Kansas Local Government Water-Quality Planning

Decision-Maker’s Guide

K-State Research and Extension
in cooperation with
Kansas Department of Health and Environment
Kansas Local Government Water-Quality Planning and Management: 

Decision-Maker’s Guide

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How to Use this Guide

The *Kansas Local Government Water Quality Planning and Management Guide* is intended to be a “how to” guide for Kansas communities and public water suppliers to develop a comprehensive local water quality protection plan. The guide is divided into two parts: a *Decision-Maker’s Guide* and a *Technical Resource Manual*. The *Decision-Maker’s Guide* is intended for local elected officials and their advisory boards, such as a water-quality planning steering committee, that would recommend management options to city and county commissioners who have the authority and resources to implement water quality protection plans.

In undertaking a comprehensive planning process related to water quality, steering committee members will address a broad set of issues. These issues might include such things as organizing a decision-making process, dealing with stakeholder concerns and potential controversy, evaluating management alternatives, and putting mechanisms in place to ensure implementation of management plans. The *Decision-Maker’s Guide* is intended to be a practical guide to this planning process and a nontechnical guide to the science and law of local water management.

The accompanying *Technical Resource Manual* provides in-depth information about the many technical issues involved in local water-quality planning. It is intended to serve as a reference manual for use by local staff who advise and support local decision-makers.

Much of the material in the *Decision-Maker’s Guide* relates to general principles of planning and management. As such, the information is also applicable to other local planning initiatives related to water and environmental resource management. Most of the material in the *Technical Resource Manual*, as well as the discussion related to water assessment and management strategies in the *Decision-Maker’s Guide*, are clearly targeted to the objective of producing a local water quality protection plan.

These materials present a comprehensive approach to water quality management. This guide is independent of other water-related initiatives, including the Source Water Assessment and Protection Program and the development of Total Maximum Daily Loads. This guide and the planning approach advocated here do not substitute for these other initiatives. Rather, this guide is intended to complement these other programs and contribute to a more comprehensive view of strategies to protect and improve water quality.
Drinking water is among our most valuable resources. The economic viability of every community depends on access to a safe drinking water supply. Once contaminated, treating water supplies is costly and may not always be feasible. While numerous state and federal programs strive to ensure our communities have drinking water, they cannot guarantee that water will always be safe. It is the responsibility of local governments to take the leadership in protecting drinking water supplies and other important water resources.

This publication and the accompanying Technical Resource Manual present an overview of the alternatives available to local governments in Kansas who want to ensure their drinking water supplies remain safe. These information resources present a practical, understandable guide to local water quality planning and management for both surface water and groundwater resources. Information resources have been gathered from the Kansas Department of Health and Environment, the U.S. Environmental Protection Agency, other states, and organizations from around the country and summarized in these documents. Particular attention has been paid to ensuring the information is relevant to Kansas needs, history, and law.

Some of the assumptions incorporated in this work should be made explicit. First, these resources focus on the protection of public water supplies (groundwater and surface water) for cities and rural water districts. While many of the management activities identified here will also be effective in protecting private water supplies, our objective is to create a resource targeted at protecting the quality of water sources used by the majority of Kansas residents.

Our next assumption is that an effective protection program will require interlocal cooperation. At a minimum, the water supplier (city or rural water district) and county need to work together. In addition to the fact that water does not respect political boundaries, there is much each entity can contribute to planning and implementation to further their common interest in clean water.

Ideally, planning and management activities would be initiated at the watershed level. This is the geographic scale at which the quality of a drinking water resource is affected. The practical realities of bringing such a large number of governmental and administrative units to consensus on strategies, however, is daunting. Yet, the administrative authority for action lies with the individual entities. The challenge is to bring together local governments that collectively possess the authority for effective action. This collective would probably best function at the county-scale, and might include city and county governments, rural water districts, conservation districts, and other entities with authority and responsibility for protecting water.

This guide also reflects the belief that preventative, rather than remedial, strategies are most desirable. While crisis may be an effective motivator for action, a preventative
approach will almost always be less costly and more effective in protecting the long-term quality of water resources.

Finally, this guide suggests that a comprehensive rather than a piecemeal approach will be most effective in protecting water quality. The threats to water quality come from many sources: urban land use, agricultural production, business and industrial activities, and individual households. Each of these contributors must realize their obligation and share the responsibility for protecting water resources. Correspondingly, a comprehensive approach will also include a combination of voluntary and regulatory strategies.

None of these assumptions, however, will prevent those who want to take a more limited approach from gaining benefit from these resources. This guide can be viewed as a “toolbox” of ideas that can be used. Each water supplier will need to determine the appropriate level of action required to ensure safe water. It is important to note that any action taken to protect water quality, no matter how large or small, will help achieve the ultimate goal of ensuring that our communities have safe water.

**Overview of Guide**

The introductory chapter provides a brief introduction to Kansas water resources and describes how water becomes contaminated. It also discusses the changing role of local governments in water resource management. Chapter 2 provides a brief introduction to Kansas water resource planning and management and the roles of various state-level agencies. Chapter 3 discusses planning at the local level, providing an overview of organizational and communication strategies to minimize potential controversy associated with the planning process.

In Chapter 4, methods for defining water quality protection planning areas, conducting a pollutant source inventory, and establishing management priorities are discussed. This is the most technical part of the guide. It has been included because decision-makers need to understand some of the science to make effective management decisions. Chapter 5 presents an overview of a wide range of management alternatives and policies available to protect water quality. Finally, Chapter 6 discusses a variety of practical issues associated with implementing a protection program, including staff assignments, funding and other administrative concerns.
Kansas Water Resources

Groundwater comes from aquifers, which are usually saturated, impermeable sand and gravel beds or rock formations. There are several major groundwater aquifers in Kansas (see Figure 1). In many areas of the state, groundwater is the only reliable source of large volumes of water. Groundwater supplies about two-thirds (67 percent) of all the water used in Kansas. About half of all Kansans depend on groundwater for their drinking water. Kansas relies on groundwater to supply a higher percentage of its water needs than almost any other state in the nation.

Surface water resources are associated with watersheds. Watersheds (also commonly referred to as “drainage basins” or “river basins”) are the drainage and collection areas for rivers, lakes, streams, wetlands, and underlying groundwater resources. Watershed boundaries are defined by the land features that dictate natural drainage patterns within an area. The size and shape of watersheds vary, ranging from just a few acres to thousands of acres. Many smaller watersheds are “nested” inside larger watersheds. In smaller watersheds, a few acres of land may drain into small streams, which flow into larger streams or rivers; the lands drained by these streams or rivers make up a larger watershed. The surface area of Kansas is drained by 12 major watersheds (see Figure 2).

Water Use in Kansas

Four out of five Kansans receive water from a public water supply. More than two-thirds (70%) of public water supplies use
groundwater as their only source of water. Four percent of public water supplies use a combination of surface and groundwater. Surface water provides the remaining water supplies.

Irrigation is the primary use of water in Kansas, accounting for about 84 percent of all water pumped or diverted for use (see Figure 3). Municipal water use accounts for nine percent, industrial use accounts for four percent, and other uses, including livestock watering, account for the remaining three percent of water use.

**How Water Becomes Contaminated**

It is important for communities to understand the wide range of natural and human activities that have the potential to pollute water resources.

Water picks up contaminants as it falls through the air as precipitation (rain and snow), as it collects on land, and as it percolates through soil (see Figure 4). Soil serves as natural barrier by absorbing, filtering, and breaking down contaminants carried by water. The type and amount of contaminants that reach groundwater depends on the soil characteristics, the ease with which contaminants dissolve in water, and the speed at which contaminants move through the soil. Large quantities of contaminates from underground storage tanks, pipelines, or wastewater lagoons may saturate the soil and interfere with its protective capabilities. When concentrated contaminants reach groundwater, they form a plume that moves through the aquifer.

Serious contamination problems often result when contaminants have a direct path to groundwater through abandoned water wells, oil and gas wells, and mine shafts. Soils with a high rate of drainage such as sand or gravel also allow contaminants to reach groundwater more rapidly. Depth to the water table is also an important factor in groundwater contamination. Depths of less than 100 feet are more vulnerable to contamination.

As rainwater and melting snow run across the land surface, they carry sediment and other contaminants into streams, lakes, and wetlands. In the past, water-quality problems were traced to the most obvious cause – single sources such as discharge pipes from municipal wastewater treatment plants, industrial facilities, landfills, hazardous waste sites, and large confined animal feeding operations. These types of water pollution sources are referred to as "point sources" and can have a significant impact on the quality of surface water resources by discharging contaminants directly into rivers and lakes. Much of the pollution in surface water also comes from
“nonpoint sources” – pollution from a large land area containing a wide variety of dispersed sources such as farms, ranches, streets and highways, parking lots, and residential areas. Stormwater runoff and the pollutants it carries is the most common type of nonpoint source pollution in lakes, rivers, and streams.

**Water-Quality Standards**

Groundwater quality in Kansas is evaluated based on U.S. Environmental Protection Agency (EPA) drinking water standards for public water supplies as defined in the federal Clean Water Act. These are the defining rules to which all states, municipalities, and water districts must adhere. These drinking water standards are established for contaminants that may have adverse effects on people’s health and for contaminants that have aesthetic effects.

Kansas Department of Health and Environment (KDHE) regulations define surface water-quality standards for drinking water and food production, livestock and irrigation, and aquatic life support.

KDHE maintains an extensive statewide water-quality monitoring network that provides information on chemical, physical, and biological water-quality factors for surface and groundwater resources. This monitoring network plays an important role in the state’s efforts to identify water-quality problems and to comply with the water-quality reporting requirements of the Clean Water Act. The data collected through this network also serves as one of the primary sources of water-quality information for cities, rural water districts, and counties.

**Water-Quality Issues in Kansas**

The quality of water resources varies greatly throughout the state. Water quality is affected by a number of factors, primarily agricultural and urban runoff, waste discharges into rivers and streams from municipal wastewater treatment plants and industrial facilities, contaminants from household and commercial activities, and natural geology. Water’s natural quality is affected by the minerals it must pass through on its way to, and within, the aquifer. While Kansas’s groundwater is relatively high in minerals with some localized areas of poor quality, there are few widespread natural water-quality problems.

Human activities have caused water-quality problems in localized areas throughout the state. There have been documented instances of groundwater contamination from oil and gas operations, agricultural activities, and underground storage tanks. Industrial solvents, manufacturing chemicals, agricultural pesticides and fumigants, and livestock wastes have also been found to contaminate groundwater.

Urban and agricultural runoff is a major cause of water-quality problems in Kansas rivers and streams. Urban stormwater often carries chemical residue and trash into rivers, while runoff from agricultural fields may carry sediments, nutrients, and pesticides to surface water. Bacteria is also a major water-quality problem in Kansas. Primary sources of bacteria are municipal wastewater treatment facilities and runoff from livestock confinement areas.
Figure 4: How Water Becomes Contaminated
**Water-Related Responsibilities of Local Governments**

Local governments have long had responsibility for a variety of water-related programs designed to protect human health and the quality of water resources. These programs include wastewater treatment, stormwater management, and drinking water treatment.

