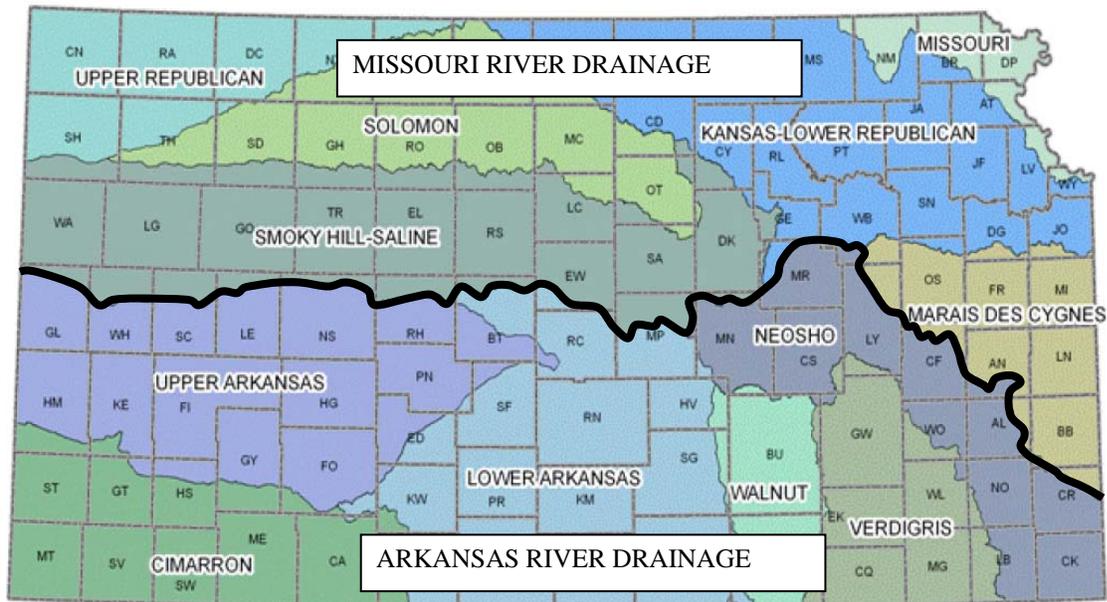
Hydrology

Kansas is part of the Mississippi River Basin and is split by the Missouri River system and the Arkansas River system (Figure 1.3).

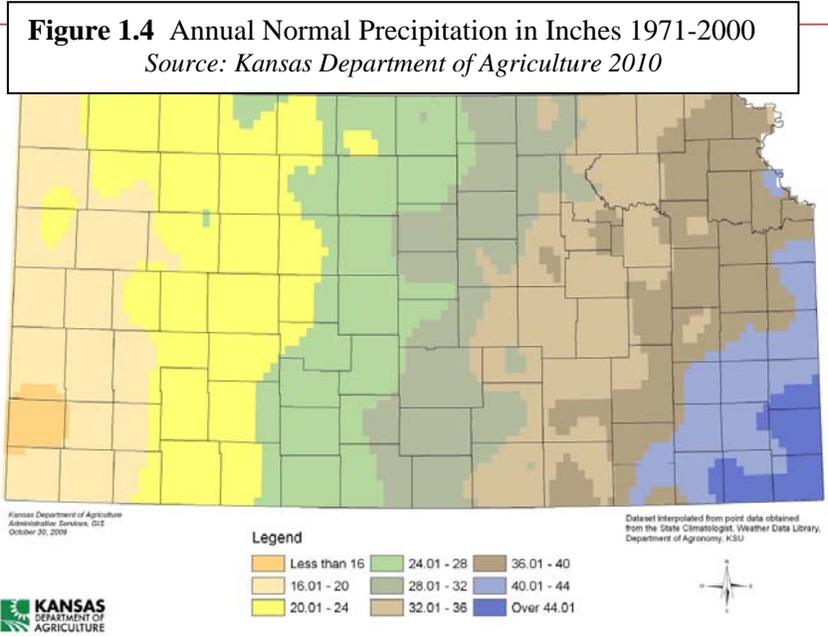
Annual precipitation varies dramatically across the state, ranging from less than 16 inches in the far west to more than 44 inches in the southeast corner of the state (Figure 1.4). Runoff also varies significantly as shown in Figure 1.5.

**Figure 1.3** Kansas River Basins

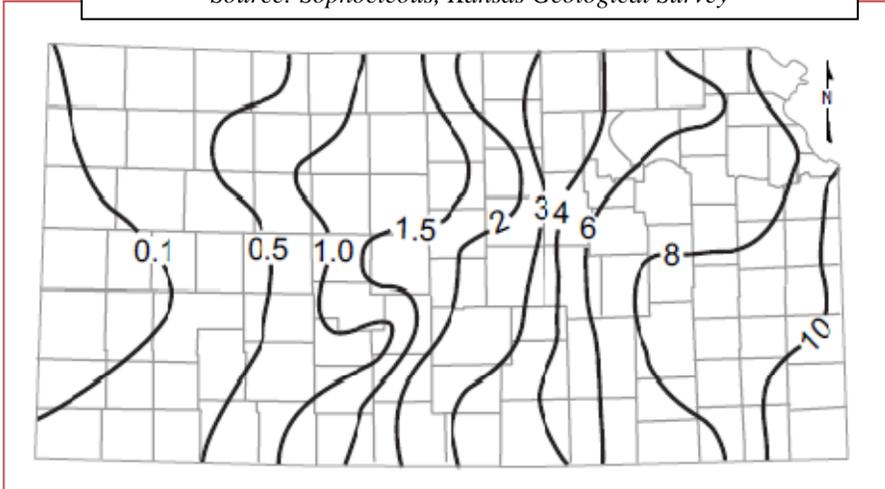
Source: Kansas Water Plan 2009



In Kansas, about two-thirds to three-quarters of total water diverted for authorized uses comes from groundwater supplies (aquifers), and the balance is from surface water supplies including streams, reservoirs, and ponds. On average, irrigation makes up 85 percent of the consumptive use of water in Kansas. This can vary significantly depending on weather conditions. Municipal use (public water supply) accounts for about 10 percent of total consumptive use of water in the state. The remaining 5 percent of consumptive water use is for industrial, recreation, stock watering, hydraulic dredging and other uses (Kansas Dept of Agriculture, 2010 - [www.ksda.gov/appropriation/](http://www.ksda.gov/appropriation/)).



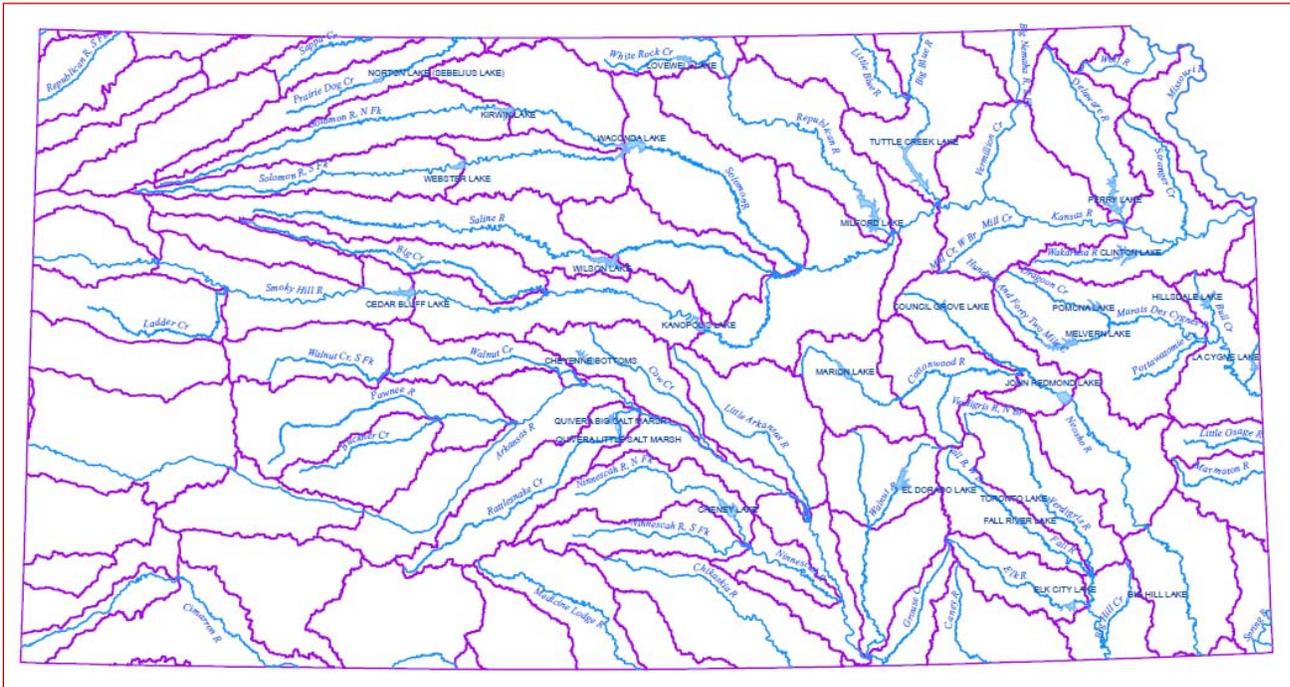
**Figure 1.5 Mean Annual Runoff in Inches**  
 (adapted from Wetter, 1987)  
*Source: Sophocleous, Kansas Geological Survey*



Ground water is the predominant source of water supply in the western part of the state, while surface water sources are most prevalent in the eastern Kansas, particularly for public water supplies. The state has 24 federal reservoirs, which provide multiple benefits including flood control, public water supply, recreation, aquatic habitat, water quality releases and irrigation water supply in some western reservoirs.

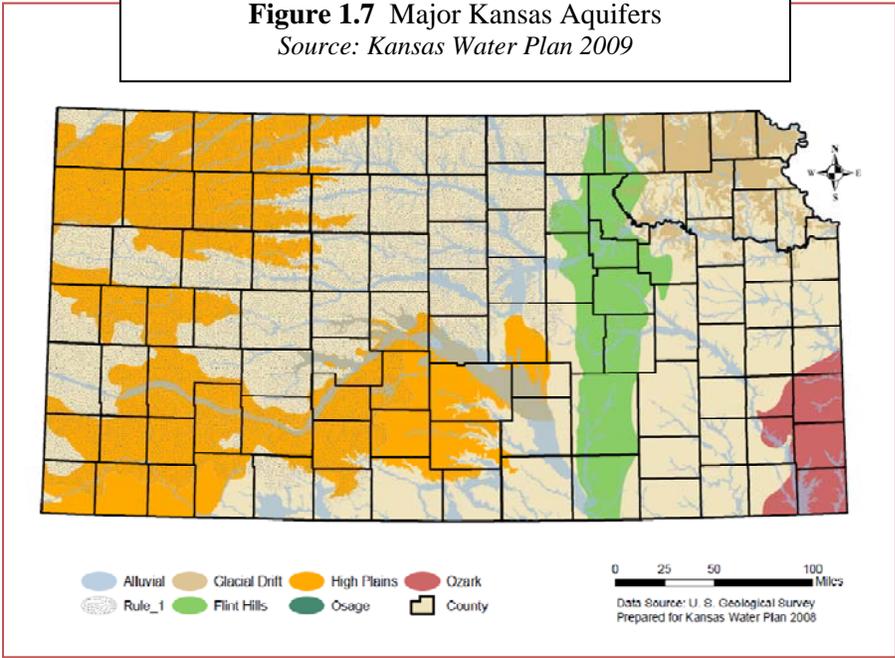
For water planning purposes the state has been divided into twelve major river basins as shown in Figure 1.3. These river basins can be divided into smaller watersheds, referred to as Hydrologic Unit Codes (HUCs) for water resource management purposes. Figure 1.6 shows the major rivers, stream and reservoirs in Kansas along with the 8 digit HUC watersheds. Figure 1.7 (page 9) shows the State’s major aquifer systems.

**Figure 1.6** Kansas 8 digit Hydrologic Unit Code Watersheds  
*Source: KDHE, 2011*



The High Plains Aquifer is the largest aquifer in Kansas and extends into bordering states including Nebraska, Colorado, Oklahoma and Texas, and is used extensively for irrigated agriculture.

**Figure 1.7** Major Kansas Aquifers  
*Source: Kansas Water Plan 2009*



Water levels have been declining in parts of this aquifer for many years causing concern about future water availability. The easternmost portion of the High Plains aquifer includes the Big Bend Prairie and the Equus Beds Aquifers in south central Kansas. The Equus Beds Aquifer provides a significant source of municipal water supply as well as irrigation.

## Land Use

Kansas encompasses nearly 52.7 million acres with about 89% of these acres related to some type of agricultural use (Kansas NRI, 2007 - [www.ks.nrcs.usda.gov/technical/ks\\_nri.html](http://www.ks.nrcs.usda.gov/technical/ks_nri.html) ). Table 1.1 shows land use changes between 2002 and 2007 based on the 2007 National Resources Inventory (NRI) conducted by the Natural Resources Conservation Service.

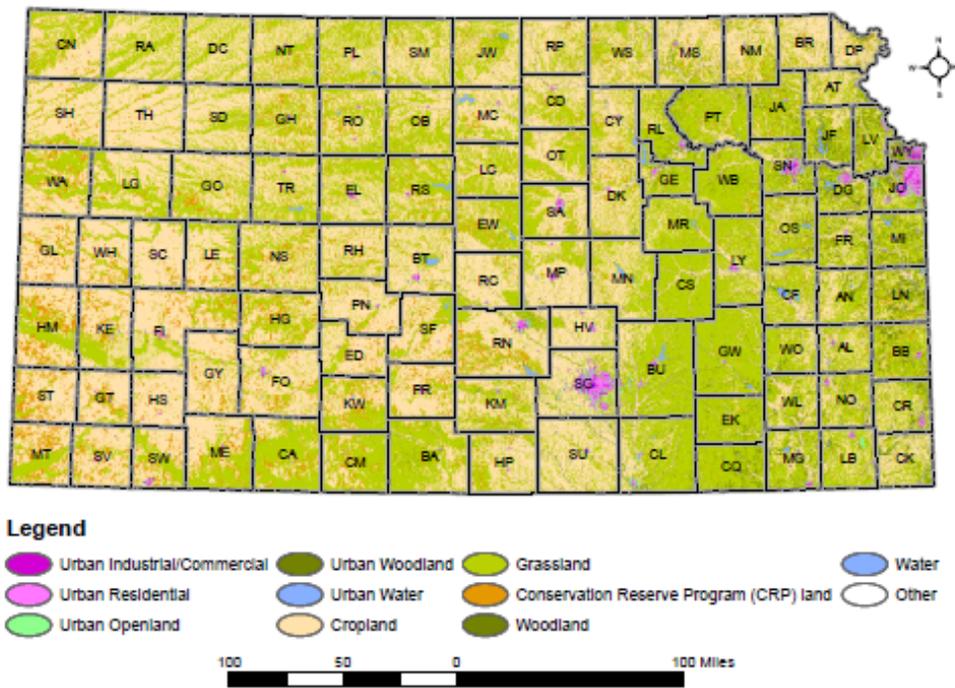
A map of land cover in Kansas is shown in Figure 1.8. Cropland is the predominant land use with large tracts of irrigated land in western Kansas and a combination of irrigated and dryland farming in the eastern half of the state as rainfall increases. Grassland, consisting of native rangeland and pasture, represents the next largest land use type with large contiguous tracts of grassland located in the Smoky Hills, Red Hills and Flint Hills physiographic regions.

