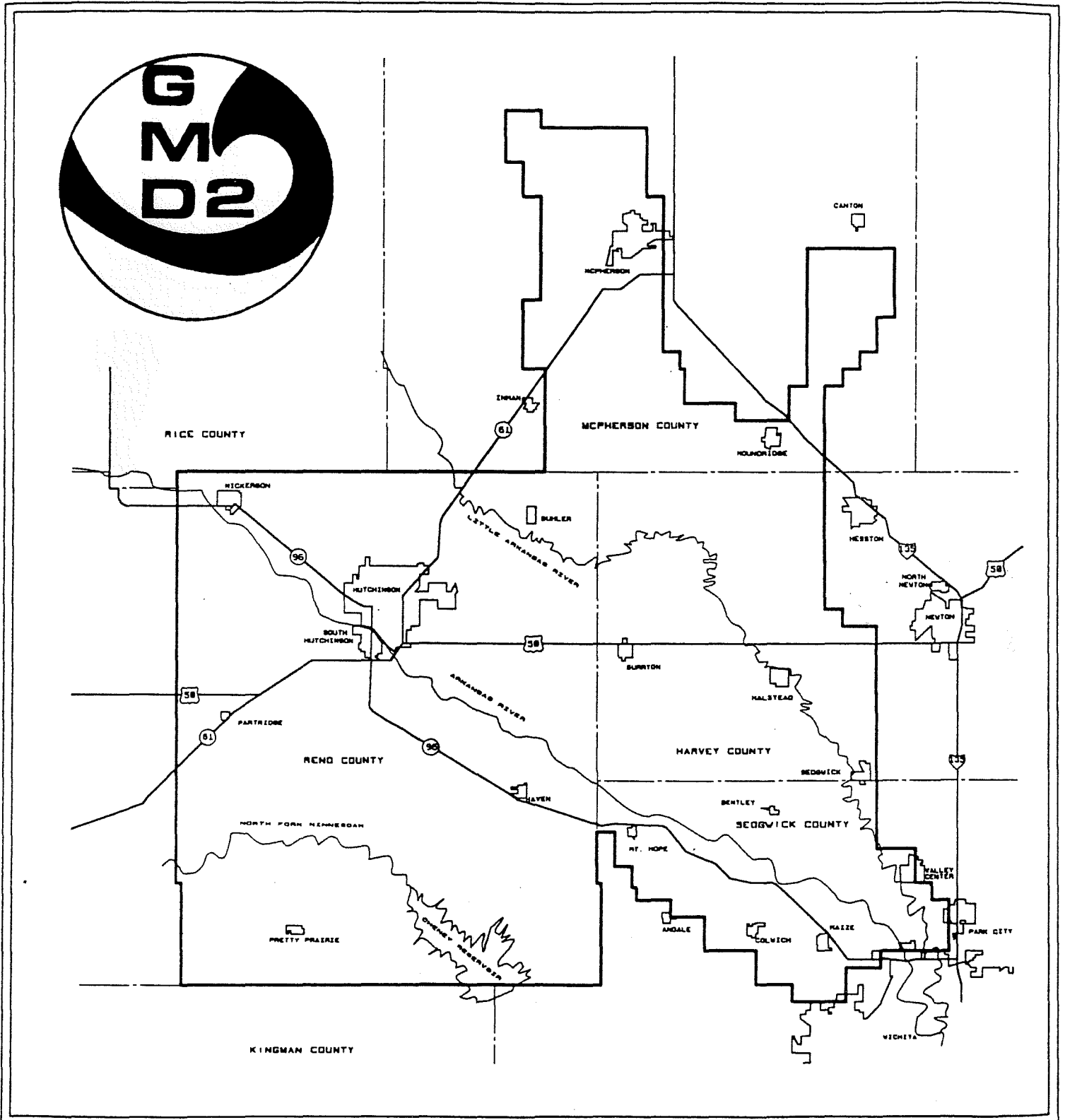


EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2 MANAGEMENT PROGRAM



MAY 1, 1995

EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2

MANAGEMENT PROGRAM

EFFECTIVE MAY 1, 1995

BOARD OF DIRECTORS

OFFICERS		COUNTY OF RESIDENCE	TERM EXPIRES
Craig Gibson	President	Reno	1998
Tim Maier	Vice President	McPherson	1997
Dennis Clennan	Secretary	Reno	1998
Charles Pauls	Treasurer	McPherson	1996

DIRECTORS

Gerald T. Blain	Member	Sedgwick	1996
Galen Flickner	Member	McPherson	1998
Brad Franz	Member	Harvey	1997
Gene Gruenbacher	Member	Sedgwick	1996
Jeff Reimer	Member	Reno	1997

**A RESOLUTION BY THE BOARD OF DIRECTORS
OF THE
EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2**

RESOLUTION ME-95-1

**ADOPTING THE MANAGEMENT PROGRAM
OF THE
EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2**

WHEREAS the District has prepared and submitted to the Chief Engineer, Division of Water Resources, State Board of Agriculture, a Revised Management Program on January 3, 1995;

WHEREAS the District has submitted modifications to the January 3, 1995 Revised Management Program to the Chief Engineer on March 21 and 28, 1995,

WHEREAS the Chief Engineer has reviewed the Revised Management Program and approved the same on March 31, 1995; and


WHEREAS the Board of Directors fixed a time and place for a public hearing upon the Revised Management Program in Halstead, Kansas, on April 11, 1995, and published notice setting forth the time and place of the hearing, in four newspapers of general circulation within the District at least 28 days prior to the hearing; and

WHEREAS the public hearing was held in Halstead, Kansas, on April 11, 1995, and the Board of Directors heard and considered all relevant testimony and information;


THEREFORE be it resolved by the Board of Directors of the Equus Beds Groundwater Management District No. 2, in accordance with the provisions of K.S.A. 82a-1029, that the Revised Management Program, dated January 3, 1995 and approved by the Chief Engineer on March 31, 1995, is now adopted.

BE IT FURTHER RESOLVED that the Revised Management Program will become effective on May 1, 1995, and that all applications filed with the Chief Engineer on or after May 1, 1995, will be subject to the provisions of the Revised Management Program.

DATED THIS 11nd DAY OF APRIL 1995, BY THE BOARD OF DIRECTORS OF THE EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT AT A REGULAR MEETING.



Craig Gibson, President
EQUUS BEDS GROUNDWATER
MANAGEMENT DISTRICT NO. 2



Attested: Dennis Clennan, Secretary
EQUUS BEDS GROUNDWATER
MANAGEMENT DISTRICT NO. 2

EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2 GROUNDWATER MANAGEMENT PROGRAM

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INTRODUCTION

The Equus Beds aquifer is the principal source of fresh and usable water in south central Kansas. The aquifer underlies portions of a four-county area which is about 900,000 acres in size.

There are 1,620 non-domestic water wells that withdraw an average of 157,000 acre-feet from the aquifer (51.2 billion gallons) each year. Industrial usage accounts for about 15 percent of the average total; irrigation accounts for 50 percent; and municipal accounts for 34 percent. Other uses account for one percent.

The Equus Beds Groundwater Management District No. 2 was formed in 1975 to manage groundwater supplies within its boundaries, figure 1. The Equus Beds aquifer is managed on two fundamental management principles: 1) Aquifer Safe-yield Principle which limits groundwater withdraws to annual groundwater recharge; and 2) Groundwater Quality Principle which seeks to maintain by protection and remediation the naturally occurring water quality of the aquifer.

This Management Program is a comprehensive aquifer management plan that was developed, adopted and implemented by the Board of Directors of the Equus Beds Groundwater Management District No. 2 to carry out these two management principles.

HISTORY

K.S.A 82a-1020. Legislative declaration. It is hereby recognized that a need exists for the creation of special districts for the proper management of groundwater resources of the state; for the conservation of groundwater resources; for the prevention of economic deterioration; for associated endeavors within the state of Kansas through the stabilization of agriculture; and to secure for Kansas the benefit of its fertile soils and favorable location with respect to national and world markets. It is the policy of this act to preserve basic water use doctrine and to establish the right of local water users to determine their destiny with respect to the use of the groundwater insofar as it does not conflict with the basic laws and policies of the state of Kansas. It is, therefore, declared that in the public interest it is necessary and advisable to permit the establishment of groundwater management districts.

FORMATION

Legislation permitting the formation of Groundwater Management Districts was passed by the Kansas Legislature in 1972. An initial meeting was held in Burrton, Kansas, to determine if sufficient interest existed to warrant formation of the District. It was the decision of those attending the meeting that formation of the District was an important step in preventing serious groundwater problems in the Equus Beds aquifer.

A task force of representatives from Harvey, McPherson, Reno and Sedgwick counties was formed, and a steering committee of seven members was selected from the 16-member task force. The steering committee worked in conjunction with the State Advisory Committee to establish a workable District area and to insure that the District's purpose was consistent with the laws and policies of the state of Kansas. Boundaries of the proposed District were approved by the Chief Engineer on August 19, 1974.

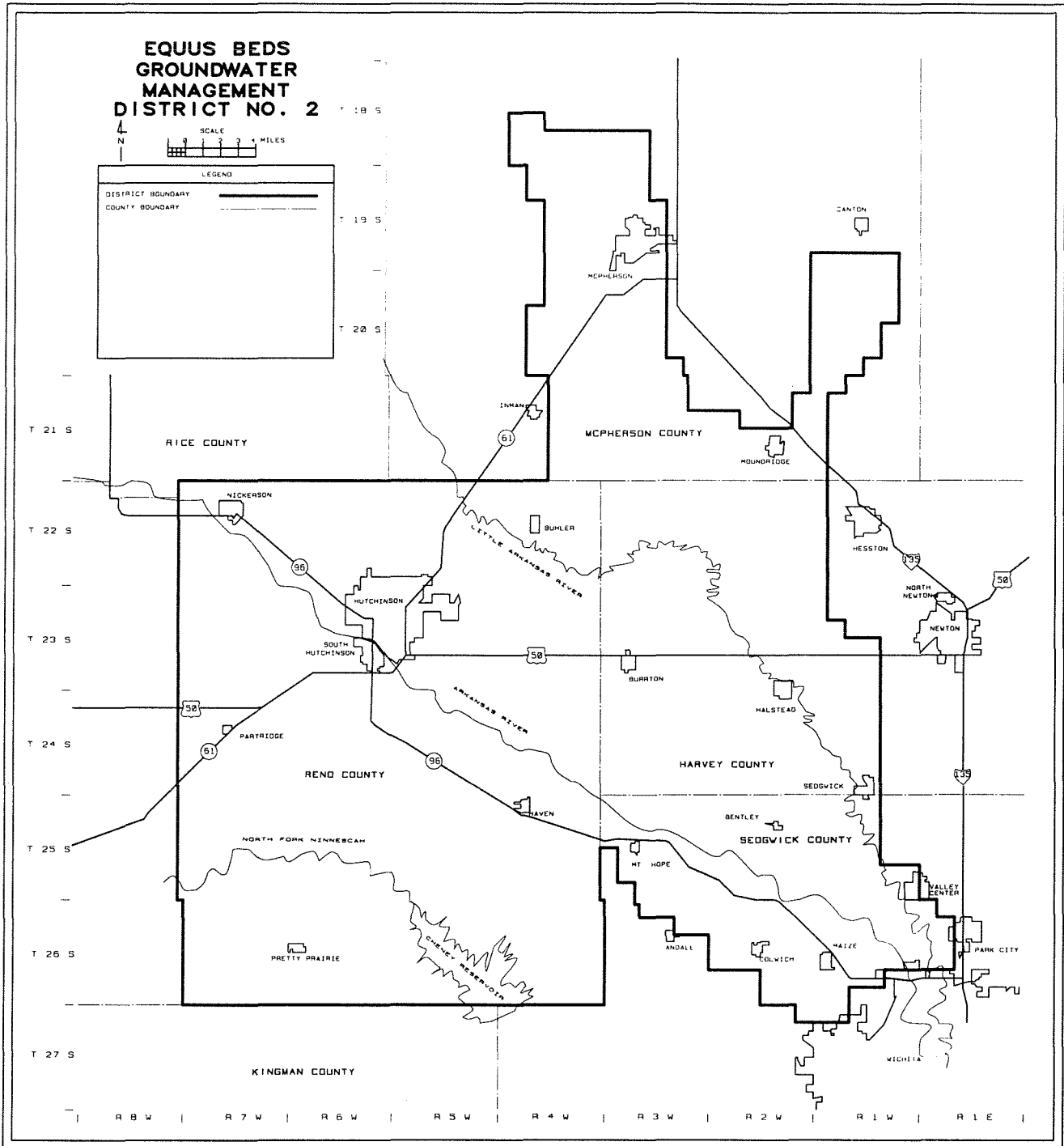


Figure 1. Equus Beds Groundwater Management District No. 2

An election was held on May 27, 1975, to determine if the District would be formed. Two hundred and forty-two voters cast votes in favor of forming the District and fifty-one voted against its formation. The Secretary of State issued a Certificate of Incorporation on May 30, 1975, which was filed in the Register of Deeds offices in Harvey, Reno, and Sedgwick counties on June 5, 1975, and in McPherson County on June 6, 1975. The Equus Beds Groundwater Management District No. 2 was the second such District to be formed in the State of Kansas.

The District boundaries remained unchanged from 1975 until 1988 when Reno county landowners and water users petitioned the Equus Beds Groundwater Management District Board of Directors to expand District boundaries in the eastern half of Reno County. Under authority of K.S.A. 82a-1033, the Chief Engineer, approved an extension of District boundaries effective December 20, 1988. The certified copy of the Chief Engineer's order approving the extension of the District was filed with the Secretary of State on January 4, 1989. It was filed for record in the office of the Register of Deeds of Reno County on January 4, 1989, Harvey County on January 18, 1989, McPherson County on February 3, 1989 and Sedgwick County on February 17, 1989.

Since formation of the Equus Beds Groundwater Management District No. 2, three additional groundwater management districts have been established, as shown in figure 2.

PROGRAM AND DEVELOPMENT

K.S.A. 82a-1029. Before undertaking active management of the district the board shall prepare a management program.

An aquifer management program was developed and implemented by the Board of Directors in 1976. It is a comprehensive plan which sets forth standards, policies, goals and objectives by which the Board of Directors manages the District's groundwater resources. The management program consists of three major components: 1) Information and Education; 2) Data Collection and Research; and 3) Administration and Regulation.

In 1984 the District initiated a service and information program for the general public and District water users. The District has averaged about 1,120 service and information requests each year since the program was implemented. Data collection and research efforts were launched by the District in 1977. Today, the District samples, measures and collects data from hundreds of sites, manages numerous hydrologic data bases and participates in local, state and federal research projects.

Beginning in 1979, District standards and policies were developed and adopted and in 1982 the Board adopted the first set of state rules and regulations. The standards and policies and rules and regulations are used to implement and administrate the District's aquifer management program. The District is governed by a Board of Directors which represents agricultural, domestic, industrial and municipal water users. Board meetings are open to the public and are held monthly. The agenda of each meeting includes time to hear groundwater resource concerns of the public.

The Board employs a manager and staff to administrate the aquifer management program and day-to-day operations of the District. An assessment is levied on land and water use to finance District operations.

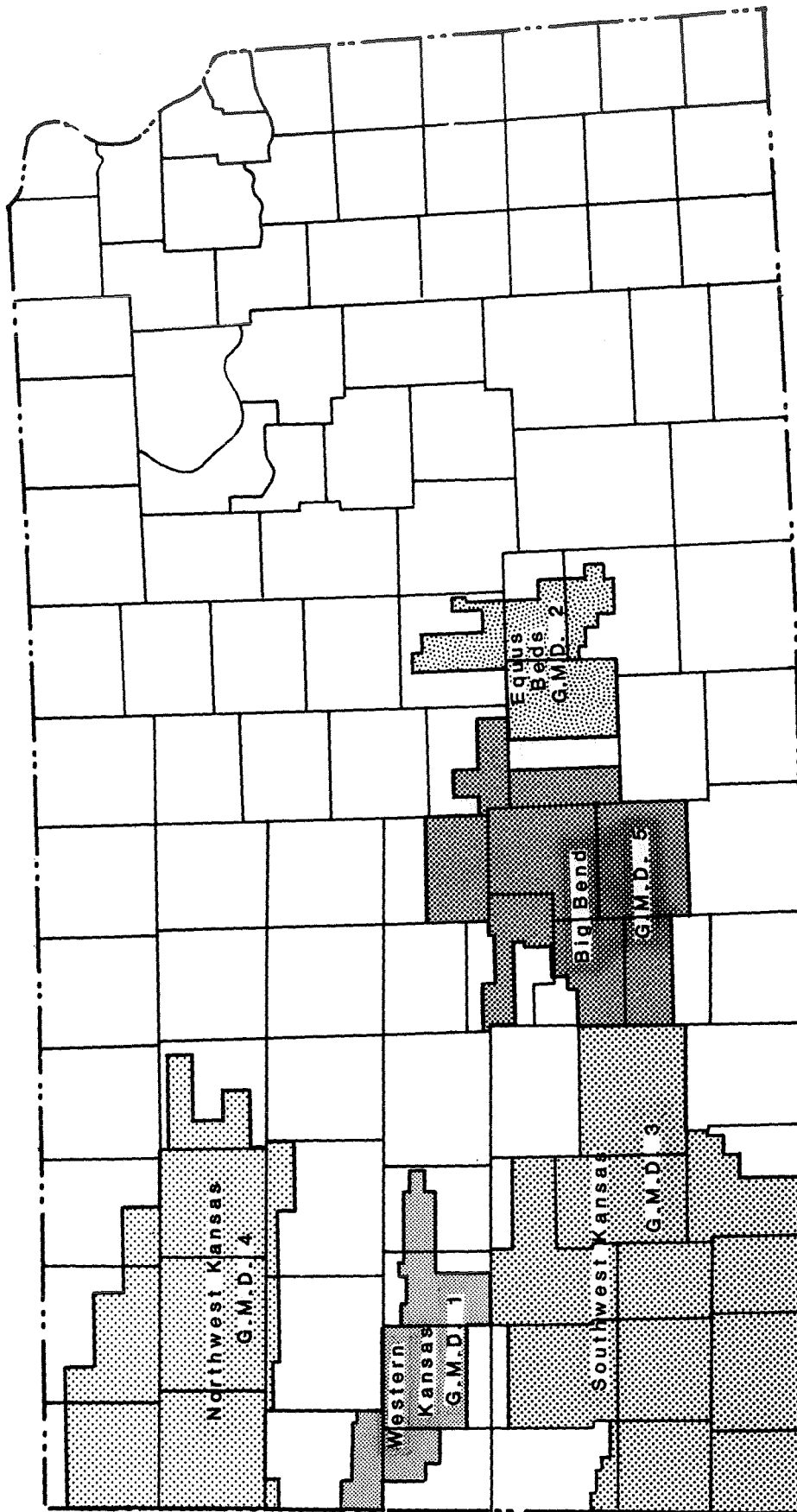


Figure 2. Groundwater management districts in Kansas.

PURPOSE

K.S.A 82a-1020. It is the policy of this act to preserve basic water use doctrine and to establish the right of local water users to determine their destiny with respect to the use of the groundwater insofar as it does not conflict with the basic laws and policies of the state of Kansas.

The purpose of the Equus Beds Groundwater Management District No. 2 and its Board of Directors is to properly manage groundwater resources of the District for the benefit of the resource and the public interest. The Aquifer Safe-yield Principle and the Groundwater Quality Principle are fundamental to such management.

GOALS

K.S.A 82a-1020. Legislative declaration. It is hereby recognized that a need exists for the creation of special districts for the proper management of groundwater resources of the state; for the conservation of groundwater resources. It is the policy of this act to preserve basic water use doctrine and to establish the right of local water users to determine their destiny with respect to the use of the groundwater insofar as it does not conflict with the basic laws and policies of the state of Kansas.

It is the goal of the Equus Beds Groundwater Management District No. 2 to manage the groundwater supplies within its boundaries by balancing groundwater withdrawals with annual recharge to the aquifer to prevent groundwater mining and protect the natural water quality of the aquifer and remediate groundwater contamination.

ACTIONS

The District will carry out its goal in the following ways:

- manage the Equus Beds aquifer on a "safe yield" principle;
- educate and inform the public on groundwater issues;
- monitor both quality and quantity of water in the aquifer;
- investigate or study the physical and hydrologic characteristics of the aquifer;
- investigate alternative sources of water;
- encourage reclamation or recycling of waste water;
- investigate ways to improve recharge and prevent its deterioration;
- support legislative changes which enhance good groundwater management practices; and
- cooperate with appropriate local, state and federal agencies and organizations.

DESCRIPTION

LOCATION AND AREA

The Equus Beds Groundwater Management District No. 2 is located in south central Kansas and occupies portions of McPherson, Harvey, Reno and Sedgwick counties. It is 878,720 acres in size and includes 167,680 acres in western Harvey County, 140,160 acres in southern McPherson County, 460,800 acres in eastern Reno County and 110,080 acres in northwestern Sedgwick County. The District lies exclusively within the eastern most region of the Great Bend Prairie physiographic province, except for its eastern edge which is in the Flint Hills Upland province, figure 3.

CLIMATE

The climate is best described as subhumid. Important geologic features impacting the area include the Rocky Mountains and the Gulf of Mexico. The mountains to the west prevent major rainfall from Pacific fronts, and the Gulf of Mexico is the source of much of the District's precipitation. In this region masses of warm, moist air from the Gulf collide with the cold dry air from the Arctic region to create a wide range of weather conditions. Summers are usually warm and humid but can be very hot and dry. The winters are usually mild, with brief periods of extremely cold weather.

TEMPERATURE

The mean annual temperature in the District is 56 degrees Fahrenheit. The highest and lowest recorded temperatures at two stations are 117 degrees Fahrenheit and -27 degrees Fahrenheit at McPherson and 114 degrees Fahrenheit and -22 degrees Fahrenheit at Wichita. The average date of the last killing frost ranges from April 6 in the southern part of the District to April 22 in the northern part. The average date of the first killing frost in the fall is October 16 in the northern part of the District and October 31 in the southern part. The average growing season ranges from 177 to 208 days.

PRECIPITATION

RAINFALL

Most precipitation is in the form of rain with smaller amounts coming from snow or sleet. Historical precipitation records show the wettest years receiving over 50 inches and the driest years receiving less than 15 inches, figure 4. Seventy percent of the annual rainfall occurs from April through September. Total annual rainfall averages about 30 inches with the south and east portions of the District having slightly more and the north and west slightly less.

Amounts of rain falling during one storm are variable but seldom exceed two inches during a twenty-four-hour period. Frequency of rainfall also varies. Normally, at least 0.1 inch is received in a three week period. Brief, severe thunderstorms are quite common in the spring and summer and are usually accompanied by heavy rain, high wind or large hail.

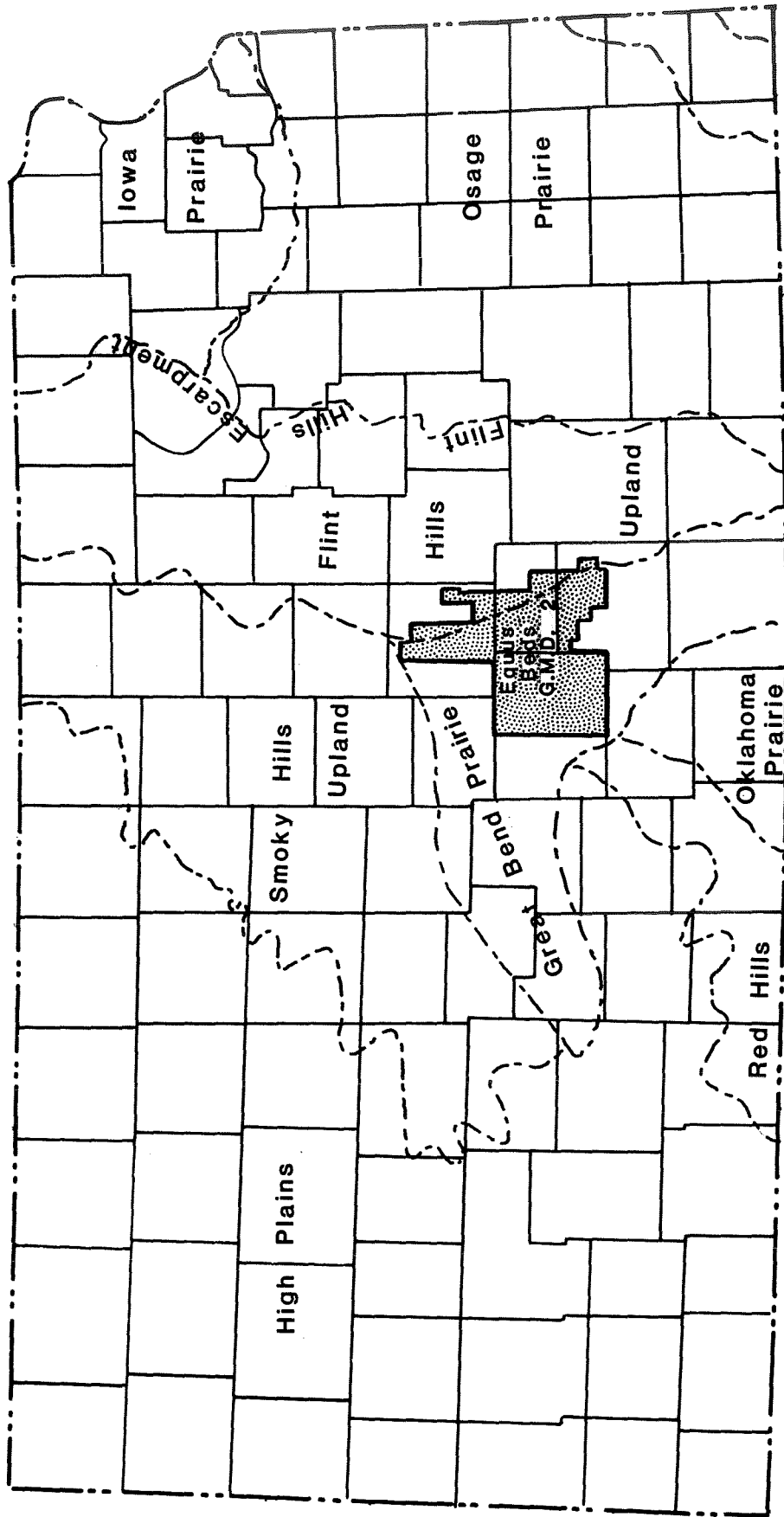


Figure 3. Physiographic regions in Kansas

SNOW

Annual snowfall is normally 15 inches, falling periodically from December through March. However, monthly snowfalls in excess of 20 inches and 24-hour snowfalls of more than 13 inches have been recorded. Although snowfall adds little recharge to the aquifer, it is of considerable value for the protection it can offer to exposed cropland by providing insulation and reducing evaporation by winter winds. The nature or type of snow ranges widely but it is generally accepted that 12 inches of snow is the equivalent of one inch of rain.