Local governments are responsible for building and operating wastewater treatment facilities and their associated collection systems, commonly referred to as “Publicly-Owned Treatment Works” (POTWs). Wastewater treatment facilities are responsible for the collection, treatment, analysis, and discharge of wastewater, and for the disposal of sludge generated from the treatment process. For mid- and large-size cities, wastewater collection and treatment activities require a National Pollutant Discharge Elimination System (NPDES) permit, issued by KDHE. Many wastewater treatment facilities also oversee pretreatment programs for industrial wastewater.

Local governments are also responsible for the collection of stormwater runoff. Municipal storm sewer systems carry stormwater runoff from roads, parking lots, and other impermeable areas directly to streams, rivers, and lakes. This allows a variety of contaminants such as oil, grease, and pesticides to reach water resources and impact water quality.

In addition to wastewater collection and treatment and stormwater management, local governments are also responsible for the operation of a public water system designed to provide a reliable, high-quality source of drinking water. Under the Safe Drinking Water Act (SWDA), public water systems must provide water treatment to ensure the quality of drinking water. This is done through various treatment methods and technologies designed to reduce or eliminate chemical, physical, radiological, and bacterial substances in water. If a public water system is found to be in noncompliance, the supplier is legally obligated to correct the problem.

**The Changing Role of Local Governments in Water-Quality Protection**

Over the past several decades, many responsibilities for individual and community well-being have shifted from broader levels of government to local units. In the past several years alone, responsibility for literally hundreds of programs has moved from the federal government to the states and local governments. The area of environmental quality has been no exception. Maintaining water quality is a case in point.

Most of the control over activities affecting water quality is in local hands. If local water quality is to be preserved, the choice and commitment to action must come from local governments, institutions, and individuals. Assuming the responsibility for clean water may be among the most important jobs for local government because the stakes are so high. A community’s economic viability and quality of life are clearly tied to access to a safe, dependable water supply. Further, a public water supplier has a legal obligation to provide safe water to its customers. All too often, it is only after problems arise that action is taken. Too many communities across Kansas and the nation have learned that reacting to a crisis is a difficult, costly, and time-consuming way to deal with threats to their local water resources.

Cities and counties throughout Kansas and the United States are moving beyond their
traditional roles of treating wastewater and providing drinking water. Many are now taking an active role in protecting local groundwater and surface water resources before costly problems arise.

Many communities in Kansas have long known the benefits of planning efforts such as comprehensive plans, zoning and subdivision ordinances, transportation planning, historic preservation, and downtown redevelopment. These communities have recognized the importance of planning for their long-term needs and protecting key resources. All of these efforts are based on a planning process that can be applied to many issues the community may face, including water-quality protection. This process involves identifying issues and concerns, developing and evaluating alternative ways to address those issues and concerns, and implementing a plan to achieve local goals and objectives.

Overview of the Planning Process

Recognition of the need for planning can arise in several ways. Sometimes, farsighted and visionary community leaders recognize the importance of local resources and acknowledge the need to be proactive in maintaining their integrity. More often, community leaders become aware of early warning signs of potentially greater problems ahead. This may appear in the form of monitoring that shows early signs of water-quality degradation.

Unfortunately, the impetus for planning too often comes from crisis. Such is the case when a water system falls out of compliance for safe water standards. At that point, the solutions tend to be dramatic and costly, such as installing new treatment systems and drilling new wellfields.

Whatever the motivating factors, the planning process is typically comprised of four general stages (see Figure 5). The first stage involves getting organized. Key stakeholders are identified and a steering committee is formed. Goals and objectives for local water-quality protection and a strategy for communicating with stakeholders and the community at large are then developed.

In the second stage, a variety of inventory and analysis activities take place. This stage begins by investigating the quality of local groundwater and surface water resources. The water resource areas in need of protection are identified. The steering committee then conducts an inventory of potential pollutant sources within the protection area and assesses the risk posed by these sources.

In the third stage of planning, the steering committee considers the various tools available to protect water resources and then develops a water-quality protection strategy. Protection tools and strategies range from voluntary to regulatory; the ultimate mix is determined by the community. Finally, the community directs resources to implement the plan.
Recognizing The Need To Take Action

- Proactive planning
  OR
- Early signs of water-quality degradation
  OR
- Noncompliance with water-quality standards

Getting Organized

- Establish steering committee
- Develop goals & objectives
- Develop communications strategy

Identifying & Analyzing Problems

- Define protection planning areas
- Inventory potential pollutant sources
- Assess risks posed by pollutant sources

Developing A Plan

- Review goals & objectives
- Select strategy & protection tools
- Develop action plan

Implementing The Plan

- Establish protection areas
- Implement protection activities
- Evaluate management activities


Figure 5: Major steps in developing a local water-quality protection plan
CHAPTER 2 – Water Resource Planning and Management in Kansas

Water Resource Management

The state’s system of water resource management has evolved over time. While local units of government retain the central responsibility to protect their resources, they do so within the context of historical water rights allocation and evolving state and federal responsibilities. Some of the state agencies with major water planning and management responsibilities are identified here to provide additional context for local planning.

The basic tool for managing water resources on a statewide basis is a system of historical water rights appropriations administered by the Division of Water Resources (DWR) of the Kansas Department of Agriculture. Certain minor uses of groundwater, such as domestic and livestock wells, are exempt from a permit requirement, but large-scale water users must apply for and be granted water rights – a permit to divert surface water or pump groundwater in specified amounts.

Kansas, like most western states, has long held a seniority system to deal with uncertainties in water supply. “First in time, first in right” is the traditional slogan, meaning that when water supplies are not adequate to supply all of the water rights, priority is established according to the seniority of the rights. That is, older (or senior) water rights take priority over more recent (or junior) water rights.

Over time, numerous special water districts have been created in Kansas to deal with local water issues. These include groundwater management districts, conservation districts, watershed districts, rural water districts, public wholesale water supply districts, drainage districts, levee districts, sewer districts, irrigation districts, and resource conservation and development areas.

Water Resource Planning

The Kansas Water Authority was created in 1981 as part of the state’s efforts to focus on long-term water conservation and management. The Kansas Water Authority is charged with overseeing the development and implementation of the Kansas Water Plan, adopted by the Kansas legislature in 1985 to address the management, conservation, and development of the state’s water resources. The Plan is organized into policy and basin sections. Policy sections address issues related to water management; conservation; quality; and fish, wildlife, and recreation. These sections contain policy recommendations for statewide program application. Basin sections deal with issues specific to each of the state’s 12 major river basins. Each basin section contains guidelines to state agencies and programs relating to issues of water supply; water quality; flooding; fish, wildlife and recreation; and an environmental protection strategy.

The Kansas Water Plan is formulated through an established planning process that emphasizes public participation through basin advisory committees, public meetings, and public hearings. Basin Advisory Committees are comprised of citizens living within the basin that provide advice on formulation and implementation of the Kansas Water Plan. Input received from each basin committee is
relayed to the Kansas Water Authority as part of the information incorporated into policy or basin sections.

Water resource planning, management, and protection in Kansas is somewhat complex, involving multiple agencies with different responsibilities. Some state agencies with specific water-related responsibilities include the Kansas Water Office, Kansas Department of Health and Environment, Kansas Department of Agriculture – Division of Water Resources, and the State Conservation Commission. The relationship between these agencies is depicted in Figure 6.

**Kansas Water Office**

The Kansas Water Office (KWO) is responsible for water resource planning in Kansas through the development of the Kansas Water Plan. Another major function of KWO is the management of the Water Marketing Program, through which the state has leased long-term water supply storage space in twelve federal reservoirs in Kansas. This water supply is made available to municipal and industrial water users through contracting procedures established by statute. The Water Office also works in cooperation with the U.S. Geological Survey to collect and analyze surface water data from monitoring stations located on Kansas streams and lakes. The Water Office uses this data to develop, implement, and monitor water management programs. The Water Office also provides information and education to the public about Kansas water resources. (See Appendix C in the *Technical Resource Manual* for more information about the Kansas Water Office.)

**Kansas Department of Health and Environment**

The Kansas Department of Health and Environment (KDHE) administers regulatory programs involving water quality, such as public water supplies, wastewater treatment facilities and discharges, solid waste landfills, hazardous waste, underground storage tanks, and other sources that impact water quality. KDHE also administers programs to remediate contamination, lessen nonpoint pollution, and evaluate environmental conditions across the state. The agency administers a variety of financial and technical assistance programs such as the Wastewater Revolving Loan Fund and the Pollution Prevention Program to assist business and industry, landowners, and local governments in achieving compliance with state and federal environmental statutes and regulations.

The KDHE Bureau of Water administers programs regulating public drinking water supplies; municipal, industrial, and agricultural wastewater treatment facilities; petroleum storage; underground injection of wastes; nonpoint sources of pollution; and water well drillers. Programs are designed to provide safe drinking water, prevent water pollution, and assure compliance with state and federal laws and regulations such as the Clean Water Act and Safe Drinking Water Act. (See Appendix C in the *Technical Resource Manual* for more information about KDHE.)
Figure 6: State Water Agencies
**Kansas Department of Agriculture – Division of Water Resources**

The Kansas Department of Agriculture’s Division of Water Resources is responsible for various water quantity programs, including the Water Appropriations Program (water rights), floodplain management, and special management programs such as Groundwater Management Districts. (See Appendix C in the *Technical Resource Manual* for more information about the Division of Water Resources.)

**State Conservation Commission**

The State Conservation Commission (SCC) administers programs that enable local entities and individuals to protect and enhance the state’s natural resources. The SCC, working with local conservation districts in each county, administers financial assistance programs that improve water quality, reduce soil erosion, conserve water, and reduce flood potential. These cost-share programs are aimed at providing financial incentives to landowners to apply enduring conservation practices. (See Appendix E in the *Technical Resource Manual* for more information about SCC funding programs.) These programs are supported with technical assistance provided by the USDA Natural Resources Conservation Service. (See Appendix C in the *Technical Resource Manual* for more information about the State Conservation Commission.)
CHAPTER 3 – Organization and Public Communication in Water-Quality Planning

The water-quality planning process begins by designing local organizational and communications strategies (see Figure 7). The organizational strategy considers how stakeholders are represented, how goals and objectives are determined, and how decisions are made. The communications strategy anticipates the information needs of the steering committee and the concerns of affected stakeholders and the general public.

Local Organization for Decision-Making

Without guidelines to follow, many communities have undertaken water-quality protection planning “by the seat of their pants.” As a result, they often fail to fully appreciate the level of concern by certain groups or miscommunicate the intent of the planning process. Anticipating the positions of various stakeholder groups and building strategies to involve or respond to their concerns can help avoid these problems.