**Table 1.1** Estimated Land Use Changes in Kansas – NRCS 2007 National Resource Inventory

<b>Land Use</b>	<b>2002 estimated acres</b>	<b>2002 percent of total</b>	<b>2007 estimated acres</b>	<b>2007 percent of total</b>	<b>percent change</b>
Cropland - cultivated	24,601,000	46.72%	23,756,700	45.11%	-1.60%
Cropland - noncultivated	1,796,300	3.41%	1,878,900	3.57%	0.16%
Conservation Reserve Program	2,663,700	5.06%	3,164,900	6.01%	0.95%
Pastureland	2,383,000	4.53%	2,497,600	4.74%	0.22%
Rangeland	15,810,000	30.02%	15,787,500	29.98%	-0.04%
Forestland	1,609,600	3.06%	1,685,500	3.20%	0.14%
Other Rural Land	721,100	1.37%	735,600	1.40%	0.03%
Urban/Built-up Land	1,081,500	2.05%	1,134,500	2.15%	0.10%
Rural Transportation - roads and railroads	952,000	1.81%	961,200	1.83%	0.02%
Water small - streams < 660 ft wide and water bodies < 40 acres	330,300	0.63%	346,100	0.66%	0.03%
Water census - streams > = 660 ft wide and water bodies >= 40 acres	208,300	0.40%	208,300	0.40%	0.00%
Federal land cover (use not recorded)	504,000	0.96%	504,000	0.96%	0.00%
<b>Total</b>	<b>52,660,800</b>	<b>100.00%</b>	<b>52,660,800</b>	<b>100.00%</b>	<b>0.00%</b>

Source: USDA Natural Resources Conservation Service, Kansas NRI Information 2007

**Figure 1.8** Kansas 2005 Land Use/Land Cover  
*Source: Kansas Water Plan 2009*



Source: Landsat 5 Imagery, Kansas Applied Remote Sensing Program, University of Kansas

Kansas Water Office, October 2008

### 2010 Integrated Water Quality Assessment Report

Kansas has over 121,000 miles of streams shown in the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD). Of this amount, 27,774 miles of perennial and intermittent waterways are designated as classified rivers and streams for surface water quality standards based on the Kansas Surface Water Register, February 12, 2009 ([www.kdheks.gov/befs/resources\\_publications.html](http://www.kdheks.gov/befs/resources_publications.html)). These water bodies are routinely monitored for water quality conditions through the State's water quality monitoring network maintained by the KDHE. The KDHE has also designated 316 lakes, reservoirs and ponds (191,103 surface acres) as classified waters as well as 36 wetlands (55,969 acres), which are also monitored on a routine basis.

The Integrated Water Quality Assessment Report is prepared by the KDHE biannually in fulfillment of CWA requirements ([www.kdheks.gov/befs/index.html](http://www.kdheks.gov/befs/index.html)). The most current assessment report was completed in April, 2010. Data used for this assessment were collected from 138 monitoring sites that are part of KDHE's stream monitoring program during 2006-2008. Following is a summary of key findings from this report related to NPS pollution (KDHE, 2010):

#### Streams:

- Monitoring data indicated that 29% of the state's designated stream mileage fully supported all designated uses, whereas 71% was impaired for one or more uses.

- Major causes of non-support for streams, in order of prevalence, were nutrient enrichment, sedimentation, weather-related impacts and elevated levels of fecal bacteria.
- Sources primarily responsible for pollutant loadings and/or use impairments included agriculture (irrigated and non-irrigated crop production, livestock grazing and feeding operations, unrestricted cattle access), natural phenomena (weather-related impacts), and physical habitat degradation.

#### Lakes and Wetlands:

- Approximately 9% of the assessed lake acreage fully supported all designated uses, whereas 91% was impaired for one or more designated uses.
- Sixteen percent of assessed wetland acreage either fully supported all uses or lacked sufficient data to evaluate conditions; the remaining 84% was impaired for one or more designated uses.
- Major causes of impairments in lakes and wetlands included nutrient enrichment, siltation, elevated turbidity levels, taste and odor problems, and zebra mussel infestations.
- Agriculture, municipal point sources, natural phenomena (e.g. weather-related impacts), and non-native species introductions were the primary sources of impairments.
- Approximately 69% of the assessed lake acreage exhibited no recent change in trophic condition, 25% experienced a measurable increase in trophic state, and 4% exhibited some improvement in trophic condition.

The report showed that for 316 lakes assessed for trends in trophic state, 16 (5.06%) were improving, 150 (47.47%) were stable, 43 (13.61%) were degrading, and 107 (33.86%) trends were unknown.

Section 303(d) of the CWA calls for the development of a list of waterbodies currently failing to meet established water quality standards. The Kansas 2010 list of impaired waters (i.e. 303(d) list) is included in the 2010 Integrated Water Quality Assessment Report and can be found on the web in its entirety at: [www.kdheks.gov/tmdl/methodology.htm](http://www.kdheks.gov/tmdl/methodology.htm) . In all, 537 water quality impairments were identified by KDHE and assigned a high priority for development of TMDLs.

Ground water quality monitoring is no longer maintained on a statewide network. A number of state programs do address protection and restoration of ground water. Ground water conditions are assessed and addressed primarily on a project by project basis.

#### KDHE Interim Assessment of Water Quality Trends

In September of 2010, the KDHE conducted an assessment of possible trends in water quality improvement utilizing the KDHE water quality monitoring data collected during 1990 through 2009. A statistical approach used by the Virginia Dept of Environmental Quality was adapted for this assessment. A baseline period was designated as 1990-1999 because these data supported 303(d) listing decisions in 2002. Stream monitoring stations in the dataset were divided by their location within each of the state's twelve major river basins. Datasets were further broken out by stations identified as impaired in 2002 and those that were not. Impairment of a given stream station could be for any parameter. Fourteen parameters (pollutants) were assessed for streams including bacteria (fecal coliform and E coli), dissolved oxygen (DO), pH, total dissolved solids, chloride, sulfate, selenium, zinc, lead, total phosphorus, nitrate, ammonia, total suspended solids (TSS) and atrazine.

Lake data were similarly distributed into two time periods of 1990-1999 and 2000-2009. Parameters assessed were chlorophyll a, total phosphorus, turbidity and Secchi depth. Lakes were also aggregated by river basin and were designated as either impaired or not impaired relative to 2002 303(d) listings and TMDLs.

Primary conclusions drawn from this analysis, which suggest some progress in water quality conditions for certain pollutants, include:

- A notable decrease in certain pollutants where point source treatment upgrades (bacteria, ammonia) were probable root causes.
- Diminished atrazine levels since the 1990s, likely the result of reduced applications, particularly during rainy seasons.
- Consistent reductions in TSS levels in Kansas streams since 2000, even during wetter periods, which could reflect implementation of watershed management practices for erosion and sediment control.
- Other pollutants (nitrate, phosphorus) and parameters (DO, pH) have yet to demonstrate notable reductions stemming from anthropogenic influences.

Additional discussion on the methodology used for this assessment and results can be found in Appendix 2.

#### Kansas Reference Stream Assessment ([www.kdheks.gov/befs/index.html](http://www.kdheks.gov/befs/index.html))

A report was completed in 2010 by KDHE entitled *Kansas Reference Streams: Selection of Suitable Candidates, Impending Threats to Reference Stature, and Recommendations for Long-Term Conservation*. The study involved assembling numerous existing geographical databases and developing a human disturbance index to evaluate and rank the state's nearly 100,000 watersheds and corresponding stream reaches. The National Hydrography Dataset (NHD) was utilized for these delineations. Watersheds were ranked based on disturbance analysis by ecoregions established for the study. The primary intent of the study was to identify potential watersheds with minimal amounts of disturbance within the various ecoregions to provide a basis for future field analysis and consideration of measures that could be employed to protect high value watersheds that demonstrate properly functioning conditions that provide good quality water. This will provide useful information for watershed projects in developing water quality restoration and protection plans.

#### 2010 Kansas Forest Resource Assessment

This recent assessment identifies both benefits and threats regarding Kansas forest resources and identifies priority areas for enhanced management and protection. Restoration and protection of water quality is recognized as a key component of the strategy. The assessment indicates about 5.2 million acres of forests, woodlands and trees in Kansas (includes windbreaks, riparian buffers and other areas that do not meet the USDA definition of forestland). The assessment suggests future declines in forest resources due to conversion to cropland, urban development and other uses. The full report can be viewed at: [www.kansasforests.org/assessment.shtml](http://www.kansasforests.org/assessment.shtml).

## Current State NPS Priority Issues

The *Kansas Water Plan* ([www.kwo.org](http://www.kwo.org)) outlines state policies and programs for the comprehensive management of water resources. It addresses both water quality and water quantity issues and establishes state priorities for targeting applicable state and federal programs. The Kansas Water Authority (KWA) and the Kansas Water Office (KWO) are responsible for coordinating the development and implementation of the *Kansas Water Plan* in collaboration with multiple local, state and federal agencies, basin advisory committees, organizations and the general public through the Kansas Water Planning Process. The plan is updated periodically to address current issues and reflect progress in plan implementation. The KWA membership is comprised of state water-related agency heads and representatives of state water interests appointed by the Governor and legislative leadership to advise the Governor and Legislature on water policy and program funding to address state water resources issues and concerns. Basin advisory committees consist of representatives of local water interests within the State's twelve major river basins that advise the KWO and KWA on issues within their respective basins.

In 1989, a State Water Plan Fund was established to facilitate implementation of the *Kansas Water Plan*. Funding is provided annually to multiple agencies to administer programs and projects that implement recommendations of the plan. The fund generates approximately \$20 million annually. The KWA makes funding recommendations each year to the Governor and Legislature on expenditure of the State Water Plan fund. Funding is subsequently appropriated to the respective agencies through the State budgetary process.

The *Kansas Water Plan* consists of both policy and basin sections. The *Plan*, updated in 2009, identifies the following primary NPS related water quality priorities:

- Total Maximum Daily Loads
- Source Water Protection
- Surface Water Nutrient Reduction
- Reservoir Sustainability
- Wetland and Riparian Area Management

### Total Maximum Daily Loads ([www.kdheks.gov/tmdl/](http://www.kdheks.gov/tmdl/))

Section 303(d) of the CWA requires states to develop TMDLs for water bodies on the State's List of Impaired Waters. TMDLs are quantitative objectives and strategies needed to achieve water quality standards. The water quality standards constitute the goals of water quality adequate to fully support designated uses of streams, lakes, and wetlands.

TMDLs in Kansas are developed on a watershed basis and priority for implementation is established as part of this process. TMDLs that are designated as a high priority are used to target applicable state and federal programs that can provide technical and financial assistance for implementation of BMPs that can address the applicable water quality impairment. High priority TMDL watersheds for implementation are identified in the applicable basin sections of the *Kansas Water Plan*. The 2009 *Kansas Water Plan* includes 67 streams, 30 lakes and 4 wetlands with high priority TMDLs established. Bacteria, nutrients and sediment represent the most significant impairments in terms of NPS implementation efforts.

Key state and federal nonpoint source pollution related programs that currently incorporate some level of targeting or priority for implementation of BMPs in high priority TMDL watersheds include:

- KDHE Watershed Restoration and Protection Strategy & 319 Grant Programs
- KDHE Local Environmental Protection Program
- SCC Nonpoint Source Pollution Control Program
- SCC Water Resources Cost-Share Program
- SCC Water Quality Buffer Initiative
- SCC Riparian and Wetland Protection Program
- NRCS Environmental Quality Incentive Program
- USDA Conservation Reserve Program (Conservation Priority Area designations)

Tables showing all approved Kansas TMDLs, including maps of high priority TMDL watersheds, and the 2010 303(d) list of impaired waters are provided in Appendix 3. Additional information on Kansas TMDLs is available at: <http://www.kdheks.gov/tmdl/index.htm>.

#### Surface Water Nutrient Reduction

In 2004, the KDHE developed the *Kansas Surface Water Nutrient Reduction Plan* ([www.kdheks.gov/water/download/ks\\_nutrient\\_reduction\\_plan\\_12\\_29\\_final.pdf](http://www.kdheks.gov/water/download/ks_nutrient_reduction_plan_12_29_final.pdf)). The plan establishes an overall goal of reducing nitrogen and phosphorus exported to other states from Kansas rivers and streams by 30%. As indicated in the plan, approximately 51,000 tons of total nitrogen (TN) and 7,700 tons of total phosphorus (TP) are exported from Kansas annually. Estimated point source contributions to this export are 18% for TN and 25% for TP, with the balance being from nonpoint sources.

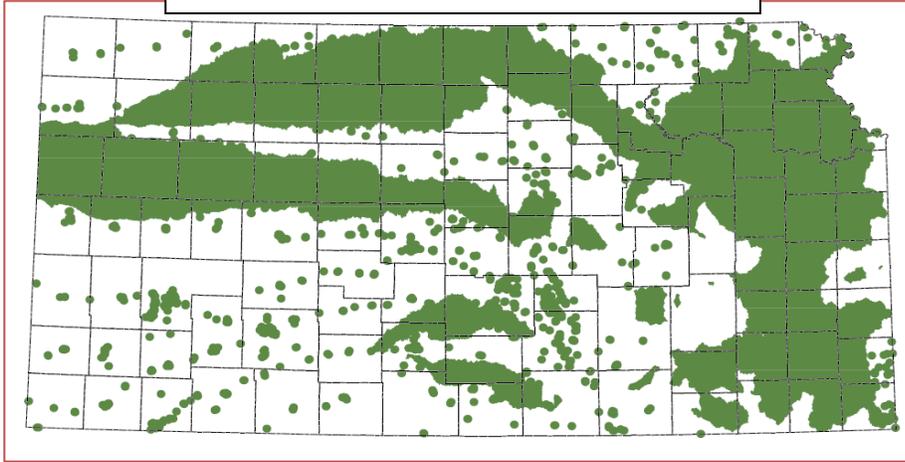
The 30% overall reduction in TN export is proposed to be accomplished by a 55% reduction in contributions from point sources combined with a 24% reduction from nonpoint sources. For TP, the 30% reduction in export is proposed to come from a 55% reduction in point source contributions and a 22% reduction in nonpoint sources.

At present, nutrient reduction from nonpoint sources of pollution are targeted primarily to nutrient related impairments in high priority TMDL watersheds in Kansas. However, increasing attention is being given to interstate watersheds where nutrient related water quality impairments are occurring in surface water bodies outside of the Kansas border. BMPS implemented in Federal Fiscal Year 2010 (October 1, 2009 – September 30, 2010) as reported to KDHE reduced annual phosphorus loads by an estimated 160,134 pounds per year and nitrogen loads by an estimated 357,798 pounds per year. In 2008, Banner Creek Reservoir was removed from the impaired waters 303(d) list for a nutrient-related eutrophication impairment having lowered elevated Chlorophyll-a levels to acceptable levels through implementation of watershed BMPs.

#### Source Water Protection ([www.kdheks.gov/nps/swap/](http://www.kdheks.gov/nps/swap/))

The 1996 amendments to the Safe Drinking Water Act required each state to develop a Source Water Assessment Program. Additionally, each state was required to develop a Source Water Assessment (SWA) for each public water supply that treats and distributes raw source water. In Kansas, there are approximately 763 public water supplies that required SWAs. These assessments were completed in 2004.

**Figure 1.9** Source Water Protection Areas  
*Source: KDHE, 2010*



A SWA includes the following: delineation of the source water assessment area; inventory of potential contaminant sources; and susceptibility analysis. The SWAs in Kansas showed 54% of the 677 systems utilizing a ground water source received a low susceptibility analysis score; 45% were scored moderate and 1% high.

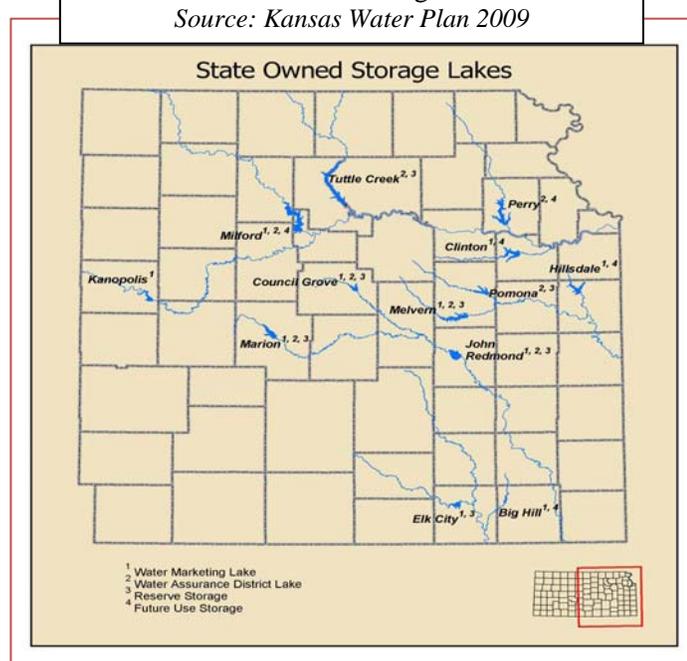
Fifty-one percent of surface water systems received low susceptibility scores, with 43% scoring moderate and 6% scoring high.

A SWA is the first step in protecting a public water supply source. The next step is the development of a source water protection plan (SWPP) followed by implementation of water quality protection measures identified in the plan. Figure 1.9 shows a map of current SWP areas for public water supply wells and surface water intakes. The 2009 *Kansas Water Plan* includes the development and implementation of SWPPs for all public water suppliers as a water quality objective in each basin section of the plan. Currently, 119 public water suppliers in Kansas have an approved SWPP.

