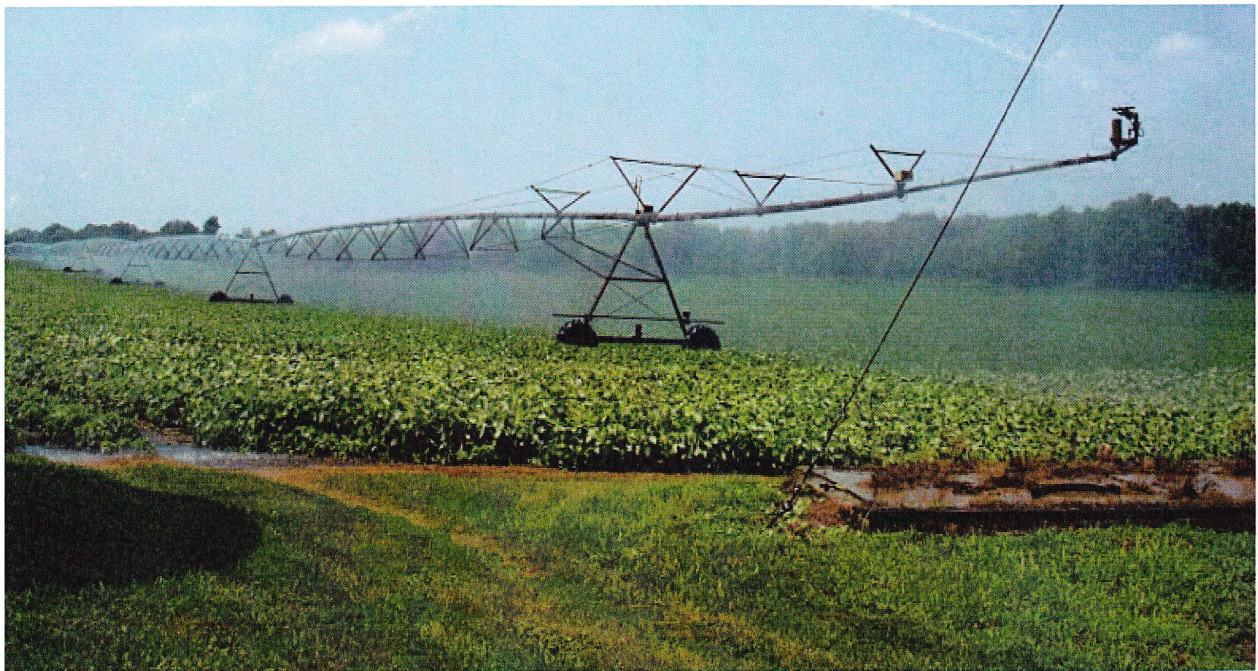




Imperial Valley Water Authority



**Strategic Plan
2011**



IMPERIAL VALLEY WATER AUTHORITY

STRATEGIC PLAN

TRUSTEES

Jeff Smith (Chairman)

Dorland Smith (Secretary)

Wayne Deppert (Treasurer)

Don Osborn Jr.

Mark J. McGrath, Atty.

Steve Wilson (ISWS, Advisor)

Kevin Rennels (ISWS, Advisor)

2011

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For further information, contact:

Jeff Smith
Chairman
2585E CR 1000N
Easton IL 62633
[E-Mail smithfarm@casscomm.com](mailto:smithfarm@casscomm.com)

Dorland W. Smith
Secretary
226 S Plum
Havana IL 62644-1318
[E-Mail dormsmit@fgi.net](mailto:dormsmit@fgi.net)

IMPERIAL VALLEY WATER AUTHORITY

The Imperial Valley Water Authority (IVWA) was established in 1989 by referendum. It comprises all of Mason County and four townships in Tazewell County. IVWA operates under the Water Authorities Act of 1951 (70 ILCS 3715/). The Water Authorities Act allows the establishment of water authorities with broad powers of control over local water supplies, excluding water used for agricultural and most domestic purposes. The powers include the following requirements: the provision by well owners of data and information on water supply, withdrawals and use; the registration of withdrawal facilities; the permitting of withdrawals; the reasonable regulation of water use; and the levy and collection of a general property tax. Today, there are 17 Water Authorities in Illinois, including 13 in East-Central Illinois. Management authority includes both surface water and groundwater.