Identifying Stakeholders

An effective water-quality protection strategy requires the input of a variety of stakeholders. Not every stakeholder needs to be involved in the decision-making process, but many will have an active interest and should be kept informed or involved at some level. When anticipating who is likely to be concerned about the planning process, it is important to: (1) identify the stakeholder, (2) identify their interest, and (3) determine how best to respond to that interest. Depending on the intensity of the interest, the appropriate response ranges from full involvement to consultation to simply providing periodic updates. Potential stakeholders to a water-quality planning initiative are identified in Table 1 on page 14.

Creating a Community Steering Committee

Crafting a comprehensive and effective water protection plan is a major undertaking. Given the complexity of the task, the importance of the decisions to be made, and the need for a deliberate and open decision-making process, it is very difficult for a city or county commission or planning board to undertake a comprehensive water-quality management planning process as a matter of normal business. In most cases, it is best to establish an ad hoc steering committee charged with the task of creating a water protection plan that would be sent to city and county commissions for consideration.

Figure 7: Getting Organized
Table 1: Potential Stakeholders to a Local Water-Quality Planning Program

| Local Government | city & county commission  
|                  | rural water districts  
|                  | local emergency management  
|                  | city & county planning  
|                  | city & county public works/utilities  
|                  | county conservation district  
|                  | county extension office  
|                  | city & county health/local environmental protection program  
|                  | irrigation districts  
|                  | groundwater management districts  
|                  | adjacent cities and counties  
| Property Owners/Local Residents | homeowner associations  
|                  | neighborhood associations  
|                  | concerned citizens  
| Major Water Rights Holders | large irrigators  
|                  | large livestock operations  
|                  | large industries  
| Business and Industry | chamber of commerce  
|                  | local developers  
|                  | major employers  
| Agricultural Groups | Farm Bureau  
|                  | local producers  
|                  | crop and livestock associations  
| Civic Organizations | Optimists  
|                  | Rotary  
|                  | Lions  
|                  | Kiwanis  
| Recreation Groups | boating and fishing associations  
| Public/Environmental Interest Groups | League of Women Voters  
|                  | Audubon Society  
|                  | Sierra Club  
| Water-related Entities | Kansas Rural Water Association  
|                  | basin advisory committees  
|                  | water assurance districts  
|                  | watershed districts  

A steering committee advises the city and county commissions. Their task would be to:

- Clearly define any problems or concerns related to the quality of local water supplies;
- Solicit and serve as the focal point for input from all affected stakeholders;
- Define a set of community goals and objectives for water-quality improvement/protection;
- Provide guidance to local staff related to technical analyses and other assessment activities;
- Investigate and evaluate alternative management strategies and their implications;
- Recommend management strategies; and
- Monitor and evaluate implementation activities.

Individuals appointed to the steering committee should understand they may be asked to serve for an extended period. The mission and expectations of the committee should be clearly defined at the start. Cooperating governing bodies should agree on the scope of the planning effort in writing. Similarly, the governing bodies should also make explicit the leadership structure and decision-making procedures of the committee. This, too, should be part of a written agreement.

Appointment to the steering committee should be carefully considered. The committee needs an appropriate blend of expertise, authority and political sensitivity. It is often beneficial to appoint a member of the city/county commission to serve as a communication link to the governing body to ensure the committee does not stray from its charge and scope of authority and to ensure that staff cooperate as needed.

**Committee Structure**

The steering committee may be structured in several ways, depending on anticipated information needs, flow of communication, and local political realities. A relatively simple committee structure frequently employed would be a five or seven member committee. A five member committee might consist of two persons appointed by the city, two appointed by the county, and one person selected “at large” by joint agreement of the city and county. Expansion in size would follow a proportionate increase in appointments and can include other affected cities in the county.

The advantages of a relatively simple committee structure are that decision-making is streamlined, the direction of the program is more easily controlled, and a smaller committee requires fewer resources. The disadvantages include less involvement by community groups who are important to the implementation of any program. Lower levels of input also increase the danger that important information might not be considered or the process more easily steered by individuals representing a narrower perspective.

In some cases, there might be greater demand for involvement by various individuals or groups. In these cases, a relatively more complex structure might be established. One model includes appointing a steering committee and one or more advisory committees. Elected officials might serve on the steering committee, and concerned citizens and interest group representatives are appointed to a citizen advisory committee. Given the substantial information needs and the necessity for numerous city and county departments to be involved in the implementation of programs, it is sometimes helpful to appoint selected city and county staff to a technical advisory committee.

There are obvious advantages and disadvantages to a more complex organizational structure. Advisory committees expand the local expertise that can be brought into the planning process. Citizens feel a part of the
solution and become energized to help build public awareness through their connections in the community. On the negative side, it is relatively easy for unrealistic expectations to develop regarding the decision-making authority a citizens’ committee may possess. Similarly, an advisory committee is more difficult to control and may push the program in directions the commissioners do not intend. Of course, advisory committees require staff time, clerical assistance, and a budget.

There are a number of factors that will make the steering committee successful. For a steering committee to be effective:

- The committee must have a clearly defined assignment or task;
- The committee must be representative of all stakeholders in the community;
- Committee members must have the ability to effectively communicate information to the community;
- The size of the committee should reflect the relative size and complexity of the community and scope of the planning effort;
- Members must be committed to the issue;
- The committee should have an appointed/designated leader (committee chair);
- All members must understand and accept the mission and role of the committee;
- The committee’s goals and objectives must be clearly defined;
- The committee must have access to technical assistance;
- The committee should follow accepted practices of effective meetings, including formal agendas, taking of minutes, and the efficient progression of business; and
- The committee must have access to necessary financial and institutional resources.

### Developing Goals and Objectives

The first major task for the steering committee is to develop goals and objectives for local water-quality protection. Goals and objectives define what the community wants to accomplish and provides a framework for evaluating the success of the community’s efforts. Goals define a general, long-term direction – they identify what the desired end result should be. Objectives are more specific and define how the goal will be achieved. Ideally, objectives should be measurable and include a specific time period for completion.

At the heart of developing goals and objectives lies the question: “Whose goals and values will direct the planning process and define the plan?” Local decision-makers and key stakeholders must play an integral role in developing goals and objectives if they are expected to endorse water-quality protection efforts. It may be more effective to agree on a limited number of high priority goals and objectives early in the process, rather than allow the entire planning process to be undermined by disagreement over a comprehensive set of goals and objectives.

Goals and objectives will vary from place to place based on local needs, constituencies and leadership, existing water-quality concerns, hydrogeologic and natural resource considerations, and other factors. Although a wide range of goals are possible, the following examples provide a starting point:

- Protect, maintain, and improve the quality of groundwater and surface water resources.
- Protect municipal water supplies from pollution.
- Encourage land use decisions that minimize impacts on water resources.
- Increase local awareness and understanding of water resources and water-quality-related issues.
- Maximize interlocal cooperation in addressing water-quality concerns.

To illustrate how objectives differ from goals, the following example objectives are provided as they relate to the goal of protecting municipal water supplies from pollution:

- Establish water-quality protection areas around municipal wells.
- Implement best management practices to minimize the impacts of development on water quality in all protection areas.
- Ensure that all underground storage tanks in protection areas are in compliance with applicable federal and state requirements.

It is important to focus on issues of greatest concern when initially developing goals and objectives for local water-quality protection efforts. As with every phase of the planning process, goals and objectives should be reviewed as water-quality concerns are reprioritized and as additional concerns are identified by the community.

**Developing Communication Strategies**

Public communication is a key to the successful adoption of new public policy. Public communication relates to the flow of information between the steering committee and external stakeholders or the general public. It is important to recognize that information flows in two directions, with different strategies and techniques appropriate depending on the direction of flow. Public communication also relates to the nature and quality of information. It can be used to educate, to reassure, and to inspire confidence and goodwill related to the planning process.

It is important to devise an explicit public communications strategy to complement planning. There are three types of public communication to consider as part of a comprehensive strategy related to water-quality management planning. The first is a public education program where the steering committee communicates to the community the need for and the nature of the actions being considered. The second is a public participation program where the steering committee solicits input from stakeholders. The third type of communication is public relations, where the planning body attempts to create a constructive community atmosphere where decisions can be made and the community moves forward.

**Establishing a Public Education Program**

The purpose of the public education program is first to create general public awareness that action related to water-quality protection is needed. A second function of a public education program is to foster knowledgeable and enlightened community discussion on the topic. The community will need to sufficiently understand the issue to judge the appropriateness of the committee’s
recommendations. Public education also minimizes misinformation and misconceptions that typically accompany controversy or ignorance of a topic.

An effective educational outreach program must be staged over the life of the planning process, employing different means and themes to achieve different objectives. For example, use of groundwater models and watershed displays can help to increase awareness of water-quality problems. Community newsletters can keep stakeholders up-to-date on water-quality planning and implementation activities. Personal contact may be most effective in helping business or agricultural producers implement new practices. Effective public education is more than simply having local media cover planning meetings.

A few important points about public outreach education:
- Do not underestimate the need for a long-term educational program to increase general community awareness and knowledge well in advance of decision-making;
- A planned educational strategy will be most effective in achieving the goals of an enlightened and informed community;
- Do not expect the media to perform the educational function;
- Match the educational technique to specific objectives and match the skills of the person responsible to the technique; and
- Seek assistance from local resource providers, such as the county Extension office and public health department.

Establishing a Citizen Participation Program

While the public education program primarily gets information from the steering committee to the public, the citizen participation program works in the reverse direction. The second major communication need is a strategy to gather input from affected stakeholders through a citizen participation program.

In structuring the overall strategy, there are several issues to consider.
- At what point in the decision-making process will citizen input be useful?
- What is the desired input into decision-making?
- How will participants be selected – through self-selection or by invitation?
- How much influence will the input collected have in decision-making?
- What is the desired outcome of the planning process?
- Where is the power in the community to influence outcomes?
- What resources are needed to obtain useful input?
- Who can facilitate the input process?
- When will it be known the process is over?

Establishing a Public Relations Program

There are many activities and events to occupy the community’s time and attention. Within an already overcrowded environment, the steering committee needs to build support to put a new program in place. This requires capturing and holding people’s attention. Public relations creates an
environment where controversy is quelled and decision-making moves forward. Initiating a public relations strategy captures attention and creates an environment where consensus can emerge.

Public relations is more than media relations. It begins with the consistent application of themes associated with the messages in both public and private conversations. Themes such as “shared responsibility” and a “can do” attitude creates a positive decision-making environment and helps the initiative move forward. These themes should be reflected in all forms of communication, including correspondence, newsletters, and notices. They are especially important in conversations with stakeholders.