### Reservoir Sustainability

Surface water reservoirs represent an important source of public water supply in Kansas. The KWO estimates that about two-thirds of the Kansas population receives public water supply benefits from the state's federal reservoirs. The State of Kansas owns storage space in 13 of these 24 federal reservoirs (see Figure 1.10). The KWO administers a state water marketing program that provides water supplies to municipalities and industries. Other federal reservoirs provide water supply directly to municipalities, such as Cheney Reservoir (City of Wichita) and El Dorado Reservoir (City of El Dorado). Surface water reservoirs are affected

**Figure 1.10** Federal Reservoirs with State Owned Storage  
*Source: Kansas Water Plan 2009*



by both water quality and water quantity impacts that are influenced primarily by their drainage areas. Once construction of a reservoir's dam is completed, sediment and pollutants are carried by incoming rivers and streams and deposited within the reservoir, resulting in loss of storage space as well as diminished water quality. Over time, this accumulation of sediment and pollutants can result in water quality impairments. Currently 22 federal reservoirs have one or more TMDLs developed to address a water quality impairment or are listed on the 303(d) list of impaired waters. Eutrophication and siltation are the most prevalent reservoir impairments resulting in large part from nonpoint sources of pollution. Smaller city owned water supply reservoirs are also affected by sediment and other pollutants contributed by NPS runoff and in need of restoration and protection efforts.

In June 2008, a series of white papers on sedimentation issues were developed through an interagency effort and a report was published addressing a number of reservoir sedimentation issues. Since that time, the KWO has prepared a Reservoir Roadmap outlining a number of actions for reservoir restoration and protection. A sediment baseline assessment was also initiated to enhance the understanding of sediment sources and processes and evaluate various management strategies. These reports can be found on the KWO website ([www.kwo.org](http://www.kwo.org)).

#### Riparian and Wetland Management

Restoration and protection of wetland and riparian area resources are identified in the *Kansas Water Plan* as a major component in restoring and maintaining the water quality in rivers and lakes to fully support their designated uses. These resources provide important sinks that trap, filter and utilize various pollutants such as sediment and nutrients before they can enter surface waters. Policy subsections of the *Kansas Water Plan* were approved in 2009 to enhance the protection of wetland and riparian resources for reservoir sustainability (sediment reduction) and related benefits ([www.kwo.org](http://www.kwo.org)). A Kansas Wetlands and Aquatic Resources Plan Framework, prepared in 2008 by a multi-agency team, outlines a number of recommended actions to further the protection, restoration and management of riparian and wetland resources (SCC, 2008). This plan is currently being revised to address all the elements outlined in the EPA Framework for State Wetland Programs.

Riparian and wetland resources represent key components of local and regional green infrastructure networks that serve to restore and maintain a more natural hydrologic system that promotes infiltration of stormwater runoff and enhances a watershed's capacity to filter out harmful pollutants before they enter streams, rivers and lakes. Other benefits such as wildlife habitat, groundwater recharge, flood attenuation and recreation can also be associated with these resources. The Conservation Fund defines *Green Infrastructure* as "...strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations." (<http://www.greeninfrastructure.net>).

Wetlands, vegetative grass or forest buffers along rivers and streams, and native grasslands, floodplains and woodlands are all examples of green infrastructure resources in both urban and rural watersheds. Wetland losses in Kansas have been estimated at nearly half of what existed in the 1780's (SCC, 2008). The *2010 Kansas Forest Assessment* estimates about 562,000 acres of riparian forestland bordering 23,731 miles of perennial streams and rivers. The report suggests that loss of forestland is occurring in riparian areas that compete with agricultural crops, urban

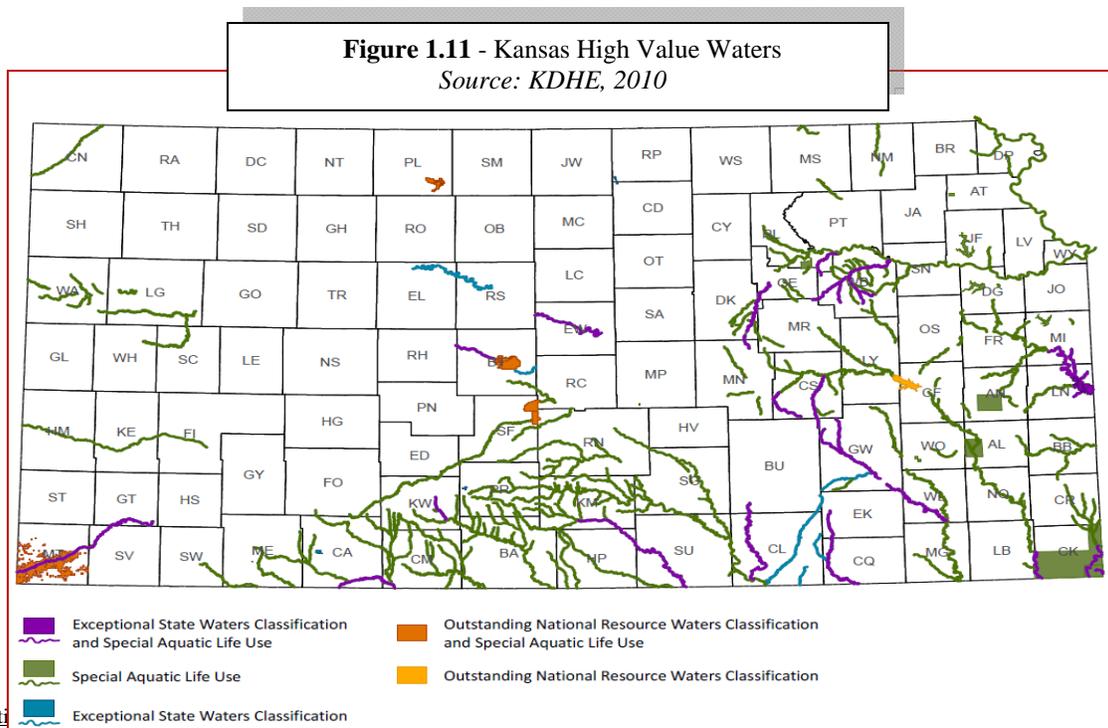
uses and other forms of development and anticipates continued threats to riparian forest resources (KFS, 2010).

The 2009 American Recovery and Reinvestment Act (ARRA) promoted the utilization of green infrastructure projects to address stormwater quality issues in rural and urban watersheds through a supplemental appropriation to the Clean Water State Revolving Loan Fund program. Kansas received an appropriation of approximately \$38 million for this program and utilized approximately \$6 million for green infrastructure projects in urban and rural watersheds.

### High Value and Threatened Waters and Watershed Resources

The Kansas Surface Water Quality Standards designate specific water bodies for high value uses including Special Aquatic Life Use, Exceptional State Waters and Outstanding National Resource Waters. Figure 1.11 shows a map of these water bodies.

In addition to these designated water bodies, properly functioning, minimally disturbed headwater watersheds represent an important resource for maintaining or improving water quality conditions in the future. The recent KDHE Reference Stream Assessment described earlier in this document identifies potential areas where protection strategies may be considered.



**Definition**

**Outstanding National Resource Waters**, K.A.R. 28-16-28b(oo), “means any of the surface waters or surface water segments of extraordinary recreational or ecological significance identified in the surface water register, as defined K.A.R. 28-16-28b(zz), and afforded the highest level of water quality protection under the anti-degradation provisions of K.A.R. 28-16-28c(a) and the mixing zone provisions of K.A.R. 28-16-28c(b).”

**Exceptional State Waters**, K.A.R. 28-16-28b(x), “means any of the surface waters or surface water segments that are of remarkable quality or of significant recreational or ecological value, are listed in the surface water register as defined in K.A.R. 28-16-28b(zz), and afforded the highest level of water quality protection under the anti-degradation provisions of K.A.R. 28-16-28c(a) and the mixing zone provisions of K.A.R. 28-16-28c(b).”

**Special Aquatic Life Use**, K.A.R. 28-16-28d(a)(2)(A), “means surface waters that contain combinations of habitat types and indigenous biota not found commonly in the state, or surface waters that contain representative populations of threatened or endangered species.”



**Table 2.2 Organizational Responsibilities for NPS Related Program  
Implementation, Administration, and Facilitation**

Organization	IE	FA	TA	TT	E	M	P	A
Kansas Department of Health & Environment	•	•	•	•	•	•	•	•
Kansas State Conservation Commission	•	•	•	•				
Kansas Department of Agriculture	•		•	•	•		•	
Kansas Water Office	•						•	•
Kansas Forest Service	•	•	•	•				•
Kansas Department of Wildlife and Parks	•	•	•	•	•	•		•
USDA Natural Resources Conservation Service	•	•	•	•	•		•	
USDA Farm Services Agency	•	•			•			
US Fish and Wildlife Service	•	•	•		•	•		•
US Army Corps of Engineers	•		•	•		•	•	•
US Environmental Protection Agency	•	•	•	•	•		•	
US Geological Survey	•					•		•
K-State Research & Extension Offices	•		•	•		•		•
Kansas Biological Survey & Geological Survey	•		•	•		•		•
County Conservation Districts	•	•	•	•			•	
Local Environmental Protection Programs	•		•	•	•		•	•
WRAPS Stakeholder Leadership Teams*	•	•		•			•	•
WRAPS Service Provider and Sponsor Organizations	•	•	•	•		•		•

**KEY**

IE – Information & Education  
 FA – Financial Assistance  
 TA – Technical Assistance  
 TT – Technology Transfer

E – Program Enforcement  
 M – Monitoring  
 P – Policy and Planning  
 A - Assessment

**NOTES**

\* Provides oversight and direction to sponsoring organizations and service providers

*Source: Adapted from Kansas Nonpoint Source Pollution Management Plan, 2000 Update*

Following is a descriptive summary of state and federal agencies that have significant NPS related program responsibilities. See Appendix 6 for supplemental information on programs and authorities.

### **Federal NPS Partners**

The **USDA Natural Resources Conservation Service** (NRCS - [www.ks.nrcs.usda.gov/](http://www.ks.nrcs.usda.gov/)) and the **USDA Farm Service Agency** (FSA - [www.fsa.usda.gov/ks](http://www.fsa.usda.gov/ks)) administer multiple federal Farm Bill programs that provide technical and financial assistance for implementation of water quality BMPs. A Kansas Technical Committee consisting of numerous agencies and organizations meets regularly to provide advice and input to NRCS and FSA on program implementation and state priorities. Primary programs that can benefit water quality in Kansas include:

- Environmental Quality Incentives Program (Federal Fiscal Year “FFY” 2010 Funding - \$22.5 million)
- Conservation Reserve Program (CRP) and Continuous CRP (FFY 2010 Rental Payments – more than \$122,000,000)
- Conservation Stewardship Program (FFY 2010 Funding – more than \$18 million)
- Wetland Reserve Program (FFY 2010 Funding – more than \$4.3 million)
- Grassland Reserve Program (FFY 2010 Funding – more than \$4.0 million)
- Farm and Ranch Lands Protection Program (FFY 2010 –more than \$800,000)
- Conservation Technical Assistance (FFY 2010 – more than \$19 million)

The **U.S. Environmental Protection Agency** ([www.epa.gov/owow/keep/NPS](http://www.epa.gov/owow/keep/NPS)) provides funding for implementation of the State’s NPS Management Program through an annual CWA Section 319 grant to KDHE. EPA personnel also provide program guidance and implementation assistance through review of 319 project implementation plans for subgrants to local project sponsors. Other funding is also made available through EPA for water quality related activities, such as the State Wetland Development Grant Program and Targeted Watershed Grant Program, which have been utilized in Kansas by local and state partners. The annual 319 program grant to Kansas in FFY 2010 was about \$3.5 million.

Other federal agencies involved in water quality related activities and projects include:

- ✚ U.S. Geological Survey ([www.usgs.gov](http://www.usgs.gov)) - e.g. water quality monitoring and assessment
- ✚ U.S. Fish and Wildlife Service ([www.fws.gov](http://www.fws.gov)) - e.g. water quality activities that benefit wildlife
- ✚ U.S. Army Corps of Engineers; Kansas City District ([www.nwk.usace.army.mil](http://www.nwk.usace.army.mil)) and Tulsa District ([www.swt.usace.army.mil](http://www.swt.usace.army.mil)) - e.g. planning and technical assistance to address ecosystem restoration and reservoir sedimentation issues, management of public lands around federal reservoirs and administration of CWA Section 404 permitting/Section 401 water quality certification process for dredge and fill activities in the waters of the U.S., including wetlands.

### **State NPS Partners**

The **State Conservation Commission** ([www.scc.ks.gov/](http://www.scc.ks.gov/)) provides state financial assistance to landowners through local county conservation district programs to implement BMPs on private

or publicly owned land. All 105 county conservation districts have a state approved Local NPS Pollution Management Plan, which guides the implementation of NPS BMPs in their respective counties. Primary SCC NPS related programs include:

- The Nonpoint Source Pollution Control Program - provides funding to producers to implement water quality BMPs through county conservation districts that have developed a local NPS Pollution Control Management Plan (State Fiscal Year “SFY” 2010 Funding – more than \$2.5 million)
- Water Resources Cost-Share Program – provides funding to producers for soil and water conservation practices through local county conservation district programs (SFY 2010 Funding –more than \$2.4 million)
- Water Quality Buffer Initiative – provides state incentive funding for implementation of vegetative buffer strips through the USDA Continuous CRP program in state priority water quality and reservoir watersheds (SFY 2010 Funding – more than \$300,000)
- Riparian and Wetland Protection Program – provides funding for technical and financial assistance to implement BMPs that protect or restore riparian and wetland resources (SFY 2010 Funding – more than \$187,000)

SCC programs are funded through the State Water Plan Fund and technical assistance for implementation of many of these practices is provided through the NRCS.

The **Kansas Department of Health and Environment** administers several programs that support NPS management. These include:

- The Bureau of Water (BOW), Watershed Management Section ([www.kdheks.gov/nps/](http://www.kdheks.gov/nps/)) administers CWA Section 319 and State Water Plan funding to local project sponsors to implement NPS BMPs and to develop and implement watershed restoration and protection strategies. The Local Environmental Protection Program currently provides State Water Plan funding support to county health departments and multi-county organizations to develop and implement local environmental protection plans addressing regulation of on-site wastewater systems, private water wells and other NPS related issues through enforcement of county sanitary/environmental codes and other activities. The WMS also provides 401 water quality reviews and certifications for federally funded/permitted projects when required.
- The BOW, Watershed Planning Section ([www.kdheks.gov/tmdl/](http://www.kdheks.gov/tmdl/)) prepares the biennial 303(d) List of Impaired Waters and administers the TMDL Program to determine restoration needs for impaired water bodies.
- The BOW, Livestock Waste Management ([www.kdheks.gov/feedlots/](http://www.kdheks.gov/feedlots/)) administers state laws and regulations that address smaller confined feeding operations as well as those regulated under the federal National Pollutant Discharge Elimination System (NPDES) Confined Animal Feeding Operations program. Livestock facilities with a capacity of 300 or more animal units must register with KDHE. Additionally, any facility that presents a significant water pollution potential must register with KDHE. BMPs are required to be installed as needed to ensure that a significant pollution potential does not exist.
- The BOW, Municipal Programs Section, ([www.kdheks.gov/muni/](http://www.kdheks.gov/muni/)) administers the Kansas Water Pollution Control Revolving Fund, which provides funding for NPS projects in collaboration with the BOW Watershed Management Section. The Section also administers NPDES permitting for municipal (MS4) stormwater, land application of municipal wastewater and wastewater sludge, and Kansas Water Pollution Control permits.

