



Imperial Valley Water Authority

Ground-water Use
Management Strategy

MASON AND TAZEWELL COUNTIES, ILLINOIS

IMPERIAL VALLEY WATER AUTHORITY GROUNDWATER USE MANAGEMENT STRATEGY

Ground-water is a Natural and Public Resource.

Ground-water use shall follow the rule of reasonable use.

Ground-water shall be used in a manner that maintains and preserves the
resource for future years.

TRUSTEES

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Acknowledgments

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ciation for providing the Irrigation Plat Maps; to **Don Wood** and **Gordon Olsen** of the Association of Illinois Electric Cooperatives for their assistance in editing and printing this document; and, finally, to the IVWA Trustees and other interested individuals in the IVWA area for their input and comments on earlier versions of this document.

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IMPERIAL VALLEY WATER AUTHORITY

GROUND-WATER USE MANAGEMENT STRATEGY

I. Introduction

The purpose of this management strategy is to provide a guideline concerning limits upon, and priorities as to, use of ground-water during periods of actual, or threatened, shortages. It is intended to be of use, now and in the future, to members of the general public, individuals and entities withdrawing underground water, and Trustees of the Imperial Valley Water Authority (IVWA).

Water-bearing sand and gravel deposits underlying the IVWA region constitute an extensive ground-water resource that supplies all of the area's water needs except power generation. Agricultural irrigation accounts for the largest use of the area's ground-water. Other users include municipalities, unincorporated communities, rural homes and farms, and commercial livestock enterprises. The Jake Wolf Fish Hatchery is the most significant single water user in the area.

The importance of the area's ground-water resources has been highlighted in recent years as a result of the severe drought which occurred in 1988-1989 and state legislative initiatives regarding ground-water quantity management. In addition, there have been concerns regarding interference drawdown between irrigation and domestic wells. These and other factors emphasize the importance of ensuring adequate ground-water supply for both short and long-term needs.

The IVWA, through its Board of Trustees, determined the need for a ground-water resource program and entered into an agreement with the Illinois State Water Survey to produce

a study of the area's ground-water levels. In connection with this study, a Rainage Network was set up to determine, the amount of precipitation within the IVWA area. An Observation Well Network was instituted to allow for tracking of water table fluctuations. In addition, a database was created to record developments. All of these study components have either been completed, or are still in progress. The option was left open for future study as needed.

The above mentioned study produced by the Illinois State Water Survey, Contract Report 582, is entitled "Reconnaissance Study of Ground-Water Levels in the Havana Lowlands Area." Prepared by Ellis Sanderson and Andrew Buck of the Illinois State Water Survey, this document is a detailed study of the sand and gravel aquifer. It contributes to the understanding that the aquifer has the capacity both to absorb impacts of concentrated withdrawals during drought periods, and to recover in future years of average and above average precipitation. This study is a valuable tool for planning purposes and for the future management of the ground-water resource.

In 1994, Gary Clark, of the Illinois Department of Transportation's Division of Water Resources, prepared a detailed, computer-based, ground-water flow model for the Havana lowlands aquifer system. The development of this model has increased the understanding of the aquifer system, especially as regards to its interaction with surface water resources, as well as with the Mahomet Aquifer located at the IVWA's eastern boundary. The model allows for evaluation of aquifer response to pumping during prolonged periods of

drought, as well as the impact on the aquifer of periods of excessive recharge such as occurred during the flood of 1993. The model is an additional valuable tool for future planning purposes as it can be used to evaluate, on a regional scale, the impacts on the aquifer of any significant change in ground-water use (such as additional irrigation or a single new use such as was presented by the Jake Wolf Fish Hatchery in 1982.)

II. Information and Explanation

It is the IVWA's position that local regulation and direction is best suited, both for financial and other practical reasons, to respond to the varied needs of the varied users of ground-water. IVWA will consider that ground-water is a shared natural and public resource. Agricultural, domestic, and commercial entities will be permitted the use of ground-water in a manner that maintains and preserves the resource for future users. The IVWA is required to "reasonably" regulate the use of ground-water.