This document contains a strategic plan for the IVWA, followed by a number of action items to implement the strategic plan. The appendices contain background information on Illinois water law, characteristics of the IVWA area and information considered in developing the strategic plan.

STRATEGIC PLAN

1. Mission

- The mission of the IVWA is to use the unique statutory authorities of the Water Authorities Act to manage water in a manner that meets demands and maintains the resource for future years.

2. Goals

- Emphasize the importance of ensuring adequate water supply for all users in both the short and long term.
- Encourage agricultural, domestic and commercial entities to use water in a manner that also maintains and manages the resource for future users.
- Improve understanding of water supplies, water variability, water use and sustainability.
- Improve the dissemination of data and information in order to educate the public about the importance of water supplies, water variability, and water supply planning and management.
- Continue to support a strong agricultural industry that is vital to the economic and social interests of the IVWA region.

3. Strategies

- Continue a water planning and management process, in cooperation with the Mahomet Aquifer Consortium and other groups.
- Continue the Observation Well and Rain Gauge networks and apply the data and information to water supply planning and management.
- Continue to apply sound scientific and engineering methods to estimate and report water withdrawals.
- Continue to work with the State Scientific Surveys on important aquifer and surface water studies.
- Make decision consistent with sound science and water resources management principles.
- Work with stakeholders, the Mahomet Aquifer Consortium and the East-Central Illinois Regional Water Supply Planning Committee to promote development and sustainability of water resources, protect the environment, and enhance public welfare and the economy of the IVWA region.
- Allow citizens within the IVWA region to receive all water needed for natural use and determine “fair share” for artificial needs.
- Encourage irrigators to adopt voluntary water use procedures prescribed by and under supervision of the IVWA during times of inadequate water supplies.
- Encourage all users of high capacity wells and domestic wells to be in compliance with the Illinois Water Well Construction code, recognizing that sand points may not meet this Code.
- Continue to work with economic development committees, the Irrigated Growers Association and other groups to benefit the IVWA region.
- Consider on a case-by-case basis requests for resource development by users outside the IVWA region.
- Develop recommendations for minimum aquifer penetration and pump intake settings, based on Illinois State Water Survey advice.
- Recognizing that streams receive some of their water from aquifers and that stream flows are reduced during severe droughts, support research to determine if groundwater withdrawals create any undesirable reductions in stream flow during severe drought periods.
- Review and revise the plan every five to seven years, or sooner if needed.

ACTION ITEMS

- Ensure the well permit ordinance is up to date.
- Accept or deny any non-agricultural high-capacity drilling requests following proper hearings.
- Make sure that the method for estimating water withdrawals is verified and meets the requirements of the Illinois Water Inventory Program.
- Improve the inventory of wells and infrastructure by establishing GIS locations and the pumping capacities of wells.
- Study and monitor water quality.
- Discuss with the Illinois Scientific Surveys the data and information needed to determine if there are any undesirable reductions in stream flow caused by groundwater withdrawals during severe droughts.
- Promote good management practices for irrigators.
- Maintain the groundwater level and rain gauge networks.

APPENDIX 1

Illinois Water Law

Illinois water law states that groundwater and surface water are natural and public resources and that their use shall follow the rule of reasonable use. In the case of a complaint, the legal system allows for adjudication by the courts of the relative needs of landowners. The lowering of the water table or reduction in water pressure by a groundwater user that reduces or eliminates the use of a neighbor's well is not necessarily unreasonable. Also, the law does not specify that it is unreasonable *per se* to dewater an aquifer, does not treat groundwater and surface water as a linked resource, and does not define the sustainability of water supplies.

The Illinois River and the lower Sangamon River are classified as navigable public waters and permits to withdraw water are required (RWSPC, 2009).

There are two categories of water use: i) natural use for drinking and household and domestic use, and ii) artificial use for irrigation and industrial use. The Illinois Water Use Act of 1983 defines "reasonable use" as "the use of water to meet natural wants and a fair share for artificial wants". Agricultural wells are exempted from regulation.