- The BOW, Industrial Programs Section, ([www.kdheks.gov/indust/](http://www.kdheks.gov/indust/)) administers NPDES permitting for construction stormwater, industrial stormwater, land application of industrial wastewater and wastewater sludge, and Kansas Water Pollution Control permits.
- The BOW, Public Water Supply Section ([www.kdheks.gov/pws/](http://www.kdheks.gov/pws/)) administers programs for regulating public water supply systems and assisting them in providing safe and potable water to the people of Kansas. The Section's Capacity Development Program assists public water supply systems to acquire and maintain the technical, financial, and managerial capacity needed to meet the public health protection objectives of Safe Drinking Water Act.
- The BOW, Geology Section, ([www.kdheks.gov/geo/](http://www.kdheks.gov/geo/)) administers programs for regulation of underground injection control (UIC), underground hydrocarbon and natural gas storage, and water well licensing, water well construction and abandonment.
- The KDHE Bureau of Environmental Field Services (BEFS-[www.kdheks.gov/befs/](http://www.kdheks.gov/befs/)) operates the State Water Quality Monitoring network and prepares the biannual Integrated Water Quality Assessment Report describing the water quality conditions of classified water bodies in the state, including the major sources and causes of impairments. BEFS District Office watershed field staff provide ongoing support and technical assistance for NPS water quality related programs including LEPP, WRAPS, 319 grants, 401 water quality certifications and other NPS activities.
- The KDHE Bureau of Environmental Remediation operates a State Water Plan Contamination Remediation Program ([www.kdheks.gov/remedial/swp/](http://www.kdheks.gov/remedial/swp/)) designed to address cleanup of contaminated sites that pose a health risk. Most of these sites involve groundwater impacts potentially affecting public or private drinking water supplies.

The **Kansas State University (KSU) Research and Extension Service** ([www.ksre.ksu.edu/](http://www.ksre.ksu.edu/)) provides water quality information, education and technical assistance services through its multiple extension and outreach programs. These include county extension offices, agricultural experiment stations, watershed specialists, Kansas Center for Agricultural Resources and the Environment (KCARE - [www.kcare.ksu.edu/](http://www.kcare.ksu.edu/)), and other related programs. KSU Research and Extension is also actively engaged in sponsoring and supporting individual WRAPS projects.

The **Kansas Department of Agriculture** ([www.ksda.gov/](http://www.ksda.gov/)) administers the Kansas Pesticide and Fertilizer Laws that provides for the inspection, registration and sampling of fertilizers products; and provides for the registration of pesticide products and dealers and establishes minimum standards for proper use, storage and disposal of pesticide products. The agency also administers the Water Structures Program, which regulates structural alterations to streams and floodplains, and the Water Appropriations Program.

Other State NPS Partners include:

- ✦ The **Kansas Forest Service** ([www.kansasforests.org/](http://www.kansasforests.org/)) provides technical assistance to landowners for proper management of private forestland to protect land and water resources, including the establishment and management of healthy riparian forest buffers to provide water quality benefits.
- ✦ The **Kansas Biological Survey** ([www.kbs.ku.edu/](http://www.kbs.ku.edu/)) and the **Kansas Geological Survey** ([www.kgs.ku.edu/](http://www.kgs.ku.edu/)) - conducts water quality related studies and provide information to water quality program managers to address a variety of surface and groundwater quality issues.

- ✦ **Kansas Department of Wildlife and Parks** ([www.kdwp.state.ks.us/](http://www.kdwp.state.ks.us/)) – conducts biological stream monitoring, assessments and environmental reviews; provides technical and financial assistance for habitat protection and improvement that also provides water quality benefits. KDWP’s Stream Survey and Assessment Program collects data pertinent to the fish, mussels and other invertebrate communities within Kansas streams and rivers for the purpose of reviewing publicly funded projects for state and federally permitted development. These efforts have been associated with rare and sensitive species, but the program maintains and updates an extensive database for all species of fish and invertebrates collected statewide. Surveys are performed on public and private lands with landowner permission. Educating and increasing awareness of the importance of streams and rivers has also been an important part of the program. KDWP also manages a significant amount of public land, particularly around many of the states lakes and federal reservoirs.
- ✦ **Kansas Corporation Commission** ([www.kcc.state.ks.us/](http://www.kcc.state.ks.us/)) – regulates oil and gas drilling operations to protect water quality; administers a well plugging program for abandoned oil and gas wells.

In addition to state governmental agencies; numerous conservation, agricultural and environmental organizations are also involved in activities addressing NPS issues (see Table 2.3, page 28).

## **Local NPS Partners**

### Conservation Districts ([www.kacdnet.org/](http://www.kacdnet.org/))

Conservation districts were created to implement soil and water conservation practices for erosion control and water quality purposes under the Conservation District Law (K.S.A. 2-1901 et seq.) enacted in 1937. Conservation districts are governmental subdivisions of the state and are governed by a board of supervisors who are elected by the land occupiers of the district. Conservation district boundaries correspond geographically with county political boundaries. Each of the 105 counties in Kansas are served by a conservation district.

Conservation districts have broad powers to develop and implement soil and water conservation practices. All districts currently have a state approved Nonpoint Source Pollution Management Plan to guide the implementation of water quality protection measures in their respective counties with State Water Plan funds administered by the SCC. Some conservation districts also serve as the sponsoring organization for WRAPS projects.

### County Health Departments and multi-county Local Environmental Protection Groups ([www.kdheks.gov/nps/lepp/](http://www.kdheks.gov/nps/lepp/))

The LEPP provides for the implementation of local environmental protection plans by county health departments and multi-county local environmental protection groups. Core program components include adoption, implementation and enforcement of sanitary/environmental codes to manage on-site wastewater systems and private water supply wells; provide for information, education and technical assistance; and organization and coordination of a LEP committee that provides advice and counsel on the LEP plan. Other program components include solid waste management, hazardous waste management, subdivision water and wastewater, public water supply protection, and other nonpoint source pollution.

County Extension Offices ([www.ksre.ksu.edu/Map.aspx](http://www.ksre.ksu.edu/Map.aspx))

K-State Research and Extension programs present useful information related to agriculture, home and family, health and nutrition, 4-H and youth development, business and economics, lawn and garden, and much more. Many extension office personnel actively engage in programs and activities to protect and restore water quality in the communities they serve.

#### Watershed Restoration and Protection Strategy (WRAPS) Stakeholder Leadership Teams

WRAPS Stakeholder Leadership Teams (SLTs) can be comprised of representatives of local agencies, organizations, interest groups and individuals. Each SLT has a sponsoring organization that provides administration support, including staff resources to facilitate coordination, planning, meetings, funding, project management and other duties. Service provider organizations can also be involved in a WRAPS project to provide specific services requested by the SLT. The SLT provides oversight and direction to the work activities of the sponsoring organization and service providers in implementing the WRAPS watershed plan.

Other local agencies involved in NPS management related activities include:

✚ Resource Conservation and Development Councils (RC&D) ([www.ks.nrcs.usda.gov/partnerships/rcd/](http://www.ks.nrcs.usda.gov/partnerships/rcd/))

The RC&D program was authorized by the Food and Agricultural Act of 1962 and provides opportunities for local units of government and individuals to improve their communities in multi-county regions. An RC&D works through a council of local citizens and USDA staff to find resources to benefit rural communities. Through RC&Ds, the NRCS helps coordinate interagency projects to improve environmental, social, and economic conditions throughout the State. Some RC&Ds serve as the sponsoring organization for WRAPS projects.

✚ Watershed Districts ([www.sakw.org/](http://www.sakw.org/))

Watershed districts are authorized under the provisions of the Watershed District Act (K.S.A. 24-1202 et seq.). Districts develop and implement general plans to abate damages from rural flooding and watershed erosion through the construction of flood control structures and other works of improvement. Funding can be obtained through local taxing authority and from state and federal assistance programs. In recent years, some watershed districts have become involved in water quality restoration and protection efforts, including sponsorship of WRAPS projects. Over 80 watershed districts have been organized in Kansas.

✚ Basin Advisory Committees ([www.kwo.org](http://www.kwo.org))

Basin advisory committees (BACs) were organized in the mid 1980s as part of the Kansas Water Planning Process and correspond to the twelve major rivers basins used for state water planning. A BAC is comprised of representatives of various water interests within its respective basin. They meet regularly (3-4 times per year) and provide advice to the KWO and KWA on priority water resource issues.

✚ Groundwater Management Districts ([www.ksda.gov/appropriation/content/295](http://www.ksda.gov/appropriation/content/295))

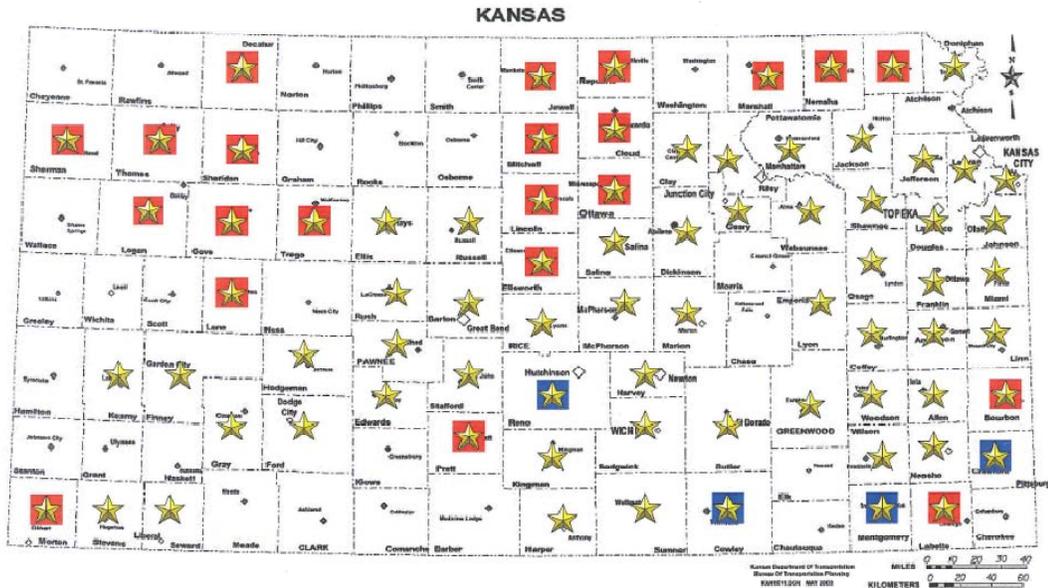
Groundwater management districts (GMDs) were organized to provide for the prudent management and conservation of groundwater resources. Water quality can be an

important component of a GMD’s management program in addition to water quantity. There are five organized GMDs in Kansas.

**City and County Governments**

City and county governments represent important players in addressing NPS issues locally through their land use planning and regulatory authorities (the following figure shows the status of county planning and zoning in Kansas). This can include management of stormwater runoff from a variety of construction and development related activities. Implementation of water quality protection and restoration measures, such as stream setback ordinances and other “Green Infrastructure” practices, has occurred in several urban communities, primarily in the northeastern part of the state. Implementation of green infrastructure projects and programs is receiving increasing attention in urbanizing communities as a way to better manage stormwater while providing other community benefits.

**Kansas County Zoning Status - 2010**



-  Countywide Zoning
-  County Zoning for Part of County Only
-  City Extraterritorial Zoning Only

Source: Yearout, 2010

**Non-Governmental Organizations**

Numerous organizations can play a significant role in addressing NPS issues through their local members and chapter organizations. Table 2.3 (page 29) provides a list of agencies and organizations that have been active in sponsoring NPS 319 funded projects

since 2000. Other groups not listed in Table 2.3 that can be involved in NPS related activities include, but are not limited to the following organizations.

Arkansas River Coalition	Kansas Wildlife Federation
Audubon Society	Lake and River Recreational Interests
Groundwater Management Districts	Land Trusts
Ducks Unlimited	League of Kansas Municipalities
Friends of the Kaw	Local civic groups
Kansas Association of Conservation Districts	National Turkey Federation
Kansas Association of Counties	Pheasants Forever
Kansas Association of County Planning & Zoning Officials	Playa Lakes Joint Venture
Kansas Association of State Floodplain Managers	Scenic Byways
Kansas Corn/Sorghum/Wheat Growers Associations	Quail Unlimited
Kansas Farm Bureau	Sierra Club
Kansas Farmers Union	Sport Fishing Associations
Kansas Grain and Feed Dealers Assn	State Association of KS Watersheds
Kansas Grazing Lands Coalition	The Nature Conservancy
Kansas Homebuilders Association	The Watershed Institute
Kansas Livestock Association	Travel and Tourism agencies
Kansas Natural Resource Council	Certified Crop Advisors
Kansas Environmental Health Association	LEPP groups
Kansas Land Improvement Contractors Association	

**Mechanisms for NPS Program Collaboration and Partnerships**

Several mechanisms exist for facilitating program coordination and collaboration. Following is a list of coordination mechanisms commonly utilized for NPS management in Kansas.

- State Water Planning Process
  - Kansas Water Authority meetings (held 3-4 times per year)
  - Basin Advisory Committees (held 3-4 times per year)
  - Technical Advisory Committees (ad hoc committees utilized for policy issue development)
- Kansas Natural Resources Sub-Cabinet (meets 2-3 times per month)
- KS-WRAPS Work Group and ad hoc issue-specific subcommittees (meets bi-monthly)
- KS-WRAPS Partnerships (partners are invited to attend WRAPS Work Group meetings)
- WRAPS Conference (held every 12-18 months)
- WRAPS Capacity-Building Workshops (held 2-3 time per year)
- Source Water Protection (partnership with Kansas Rural Water Association)
- Local Environmental Protection regional meetings and KDHE email distribution to LEPP contacts USDA State Technical Committee and subcommittees (meet as needed for recommending program guidance and priorities)
- State Conservation Commission and Kansas Association of Conservation Districts regional workshops and annual conference
- KDHE – email distribution to WRAPS Project Coordinators
- Participation and presentations at meetings and conferences of statewide organizations, such as:
  - Kansas Environmental Health Association

- Kansas Small Flows Association
- State Association of Kansas Watersheds
- Kansas Rural Water Association
- Kansas Association of Conservation Districts
- Kansas Alliance for Wetlands and Streams
- Kansas Association for Conservation and Environmental Education

**Table 2.3 KDHE 319 Program Sponsoring Organizations (2000-2010)**

Allen County Conservation District (CCD)	Great Plains Foundation	Mid-America Regional Council
Andale Chamber of Commerce	Greenwood CCD	Missouri River Relief
Andale High School	Grouse–Silver Creek Watershed Dist.	NE Kansas Environmental Services
Anderson CCD	Harper County Health Department	Nemaha CCD
Arkansas River Coalition	Hillsdale Water Quality Project Inc.	Norton CCD
Atchison CCD	Jackson CCD	No-Till on the Plains, Inc.
Blue River Watershed Association	Jefferson CCD	Osage CCD
Boy Scouts of America	Jefferson County North High School	Osage Valley RC&D
Brown CCD	Jewell CCD	Ottawa Co. Rural Water District No. 2
Bourbon CCD	Johnson County Parks & Recreation Dept	Pheasants Forever
Butler County Community College	Johnson County Stormwater Mgmt	Philips CCD
Butler CCD	KACEE	Pittsburg State University
Central Prairie Resource Conservation and Development (RC&D)	Kansas Ag Network	Post Rock Rural Water District
Cherokee County Health Department	KS Alliance for Wetlands & Streams	Reno CCD
City of Abilene	Kansas Biological Survey	Reno County Health Department
City of Fairway	Kansas Crossroads RC&D	Riley CCD
City of Ft. Scott	Kansas Dairy Association	Rooks CCD
City of Horton	Kansas Geological Survey	Royal Valley Elementary School
City of Kinsley	Kansas Radio Networks	Rush County CCD
City of Lawrence	Kansas Rural Center	Russell County Extension Office
City of Lenexa	Kansas Small Flows Association	Sedgwick County Dept of Environmental Health
City of Mission Hills	Kansas State Conservation Commission	Seward County Planning and Zoning
City of Neodesha	Kaw Valley Heritage Alliance	See-Kan RC&D
City of Olathe	KFRM Radio	Shawnee CCD
City of Pretty Prairie	Kansas State University	Sheridan CCD
City of Spring Hill	KU Center for Research	Smoky Hills RC&D Area Inc.
City of Wichita	Lake Region RC&D	Solomon Valley RC&D
Clay CCD	Leavenworth County Board of County Commissioners	St. Pauls United Methodist Church
Coffey CCD	Leavenworth CCD	Sumner CCD
Cowley CCD	Leavenworth County	Sunflower Land Trust
Douglas CCD	Linn CCD	Sunflower RC&D
Douglas County Extension Council	Logan CCD	Thomas CCD
Ellsworth CCD	Lyon CCD	Topeka Round Up
Extension Education Foundation, Inc.	Marmaton Joint Watershed District	Topeka USD 501 Public Schools
Flint Hills RC&D	Marion CCD	Twin Lakes Water Quality Project
Ford CCD	Marshal CCD	Wabaunsee CCD
Fort Scott Community College	McPherson CCD	Washington CCD
Franklin CCD	McPherson County Extension	Whispering Hills Homeowners Assoc
Friends of the KAW	Miami County CCD	Wichita State University
Glacial Hills RC&D	Miami County Extension Council	Wilson CCD
Graham CCD	Mid-America Ag Network	Wood Recycle & Composting Center
Gray CCD		Wyandotte CCD



## CHAPTER THREE STRATEGIC PLAN FOR NPS MANAGEMENT

NPS management in Kansas utilizes a partnership approach that relies on active participation from local, state and federal agencies, organizations and individuals. Priorities are set at both the local and state level and multiple programs are used to address these priorities in a coordinated manner.