There shall be two categories of ground-water use:

1. Natural Use
 - A. Drinking
 - B. Household and domestic use
2. Artificial Use
 - A. Agricultural irrigation
 - B. Industrial use

The ground-water withdrawals within the IVWA follow the rule of "reasonable use" pursuant to the Water Use Act of 1983. "Reasonable use" is defined in that statute to mean the "use of water to meet natural wants and a fair share for artificial wants."

Although ground-water is dispersed for agricultural irrigation purposes at more than 1,000 wells, agricultural irrigation should be

viewed as a single industry. Within the IVWA region, it is an industry which has brought great benefits to the area. It has allowed for greatly increased crop yields to producers, and this has translated into additional money with which to purchase products for family and home. In addition, it has generated increased demand for the products of agricultural-related businesses. The increased quality of produce derived as a result of irrigation has enabled specialty crop and vegetable companies to prosper, and this, in turn, has created greater employment opportunities in the region. The continued strength of the agricultural irrigation industry is vital to the economic and social interests of the IVWA region.

Field and specialty crops must receive an adequate supply of water at the proper time during the growth period in order to produce the yield and quality required to meet the cost of production and return a profit to the producer. As the IVWA area's sandy soils have little water-holding capacity, it is crucial that irrigation be available during the growing period from June through September. The study, "The Irrigation Practices in Illinois," prepared by Jean Bowman and Brian Kimpel in 1991, found that, in general, farmers within the IVWA region were applying the appropriate amounts of water--at appropriate times during the growing season--thereby using ground-water in an efficient manner.

As in many rural areas, in the IVWA region there are ongoing efforts to enhance the image and economic vitality of the area. Population has fallen in the last decade and Mason County, in particular, has been identified as one of the poverty-stricken areas of Illinois. Economic development committees, the Irrigated Growers Association, and other groups have been active in attempting to attract food processors and other industries. It is imperative that the IVWA continue to work with such groups and to assist these efforts to benefit the IVWA region.

III. Action Strategy

Ordinances and regulations of the IVWA should be kept to a minimum, and enacted only as circumstances require.

Five areas of study have been established in accordance with IVWA's original objectives:

- A. The Reconnaissance Study of 1992-1993. In comparison to the findings of the 1960 study, the 1992-1993 study suggests that development of the ground-water resource during the last three decades has not resulted in any diminution of the resource.
- B. The Rainage Network. Established for at least five years, this Network will provide data to determine the amount of precipitation on a grid basis. This will assist in calculating the recharge in a small section of the IVWA region, as well as the entire IVWA area.
- C. The Observation Well Network. This Network will provide data to determine fluctuation of the water table and monitor the impact of ground-water resource development.
- D. Methods are in place to determine the amount of withdrawal by high capacity wells. Several irrigators have cooperated in providing this information.
- E. A computer data base is now in place. This allows data to be kept on file and provides for convenient access and use by the IVWA and its designated representatives.

With continual monitoring and data gathering, the IVWA intends to be able to evaluate the ground-water balance at any given time in the future. A second measurement

study should be conducted at or about the year 2003, or at a time of severe drought, whichever occurs first.

IVWA Ordinance #4 pertains to permits. With the exception of agricultural wells, which are exempted by state statute from regulation, all high capacity wells require a permit before drilling can commence. The IVWA has the authority to accept or deny any drilling requests following proper hearings. All decisions must be made consistent with sound ground-water resource management principles. The IVWA has the authority to determine the placement, timing of pumping, amount pumped in any given time, and other matters affecting draw-down.

The IVWA shall seek to promote the common welfare by considering the public interest, the average amount of present withdrawals, the relative benefits or importance of use, the economy or efficiency of use and other reasonable differentiation. Appropriate consideration shall be given by the IVWA to any user who has reduced the volume of ground-water previously consumed, or who has met needs for increased water by installing and using equipment and facilities allowing for the use of surface water.

The IVWA shall continue to work with economic development groups and others to promote development of the ground-water resource to enhance the economy of the IVWA region. The IVWA shall utilize negotiations, as well as regulations, in dealing with the impact of continued development.