In this context, public relations is related to, but different from, the public education program. Ideally, public education is fact-based and value free. It raises awareness and increases public knowledge about the needs and alternatives related to water-quality management. Conversely, public relations builds support for an outcome. While each community must uniquely determine how it will achieve water-quality goals, there is little argument that preserving and enhancing water quality is in everyone’s best interest. Thus, the function of public relations is to build support for the overall planning effort, inspire confidence in the planning process, and minimize delay in reaching its conclusion.

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**Working with the Media**

To avoid problems that sometimes occur when working with the media, **do not**:

- Try to tell journalists how to do their jobs;
- Complain about unfair coverage or mistakes unless they actually make a difference in perceptions or understanding of fact;
- Pester the local media about running a story;
- Overuse news releases, letters to the editor, or other communication;
- Tell a reporter something “off the record” unless it is agreed to in advance;
- Say anything to a reporter as an aside or casually that cannot appear in print;
- Send out written materials that contain factual, grammatical, spelling or syntax errors;
- Comment on topics about which little is known or where the authority to comment is lacking;
- Delay in responding to a reporter’s inquiry;
- Prohibit any local government staff person from talking to a reporter, but do have a clearly identified official spokesperson for potentially controversial issues; and do not
- Comment at all if there is potential or pending litigation.
Overview of the Assessment Process

The purpose of a water resource assessment is to identify potential threats to public water supplies so communities can select appropriate water-quality protection strategies. The assessment of water resources involves three steps (see Figure 8):
1) Define water-quality protection planning area(s);
2) Conduct an inventory of potential pollutant sources; and
3) Evaluate the risk posed by these sources.

The first step is to define, or delineate, the land area around a groundwater well or surface water intake where contamination could threaten the drinking water supply. This area is called the water-quality protection planning area. The second step is to conduct a pollutant source inventory. This involves a survey within the water-quality protection area to identify activities that may pollute water resources. The final step involves evaluating potential pollutant sources to determine which pose the greatest risk to the public water supply. Each of these three steps is explained in this section.

STEP 1— Defining Water-Quality Protection Planning Areas

Water pumped from a well may have traveled thousands of feet above and below ground to reach the well. Water drawn from rivers and reservoirs may have traveled some distance through the watershed, possibly picking up natural and human contaminants. The first step in the assessment process is to identify the land area that contributes water to a public water supply (PWS).

The area contributing groundwater to a PWS well is called the well-recharge area (zone of contribution). The area contributing surface water to a PWS intake is the drainage basin, or watershed. These areas are defined (delineated) to identify the geographic areas most critical to the protection of groundwater and surface water resources.

Methods for Delineating Wellhead Protection Areas

Several methods can be used to identify wellhead protection areas. These methods range in complexity and cost of implementation. A community’s choice of delineation method depends on available resources, the complexity of the hydrogeologic (natural) setting, KDHE guidelines, and the goals of the

Figure 8: Water Resource Assessment
Table 2: Summary of Wellhead Protection Area Delineation Methods

<table>
<thead>
<tr>
<th>Delineation Methods</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Arbitrary Fixed Radius | § Easily implemented  
§ Inexpensive  
§ Requires minimal technical expertise | § Not scientifically accurate  
§ Large radius required to compensate for uncertainty will generally result in overprotection  
§ Highly vulnerable aquifers may be underprotected  
§ Highly vulnerable to legal challenge |
| Calculated Fixed Radius| § Easy to use  
§ Relatively inexpensive  
§ Requires limited technical expertise  
§ Based on simple hydrogeologic principles | § Does not account for well recharge area  
§ Inaccurate for some aquifers  
§ Not appropriate for unconfined aquifer |
| Variable Shapes        | § Easily implemented once shapes are calculated  
§ Limited field data required once shapes are developed  
§ Relatively little technical expertise required for actual delineation  
§ Greater accuracy for only modest increase in cost | § Relatively extensive data on aquifers required to develop the standardized forms for a particular area  
§ Inaccurate in heterogeneous aquifers |
| Analytical Models      | § More accurate than variable shapes because it is based on site-specific conditions  
§ Technical expertise required, but equations are understood by most engineers  
§ Various equations have been developed, allowing delineation that fits local conditions | § Relatedly extensive data on aquifer characteristics required to solve equations  
§ Cost of developing site-specific data can be high |
| Hydrogeologic Mapping  | § Well suited for unconfined aquifers  
§ Necessary to define aquifer boundary conditions  
§ Less suitable for deep, confined aquifers | § Requires special expertise in hydrogeology  
§ Requires considerable time and cost for data collection |
| Numerical Models       | § Most accurate of all methods  
§ Can be used for most hydrogeologic settings  
§ Allows assessment of natural and human-related affects on groundwater system | § High degree of technical expertise required  
§ Extensive data required  
§ Most expensive method in terms of time and data collection/analysis costs |
water-quality protection plan. The more sophisticated methods involve analytical techniques and/or computer modeling. If a highly detailed delineation is required, communities will likely need to involve consultants. A comparison of the different delineation methods is shown in Table 2.

**Selecting a Method for Delineating Wellhead Protection Areas**

Using multiple approaches to delineate a wellhead protection area makes it less likely that lands that do not actually contribute groundwater to the well are included. More sophisticated methods of delineating wellhead protection areas exist, several of which are discussed in the accompanying *Technical Resource Manual*.

Two situations that might require more sophisticated delineation methods include: (1) a large number of potential pollutant sources in the wellhead protection area, and (2) strong opposition to regulatory controls for wellhead protection. In the first situation, the use of more sophisticated methods helps avoid unnecessary effort to inventory potential pollutant sources outside the well recharge area. In the second case, opposition may be partly defused by excluding areas from regulatory control that might otherwise have been included. More sophisticated methods are also easier to defend against legal challenges.

**Methods for Delineating Watershed Protection Areas**

There are three methods for identifying (delineating) watershed protection areas for public water supplies that utilize surface water resources. The topographic boundary delineation simply looks at the contours of the land surface. The protection area is comprised of the portion of the watershed that contributes water to the drinking water intake (see Figure 9).

Another method is to establish buffer zones (see Figure 10). The third method for delineating watershed protection areas is the time of travel (TOT) calculation. This is based on the amount of time it takes water to travel from an upstream monitoring point to the surface water intake (see Figure 11).
STEP 2 – Identifying Potential Sources of Pollution

Once a water-quality protection area has been identified, the next step is to inventory sources within the protection area that could potentially contaminate groundwater or surface water resources. The inventory identifies the type of source, location, and potential contaminants.

Available maps and other sources of information on current and past land use activities in the water-quality protection area should be reviewed as part of the inventory process. Identification of active potential sources, such as industrial facilities, is relatively straightforward. Locating inactive sources, such as abandoned wells, underground storage tanks, and old waste disposal sites, may require additional research by city/county staff.

Reviewing Potential Pollutant Sources

To identify potential pollutant sources adequately, it is useful to prepare a comprehensive inventory. The community can list
potential pollutant sources according to land use or type of source. Table 3 lists various sources by land use category and contaminants that might be associated with these sources.

There are two general types of pollution sources that may contaminate water resources: point sources and nonpoint sources. Point sources are those that release contaminants from a specific, identifiable location, such as a leaking underground storage tank. Point sources also include discharge pipes to surface waters from municipal and industrial wastewater treatment. These discharges are regulated under the Clean Water Act and require permits from KDHE. Monitoring logs for point sources are on file at KDHE, and may be an additional source of water-quality information.

Nonpoint pollution sources are widespread sources of contamination that cumulatively present a threat to groundwater and surface water resources. These sources are more difficult to identify, spread over a wide geographic area, and are not generally regulated by permits. Nonpoint sources include urban and agricultural runoff, leakage from septic systems, and runoff from roadways and parking lots.

**Conducting the Pollutant Source Inventory**

The detail and complexity of the pollution source inventory will vary based on several factors, including the size and types of land use within the protection area, the goals of the water-quality protection plan, and the community’s human and financial resources. In smaller communities, the types and number of potential pollutant sources may be much smaller, requiring a less rigorous inventory. In communities where a large number of commercial and industrial sites are located within a water-quality protection area, a more rigorous, phased inventory may be needed. The first phase would identify as many potential pollutant sources as possible. This information could be screened to identify the highest risk sites. In the second phase, these sites could be revisited to collect more detailed information.

Communities will grapple with how thorough an inventory is needed for planning and implementation to proceed. The answer will vary across communities, but a few considerations can help. A designated wellhead protection area, or those areas within a 1- or 2-year time of travel up-gradient from the well will require a more thorough inventory. In circumstances where water-quality problems already exist or where land use patterns pose a high risk, it will be appropriate to move aggressively into a detailed inventory.

A general inventory should be sufficient in most cases to proceed with the management plan. The inventory should include a description of the land use activities that have the potential to impact water quality and their location in the water protection area. In some cases, a preliminary inventory will establish priorities for long-term investigation as part of the implementation program.