### Nonpoint Source Pollution Long-Term Management Goals

Kansas has established the following long-term goals for NPS Management:

1. No lake, river, stream or wetland has a violation of Kansas Surface Water Quality Standards due to nonpoint sources of pollutants and all designated uses are fully supported;
2. Kansas surface and ground water are protected from all nonpoint pollutant sources through the use of recommended water quality best management practices;
3. *Kansas Water Plan* objectives are achieved by:
  - a. Reducing the levels of pathogens, biochemical oxygen demand, dissolved solids, metals, nutrients, pesticides and sediment that adversely affect the water quality of Kansas lakes, rivers, streams and wetlands
  - b. Reducing the levels of dissolved solids, metals, nitrates and volatile organic chemicals that adversely affect the quality of Kansas ground water
  - c. Maintaining water quality conditions for unimpaired waters at a level equal to or better than existing conditions

The following priorities will be considered in the implementation of NPS programs utilized to achieve the long-term goals:

### State NPS Priorities

- 1) Restoration of high priority TMDL watersheds
- 2) Protection of public water supply watersheds and wellhead capture zones used for public water supply
- 3) Protection of high value water bodies designated for special aquatic life uses, exceptional state waters, outstanding national resource waters
- 4) Restoration and protection of high priority wetlands and riparian areas
- 5) Restoration and protection of watersheds with interstate significance

### Guiding Principles

The following guiding principles will be utilized in implementing strategies to achieve NPS management goals and objectives:

- *Utilize a watershed approach for restoring and protecting water resources that engages stakeholders within the affected watersheds and that transcends political boundaries, both intrastate and interstate;*
- *Integrate the management of surface and ground water to achieve comprehensive environmental protection and restoration, including full support of designated uses of water;*
- *Target financial and technical resources to priority watersheds for restoration of impaired waters and protection of high value waters;*

- *Protect public water supplies, surface and ground water, through the development and implementation of source water protection plans;*
- *Encourage proper management of wetlands, riparian corridors, floodplains, natural areas and other green infrastructure resources in urban and rural watersheds to help achieve and maintain properly functioning watersheds;*
- *Promote voluntary, locally-led, incentive-based strategies to address NPS issues while ensuring that regulatory requirements are adhered to when applicable;*
- *Establish and strengthen partnerships among stakeholders at local, state and federal levels that play a role in the management of NPS pollution sources;*

The Kansas NPS Management Strategy embodies a two-prong approach for addressing NPS pollution. Figure 3.1 (page 43) outlines this approach consisting of a Base NPS Component and a Targeted NPS Component.

### **Base NPS Program Component**

The base component consists of a statewide interagency infrastructure to address nonpoint source pollution issues through locally administered plans and programs. Key elements of this component include:

**Local NPS Management Plans.** All conservation districts in Kansas have developed a state-approved Local NPS Management Plan that guides the implementation of NPS water quality BMPs within their respective counties. The conservation districts determine the specific practices available for funding and the level of financial assistance available to producers based on state and local NPS priorities outlined in their Local NPS Management Plans. The primary funding source for BMP implementation is provided through the SCC's Nonpoint Source Pollution Control Program. Other SCC and USDA cost-share programs administered through the conservation districts and local USDA field offices also provide funding for implementation of BMPs that address local NPS goals and objectives.

**Local Environmental Protection Plans.** Currently local environmental protection plans are being implemented in 104 counties by county health departments or other multi-county organizations with authority to address local environmental/health issues. This includes the adoption, implementation and enforcement of county sanitary/environmental codes for on-site wastewater systems and private water wells, providing information education and technical assistance, and coordination of a local environmental protection committee. Additional issues are also addressed through local environmental protection plans such as subdivision water and wastewater, public water supply protection, solid waste management, hazardous waste management, and participation in other NPS management activities. These groups receive support through the Local Environmental Protection Program administered by KDHE.

**Local Water Quality Protection Plans.** These plans are developed on a project by project basis to address potential NPS pollution issues associated with specific urban or rural projects or activities. Specific best management practices are identified to address potential pollution

concerns. A template for development of a local water quality protection plan is provided at: [www.kdheks.gov/nps/resources/nwpwqppfrm.pdf](http://www.kdheks.gov/nps/resources/nwpwqppfrm.pdf).

**Information, Education and Technical Assistance Programs.** Water quality information and education programs are funded across the state through a variety of local, state and federal programs and outreach efforts. These programs are essential in developing an informed and knowledgeable citizenry that understands the importance of restoring and protecting our water resources for current and future generations. In addition local agencies such as conservation districts, NRCS field offices, local environmental protection offices, county extension offices and KDHE district offices provide technical assistance for implementing a wide variety of water quality BMPs.

**Integration with Existing Plans and Programs.** A variety of local, state and federal plans and programs can be utilized to address NPS issues across the state. Figure 3.1 shows some of the applicable plans and programs. Integration of water quality protection considerations early in ongoing land use planning, management and development processes can help ensure that impacts to water bodies are avoided or minimized.

### **2015 Goals, Objectives and Strategies**

The following short-term goals, objectives and strategies will be utilized for the Base Program Component to achieve progress toward attainment of the NPS Long-Term Management Goals. Timeframes indicated are for state fiscal years (July 1 through June 30).

A. **2015 Goal:** Support local and state institutional capacity to address NPS issues and priorities.

#### **Objectives**

1. Maintain base funding and technical assistance for implementation of BMPs through local, state and federally funded NPS related programs administered through local, state and federal agencies.

#### **Strategies**

- a. Coordinate with state agencies through the State Water Planning Process to maintain State Water Plan funding for nonpoint source pollution control programs administered through the SCC, and the KDHE (FY 2011-2016).
- b. Participate on the Kansas Technical Committee and work with NRCS and FSA to ensure federal funding is being directed to address NPS priority issues to the extent possible through applicable federal programs such as EQIP and CRP (FY 2011-2016).
- c. Support the development of water quality protection plans and implementation of water quality BMPs for activities and projects not addressed through other programs that could adversely affect water quality (FY 2011-2016).
- d. Utilize the 401 Water Quality Certification process where applicable to address potential NPS issues for specific projects and develop local water quality protection plans when applicable (FY 2011-2015).
- e. Promote better integration of water quality protection with local land use planning and development processes to avoid or mitigate future NPS pollution problems (FY 2013-2016).

- f. Provide adequate technical assistance to implement water quality BMPs through collaborative partnerships among local, state and federal agencies and conservation organizations (implement in FY 2011-2012).
  - g. Maintain a statewide monitoring program to assess water quality conditions and determine attainment of water quality standards (FY 2011-2016).
  - h. Inform local and state decision-makers of program accomplishments through publication and dissemination of program summaries, fact sheets and other media (annually FY 2011-2016).
2. Provide adult and youth educational opportunities for multiple audiences including local citizens, community leaders, landowners, contractors and youth to develop an informed citizenry regarding water quality issues.

Strategies

- a. Support adult NPS education via the Kansas Environmental Leadership Program or similar programs for multi-disciplinary water quality training of local agency staff, basin advisory committee members, WRAPS stakeholder leadership team members, landowners, contractors and other community leaders (FY 2011-2016).
- b. Support youth education through programs that instill an understanding and appreciation for water resource protection, restoration and conservation in future generations (FY 2011-2016).
- c. Include information and education components in all local NPS plans (e.g. WRAPS, SWP, LEPP; FY 2011-2016).
- d. Coordinate with local extension and other outreach programs at the community level that address water quality education for youth and adults (FY 2011-2016).
- e. Develop and implement a statewide public relations strategy to better inform Kansas citizens about water quality issues and opportunities to address them through involvement and participation in local, state and federal water quality programs and projects (implement strategy in FY 2012).
- f. Support community efforts to recognize individuals involved in local water quality restoration and protection projects and celebrate local project successes (FY 2011-2016).
- g. Work with other water resource agencies to establish a recognition program for communities that develop and implement effective water resource management programs, including water quality restoration and protection efforts (implement FY 2013-2015).

**B. 2015 Goal:** Enhance collaboration among local, state and federal agencies and private sector organizations addressing NPS pollution.

Objectives

- 1. Improve program communication and coordination.

Strategies

- a. Continue to actively utilize existing coordination mechanisms, including (FY 2011-2016):

1. Kansas Water Planning Process
  - a. Kansas Water Authority
  - b. Basin Advisory Committees
2. USDA Kansas Technical Committee
3. KS-WRAPS Work Group and Natural Resources Sub-Cabinet
4. Other mechanisms described in Chapter 2, page 28.
- b. Expand opportunities for enhanced collaboration with NPS partner organizations:
  1. Enhance the KS-WRAPS Watershed Partnership to facilitate more interaction and dialogue with WRAPS groups and other rural and urban organizations regarding NPS and watershed related issues (FY 2011-2012).
  2. Establish more direct interaction with state agricultural, urban and environmental organizations on NPS issues and management needs at annual meetings, conferences, etc. (initiate in FY 2011-2012).
  3. Conduct biennial WRAPS conference to enhance collaboration with existing and potential NPS partners (FY 2011, 2013, 2015).
2. Improve information sharing among existing programs to track the status of NPS program implementation

Strategies

- a. Identify information needs shared by multiple agencies and organizations (FY 2011-2012).
- b. Establish a mechanism to efficiently report and share program information among interested parties (complete in FY 2012).
3. Expand funding opportunities for NPS projects through cooperation with other programs and agencies

Strategies

- a. Continue to utilize the Kansas Water Pollution Control Revolving Fund for NPS projects and explore opportunities to expand use of this program in the future (FY 2011-2016).
- b. Seek opportunities to collaborate with other agencies and organizations to leverage funding that can accomplish multiple environmental objectives, in addition to NPS pollution control, such as water and energy conservation, wildlife habitat and stormwater/flood management. (FY 2011-2013).

**C. 2015 Goal:** Develop and implement a strategy to facilitate the management of green infrastructure resources in rural and urban watersheds.

Objectives

1. Work with rural and urban partners to enhance the understanding and management of green infrastructure resources in urban and rural watersheds throughout Kansas to enhance water quality protection and achieve other environmental benefits.

### Strategies

- a. Continue to utilize the Green Project Reserve component of the Clean Water State Revolving Fund program to fund green infrastructure projects where applicable (FY 2011 – 2016).
- b. Develop an educational program on green infrastructure planning, management and project implementation to increase awareness and understanding of the importance of wetlands, riparian areas and other green infrastructure resources for water quality protection and other environmental benefits (FY 2012-2013).
- c. Work with WRAPS stakeholder leadership teams, Conservation Districts, LEPP groups and BACs to promote green infrastructure and Low Impact Development concepts in their respective communities (FY 2013-2015).
- d. Conduct a statewide assessment of green infrastructure resources, functions and values (complete in FY 2014).
- e. Prepare a comprehensive strategy for promoting protection and management of green infrastructure resources at the state and community level (complete strategy in FY 2015).

### **Targeted NPS Program Component**

Targeting of NPS practices to priority issues has been a concept promoted through both the current *Kansas NPS Pollution Management Plan* and the *Kansas Water Plan*. Targeting can address both restoration and protection efforts. The primary priorities for targeting applicable NPS plans and programs include:

#### Restoration

- TMDL watersheds designated as high priority for implementation
- Water bodies listed as impaired on the 303(d) List of Impaired Waters

#### Protection

- Source water protection areas for public water supplies including surface water intakes and wellheads
- High value resources including Special Aquatic Life Use waters, Exceptional State Waters, Outstanding National Resource Waters and high quality wetland and riparian resources in priority watersheds
- Protection oriented TMDLs and other water bodies of local or regional significance identified in WRAPS plans

Implementation of water quality protection measures to address targeted NPS priorities will be accomplished through:

1. Development of targeted NPS water quality plans including:
  - a. Watershed Restoration and Protection Strategies. WRAPS projects are stakeholder driven, watershed based projects that provide a planning and management framework to address water quality and other natural resource issues. Projects go through a process of developing a stakeholder leadership team; assessing watershed problems and opportunities and determining priority

issues; developing a watershed plan that outlines goals, objectives and strategies to address priority issues; and implementing the plan and tracking progress.

The watershed plans developed by WRAPS projects are compliant with EPA’s 9 required elements for restoration of impaired waters. A major focus of WRAPS plans is the restoration of water quality impaired water bodies and achievement of pollutant load reductions to address the specific impairments. A map of the current WRAPS projects is shown in Figure 3.2 (page 44). More information on the KS-WRAPS Program and WRAPS Process is available at: [www.kswraps.org](http://www.kswraps.org).

The State of Kansas adopted this local watershed based approach in 2004 as part of the Kansas Water Planning Process to address State Water Plan priority issues. A Memorandum of Agreement was signed by the heads of the state agencies represented on the Natural Resources Subcabinet to establish the Kansas WRAPS Program. Two million dollars in annual EPA Section 319 funds and State Water Plan Funds are committed to support the WRAPS process and fund WRAPS projects in priority watersheds. An interagency work group comprised of state and federal agency representatives oversees program administration and makes annual funding recommendations to the Natural Resources Subcabinet for WRAPS projects. Agencies on the Work Group include:

<b>Kansas WRAPS Work Group</b>	
KS Dept of Agriculture	KSU Research and Extension
KS Dept of Health & Environment	KS Water Office
KS Dept of Wildlife & Parks	State Conservation Commission
KS Dept of Transportation	US Environmental Protection Agency
KS Biological Survey	USDA Natural Resources Conservation Service
KS Forest Service	USDA Farm Service Agency
KS Geological Survey	US Geological Survey

Other state and federal programs are utilized to support WRAPS project implementation of watershed plans by providing technical and financial assistance to implement water quality protection measures in priority watersheds.

- b. **Source Water Protection Plans.** These plans are focused on protection of surface and groundwater sources that provide public water supply. WRAPS plans may serve as the source water protection plan for surface water bodies – i.e. rivers and reservoirs used for public water supply or a separate source water protection plan for a specific lake may be prepared within a WRAPS watershed. Specific measures to protect public water supply wellheads are typically not addressed in a WRAPS plan and are usually addressed through a separate wellhead protection plan prepared by the public water supplier. Source water protection plans can be implemented through local, state or federal assistance programs, depending on the specific protection measures included in the plan.

2. Integration of targeted areas with existing program and plan implementation, including:

a. State Programs

- i. The SCC has been allocating a portion of the cost-share funding received from the State Water Plan Fund to high priority TMDL watersheds since SFY 2000 to implement practices and projects through county conservation district programs that address the specific NPS impairments identified in a TMDL. Conservation districts are also encouraged to consider TMDLs in prioritizing practices and projects for their base funding allocations. The primary SCC programs used for targeting HP TMDLs include the Nonpoint Source Pollution Control Fund, the Water Resources Cost-Share Program, the Water Quality Buffer Initiative and the Riparian and Wetland Protection Program.
- ii. The KDHE Livestock Management Section considers TMDLs in program activities related to land application of manure. The applicable water quality impairments are noted and implementation of manure management plans are directed as needed to ensure compliance with the applicable TMDL.

b. Federal Programs: USDA Farm Bill Programs, USGS and other applicable federal programs

TMDLs and other state water quality restoration and protection priorities are included as factors in the ranking criteria for funding applications for USDA Farm Bill Programs, primarily the Environmental Water Quality Incentives Programs (EQIP). State water quality priority areas were also considered in selecting Conservation Priority Areas for the Conservation Reserve Program.

Other federal agencies such as the U.S. Geological Survey conduct a number of assessment and monitoring studies addressing TMDLs and other water quality issues through cooperative agreements with state and local partners. The Kansas Water Resources Institute (KWRI - [www.kcare.ksu.edu/DesktopDefault.aspx?tabid=763](http://www.kcare.ksu.edu/DesktopDefault.aspx?tabid=763)), funded in part through the USGS, provides funding for research and other activities that support water quality and related issues. KWRI provided leadership on the development of a series of white papers addressing reservoir sedimentation issues, including water quality topics.

c. Local Programs: Conservation District NPS Programs, LEPPs, nutrient management plans, watershed district programs, urban stormwater programs, city and county comprehensive plans and other applicable local programs.