Public Act 096-0222 (2009) amends the Water Use Act of 1983 and requires any person or land occupier that is responsible for a point of withdrawal classified as a high-capacity well, high-capacity intake, or public water supply to participate in the Illinois State Water Survey's (ISWS's) Illinois Water Inventory Program (IWIP). However, high capacity wells used for agricultural irrigation are exempt for the first 5 years after the effective date (January 1, 2010) of the amendatory Act. A person or land occupier responsible for a point of withdrawal classified as a high-capacity intake used for irrigation and agriculture shall determine water use through estimation methods acceptable by the ISWS. A person or landowner responsible for a point of withdrawal classified as a high-capacity well or intake used for irrigation that lies within the boundaries of a water authority that estimates water withdrawals through a method deemed acceptable by the ISWS is exempt from participating as an individual in the IWIP.

IVWA Ordinance No. 49 (April 14, 2010) provides for application for drilling permits, adoption of guidelines for action thereon, registration of high capacity wells and provision of penalties for violations. All high-capacity, non-agricultural wells and wells for domestic purposes in which more than four families are supplied from the same well or source require a permit before drilling can commence.

APPENDIX 2

Characteristics of the Region

Groundwater supplies all of the area's water needs except power generation. Irrigation of agricultural crops using groundwater from the Mahomet Aquifer is the largest user of water and methods are in place to determine and record the amount of withdrawal by high-capacity wells. Irrigated cropland in Mason and Tazewell counties more than doubled from 76,352 acres in 1985 to 166,168 acres in 2007 (RWSPC, 2009). The number of irrigation systems has increased to 2,077 in 2010. In 2005, a drought year, an estimated 196 million gallons per day (averaged over the year) were withdrawn in the two counties. In 2008-2010, estimated water withdrawals have averaged 78 million gallons per day (IVWA, 2010). The Jake Wolf Fish Hatchery is the largest single water user in the area; 10 wells have a pumping capacity of 11.5 million gallons per day (IDNR).

The area is characterized by sandy soils overlying a sand and gravel geologic unit. It is this subsurface sand and gravel that makes up the Mahomet Aquifer, with a saturated thickness of as much as 200 feet. It's because of the sandy soil that irrigation is needed and these same permeable soils allow significant infiltration that recharges the aquifer. Agricultural irrigation for field and specialty crops has brought great benefits to the area and the continued strength of the agricultural irrigation industry is vital to the economic and social interests of the IVWA region.

In the Havana Lowlands, groundwater elevation in the vicinity of pumping wells varies by up to 15 feet or more between wet and dry years, and in dry years some small streams may go dry. Both drought and irrigation pumping reduce groundwater elevation and saturated thickness in the unconfined aquifer. However, there are huge amounts of water in storage in the unconfined aquifer and saturated thickness was reduced by only about seven percent in the drought year of 2005, and has since recovered. This is due to the fact that the unconfined aquifer in the Havana Lowlands is able to release about 1,000 times more water out of storage per foot of drawdown than in the confined aquifer. Groundwater elevation and saturated thickness can recover quickly after the growing season and/or drought (RWSPS, 2009). The 2005 estimated withdrawals of groundwater of 196 million gallons per day are considerably less than the estimated annual average recharge rate of between 300 and 377 mgd. It is reasonable to conclude from this that such withdrawals do not exceed the annual average recharge rate and are sustainable. However, during the 2005 summer growing season withdrawals averaged 586 mgd – well above the calculated annual recharge rates – and peak day withdrawals were almost one billion gallons (RWSPC, 2009).

In the Havana Lowlands, the geology and hydrology of the Mahomet Aquifer are different

than in the central and eastern parts of the aquifer. Overlying relatively impermeable tills are absent in the Havana Lowlands and the aquifer is unconfined and behaves like a quick-response shallow aquifer: droughts and large groundwater withdrawals for crop irrigation in summer lower groundwater levels and create cones of depression, but water levels typically rebound after the growing season and with the return to higher precipitation.