A three-step approach to developing an inventory of potential pollutant sources is explained in detail in the accompanying Technical Resource Manual.
<table>
<thead>
<tr>
<th>Potential Pollutant Source</th>
<th>Potential Contaminants Associated with Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural chemicals sales/storage</td>
<td>Pesticides, fertilizers, &amp; herbicides; other agricultural chemicals</td>
</tr>
<tr>
<td>Airports, abandoned airfields</td>
<td>Jet fuels, deicers, batteries, diesel fuel, solvents, automotive wastes, heating oil, building wastes</td>
</tr>
<tr>
<td>Gas stations, truck stops</td>
<td>Gasoline, oil, solvents, acids, miscellaneous wastes</td>
</tr>
<tr>
<td>Auto fleet maintenance facilities</td>
<td>Gasoline, oil, solvents, acids, paints, miscellaneous wastes</td>
</tr>
<tr>
<td>Auto repair/service stations</td>
<td>Gasoline, oil, batteries, solvents, acids, paints, miscellaneous wastes</td>
</tr>
<tr>
<td>Auto dealers, car rental facilities</td>
<td>Automotive wastes, waste oils, solvents, miscellaneous wastes</td>
</tr>
<tr>
<td>Carpet &amp; upholstery cleaners</td>
<td>Solvents, cleaners, miscellaneous chemical wastes</td>
</tr>
<tr>
<td>Chemical manufacturing</td>
<td>Solvents, oils, miscellaneous organics &amp; inorganic compounds, paint wastes, wastewater treatment sludges, toxic &amp; hazardous chemicals</td>
</tr>
<tr>
<td>Confined animal feeding operations</td>
<td>Seepage from livestock waste disposal areas</td>
</tr>
<tr>
<td>Dry cleaners commercial laundries</td>
<td>Solvents, spotting chemicals (peroxides, hydrochloric acid, rust removers), &amp; detergents, bleaches, fabric dyes</td>
</tr>
<tr>
<td>Farm machinery areas</td>
<td>Automotive &amp; welding wastes</td>
</tr>
<tr>
<td>Fertilizer, pesticide, &amp; herbicide manufacturing &amp; storage</td>
<td>Fertilizers, pesticides, &amp; herbicides, miscellaneous chemical wastes</td>
</tr>
<tr>
<td>Lawn &amp; garden care services</td>
<td>Fertilizers, herbicides, pesticides, automotive wastes</td>
</tr>
<tr>
<td>Machine &amp; metalworking shops</td>
<td>Solvents, metals, miscellaneous organics, sludges, oily metal shavings, lubricant &amp; cutting oils, degreasers, metal marking fluids, mold-release agents</td>
</tr>
<tr>
<td>Medical facilities</td>
<td>X-ray chemicals, biological, infectious, &amp; radiological wastes, disinfectants, dental acids, formaldehyde, miscellaneous chemicals</td>
</tr>
<tr>
<td>Metal finishing &amp; plating</td>
<td>Paint wastes, acids, heavy metals, plating wastes, oils, solvents, toxic &amp; hazardous chemicals, heavy-metal contaminated wastewater/sludge</td>
</tr>
<tr>
<td>Municipal wastewater treatment plants</td>
<td>Untreated wastes, bacteria, viruses, nitrates, miscellaneous chemicals &amp; household hazardous wastes</td>
</tr>
<tr>
<td>Oil &amp; gas exploration &amp; pipelines</td>
<td>Oil, gas, solvents, automotive wastes, seepage from pipelines</td>
</tr>
<tr>
<td>Photography shops &amp; photo-processing laboratories</td>
<td>Hazardous &amp; toxic chemicals, silver sludges, miscellaneous sludges</td>
</tr>
<tr>
<td>Plumbing, heating, &amp; air conditioning services</td>
<td>Freon, toxic &amp; hazardous chemicals, cleaners/degreasers</td>
</tr>
<tr>
<td>Scrap, salvage, &amp; junkyards, automotive wastes, metals</td>
<td>Used oil, gasoline, antifreeze, PCB-contaminated oils, lead acid batteries</td>
</tr>
</tbody>
</table>

**Sources:** Adapted from *Ground Water and Wellhead Protection Handbook*, U.S. Environmental Protection Agency, 1994.
Creating a Map of Potential Pollutant Sources

Once potential pollutant sources have been identified, each source should be plotted on a map of the protection area. This map should identify all of the existing and potential pollutant sources identified in the inventory, including both point and nonpoint sources. The map should also identify areas where actual or suspected water-quality degradation has already occurred. Figure 12 provides a sample potential pollutant source map.

STEP 3 – Assessing the Risks Posed by Potential Pollutant Sources

The final step in the water resource assessment is to evaluate the level of risk posed by potential pollutant sources in the water-quality protection area. This process is called a risk assessment. Levels of risk are assigned to existing and potential sources of pollution based on their proximity to water supplies, characteristics of the contaminants, the use and effectiveness of existing water-quality protection measures, and other considerations.

The risk assessment can be completed for each potential pollution source identified in the inventory, or for each category of sources found in the water-quality protection area. In other words, a risk assessment could be done for each underground storage tank, or a general assessment could be done for all underground storage tanks found in the protection area. A general risk assessment would serve as a preliminary step to a more detailed assessment of individual sources.


Mapping Risk Assessment Scores for Potential Pollutant Sources

After assigning risk scores to potential pollutant sources (or categories of sources) identified in the inventory, a map should be prepared showing the location and overall risk score for each of the sources in the water-quality protection area. Figure 13 provides a sample risk assessment map. This helps determine which areas of the community require immediate attention to prevent contamination of water supplies. The risk assessment can also be used to identify the types of sources posing the greatest overall risk. This information will also be used to help establish management priorities.
Figure 13: Risk Assessment Map
A variety of “tools” can help local governments protect water quality. Although these tools have traditionally been used for other purposes, all are effective in helping protect groundwater and surface resources. This section describes tools used successfully by other local governments in protecting water supplies. Generally, the organization of this section moves from voluntary to regulatory alternatives, and preventative measures to those used to remedy an existing problem.

**Water-Quality Protection Tools**

**Public Education**

Public awareness of water-quality issues is vital to the success of any program. Residents must understand the need to maintain or enhance water quality and how their actions can help to preserve or harm water quality. All water-quality protection programs should include a strong, long-term public education component.

In organizing a public education program:
- Specific individuals should be assigned or delegated responsibility for developing and implementing educational programs and activities;
- Financial resources will be needed to do the job effectively, although much can be accomplished with a modest amount of funding; and
- A sustained effort will be required to achieve widespread awareness and understanding of water-quality-related issues.

The county Extension office and the local health department staff can assist with the design and implementation of a public education program.

**Hazardous Waste Collection**

Many common commercial and household products such as solvents, septic system chemicals, paints, and cleaners contain toxic or hazardous substances that may pollute water supplies if not disposed of properly. Hazardous-waste collection programs create a powerful educational opportunity to increase public awareness of water-quality issues. Many cities and counties throughout the state now participate in regional hazardous-waste collection programs that help to minimize costs and legal liability.

**Best Management Practices**

Best management practices (BMPs) define operating procedures for a particular industry or commercial activity that minimize threats to the environment. Because hazardous substances pose a threat to wellhead and watershed protection areas, encouraging the
adoption of agricultural and industrial BMPs should be an integral part of a protection program. Researchers at universities, private companies, and state and federal agencies have identified numerous industrial processes and agricultural practices that minimize threats to water quality. City and county staff who advise agricultural producers and businesses are in an excellent position to help put BMPs in place. These staff will need training to keep up-to-date on the practices and economics of implementation. There may also be opportunities to couple BMP requirements with other technical assistance or cost sharing programs.

**Water-Quality Monitoring**

Some communities have established monitoring programs to assess the quality of local groundwater and surface water resources. A water-quality monitoring program typically consists of sampling public and private wells, aquifers, lakes, and streams for selected contaminants on a regular basis. A water-quality monitoring program can be targeted at specific areas, such as wellhead/watershed protection areas or naturally vulnerable areas, or to a broader geographic area such as an entire county.

A water-quality-monitoring program need not be costly. A series of simple and inexpensive indicator tests can provide evidence of whether more serious contaminants may be present. Testing for specific pesticides or other chemicals will be more expensive. A water-quality monitoring program also provides objective information about the community’s progress in meeting water-quality improvement goals. Local governments in Kansas can also take advantage of water-quality monitoring data already being collected by KDHE through an extensive statewide monitoring network.

**Water Conservation**

Water conservation can help a community in two ways: by reducing the total quantity of water drawn from groundwater and surface water resources and by reducing the rate at which contaminants spread in the water. Many communities around the country already encourage voluntary water conservation and have mandatory conservation programs during times of mandatory drought.

**Purchase of Property or Development Rights**

Effective water-quality protection often requires some level of influence over land use activities. One way to ensure protection is through land acquisition. However, given the financial and political barriers to purchasing land, many local governments choose to protect water resources by purchasing conservation easements, also referred to as “purchase of development rights.” Under a conservation easement, a landowner agrees to sell some or all of the development rights to his/her property to another person or legal entity, such as a city or county government or a private conservation organization. While the landowner maintains ownership of the property, the provisions of the easement restrict the types of land use activities that are permitted on the property for a specified period of time or in perpetuity.

**Comprehensive Plans**

State statutes authorize cities and counties to develop a comprehensive plan, which forms the foundation for most local planning efforts. The statutes specifically make reference to the “utilization and conservation of natural resources.”

Many cities and counties have incorporated natural resource protection into the goals of their comprehensive plans, providing the
foundation for other management initiatives and making a clear statement of priority for water resource protection. Local governments should update their comprehensive plans to include their goals and objectives for local water-quality protection. Water-quality protection areas should also be identified in the comprehensive plan. Once goals and objectives have been developed and protection areas identified, land use management tools such as zoning, special use permits, subdivision regulations, site plan review, and design standards can be utilized to achieve the community’s water-quality protection goals.

**Zoning Ordinances**

Zoning is a common land-use management tool that has traditionally been used to guide development in an efficient, orderly manner. Zoning is a practice of dividing a city or county into districts and designating appropriate land use activities that ensure fair and uniform treatment of landowners. Traditionally, zoning has been used to separate incompatible land uses, such as residential, commercial, and industrial areas. Zoning identifies what kinds of general land use activities can occur within a given district (such as commercial or residential) and defines other uses that are permitted only if special conditions are met – these are known as “conditional uses.”

Zoning offers a variety of benefits to both individual property owners and the community as a whole. Zoning:

- Avoids conflicts between incompatible land uses;
- Protects property values;
- Provides for efficient public services;
- Preserves the character of the community;
- Protects prime farmland and other important natural resources;
- Avoids sprawling development patterns; and
- Protects against nuisances.

Zoning has also been used as a tool in protecting groundwater and surface water quality. A city or county can develop a new zoning ordinance or modify an existing ordinance to protect its drinking water supplies. If a protection area is currently zoned and developed in a way that is incompatible with water-quality protection, new zoning can be phased in over time, as existing land ownership and use changes. Although a phased approach may take time to fully implement, it allows the use of zoning despite existing, incompatible development patterns.

**Conditional Zoning**

Conditional zoning requires proposed development meet certain conditions before being permitted in a particular zoning district. These conditions should be outlined in the zoning ordinance. For example, single-family housing might be allowed in a residential zone within a watershed protection area, while apartment complexes are allowed only if they are connected to a public sewer system. Conditional zoning is an effective tool because it allows communities greater flexibility in permitting potentially polluting land uses within a protection area. Rather than completely rejecting certain land use activities, a community can address specific aspects of a proposed development that may threaten water quality.

**Overlay Zoning**

Overlay zoning takes an existing zoned area and overlays additionally defined zones for environmental or other considerations. Overlay zones do not necessarily conform to the boundaries of existing zoning districts. Use of this technique requires the city or county already have zoning in place.

Figure 15 illustrates the use of an overlay zone. In this example, the overlay zone is the wellhead protection area. Only that area
within the overlay zone becomes subject to special wellhead protection measures. The area is designated a water supply protection district in addition to the original zoning designation. Thus, the area is covered by the regulations of both the original industrial zoning district as well as the wellhead protection overlay district. Creating a wellhead protection area district may involve, for example, restricting the use of septic systems or requiring lower-density residential development. A major advantage of using an overlay zone is that it can target changes in protection areas while allowing uses outside the overlay zone to continue.

**Source Prohibitions**

Zoning ordinances can also be used to prohibit certain activities within particular zones, such as banning the storage or use of hazardous materials in residential areas. These provisions are known as source prohibitions, and generally take the form of either prohibitions against certain kinds of activities that require the use of hazardous materials or restrictions on specific hazardous materials. Activities that involve the use of hazardous materials that might be prohibited within a wellhead or watershed protection area include salvage yards and machine shops. Specific hazardous materials that might be prohibited within the protection area include heavy metals, solvents, and petroleum products.