A number of locally developed plans and programs can be utilized to address TMDLs and restoration of impaired water bodies. Local NPS Management Plans developed by county conservation districts and Local Environmental Protection Plans developed by Local Environmental Protection groups are examples of local plans and programs that can be utilized to target resources to priority water

quality watersheds. In addition, many city and county programs addressing land use and stormwater management also provide opportunities to address priority watersheds. Nutrient management plans for handling manure applications from livestock facilities and local watershed district programs that promote water quality projects are also examples of local mechanisms that can be used to address water quality restoration in targeted watersheds.

### 3. Water Quality Monitoring

- a. Targeted Subwatershed Monitoring. A select number of priority subwatersheds identified in WRAPS 9 element plans will be monitored to assess water quality improvements resulting from targeted implementation of water quality protection measures. These monitoring activities will be accomplished through KDHE's Bureau of Environmental Field Services and WRAPS service providers in selected WRAPS watersheds. Additional monitoring of other priority WRAPS subwatersheds will also be accomplished utilizing various service providers.
- b. KDHE Water Quality Monitoring Network. The State Water Quality Monitoring Network is used for the tracking water quality improvements in impaired water bodies for 303(d) delisting purposes. Water bodies achieving standards are removed from the Impaired Waters List. Achievement of water quality protection goals will also be determined via this network through maintenance of water quality conditions. Additional listing of water bodies on the 303(d) list may also occur in the future where water quality data indicates impairment of designated uses.

### **2015 Goals, Objectives and Strategies**

The following short-term goals, objectives and strategies will be utilized for the Targeted Program Component to achieve progress toward attainment of the NPS Long-Term Management Goals. Timeframes indicated are for state fiscal years (July 1 through June 30).

#### Restoration

- D. **2015 Goal:** Reduce pollutant loads in high priority TMDL watersheds through the implementation of BMPs and increase the number of water bodies meeting surface water quality standards.

#### Objectives

1. Enhance targeting of state and federal programs that provide technical and financial assistance for the implementation of BMPs to high priority TMDL watersheds.

#### Strategies

- a. Utilize the Kansas Water Planning process to provide guidance to State Water Plan funded programs to enhance targeting of TMDL high priority watersheds and critical restoration subwatersheds identified in WRAPS plans (FY 2011- 2016).

- b. Actively participate on the Kansas Technical Committee and water quality related subcommittees to establish program priorities and ranking criteria that target applicable federal water quality programs to high priority TMDL watersheds and critical restoration subwatersheds identified in WRAPS plans (FY 2011-2016).
  - c. Utilize the KS-WRAPS Work Group, Watershed Partnership and Natural Resources Sub-Cabinet to enhance program coordination to address TMDL priorities through applicable state programs (FY 2011-2015).
  - d. Support the implementation of WRAPS projects that address high priority TMDL watersheds (FY 2011-2016).
  - e. Develop an inventory of NPS BMP needs in high priority TMDL and WRAPS watersheds and high value protection watersheds (FY 2012-2013).
  - f. Support targeted TMDL implementation efforts through Conservation District, LEPP, and other applicable programs (FY 2011-2016).
2. Work with WRAPS SLTs to ensure that existing WRAPS Projects address high priority TMDLs.

Strategies

- a. Provide technical and financial resources to WRAPS projects that address high priority TMDLs (FY 2011-2016).
- b. Provide technical and financial resource to WRAPS projects for implementation of BMPs as outlined in 9 element watershed plans (FY 2011-2016).

- E. **2015 Goal:** Reduce pollutant loads in state priority watersheds through targeted implementation of BMPs identified in WRAPS 9 element watershed plans.

Objective

1. Work with WRAPS SLTs to develop and implement 9-element watershed plans for WRAPS projects to facilitate BMP implementation in high priority TMDL watersheds and restore impaired waters.

Strategies

- a. Develop 9-element watershed plans for WRAPS watersheds that target implementation of BMPs to high priority TMDL watersheds and other priority water quality restoration and protection needs.
  - i. Provide guidance to WRAPS groups on meeting the 9-element requirements (FY 2011-2012).
  - ii. Integrate WRAPS project implementation with TMDL planning and evaluation (FY 2011-2013).
  - iii. Provide technical support where needed to update existing WRAPS watershed plans to incorporate the required 9-elements for restoring impaired waters (complete in FY 2013)
  - iv. Ensure all new WRAPS watershed plans that address impaired waters meet EPA's 9 required elements (FY 2011-2016).
  - v. Continue to build organizational capacity of WRAPS groups through workshops and other capacity-building mechanisms (FY 2011-2016).

- vi. Target technical and financial assistance to implement BMPs in priority subwatersheds identified in 9-element watershed plans (FY 2011-2016).
  - vii. Enhance funding through the State Water Planning Process for WRAPS BMP implementation projects in high priority subwatersheds identified in WRAPS plans (FY 2011-2014).
  - viii. Track progress of water quality improvements in priority subwatersheds through targeted monitoring programs for WRAPS watersheds (initiate in FY 2011).
  - ix. Celebrate Success Stories in watersheds where impaired waters have been restored (FY 2011-2016).
- b. Revise WRAPS scoring matrix to ensure that the highest priority watershed projects are being addressed with available technical and financial resources (FY 2011-2012).
  - c. Encourage WRAPS stakeholder leadership teams to address source water and wellhead protection, habitat restoration and protection, urban stormwater and other watershed management concerns where applicable through collaborative, inter-jurisdictional watershed planning and coordination (FY 2012-2016).

#### Protection

- F. **2015 Goal:** Target the implementation of BMPs in urban and rural watersheds to prevent the occurrence of pollution problems affecting high quality water bodies and watersheds to avoid future impairment of state waters.

#### Objectives

- 1. Protect high value water bodies identified as Exceptional State Waters, Outstanding National Resources Waters and Special Aquatic Life Waters in the Kansas Surface Water Quality Standards.
- 2. Protect high priority wetland and riparian areas and other high value watershed resources, including water quality reference streams, in priority restoration and protection watersheds.

#### Strategies

- a. Work with WRAPS groups and other organizations to implement a Healthy Watershed Initiative Grant to explore opportunities and mechanisms to protect high value watersheds (FY 2011-2012).
- b. Continue interagency support for wetland and riparian area protection including inventory, assessment, prioritization and planning projects through EPA's Wetland Development Grants and other funding programs (FY 2011-2015).
- c. Work with WRAPS projects to incorporate protection of high value water bodies and wetland and riparian resources in 9 element watershed plans (FY 2013-2016).
- d. Work with agencies and stakeholder groups to implement the wetland and riparian protection policy subsection of the *Kansas Water Plan* including the identification of priority wetland and riparian areas (2012-2015).
- e. Develop a state strategy for protection of high value watersheds through the State Water Planning Process (FY 2015-2016).

- G. **2015 Goal:** Implement statewide pollutant-specific strategies to reduce sediment and nutrients originating from nonpoint sources of pollution.

Objectives

1. Achieve reductions in total nitrogen and total phosphorus loads in priority water bodies as outlined in the *Kansas Surface Water Nutrient Reduction Plan*.
2. Reduce sediment loading to streams in priority watersheds to address high priority TMDLs and reduce sediment loading in public water supply reservoirs.

Strategies

- a. Develop and implement pollutant specific strategies for sediment and nutrients to restore impaired waters and protect public water supplies through the Kansas Water Planning Process (FY 2011-2013).
  - i. Utilize the goals and approach outlined in the *Kansas Surface Water Nutrient Reduction Plan* and *Kansas Water Plan* basin sections to guide the implementation of BMPs that address nutrients contributed from nonpoint sources
  - ii. Work collaboratively with agencies and stakeholder groups in Kansas and in neighboring states to facilitate implementation of the strategies developed
  - iii. Work collaboratively with the agencies involved in the *Kansas Water Plan* Reservoir Sustainability Initiative, Reservoir Roadmap and Sediment Baseline Study to develop and implement sediment management strategies in priority reservoir watersheds
- b. Integrate pollutant-specific strategies with ongoing programs including the KDHE WRAPS/319 program, SCC cost-share programs, NRCS EQIP and other applicable programs to facilitate implementation (FY 2013-2015).

- H. **2015 Goal:** Increase protection of public water supply sources through the implementation of source water protection plans, either as an integrated part of a WRAPS watershed plan or an independent source water protection plan.

Objectives

1. Work with local public water suppliers to complete and initiate implementation of 10 source water protection plans annually.

Strategies

- a. Work cooperatively with the Kansas Rural Water Association and other organizations to provide planning support and technical assistance to local public water suppliers to develop source water protection plans (FY 2011-2016).
- b. Enhance outreach to public water suppliers to actively participate in applicable WRAPS projects or develop a source water protection plan if supply is not addressed through a WRAPS project (FY 2012-2013).
- c. Work with WRAPS projects to facilitate source water protection plan development and implementation within WRAPS watersheds (FY 2013-2015).

2. Demonstrate progress in implementation of all approved source water protection plans.

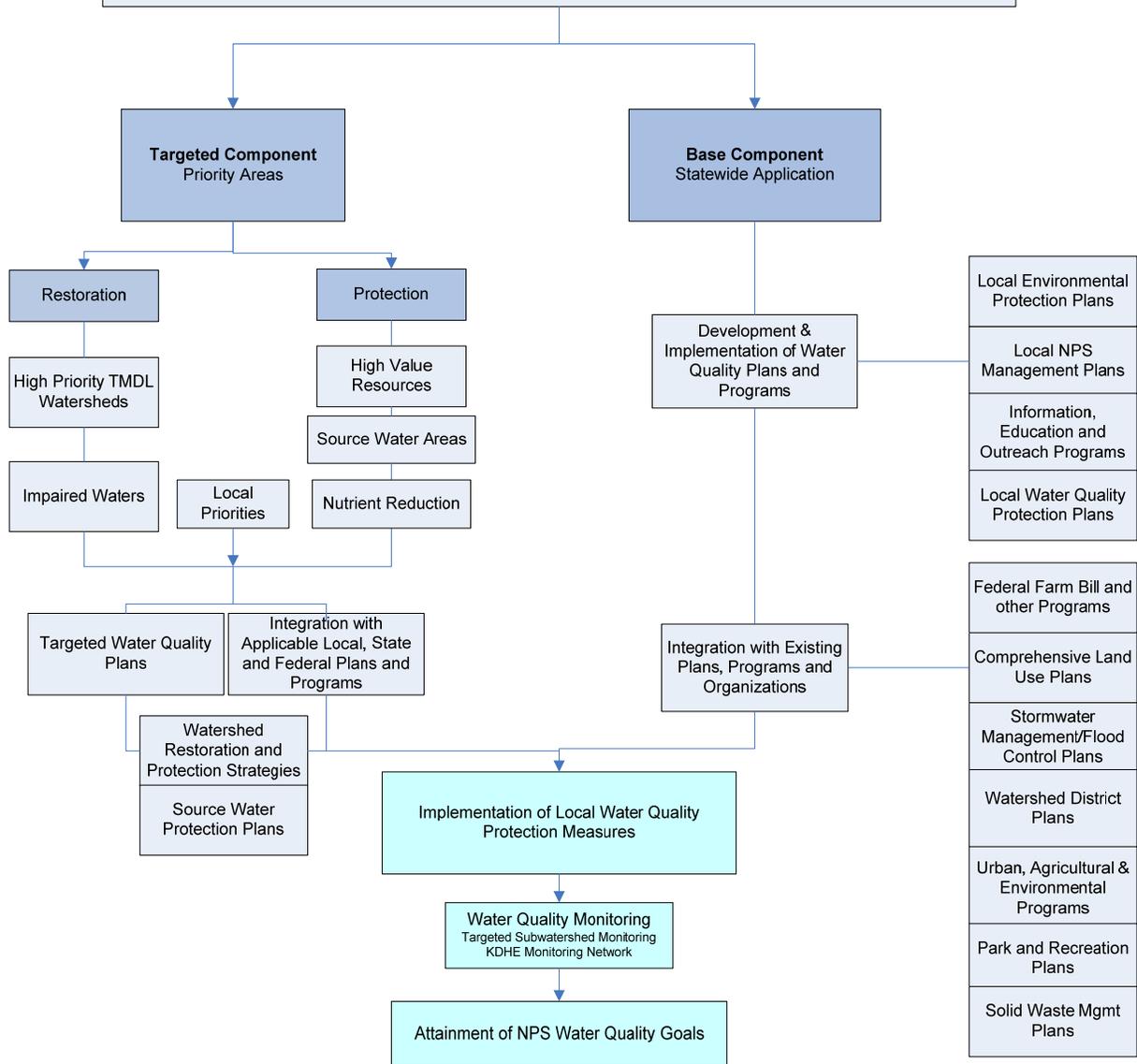
Strategies

- a. Develop and maintain a system to effectively track progress in plan implementation (develop system in FY 2012; maintain through 2016).
- b. Work with the KDHE Public Water Supply Section's Capacity Development Program and other entities to explore potential funding opportunities for enhanced implementation of approved source water protection plans (FY 2012-2014).

**Figure 3.1  
Kansas Nonpoint Source Pollution Management Strategy  
2010**

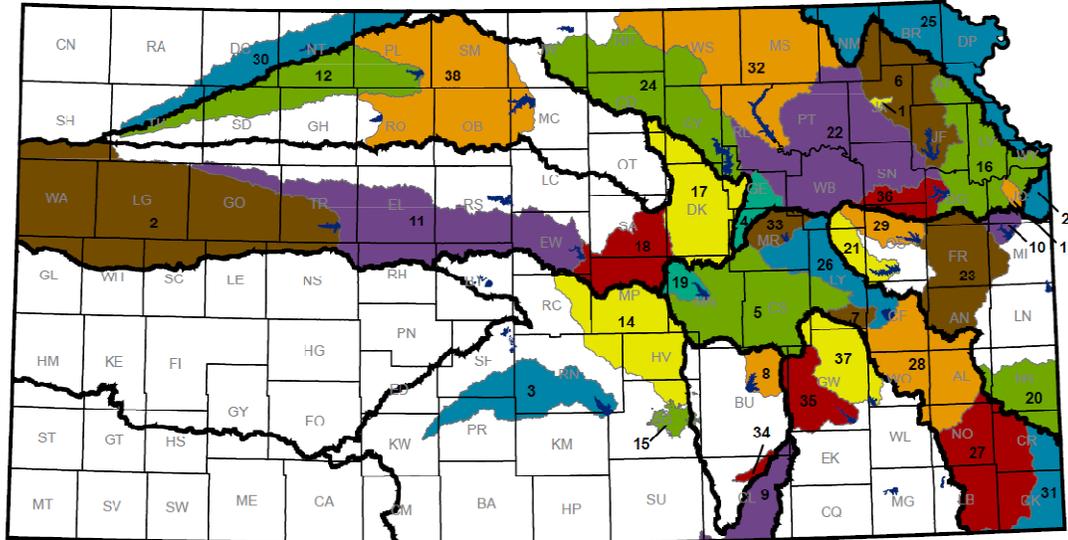
**Long Term Goals**

1. *No lake, stream or wetland has a violation of Kansas Water Quality Standards due to nonpoint sources of pollutants.*
2. *Kansas surface and ground water are protected from all nonpoint pollutant sources through the use of recommended water quality protection measures.*
3. *By 2015, support achievement of the Kansas Water Plan water quality objectives:*
  - a. *Reduce the levels of bacteria, biochemical oxygen demand, dissolved solids, metals, nutrients, pesticides and sediment that adversely affect the water quality of Kansas lakes and streams.*
  - b. *Reduce the levels of dissolved solids, metals, nitrates, pesticides and volatile organic chemicals that adversely affect the quality of Kansas groundwater.*
  - c. *Maintain water quality conditions at a level equal to or better than conditions seen in the past.*