As previously indicated, Illinois law provides that wells for agricultural purposes are exempt from regulation. Therefore, during times of inadequate aquifer water supply, irrigators would need to adopt a voluntary water use procedure as prescribed by the IVWA.

The Trustees of the IVWA shall consult and receive available information concerning their duties and responsibilities from the State Water Survey, the Board of Natural Resources and Conservation, the State Geological Survey, the Water Resources and Flood Control Board, and any other board or commission of the State of Illinois that the IVWA determines may have information or assistance for use by the IVWA.

High capacity wells are the greatest users of the ground-water resource. The IVWA shall encourage all users of high capacity wells to be in compliance with the Illinois Water Well Construction Code. Guidelines for construction of high capacity wells are included in a later portion of this document, Part IV, "Well Construction Guidelines."

Each individual domestic well owner shall accept his share of water in a responsible manner. The IVWA shall encourage users of domestic wells to meet the Illinois Water Well Construction Code. Sand points may not meet that Code. Guidelines concerning sand points and/or domestic wells are also included in Part IV of this document.

Citizens within the IVWA shall receive all water required for natural use. Developments of the ground-water resource to meet artificial needs by users will be carefully examined and reviewed in an appropriate manner to determine "fair share." A reasonable request for resource development by users outside the IVWA region will be considered on a case-by-case basis.

It must be recognized that this management strategy is set forth in a generalized manner. There should be continued monitoring and study of all data. Data gathered from monitoring should be considered and used to revise the strategy in the future as deemed appropriate by the Trustees.

IV. Well Construction Guidelines

The decision on whether to construct a new well in accordance with the recommended guidelines or to upgrade an existing well to conform to the guidelines should be carefully considered by individual well owners. Factors to be considered include the historical ground-water conditions in the vicinity; the existence of nearby wells capable of large ground-water withdrawals; and the possibility for future development of points of significant ground-water withdrawal.

A natural consequence of ground-water withdrawal is drawdown in the source aquifer. An aquifer can support a certain amount of drawdown, called "allowable drawdown," without jeopardizing the availability of the regional ground-water resources. This allowable drawdown implies that there is a critical water level elevation for the aquifer. As long as the actual water level in the aquifer does not fall below the critical water level elevation, the aquifer resource remains protected. The recommended guidelines are designed to promote construction of new wells which will provide an uninterrupted supply of water for reasonable use with the aquifer water level at, or above, the critical water level. The IVWA intends to use data provided by the observation wells and rain-gage network as guidelines in determining the critical water level.

The recommended guidelines for the minimum aquifer penetration and pump intake settings, based upon aquifer type found in the IVWA area (unconfined water table aquifer), shall be:

A. Minimum well penetration into aquifer for high capacity wells.

If the aquifer can be fully penetrated within 100 feet of the land surface--
100% penetration of the aquifer.

If the aquifer is less than or equal to 50 feet thick--100% penetration of the aquifer.

If the aquifer is greater than 50 feet thick--50% penetration of the aquifer or 50 feet below the water table, whichever is greater.

For domestic and other wells:

Minimum well penetration shall be at least 20 feet below the water table at time of drilling.

B. Minimum pump intake setting:

At or as close as possible to the top of the well screen.

The construction guidelines set forth above are recommended. The decision of whether or not to follow them is left to the discretion of the individual well owner. However, in order to be able to file a valid complaint with the IVWA, the recommended well construction guidelines must have been met.

REFERENCES

Reconnaissance Study of Ground-Water Levels in the Havana Lowlands Area.

Ellis Sanderson and Andrew Buck, Office of Ground Water Resources Evaluation & Management, Illinois State Water Survey. May 1995

Mouth of the Mahomet Regional Ground-Water Model, Imperial Valley Region of Mason, Tazwell, and Logan Counties, Illinois.

Gary Clark, Division of Water Resources, State of Illinois. December 1994

Irrigation Practices in Illinois.

Jean Bowman and Brian Kimpel, Illinois State Water Survey, 1991.

Operation of a Raingage Network for the Imperial Valley Water Authority.