Due to sub-regional variations in geological and hydrological conditions, drawdown (lowering of the water table) in the unconfined aquifer in the Havana Lowlands is much less than, for example, drawdown (lowering of head) in the confined Mahomet Aquifer in Champaign County, even though withdrawals in the Havana Lowlands are much greater. These characteristics are the reasons why there is much crop irrigation in Mason and Tazewell Counties: the low water-holding capacity of the sandy soils makes irrigation beneficial and facilitates faster groundwater recharge (RWSPC, 2009).

Annual precipitation in Mason and Tazewell Counties averages about 36 inches per year. However, annual precipitation varies from about 20 inches to over 50 inches and each year annual and seasonal precipitation varies within the two counties. Severe droughts occurred in the 1930s, the 1950s, in 1988-1989 and most recently in 2005. Severe flooding, including groundwater flooding, has occurred most recently in 1993 and 2010.

The ISWS maintains a voluntary water withdrawal reporting inventory for the whole state – the Illinois Water Inventory Program.

The ISWS also maintains a Rain Gauge Network (Figure 1) and data base for the IVWA to determine the amount of precipitation within the area and to assist in calculating recharge. An Observation Well Network (Figure 1) and data base, also operated by the ISWS, allow for tracking of water table fluctuations and monitoring the impact of groundwater resource development. The historical record of water level in the Snicarte wells is shown in Figure 2.

A map of the saturated thickness of the unconfined Mahomet Aquifer is shown in Figure 3. The saturated thickness is the depth, in feet, between the base of the aquifer and the average level of the water table.