WIND

Prevailing wind direction is from the south with the windiest period from March to April. July has the least wind. Wind speed averages about 12 m.p.h. with March and April averaging 14 m.p.h. Strong north winds occur from late fall through early spring and are associated with cold fronts.

EVAPORATION

As a process, evaporation is influenced by moisture, temperature and wind. The rate of evaporation in the District increases from east to west. The free-water-surface evaporation ranges from 52 inches along the eastern side to 56 inches on the western side. The average annual rate for the District is 54 inches a year. The relatively high mean wind speed enhances evaporation during the summer.

HUMIDITY

Evaporation continually replenishes moisture in the air, and humidity becomes apparent during periods of low wind velocity. Relative humidity tends to cycle through the day, rising at night, decreasing during the day, then increasing again until the following morning. Long-term records show a mean relative humidity of 73 percent at 12:00 midnight, 80 percent at 6:00 a.m., 56 percent at 12:00 noon and 55 percent at 6:00 p.m..

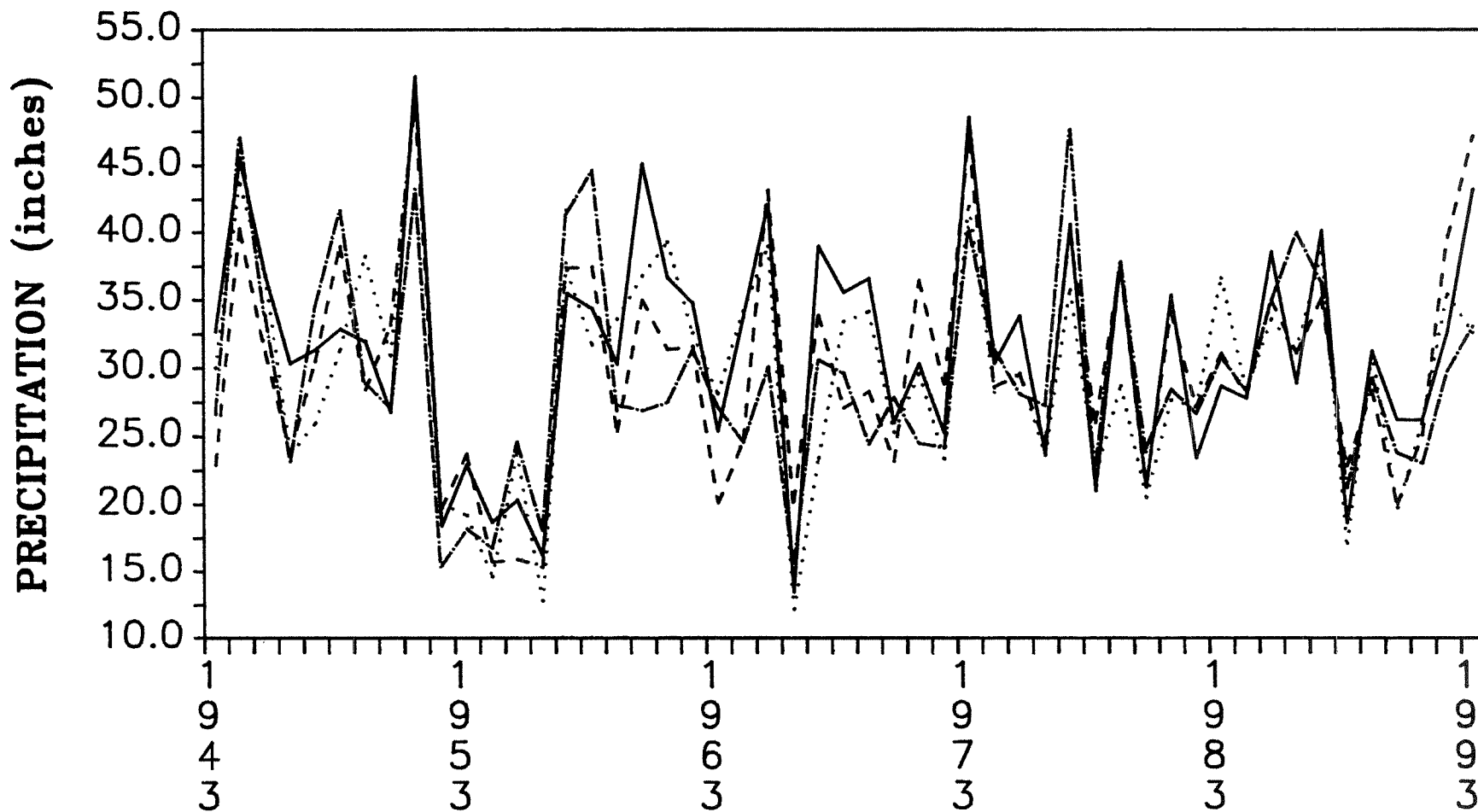
GEOLOGY

TOPOGRAPHY

The District's surface topography is mainly a flat plain whose surface is modified by the presence of sand dunes, shallow depressions, rivers and their tributaries.

A major belt of sand dunes extends southeastward from Rice County across Reno County between the northern edge of the Arkansas River Valley and the Little Arkansas River to an eastern terminus northeast of Burrton in Harvey County. Smaller isolated sand dunes are located between Kisiwa Creek and the Arkansas River and east of Halstead.

GROUNDWATER MANAGEMENT DISTRICT NO. 2 ANNUAL PRECIPITATION 1943-1993



— HARVEY -- MCPHERSON -·- RENO ··· SEDGWICK

DATA SOURCE: NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
PREPARED BY: EQUUS BEDS GMD#2

Figure 4. Annual precipitation by county, 1943 - 1993.

Land surface elevations range from a low of 1,200 feet above sea level in the southeast near Wichita to a high of 1,650 feet above sea level near Hutchinson in the northwest. The area was once prairie with robust stands of native grasses. Originally trees were limited to flood plains and river bottoms due to fire, foraging and moisture limitations. The fertile soils and climate makes the area ideal for conversion from native grasses to food and feed grains.

SOIL ASSOCIATION

Soils mapping by the Natural Resources Conservation Service identifies Lancaster-Hedville-Edalگو, Ladysmith-Goessel, Pratt-Carwile, Farnum-Shellabarger and Bethany-Tabler as the major soil associations occurring in the District. County soil surveys published by the Natural Resources Conservation Service in cooperation with the Kansas Agricultural Experiment Station describe these major soil associations.

Lancaster-Hedville-Edalگو Association: Moderately deep and shallow, moderately sloping and strongly sloping, well drained and somewhat excessively drained soils that have a loamy or silty subsoil; on uplands. This association is on the tops and sides of ridges dissected by entrenched drainage ways in McPherson County. It is about 35 percent Lancaster soils, 16 percent Hedville soils, 11 percent Edalگو soils and 38 percent minor soils.

The association is used mainly as range. Some of the less sloping areas are used for cultivated crops, including wheat and grain sorghum. Controlling erosion and conserving moisture are the main management needs in cultivated areas.

Ladysmith-Goessel Association: Deep, nearly level and gently sloping, moderately well drained soils that have a dominantly clayey subsoil; on uplands. This association is on broad ridges and narrow side slopes dissected by drainage ways and creeks. It is about 80 percent Ladysmith soils, 15 percent Goessel soils and five percent minor soils. The association is located in the southwest part of McPherson County and extends southward into Harvey County.

Wheat and grain sorghum are the chief crops grown on the association. Measures that help to control water erosion and conserve moisture are the main management needs.

Pratt-Carwile Association: Deep, nearly level, imperfectly drained soils that have a clayey subsoil and well-drained, sandy, hummocky soils. The areas of this association are in the western and northeastern part of Reno County, extending into Harvey County.

About 40 percent of the association is Pratt soils, about 35 percent is Carwile soils, about 20 percent is Naron soils and about five percent is Tivoli soils. In most of the association, the soils are cultivated, but the Tivoli soils are mainly in grass. Grain sorghum and wheat are commonly grown in the cultivated areas, but sorghum is better suited than wheat because of the hazard of wind erosion.

Farnum-Shellabarger Association: Deep, brownish, loamy soils over somewhat sandy or gravelly material on sloping and dissected outwashed plains. This association occupies a large area through the central part of Reno County. Deep Farnum and Shellabarger soils make up about 75 percent of this association; Albion soils that are shallow over gravel make up about 10 percent; and Carwile and Pratt soils and breaks and alluvial land along drainage ways make up the rest.

Wind and water erosion are a hazard on the soils of this association. Also, the Albion soils are droughty. Small grains, sorghum and alfalfa are grown on this association, and much of the acreage of Albion soils has been seeded to native grass. The areas of breaks and alluvial land along small streams are mostly in native grass.

Bethany-Tabler Association: Deep, dark, nearly level to gently sloping, loamy soils that have a clayey subsoil. Nearly level or gently sloping, dark soils are in this association. The soils are loamy and have a clayey subsoil. The association occupies a portion of southeastern Reno County, extending into Sedgwick County.

Bethany and Tabler soils make up about 90 percent of this association. Deep, reddish Smolan soils and deep, brownish Vanoss soils make up about ten percent of this association. The Smolan and Vanoss soils are steeper than the Bethany and Tabler soils and occupy slopes along the valley of the Little Arkansas River. The Smolan soils are especially susceptible to water erosion. Wheat, sorghum and alfalfa are commonly grown on this association.

BEDROCK

The bedrock surface underlying the younger unconsolidated deposits in the District is formed on rocks of the Nippewalla and Sumner Groups, both of Lower Permian age.

The Harper Sandstone (Nippewalla Group) forms a bedrock surface along the extreme western edge of the District in Reno County. It subcrops along a line between Range 7 and 8 west. The Harper Sandstone consists of brownish-red siltstone and silty shale with a few thin beds of silty sandstone. It may yield no water or as much as 100 gallons per minute to wells. The water may be of poor chemical quality.

To the east of the Harper Sandstone, rocks of the undifferentiated Stone Corral Formation and Ninnescah Shale (Sumner Group) comprise the bedrock surface in Townships 18, 19 and 21 through 23 south, Range 4 west and Townships 24 through 26 south, Ranges 3 and 4 west. The Stone Corral Formation consists of anhydrite and gypsum while rocks of the Ninnescah Shale consist of soft to hard, red to grayish-green shale, siltstone, and very fine grained silty sandstone. The Stone Corral Formation is not known to yield water to wells. The Ninnescah Shale may yield water of fair to poor chemical quality to wells located in outcrop areas in southeastern Reno County.

The eastern portion of the District was formed on rocks of the Wellington Formation (Sumner Group). The Wellington Formation is divided into three distinct units. The lower Wellington member is sometimes referred to as the "anhydrite beds". It consists of gray shale, and some dolomite with thin anhydrite and gypsum beds.

The middle unit or Hutchinson Salt Member consists of salt interbedded with small amounts of shale, gypsum and anhydrite. The salt unit averages about 300 feet in thickness. The upper Wellington member is in contact with the Ninnescah Shale. The upper member consists mainly of gray shale with small amounts of gypsum, anhydrite, dolomite and sandstone.

Two major channels known as the McPherson and Ancestral Arkansas River Channels were cut into the bedrock surface by rivers or streams during late Pliocene and early Pleistocene time. As shown in figure 5, the McPherson Channel extends southward from McPherson County to southeast of Hutchinson where it converges with the Ancestral Arkansas River Channel.

The ancestral river in the McPherson Channel was captured by the Smoky Hill River to the north. After the capture, the river in the Ancestral Arkansas River Channel became the dominant river, entering the northwestern edge of the District and flowing southeastward.

A bedrock ridge or high is located just north of the Ancestral Arkansas River Channel and trends northwest to southeast terminating just south of Burrton. A saddle was formed in the ridge at the confluence of the McPherson and Ancestral Arkansas River Channels.

HYDROLOGY

SURFACE WATER

RIVERS

The Arkansas River and its tributaries are the principle drainage system in the District. A major tributary of the Arkansas River is the Little Arkansas River that flows through the central part of the District. The southwestern part of the District is drained by the North Fork Ninnescah River, also a tributary of the Arkansas River. A small area in the extreme northern part of the District is drained by tributaries of the Smoky Hill River, a part of the Kansas River system. Surface drainage is chiefly to the southeast, except for the area that is drained to the north by tributaries of the Smoky Hill River.

Other tributaries to the Arkansas River are Cow, Salt, Big Slough and Cowskin creeks. Tributaries to the Little Arkansas River are Kisiwa, Emma, Blaze Fork, Turkey, and Black Kettle Creeks; tributary to the North Fork Ninnescah is Red Rock Creek; tributaries to the Smoky Hill River are Paint, Sharps and Indian Creeks.

The U. S. Geological Survey in cooperation with the state of Kansas maintains and collects data from several streamflow-gauging stations.

Little Arkansas River at Alta Mills (Station #07143665): This station has a drainage area of 736 square miles with 55 square miles noncontributing. Its period of record is from June of 1973 to the present and the gauge used is a water-stage and groundwater level recorder and is equipped with satellite telemeter. The average discharge for the period from 1973 to 1991 was 189 cubic feet per second or 137,100 acre-feet per year. The streamflow extremes range from a maximum of over 30,100 cubic feet per second in October of 1973 to a minimum of 0.0 cubic feet per second in August of 1991.

Little Arkansas River at Sedgwick (Station #07144100): This station was established in the fall of 1993. The gauge is a water-stage and groundwater level recorder and is equipped with satellite telemeter. Basic and statistical data were not available, due to period of record.

Little Arkansas River at Valley Center (Station #07144200): This station has a drainage area of 1,327 square miles with 77 square miles noncontributing. Its period of record is from June 1922 to the present. The gauge is a water-stage and groundwater level recorder and is equipped with satellite telemeter. The average discharge for the period from 1922 to 1991 was 284 cubic feet per second or 205,600 acre-feet per year. Streamflow extremes for this station range from a high of 32,000 cubic feet per second in April of 1945 to a low of 1.1 cubic feet per second recorded in October of 1956.

Arkansas River near Hutchinson (Station #07143330): The drainage area for this station is 38,910 square miles with 7,186 square miles noncontributing. The period of record is from October 1959 to the present. The gauge is a water-stage and groundwater level recorder and is equipped with satellite telemeter. The station is located about three miles north of Haven. Average discharge for the period from 1959 to 1991 was 512 cubic feet per second or 370,800 acre-feet per year. Extreme flows for this station range from a maximum of 24,700 cubic feet per second in September of 1973 to a minimum of 27 cubic feet per second in October of 1980.

Arkansas River near Maize (Station #07143375): The river at this point drains 39,110 square miles of which 7,186 square miles is noncontributing. The period of record is from March 1987 to the present. The gauge is a water-stage recorder. The average flow for the station for the period from 1987 to 1991 was 222 cubic feet per second. The maximum streamflow recorded was 14,300 cubic feet per second in March of 1987 and a minimum flow of 3.5 cubic feet per second in October of 1991.

Arkansas River at Derby (Station #07144550): This station is outside the District and has a drainage area of 40,830 square miles with 7,263 square miles noncontributing. The gauge for the station is a water-stage recorder and is equipped with satellite telemeter. The period of record is from October of 1968 to the present with an average discharge for the period from 1968 to 1991 of 1,053 cubic feet per second or 762,800 acre-feet per year. Streamflow extremes for the period are a high of 43,400 cubic feet per second in October of 1973 and a low of 83 cubic feet per second in October of 1991.

North Fork Ninescaw River above Cheney Reservoir (Station #07144780): The drainage area for this recording station is 787 square miles with 237 square miles noncontributing. The gauge is a water-stage recorder and it is equipped with satellite telemeter. Records have been maintained on the station from 1965 to the present. Average discharge for the period was 145 cubic feet per second or 104,800 acre-feet per year. Extreme flows vary from a high of 39,700 cubic feet per second in October of 1979 to a low of 0.0 flow in July of 1966 and again in August of 1968.

North Fork Ninescaw River at Cheney Dam (Station #07144795): This station is located 1,400 feet downstream from Cheney Dam and is subject to considerable artificial control. It is located outside District boundaries. The drainage area is 901 square miles with 237 square miles noncontributing. Records have been maintained from October of 1964 to the present. The gauge is

a water-stage recorder. Average streamflow for the period of record was 112 cubic feet per second. The maximum discharge during that time was 1,910 cubic feet per second in April of 1969 and the minimum discharge recorded was no flow at various times through out the period of record.

RESERVOIR

Cheney Reservoir is the only major reservoir in the District. The reservoir dam was completed in 1964 on the North Fork Ninescah River in southeastern Reno County. It is a compacted earthfill dam and is used for supplemental water supply for municipal and industrial uses in the City of Wichita, fish and wildlife conservation, flood control and recreational purposes. Total capacity is 566,300 acre-feet.

The U. S. Geological Survey in cooperation with the State of Kansas maintains and collects data from a water-stage recorder at the reservoir.

Cheney Reservoir near Cheney (Station #07144790): The drainage area for this recording station on Cheney Reservoir extends over an area of 901 square miles of which 237 square miles is considered noncontributing. Records have been maintained on this station from November of 1964 to the present. The gauge is a water-stage recorder and it is equipped with satellite telemeter. Storage of water in the reservoir began in November of 1964. Extremes for the period from 1964 to 1991 range from a maximum elevation of 1,429 feet containing 250,300 acre-feet in November of 1979 to a minimum elevation 1,412 feet containing 93,300 acre-feet in December of 1971.

USE

The Little Arkansas River and its tributaries are the chief source of water for irrigation use. About 22 diversion points on the Little Arkansas River and its tributaries diverted 735 acre-feet for irrigation use in 1992.

The North Fork Ninescah River supplies Cheney Reservoir with water for municipal and industrial use. The City of Wichita is the reservoir's single water user. Municipal and industrial use for the period from 1989 to 1993 averaged 25,400 acre-feet. Extremes for the period ranged from a high of 29,114 acre-feet in 1990 to a low of 20,733 acre-feet in 1992. Less than 200 acre-feet were diverted from the North Fork Ninescah for irrigation and recreational use.

GROUNDWATER

HIGH PLAINS AQUIFER

The Equus Beds aquifer is part of a regional aquifer system known as the High Plains aquifer system. The regional aquifer extends into Colorado, Nebraska, New Mexico, Oklahoma, South Dakota, Texas and Wyoming. The Equus Beds aquifer forms the eastern most portion of the regional aquifer system in Kansas. It derives its name from Equine fossils found in unconsolidated deposits underlying the entire District.

The Equus Beds aquifer was formed during the Quaternary Period between 700,000 to 1,000,000 years ago. Depositional, erosional and structural processes were the main forces that formed it.

Erosion from through-flowing rivers or streams and subsidence from the solution of portions of the underlying Hutchinson Salt member reshaped the ancestral land surface. Deep troughs or channels were cut into bedrock. Later deposition by streams, rivers and wind filled the channels with unconsolidated deposits of clay, silt, sand and gravel. The thickness of the deposits range from 300 feet in the McPherson Channel to almost 350 feet in the Ancestral Arkansas River Channel.

The portions of the unsaturated deposits were later saturated with water from rainfall, rivers and streams to form a groundwater reservoir known as the Equus Beds aquifer.

Depth to groundwater below land surface ranges from less than ten feet to 110 feet , as shown in figure 6. Depth to water in the northern portion of the District is greater and ranges from 40 feet to 110 feet; in the southern portion it is less, ranging from less than ten to 40 feet.

The water table gradient varies in the District from less than four feet per mile to as much as 17 feet per mile. In general, the regional gradient is about five to six feet per mile. Figure 7 shows the shape and slope of the water table.

Groundwater flow is perpendicular to water table contour lines. As shown in figure 7, the direction of flow varies in the District. In the southern part of the District, regional flow is southeasterly; in the northeastern part flow is south to southwest; in the extreme northern part of the District in McPherson County flow is northwest; and flow in northeastern Reno County is to the northeast. Groundwater velocity or movement is very slow and ranges from 300 feet to 500 feet a year.

As shown in figure 8, the saturated thickness of the Equus Beds aquifer ranges from less than 50 feet to 300 feet. Areas of greatest thickness correspond to the McPherson and Ancestral Arkansas River bedrock channels. Areas of least thickness are associated with highs or ridges in the bedrock surface.

RECHARGE

Recharge is a continuous process that adds water directly to the aquifer. Several natural sources of water make up the total recharge supply for the Equus Beds aquifer. Of these sources, precipitation contributes the greatest amount to groundwater recharge. Annually, 30 inches of precipitation fall on the land surface overlying the Equus Beds aquifer. Due to geologic, hydrologic and climatic conditions, about 80 to 90 percent of annual precipitation will either drain into streams or rivers, evaporate back to the atmosphere or be used by plants or people.

Factors which affect the rate which precipitation is recharged include surface topography, vegetation, temperature, evaporation, soil properties, subsurface conditions and depth to aquifer's water table. Throughout the southern two-thirds of the District, recharge conditions are favorable with 20 percent or six inches of precipitation returned to aquifer annually. In the northern one-third, conditions are less favorable and only 10 percent or three inches of annual precipitation recharges the aquifer.

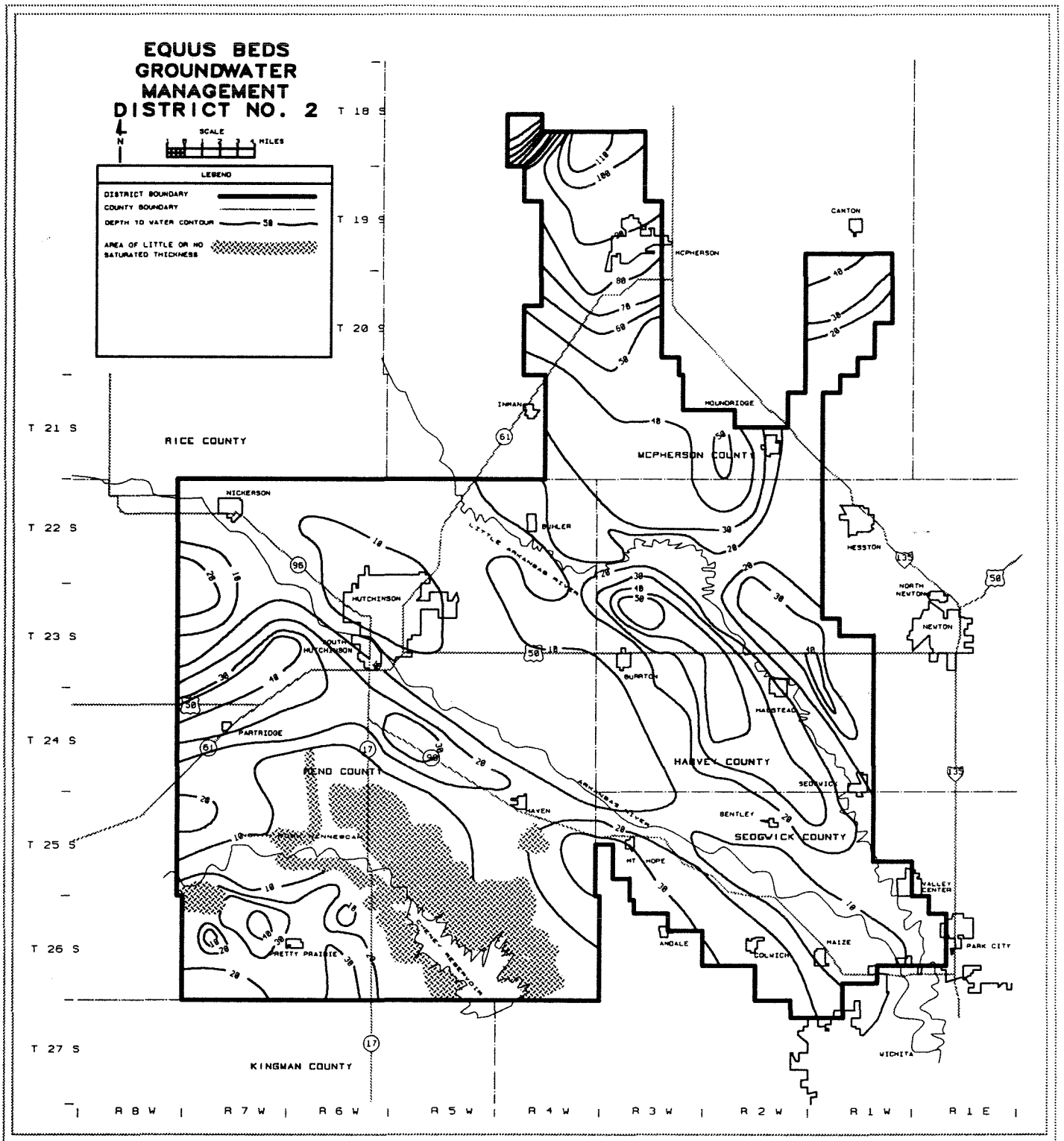


Figure 6. Depth of water below land surface of the Equus Beds aquifer.