Annually beginning September 1992-August 1994, Randy Pepler and Steven Hollinger, Illinois State Water Survey

Observation Well Network Report.

Beginning with year 1995 Trustees, Imperial Valley Water Authority

Irrigation Plat Map--Mason-Tazwell Counties, Illinois.

Map created by Rockford Map Publishers, Inc., Central Illinois Irrigated Growers Association, Mason County Farm Bureau, Mason County Extension Service

Recommended Guidelines for the Construction of Wells and the Type and Setting of Pumps.

Illinois Department of Agriculture and Illinois Soil and Water Conservation Districts.

Water Authorities Act, 70 ILCS 3715/0.01 et. seq.

Water Use Act, 525 ILCS 45/1 et. seq.

RESOLUTION NO. 95 -

WHEREAS, the Imperial Valley Water Authority was established by citizen referendum and pursuant to an Order entered by the Honorable Judge Brownfield on November 14, 1989;

WHEREAS, soon after the Imperial Valley Water Authority was established the Trustees of the Imperial Valley Water Authority adopted an objective which was to develop and implement a ground water use management plan.

WHEREAS, 70 ILCS 3715/6 subsection 8 authorizes the Imperial Valley Water Authority to consult with and receive available information concerning their duties and responsibilities from the Illinois State Water Survey and other State agencies; and

WHEREAS, the Imperial Valley Water Authority entered into a contract with the Illinois State Water Survey, through the University of Illinois Contractual office, to engage in a rainwater gauge network study of the affect of rainfall on the underground water in the Imperial Valley Water Authority; and

WHEREAS, the Imperial Valley Water Authority entered into a contract with the Illinois State Water Survey, through the University of Illinois Contractual office, to engage in a computer data base development for information on the underground water located within the Imperial Valley Water Authority; and

WHEREAS, the Imperial Valley Water Authority entered into a contract with the Illinois State Water Survey, through the University of Illinois contractual Office, to engage in a reconnaissance study of ground water levels in the Imperial Valley Water Authority; and

WHEREAS, a permanent observation well network was established as the result of reconnaissance study of ground water levels in the Imperial Valley Water Authority; and

WHEREAS, the City of Springfield, according to published news accounts, has been "forced" to consider supplementing its existing surface water supply with underground water and according to published news and other accounts has considered extraction of water from land located within the Imperial Valley Water Authority; and

WHEREAS, the Trustees of the Imperial Valley Water Authority recognize that in the future there may be actual or threatened shortages of water and that there is a need for the Imperial Valley Water Authority to establish limits upon or priorities of the use of the water.

WHEREAS, 70 ILCS 3715/6 subsection 5 authorizes the Imperial Valley Water Authority to reasonably regulate the use of the water and during any period of actual or threatened shortage to establish limits upon or priorities as to the use of water; and

WHEREAS, the Trustees of the Imperial Valley Water Authority desire to promulgate a ground water use management strategy.

BE IT THEREFORE RESOLVED by the Board of Trustees of the Imperial Valley Water Authority as follows:

A. Based upon the foregoing studies and statutory provisions and pursuant to the authority contained within 70 ILCS 3715/6 subsection 5 the Trustees of the Imperial Valley Water Authority hereby adopt the attached Ground Water Use Management Strategy as the Ground Water Use Management Strategy for the Imperial Valley Water Authority.

B. The Secretary of the Imperial Valley Water Authority shall distribute copies of the attached Ground Water Use Management Strategy to the Illinois State Water Survey, the Illinois State Geological Survey, the Department of Natural Resources Office of Water Resources, the Mason County Farm Bureau, the Tazewell County Farm Bureau, the Irrigated Growers Association, the Mason Unit Office of the Cooperative Extension Service, the Tazewell Unit Office of the Cooperative Extension Service and each of the municipalities are located within the Imperial Valley Water Authority which are, Havana, Green Valley, Manito, Mason City, Kilbourne, Bath, and Forest City, San Jose and Easton.

Adopted by the Board of Trustees this 8th day of November, 1995.