It is important to note that local governments may not have the authority to establish prohibitions or to regulate certain activities the state has reserved the right to regulate. This most commonly applies to agricultural activities, including crop production and confined animal feeding operations.

**Subdivision Ordinances**

Another land-use management tool that local governments can adapt for water-quality protection is a subdivision ordinance. Subdivision ordinances apply when a parcel of land is divided into two or more lots for sale or development, and are typically part of an overall zoning program. The primary purpose of a subdivision ordinance is to ensure growth does not outpace local infrastructure capacity, such as
roads, schools, and emergency services (police, fire, ambulance). A subdivision ordinance will direct the future development of an area, but will not change existing development patterns.

The usefulness of a subdivision ordinance in protecting water quality will depend on the extent of existing development and whether future development will entail subdividing existing properties. With little or no development on large parcels of undivided land, a wide variety of subdivision ordinance options may be available. Alternatively, if an area is fully subdivided into small units, a subdivision ordinance will be of limited use.

**Site Plan Review**

In addition to minimum lot sizes and other requirements, subdivision ordinances can include site plan review provisions. The purpose of a site plan review is to determine whether a proposed project is compatible with existing land uses and whether existing or planned infrastructure will support the new development. A site plan review is typically done by a city or county planning board before any construction can begin. The development plan may be required to meet a general condition, such as compatibility with surrounding land uses, or may have to include relatively detailed specifications. If the city or county planning commission determines the proposed development represents an incompatible use, does not meet required design standards, or would outpace the available infrastructure, the board may reject the plan outright or accept the plan with changes.

**Design Standards**

Design standards are incorporated into subdivision ordinances to better manage the environmental impacts of new developments. Design standards are typically applied to new structures or infrastructure that might have an impact on groundwater or surface water. An example of a design standard is a requirement that runoff collection systems for roads and parking lots control at least the first inch or two of rain, which typically contains most of the contaminants carried by runoff. A design standard also might be applied to storage tanks, requiring a secondary containment system to prevent an accidental release of hazardous substances such as gasoline or heating oil.

**Health/Sanitary Codes**

The county sanitary or health code (sometimes referred to as an environmental code) is also an effective means to protect the quality of groundwater and surface water resources. Most counties in Kansas have already adopted a sanitary code.

Wastewater management plans and wellhead protection provisions can be included within the sanitary code. Some communities around the United States have incorporated specific provisions in these codes that:

- Prohibit the transportation and disposal of certain hazardous wastes;
- Establish setback requirements for certain types of activities that impact groundwater or surface water resources;
- Require a permit for certain types of dangerous activities;
- Address nuisance abatement;
Establish performance standards for on-site wastewater systems;
- Establish monitoring and reporting requirements for certain activities; and
- Require cleanup procedures in the event that contamination is detected.

Water-Quality Protection Strategies

Designation of Special Management Areas

A comprehensive water-quality protection strategy is based on the designation of special management areas and the management of specific types of pollution sources. The designation of special management areas focuses protection efforts on defined areas where all sources of pollution are of concern. These areas are naturally more vulnerable to pollution or are critical to protect because they contribute water directly to a public water supply.

There are two types of special management areas: (1) naturally vulnerable areas, and (2) wellhead / watershed protection areas.

Naturally Vulnerable Areas

Naturally vulnerable areas are susceptible to contamination because the natural barrier provided by soils and bedrock do not provide adequate protection against the rapid movement of pollutants into groundwater. Since these areas have limited ability to break down pollutants before they reach water, it is important to protect them from high-risk land uses identified in the pollution source inventory and risk assessment. Naturally vulnerable areas are identified based on characteristics of the underlying geology, including soil characteristics, types and amount of vegetation, and depth to groundwater.

Naturally vulnerable areas may or may not be located within wellhead or watershed protection areas.

Wellhead and Watershed Protection Areas

Wellhead and watershed protection areas contribute water directly to a groundwater well or surface water intake. These areas were identified in the first phase of the water resource assessment. Given these areas have the potential to introduce pollutants directly into public water supplies, the community should formally designate them as special management areas in need of protection.

The initial identification of these protection areas may only have been preliminary to complete the water resource assessment. Depending on the management alternatives under consideration, a more rigorous delineation may be needed to accurately define the special management area.

Wellhead protection areas can be divided into protection “zones” based on the concept of time of travel (see Figure 16). An “inner zone” – the area immediately surrounding the wellhead with a radius of 100 feet – should be protected from direct contamination by pollution sources. This is the minimum radius recommended by KDHE. An “intermediate zone” of protection may include the outer limits of the well’s cone of depression (a depression in the water table around a well created by withdrawing groundwater more quickly than it can be replenished). Pollutants enter-
ing the ground above the cone of depression pose the greatest level of risk because they move much more rapidly toward the well. Protection tools that may be appropriate for this “intermediate zone” include zoning and subdivision ordinances and purchase of property or conservation easements. “Outer zones” within the wellhead protection area may be established using time of travel calculations. This is based on the idea that pollutants may be broken down naturally as they travel through soil and groundwater. Outer zones also allow time for emergency response in the event of contamination within the wellhead protection area. Protection tools that may be appropriate for this “outer zone” include public education and voluntary use of BMPs.

Large watershed protection areas are made more manageable by dividing them into smaller areas (see Figure 17). The areas closer to the surface water intake should be designated for higher levels of protection since they offer the greatest risk. Protection tools that may be appropriate for these areas include zoning and subdivision ordinances and purchase of property or conservation easements. Outer areas should be designated for less intensive protection, such as public education and voluntary use of BMPs.

**Management of Pollutant Sources**

The second component of a comprehensive water-quality protection strategy is management of specific pollutant sources. This allows communities to target resources to “high-risk” pollution sources identified in the pollution source inventory and risk assess-

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**Figure 16: Wellhead Protection Area**

**Figure 17: Watershed Protection Area**
These high-risk activities are frequently prohibited or regulated in critical water-quality protection areas:

- Airport maintenance areas
- Confined animal feeding operations
- Appliance/small engine repair shops
- Asphalt/concrete/tar plants
- Auto repair and body shops*
- Boat service, repair, and washing facilities
- Business and industrial uses (excluding agriculture) that involve the onsite disposal of wastes
- Car & truck washes
- Chemical/biological laboratories
- Chemical manufacturing/processing facilities
- Dry cleaners & commercial laundry*
- Disposal of liquid waste (except for properly designed commercial and residential onsite wastewater disposal systems and normal agricultural operations)
- Electroplaters (metal plating and finishing) and metal fabricators*
- Fuel oil distributors
- Furniture and wood stripping and refinishing*
- Gas stations
- Golf courses/parks/nurseries
- Cemeteries
- Improperly constructed or abandoned wells
- Junkyards and salvage yards*
- Landfills and dumps*
- Lots with more than 10 percent impervious surface
- Parking lots with more than 50 spaces
- Mining operations
- Medical services (including dental & veterinary)
- Military installations
- Motels/hotels
- Municipal wastewater treatment facilities with onsite disposal of primary or secondary effluent
- Oil and gas drilling and production*
- Petroleum refining and manufacturing
- Outdoor storage of road salt, or other de-icing materials, the application of road salt, and the dumping of salt-laden snow*
- Outdoor storage of pesticides & fertilizers*
- Pesticide & fertilizer stores
- Photo processors & printing shops
- Hazardous materials transport, storage, and disposal facilities*
- Sand and gravel extraction
- Trucking or bus terminals
- Underground storage of oil, gasoline or other petroleum products*
- Oil & gas pipelines
- Use of septic system cleaners that contain toxic chemicals
- Wood preserving and treating facilities*

* Highest risk activities

**Source:** Adapted from *Groundwater and Wellhead Protection Handbook*, U.S. Environmental Protection Agency, 1994.

The management of high-risk pollution sources is critical in the inner and intermediate protection zones. This higher level of protection can be achieved through a combination of voluntary efforts together with zoning and subdivision ordinances. Pollution in the outer zone may be managed through education, technical assistance, and best management practices.

Figure 18 illustrates some common potential pollutant sources. Table 5 on page 38 summarizes the state statutes, state and federal environmental regulations, and the state agencies that regulate these sources.

### Legal Tools for the Management of Pollution Sources

Cities and counties in Kansas also have a broad range of authority to address pollution. Several state statutes and some federal environmental laws authorize local governments to manage land use activities that threaten public safety. These tools are often used to remedy problems rather than prevent future problems from occurring.

### Abatement of Nuisances

Cities and counties in Kansas have authority under state statutes to manage pollution sources through the abatement of nuisances. State and county public health officials have long had authority to investigate nuisances that in their opinion may prove harmful to the public health within any county or municipality.

Nuisance abatement has traditionally been used by cities and counties to control weeds, rodents, junked vehicles, and other threats to public health and safety. If a local governing body determines a particular ac-
Figure 18: Common Pollutant Sources
Table 5: Laws and Regulations Governing the Management of common Pollution Sources