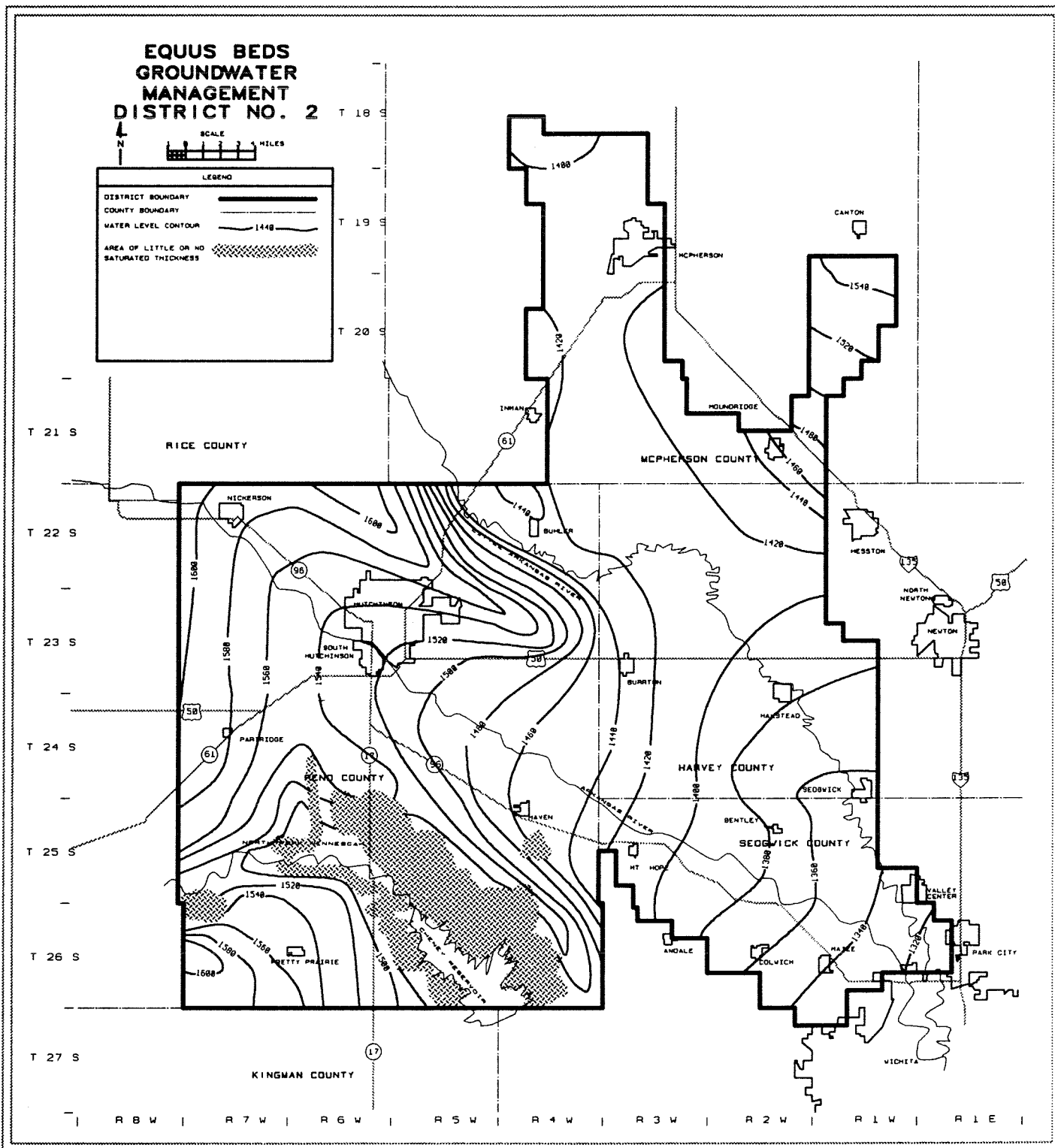


Figure 7. Water table configuration of the Equus Beds aquifer.

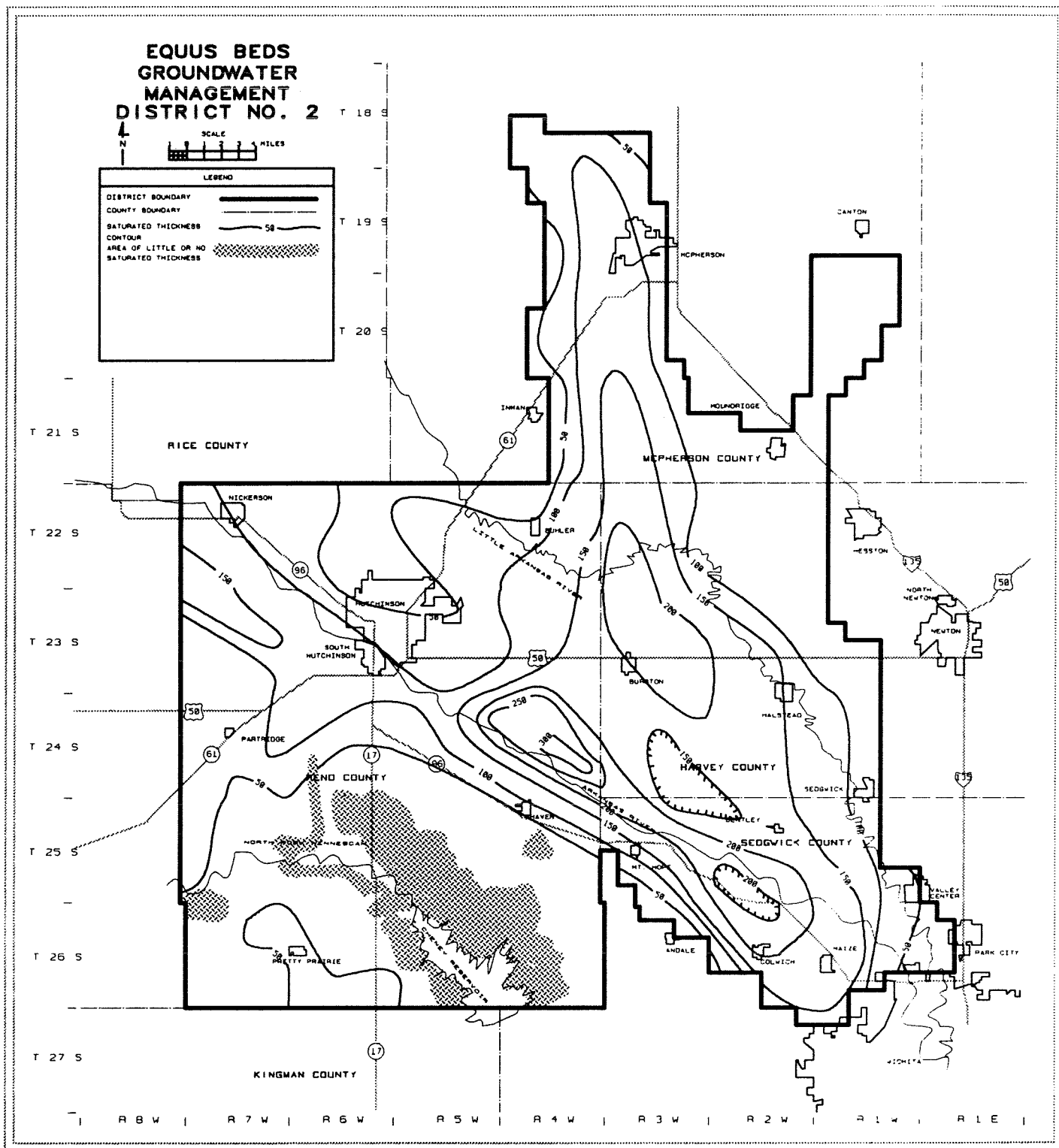


Figure 8. Saturated thickness of the Equus Beds aquifer.

In general, the best times of the year for recharge occur in the spring and fall months, when temperature and plant growth are minimal.

Other sources of recharge include inflow from adjacent aquifers and infiltration of streamflow. Groundwater moves into the Equus Beds aquifer laterally as inflow along the western edge of the District. When the aquifer's water table is lower than the water level in a river or stream, water will seep or infiltrate below the stream channel to the aquifer.

DISCHARGE

Groundwater discharges are continuous natural and man-made processes including outflow, baseflow, evaporation, transpiration, and withdrawals by wells.

The Equus Beds aquifer loses water to adjacent aquifers in the southeastern and extreme northern portions of the District, as groundwater moves laterally from the aquifer.

Baseflow is groundwater that seeps, flows or is naturally discharged from the aquifer to rivers or streams. Baseflow conditions exist when the water table is higher than the water level in the rivers or streams. Previous studies by the Kansas and U.S. Geological Surveys, concluded that low flows in the Arkansas, Little Arkansas, and the North Fork Ninnescah rivers are maintained by discharge from the Equus Beds aquifer. The Little Arkansas River obtains about eight percent of its total flow from baseflow, amounting to 18,000 acre-feet per year discharged from the aquifer to the river. To account for the baseflow discharge to the Little Arkansas River, the District established and maintains 215 baseflow nodes on the Little Arkansas River. The nodes are spaced 1,320 feet apart and extend from near Medora to Wichita.

In areas where the water table intersects or is near land surface, groundwater evaporates from the water surface or through soil pores and transpires from plants with roots that intercept the water table.

Presently, about 1,620 wells withdraw water from the aquifer for industrial, municipal, irrigation, recreational and stockwater uses. A myriad of small yielding domestic wells also tap the aquifer.

WATER QUALITY

In general the inorganic quality of groundwater in the District is good and suitable for most uses. However, groundwater contamination from natural and man-made sources has occurred in the District.

Oil field brine contamination in western Harvey county has rendered water in portions of the Equus Beds aquifer unsuitable for most uses. In the contaminated areas, chloride concentrations, an indicator of brine, range from 500 mg/l to 8,000 mg/l. Prior to the contamination, chlorides were less than 150 mg/l.

Salinity problems also occur in an area along the Arkansas River from Hutchinson to Wichita and south of the Arkansas River northwest of Hutchinson.

High iron concentrations are associated with areas where groundwater was contaminated from oil field brine and in the sand dune areas. However, iron concentrations can vary greatly from place to place and at different depths in the same well.

Portions of the aquifer in southeastern Reno County have nitrate concentrations that exceed the Environmental Protection Agency drinking water maximum contaminant level of ten mg/l. Water quality data for public water supply wells in the 100 square mile area shows nitrate concentration exceeding maximum contaminant level since 1967.

USE

Groundwater is the principal source of fresh water for most uses in the District. The three leading uses are industrial, irrigation and municipal.

There are 1,620 water wells pumping from the Equus Beds aquifer. Of these wells, ten percent were industrial wells; 73 percent were irrigation wells; 13 percent were municipal wells; and the remaining four percent were hydraulic dredging, remediation, recreational and stockwater wells.

Total usage for the period from 1981 to 1993 has remained fairly constant, except during periods of precipitation extremes. Water usage ranged from a high of 197,651 acre-feet (64.4 billion gallons) in 1991 to a low of 111,690 acre-feet (36.4 billion gallons) in 1986. The average annual usage for the period of record was 157,350 acre-feet (51.3 billion gallons).

Industrial usage accounted for about 15 percent of the average total; irrigation usage accounted for 50 percent; and municipal usage accounted for 34 percent. Other uses were one percent of the total average usage.

For the period of record, industrial usage averaged 24,462 acre-feet and usage ranged from a high of 28,330 acre-feet in 1989 to a low of 19,690 acre-feet in 1986; irrigation usage averaged 77,921 acre-feet and ranged from a high in 1991 of 110,240 acre-feet to a low in 1986 of 50,210 acre-feet; municipal usage averaged 53,031 acre-feet and ranged from a high of 56,920 acre-feet in 1989 to a low of 44,400 acre-feet in 1986.

Table 1 provides a summary of water usage data for the period of record for each county and for the District. Figures 9, 10, 11 and 12 show the usage for each county and figure 13 shows District usage.

INDUSTRY

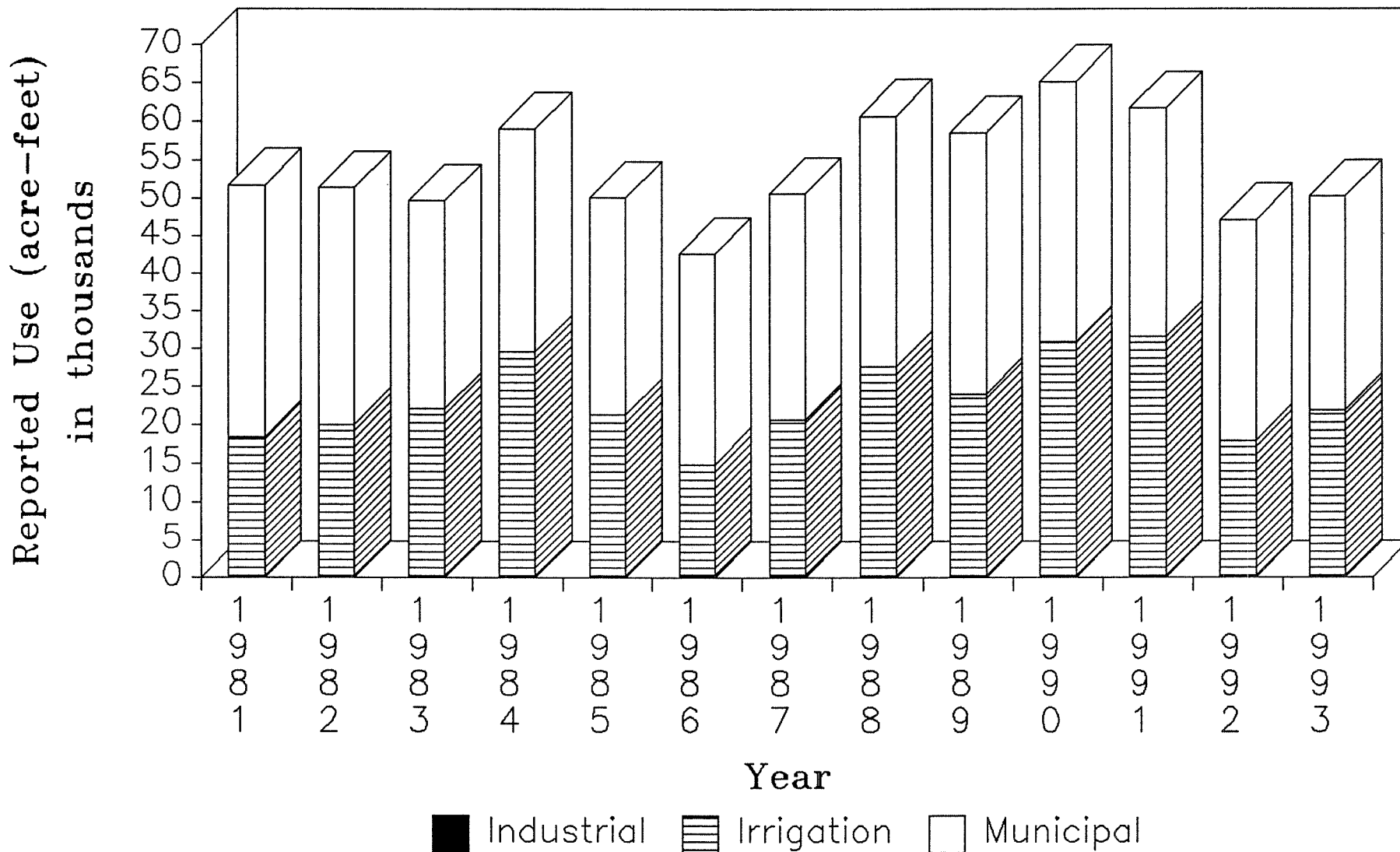
The centralized geographic location of the area, good transportation routes, availability of substantial quantities of good quality water and reasonable prices for energy, labor and raw materials are factors which are conducive to development of industry.

HARVEY COUNTY	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
INDUSTRIAL	249	271	96	92	262	388	329	120	96	110	114	115	43
IRRIGATION	18,144	19,783	22,014	29,578	21,076	14,522	20,291	27,488	23,901	30,807	31,442	17,765	21,864
MUNICIPAL	33,403	31,412	27,657	29,432	28,819	27,800	30,035	33,140	34,568	34,338	30,152	29,313	28,357
OTHER	1,570	838	1,362	740	347	266	395	390	454	319	752	496	264
COUNTY TOTAL	53,368	52,305	51,130	59,843	50,506	42,978	51,050	61,140	59,019	65,576	62,460	47,689	50,528
RENO COUNTY													
INDUSTRIAL	14,214	14,066	15,602	16,011	15,453	14,359	18,537	19,794	21,549	19,069	19,303	19,659	20,397
IRRIGATION	9,857	10,106	13,542	19,116	19,076	9,876	13,262	18,416	17,302	21,575	22,068	12,186	17,244
MUNICIPAL	6,657	6,474	7,525	8,649	7,876	5,826	7,234	6,712	8,184	8,917	8,644	7,644	7,605
OTHER	53	47	63	38	32	34	36	7	21	2,611	2,681	2,925	3,517
COUNTY TOTAL	30,783	30,694	36,734	43,816	42,439	30,096	39,070	44,931	47,056	52,173	52,696	42,414	48,763
MCPHERSON COUNTY													
INDUSTRIAL	4,067	3,391	2,496	3,105	3,008	2,978	2,870	3,439	3,890	3,159	3,046	3,022	3,272
IRRIGATION	13,499	14,792	16,580	23,277	13,221	12,856	15,020	20,236	19,177	26,929	27,685	9,635	18,200
MUNICIPAL	3,939	3,794	4,221	4,460	3,724	3,718	3,932	4,392	4,271	4,491	4,376	3,150	3,581
OTHER	0	0	0	0	0	0	0	12	13	111	306	426	241
COUNTY TOTAL	21,507	21,978	23,298	30,844	19,954	19,552	21,822	28,081	27,351	34,691	35,413	16,233	25,294
SEDGWICK COUNTY													
INDUSTRIAL	6,436	6,435	4,654	3,450	2,517	1,961	2,056	2,948	2,793	3,039	3,981	2,871	2,818
IRRIGATION	20,027	22,868	21,262	25,647	17,430	12,954	19,617	26,292	22,949	27,318	29,044	16,229	17,920
MUNICIPAL	9,087	9,842	9,203	9,933	14,298	7,055	8,994	10,034	9,894	8,635	13,577	15,188	15,228
OTHER	99	37	307	159	198	51	69	85	73	547	480	760	950
COUNTY TOTAL	35,651	39,184	35,428	39,190	34,444	22,022	30,736	39,361	35,709	39,541	47,082	35,048	36,916
DISTRICT													
INDUSTRIAL	24,969	24,164	22,850	22,660	21,242	19,687	23,792	26,303	28,328	25,379	26,444	25,667	26,530
IRRIGATION	61,529	67,551	73,399	97,620	70,804	50,209	68,190	92,433	83,329	106,630	110,239	55,815	75,228
MUNICIPAL	53,088	51,524	48,608	52,476	54,718	44,401	50,197	54,281	56,917	56,382	56,749	55,295	54,771
OTHER	1,723	923	1,733	938	578	352	500	495	561	3,589	4,219	4,607	4,972
DISTRICT TOTAL	141,310	144,162	146,591	173,694	147,344	114,650	142,680	173,513	169,135	191,981	197,651	141,384	161,501

Note: Usage values are units of acre-feet. One acre-foot equals 325,851 gallons.

Table 1. Summary of water usage data by county and District.

GROUNDWATER MANAGEMENT DISTRICT NO. 2 REPORTED GROUNDWATER USE FOR HARVEY COUNTY (1981-1993)

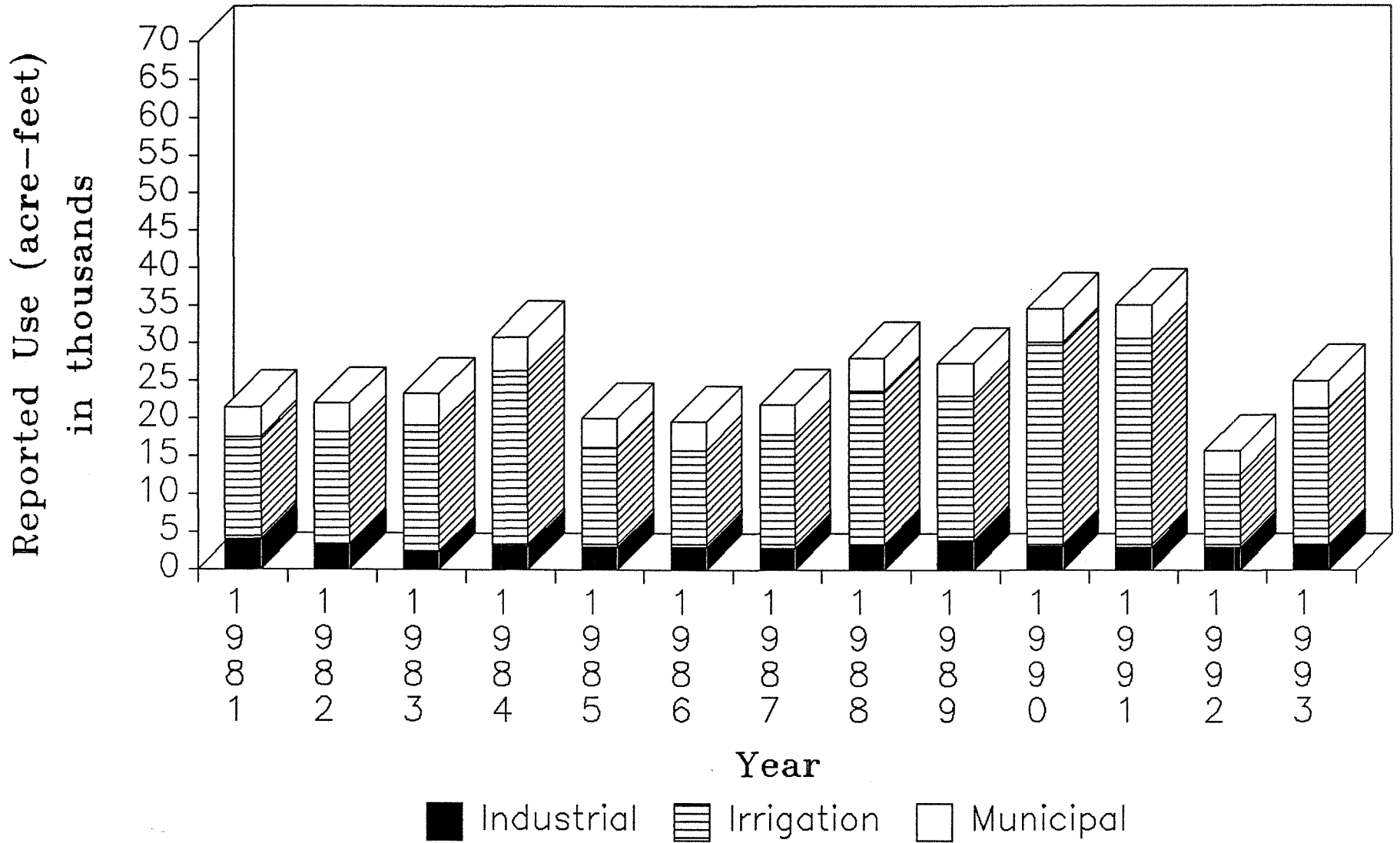


DATA SOURCE: DIVISION OF WATER RESOURCES
 PREPARED BY: EQUUS BEDS GROUNDWATER
 MANAGEMENT DISTRICT NO. 2

Figure 9. Groundwater use for Harvey County, 1981 - 1993.

Figure 10. Groundwater use for McPherson County, 1981 - 1993.

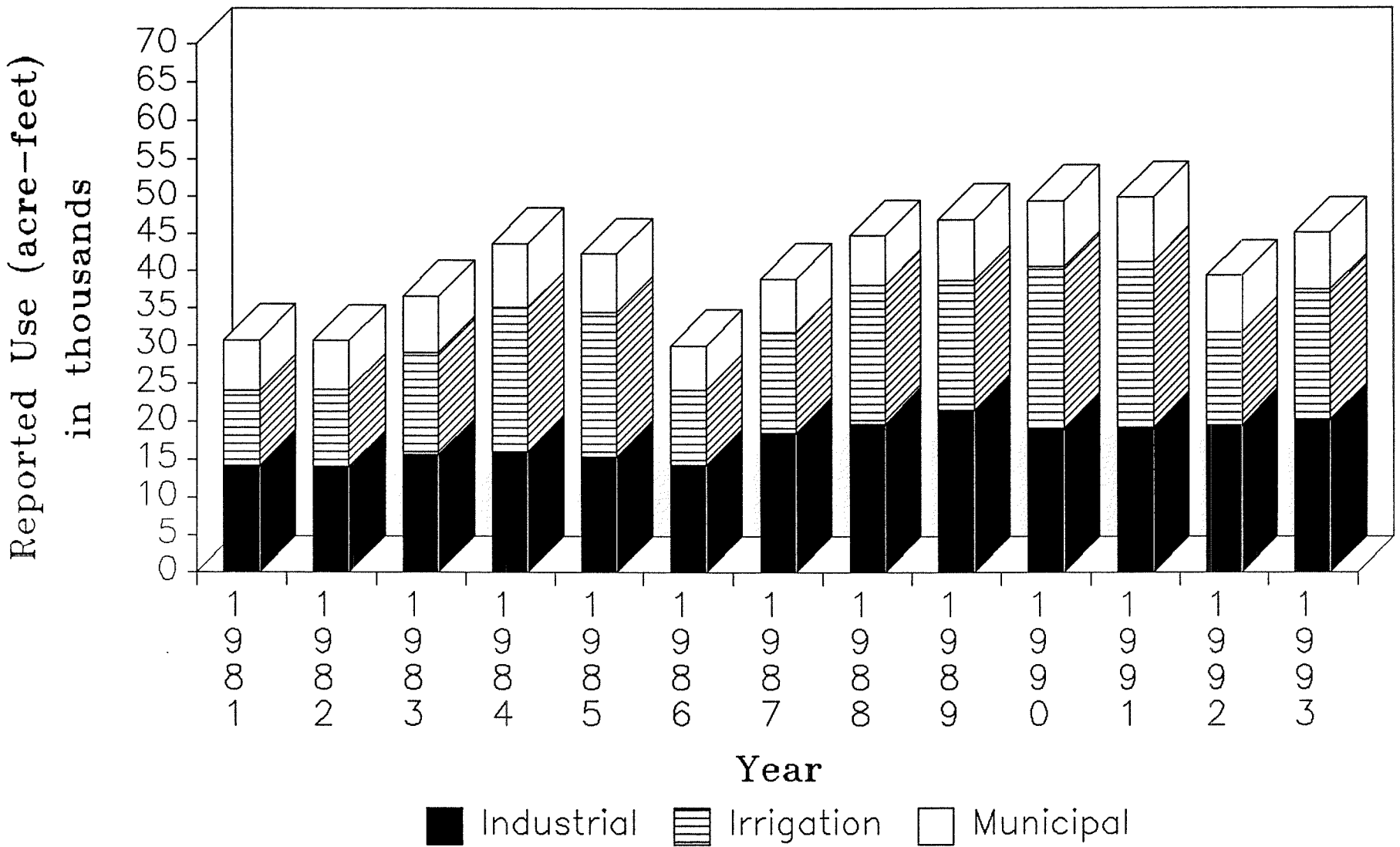
GROUNDWATER MANAGEMENT DISTRICT NO. 2 REPORTED GROUNDWATER USE FOR MCPHERSON COUNTY (1981-1993)



DATA SOURCE: DIVISION OF WATER RESOURCES
 PREPARED BY: EQUUS BEDS GROUNDWATER
 MANAGEMENT DISTRICT NO. 2

Figure 11. Groundwater use for Reno County, 1981 - 1993.