APPROVED:

Morris L. Bell

Morris Bell, Chairman

ATTEST TO:

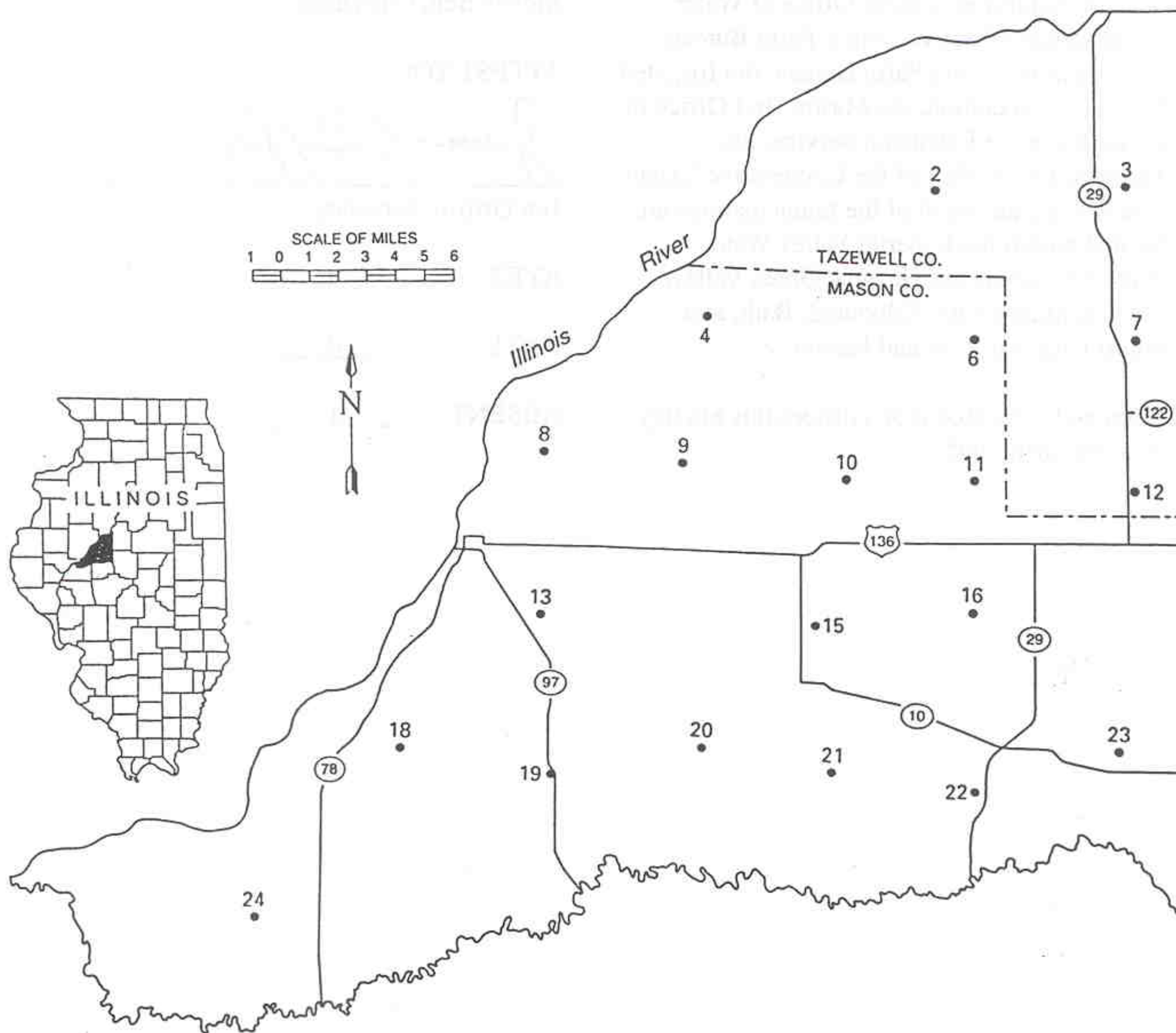
James C. Griffin