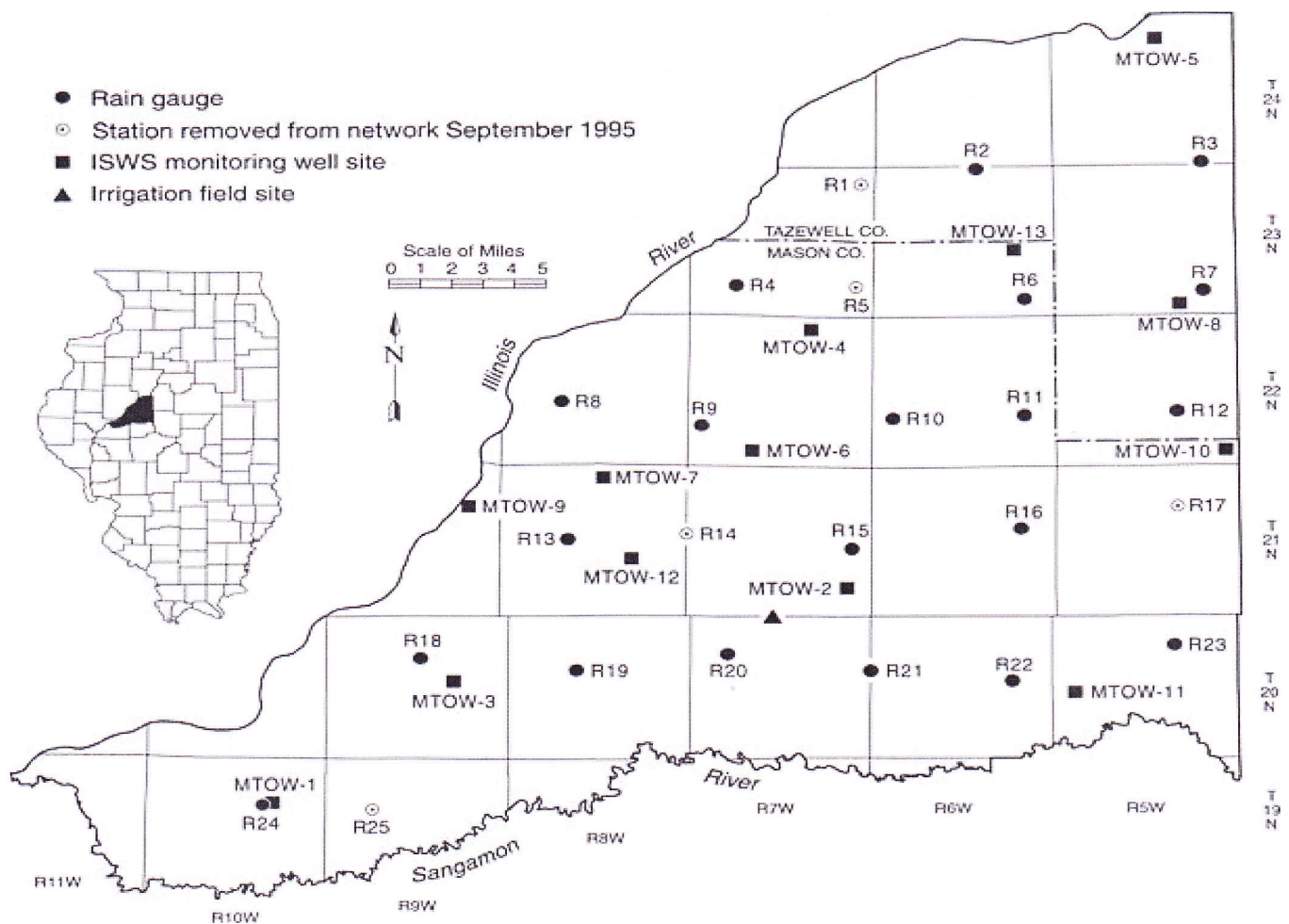


Figure 1. Location of rain gauges, monitoring wells and irrigation field site.
 (Source: Illinois State Water Survey)

