3. RECOMMENDED REGIONAL WATER SUPPLY PLAN

East-Central Illinois is not facing an immediate water crisis, but the Committee is driven by a desire to avoid crises that sometimes plague other states and countries, as illustrated in recent headlines:

"Georgia Water Woes: Drought Leads to Widespread Water Shortages"[1]

"Water shortage threatens a million in Australia"[2]

"Israel Faces Acute Water Shortage"[3]

The Committee believes strongly that stakeholders in the region can shape the future, rather than allowing runaway events to take control and crises to occur. A regional plan – a framework for action and a series of action items – provides a means to shape the future. It is the Committee's intention that implementation of the regional plan can lead to more desirable headlines such as:

"Voluntary standards set to protect the Mahomet Aquifer"

"Sustainable water supplies for East-Central Illinois"

"No drinking water shortages in East-Central Illinois"

The regional plan builds on the Committees findings (Chapter 2) and information in Appendices 1 and 2. In the framework for action, elements of strategic planning are first described, followed by identification of major factors considered by the Committee in focusing its recommendations. A set of recommended guidelines, a vision of the future, a goal, and a set of standards for regional water supply planning and management then are presented. The recommended action items are strategies to implement the plan.

FRAMEWORK FOR ACTION

Strategic planning

The framework selected by the Committee is a strategic planning framework. Strategic planning is a systematic process to determine through strategic thinking and analysis where an entity or effort is going and how it's going to get there. Strategic planning is responsive and adaptive to a dynamic, changing environment and keeps efforts focused and relevant. Participation in a consensus-building process provides stakeholders with shared ownership of and responsibility for shaping the future and can lead to the creation of a regional organizational structure to effectively deploy resources to achieve a desired future.

Strategic planning is a well-established and structured process requiring the development of the following key components:

Vision: A short, succinct, and inspiring statement of what the Committee intends to achieve for regional water supply planning and management in East-Central Illinois. It describes aspirations for the future, without specifying the means that will be used to achieve the desired ends.

Goal: The state of affairs that a plan is intended to achieve in alignment with the vision.

Standard: A norm, consistent with identified principles, used to establish uniform criteria, methods, processes and practices. Standards also can serve as a basis of comparison to determine the adequacy of plan proposals to attain goals.

Plan: A design which seeks to achieve agreed-upon goals. The process of planning and the production and implementation of a plan are necessary for the wise management of resources.

Action items: A combination of strategies, institutional arrangements, funding requirements and other measures to implement a plan.

Factors considered

To this point, the Committee has identified the need to meet the requirements of Executive Order 2006-01 and has documented key findings. As a prelude to developing a specific framework for action, the Committee identifies and comments on a complex multitude of interrelated environmental, societal and economic factors relevant to water supply planning and management. Figure 9 illustrates diagrammatically major interrelated factors relevant to providing dependable and adequate supplies of clean water for all users at reasonable cost.