Jim Griffin, Secretary

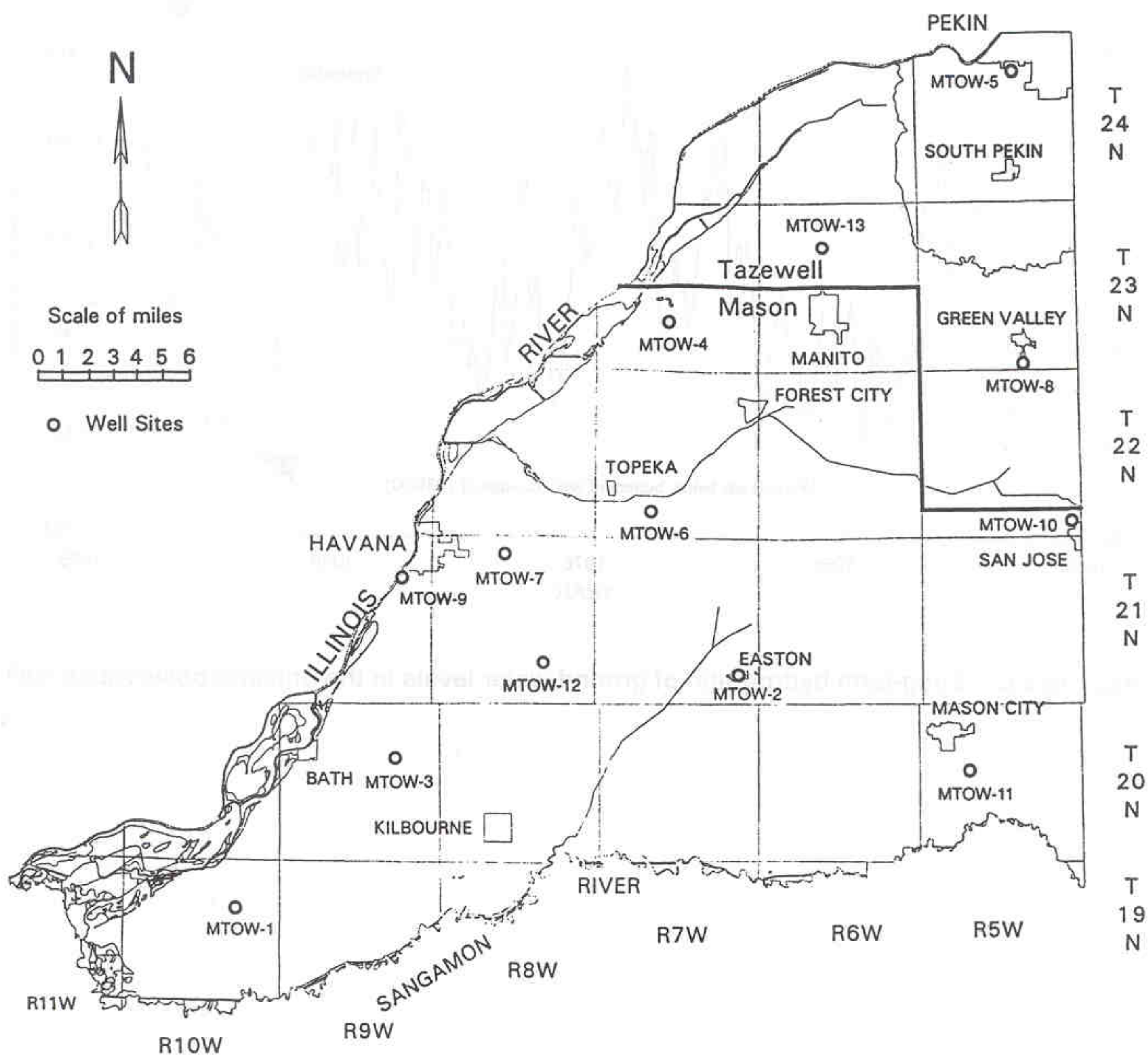
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NAYS: 0