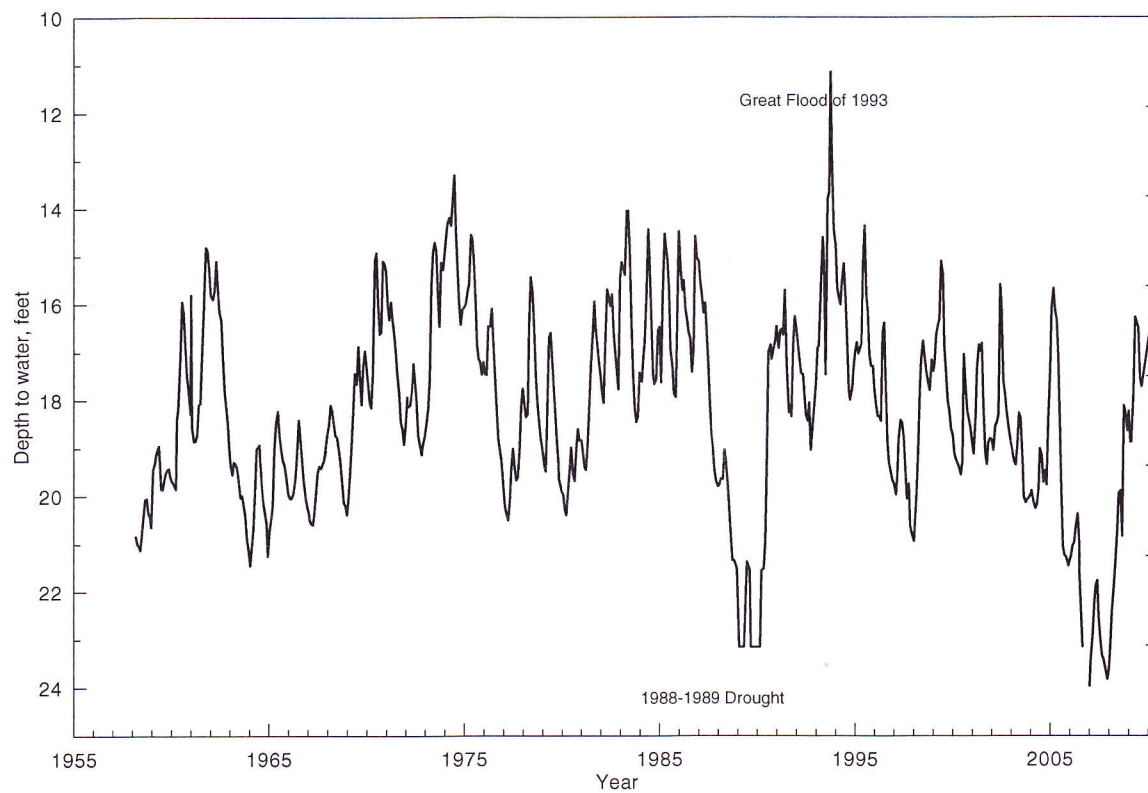
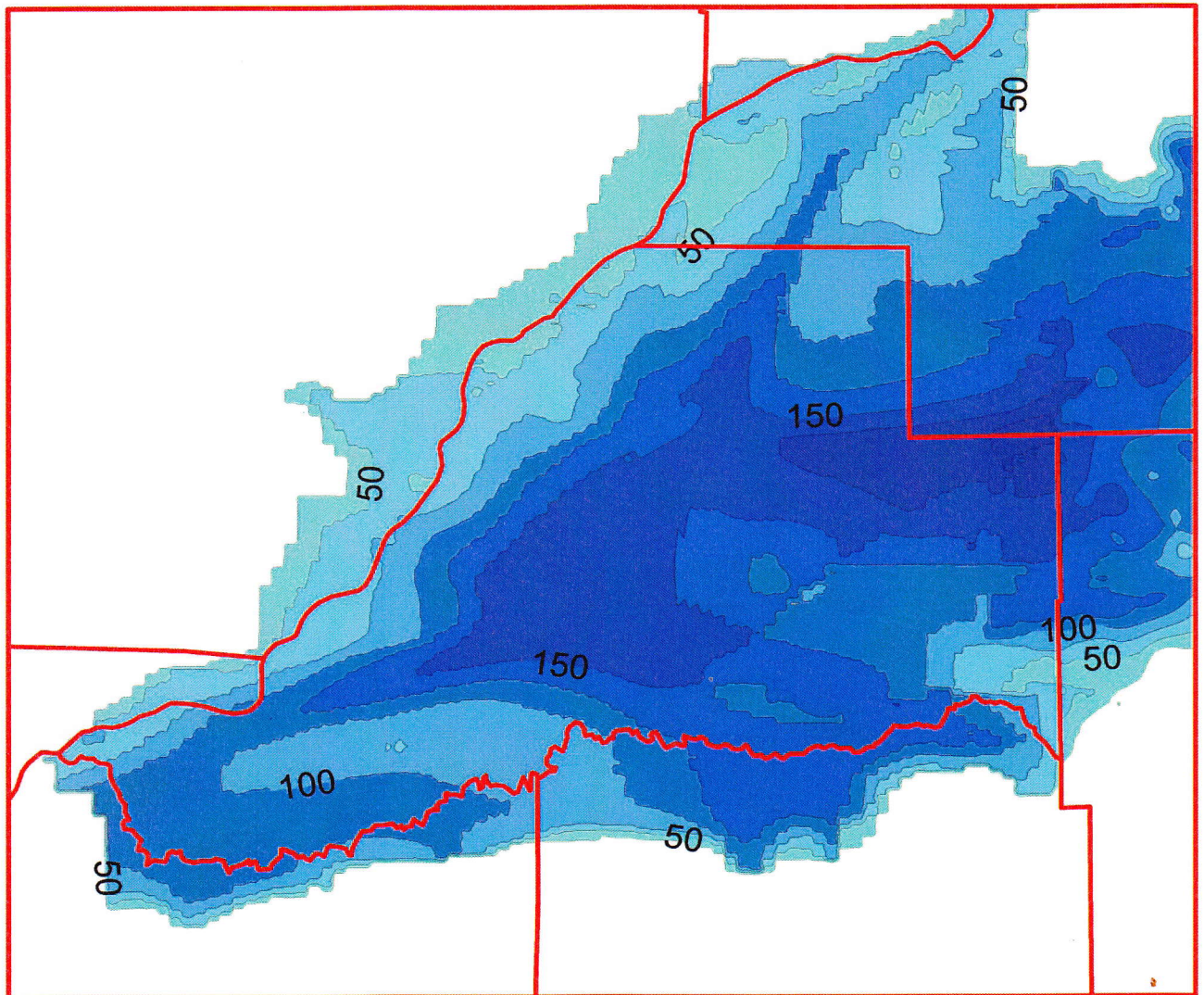


Figure 2. Groundwater levels at the Snicarte wells, 1958-2010
(Source: Illinois State Water Survey)



**Figure 3. Saturated thickness of the unconfined Mahomet Aquifer in feet.
(Source: George Roadcap, Illinois State Water Survey)**