**Figure 3.2**

**Kansas WRAPS Projects**  
Stakeholder Leadership Team Areas  
as of January 2011



**Project Key and Contact Information**



- |  |   |  |  |
|--|---|--|--|
| <p><b>1</b> Banner Creek<br/>Contact: Roberta Spencer<br/>Jackson Co. Conservation Dist.<br/>785.364.4638</p>  | <p><b>11</b> Kanopolis Lake: Big Creek,<br/>Middle Smoky Hill River<br/>Contact: Stacie Minson<br/>Kansas State University<br/>785.769.3297</p> | <p><b>20</b> Marmaton River Watershed<br/>Contact: Kara Niemiec<br/>Marmaton Joint Watershed<br/>District No. 102<br/>620.756.1000</p> | <p><b>29</b> Pomona Lake<br/>Contact: Lori Kuykendall<br/>Osage Co. Conservation Dist.<br/>785.828.3458</p>                    |
| <p><b>2</b> Cedar Bluff<br/>Contact: Darla Juhl<br/>Smoky Hills RC&amp;D<br/>785.425.6647</p>                  | <p><b>12</b> Kirwin<br/>Contact: Teresa Webb<br/>Solomon Valley RC&amp;D<br/>785.425.6647</p>   | <p><b>21</b> Melvern Lake<br/>Contact: Paul Ingle<br/>Flint Hills RC&amp;D<br/>785.640.2645</p>  | <p><b>30</b> Prairie Dog Creek<br/>Contact: Twila Dizmgang<br/>Norton Co. Conservation Dist.<br/>785.877.2623 ext 40</p>       |
| <p><b>3</b> Cheney Lake<br/>Contact: Lisa French<br/>Reno Co. Conservation Dist.<br/>620.665.0231</p>          | <p><b>13</b> Lake Olathe<br/>Contact: Rebecca Bilderback<br/>City of Olathe<br/>913.971.9116</p>  | <p><b>22</b> Middle Kansas Watershed<br/>Contact: Rick Davis<br/>Kansas Alliance for<br/>Wetlands &amp; Streams<br/>785.233.5632</p>   | <p><b>31</b> Spring River Watershed<br/>Contact: Jessica Gordon<br/>See-Kan RC&amp;D<br/>620.431.6180</p>                      |
| <p><b>4</b> Clarks Creek<br/>Contact: Angela Beavers<br/>Flint Hills RC&amp;D<br/>785.210.4338</p>             | <p><b>14</b> Little Arkansas Watershed<br/>Contact: Ron Graber<br/>Kansas State Extension<br/>316.722.7721</p>                                  | <p><b>23</b> Middle Marais des Cygnes<br/>Contact: Rick Porter<br/>Lake Region RC&amp;D<br/>785.242.2073</p>                           | <p><b>32</b> Tuttle Creek Lake<br/>Contact: Barbara Donovan<br/>Glacial Hills RC&amp;D<br/>785.337.2314</p>                    |
| <p><b>5</b> Cottonwood Watershed<br/>Contact: Robert Wilson<br/>Kansas State University<br/>785.532.7823</p>   | <p><b>15</b> Lower Arkansas River<br/>Contact: Scott Lindebak<br/>City of Wichita, Stormwater<br/>316.268.4545</p>                              | <p><b>24</b> Milford Lake<br/>Contact: Robert Wilson<br/>Kansas State University<br/>785.532.7823</p>                                  | <p><b>33</b> Twin Lakes<br/>Contact: Angela Beavers<br/>Flint Hills RC&amp;D<br/>785.210.2338</p>                              |
| <p><b>6</b> Delaware River<br/>Contact: Marlene Bosworth<br/>Glacial Hills RC&amp;D<br/>785.284.0080</p>       | <p><b>16</b> Lower Kansas<br/>Contact: Rick Davis<br/>Kansas Alliance for<br/>Wetlands &amp; Streams<br/>785.233.5632</p>                       | <p><b>25</b> Missouri River<br/>Contact: Carl Johnson<br/>Glacial Hills RC&amp;D<br/>913.991.7942</p>                                  | <p><b>34</b> Upper Timba Creek<br/>Contact: Ron Graber<br/>Kansas State Extension<br/>316.722.7721</p>                         |
| <p><b>7</b> Eagle Creek<br/>Contact: Scott Jones<br/>Flint Hills RC&amp;D<br/>620.343.3570</p>                 | <p><b>17</b> Lower Smoky Hill, Lower<br/>Contact: Janet Meyer<br/>Dickinson Co. Department<br/>of Environmental Services<br/>785.263.4780</p>   | <p><b>26</b> Neosho Headwaters<br/>Contact: Paul Ingle<br/>Flint Hills RC&amp;D<br/>785.640.2645</p>                                   | <p><b>35</b> Upper Fall River<br/>Contact: Bernie Obermeyer<br/>Flint Hills RC&amp;D<br/>620.583.6461</p>                      |
| <p><b>8</b> El Dorado Lake<br/>Contact: Sandy Koozts<br/>Butler Co. Conservation Dist.<br/>316.320.5891</p>    | <p><b>18</b> Lower Smoky Hill, Upper<br/>Contact: Ron Graber<br/>Kansas State Extension<br/>316.722.7721</p>                                    | <p><b>27</b> Neosho, Middle<br/>Contact: Doug Dlex<br/>Kansas Alliance for<br/>Wetlands &amp; Streams<br/>620.289.4663</p>             | <p><b>36</b> Upper Wakarusa<br/>Contact: Tom Hanzinger<br/>Kansas Alliance for<br/>Wetlands &amp; Streams<br/>785.766.6717</p> |
| <p><b>9</b> Grouse-Silver Creek<br/>Contact: Jennifer Carr<br/>Watershed District No. 92<br/>620.221.1850</p>  | <p><b>19</b> Marion Lake<br/>Contact: Peggy Blackman<br/>Flint Hills RC&amp;D<br/>620.382.2541</p>  | <p><b>28</b> Neosho, Upper<br/>Contact: Robert Wilson<br/>Kansas State University<br/>785.532.7823</p>                                 | <p><b>37</b> Upper Verdigris, Toronto Lake<br/>Contact: Bernie Obermeyer<br/>Flint Hills RC&amp;D<br/>620.767.5111</p>         |
| <p><b>10</b> Hillsdale Lake<br/>Contact: Gale Salzman<br/>Hillsdale Water Quality Project<br/>913.829.9414</p> |   |  | <p><b>38</b> Waconda<br/>Contact: Teresa Webb<br/>Solomon Valley RC&amp;D<br/>785.425.6647</p>                                 |



Map produced by  
Kansas Department of Health & Environment - Bureau of Water, Watershed Management  
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**CHAPTER FOUR  
NONPOINT SOURCE PROGRAM MANAGEMENT  
AND ADMINISTRATION**

**Measuring Progress**

The following indicators will be utilized to measure success in NPS program management. Annual or interim goals and 2015 milestones are listed for each indicator. Interim goals and milestones will be measured on a state fiscal year basis (June 30 – July 1). 2015 milestones indicate program status as of June 30, 2016.

A summary schedule of 2015 goals, objectives, strategies and program indicators is provided on pages 50-53.

Program Indicators

- A. Amount of state and federal BMP funding spent in WRAPS priority subwatersheds identified in 9 element watershed plans
  - i. Interim goal – establish baseline in FY 2011(July 1, 2010-June 30, 2011)
  - ii. 2015 goal – increase by 25% from FY 2011 baseline funding
- B. Amount of estimated pollutant load reductions achieved for sediment, phosphorus and nitrogen from state and federal funded BMPs in high priority TMDL and WRAPS watersheds, including priority subwatersheds
  - i. Interim goal: increase load reductions for all pollutants by 5% annually from SFY 2011 baseline in high priority TMDL watersheds and priority WRAPS subwatersheds
  - ii. 2015 milestone: increase load reductions in high priority TMDL watersheds and priority WRAPS subwatersheds by 25% from FY2011 baseline
- C. Number of 9 element watershed plans and source water protection plans approved
  - i. Interim goal: 1) All WRAPS projects active in 2010 that address TMDL watersheds will have approved plans by end of FY 2012 (June 30, 2012), 2) Ten source water protection plans approved each beginning in FY 2012
  - ii. 2015 milestone: 1) All WRAPS projects with approved plans are actively implementing BMPs in critical areas identified in the plans, 2) 50 additional source water protection plans approved since FY 2011
- D. Number of TMDLs developed or revised in support of WRAPS 9 element plans
  - i. Interim goal: develop/revise 5 TMDLs annually
  - ii. 2015 milestone: Complete development or revision of 20 TMDLs
- E. Number of priority subwatersheds identified in 9 element plans showing water quality improvement based on water quality milestones identified in the watershed plans
  - i. Interim goal: Initiate targeted monitoring in priority subwatersheds to establish baseline conditions (FY 2011-2012)
  - ii. 2015 milestone: Characterize baseline conditions and establish timeframe for subsequent monitoring following BMP implementation in initial subwatersheds

- iii. Establish second suite of priority subwatersheds for monitoring before SFY 2014
- F. Number of HUC-12 subwatersheds containing previously impaired water bodies that now show water quality improvement as a result of watershed-based implementation of TMDLs and WRAPS.
  - i. Interim goal: By April 1, 2012 (submission date of 2012 303(d) list), five HUC-12 subwatersheds will have been identified as having improved water quality since 2002.
  - ii. 2015 milestone: A total of eight-to-ten HUC-12 sub-watersheds will have been identified to EPA as having improved water quality since 2002.
- G. Number of impaired waters removed from the impaired waters list due to WRAPS/NPS implementation
  - i. Interim goal: remove one water body from impaired waters list
  - ii. 2015 milestone: remove all 2002 impairments from five streams or lakes from 2014 impaired waters list
- H. Reductions in nutrient loads leaving Kansas
  - i. Interim goal: Establish baseline of load reductions from BMP implementation in FY 2011 for the following HUC 8 watersheds (see Figure 4.1):
    - Tarkio-Wolf (HUC 10240005)
    - South Fork Big Nemaha (10240007)
    - Big Nemaha (10240007)
    - Middle and Lower Kansas Rivers (HUCs 10270102 and 10270104)
    - Upper Marais des Cygnes (HUCs 10290101)
    - Big Creek (HUC 10260007)
    - Little Arkansas (HUC 11030012)
    - Upper Walnut (HUC 11030017)
    - Kaw Lake (Grouse Creek – HUC 11060001)
    - Upper and Middle Neosho River (HUCs 11070204 and 11070205)
    - Spring River (HUC 11070207)
  - ii. 2015 milestone: increase estimated nutrient load reductions from implementation of NPS BMPS in the selected HUC 8 watersheds by 10% or greater.
- I. Trends in water quality data for major river basins and HUC 8 watersheds with established high priority TMDLs
  - i. Interim goal: complete trend analysis for nitrogen, phosphorus, total suspended solids and bacteria in HUC 8 watersheds with high priority TMDLs in FY 2011 and on active WRAPS watersheds as of 2010
  - ii. 2015 milestone: show improving water quality trends for all twelve river basins and majority of HUC 8 TMDL watersheds with active WRAPS projects relative to trends of 1990-2010
- J. Number of Kansas citizens actively serving as SLT members for WRAPS Projects
  - i. Interim goal: establish baseline in FY 2011

- ii. 2015 milestone: increase number of active participants by 10% over FY 2011 baseline

In addition to the 2015 milestones listed above, the following mid and long term milestones will be utilized for plan evaluation. These milestones will be revisited during each 5 year review period and revised as appropriate.

<b>Short, Mid and Long Term Milestones</b>
<b>2010-2015</b> (complete by June 30, 2016)
<ul style="list-style-type: none"> <li>• Establish baseline conditions for program indicators</li> <li>• Complete approval of all existing watershed plans as 9 element compliant</li> <li>• Complete baseline sampling for initial set of WRAPS priority subwatersheds</li> <li>• Remove all 2002 NPS related impairments from five streams or lakes</li> <li>• Assess interim and 2015 progress milestones</li> <li>• Review and update plan as needed</li> </ul>
<b>2015-2030</b> (complete by June 30, 2031)
<ul style="list-style-type: none"> <li>• Show significant progress towards completion of implementation activities for all 9 element watershed plans</li> <li>• Demonstrate water quality improvement in 50% or more of the monitored priority WRAPS subwatersheds resulting from plan implementation activities</li> <li>• Show significant reduction in pollutant loadings in 50% or more of the high priority TMDL watersheds identified in the 2009 Kansas Water Plan</li> <li>• Show annual increases in funding and quantities of BMPs implemented in high priority TMDL watersheds and WRAPS priority subwatersheds</li> <li>• Remove one water body per year from the 2010 303(d) list</li> </ul>
<b>2030-2050</b> (complete by June 30, 2051)
<ul style="list-style-type: none"> <li>• Complete BMP implementation for 75% of the 9 element plans approved during 2010-2015 timeframe</li> <li>• Remove 50% or more of high priority TMDLs from 2010 303(d) list</li> </ul>

**Monitoring and Reporting Progress**

1. Water Quality Monitoring

a. WRAPS targeted monitoring program

- i. KDHE monitoring – the KDHE BEFS will conduct targeted monitoring in selected WRAPS priority subwatersheds. Monitoring will be done for a period of 5 years and then rotated to other priority subwatersheds. Follow-up monitoring will be done in subsequent years following substantive BMP implementation to assess changes in water quality conditions.
- ii. WRAPS Service Providers – Selected WRAPS projects will be considered for monitoring projects for priority subwatersheds to assess water quality changes following BMP implementation.
- iii. All monitoring projects will be conducted in accordance with Quality Assurance Plans approved by KDHE.

b. KDHE statewide monitoring program

Surface water quality data collected through the KDHE statewide monitoring program will continue to be evaluated for water quality conditions and utilized for determining compliance of classified water bodies with Kansas Surface Water Quality Standards.

c. Partner Agency Monitoring

Water quality data and studies performed by other agencies will be utilized to help assess water quality conditions and changes in priority watersheds when available to assist with evaluation of BMP implementation.

2. Reporting

- a. BMP Reporting – quantities and types of BMP projects will be reported using the SCC and KDHE’s online reporting systems (see NPS Program Administration). Load reduction estimates will be calculated and entered into the EPA Grant Reporting and Tracking System (GRTS). Efforts will be made to also work with USDA agencies to capture other BMPs funded through Farm Bill Programs for high priority TMDL watersheds and WRAPS watersheds.
- b. Water Quality Reporting – Annual progress reports will be compiled for all targeted water quality monitoring projects in priority WRAPS subwatersheds funded with WRAPS/319 funding. A standard template will be developed for reporting of project monitoring data and data will be made available.
- c. All WRAPS and 319 grant projects will be required to submit a final project report for KDHE approval.
- d. Annual 319 Program Reports required by EPA will be compiled by KDHE and submitted to EPA in accordance with the grant reporting timelines.

**NPS Program Administration**

An annual work program and workplan will be submitted to EPA for utilization of CWA Section 319 funding. The annual workplan will outline the specific components of the Kansas NPS Pollution Management Plan to be accomplished during that year. Adjustments to strategies and timelines may be made on a year to year basis as needed.

Applications for 319 funding will be solicited annually for subgrant projects to implement the strategies outlined in this document. Project Implementation Plans will be developed and approved for subgrant projects outlining the project objectives, tasks, deliverables and timeframes.

Federal 319 and State Water Plan funds for NPS implementation will be administered by KDHE and SCC. Both agencies utilize automated financial management systems for program administration and all accounting and financial transactions are done in accordance with State of Kansas accounting procedures and guidelines.

KDHE utilizes an online grant management system to manage NPS grant applications, project implementation plans, financial transactions and reporting requirements called the

Kansas Clean Water (KCW) system. The Kansas Clean Water System is a web-based system located at: <http://kanphix.kdhe.state.ks.us/public/kcw/> .

The State Conservation Commission utilizes an online system for contract administration and management of cost-share programs called the Cost-Share and Information Management System (CSIMS). This systems tracks allocations and expenditures of all funds contracted for implementation of NPS practices and allows for mapping of NPS projects. Additional information on this system is available at: <http://www.scc.ks.gov/node/149> .