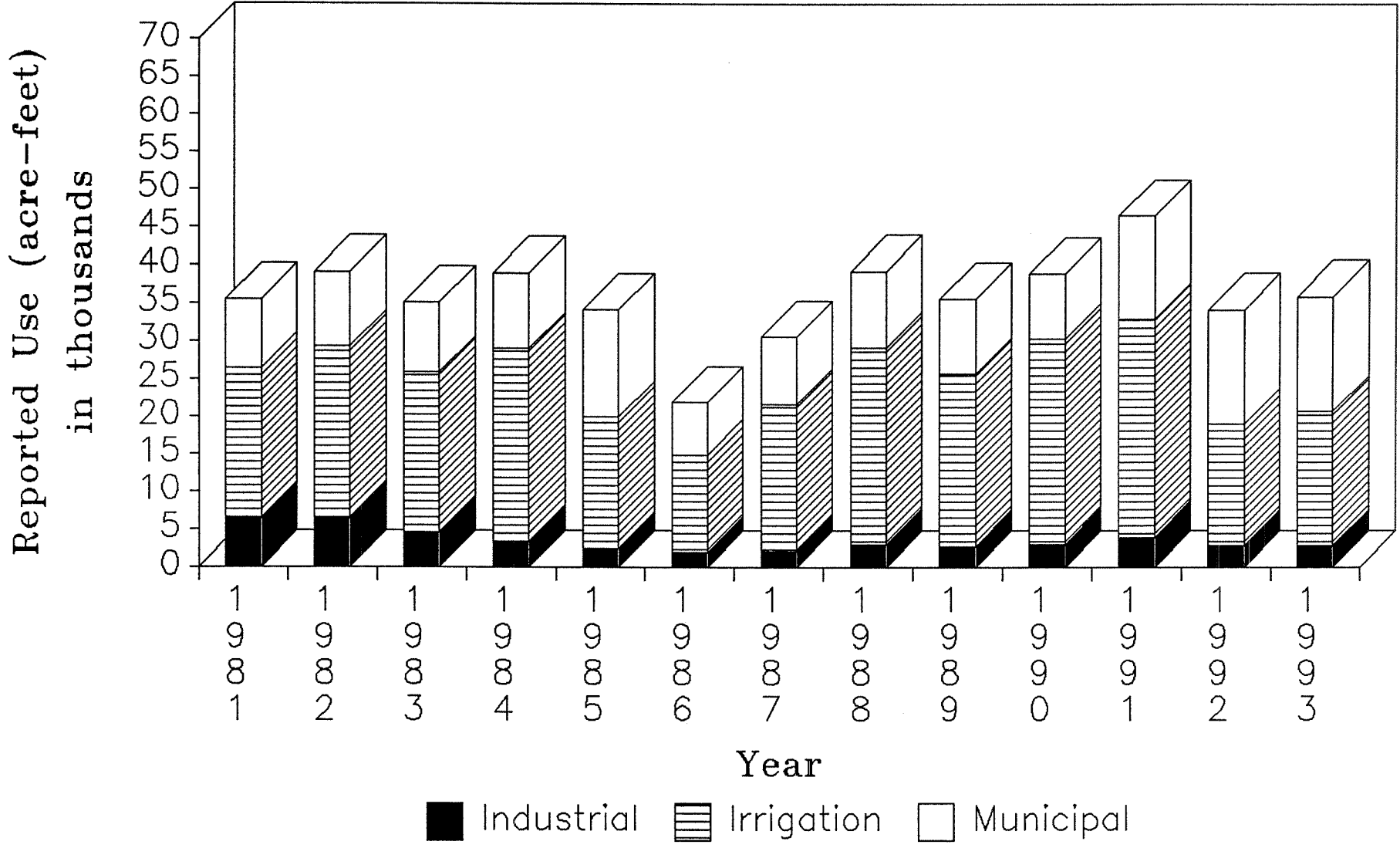
GROUNDWATER MANAGEMENT DISTRICT NO. 2 REPORTED GROUNDWATER USE FOR RENO COUNTY (1981-1993)



DATA SOURCE: DIVISION OF WATER RESOURCES
PREPARED BY: EQUUS BEDS GROUNDWATER
MANAGEMENT DISTRICT NO. 2

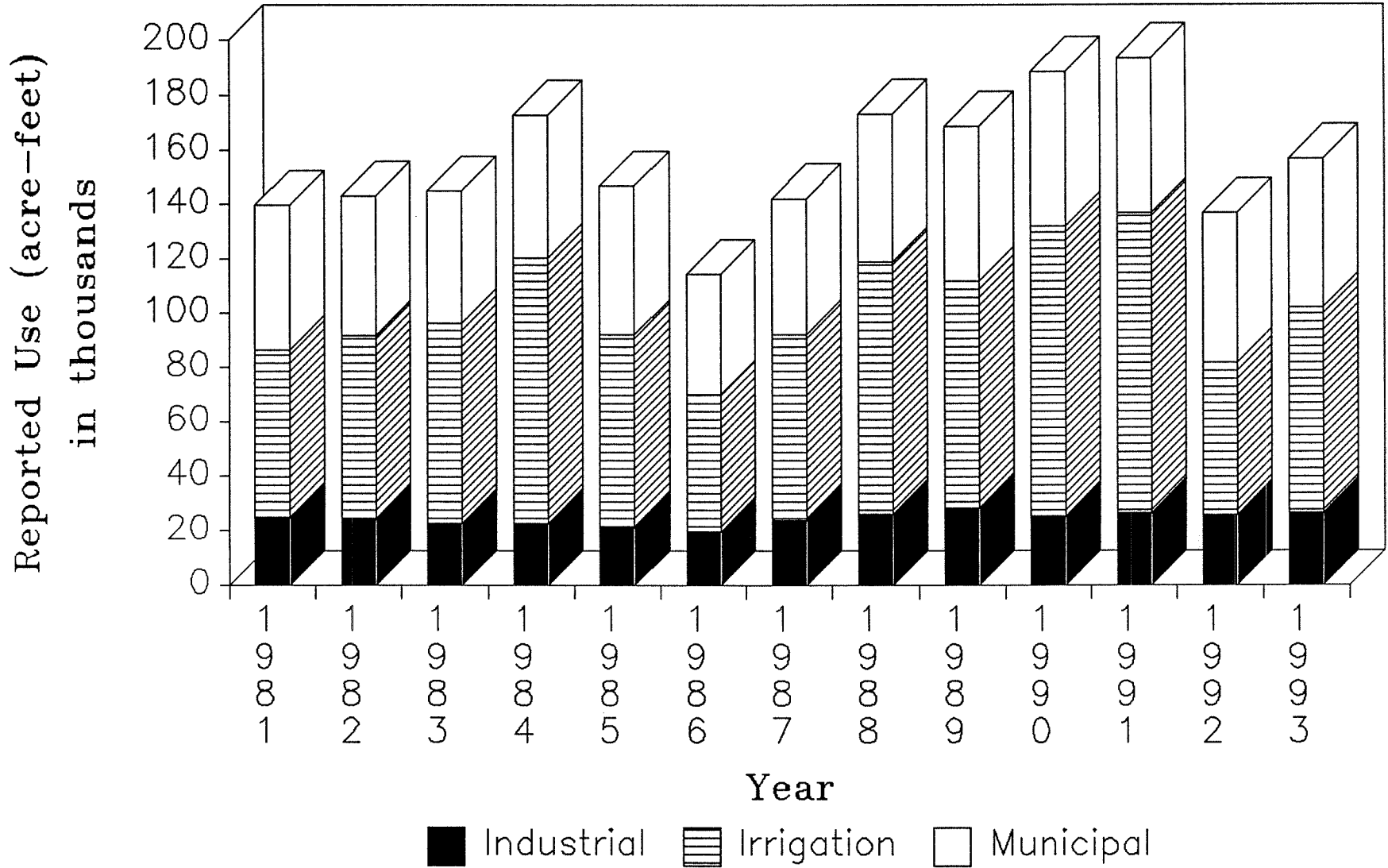
Figure 12. Groundwater use for Sedgwick County, 1981 - 1993.

GROUNDWATER MANAGEMENT DISTRICT NO. 2 REPORTED GROUNDWATER USE FOR SEDGWICK COUNTY (1981-1993)



DATA SOURCE: DIVISION OF WATER RESOURCES
PREPARED BY: EQUUS BEDS GROUNDWATER
MANAGEMENT DISTRICT NO. 2

GROUNDWATER MANAGEMENT DISTRICT NO. 2 TOTAL REPORTED GROUNDWATER USE (1981-1993)



DATA SOURCE: DIVISION OF WATER RESOURCES
 PREPARED BY: EQUUS BEDS GROUNDWATER
 MANAGEMENT DISTRICT NO. 2

Figure 13. Groundwater use for the Equus Beds Groundwater Management District No. 2 1981 - 1993. 27

The major industry in Sedgwick County is in aircraft construction and maintenance. Beech, Boeing, Cessna and Learjet each employ over 1,000 people. The second largest industrial group is in health care. In addition there are 13 other businesses in Sedgwick County with more than 1,000 employees, and there are another 14 companies who employ between 500 and 1,000 persons. Industries in the county for 1990 totaled 10,646.

Reno County has four major firms with 300 to 1,000 employees. These include businesses in the food industry, farm equipment, specialty vehicle construction and meat processing. There are numerous smaller firms involved in a variety of activities. The county had a total of 1,641 industrial units in 1990.

Power generating plants in both Sedgwick and Reno counties have above average reserve capacities.

Harvey and McPherson counties support somewhat smaller industries with major emphasis on manufacturing. These include firms involved in pharmaceuticals, fabricated metal products, oil refining, farm machinery and equipment, and glass products. Industries in Harvey and McPherson Counties for 1990 totaled 758 and 840 respectively.

Numerous firms in the area manufacture farm equipment or parts to be used with farm equipment. Others are involved in servicing the agricultural community by way of providing markets for crops and livestock, sources for fuels, fertilizers, seed and other products and services required in a contemporary farm operation.

In addition to agriculture and agri-business, other industrial concerns have developed in the area for geological reasons. More specifically, industries related to oil, gas and salt mining have been operated in and around the District since the turn of the century. The northwest region of the District has been and continues to be quite active in the production of salt.

Including agriculture related services, mining, construction, manufacturing, transportation, wholesale and retail trade, finance, insurance, real estate, and services; the total annual payroll for industry in all four counties was over five billion dollars in 1990.

AGRICULTURE

The District extends over an area of fertile farmland in the lower Arkansas basin, and agriculture is a key element in determining the overall economy. Most of the farms are family owned. The average size for farms in the four counties of the District was 395 acres in 1991. There is a trend toward fewer farms and farms of larger size. Both trends are expected to continue into the future.

Principal crops grown include wheat, corn, sorghums and soybeans. Crop figures reported for 1991 indicate that in Harvey, McPherson, Reno and Sedgwick counties there were 1,394,040 acres of these four crops harvested. Of this total, seven percent or 96,590 acres was irrigated. Other common agricultural land uses include use for oats, hay and pasture land. Crops harvested in 1991

in the four counties represent a \$183,324,400 contribution to farm income. Cropland is regularly fertilized and pesticide may be applied depending on need.

Livestock production includes cattle, hogs, sheep and chickens. Most of the production is from small farms which results in a rather even livestock population distribution. Feedlots in the District generally have a capacity of less than 100 head. There are several egg production operations, often with an excess of 25,000 layers in each. Farm income from livestock production in the District's four counties totaled \$133,804,400 for 1991.

ECONOMY AND POPULATION

Like most of Kansas, the District is subject to a variety of economic factors. Those factors impacting agriculture seem to be most influential. Weather conditions over extended periods or geographic areas, costs of fuel, fertilizer and labor costs, international events influencing prices of commodities and legislative rules all have their impact on economic conditions in the District.

The larger cities and to a lesser degree the smaller cities have become sites for location of numerous industrial and service businesses. The oil and gas industry has been and continues to be quite active in the region, and salt mines in Reno County make a significant contribution to the overall economy. There are about 17 smaller towns or cities in the District, most with strong agricultural involvement.

There are two cities within the District with populations in excess of 10,000 residents, Hutchinson with a population of about 41,000 and McPherson with a population of about 12,000. Two other cities lie just beyond District boundaries. Wichita, with a metropolitan statistical area population (which includes portions of Butler and Harvey counties) of 460,000, obtains about half of its water supply from well fields within the District, and Newton (population 16,000) also obtains water from wells located inside the District.

Population projections were relatively flat for Harvey and McPherson counties through the year 2030. Projections for Reno County indicate a steady decrease in population. By 2030, population was projected to decrease by 16 percent from its 1995 peak of 61,746. Projections for Sedgwick County, including the City of Wichita; indicate a 21 percent increase in population from 1995 to 2030, an increase of nearly 60,000.

County	2000	2010	2020	2030
Harvey	31,760	31,975	31,928	31,354
McPherson	27,946	28,087	28,091	27,723
Reno	58,898	56,067	54,225	52,222
Sedgwick	442,377	459,161	478,337	488,891
Totals	560,981	575,290	592,581	600,190

Source: *Kansas Statistical Abstract*, 1991 - 1992, Institute For Public Policy and Business Research, The University Of Kansas.

Table 2. County population estimates and projections. 2000 - 2030.

GROUNDWATER SUPPLY PROBLEMS

BACKGROUND

The Equus Beds aquifer supplies water for agriculture, industry and the domestic needs of over 500,000 area residents. In most areas of the District, it is capable of adequate recharge. If managed wisely it should continue to provide a supply of fresh and usable water for growth and continued economic development.

Groundwater supply problems are classified as either quantity or quality related. Unmanaged groundwater development and excessive pumping demand are the root cause of most quantity supply problems. Quality problems are the result of acts or omissions by individuals or natural conditions that render the groundwater unfit or unsuitable for beneficial use. If the problem is not properly managed or remediated, the supply of groundwater will be adversely affected.

The aquifer's safe yield is the total quantity of groundwater pumped by wells and naturally discharged to a stream without exceeding recharge to the aquifer or impairing existing water rights. Quantity problems occur when groundwater withdrawals exceed safe yield and groundwater mining or depletion occurs. During mining groundwater levels continuously decline.

Figure 14 illustrates the changes occurring in groundwater levels since 1940. Using 1940 water levels as a baseline for development of the Equus Beds aquifer there are three areas that have experienced declines of 10 or more feet. In the McPherson Intensive Groundwater Use Control Area the declines in water levels vary from 10 to 30 feet.

Groundwater quality problems in the District are usually related to agricultural, industrial or municipal activities overlying the aquifer. Activities contributing to the quality problem include the manufacture, production, distribution, handling, application or disposal of goods, services or products. Hydrologic, geologic, climatic and soil characteristics make the aquifer in certain areas vulnerable to contamination from such activities. Identification of problem areas is a continuous process in the District and requires the coordination and cooperation of local, state and federal agencies.

QUANTITY

Groundwater resources are finite and must not be overdeveloped. The Equus Beds Groundwater Management District No. 2 includes areas that have encountered water quantity problems. One such area has been overdeveloped and is experiencing quantity problems. Steps were taken to limit withdrawal and explore alternate sources of water to support current needs and anticipated growth or development.

MCPHERSON INTENSIVE GROUNDWATER USE CONTROL AREA

The McPherson Intensive Groundwater Use Control Area (IGUCA) encompasses a 56-square-mile area located in the extreme northern portion of the District as shown in figure 15. The control area was established March 28, 1980, by the Chief Engineer-Director, Division of Water Resources, at the request of the Equus Beds Groundwater Management District No. 2 because of declining water levels in the Equus Beds aquifer. Groundwater development or withdrawal exceeded natural groundwater recharge, and groundwater mining resulted.

Groundwater management action established in the control area included:

- closing the area to further groundwater development, except for domestic use,
- dismissing all groundwater permit applications filed prior to the establishment of the control area,
- requiring the installation of water meters on all water wells in the control area, except domestic wells, and
- establishing a data collection and reporting system for monitoring water levels, rainfall and groundwater withdrawals

Soil in this region is generally impermeable, thus reducing recharge to the aquifer. In a normal year, about three inches of rainfall recharges the aquifer. The remaining 27 inches evaporates, is used by plants or drains to rivers or streams. The Kansas Geological Survey has estimated that average annual recharge to the McPherson IGUCA totals approximately 10,000 acre-feet.

Reported 1992 groundwater usage for industrial, municipal and irrigation use within the IGUCA totaled 7,444 acre-feet. This was a 43 percent decrease from the record high set in 1991 and was below the 19-year average usage of 10,539 acre-feet by 3,095 acre-feet. Municipal usage for 1992 was 2,691 acre-feet, down 560 acre-feet from 1991 usage; industrial use was 3,275 acre-feet, down 152 acre-feet; and irrigation usage was 1,478 acre-feet, down 5,104 acre-feet from a record high in 1991.

The total amount of groundwater usage for the 19-year period from 1974 to 1992 was 200,241 acre-feet. The average usage for this period was 10,539 acre-feet. Average usage for the period from 1974 to 1979 prior to the control area was 11,090 acre-feet. Average usage for the period from 1982 to 1992 after the establishment of the control area was 10,284 acre-feet

Industrial usage has declined since 1976 and municipal usage has remained fairly constant since 1974. Irrigation usage is weather dependent and is subject to extreme fluctuations. For the period of record there have been eight years that irrigation usage exceeded 4,000 acre-feet. The years of high usage correspond to below normal precipitation and drought conditions.

The groundwater level recovered throughout the control area in 1992 by as much as two feet. The recovery was the result of above normal rainfall, the timeliness of the rainfall, and a substantial reduction of pumpage from the aquifer for the year. However, historical water-level data, shows that 20 to 30 feet or about 20 percent of the aquifer was dewatered or depleted in the IGUCA.

Another management provision of the control area seeks to encourage the use of alternate sources of either surface or poor quality groundwater supplies. Several industries in the control area are using the Wellington aquifer as an alternate source. The Wellington aquifer has a poor water quality and underlies the Equus Beds aquifer.

DEMAND

Between 1900 and 1940, demand on the Equus Beds aquifer was minimal and water withdrawn was mainly for municipal and industrial uses. In 1940, about 30,000 acre-feet of water was pumped from the aquifer to meet municipal and industrial demands. From 1940 to the 1950s municipal demand increased fourfold and surpassed industrial demand. Irrigation demand started to grow in the mid-1950s and by the 1970s was slightly more than municipal demand. Demand for all three uses was more than three times greater between 1970 and 1978 than between 1940 and 1970. Demand from 1981 to 1992 averaged 157,000 acre-feet per year. Usage fluctuated during periods of precipitation extremes and ranged from a high of 197,651 acre-feet in 1991 to a low 111,690 acre-feet in 1986.

As population, agricultural and industrial development increase, the demand and stress on the Equus Beds aquifer will continue. The ability to manage this demand, prevent over-development and exploitation of the aquifer is one of the underpinning principles of the District's management program.

MUNICIPAL AND INDUSTRIAL

In addition to McPherson and Hutchinson, two other cities, Wichita and Newton, not within the boundaries of the District, have municipal water wells located in the District and are dependent on water supplies from the Equus Beds aquifer. It is anticipated that area populations for most of the District will decrease by four percent over the next ten years. However, the Wichita-Sedgwick County area, which obtains about one-half of its water supply from the Equus Beds aquifer, is projected to experience population increases of about 6 percent over that time.

AGRICULTURAL

Irrigation use fluctuates with precipitation. As shown in figure 13 reported water use shows that agricultural use of groundwater has steadily increased and most of the time exceeds the combined totals used for municipalities and industries. Irrigation demand ranged from a high of 110,240 acre-feet in 1991 to a low of 50,210 acre-feet in 1986. Table 1 also shows the variable demand on groundwater for irrigation, not only for the District but also for each county within the District.

QUALITY

SALTWATER CONTAMINATION

Groundwater contamination from saltwater is primarily a result of past industrial waste disposal practices. Most known existing groundwater contamination sites were caused by improper disposal of oil field brine over the first half of this century. Such contaminants entering the groundwater do not remain static but tend to move as groundwater flows. Pumping of existing wells and natural water movements within the aquifer tend to carry contaminants along with these movements. Withdrawing water from a well near a contaminated site tends to direct the movement of water and contaminants toward the well.

The Burrton and Hollow-Nikkel oil pools were discovered over 50 years ago. The discovery of these oil pools and subsequent production brought economic prosperity to the surrounding area as well as to the state of Kansas. This prosperity continues even today. However, this benefit was not without cost. The cost came in the form of saltwater brine, a by-product of oil and gas production. The brine was pumped up with the oil and then separated from the oil. In the discovery days of the oil pools the brine was discharged into creeks and streams. Later this practice was prohibited and the brine was disposed of in "evaporation pits" or shallow injection wells. This practice continued for many years and millions of barrels of brine were disposed of in this manner.

It was later found that the evaporation pits were for the most part recharge or infiltration pits and the shallow injection wells were too shallow. For also underlying the area and overlying the Burrton and Hollow-Nikkel oil pools was the Equus Beds Unconsolidated aquifer. It was also discovered that past disposal practices had polluted the aquifer. The "evaporation pits" and shallow disposal wells have been prohibited and the brine is now disposed of by deep injection wells. The pollution is major and even today the residual brine threatens to spread to other areas of the aquifer.

BURRTON INTENSIVE GROUNDWATER USE CONTROL AREA

The Burrton Task Force was established in August 1982 by the Chief Engineer, Division of Water Resources, State Board of Agriculture. The Task Force was commissioned to investigate and research water quality problems in the Burrton area and other problems they deem appropriate. Additionally, based on the findings and conclusions of the investigation and research, the Task Force was to submit to the Chief Engineer recommendations and management provisions to improve or control the water quality problems in the Burrton area.

The Burrton Task Force report, findings and recommendations were submitted to the Chief Engineer in February 1984. In June 1984, the Chief Engineer issued an order establishing the Burrton Intensive Groundwater Use Control Area (IGUCA).

In 1992, the task force was decommissioned by the Chief Engineer and replaced with the Equus Beds Oil and Gas Brine Committee. The committee was created by order of the Kansas Corporation Commission. It was charged with making recommendations and advising the Commission on matters pertaining to the protection and remediation of the Equus Beds aquifer from oil and gas related brine contamination within the boundaries of the groundwater management district.

EQUUS BEDS SPECIAL WATER QUALITY USE AREA

In December 1984 the task force voted to implement the applicable recommendations in the area overlying the Hollow-Nikkel Oil Pool. The area is immediately north of the Burrton IGUCA and was referred to as the Equus Beds Special Water Quality Use Area (SWQUA). The area had been under investigation and research by the Equus Beds Groundwater Management District, the Kansas Department of Health and Environment, and the Kansas Geological Survey. Based on the investigation and research, it was found that the area experienced the same water quality problems found in the Burrton IGUCA.

Through tests conducted on water samples collected from a network of water quality observation wells, the District determined that groundwater within the SWQUA showed chloride concentrations exceeding normal values by as much as 8,000 mg/l. The Environmental Protection Agency (EPA) recommends chloride concentrations for drinking water be no greater than 250 mg/l. The District recommended that water used for irrigation not exceed 500 mg/l, depending on soil and crop conditions. The Board passed a resolution on November 12, 1985, requesting the Chief Engineer designate a 35-square-mile area in northwest Harvey County, south central McPherson County, and northwest Reno County as the Equus Beds Special Water Quality Use Area. The Chief Engineer established the SWQUA, effective September 17, 1986..

MANAGEMENT RECOMMENDATIONS

A number of management practices were applied in the Burrton IGUCA and the Equus Beds Special Water Quality Use Area, including:

- testing the integrity of saltwater disposal lines on a regular basis
- installation of deeper water quality monitoring wells to detect water quality changes in the aquifer
- soil analysis in and around abandoned saltwater pits for residual leachates
- monitoring and research of the groundwater quality in the Intensive Groundwater Control Area and the Equus Beds Special Water Quality Use Area
- reviewing groundwater permit applications in the area on an individual basis.
- implementing water well construction standards to prevent cross communication of polluted water with fresh and usable water
- using polluted groundwater for water flooding operations.
- informing water users and the public about the brine contamination.