APPENDIX 3

Considerations in Developing the Plan

- There is growing public recognition of the value of water, both quantity and quality, and the need for good stewardship.
- Springfield and other groups outside of the IVWA area have looked to the IVWA region as a possible source for new water supplies.
- In 2006, Governor Blagojevich issued Executive Order 2006-001 which requires progress in regional water supply planning. One of the areas selected was a 15-county region in East-Central Illinois. Mason and Tazewell Counties are two of these 15 counties.
- The Mahomet Aquifer Consortium established a Regional Water Supply Planning Committee (RWSPC) which in 2009 issued *"A Plan to Improve the Planning and Management of Water Supplies in East-Central Illinois"*. The report includes data on water withdrawals, climate variability, the variability of water resources and analyses of water supply and demand to 2050. Jeff Smith, Chairman of the IVWA, served as Vice Chair of the RWSPC and represented agricultural stakeholders. Morris Bell represented water authorities.
- There is a considerable range in climate model projections of possible future climate scenarios in Illinois. However, severe multi-year droughts have occurred in the past and can be expected to recur in the future (RWSPC, 2009).
- Groundwater withdrawals in the Havana Lowlands are projected to continue to increase (RWSPC, 2009).
- The RWSPC also recommends that key aquifer recharge areas, key stream reaches, and ecosystem-sensitive stream flows be identified and preserved and/or restored. Water supply planners also must understand the nature, extent, cause and trend of impacts (such as water withdrawals) on ecosystems (RWSPC, 2009).

- The RWSPC further recommends that water supply facilities be designed, constructed and operated in a manner that prevents unacceptable impacts to surface waters, including streamflow and water levels in lakes, wetlands and aquatic and riparian ecosystems, while providing sufficient water to meet demand. Little is known in the region of possible adverse impacts on surface waters and aquatic and riparian ecosystems of surface water capture resulting from groundwater withdrawals. Meaningful criteria and a voluntary standard(s) to protect surface waters and aquatic and riparian ecosystems from possible unacceptable impacts of groundwater withdrawals cannot be set at this time, but need to be developed. Indicators of instream biological diversity and integrity should include biological sensitive stream data gathered by the Illinois Department of Natural Resources (RWSPC, 2009).
- Between the central and western parts of the region, there is a transition zone between the confined and unconfined parts of the Mahomet Aquifer. The RWSPC recommends that the transition zone be defined and an appropriate voluntary standard(s) be developed to protect the aquifer, surface waters and ecosystems, while allowing for groundwater development (RWSPC, 2009).
- The RWSPC recommends a continuous process for water supply planning and that regional and local water supply plans be reviewed and updated by stakeholders at least every five years (RWSPC, 2009).
- In order to answer the question of how much drawdown can be tolerated with heavy summer pumping, the summer recharge rate and drawdown in a severe drought year such as in the 1930s or 1950's must be known. A thorough understanding of relationships among precipitation, evapotranspiration, groundwater levels, stream flows and water withdrawals remains to be developed. Such an understanding is necessary to be able to understand the natural variability of the system and the impacts of groundwater withdrawals on streamflow and aquatic and riparian ecosystems (RWSPC, 2009).
- Evolving technology for irrigation, such as low pressure irrigation with drop nozzles to decrease evaporation, should be considered.
- There is a need to develop alliances as a basis for stewardship, such as with the Soil and Water Conservation Districts, Extension Services, Water Authorities Association, Menard Electric Cooperative, Central Illinois Irrigated Growers Association, and Jake Wolf Fish Hatchery.

- Strengths

- 20 years of water planning, record keeping and analysis.
- Strong technical advisors.
- Diverse advisory committee that includes stakeholders.
- Water provided to everyone during times of drought (no water shortages).

Weakness

- Lack of public understanding of what IVWA does.

Opportunities

- More public education about IVWA and the aquifer.
- Continued understanding and research about how the aquifer works (including impacts of flooding on Emiquon).

Threats

- Possible changes in water withdrawal and water rights on the state and federal levels may not consider regional differences in water availability.
- Increasing demands for water outside the IVWA area.
- Risk of polluting the aquifer.

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