<table>
<thead>
<tr>
<th>Potential Pollution Sources</th>
<th>Kansas Statutes &amp; Regulations Federal Environmental Laws</th>
<th>Agency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Facilities (hazardous materials)</td>
<td>KSA 65-5 701-5711; KAR 28-1 3, 65; RCRA; EPCRA; TSCA</td>
<td>KDHE BER</td>
<td>Registration of hazardous chemicals.</td>
</tr>
<tr>
<td>Hazardous Wastes &amp; Contamination Sites</td>
<td>KSA 65-1 71, 461, 2701-2704, 3401-34, 130, 5701-5711; KAR 28-1 6-27, 31, 48, 65-1 4; CERCLA; SARA; EPCRA, RCRA</td>
<td>KDHE BER</td>
<td>Management &amp; tracking of hazardous substances from manufacture to use and disposal. Reporting requirements for spills. Assessment of waste sites to determine needed monitoring &amp; cleanup actions and responsible parties.</td>
</tr>
<tr>
<td>Salvage/Junkyards</td>
<td>KSA 68-2 202-2204; Local zoning ordinance &amp; nuisance regulations</td>
<td>KDOT Cities &amp; Counties</td>
<td>Restrictions junkyards in areas adjacent to highways, roads and streets within the state.</td>
</tr>
<tr>
<td>Solid Waste (landfills)</td>
<td>KSA 19-37; 65-3 401-34, 130; KAR 28-2 9; RCRA</td>
<td>KDHE BWM</td>
<td>Facility design, operation, maintenance, closure, and post-closure water-quality monitoring requirements.</td>
</tr>
<tr>
<td>Storage Tanks</td>
<td>KSA 65-1 71, 34, 100-3 4, 130; KAR 28-4 4;</td>
<td>KDHE BER</td>
<td>Permits, standards, &amp; inspections for spill &amp; leak prevention &amp; identification.</td>
</tr>
<tr>
<td>Nonpoint Source Pollution</td>
<td>CWA</td>
<td>KDHE BOW</td>
<td>Development &amp; implementation of state NPS plan. Coordination of NPS grants &amp; cost-share funds. Technical assistance &amp; review of local NPS plans.</td>
</tr>
<tr>
<td>Public Water Supplies</td>
<td>KSA 65-1 62-163, 171; 82a-1 201-1219; KAR 28-1 4, 15, 30; SDWA</td>
<td>KDHE BOW</td>
<td>Construction, abandonment, and plugging requirements. Drinking water standards and treatment requirements.</td>
</tr>
<tr>
<td>Confined Animal Feeding Operations</td>
<td>KSA 65-1 178-1198; KAR 28-1 8; CWA</td>
<td>KDHE BOW</td>
<td>Facilities with 300+ animal units must register with KDHE. Facilities with 1,000+ animal units must obtain a Livestock Waste Management Permit.</td>
</tr>
<tr>
<td>Fertilizers &amp; Pesticides</td>
<td>KSA 2-1 226-1232, 2438-2480; KAR 4-1 3-1-65, 4900-4984; FIFRA</td>
<td>KDA</td>
<td>Inspection &amp; registration of fertilizer products, design standards for containment facilities, standards for proper use, storage, and disposal.</td>
</tr>
<tr>
<td>Septic Systems</td>
<td>KSA 65-1 61-166, 171; KAR 28-5; CWA</td>
<td>KDHE BOW</td>
<td>Design &amp; construction requirements.</td>
</tr>
<tr>
<td>Dry Cleaners</td>
<td>KSA 65-3 4, 141; KAR 28-3 1, 68; RCRA; TSCA</td>
<td>KDHE BER</td>
<td>Requirements for registration of dry cleaning facilities, and for handling, storage, and disposal of dry cleaning chemicals (considered hazardous substances).</td>
</tr>
<tr>
<td>Wastewater Treatment Facilities</td>
<td>KSA 65-1 61-167, 171, 3301-3329; KAR 28-5, 16; CWA</td>
<td>KDHE BOW</td>
<td>Handling, treatment, and disposal requirements. Approval of facility plans. Administration of NPDES permits.</td>
</tr>
<tr>
<td>Oil, Gas, and Injection Wells</td>
<td>KAR 82-3</td>
<td>KCC</td>
<td>Drilling &amp; construction and plugging &amp; abandonment of oil, gas and injection wells.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BER</td>
<td>Bureau of Environmental Remediation</td>
</tr>
<tr>
<td>BOW</td>
<td>Bureau of Water</td>
</tr>
<tr>
<td>BWM</td>
<td>Bureau of Waste Management</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td>CWA</td>
<td>Clean Water Act</td>
</tr>
<tr>
<td>KAR</td>
<td>Kansas Administrative Regulations</td>
</tr>
<tr>
<td>KCC</td>
<td>Kansas Corporation Commission</td>
</tr>
<tr>
<td>KDA</td>
<td>Kansas Department of Agriculture</td>
</tr>
<tr>
<td>KDHE</td>
<td>Kansas Department of Health &amp; Environment</td>
</tr>
<tr>
<td>KDOT</td>
<td>Kansas Department of Transportation</td>
</tr>
<tr>
<td>KSA</td>
<td>Kansas Statutes Annotated</td>
</tr>
<tr>
<td>EPCRA</td>
<td>Emergency Planning and Community Right-to-Know Act</td>
</tr>
<tr>
<td>FIFRA</td>
<td>Federal Insecticide, Fungicide, &amp; Rodenticide Act</td>
</tr>
<tr>
<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
</tr>
<tr>
<td>NPS</td>
<td>Nonpoint Source Pollution</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
</tr>
<tr>
<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act</td>
</tr>
<tr>
<td>SCC</td>
<td>State Conservation Commission</td>
</tr>
<tr>
<td>SDWA</td>
<td>Safe Drinking Water Act</td>
</tr>
<tr>
<td>TSCA</td>
<td>Toxic Substances Control Act</td>
</tr>
</tbody>
</table>
activity threatens the quality of the public water supply, enforcing its nuisance abatement procedure could be one solution. Such a procedure usually involves notifying the violating landowner and specifying a time frame within which the landowner must voluntarily remove the nuisance or face other legal consequences.

While local governments may only enforce a nuisance abatement procedure within their respective jurisdictions, lawsuits claiming damages and seeking an injunction may be brought by any governmental entity that can prove there is a threat to the health and safety of citizens, regardless of the location of the nuisance. For example, a city may bring a nuisance lawsuit against a landowner who lives outside the city limits if the city believes that the landowner is contaminating the city’s water supply.

Local Enforcement of Federal Environmental Laws

Several federal environmental statutes provide legal authority to protect public water supplies. The Clean Water Act, for example, addresses the pollution of water resources that are used for public water supplies. It expressly authorizes municipal enforcement of federal and state wastewater discharge limitations against point sources of wastewater, such as industrial wastewater treatment plants. Under the Resource Conservation and Recovery Act, a city can take legal action against a person or company that is threatening public water supplies by improperly disposing of solid or hazardous wastes.

One of the major advantages for a city considering use of these federal statutes is that there are no jurisdictional or boundary limitations with which to contend. The fact that the source of any actual or potential pollution is outside of the city’s land use jurisdiction does not prevent a city from taking legal action to enforce the applicable federal law.

CHAPTER 6 – Implementation of a Water-Quality Protection Program

This section highlights issues associated with the implementation of a local water-quality protection program. Some of the considerations involved in strategy selection, interlocal cooperation, securing qualified staff, continuing communication with the community, financing, compliance and evaluation methods, and other policy/administrative considerations are discussed.

Selecting Water-Quality Protection Strategies

Determining a course of action involves making difficult choices. There is no single formula or approach that is appropriate for all places. Nor is there any guarantee that a particular course of action will positively succeed. Local officials need to make judgements regarding local needs, capacity and preferences. In some cases, a community will want to approach the task of water-quality protection in a comprehensive manner. Others may prefer to deal with specific issues individually. Following are several issues to consider in choosing your approach:

Remedial versus Preventive

A community can always wait until a problem arises with the quality of their drinking water. While technology exists to treat many water-quality problems, this situation generally creates a crisis atmosphere. The time and cost of cleanup are usually prohibitive. In general, it is best to avoid the problem all together by recognizing the value of pollution prevention.

Comprehensive versus Limited Scope

Many communities may not feel they have the skills, capacity, or resources to undertake a comprehensive water-quality protection program. If this is the case, there certainly is value to a more limited approach. Increasing educational outreach, emphasizing BMPs in technical outreach assistance, or revising the county sanitary code with greater sensitivity to drinking water protection are all valuable contributions. The important consideration with a limited approach is to focus on high risk potential pollutant sources first.

General Pollution Prevention versus Special Management Areas

Another choice local officials need to make is whether to approach pollution prevention efforts generally, regardless of where it occurs, versus focusing efforts on a special management area such as a wellhead protection zone. Focusing has the advantage of being able to tailor strategies to the unique characteristics of the area.

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Establish protection areas  Implement protection activities  Evaluate management activities

Figure 19: Implementing the Plan
Long-term versus Short-term Strategies

The element of time will need to be considered in the context of planning. A community probably cannot do everything at once. Some aspects of the program will likely be implemented over time. The important consideration is to ensure the actions taken today help build toward long-term program needs. Such a long-term perspective should be incorporated into all the strategies selected.

Regulatory versus Voluntary Approaches

A balance between effective and politically acceptable management strategies will need to be achieved. For many, the idea of additional regulation is not a comfortable alternative. A compelling argument, however, is that while one person may have additional regulatory responsibilities, another is protected from damages or the unfair burden of pollution. Both voluntary and regulatory strategies have their place in an effective strategy.

Interlocal Cooperation

Implementation of a water-quality protection program requires cooperation between the city or rural water district and county. To avoid duplication, the city and county commissions may consider adopting an interlocal agreement for implementation. After examining the staffing capacity and functional expertise of city and county departments, it may be most efficient to authorize one unit to serve both incorporated and unincorporated areas of the county. Similarly, there are considerable benefits associated with joint city-county planning that extend to many matters of growth and development. Such cooperation may be beneficial to achieving the most efficient and effective implementation program. Additional information related to interlocal cooperation is included in Appendix D of the Technical Resource Guide.

Interagency Cooperation

The challenge in meeting water-quality goals often lies in determining who should take what action within a system of shared rights and responsibilities. Figure 20 illustrates the relationships among different levels of government. The federal government is shown as the outermost ring, with the state and various local units of government shown within. Each level of government exercises various means of influencing the others. For example, the federal government uses both mandates and incentives to facilitate action by the state, as depicted by the inward arrows. Similarly, the state uses various types of influence to facilitate action by local units. At times, the federal government may interact directly with local levels of government.

The direction of influence is not necessarily one way. While a broader level of government may mandate action, it is generally not without some sensitivity to the rights and constraints of lower levels of government. Indeed, lower levels of government can and do hold broader levels of government accountable in many ways. The influence depicted by the outward arrows is often not appreciated or understood by local officials.
Local units of government have considerable latitude in exercising their rights and responsibilities in protecting the quality of water resources. While many cities and counties chafe under the perception of mandates from broader levels of government, the reality is that much of the responsibility and decision-making affecting water quality falls to the local level. For water quality to be preserved and enhanced, local officials need to recognize and exert both their rights and responsibilities for action.

The interrelationships shown in Figure 20 also depict a model for water-quality planning. Because water resources generally span municipal boundaries, interlocal cooperation is critical in most cases to achieve an effective program. The various legal and institutional rights held by local units of government suggest that they must work cooperatively to utilize the resources and authority needed for effective action.

A simplified single-county situation is shown in Figure 20. Other local and regional stakeholders will likely include rural water districts, local environmental protection programs, and conservation districts. Each stakeholder has different rights, expertise, and authority for action. The cooperation among these entities (represented in Figure 20 by the three inner rings) provides an opportunity for communication, planning, and decision-making. Relationships and resources with state and federal agencies can also be utilized to achieve local water-quality protection goals.

**Staffing Concerns**

City/county staff are critical to the successful implementation of a water-quality protection program. Staff will need knowledge of local groundwater and/or surface water resources and the protection tools that make up the program. The more knowledgeable local staff become with water resource and quality issues, the easier it will be for them to make sound recommendations to local decision-makers. Knowledgeable staff should be able to:

- Understand why certain water resources are in need of protection;
- Evaluate potential pollution threats to the community’s water supply;

*Figure 20: Interagency Cooperation and Influence*
- Effectively administer and enforce local ordinances;
- Identify problems and challenges to implementation; and
- Evaluate the success of the protection program.