VOLATILE ORGANIC CHEMICALS

Volatile organic chemicals (VOC's) are a group of synthetic chemical compounds that contain carbon and either inorganic or organic substances. They do not occur naturally in groundwater. Commonly used products such as ink, oil, solvent, antifreeze, paint, thinner, cleaner and other household and industrial products contain VOC's.

The improper storage, handling, use or disposal of products containing VOC's has resulted in groundwater contamination. Especially affected by VOC contamination are public water supply wells located in urbanized areas where these products are numerous and frequently used. By 1989 public water supply wells in five cities in the District were contaminated with VOC's. All of the sites are either under state or federal required site investigation, monitoring or groundwater cleanup activity.

NITRATE

An area in southeastern Reno County has experienced nitrate-nitrogen concentrations that exceed the drinking water maximum contaminant level (MCL) of 10 mg/l for nitrate-nitrogen, as established by the Kansas Department of Health and Environment.

Previous water-related reports by state and federal agencies and a private consultant indicate the nitrate-nitrogen presence. However, data were sparse and insufficient to determine the source and extent of the high nitrate-nitrogen concentrations.

Water quality data show nitrate-nitrogen concentrations exceeding the MCL in the public water supply wells of Pretty Prairie since 1967. Levels above the MCL have been identified as health risks for infants that are less than one year old.

Nitrate-nitrogen concentrations in groundwater vary. Geologic conditions, soil, vegetative cover, human and animal waste leachate and fertilizer applications effect the levels of nitrate-nitrogen in groundwater.

The Kansas Department of Health and Environment and the Equus Beds District entered into a cooperative agreement to investigate the nitrate-nitrogen concentrations in a 100 square-mile area in southeastern Reno County.

GROUNDWATER MANAGEMENT PROGRAM

82a-1020(h) "Management program" means a written report describing the characteristics of the District and the nature and methods of dealing with the groundwater supply problems within the District. It shall include information as to the groundwater management program to be undertaken by the district and such maps, geological information, and other data as may be necessary for the formulation of such a program.

DATA COLLECTION

Collection of data is a critical function in effective management of groundwater resources. Information regarding water quantities, qualities, demand and contamination is the core of the decision making process. An abundance of water-related information has been accumulated through state and federal research programs as well as the District's efforts to collect pertinent data for proper management of groundwater. Vital information needed to manage the District is obtained by 1) direct measurements of quality and quantity by District staff and 2) by local, state or federal agencies and other organizations providing additional information. Data are made available to other organizations, agencies and to the general public. Data or information sharing provides for better understanding of groundwater conditions within the District and is more efficient than collecting all basic data locally.

The District maintains a large part of the water resource information on computer data base files. This mode of data management permits quick access to information and enhances storing, receiving and transmitting data to others. The District consolidates available data in one location and provides the public with information through the use of written publications, workshops and public meetings.

GROUNDWATER LEVELS

Groundwater level data provide information regarding depth to water and water level changes in various regions of the District. As may be seen in figure 14, historical records of changes in these levels show trends. There are some areas within the District where groundwater levels have declined 30 feet since 1940. The District measures water levels in 100 observation wells. These measurements are made annually, usually in January.

Other projects include study and research areas and special water use areas which require closer monitoring. In 1993 the District made about 1,600 measurements as part of our annual measurements and special projects. Figures 16 through 19 show water level changes at specific sites in Harvey, McPherson, Reno and Sedgwick counties. In addition to this data, water levels in other areas of the District are received from local utility companies, state and federal agencies and organizations. The District regularly shares information with the Division of Water Resources and other state and federal water-related agencies. Using this data the District produces an annual report on water level changes within its boundaries. Some of this information is shown graphically in figures 6, 7, 14, and 16 through 19.

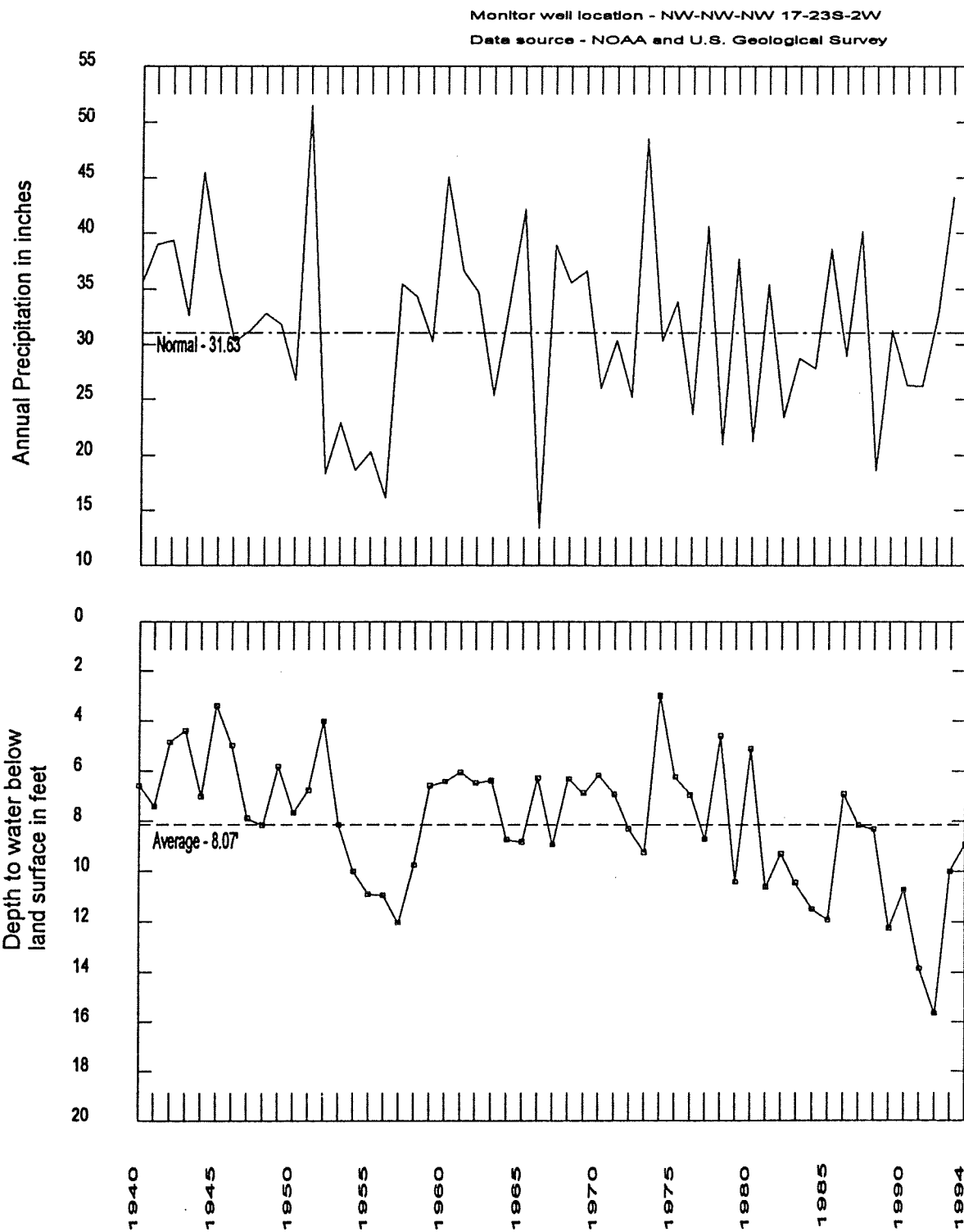


Figure 16. Harvey County precipitation and groundwater level, 1940 - 1993.

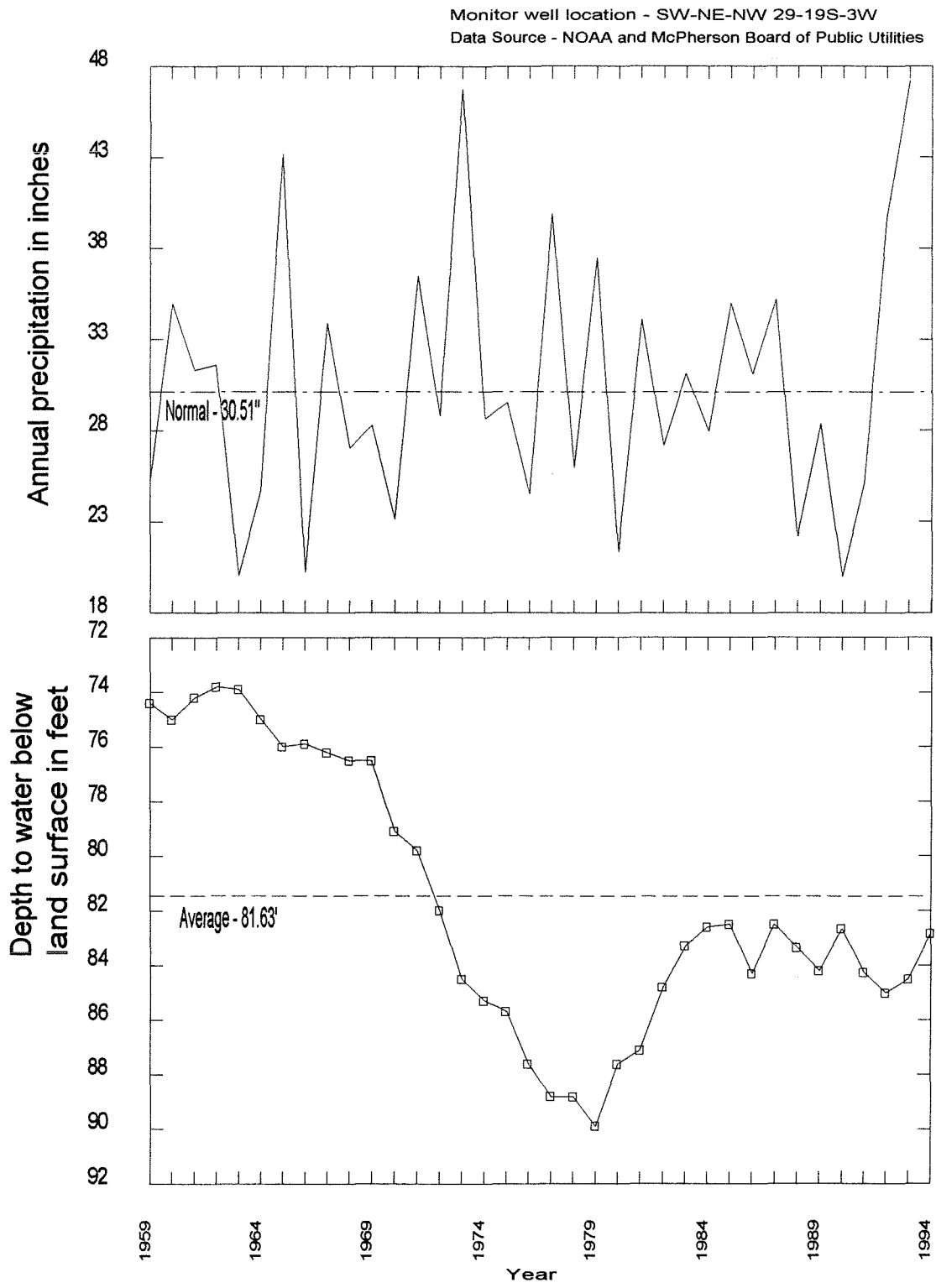


Figure 17. McPherson County precipitation and groundwater level, 1960 - 1993.

Monitor well location - SW-SW 13-24S-4W
Data source - NOAA and U.S. Geological Survey

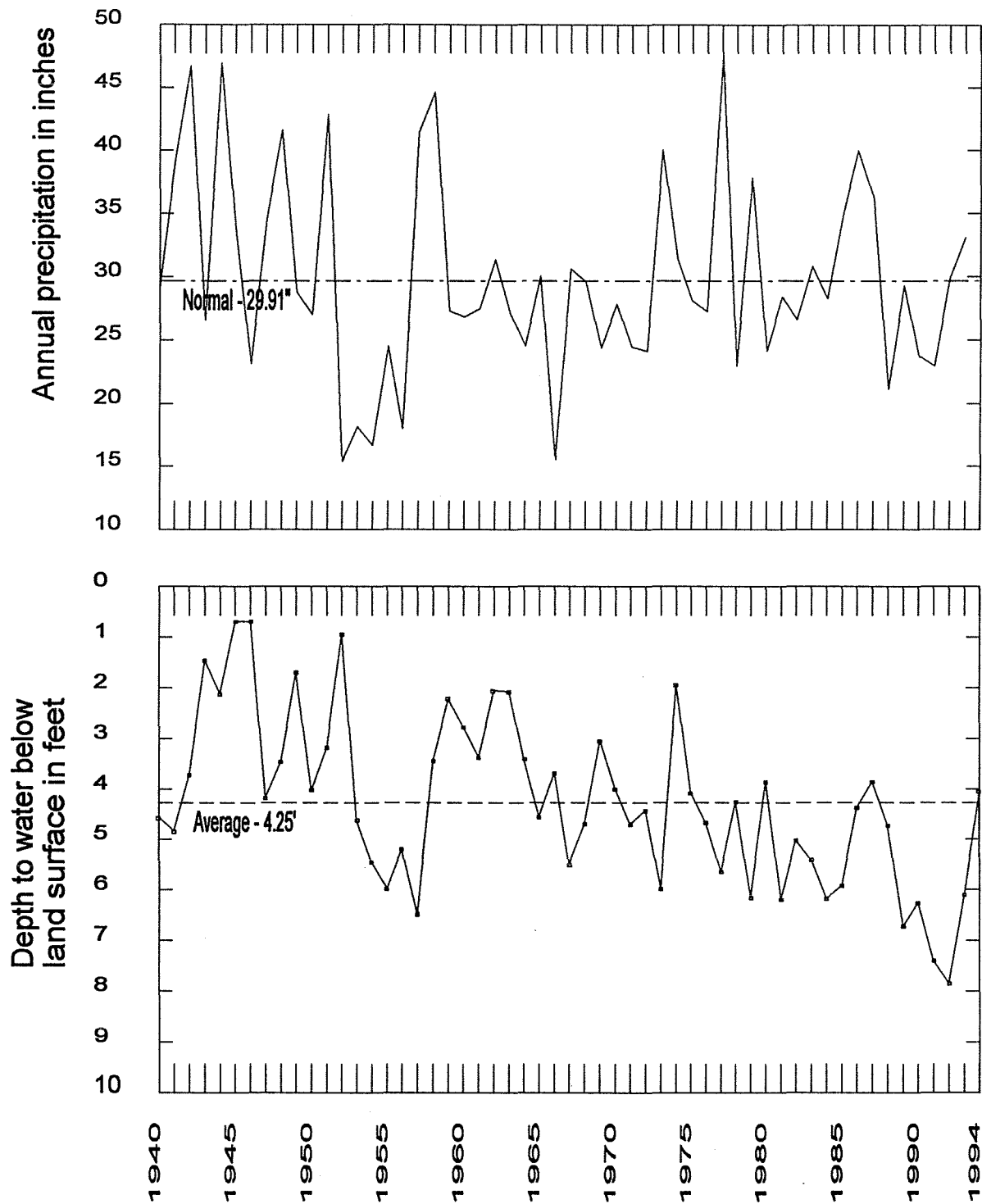


Figure 18. Reno County precipitation and groundwater level, 1940 - 1993.

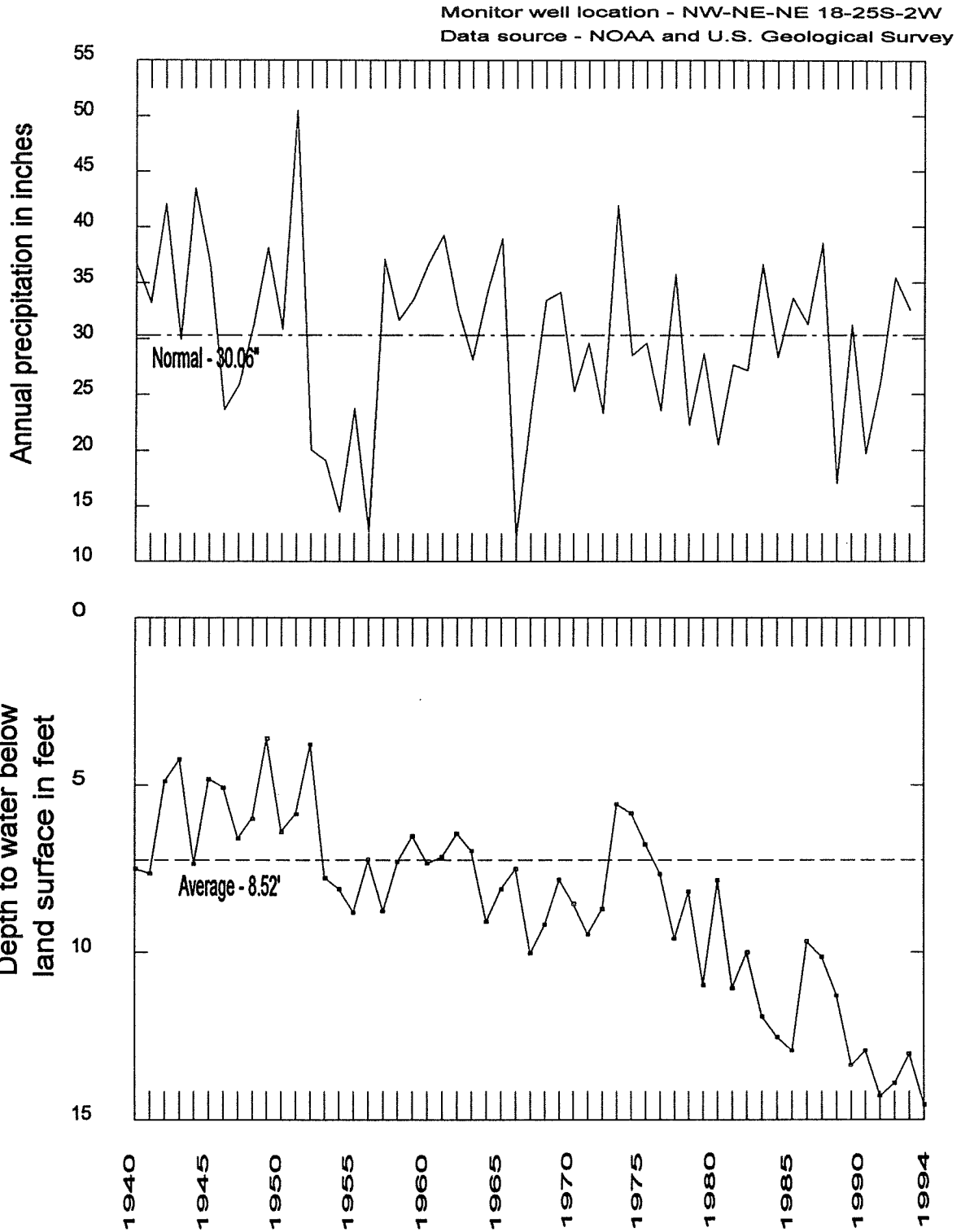


Figure 19. Sedgwick County precipitation and groundwater level, 1940 - 1993. 40 - 1993.

WATER QUALITY

The District currently maintains a water quality network consisting of 334 wells at 165 groundwater monitoring sites. Water quality data is maintained at the District office in computer data base files and is available to the public and interested persons.

The data collection and monitoring system permits the District to detect and evaluate changes in water quality, target affected areas and attack suspected or known water quality problems. There are currently five specific targets for the District's quality monitoring program.

- 1) Burrton Intensive Groundwater Use Control Area. As figure 15 indicates this area extends into both Reno and Harvey counties. It was contaminated by oil field brine as a result of past brine disposal methods and present spills and leaks.
- 2) Hollow-Nikkel Special Water Quality Use Area. Also shown in figure 15 is a region in southern McPherson County, northeastern Reno County and northwestern Harvey County also contaminated by oil field brine whose nature and origin are similar to that of the Burrton IGUCA.
- 3) Arkansas River-Equus Beds Aquifer Interaction Study. The District, in cooperation with the Bureau of Reclamation, conducted a water quality study along both sides of the Arkansas River between Wichita and Hutchinson. Groundwater in portions of the study area is contaminated by brine. The origin of the contamination was from multiple brine sources including oil and gas, salt mining and natural.
- 4) Water Quality Investigations. The District is often notified of actual or potential contamination of groundwater. In such cases established standards and policies are followed to investigate the water quality complaint.
- 5) Nitrate Investigation. A 100 square-mile area in southeastern Reno County has experienced nitrate-nitrogen concentrations exceeding the maximum contaminate levels established by the Kansas Department of Health and Environment for drinking water. A water quality monitoring system has been established by the District and KDHE as part of a special 36 month investigation. The purpose of the investigation is to identify point or nonpoint nitrate sources and the extent of the nitrate in space and time.

PRECIPITATION

The District receives precipitation data from four U.S. Weather Bureau stations. The stations are located at McPherson, Hutchinson, Newton and Wichita. Information is electronically transferred from weather bureau data files via computers to the District's computer rainfall data base. Annual and monthly rainfall totals from 1938 to present are maintained. The information is used to produce an annual precipitation report as shown in figure 4.

RIVER AND STREAM FLOWS

The U. S. Geological Survey in cooperation with the state of Kansas provides data from streamflow-gauging stations. Stations of specific interest to the District as listed with the U.S. Geological Survey include:

- 07143665 - Little Arkansas River at Alta Mills in 30-T22S-R2W;
- 07144200 - Little Arkansas River at Valley Center in 36-T25S-R1W;
- 07144100 - Little Arkansas River near Sedgwick in 15-T25S-R1W
- 07143330 - Arkansas River near Hutchinson in 21-T24S-R4W;
- 07143375 - Arkansas River near Maize in 29-T26S-R1W;
- 07144550 - Arkansas River at Derby in 12-T29S-R1E;
- 07144780 - North Fork Ninescah River above Cheney Reservoir in 25-T25S-R6W;
- 07144790 - Cheney Reservoir near Cheney in 6-T27S-R4W and
- 07144795 - North Fork Ninescah River at Cheney Dam in 6-T27S-R4W.

WATER RIGHTS ADMINISTRATION

The District Board of Directors and the Chief Engineer, Division of Water Resources, have cooperatively implemented a procedure for processing water permit and change applications. Such applications are evaluated for compliance with the District's management program, standards and policies, and rules and regulations. Attention is also given to groundwater supply problems which may be impacted by approval of the application.

The District submits its recommendation for approval, denial or modification to the Chief Engineer, Division of Water Resources, with a copy to the applicant. Statutes require final approval by the Chief Engineer for permit and change applications. The procedure provides for orderly management of the Equus Beds aquifer and for water rights to be used within their limits and conditions. Specific District policies and procedures for water right applications are found in D.S.P. - 8103.6.

APPLICATION ASSISTANCE

Upon request, District staff assists landowners and water users with preparation of water permit, term permit, chemigation, change and other water-related applications. It is important that applications are accurate and complete when filed. It is the responsibility of the applicant to submit such applications to the appropriate state agency.

WATER RIGHT CONSULTATION

When requested, the District will provide consultation to water right owners. Consultation is limited to existing rights, permits, change applications, water use, certification and nonuse. The District does not serve as a consultant or adviser for legal or non legal disputes.

GROUNDWATER PROTECTION

82a-1020. It is hereby recognized that a need exists for the creation of special districts for the proper management of groundwater resources of the state and for the conservation of groundwater resources. It is the policy of this act to preserve basic water use doctrine and to establish the right of local water users to determine their destiny with respect to the use of the groundwater.

The Groundwater Management District was established in order to protect and manage the quality of our groundwater resources. The goal of the District's Groundwater Quality Principle is to protect the naturally occurring quality of our groundwater resource and remediate contaminated groundwater to a usable quality. The principle is implemented by the District with the cooperation of state and federal water-related agencies.

WASTE OF WATER

The District will investigate and take action in circumstances where water is wasted. A Waste of Water Policy has been adopted to prevent the waste of groundwater. Waste of water investigations are conducted by District staff, and notice of violations are issued by the District to a water user found to be wasting water.

If three waste of water violations are issued to a water user within two years, the District will file a complaint with the county attorney's office to prevent further waste and require the water user to develop and implement a water conservation plan.

WATER QUALITY

The District policy on Water Quality, D.S.P. - 8909.5, defines an investigative procedure for staff when they become aware of contamination or potential contamination of groundwater. Water quality investigations are conducted in each reported case of actual or possible groundwater pollution. Water quality complaints along with the field investigation are filed with either Kansas Department of Health and Environment, Kansas Corporation Commission or other appropriate state agency.

GROUNDWATER REMEDIATION METHODOLOGY

INTRODUCTION

It is in the best interest of this District and its citizens to maintain and manage groundwater supplies in a fresh and usable state. Much has been done by various water-related state agencies and the Groundwater Management Districts to protect groundwater from pollution. This recent effort must continue as our first line of defense against groundwater pollution. However, even the best defense can not be 100 percent effective and as a result, groundwater pollution can occur.

The following conceptual cleanup plan seeks to serve as a foundation from which to build a planning framework or process for groundwater cleanup projects. The process uses a problem-solving methodology including: problem identification, data collection, data interpretation, project design and implementation.

The plan is structured in three phases. At the end of a phase a decision point is reached. These decision points allow for a continuous review of incoming data, centralize the decision-making process, and provide continual direction for the cleanup project.

PHASE I - IDENTIFICATION

Reports of pollution received from the general public or a state or local agency are given to a site investigator. The investigator will identify the source of pollution and apply correction measures to prevent further pollution. This process may include field observations, sample collection, interviews with area residents, and where appropriate, coordination with local, state and federal officials. After review of published material for soil conditions, surface and subsurface geology, and groundwater conditions, the investigator will prepare a report of findings of initial site investigation and data analysis.

At this point sufficient data is normally available to make a decision regarding further action. Predetermined criteria should be used to evaluate initial investigation findings. The site investigator decides if the initial site investigation warrants initiation of the next phase.

PHASE II - SITE INVESTIGATION

It may be desirable to establish a multi-discipline task force consisting of members from water-related agencies and private parties. A legal investigation will be needed to determine liability, determine the responsible party and determine legal needs of the cleanup project. The task force should also develop funding sources. Potential sources include the liable party, private sources or supporting federal, state or local agencies.