ABSENT: 1



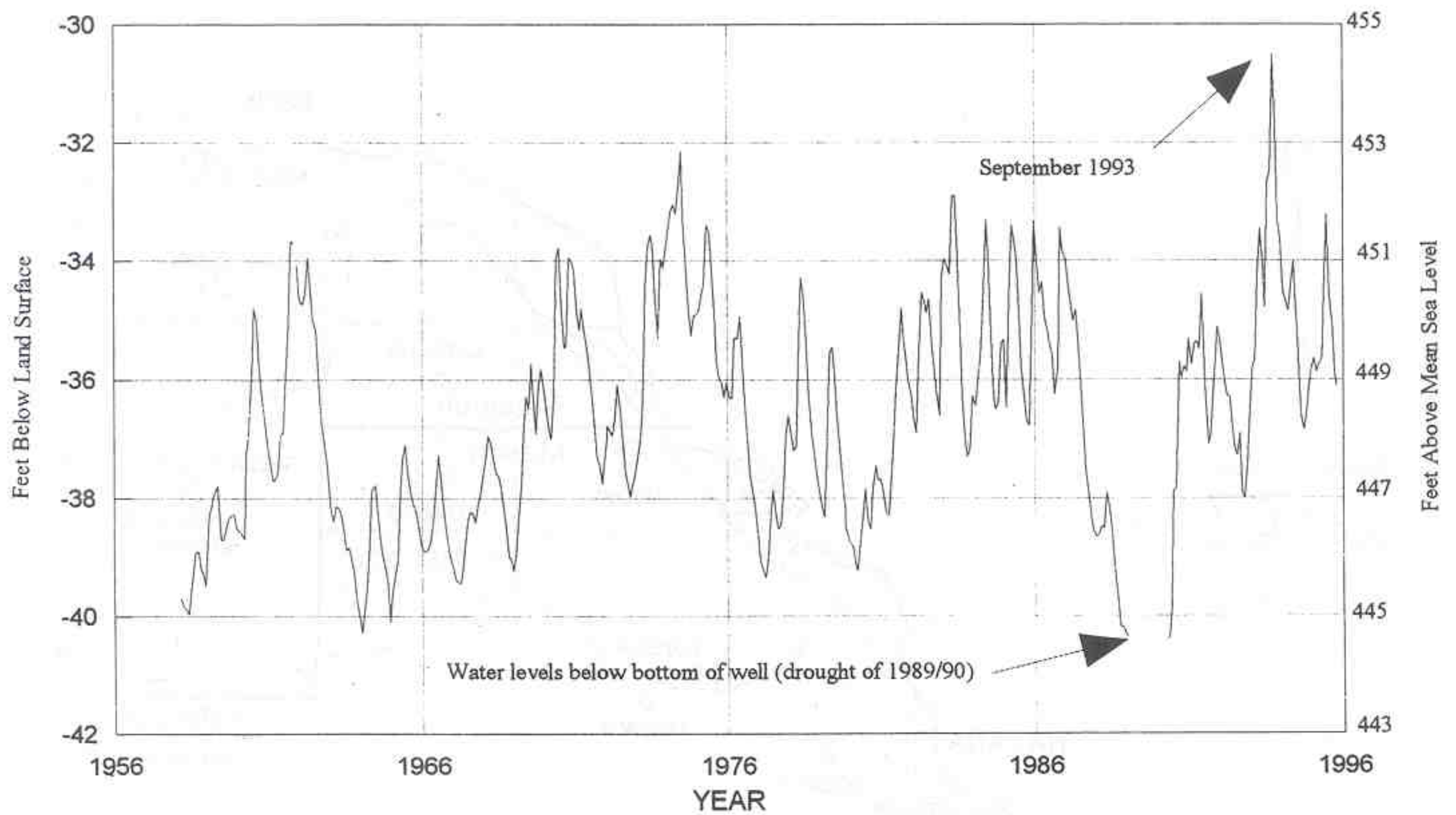
Appendix A Raingage Network Station Locations



Appendix B Observation Well Network Station Locations

SNICARTE OBSERVATION WELL

Section 11.8b, T.19N., R.10W., Mason County



Appendix C Long-term hydrograph of ground-water levels in the Snicarte observation well