Local government staff, especially in smaller communities, are unlikely to have experience in all aspects of water-quality protection. Similarly, existing staff may not have the capacity to assume many new responsibilities associated with an aggressive water protection program. Following are ideas to help strengthen staff resources:

### Upgrading Skills for Existing Staff

- Broaden the skills of existing staff with in-house training programs in areas such as water-resource assessment, hydrogeology, environmental law, and land-use planning. Arrange training opportunities through KDHE, state universities, local community colleges, and K-State Research and Extension.
- Budget for staff participation in state and regional environmental conferences to upgrade staff knowledge and skills, and to form relationships with external resource providers.
- Use informal means to increase the knowledge and skills of existing staff by seeking out information resources and technical expertise from state and federal agencies, such as K-State Research and Extension, KDHE, and EPA. Appendix C in the Technical Resource Manual includes information about state and federal agencies and the types of assistance they can offer to cities and counties in developing water-quality protection programs.

### Utilizing Existing External Resources

- Make full use of state and federal agencies who have formal responsibilities related to water protection. Establish relationships with agency personnel to learn about their responsibilities and available programs and be the first in line to request assistance.
- Establish a relationship with specialists at K-State Research and Extension, state universities and community colleges. Offer your community as a test site, demonstration site, or a student project community.
- Contract with consulting firms to perform specific studies and projects that are beyond the technical expertise of city/county staff.

### Seeking Creative Staffing Solutions

- Seek state or federal financial assistance to hire additional staff to lead the local implementation program for a limited term under existing pollution prevention programs.
- Purchase services from nearby cities and counties that currently have staff with specialized skills in areas of planning, law, or the environment.
- Work with other municipalities to share the cost of a new staff position or to contract for specialized studies. Where external consultants are needed, negotiate reduced rates for bundling two or three studies together.
Contact K-State Research and Extension or other universities to suggest they hire and train a specialist who would be available on a contract basis to perform certain studies or other services.

**Identifying Local Staff Responsibilities**

City and county staff will be the individuals implementing most aspects of the water-quality protection program. In reviewing the many functions common to most local governments, it is apparent that cities and counties have a significant resource pool with which to work. Table 6 identifies several common local government departments and identifies potential contributions each may make to a water-quality protection program.

**Continuing Outreach Education**

Communication with citizens and stakeholders does not end with the completion of a water-quality protection plan. Many of the strategies for protecting water quality will require voluntary compliance by citizens and businesses. Other strategies may require modifying permitting procedures or new regulatory requirements. Finally, the city and county commission will want citizens to know about the progress made in protecting water resources. Thus, continuing education and communication is an important component of an effective water-quality protection plan.

All city and county departments involved in some aspect of implementation should be asked to create a specific plan for informing affected stakeholders about procedural changes and new responsibilities. Staff from the county Extension office or local health department can initiate a long-term public education program. Extension staff can create educational resource materials for distribution through other county departments.

There are numerous educational/communication alternatives available. Among the more common are a local speaker’s bureau and a water-quality project newsletter. Numerous educational resource materials are identified in Appendix A of the Technical Resource Manual.

**Financing Water-Quality Protection Programs**

Among the primary concerns local officials often have is where the money will be found to take on new responsibilities. There remain a number of important financial assistance programs available from federal and state sources that can help with parts of the planning and implementation. In some cases it may require creativity to demonstrate that what a community wants to do fits into the objectives of the grant or loan program.

One of the most common types of programs targets individuals (usually farmers) with cost-sharing and technical assistance to improve land management practices. A water-quality management plan should heavily promote the use of these programs. On the community side, several programs can assist with building or upgrading municipal water and wastewater treatment systems. There are
Table 6: Local Government Functions and Potential Roles in Water-Quality Protection

<table>
<thead>
<tr>
<th>Department/Position</th>
<th>Potential Water-Quality Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commission/Council</td>
<td>▪ Goal setting and policy application consistency</td>
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<tr>
<td></td>
<td>▪ Implementation monitoring</td>
</tr>
<tr>
<td>City/County Manager</td>
<td>▪ Overall leadership &amp; coordination</td>
</tr>
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<td></td>
<td>▪ Implementation monitoring</td>
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<tr>
<td>Attorney/Legal Advisors</td>
<td>▪ New ordinance development and review</td>
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<td></td>
<td>▪ Compliance enforcement</td>
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<tr>
<td>County Extension</td>
<td>▪ General public education</td>
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<tr>
<td></td>
<td>▪ Agriculture and home technical assistance and BMPs</td>
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<tr>
<td></td>
<td>▪ Pesticide handling</td>
</tr>
<tr>
<td>Emergency Management &amp; Fire Department</td>
<td>▪ Hazardous materials inventory</td>
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<tr>
<td></td>
<td>▪ Pollution potential assessment</td>
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<tr>
<td></td>
<td>▪ Hazardous spills</td>
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<tr>
<td>Conservation District</td>
<td>▪ Agricultural technical assistance and BMPs</td>
</tr>
<tr>
<td></td>
<td>▪ Incentives / Cost-share programs</td>
</tr>
<tr>
<td>Public Health</td>
<td>▪ General public education</td>
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<td></td>
<td>▪ Onsite wastewater treatment</td>
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<td></td>
<td>▪ Nuisance abatement</td>
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<td>▪ Enforcement</td>
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<td></td>
<td>▪ Private well testing</td>
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<td></td>
<td>▪ Water-quality data collection and assessment</td>
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<td></td>
<td>▪ Inspection programs</td>
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<td></td>
<td>▪ Consultation with families and businesses</td>
</tr>
<tr>
<td>Weed Control</td>
<td>▪ Pesticide storage and application practices</td>
</tr>
<tr>
<td>Planning and Zoning</td>
<td>▪ Overall planning consistency</td>
</tr>
<tr>
<td></td>
<td>▪ Pollution source inventory and mapping</td>
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<td></td>
<td>▪ New ordinance development</td>
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<td></td>
<td>▪ Development code review</td>
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<td></td>
<td>▪ Plat and site review</td>
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<td></td>
<td>▪ Enforcement</td>
</tr>
<tr>
<td>Roads and Highways</td>
<td>▪ Salt storage and road salting practices</td>
</tr>
<tr>
<td></td>
<td>▪ Road and bridge construction erosion control</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>▪ Landfills / transfer stations</td>
</tr>
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<td></td>
<td>▪ Recycling centers</td>
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<tr>
<td></td>
<td>▪ Household and agricultural hazardous waste</td>
</tr>
<tr>
<td>Engineering / Public Works</td>
<td>▪ Delineation of protection areas</td>
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<td></td>
<td>▪ Risk assessment</td>
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<tr>
<td></td>
<td>▪ Pollution source inventory</td>
</tr>
<tr>
<td>Water, Wastewater and other Utilities</td>
<td>▪ Hazardous materials storage and handling</td>
</tr>
<tr>
<td></td>
<td>▪ Sludge disposal practices</td>
</tr>
</tbody>
</table>
also a few programs that can help with technical assistance, consulting fees, and staffing costs to put environmental protection plans in place.

It is important to stress that securing new or free financing is not the primary limiting factor to implementing a water protection program. Much can be accomplished with existing resources. Appendix E in the accompanying *Technical Resource Manual* contains additional information about funding opportunities.

**Evaluating Program Compliance and Success**

It is important that the water-quality protection program include mechanisms to ensure compliance and measure success in meeting water-quality protection goals. This includes the success of both voluntary and regulatory compliance. The program will have fewer compliance problems if the requirements are detailed and clear, and if there are standards, criteria, or other ways of measuring the success of voluntary or regulatory activities. Communities should clearly designate who will be responsible for evaluation activities. It is also important to identify who will take action and what steps will be taken if it is determined the community is not meeting its goals.

Evaluation may include various types of measures:
- Educational programs conducted;
- Written communications documented;
- Consultations completed;
- Water-quality monitoring;
- Financial incentives awarded;
- Technical assistance provided;
- Inspections conducted;
- Permits issued;
- Licenses issued;
- Publication of specific rules documented; and
- Progress reports demonstrating compliance.

Incentives and technical assistance are perhaps the most effective ways to encourage compliance.

Several state agencies offer programs that provide financial and technical assistance to local governments, businesses, farmers, landowners, and homeowners in implementing best management practices, facility improvements, or other actions designed to protect water-quality. See Appendix E in the accompanying *Technical Resource Manual* for information about potential funding sources.

Cities and counties should look for innovative ways to reduce the costs associated with compliance activities. It may be possible to combine these activities with other local government programs. For example, the department responsible for issuing building permits may be able to ensure that best management practices or design standards in subdivision regulations are incorporated into new construction or major renovations of buildings or facilities.

Compliance can also be achieved through “self-enforcement of standards.” Under this approach, individuals or businesses subject to specific requirements, such as best management practices, document their compliance activities on a regular basis.
Policy and Administrative Considerations

There are several policy concerns and administrative actions that communities should undertake in the implementation of the protection program. The city and county commission’s primary responsibilities are to ensure policies are carried out. Commissioners can increase the likelihood of success in several ways:

- Ensure the policy is clear and that instructions for implementation are consistent and clear;
- Ensure that staffing levels are adequate, that staff have sufficient training and authority, and have the resources necessary to implement policies;
- Assist department heads in establishing appropriate priorities when resources are scarce or conflicts arise; and
- Establish a mechanism for periodic reporting of progress in achieving water-quality protection goals.

Other administrative actions that can be taken to further project implementation:

- Department heads can review the departmental mission and functions, and develop written guidelines indicating how water quality will be considered;
- Planning staff or attorneys can review existing plans and ordinances to ensure water-quality goals are incorporated throughout;
- Establish mechanisms to regularly communicate water-quality priorities to all employees;
- Establish procedures for regularly gathering data related to water-quality objectives; and
- Establish a long-term strategy for securing additional resources or redirecting priorities to carry out water-quality responsibilities.
Conclusion

Because communities face different water-quality problems, no single water-quality protection tool or combination of tools can be prescribed as best for all communities. Sometimes, a relatively simple approach will work. In an agricultural area, for example, where the only threat to water quality comes from livestock operations, a single tool, such as best management practices for animal feedlots, may be sufficient to protect groundwater or surface water resources. Similarly, in an undeveloped protection area with affordable land prices, a land acquisition or conservation easement program may be the most effective means of ensuring water quality.

In other situations, a more complex protection program may be needed. For example, a community could create a wellhead or watershed protection district as an overlay zone to existing zoned areas. Within the overlay zone, the use of septic systems could be limited and new construction could be subject to site plan review. Or, if the community is concerned about potential leaks from underground storage tanks, it could direct its efforts at helping tank owners upgrade their facilities.

Communities can develop effective programs to protect groundwater and surface water resources. All it takes to get started is an understanding of local hydrogeologic conditions, a familiarity with the appropriate protection tools, and the motivation to protect water resources.
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