### **Plan Evaluation and Revisions**

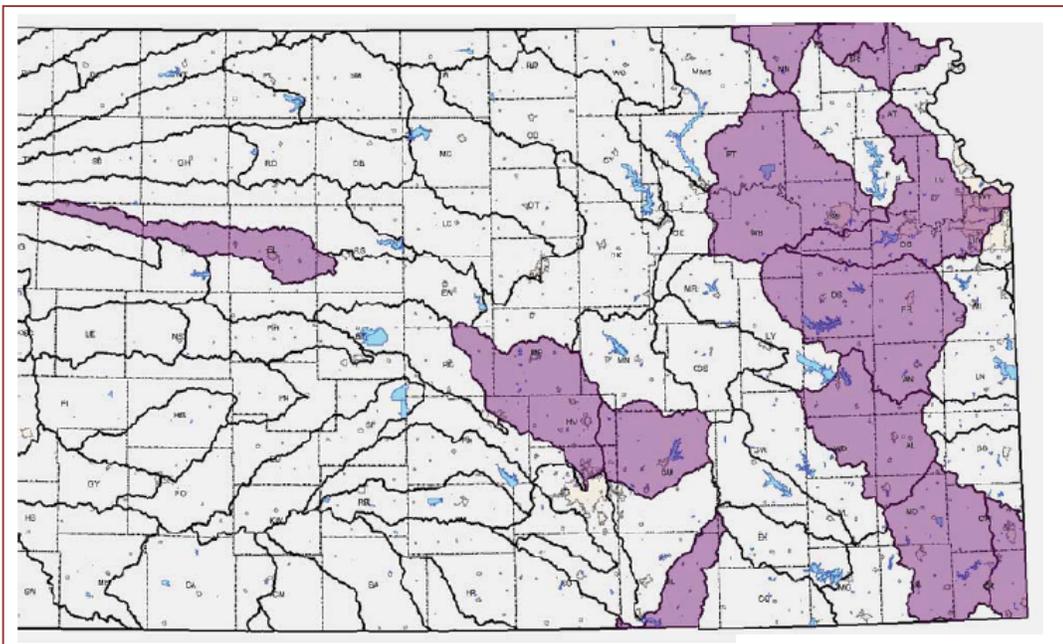
Progress in implementing the Kansas NPS Management Plan will be reviewed in 2013 by an interagency committee consisting of the following agencies:

1. Kansas Department of Health and Environment
2. State Conservation Commission
3. Kansas Water Office

The primary purpose of the review will be to consider the status of the goals, objectives and strategies outlined in the plan and identify areas that may need additional emphasis. Results of the review will be discussed with the KS-WRAPs Work Group and adjustments made as needed.

A comprehensive interagency review of the plan will be conducted in 2015 in collaboration with the KS-WRAPs Work Group and updates completed as needed. This will include a review of the 2015 Program Indicators to determine the level of program success achieved during the preceding 5 year period.

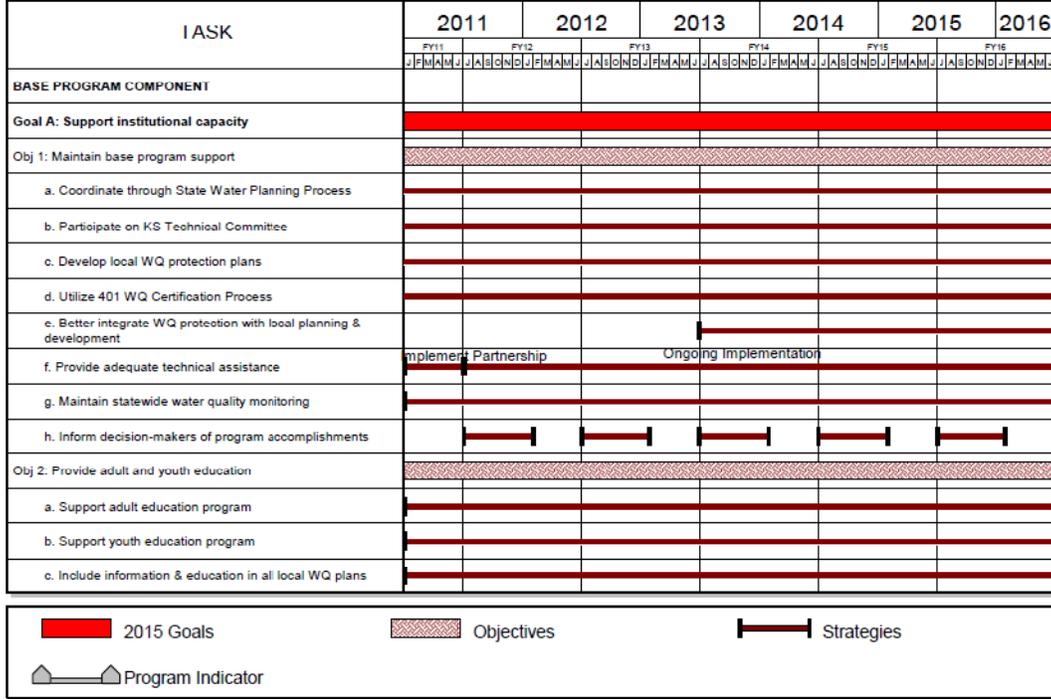
**Figure 4.1** HUC 8 Watersheds for Tracking BMP Nutrient Load Reductions



## Schedule of 2015 Goals, Objectives, Strategies and Program Indicators

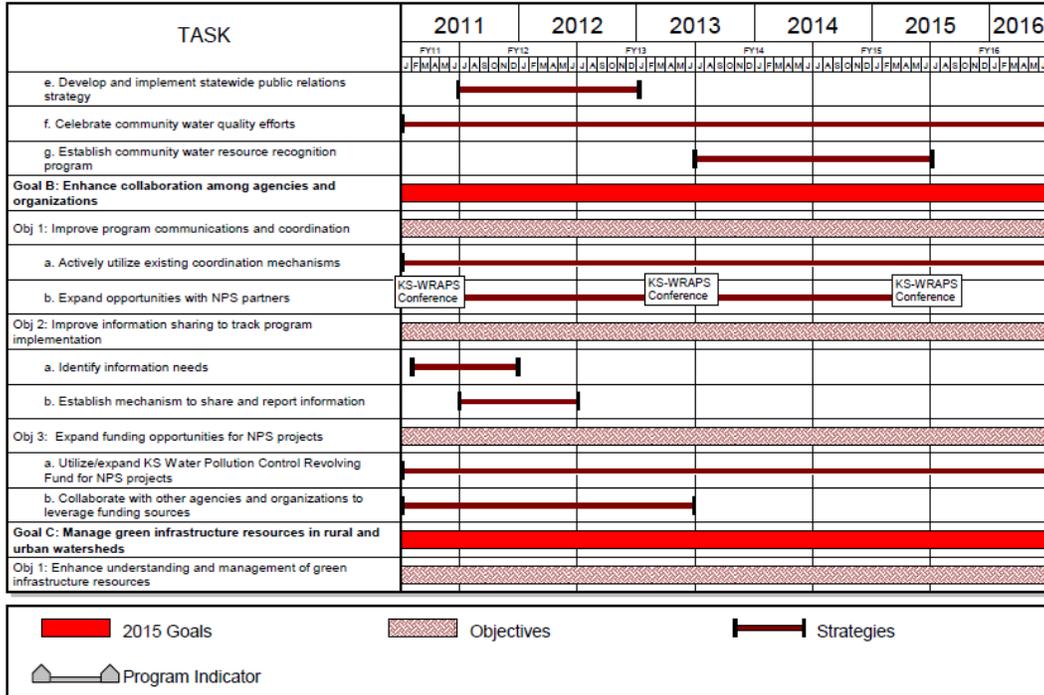
### Kansas NPS Pollution Management Plan - 2010 Update Implementation Schedule

Page 1 of 8



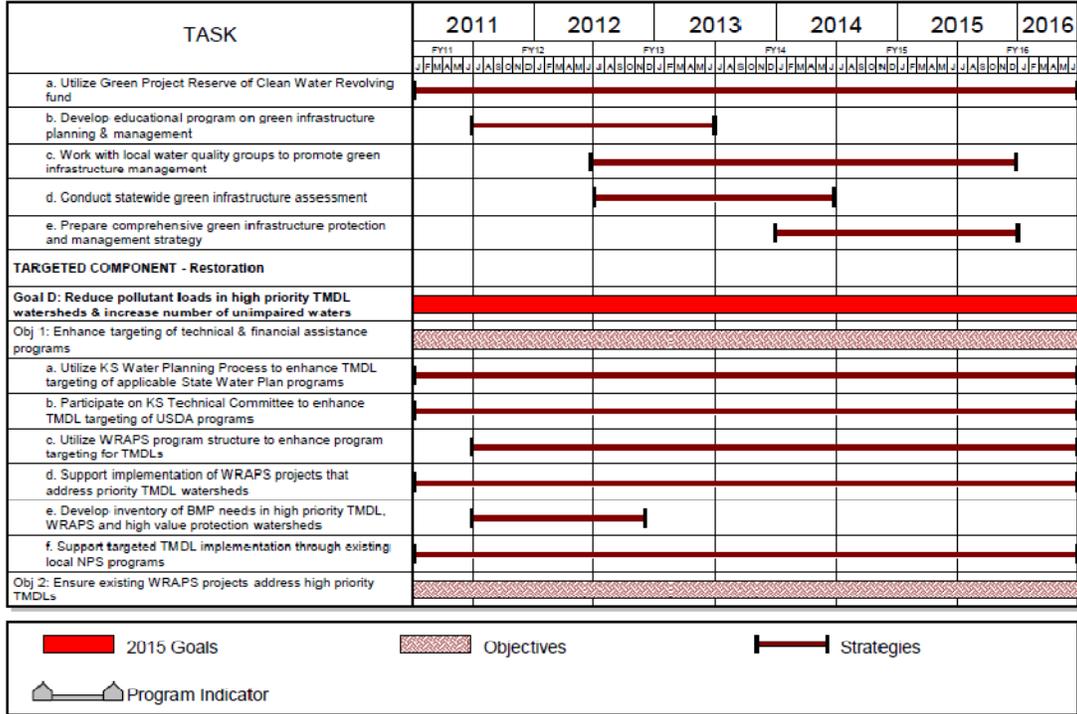
### Kansas NPS Pollution Management Plan - 2010 Update Implementation Schedule

Page 2 of 8



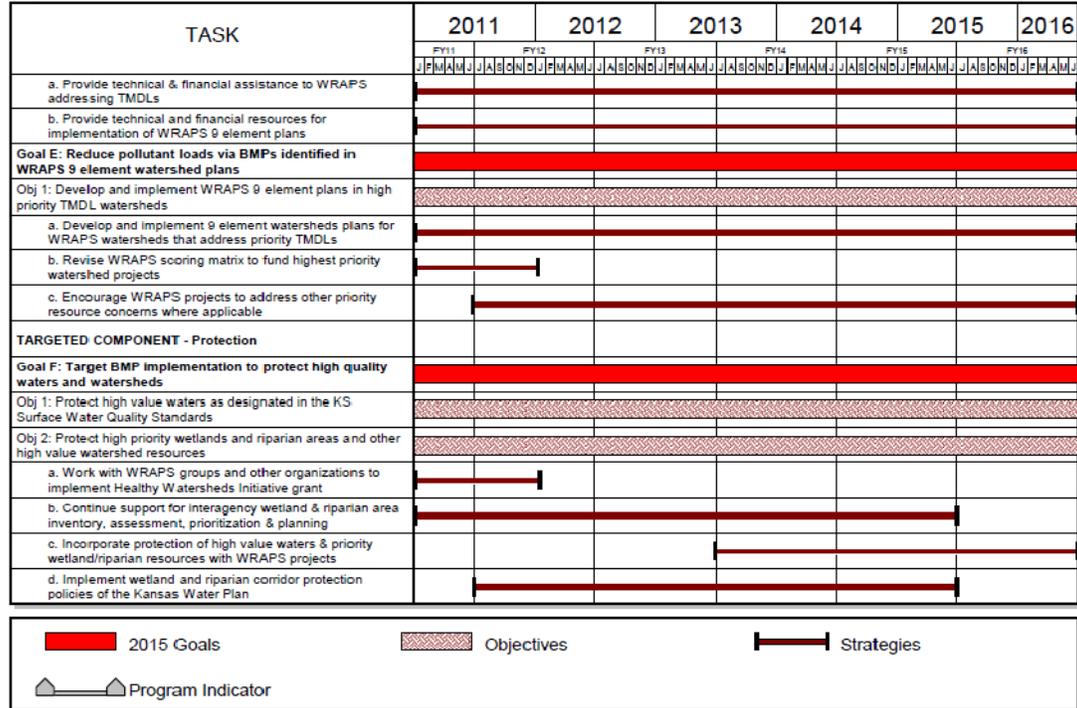
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Page 3 of 8



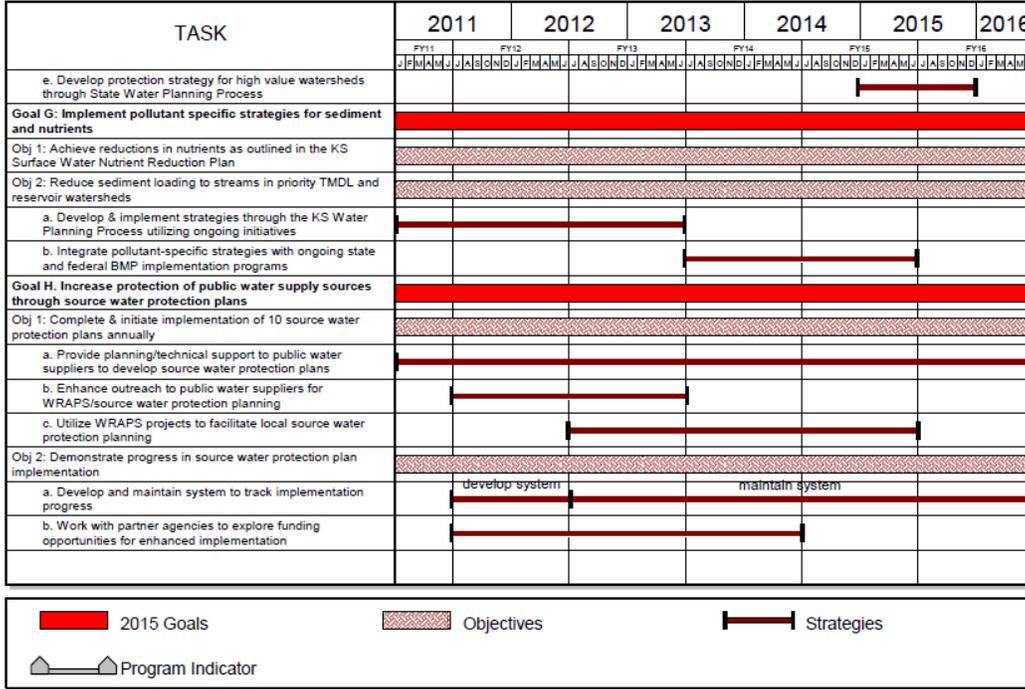
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Page 4 of 8



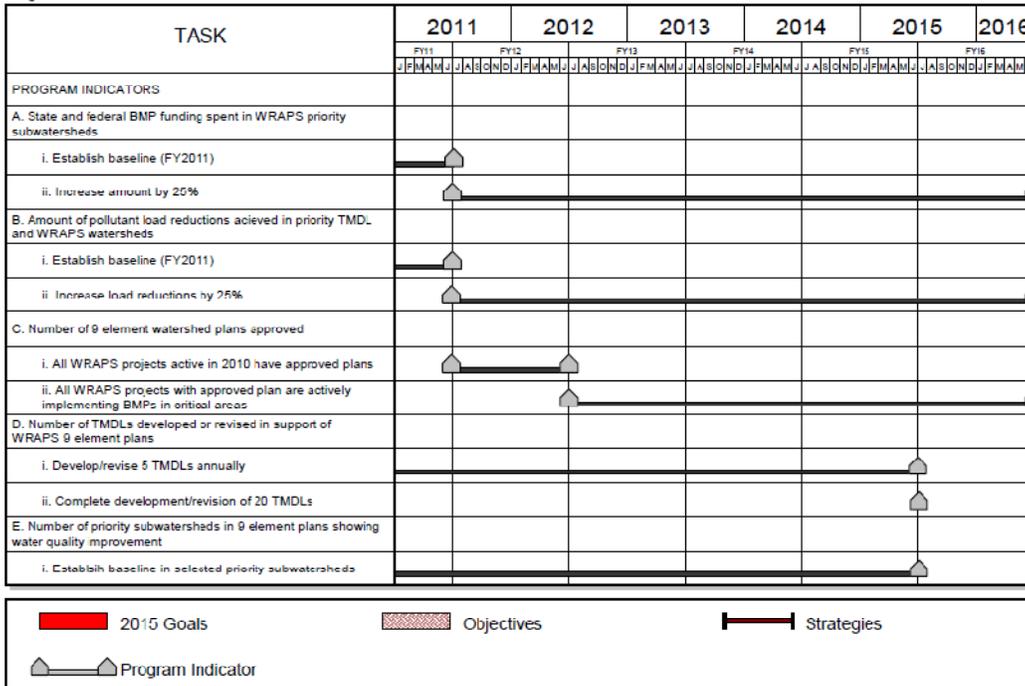
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Page 5 of 8



## Kansas NPS Pollution Management Plan - 2010 Update Implementation Schedule

Page 6 of 8





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