In identifying the area of pollution the task force should use existing data and water wells to develop a general outline of the polluted area. A bedrock map, water level map, location map, area of known pollution map, cross sections of the area and location map of area water wells should be compiled. The next step is to evaluate data and determine areas where additional information is needed.

The task force should establish a data collection and monitoring system and outline the area and extent of pollution at the site. It is preferable to use existing wells for a monitoring system. However, it may be necessary to utilize temporary test holes or permanent observation wells. Findings and conclusions of the site investigation are then reported.

Based on the evaluation of the site findings and conclusions the task force decides if the next phase should be initiated.

PHASE III - AQUIFER RESTORATION

Potential aquifer restoration methods should include containment, withdrawal, or simply leaving the pollution in place. In the event that a decision is made to withdraw the polluted water an appropriate plan of treatment is required. The following list of water treatment alternatives should be considered to select the best course of action:

- Granulated Activated Carbon
- Aerobic Biological
- Air Stripping
- Chemical Treatment
- Combined Ionization/Ultraviolet Radiation
- Ion Exchange
- Reverse Osmosis
- Ultra-filtration Wet-Air Oxidation
- Deep Injection Well Disposal

Advanced consideration should be given to the potential uses of polluted groundwater. In some cases it may be blended or mixed with better quality water and used as the quality level permits. Another option is to use the polluted water withdrawn for secondary recovery of oil. In some cases the polluted water, after withdrawal and treatment, may be suitable for industrial purposes. Cost-benefit ratios should be determined for restoration methods and to determine the impact of pollution on the site economy.

Design and construction of restoration equipment and the treatment method are studied carefully before implementation. The final and often long-term step in the process is to monitor and record results.

CHEMIGATION

The injection of agricultural chemicals through irrigation systems has been recognized as an acceptable agricultural practice and as a potential for groundwater pollution if not properly carried out. It is important that chemigation within the District is carried out according to state specifications and complies with the Kansas Chemigation Act.

State chemigation standards have been established and a program of systematic inspections of such systems has been adopted. The District maintains a computer data base of water wells which are permitted for chemigation use and assists well owners and operators in the preparation of chemigation permit applications.

ABANDONED WELLS

Abandoned wells are a groundwater contamination threat and a public safety hazard. Surface water runoff containing pesticides, salts, or other contaminants can be injected directly into the aquifer through the abandoned well. In some cases open abandoned wells have casing diameters large enough that children or small animals can fall down them. It is important that such wells are properly plugged to prevent injury or incidental entry of contaminants.

The District provides information and technical assistance to well owners on plugging procedures and administers the Abandoned Well and Inactive Well Policies to insure that abandoned wells are properly disposed of.

CATHODIC PROTECTION BOREHOLES

Cathodic protection boreholes are used to protect metal facilities, such as pipelines, from electrical corrosion. Other facilities include oil, gas and water storage tanks, power and communication cables and switchyards.

Boreholes are drilled through the Equus Beds aquifer and penetrate several hundred feet into underlying bedrock formations. Conditions encountered in bedrock include highly mineralized artesian waters, porous lost circulation zones and salt formations. Improperly drilled, constructed, or plugged boreholes could cause contamination of the groundwater by connecting it with underlying salt formations, saltwater aquifers or both.

A Cathodic Protection Borehole standard and policy was adopted by the District to regulate the drilling, construction and closure of boreholes.

WATER USE MANAGEMENT

All water users are urged to monitor their own policies and procedures in regard to water use. Often it is possible to improve efficiency or reduce consumption by initiating policy changes or updating structures and equipment.

AGRICULTURE

The Equus Beds Groundwater Management District No. 2 encourages agricultural water users to seek information on efficient water use from crop servicing companies, area extension services, and local conservation district offices and to implement practices appropriate for their operation.

IRRIGATION MANAGEMENT

Efficient use of water for irrigation is largely dependent on interaction between the irrigation system design and irrigation water management. Water use efficiency is the ratio of water used beneficially to the total amount of water pumped. Potential and target water application efficiencies vary with type of irrigation in use. Sprinkler system target efficiencies are set at about 75 percent with a potential efficiency of 80 percent. Graded furrow systems are rated at about 70 percent target efficiency and 80 percent potential efficiency. Sound irrigation water management practices include:

- an accurate measurement of water use through metering;
- scheduling by integrating information on soil characteristics, soil moisture conditions, water requirements of crops at various stages of growth, climatic factors and other factors used for coordinating water application for field use;
- minimum tillage practices and proper crop residue management; and
- crop selection for varieties which are most water efficient.

The District encourages irrigators to prepare, implement and maintain an irrigation conservation plan. The plan should include:

- 1) specific information on irrigation system design and water management practices contained in the Kansas Irrigation Guide of the U.S. Department of Agriculture;
- 2) an irrigation system design achieving as a minimum the target water application efficiency discussed above;
- 3) an irrigation scheduling program for predicting the optimum timing and quantity of water application to the field. This includes metering of water use in compliance with meter installation standards established by the Division of Water Resources and the Equus Beds Groundwater Management District; and
- 4) plans for use of tailwater recovery pits or other runoff control practices which meet the standards of the United States Department of Agriculture Natural Resources Conservation Service.

Upon development and implementation of an irrigation conservation plan, it is then important to review it, periodically updating it to reflect changes in operating conditions and water conservation practices.

Water conservation plans are required when a water user is issued three waste of water violations in two years or water use exceeds the annual quantity authorized by a user's water permit.

MUNICIPAL

Municipal water use includes the various uses made of water delivered through a common distribution system operated by a municipality, rural water district, public wholesale water supply district, a group of 10 or more households, mobile home parks or any other similar entity distributing water to other water users for household purposes.

The Equus Beds Groundwater Management District No. 2 encourages municipalities to:

- anticipate future water demands and needs;
- assess options for development of new water supplies;
- develop a philosophy to maintain, manage, and protect its public water supply;
- endeavor to initiate water reclamation and recharge projects to meet future water supply needs;
- encourage and where possible replace the use of potable water with recycled wastewater; and
- cooperate with the District to investigate means to supplement groundwater resources by improving recharge, preventing its deterioration and seeking means to import water.

MUNICIPAL WATER USE

In addition to domestic uses, municipal use includes water supplied to commercial and office buildings which are also served by municipal systems. Quite often industrial needs are met by the same delivery system. It is estimated that of the total municipal use approximately 52 percent is used for interior residential purposes, about 18 percent for exterior residential purposes and 30 percent for commercial or institutional purposes.

Management of municipal water supplies is approached from two aspects:

- 1) supply management, which begins at the source of water in use and stops at the point of delivery to the user; and
- 2) demand management, which incorporates public relations, education, pricing and regulatory methods.

The District recommends that municipalities meter their groundwater production and develop information or education programs to promote the efficient use of water. All public water supply utilities are also encouraged to develop a water conservation plan. A conservation plan should include, at a minimum, supply and demand management options.

SUPPLY MANAGEMENT OPTIONS

1. Leak detection and repair. Water distribution systems should have a leak detection and maintenance program. Water losses in many systems can be significantly reduced by such programs.
2. Pressure Reduction. Excessive pressure increases leakage and waste. In systems where water pressure normally exceeds 80 pounds per square inch, reduction of pressure can be an effective conservation technique.
3. Metering. Metering of the public water supply well and the discharge from the sewage treatment facility is important. Without metering it is difficult to obtain the information needed to establish a water conservation program and to monitor its effectiveness once implemented. Pricing methods and most regulatory measures are eliminated from consideration if meters are not installed at individual service connections.
4. Recycling and reuse. Recycling of municipal wastewater has had some application throughout the nation. There are four potential uses for recycled municipal wastewater: industrial, agricultural, groundwater recharge and direct reuse. The benefits derived from recycling/reuse programs are primarily associated with an overall lessened demand for water which translates to potential postponement of treatment plant expansion and well field expansion. Meeting demands through recycling has been shown to be cheaper than developing new sources of supply.
5. Pricing structures. The District recommends realistic pricing of groundwater production to discourage waste. The price of water has a direct effect on demand; the higher the price the lower the demand. A general rule of thumb states that doubling the price will reduce demand by about 20 percent.
6. Regulation. With the exception of plumbing code changes requiring the use of water-saving plumbing devices, regulatory measures are generally used only during drought conditions.

DEMAND MANAGEMENT OPTIONS

1. **Plumbing devices.** One of the basic demand management techniques is the use of water-saving plumbing devices. Conventional toilets use approximately five gallons of water per flush. Toilet tank inserts or dams can be used which displace water from the tank, reducing use to approximately 3.5 gallons per flush. Water efficient toilets can achieve water savings equivalent to or greater than dams. Standard shower heads have average flow rates of about four gallons per minute. Low-flow heads reduce flow to the range of 2-2.75 gallons per minute. Most new residences are equipped with shower heads that limit flows due to recent revisions in national plumbing codes, thus this option appears most applicable to older homes.
2. **Horticultural Practices.** Irrigation of lawns and other ornamental vegetation can account for up to 70 percent of residential water use in the summer. Proper timing and duration of lawn sprinkling and use of appropriate vegetation adapted to the climate can reduce water use.
3. **Public information.** A public information program can be used to increase public awareness of water and the need for water conservation. Such a program can help the public understand where water comes from, why it is valuable, how to use less of it and what benefits can be received from conservation.

INDUSTRIAL

INDUSTRIAL USE

Industrial water use includes the use of water in connection with the manufacture, production, transport or storage of products, or the use of water in connection with providing commercial services, including water used in connection with steam electric power plants, secondary and tertiary oil recovery, air conditioning, heat pumps, restaurants, hotels and motels.

Available information indicates that in Kansas approximately 58 percent of water used by industry is used for thermal electric power generation, 28 percent is used for mining and 15 percent is used in manufacturing. The greatest use in manufacturing is for cooling and condensing.

As in municipal use, management of industrial use of water is approached from the aspect of supply and demand management. The conservation plan should address, at a minimum, the following supply and demand options.

SUPPLY MANAGEMENT OPTIONS

- Use of wastewater as process water
- Leak detection and repair
- Water system efficiency evaluation
- Substitution of low-quality water
- Skimming of excess streamflow

DEMAND MANAGEMENT OPTIONS

- Alternative cooling methods
- Recycling
- Pressure-reducing valves
- Increased process water application efficiency
- Use of residential conservation techniques
- Process modification
- Rinse water reduction

The District recommends the installation of water-saving devices and operating practices which will result in efficient use and conservation of groundwater. Where possible, water for industrial purposes should be recycled to obtain the maximum possible use from the water. Manufacturers are encouraged to seek out and use processes which require less water. Industrial users are urged to equip each groundwater supply well with a water meter.

DOMESTIC AND OTHER

It is important that domestic wells be properly located, constructed and maintained. Domestic and other users are encouraged to practice water conservation. Domestic users will effect significant water conservation if they install efficient toilets, low-flow shower heads, repair plumbing leaks, including leaky faucets, and schedule lawn watering.

WATER CONSERVATION

SAFE YIELD

Average annual precipitation in the District is 30 inches. Several studies concerning recharge have been made by the Kansas Geological and U.S. Geological Surveys. The average recharge to the Equus Beds aquifer ranges from 10 to 20 percent of the average annual rainfall, or three to six inches. The average annual recharge to the aquifer within a two-mile radius circle ranges from 2,010 acre-feet to 4,021 acre-feet. The highest recharge rate occurs in the southern two-thirds of the District and the lowest in the northern third.

It is the District goal to implement the Safe-yield Principle to manage the Equus Beds aquifer, so that a safe-yield balance will be maintained between groundwater recharge and discharge. Discharges from wells and baseflow must not exceed natural recharge or aquifer depletion will occur. Except for domestic use, all water right and permit applications, including appropriation and term, are subject to the Safe-yield regulation. To account for baseflow discharge from the Equus Beds aquifer to the Little Arkansas River, the District established by regulation 215 baseflow nodes on the Little Arkansas River. Each node is allocated an annual quantity of water ranging from 50 acre-feet per year to 104 acre-feet per year. The nodes are spaced 1,320 feet apart along the river and extend from near Medora to Wichita.

ALTERNATE WATER SOURCES

Water from the Equus Beds aquifer is suitable for most purposes. However, certain uses of groundwater are not beneficial when alternate sources of water are available. Alternate sources may include a lesser quality water, surface water, imported water, reclaimed water or recycled water. Certain uses of fresh and usable water from the aquifer are prohibited under the Alternate Water Sources Policy.

GROUNDWATER RECHARGE

More than 90 percent of annual groundwater recharge is from precipitation falling on the land overlying the Equus Beds aquifer. Factors affecting recharge in addition to rainfall amount are:

- soil composition and density;
- urban construction and development;
- groundcover; and
- depth to the water table.

In general good recharge areas are rural, have good vegetation, permeable soils and a shallow water table.

Industrial and urban development and expansion into these areas pose a threat not only to the quantity of recharge but also to the quality of water recharged. Landfills, sand and gravel mining, urban development and industrial development must be planned and structured to prevent impairment or damage to natural recharge areas. These areas are a critical part to sustaining the life of the Equus Beds aquifer and must be protected from development which will impair recharge and cause contamination. The District will support local decision-making bodies in their efforts to protect recharge areas as contained in the Protection of Groundwater Recharge Areas Policy.

WATER RECLAMATION AND RECYCLING

The concept of water reclamation and recycling is important not only for municipalities but also for irrigators and for industrial water users. Technology currently exists which permits the efficient reclamation and recycling of certain types of wastewater.

As existing supplies of available groundwater become more expensive, reclamation and recycling will become cost effective. The capture and redistribution of water from tailwater pits was a first step in the direction of recycling for irrigators.

Industrial concerns are becoming increasingly aware of the benefits of reusing their water, especially in manufacturing and power generation which use large quantities for heat-exchange purposes. With technology increasing the efficiency for heat-exchange process (e.g. mixing air with cooling water), it becomes more practical and desirable to reuse these formerly "waste" waters.

The District has adopted a policy to provide information and assistance to water users to develop programs for groundwater reclamation and recycling.

WATER METER PROGRAM

The Board of Directors believes that a water meter is a basic management tool to aid the water user in water management and well maintenance; and water meters enable the user to accurately report water use, which is the basic management data needed to properly manage groundwater resources.

Voluntary use of water meters by groundwater users is encouraged and promoted by the District. However, the District requires the installation and use of water meters as specified by its metering policy. Additionally, the policy provides for technical assistance and information concerning meter specifications, installation, service, repair and price discounts for meters which are ordered through the District.

PUBLIC INFORMATION

INFORMATION REQUESTS

Equus Beds Groundwater Management District No. 2 staff are available to assist landowners, water users and the public with information and service requests. In 1993 District staff responded to 1,650 requests for information or service. These responses ranged from helping with preparation of applications to field investigations of reported waste of water or water quality problems. Staff provides information and assistance regarding water permits, assessments, water meters, applications and other concerns of landowners and water users.

The District also provides water resource information for and works cooperatively with industrial concerns, state and federal agencies, municipalities, civic clubs, educational institutions and other organizations.

D.S.P. - 7901.1 DEFINITIONS

History: Adopted 1/79, Rev. 7/90, Rev. 5/95, Rev. 7/03

Definitions. The following terms when used in these standards and policies shall have the limitations and meanings respectively ascribed to them in this section:

- a. **Abandoned water well** means a water well determined by the District to be a well:
 - 1) in which the use has been permanently discontinued;
 - 2) in which pumping equipment has been permanently removed;
 - 3) which is in a state of disrepair such that it cannot be used to supply water, or it has the potential for transmitting surface contaminants into the aquifer or both;
 - 4) which poses potential health and safety hazards; or
 - 5) which is in such a condition it cannot be placed in active or inactive status.
- b. **Active well** means a water well which is operational and used to withdraw water, monitor or observe groundwater conditions.
- c. **Annular space** means the space between the surface casing and the cathodic protection borehole or the space between two or more strings of surface casing.
- d. **Assessment year** means:
 - 1) the calendar year, beginning January 1 and ending December 31, that the water use was either reported or withdrawn; or
 - 2) the year an assessment was charged against the land.
- e. **Aquifer** means any geological formation capable of yielding water in sufficient quantities that can be extracted for beneficial purposes.
- f. **Bedrock** means shale, siltstone, sandstone, anhydrite, gypsum, salt or other consolidated rock that underlie an aquifer.
- g. **Board** means the board of directors constituting the governing body of the Equus Beds Groundwater Management District No. 2.
- h. **Cathodic protection borehole** means any excavation penetrating the water table of an aquifer that is drilled, cored, bored, washed, driven, dug or otherwise constructed for the intended use or purpose of installing equipment to prevent electrolytic corrosion of metallic equipment or facilities.
- i. **Chief engineer** means the chief engineer of the Division of Water Resources of the Kansas State Board of Agriculture.
- j. **Collection year** means the year that the County Clerk collected the assessment by means of a county tax statement.
- k. **District** means the Equus Beds Groundwater Management District No. 2.
- l. **Eligible voter** means any person who is a landowner or a water user except as hereafter qualified. Every natural person of the age of 18 years or upward shall be an eligible voter of the district if:

- 1) he or she is a landowner who owns, of record, any land, or any interest in land, comprising forty or more contiguous acres, , or
 - 2) he or she withdraws or uses groundwater from within the boundaries of the District in an amount of one acre-foot or more per year.
 - 3) Except as is hereafter qualified, every public or private corporation shall be an eligible voter either:
 - A) if it is a landowner who owns, of record, any land, or any interest in land, comprising forty or more contiguous acres, or
 - B) if it is a corporation that withdraws groundwater from within the boundaries of the District in an amount of one acre-foot or more per year.
- m. **Grout** means cement, neat cement, bentonite clay grout, bentonite cement or other material approved by the District used to create a permanent impervious watertight bond as required for construction of a cathodic protection borehole.
- 1) **Cement** means a mixture consisting of one 94 pound bag of Portland cement to an equal volume of sand having a diameter no larger than 0.080 inches to five or six gallons of clean water.
 - 2) **Neat cement** means a mixture consisting of one 94 pound bag of Portland cement to five or six gallons of clean water.
 - 3) **Bentonite clay grout** means a mixture weighing not less than 9.4 pounds per gallon consisting of clean water and commercial grouting or plugging sodium bentonite clay containing high solids such as that manufactured under the trade name of “Volclay grout” or “HolePlug” or an equivalent approved by the District.
 - 4) **Bentonite cement** means a mixture weighing not less than 14.1 pounds per gallon consisting of clean water, Portland cement and four to eight percent bentonite clay grout.
- n. **Inactive well** means a water well which is not operational and is properly constructed, equipped with a watertight seal and maintained in good repair until it is returned to service as an active well.
- o. **Land** means real property as that term is defined by the laws of the state of Kansas.
- p. **Land comprising forty or more contiguous acres** means a single tract of land:
 - 1) located within the boundaries of the District,
 - 2) located outside the corporate limits of any municipality,
 - 3) excluding any public right-of-way located within the tract, as prescribed by K.S.A. 79-201a, and K.S.A. 79-213,
 - 4) calculated and recorded by the county appraiser, and
 - 5) having an area forty acres or greater.
- q. **Landowner** means the person who is the record owner of any real estate within the boundaries of the District or who has an interest therein as a contract purchaser of forty or more contiguous acres. Owners of oil leases, gas leases,

mineral rights, easements, or mortgages shall not be considered landowners by reason of such ownership.

- r. **Management program** means a written report describing the characteristics of the District and the nature and methods of dealing with groundwater supply problems within the District. It shall include information as to the groundwater management program to be undertaken by the District and such maps, geological information and other data as may be necessary for the formulation of such a program.
- s. **Observation well** means a well used to monitor, obtain or collect hydrologic, geologic, geophysical, quality or other technical data pertaining to groundwater, surface water or other hydrologic conditions.
- t. **Person** means any natural person, private corporation, municipality, or other public corporation.
- u. **Pitless casing adapter** means an assembly of parts installed in the surface casing of a cathodic protection borehole to permit the installation of a conduit through the wall of the surface casing and sealed to prevent the entrance of any fluids or contaminants into the surface casing.
- v. **Repeat violation** means a waste of water violation issued on the same water permit or for the same wasteful situation within two years of a prior waste of water violation.
- w. **Surface casing** means nonmetallic casing equipped with centralizers installed in a cathodic protection borehole with the annular space grouted.
- x. **Verified claim** means an affirmed statement submitted to the District on a District form for the purpose of having the water user's annual groundwater assessment charge based on the actual amount of groundwater withdrawn instead of the permitted or allocated amount.
- y. **Violator** means any person, private corporation, municipality or public corporation that causes water to be wasted.
- z. **Water right** shall have the meaning ascribed to that term in K.S.A. 82a-701(g), and any acts amendatory thereof or supplemental thereto.
- aa. **Water user** means any person who is withdrawing or using groundwater from within the boundaries of the District in an amount not less than one acre-foot per year. If a municipality is a water user within the District, it shall represent all persons within its corporate limits who are not water users as defined above.

~~D.S.P. 7901.2 UNAUTHORIZED GROUNDWATER APPROPRIATION~~

History: Adopted 1/79, Rev.7/90.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

Except for domestic use and the production and return of saltwater in connection with an oil or gas operation, no person shall appropriate or threaten to appropriate groundwater without first obtaining a permit for such appropriation from the Chief Engineer, Division of Water Resources.

Scope

The Equus Beds Groundwater Management District No. 2 shall assist in the proper and orderly development of water permits and insure that all water wells are properly permitted. This policy has been adopted in order to establish a procedure for District staff to follow regarding unauthorized water wells or groundwater diversions.

Standards

The following procedure shall be used by District staff when it is suspected that a water well does not have an approved water permit or an unauthorized groundwater diversion is occurring:

- a. When the District has information which indicates that a well is unpermitted, the District shall investigate as follows:
 - 1) the well is unpermitted, the District shall investigate as follows:
- b. The District's records through the Division of Water Resources' water permit records shall be reviewed to determine if the well has an approved water permit.
- c. If the review of the water permit records substantiates that:
 - 1) the well has an approved water permit, no further action is required; or
 - 2) the well does not have an approved water permit, a field inspection shall be conducted by District staff.
- d. The District shall conduct a field inspection, complete the Unpermitted Well form, AR 86-3, and attach to the form a location map showing the footage measurements of the well from the southeast corner of the section or from the nearest section corner in which the well is located.
- e. The District shall contact the landowner by letter and allow ten days for the landowner or his representative to file an application for a water permit. The letter shall:
 - 1) contain the findings of the field inspection;
 - 2) inform the landowner of the statutes, rules and regulations and the penalties; and
 - 3) advise the landowner that an application for a water permit must be filed on the well within ten days from the date of the notification letter.

SUPERCEDED

- f. If the landowner fails to comply with the first notification letter within 18 days, a second notification letter shall be sent to the landowner advising that an application for a water permit must be filed within five days of the date of the second notification letter.
- g. If the landowner fails to comply with the second notification letter, the District shall file a formal complaint with the Chief Engineer, Division of Water Resources and request that his office take appropriate action pursuant to the Division of Water Resources Administrative Policy No. 83-46. All information, field inspection forms and correspondence pertaining to the well shall be attached to the complaint letter.

~~D.S.P. 7902.3 ALTERNATE WATER SOURCES~~

History: Adopted 2/79, Rev. 7/90.

82a-1028. District Powers; home office. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

The use of fresh groundwater shall be prohibited where alternate sources of water are available for the proposed use and it is technologically and economically feasible to use the alternate source of water.

Scope

Water from the Equus Beds aquifer shall not be used for domestic purposes. Certain uses of fresh groundwater are not beneficial uses. Fresh water from the Equus Beds aquifer must not be used if a poor quality water is available which can be substituted for the proposed use.

SUPERCEDED

Standards

- a. Alternate sources of water may include:
 - 1) using poor quality water where conditions permit;
 - 2) developing storage facilities (ponds, lakes, reservoirs or other);
 - 3) importation of water when and if feasible; and
 - 4) reclamation or recycling of water available or produced by the user.
- b. The use of fresh groundwater shall be prohibited for:
 - 1) water flooding projects in connection with secondary or tertiary recovery of petroleum product from oil or gas activities;
 - 2) solution mining for the construction of storage caverns in subsurface salt deposits;
 - 3) the displacement of petroleum products for extraction from subsurface storage caverns; and
 - 4) other uses which the Board determines not to be beneficial.

D.S.P. - 8103.1 BOARD REPRESENTATION

History: Adopted 3/81, Rev. 7/90.

82a-1027. (a) All powers granted to a groundwater management district under the provisions of this act shall be exercised by an elected board of directors which shall be composed of the number of persons specified in the petition.

Policy

The Board of Directors of the Equus Beds Groundwater Management District No. 2 shall consist of nine members who are eligible voters of the District. The following Board representation will be encouraged:

- a. no less than one and not more than three members from each of the four counties in the District; and
- b. at least one representative from each of the following use categories:
 - 1) agriculture,
 - 2) municipal,
 - 3) industry, and
 - 4) domestic.

Scope

The Board is responsible for proper management of groundwater resources within the District boundaries. It is the governing body for the District regarding groundwater issues and provides representation of the District's eligible voters.

D.S.P. - 8103.2 POLICY ADOPTION

History: Adopted 3/81, Rev. 7/90.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

All proposed District standards and policies presented for consideration by the Board shall be read at two separate Board meetings. The Board may adopt, modify, table or reject the proposed standard or policy.

Scope

Policies adopted by the Board have significant impact on eligible voters represented by the Board. The complexity of issues involved requires that decisions to adopt new policies be approached thoughtfully and cautiously. It is the intent of this policy to insure that all aspects of a proposed policy have been adequately considered prior to adoption.

Standards

Proposed District standards and policies:

- a. shall be prepared in written form;
- b. shall be presented at the first reading and may be modified, tabled, rejected or approved for a second reading;
- c. shall be presented at the second reading and may be adopted, modified, rejected or tabled;
- d. if adopted shall become effective on a date determined by the Board of Directors; and
- e. shall be designated by the following system:
 - 1) The initials "D.S.P." will precede District standards and policies.
 - 2) A hyphen with a space before and after will separate the initials from the number.
 - 3) The first two digits of the "D.S.P. number" will represent the year the D.S.P. was effective.
 - 4) The third and fourth digits of the "D.S.P. number" will represent the month it was effective.
 - 5) Following the year and month, District standards and policies will be numbered sequentially with a sequence number separated from the year and month by a decimal point. The next available sequence number will be set to "1" on January first of each year.

D.S.P. - 8103.3 INTENSIVE GROUNDWATER USE CONTROL AREAS

History: Adopted 3/81, Rev. 7/90.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (s) recommend to the chief engineer the initiation of proceedings for the designation of a certain area within the district as an intensive groundwater use control area.

Policy

The Board of Directors may initiate proceedings for the designation of Intensive Groundwater Use Control Areas within the District by petitioning the Chief Engineer. These proceedings may be initiated if the Board finds that circumstances warrant additional management of groundwater resources in a designated area.

Scope

Unique circumstances or groundwater problems may require that special management provisions apply to a designated area within the District. Application of these provisions is necessary when unusual problems exist or may develop if appropriate action is not taken to correct or prevent them.

Standards

The Board may seek to establish Intensive Groundwater Use Control Areas whenever it has reason to believe that:

- a. groundwater levels in the area in question are declining or have declined excessively;

- b. the rate of withdrawal of groundwater within the area in question equals or exceeds the rate of recharge in such area;
- c. preventable waste of water is occurring or may occur within the area in question;
- d. unreasonable deterioration of the quality of water is occurring or may occur within the area in question; or
- e. other conditions impact the area in question, requiring regulation in the public interest.

~~D.S.P. 8103.4 MAXIMUM USE~~

History: Adopted 3/81, Rev. 7/90, Rev. 5/95.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

Maximum quantities of water to be approved for various uses are established by the District.

Scope

Standards for amounts of water required for various uses have been established and provide a basis for determination of appropriate water volumes to be approved for such uses. These standards have been adopted from sources within the use to and for information related to maximum volumes of water needed for various uses.

SUPERCEDED

Standards

The proposed quantity of water requested on an application to appropriate water for beneficial use or term permits shall not exceed the amounts set forth in the following standards.

- a. The maximum quantity of water for irrigation shall be one and one-half (1 ½) acre-feet per acre per year.
- b. The maximum quantity of water for recreational use ponds that do not intersect the water table shall be calculated using the formula $Q_e = (E + S)/12 - R \times A_{sw} + F$ where:
 - 1) Q_e is the maximum quantity of water for recreational pond use in acre-feet per year;
 - 2) E is the average evaporation in inches per year;
 - 3) R is the average rainfall in inches per year;
 - 4) S is the seepage loss based on soil and subsoil;
 - 5) A_{sw} is the surface water area of the pond in acres and
 - 6) F is the water requirement to initially fill the pond in acre-feet.
- c. The maximum quantity of water to be recommended for industrial use shall be determined as follows:

- 1) using established industry standards for water use associated with the manufacture, production, transport or storage of products or in connection with providing commercial services; and
- 2) calculating evaporation from an excavation intersecting the water table using the formula $Q_e = (E - R)/12 \times A_{sw}$ where:
 - A) Q_e is the maximum quantity for evaporation from the excavation;
 - B) E is the average evaporation in inches per year;
 - C) R is the average rainfall in inches per year; and
 - D) A_{sw} is the surface water area of the excavation in acres.
- 3) The applicant shall provide adequate water use information and established industry water use standards to justify the quantity requested.

d. The maximum quantity of water to be recommended for approval for municipal use shall be determined as follows:

- 1) If the municipality does not have an existing vested right, appropriation or term permit, the maximum quantity of water recommended for approval shall be computed as follows:
 - A) multiplying 200 gallons per capita per day times 365 days per year; and
 - B) multiplying this result by the projected population for the 20th year after the year the application is filed.
- 2) If the municipality has an existing vested right, appropriation or term permit, the maximum quantity of water recommended for approval shall not exceed the municipality's combined appropriations as determined by:
 - A) Multiplying either 110 percent of the current per capita per day usage or 200 gallons per capita per day, whichever is the lesser amount times 365 days per year and;
 - B) Multiplying this result by the projected population for the 20th year after the year the application was filed.
- 3) Population projections shall be based on U.S. Census Bureau, Kansas Census Bureau or County or local studies. They shall be made by accepted methods, and shall be based upon historic population trends for the municipality. Any unreasonable deviation from historic trends made in the population projection must be justified by the applicant.

e. The maximum quantity of water to be recommended for each kind of livestock use is:

Livestock	Gallons per day	Units
Beef animal	15	per head
Calf	10	per head
Milking cow	35	per head
Milking sanitation	20	per head
Dry cow	15	per head
Horse	15	per head
Swine	5	per head
Sheep	2	per head
Goat	2	per head
Turkeys	15	per 100 birds
Chicken	10	per 100 birds

- f. A quantity exceeding policy standards shall be accompanied with adequate information justifying the quantity of water and rate of diversion requested by the applicant. Adequate use information includes, but is not limited to, adopted or established peer water use standards, historical measured usage or professional recommendations.
- g. The District will cooperate with the Chief Engineer to establish reasonable limitations on rates of diversion and total annual quantities for proposed beneficial uses of water within the District.

~~D.S.P. 8103.5 METERING~~

History: Adopted 3/81, Rev. 7/90, Rev. 5/95.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (l) install or require the installation of meters, gauges, or other measuring devices and read or require water users to read and report those readings as may be necessary to determine the quantity of water withdrawn; (p) enter upon private property within the district for inspection purposes, to determine conformance of the use of water with established rules and regulations, including measurements of flow, depth of water, wastage and for such other purposes.

Policy

A well which meets one of the following criteria shall be equipped with a permanently installed water meter:

- a. wells authorized by approved water rights after September 1, 1987, and replacement wells whose change in point of diversion was approved after September 1, 1987;
- b. standby wells;
- c. wells described in an application for change in use or change in use made of water for an existing water right;
- d. wells described in an existing vested, appropriation or term permit issued a third waste of water violation within two years of a prior waste of water violation;
- e. wells described in a certificate of appropriation issued on or after July 1, 1995; or
- f. when the Board deems the installation of a water meter necessary to insure:
 - 1) the accuracy of the reported water use;
 - 2) the conditions and limitations of a water right are fulfilled;
 - 3) existing water rights are not impaired; or
 - 4) the public interest is not unreasonably affected.

SUPERCEDED

Scope

The Equus Beds Groundwater Management District No. 2 will promote the voluntary use of water meters by groundwater users. The District will require the proper installation and use of water meters as specified by this policy. The District will provide technical assistance and information concerning meter specifications, installation, service and repair for meters which are

ordered through the District. The District will seek to offer price incentives for water meters ordered through the District.

Standards

- a. The District shall notify the water right owner by letter of the meter requirements and installation specifications. Water meter specifications, installation specifications and a Completion of Flow Meter Installation-form will be included with the notification letter.
- b. The water right owner shall notify the District, within 30 days, after the meter is installed on the well by submitting either a completed Completion of Flow Meter Installation-form or a Division of Water Resources Notice and Proof of Completion form to the District within the required time.
- c. Installation requirements are as follows:
 - 1) The meter must be installed within 30 days after the completion of the well. A well is considered completed upon installation of the pump and power unit.
 - 2) Existing wells must be equipped with a meter within 30 days after the approval date of the water right or change application or the issuance of a certificate of appropriation.
 - 3) Extensions of time may be granted in installing the meter. A groundwater user must request an extension of time prior to the end of the 30-day period. Extensions of time may be granted for the following reasons:
 - A) The groundwater user has contracted with a vendor to buy and/or install the meter and the vendor cannot complete the contract within the 30-day period.
 - B) Weather conditions prevent the meter from being installed within the 30-day time period.
 - C) Other reasons which the Board or manager determine as valid.
- d. It is the responsibility of the water right owner to insure that the meter meets or exceeds the current minimum meter and installation specifications established by the Chief Engineer, Division of Water Resources.
- e. The water right owner shall maintain the meter in good repair according to the manufacturer's maintenance instructions or recommendations.
- f. The District shall inspect the meter and installation to determine if they meet or exceed the minimum specifications established by the Chief Engineer, Division of Water Resources. The groundwater user will be notified of the inspection results.
- g. The District may inspect and read the meter whenever it is deemed necessary.
- h. Enforcement of this policy shall be by Kansas Administrative Regulation 5-22-6, Procedures for Noncompliance of Rules and Regulations.

~~D.S.P. 8103.6 WATER RIGHT APPLICATION~~

History: Adopted 3/81, Rev. 7/90, Rev. 5/95.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

Applications filed for permit to appropriate water for beneficial use, change or term permits within the District shall comply with the management program, District standards and policies and rules and regulations. Applications shall be reviewed and a recommendation of approval or denial made to the Chief Engineer, Division of Water Resources, by the District.

Scope

The Kansas Water Appropriation Act requires the Chief Engineer, Division of Water Resources, to approve or deny applications for permit to appropriate water and change applications. The formation of the groundwater management district provided an opportunity for water users to manage the Equus Beds aquifer locally. The Equus Beds Groundwater Management District No. 2 Board of Directors cooperatively implemented a procedure to review water permit and change applications for compliance with the aquifer management program and to make recommendation to the Chief Engineer as to the approval or denial of such applications.

SUPERCEDED

Standards

Except as provided in sub-paragraph (d), the following water right application standards apply.

- a. The Chief Engineer shall submit new applications for permit to appropriate water for beneficial use, change and term permits to the District for review and recommendation.
- b. The District will submit to the Chief Engineer, within 15 working days, its recommendations for approval, denial or modification of the application.
- c. The District may assist in the preparations of applications for permit to appropriate water, change and term permits. It shall be the responsibility of the applicant to submit such application to the Chief Engineer.
- d. Applications which are not subject to this policy shall be applications for change in point of diversion for wells which are relocated or moved 300 feet or less from the original authorized well location.

D.S.P. - 8312.1 PUBLIC RECORDS

History: Adopted 12/83, Rev.07/90, Rev. 05/95, Rev. 07/96, Rev. 03/01

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

All records maintained by the Equus Beds Groundwater Management District No. 2 are the property of the District. Subject to the standards of this policy and the Kansas Open Records Act, the District shall:

- a. make public records open for inspection by any person,
- b. liberally construe and apply the policy standards and the Kansas Open Records Act to promote inspection of public records by any person, and
- c. identify, maintain and safeguard public records required for the conduct of District business.

Scope

The District encourages individuals to maintain records which are accurate and complete. Further, it recognizes that, at times, it is necessary to obtain information which is not in the records maintained by the individual. This policy is established to provide standards for allowing access to District records by any person as provided by the Kansas Open Records Act..

The District shall have a Records Retention Program in order to assure the retention and protection of the District's records and the prompt destruction of obsolete records.

The retention and protection of records will: a) assure the availability of information required in the management of the Equus Beds Aquifer, b) protect legal rights, c) assure compliance with statutory requirements, d) support tax records, e) provide documents for audit requirements, and f) insure availability of essential information for the resumption of operations following a major catastrophe.

In addition cost reduction is a goal of a Records Retention Program by: a) providing for the systematic transfer of inactive records from office files to records storage areas, b) maintaining an efficient filing system in records storage areas, and c) providing additional space in office files and records storage areas through the periodic transfer and destruction of obsolete records.

Standards

- a. The official custodian of all records and the freedom of information officer shall be the manager of the District.
- b. District business hours are from 8:00 a.m. to 12:00 p.m. and from 1:00 p.m. to 5:00 p.m. Monday through Friday except holidays and any other days the District office is officially closed.

- c. The office of the Equus Beds Groundwater Management District No. 2 is located at 313 Spruce, Halstead, Kansas 67056-1925. Public records may be inspected by any person at this address during business hours. There will be no additional hours established by the District for records inspection.
- d. An administration fee of \$15.00 per hour or any portion thereof shall be charged for custodian and staff time to produce, supervise the inspection of, and replace the requested records.
- e. A photocopy fee of 20 cents per copy plus \$15.00 per hour shall be charged for custodian and staff time to produce, copy and return the original record to its location.
- f. Eligible voters shall not be charged to inspect or have copies made of records directly pertaining to their own water rights or information pertaining to water levels or water quality of their own well. In addition, government agencies or those agencies that exchange information and data with the District shall not be charged unless the custodian deems the request for information will place an unusual burden on District resources.
- g. All requests for records shall be made in writing, either by letter or on forms provided by the District. The request shall:
 - 1) contain the name and address of the requester,
 - 2) a description of the records requested,
 - 3) the purpose for which the information will be use, and
 - 4) certify:
 - A) any names and addresses contained in or derived from the requested public record will not be used for the purpose of selling or offering for sale any property or service to any person or firm who resides at any address listed in the record and
 - B) any names or addresses derived from the requested public records or information will not be sold, given or otherwise made available to any person or firm for the purpose of allowing that person or firm for the purpose of selling or offering for sale any property or service to any person or firm who resides at any address listed in the record.
- h. The District will provide information as soon as possible but no later than three working days after receipt of the request.
- i. The custodian or designee shall supervise the inspection of all records and shall remain with the records at all times during their inspection. The custodian or designee may refuse access to a record but must provide a written explanation to the requester within three working days following receipt of the written request, citing the statute under which refusal is made.

- j. The custodian:
 - 1) shall develop a Records Retention Schedule consistent with state and federal record retention and disposal regulations and statutes,
 - 2) may issue implementation instructions to facilitate policy compliance and designate staff to administer and coordinate records management activities,
 - 3) shall provide for the transfer of inactive records from office files to record storage area and provide for the destruction of obsolete records on or before February 28 annually, and
 - 4) shall prepare a listing of files scheduled to be destroyed. This listing shall be retained permanently.

- k. At least 30 days prior to destruction of any obsolete record, a notice shall be published in a newspaper of general circulation in each county of which the District is a part, the notice shall state:
 - 1) the time, date, and place set for the destruction of obsolete records,
 - 2) the obsolete records may be inspected by the public prior to the destruction date, and
 - 3) the right to appeal the destruction of obsolete records to the Board of Directors.

- l. At the end of each fiscal year, the hard drive(s) of the file server shall be backed up in full using magnetic or other forms of data storage media, which shall be stored in a secure off-site location.

~~D.S.P. 8506.1 WASTE OF WATER~~

History: Adopted 6/85, Rev. 7/90, Rev. 5/95.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

It shall be a violation of these standards and policies for any person, private corporation, public corporation, municipality, company, institution, township, county, state agency or federal agency to waste water.

Scope

The Equus Beds Groundwater Management District No. 2 recognizes the social and economic benefits from developing and using groundwater resources. Proper use and management of the groundwater resources is essential and is the responsibility of the water user. To insure the groundwater resources of the District are used beneficially and not wasted, the District has established a policy and procedure to prohibit waste of groundwater within the District.

Standards

- SUPERCEDED**
- a. A person may file a waste of water complaint with District staff. The complaint may be filed by letter, telephone, in person or other methods acceptable to the District staff or Board. The complaint shall be recorded on a District waste of water complaint form.
 - b. A field investigation shall be conducted to substantiate the waste of water complaint. The investigation may be conducted by District staff, a law enforcement official or Division of Water Resources personnel. Information collected during the investigation shall be entered onto a waste of water complaint form. The following information should be obtained during the investigation:
 - 1) date and time of investigation;
 - 2) name of investigator;
 - 3) location of water well involved;
 - 4) location of waste of water;
 - 5) observable waste of water flow;
 - 6) measurement of waste of water flow (measured or estimated);

- 7) how flow rate was determined;
 - 8) number of repeat violations issued;
 - 9) location map; and
 - 10) recommendations.
- c. A violation shall not be issued by the District if items (b)(1) through (b)(5) are missing on the waste of water complaint form or are not observed in the field.
- d. The violator shall be notified of the violation by telephone, letter, in person or by other methods acceptable to the District staff or Board. The violator will have 48 hours after notification to comply with the waste of water policy. If the violator fails to comply within 48 hours a second violation notice shall be issued. Regardless of the method of notification, violators shall be sent a written notice of violation with a copy to the complainant, the appropriate Water Commissioner's office and the Division of Water Resources Certification Section. The completed waste of water complaint form and a copy of the written notice of violation plus other information pertaining to the violation shall be filed in the District office.
- e. If a repeat violation occurs, the District shall issue an order to the violator stating the nature of the violation and directing the violator to comply within 48 hours. If the violator fails to comply within 48 hours, a third notice of violation shall be issued. The order shall be sent certified mail. Copies shall be sent to the complainant, appropriate Water Commissioner and the Division of Water Resources Certification Section. The completed waste of water complaint form and a copy of the written notice of violation plus other information pertaining to the violation are to be filed in the District office.
- f. Upon the issuance of a third violation the District shall:
- 1) enforce the policy by the Kansas Administrative Regulation 5-22-6, Procedures for Noncompliance of Rules and Regulations;
 - 2) require that the water permit owner prepare and implement, pursuant to K.S.A. 82a-733, Conservation Plans and Practices, a conservation plan as a condition of the existing permit; and
 - 3) file the completed waste of water form, a copy of the complaint, and other information pertaining to the violation in the District office.
- g. Guidelines for preparing water conservation plans are available through the District, local Natural Resources Conservation Service offices, Kansas Water Office or the Kansas State University-Cooperative Extension Service.
- h. When it is determined, either by a law enforcement official or as defined in the Kansas Statutes Annotated, that a waste of water violation is either a public hazard or nuisance, the District may issue the violator an order to cease the violation. The violator shall be given 1 hour to cease the violation, regardless of the number of past violations.
- i. Enforcement of this policy shall be by the Kansas Administrative Regulation 5-22-6, Procedures for Noncompliance of Rules and Regulations.

D.S.P. - 8601.1 VERIFIED CLAIM

History: Adopted 1/86, Rev. 7/90, Rev. 5/95.

82a-1030. (a) In order to finance the operations of the district, the board may assess an annual water user charge against every person who withdraws groundwater from within the boundaries of the district.

Policy

Actual groundwater withdrawal amounts reported on a verified water use claim shall be accurate and recorded by a water meter.

Scope

Water use assessment charges are based on the total amount of groundwater allocated by an individual's water right or the actual amount withdrawn. Fair and equitable groundwater assessments must be based on uniform and accurate reported amounts.

Standards

Except as set forth in subparagraph (g), verified claims shall meet the following provisions:

- a. The well listed on the verified claim shall be equipped with a water meter for the reported water use year.
- b. The verified claim shall be filed on or before April 1 of each year using forms provided by the District.
- c. The total amount of groundwater used and reported on the verified claim shall be a metered value in units of gallons, acre-feet, acre-inches or barrels (42 gallons per barrel).
- d. The meter serial number and manufacturer's name shall be submitted with the verified claim or registered with the District.
- e. The beginning and ending meter reading and dates of each meter reading must be reported on the verified claim.
- f. The water meter and installation shall meet or exceed the specifications of Kansas Administrative Regulation 5-22-4, Metering.
- g. A verified claim may be submitted without a metered amount:
 - 1) for a well which was not drilled and completed under its original approval during the reported water use year;
 - 2) for a water permit whose place of use enrolled in the U.S. Department of Agriculture Conservation Reserve Program and the authorized point of diversion is an inactive well; and
 - 3) for a water permit enrolled in the Division of Water Resources, Water Right Conservation Program and the authorized point of diversion is an inactive well.

D.S.P. - 8608.2 ELECTION OF DIRECTORS

History: Adopted 8/86, Rev. 5/95, Rev. 7/03

82a-1027. (a) All powers granted to a groundwater management district under the provisions of this act shall be exercised by an elected board of directors which shall be composed of the number of persons specified in the petition.

Policy

The Board of Directors shall be elected from the eligible voters of the District and as provided in K.S.A. 82a-1027.

Scope

The Board of Directors of the Equus Beds Groundwater Management District No. 2 recognizes the right of qualified groundwater users and landowners in the District to vote for the Board of Directors positions.

Standards

- a. Directors shall be elected at the annual meeting held the second Tuesday of January.
- b. For each director's election the District shall produce from the previous year's certified land and groundwater use assessment lists:
 - 1) an eligible landowner voter list, and
 - 2) an eligible water user voter list..
- c. Substitute or proxy voting is not authorized.
- d. A person desiring to vote in an election shall provide appropriate identification to the custodian of the eligible voter lists so that the custodian can verify the person's identity and eligibility..
- e. The custodian shall provide a ballot to the eligible voter and have the person sign the appropriate voter list by the voter's name as it appears on the eligible voters list.
- f. A person representing an estate, trust, municipality or a public or private corporation must complete a duly authorized representative form on the form prescribed and provided by the District.
 - 1) Upon receipt and verification of the properly completed form:
 - A) the duly authorized representative shall sign the appropriate voter list for the entity which that person represents, and
 - B) a ballot shall be provided to the duly authorized representative,
 - 2) the custodian shall retain the completed authorization form.
- g. A landowner agreeing to another party in interest voting:
 - 1) for land held:
 - A) by lease,
 - B) under an estate for years, or
 - C) under contract.

- 2) shall submit by January 1 of the election year , a completed parties in interest affidavit form with supporting information showing:
 - A) the tract of land is forty contiguous acres or more,
 - B) the tract is within the boundaries of the District, and
 - C) the parties in interest have agreed as to who shall vote for the land.
 - 3) upon receipt and verification of the properly completed form and the supporting information the landowner shall sign the eligible landowner voter list for the parties in interest,
 - 4) at the election a ballot shall be provided to the person the parties in interest have agree to vote for the tract of land,
 - 5) a party in interest having more than one lease, estate or contract shall cast but one vote for all such interests, and
 - 6) the completed affidavit with supporting information form shall be retained by the custodian.
- h. A person desiring to vote as a landowner and whose name is not contained on the eligible voter land list, shall:
- 1) complete a voter's affidavit form, and
 - 2) shall submit information showing:
 - A) the tract of land is forty contiguous acres or more,
 - B) the tract is within the boundaries of the District, and
 - C) the person is either the landowner of record or a joint owner of record.
 - 3) Upon receipt and verification of the properly completed form and the supporting information:
 - A) the person shall sign the eligible landowner voter list by the voter's name as it appears on the list, and
 - B) a ballot shall be provided to the person,
 - 4) the completed voter's affidavit with supporting information form shall be retained by the custodian.
- i. A person desiring to vote as a water user, and whose name does not appear on the eligible voters water use list, shall:
- 1) complete a voter's affidavit form, and
 - 2) shall submit information showing:
 - A) the diversion was within the boundaries of the District,
 - B) the legal description of the diversion of groundwater, and
 - C) the amount withdrew or used was not less than one acre-foot per year.
 - 3) Upon receipt and verification of the properly completed form and the supporting information:
 - A) the person shall sign the eligible water user voter list by the voter's name as it appears on the eligible voters list, and
 - B) a ballot shall be provided to the person,
 - 4) the completed voter's affidavit with supporting information form shall be retained by the custodian.

- j. An election committee consisting of the District's legal counsel and three eligible voters shall be appointed by the Board President prior to the election.
 - 1) District legal counsel shall:
 - A) serve as committee chair, and
 - B) adjudicate election procedural questions.
 - 2) The committee shall be responsible for:
 - A) collection, security and tallying of the ballots;
 - B) determining the reasonableness of information submitted to the custodian for purposes of proving voter eligibility; and
 - C) announcing the official results of the vote tally and the election winners.
 - 3) Members of the District Board of Directors shall not serve on the election committee.
- k. Eligible voters lists, ballots, completed affidavit forms, and any other information, forms, or documentation shall be maintained pursuant to Public Records Standard and Policy 8312.1.

D.S.P. - 8701.1 ASSESSMENT

History: Adopted 1/87.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (h) levy water user charges and land assessments, issue general and special bonds and incur indebtedness within the limitations prescribed by this act; 82a-1030. (a) In order to finance the operations of the district, the board may assess an annual water user charge against every person who withdraws groundwater from within the boundaries of the district.

Policy

The District shall:

- a. insure that land and water user assessments are properly charged against water users and landowners;
- b. certify such assessments to the appropriate County Clerk's office for collection; and
- c. correct or amend clerical errors in the assessments as provided by statutory authority.

Scope

The purpose of this administrative policy is to establish a procedure for District staff to follow for land and water user assessment methods, assessment certification and assessment corrections or amendments.

Standards

- a. A groundwater use charge shall be assessed against a person who:
 - 1) has an approved, certified, vested or term permit at the end of the assessment year;
 - 2) has an approved appropriation, certified, vested or term permit that was reinstated by the Chief Engineer, Division of Water Resources, on or before the end of the assessment year; or
 - 3) on or prior to the end of the assessment year, reports or withdraws groundwater from a well which is:
 - A) either exempt from water permitting requirements;
 - B) unpermitted; or
 - C) its permit was approved and terminated in the same assessment year.
- b. District staff shall prepare land and water use assessments from County Clerks' real estate records and from the Division of Water Resources' water permit records and verified claims submitted for the current assessment year.
- c. The Board of Directors shall hold a public budget hearing to submit a proposed budget for the coming year to eligible voters of the District. Proper notice of the budget hearing shall be given as required by K.S.A. 82a-1030(b).
- d. Following the budget hearing, the Board of Directors shall adopt by resolution a proposed budget and determine the amount of land assessment and/or water user charge needed to support the adopted budget.
- e. The District manager shall submit land and water user assessment lists to the District Board of Directors at the July Board meeting. The lists shall be certified by the Board of Directors to the proper County Clerks for collection.
- f. After certification of the assessment lists, the District staff shall, within 14 days, send the certified lists to the appropriate County Clerks.
- g. The Board of Directors or District staff may make clerical corrections or amendments to both land and water use assessment lists prior to certification.
- h. The Board of Directors or District staff may not make clerical corrections or amendments to either land or water use assessment lists after certification.
- i. Clerical errors existing in an assessment list after certification and prior to November 1 of the collection year must be corrected or amended by the appropriate County Clerks. Where

it is deemed appropriate, the Board of Directors or District staff may make recommendations to the County Clerks regarding the clerical error.

- j. Clerical errors existing in an assessment list after certification and after November 1 of the collection year and two years preceding must be corrected or amended by the appropriate Board of County Commissioners. Where it is deemed appropriate, the Board of Directors or District staff may make recommendations to the Board of County Commissioners regarding the clerical error.

D.S.P. - 9007.1 APPEAL

History: Adopted 7/90, Rev. 5/95.

82a-1028. District Powers; home office. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

It is the policy of the District to provide eligible voters with a structured procedure for appeal of a decision by the District staff.

Scope

This policy establishes a procedure by which an eligible voter may appeal a decision by the District staff.

Standards

- a. **Appeal** - An eligible voter may appeal a decision of the District in the following manner:
 - 1) **Initiating Appeal.** The eligible voter may appeal decisions of the District staff to the District Board of Directors by filing an appropriate written Petition with the District office. The appeal must be filed within 60 days of the staff decision.
 - 2) **Petition.** The Petition shall state its basis and be accompanied by any supporting documents needed to allow for a proper review by the Board.
 - 3) **Procedure for Argument.** The Board shall allow each party to present briefs and may afford each party an opportunity to present oral arguments, if appropriate.
 - 4) **Action by the Board.** Upon due consideration, the Board may render either a Final Decision to dispose of the case or a decision remanding the matter with appropriate instructions to the staff. If the matter is remanded, the Board may order any appropriate temporary relief.
 - 5) **Service of Decision.** A Final Decision or a decision remanding the matter to the staff shall be in writing. Notice of the Board's decision shall be served to all interested parties by certified mail with return receipt requested, within forty-five (45) days after the Board's receipt of briefs and oral arguments. This time period may be waived or extended with the written consent of all parties, or if good cause is shown.
 - 6) **Contents of Final Decision or Remand.** A Final Decision or decision remanding the matter shall identify any differences between such decision and the initial staff

decision, and shall include all matters required by subsection C of K.S.A. 77-526, with regard to Final Orders (Final Decisions) and Initial Orders (Staff Decisions).

b. Reconsideration

- 1) **Process.** Any party, within 15 days after service of a Final Decision, may file a written Petition for Reconsideration with the Board. Such Petition shall state the specific grounds upon which relief is required.
- 2) **Action by Board.** The Board shall render a written Order either denying the Petition, granting the Petition and dissolving or modifying the Final Order, or granting the Petition and setting the matter for the proceedings. The Petition may be granted, in whole or in part, only if the Board states in the written Order, findings of fact, conclusions of law, and policy reasons for the decision. The Petition is deemed to have been denied if the Board does not dispose of it within 30 days after the filing of the Petition.

D.S.P. - 9007.2 PROTECTION OF GROUNDWATER RECHARGE AREAS

History: Adopted 7/90.

82a-1028. District Powers; home office. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

The District will support local decision-making bodies in their efforts to prevent impairment of groundwater recharge in natural recharge areas.

Scope

More than 90 percent of annual groundwater recharge comes from precipitation falling directly on land overlying the Equus Beds aquifer. Widespread construction of roads, buildings and other urban structures over natural recharge areas of the District could reduce recharge of the aquifer. Local governments, through planning processes, have the ability to control urban growth to reduce the effect on recharge to the aquifer.

Standards

- a. Local governments should implement adequate policies, rules and regulations to prevent contamination and reduction of natural recharge by:
 - 1) urban runoff, sewage systems, septic tanks or other waste disposal methods;
 - 2) roads, parking lots, housing additions and other urbanization;
 - 3) industrial process or activities; and
 - 4) agricultural practices.
- b. Upon request by local governments, the District will provide groundwater management expertise and technical information.

~~D.S.P. 9007.3 ABANDONED WELL~~

History: Adopted 7/90. Rev. 5/95

82a-1028. District Powers; home office. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district. (p) enter upon private property within the district for inspection purposes, to determine conformance of the use of water with established rules and regulations, including measurements of flow, depth of water, wastage and for such other purposes.

Policy

An abandoned water well shall be considered a groundwater contamination threat. It shall be the responsibility of the well owner to properly plug the well in accordance with Article 30 of the Administrative Regulations of the Kansas Department of Health and Environment and the provisions of this standard and policy.

Scope

An abandoned water well represents a groundwater contamination threat and a health and safety hazard. The intent of this policy is to eliminate health, safety and contamination problems caused by abandoned water wells.

Standards

- a. A person may file an abandoned water well complaint with District staff. The complaint may be filed by letter, telephone, in person or other methods acceptable to the District staff or Board. The complaint shall be recorded on a District abandoned well complaint form.
 - 1) A field investigation shall be conducted upon receipt of an abandoned well complaint. The investigation shall be conducted by authorized personnel of the District, Division of Water Resources, Kansas Department of Health and Environment, or County/City Health Department. The investigator shall record information collected during the field investigation on District form AR-89-1.
 - 2) Upon verification of the abandoned well, the owner(s) of the abandoned well shall be notified by District order that the well shall be plugged within 30 days from the date of the order. Copies of the order may be furnished to the Kansas Department of Health and Environment and the complainant.
- b. An abandoned well shall be plugged by the well owner upon termination of the water permit by the Chief Engineer, Division of Water Resources.
- c. The well owner or an agent shall notify District staff 48 hours prior to plugging operations. District staff may be present during plugging operations and may inspect the plugged well prior to being backfilled.
- d. The well owner shall submit a completed plugging report to the Kansas Department of Health and Environment within 30 days after an abandoned well is plugged and a copy of the plugging report shall be submitted to the District within the same time period.

- e. It shall be considered noncompliance of this policy for any person, private corporation, public corporation, municipality, company, institution, township, county, state agency or federal agency to fail to properly plug an abandoned water well.
- f. Enforcement of this policy shall be by Kansas Statutes Annotated 82a-1028 (n), District Powers.

~~D.S.P. 9007.4 INACTIVE WELL~~

History: Adopted 7/90. Rev. 5/95

82a-1028. District Powers; home office. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district. (p) enter upon private property within the district for inspection purposes, to determine conformance of the use of water with established rules and regulations, including measurements of flow, depth of water, wastage and for such other purposes.

Policy

Any water well placed in an inactive status shall be properly constructed, equipped with a watertight seal and maintained by the well owner in accordance with Article 30 of the Administrative Regulations of the Kansas Department of Health and Environment and the provisions of this standard and policy.

Scope

An inactive water well represents a well with the potential to be returned to an active status with a minimum of effort. The intent of this policy is to eliminate health, safety or contamination threats associated with inactive water wells. It is the responsibility of the well owner to properly construct, seal and maintain an inactive well.

Standards

- a. To maintain a well in an inactive status, a well owner shall:
 - 1) comply with Article 30 of the Kansas Department of Health and Environment's Administrative Regulations;
 - 2) complete:
 - A) a District inactive water well agreement; and
 - B) an inactive well form and submit it to the District and the Kansas Department of Health and Environment within 30 days after an inactive well is properly constructed;
 - 3) protect and mark the inactive well by:
 - A) safeguarding the well from damage; and
 - B) posting a sign on or near the well. The sign shall be:
 - a) a minimum of three feet above land surface;
 - b) easily visible; and
 - c) of durable construction with "Inactive Water Well" and the legal description (10 acre tract, section, township and range) written legibly on the sign.

SUPERCEDED

- 4) seal the casing of the inactive well at least one foot above land surface with a watertight seal. An authorized seal shall consist of either:
 - A) a ¼ inch steel plate completely welded to the casing top;
 - B) a PVC cap glued to the casing top (rated schedule 80 PVC for casing diameters equal to or greater than 6 inches and schedule 40 PVC for casing diameters less than six inches); or
 - C) other apparatus approved by the District.
 - 5) immediately repair any damage to the well and notify the District when repair is completed. The District shall inspect any repairs made to the well; and
 - 6) notify the District and appropriate state agencies when the well is returned to service as an active well.
- b. District staff shall inspect the well site and record the inspection information on a District inactive well inspection form prior to re-opening.
 - c. A well may be maintained in an inactive status for a period not to exceed five years or any extension authorized by the District.
 - d. An inactive well not properly constructed, sealed or maintained may be declared an abandoned well by the District or the Kansas Department of Health and Environment.
 - e. An inactive well may be periodically inspected by the District. Inspection information will be recorded on a District inactive well inspection form.
 - f. Failure to comply with the provisions of this policy by any person, private corporation, public corporation, municipality, company, institution, township, county, state agency or federal agency shall be considered noncompliance with this policy.
 - g. Enforcement of this policy shall be by Kansas Statutes Annotated 82a-1028 (n), District Powers.

SUPERCEDED

D.S.P. - 9007.5 WATER QUALITY

History: Adopted 7/90

82a-1028. District Powers; home office. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

It shall be a violation of these standards and policies for any person, private corporation, public corporation, municipality, company, institution, township, county, state agency or federal agency to contaminate or threaten to contaminate the fresh and usable groundwater of the District.

Scope

The Equus Beds Groundwater Management District No. 2 recognizes the social and economic

benefits derived from groundwater resources. Proper protection and management of the groundwater is essential and is the responsibility of the water user. To insure that groundwater resources are protected and not contaminated, the District has established a policy to prohibit contamination of groundwater within the District.

Standards

- a. A water quality complaint may be filed at the District office either by a member of the Board, staff, an eligible voter or any person at least 18 years of age residing within the District. The complaint may be filed by letter, telephone, in person or other methods acceptable to the District staff or Board. The complaint shall be filed on a District water quality complaint form.
- b. A field investigation must be conducted by District staff to substantiate the water quality complaint. The field investigation shall include the following information or analyses:
 - 1) date and time of investigation;
 - 2) name of investigator;
 - 3) location of site of contamination;
 - 4) description or nature of contamination;
 - 5) source of contamination;
 - 6) number of previous violations;
 - 7) soils;
 - 8) depth to bedrock;
 - 9) saturated thickness;
 - 10) analysis of soil and/or water;
 - 11) remediation recommendations; and
 - 12) water wells within ½ mile of the site.
- c. The District shall file a water quality complaint and associated field investigation with the appropriate state or federal agency for violation of this policy.

D.S.P. - 9007.6 RECLAMATION AND RECYCLING

History: Adopted 7/90.

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (m) provide advice and assistance in the management of drainage problems, storage, groundwater recharge, surface water management, and all other appropriate matters of concern to the district.

Policy

The District will cooperate with groundwater users to establish programs and practices for water reclamation and recycling.

Scope

The District will encourage and actively seek involvement in reclamation and recycling plans. Groundwater management expertise and information regarding District and state standards and policies will be made available to planners.

Standards

The Equus Beds Groundwater Management District No. 2 resolves that groundwater users are encouraged to:

- a. anticipate future water demands and needs;
- b. assess options for development of new water supplies;
- c. embrace a philosophy that the groundwater user has a responsibility to maintain, manage and restore groundwater resources;
- d. endeavor to initiate cooperative water reclamation and supply projects using water which has been treated, purified and reclaimed to recharge or store to meet future water supply needs;
- e. embrace the concept of continual recycling of usable water; and
- f. cooperate with the District to investigate means to supplement groundwater resources by improving recharge, preventing its deterioration and seeking means to import water.

D.S.P. - 9007.7 WAIVER OR EXEMPTION

History: Adopted 7/90. Rev. 5/95

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

A waiver from any District standard and policy may be granted at the sole discretion of the Board if it is proven to the satisfaction of the Board that the waiver complies with the following standards and procedure.

Scope

Standards and policies are means of establishing uniform and consistent response to groundwater problems or issues. In some situations, however, circumstances may be unique in that it is inappropriate to apply an established standard or policy. In those cases, the Board of Directors may examine the request and determine if a waiver of a District standard and policy should be granted.

Standards

- a. A written request for waiver must be filed at the District office as provided by Appeal Policy D.S.P. 9007.1 (b) The grant of a waiver shall be solely at the discretion of the Board.
- b. The Board shall not grant a waiver unless it is proven by the applicant by clear and convincing evidence that the waiver will not:

- 1) impair an existing water right;
- 2) adversely affect the public health and safety;
- 3) contaminate or threaten to contaminate groundwater;
- 4) adversely affect the public interest; or
- 5) significantly impair the ability of the District to apply and enforce its standards and policies, rules and regulations and management program.

~~D.S.P. 9107.1 CATHODIC PROTECTION BOREHOLE~~

History: Adopted 07/91. Rev. 5/95

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

Cathodic protection boreholes that penetrate the water table of an aquifer shall comply with the minimum District standards for drilling, construction and abandonment.

Scope

The Natural Gas Pipeline Act, Public Law 90-481, requires that certain pipelines are equipped with cathodic protection. The purpose of this policy is to establish minimum standards to prevent contamination of groundwater from improperly drilled, constructed or abandoned cathodic protection boreholes. Cathodic protection boreholes are used to protect metal facilities from electro-chemical corrosion. Facilities protected by cathodic protection boreholes include petroleum, natural gas and water pipelines, storage facilities, power lines, telephone cables and switchyards.

Standards

- a. **Permits.** It shall be a violation of this standard and policy for any person to drill and construct a cathodic protection borehole without first applying for and obtaining a permit to drill and construct a cathodic protection borehole in accordance with this standard and policy. An application for permit shall be made upon the form prescribed and furnished by the District and submitted a minimum of 60 days prior to planned construction.
- b. **Appeals.** The applicant may appeal these standards pursuant to Appeal Policy, D.S.P. 9007.1.
- c. **Waivers.** The Board may waive compliance with these standards pursuant to D.S.P. 9007.7. In waiving any of these standards, the Board shall require that measures be implemented that provide the same or greater level of groundwater quality protection than would otherwise be provided by these standards.
- d. **Drilling.**
 - 1) A driller or water well contractor licensed with the Kansas Department of Health and Environment shall drill the cathodic protection borehole.

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- 2) The cathodic protection borehole shall be logged according to the following:
 - A) drill cuttings shall be sampled and recorded at intervals not greater than five feet and more frequently, if needed, to produce an accurate lithologic or driller's log of the complete cathodic protection borehole; and
 - B) any electrical readings or log and other geophysical readings or logs of the complete cathodic protection borehole shall be recorded and made a permanent record.
 - 3) The diameter of the cathodic protection borehole containing the surface casing shall be a minimum of six inches larger than the diameter of the surface casing.
 - 4) The cathodic protection borehole shall be "tagged" or measured to determine the surface casing and total depths.
 - 5) Products designed for drilling purposes that contain organic polymers shall not be used as grout or drilling mud.
 - 6) When determined by the District that the use of a pit threatens to contaminate groundwater, the pit shall be:
 - A) constructed so that the bottom and sides are of a hydraulic conductivity no greater than that of the surrounding formation;
 - B) situated above ground, or
 - C) situated above ground tank.
 - 7) Fluids that threaten to contaminate groundwater shall be removed from the drilling pit and properly disposed of upon closure of a pit.
 - 8) A borehole completion report, any electrical or geophysical readings or logs and an as-built plan shall be submitted to the District 30 days after the cathodic protection borehole is constructed.
- e. **Surface casing.** Non metallic surface casing equipped with centralizers shall be installed in the borehole when drilling penetrates 20 feet into either shale or impermeable bedrock.
- 1) The annular space shall be grouted.
 - 2) Grout shall be installed using a tremie pipe or as recommended by grout manufacturer's instruction and allowed to set undisturbed as recommended by the grout manufacturer's specifications.
 - 3) Surface casing shall be installed pursuant to and as described in paragraph (g).
 - 4) No opening shall be made through the surface casing, except for the installation of a pitless casing adapter.
 - 5) Centralizers shall be installed along the entire length of the surface casing at intervals not greater than 40 feet starting at the bottom end of the surface casing.
 - 6) The surface casing shall have a standard dimension ratio (SDR) of 21 or less. The SDR number shall be calculated by dividing the surface casing's outside diameter (OD) by its minimum wall thickness (MWT); (SDR = OD/MWT).
- f. **Anodes and anode conductor.** Anodes and anode conductor shall be installed in the cathodic protection borehole beginning five feet below the bottom of the surface casing.

- g. **Surface construction features.** Surface construction features of a cathodic protection borehole shall serve to prevent physical damage to the installation, prevent entry of pollutants and contaminants and prevent unauthorized access.
- 1) The top of the surface casing shall be fitted with a watertight seal, cover or an equivalent device or housing.
 - 2) The cathodic protection borehole shall be vented of any gases.
 - A) The vent pipe shall terminate a minimum of three feet above land surface.
 - B) The above ground terminus end of the vent pipe shall be turned 180 degrees and equipped at its terminus with a 16-mesh or greater brass, bronze, copper screen or approved material.
 - C) Surface casing tops shall be fitted with security devices to deter unauthorized access.
 - D) Above-ground installations shall be marked, easily visible and protected from damage.
 - 3) Except as set forth in subparagraphs (g)(4) and (g)(5), the top of the surface casing shall terminate a minimum of three feet above land surface or one foot above the highest known flood elevation greater than three feet above land surface.
 - 4) Except as set forth in subparagraph (g)(5), a water resistant and structurally sound vault must be installed to house the top of the surface casing where it is terminated below land surface.
 - A) The cover or lid shall be fitted with security device to prevent unauthorized access.
 - B) The vault and cover or lid shall be strong enough to support vehicular traffic where such traffic is a possibility.
 - C) The vault shall be designed so that surface drainage or runoff is directed away from the vault.
 - D) The surface casing shall contact the vault to form a water resistant and structurally sound seal and connection.
 - 5) Surface casing installations terminated and buried below land surface shall be constructed to prevent physical damage to the installation and prevent entry of pollutants and contaminants. Buried installations shall meet the following minimum requirements.
 - A) The cathodic protection borehole shall be plugged from a minimum of five feet below the bottom of the surface casing to the top of the surface casing with grout, placed with a tremie pipe or as recommended by the grout manufacturer.
 - B) From the top of the surface casing to land surface, the borehole shall be backfilled with clean topsoil and compacted.
 - 6) Any concrete base or pad constructed around the above-ground surface casing or vault shall be:
 - A) a minimum of four inches thick;
 - B) sloped so that surface drainage or runoff is directed away from the installation;
 - C) free of cracks, voids or other defects that detract from its watertightness; and
 - D) the joint between the base and the surface casing must be structurally sound and water resistant.
- h. **Abandonment.** A cathodic protection borehole shall be abandoned when it:

- 1) is not completed due to unforeseen circumstances;
 - 2) either contaminates or threatens to contaminate a fresh water aquifer;
 - 3) encounters uncontrollable artesian flow;
 - 4) has exhausted its anodes and replacement anodes are not installed within one year; or
 - 5) has not been used for one year and the owner does not demonstrate intentions to use it.
- i. **Plugging.** Abandoned cathodic protection boreholes shall be plugged or caused to be plugged by the owner. In all cases, the owner shall perform the following as minimum requirements for plugging abandoned cathodic protection boreholes.
- 1) Any cables, anodes, vent pipe, anode conductor or other materials installed in the borehole shall be removed as necessary to insure the borehole is properly plugged.
 - 2) The surface casing shall be cut off a minimum of three feet below land surface and removed.
 - 3) All cathodic protection boreholes shall be plugged with grout from a minimum of five feet below the bottom of the surface casing to the top of the remaining surface casing, placed with a tremie pipe of length as recommended by the grout manufacturer.
 - 4) From three feet below the surface casing to the top of the borehole shall be backfilled with clean top soil and compacted.
 - 5) Any vent pipe removed from the cathodic protection borehole shall be completely filled with grout.
 - 6) Where subsurface pressure causing artesian flow is encountered, a pressure required for placement of the grout plug shall be maintained long enough for the plug to set.
 - 7) A plugging report shall be submitted to the District 30 days after the cathodic protection borehole is plugged.

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D.S.P. - 9206.1 OPEN MEETINGS LIST POLICY

History: Adopted 06/92

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (n) adopt, amend, promulgate, and enforce by suitable action, administrative or otherwise, reasonable standards and policies relating to the conservation and management of groundwater within the district.

Policy

The District will notify persons in advance of meetings of the Board of Directors, Equus Beds Groundwater Management District No. 2, by maintaining a current list of persons requesting such notification.

Scope

The District encourages persons to attend and take part in all District and Board of Directors' meetings, hearings, work sessions or other business. A notification list will be maintained by the District. Notice of the date, time and place of any regular or special meeting, work session or hearing will be furnished to persons requesting such notice.

Standards

The following standards shall be followed by District staff in maintaining the list and notifying persons.

- a. A list of those persons requesting notice of the meetings of the District shall be maintained at the District office.
- b. The list shall include the person's:
 - 1) name;
 - 2) address; and
 - 3) telephone number.
- c. Any request received by the District which could reasonably be interpreted as requesting notice of the meetings shall be noted on the list.
- d. Whenever possible, such requests shall be in writing either by the District staff or by the requesting party.
- e. The District manager shall be designated by the presiding officer of the District to maintain the list of persons requesting notice.
- f. Any request received during the calendar year shall be deemed to have expired on December 31st of that year.
- g. On or before December 1st of every year, the District shall cause a letter to be mailed to persons on the list stating that their request will expire on December 31st of that year unless, prior to that date, a new request is received from the person indicating their request to continue receiving notice.
- h. The District will supply a form to be utilized to request notice and remain on the list.
- i. No request shall be deemed expired until after January 15th following the stated expiration date.

ADMINISTRATION

BOARD

82a-1027. (a) All powers granted to a groundwater management district under the provisions of this act shall be exercised by an elected board of directors.....

The governing body of the Equus Beds Groundwater Management District No. 2 is its Board of Directors, who represent all water users within the District. They are elected by the eligible voters of the District and serve without compensation.

The Board establishes the goals, policies and objectives of the District and empowers the manager to administer them. Using established goals, policies and objectives as a guide, the Board members develop and adopt a management program from which the District is managed.

It is the responsibility of the Board to fairly and accurately assess groundwater management needs of the District, apply existing, or formulate and adopt new policies to meet these needs, then direct District staff to execute these policies or programs.

MEETINGS

The Board of Directors meet in regular session the second Tuesday of each month. All meetings and any portion thereof are open to the public, except for closed or executive meetings.

The District encourages persons to attend District and Board of Directors' meetings, hearings, work sessions or other business meetings. Public comment is welcomed during the public forum at each regular board meeting. Individuals are provided the opportunity to voice their groundwater issue or concern directly to the Board.

It is a policy of the District to maintain a meeting notification list of persons who request advanced notification of District and Board meetings. Notice of the date, time and place of any regular or special meeting, work session or hearing will be furnished to persons requesting notification.

ELECTIONS

On the second Tuesday of January each year an election is held to select three Board members from the eligible voters of the District. The newly elected directors take office in February and serve a term of three years, or until their successors are duly elected and qualified. Terms of one-third of the Board members expire each year.

STAFF

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (d) employ such legal, engineering, technical, and clerical services as may be deemed necessary by the board.....

The Board of Directors employs a manager and assisting staff to carry out the programs, policies and objectives of the District. The manager is responsible for administration of all operations and affairs of the District as a whole, and for advising and making recommendations to the Board of Directors with respect to these matters. Other duties of the manager include:

- A. Direction of development of specific policies, procedures and programs needed to implement the groundwater management program adopted by the Board of Directors, and coordination of administration and control of these policies, procedures and programs;
- B. Proposal of projects to the Board of Directors that the District should undertake and performance of the detailed planning of these projects; and
- C. Proposal and execution of such contracts and commitments as may be authorized by the Board of Directors.

The manager is the Board's designee and may be assigned other responsibilities as the Board deems appropriate or necessary.

ASSESSMENTS

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (h) levy water user charges and land assessments, issue general and special bonds and incur indebtedness within the limitations prescribed by this act.....

The Board of Directors prepares and adopts an annual budget from which the District is operated. These operational funds are derived from user charges assessed to water users in the District. The amount of the assessment made is determined by volume of water used and the user charge then in effect. An additional assessment is made on landowners based on acres owned within the District. These moneys are collected by respective county clerks the same as other special assessments and remitted to the treasurer of the District.

OFFICE AND RECORDS

82a-1028. Every groundwater management district organized under this act shall be a body politic and corporate and shall have the power to: (c) rent space, maintain and equip an office, and pay other administrative expenses; (q) select a residence or home office for the groundwater management district.

Office

The Equus Beds Groundwater Management District No. 2 is managed from a central office located at 313 Spruce in Halstead, Kansas. District business hours are from 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. Monday through Friday except holidays and any other days the District office is officially closed.

The office provides facilities for:

- administration of policies and programs approved by the Board,
- gathering of data and research information,
- meetings related to management of groundwater, including Board of Directors meetings and
- other activities necessary or convenient for effective management of groundwater resources of the District.

The District office provides visibility within the community for the Equus Beds Groundwater Management District No. 2. It also serves as a clearinghouse for communication between the public and the Board.

District staff responds to an array of questions from the public. They range from general inquiries on groundwater to quite specific questions on water rights and permits.

Records

The custodian of District records is the manager and the manager's full-time staff. Public records may be inspected by any person at this address during business hours. Fees are \$15.00 per hour or any portion thereof for access to the records.

The hourly fee is to pay for the custodian time to produce, supervise the inspection of and replace the requested records. The fee for copies of records is 20 cents per copy plus \$15.00 per hour of custodian time to produce, copy and return the original record to its pre-copy location. There is no charge for District members to inspect or have copies made of records directly pertaining to their own water rights or information pertaining to water levels, water quality or other information pertinent to their own water well.

Requests for records must be made in writing, either by letter or on a form provided by the District. The written request must contain the name and address of the requester and a description of the records requested. The District will provide information as soon as possible but no later than three working days after receipt of the written request.

District staff will supervise the inspection of requested records and will remain with the records during their inspection. The custodian may refuse access to a record but will provide a written explanation to the requester within three working days following receipt of the written request, explaining why the request was refused.

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REFERENCES

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