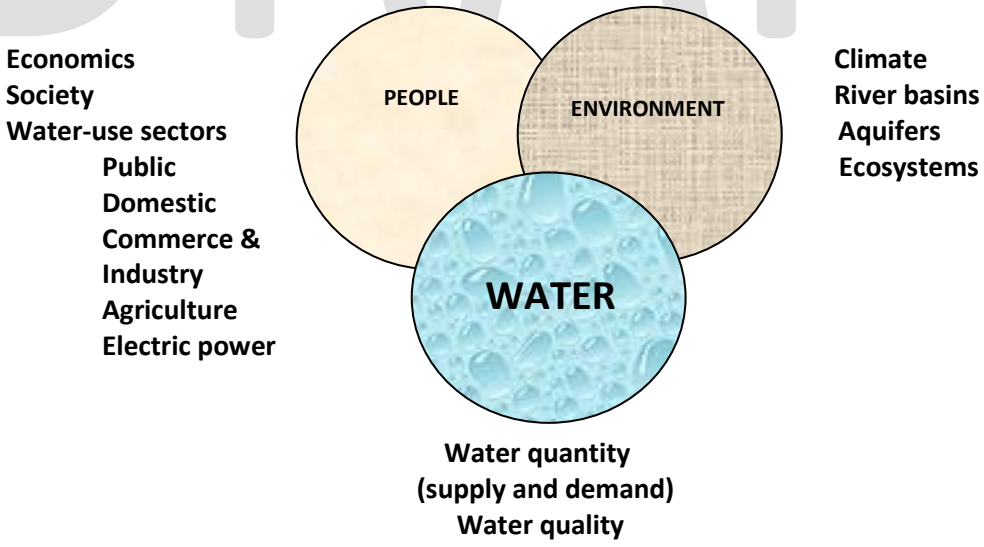

Figure 9. Major environmental, societal and economic factors that need to be considered in regional water supply planning and management.

There is probably little debate that all users should be provided with dependable and adequate supplies of clean water to meet their needs at reasonable cost, but there can be much debate on the meaning of the terms “adequate”, “dependable”, “all users”, and “reasonable cost”. There follows a brief discussion of these key terms.

The provision of adequate supplies of water generally means that water supply should satisfy user needs, as expressed in water demands. But this raises questions as to how user needs or water demands are specified. In economics, water – like other resources – is regarded as a scarce resource and the balance between supply and demand is governed largely by price and the ability and willingness to pay. This is why the price of water and family income are reported to be key factors in explaining historical trends in water withdrawals and in constructing scenarios of future withdrawals in East-Central Illinois[4]. The average family is likely to resist paying a high price for water unless income also increases.

Different values and priorities also can be assigned to water use. Some uses of water – drinking water, for example – are essential for life. Other uses of water – washing cars and watering lawns – may be regarded as less essential. During periods of water shortage, priorities often are set within the water-use sectors and restrictions implemented.

Another example of the complexities of water demand is that many water demands can be reduced by implementing, for example, conservation measures and more efficient technologies. An increase in the price of water is reported to reduce demand[4], but the price of water charged by utilities varies greatly and price is not the only factor influencing water demand. Some utilities charge customers a flat rate for unlimited water use, some increase their rates as more water is used, and others reduce their rates as more water is used. Other municipal water systems utilize costs subsidies and do not reflect the full cost of providing water in their water rates. It is evident, therefore, that economic principles do not uniformly explain water prices or water demand. And in addition to residential, commercial, agricultural and industrial uses, water is needed for recreation and navigation. Aquatic and riparian ecosystems also need large amounts of water, which at present are not accounted for. Fundamental issues in water supply planning and management, therefore, are whether all water demands should be treated equally and what role pricing should play in shaping demand.

While users generally prefer to pay as little as possible for services, when properly educated they also understand that providing quality and dependable service often necessitates higher cost. Providing dependable service requires, for example, consideration of the safety, security and continuity of water supplies. An issue is the level of uninsured or unprotected risk that should be planned for. Put another way, should utilities plan to provide a continuous and uninterrupted supply of water for all contingencies, regardless of the low probability of occurrence and high cost of dealing with extreme events?

In water supply planning and management, a key issue is the willingness to pay the cost of constructing and operating facilities to meet water demand during drought, when water availability generally decreases and water demand increases. Planning only for a moderate drought leaves open an uninsured or unprotected risk of water shortages during a severe drought.

Similarly, economics and the willingness to pay are key determinants in the use of what traditionally have been regarded as exotic sources of water. Examples of possible exotic water supplies for East-Central Illinois are desalinating water pumped from the deep St. Peter or Elmhurst-Mt. Simon Aquifers, transporting and treating water from the Mississippi or Illinois Rivers, and treating and transporting used

water and stormwater runoff for reuse. Clearly, economics and value judgments play key roles in strategies to provide dependable and adequate supplies of clean water at reasonable cost.

And cost is not restricted to monetary cost. When water is withdrawn from aquifers and streams, or reservoirs are constructed, there can be non-monetary environmental costs, or impacts. As with monetary costs, a key issue is to determine the environmental costs that are acceptable or tolerable. This issue is closely related to an often-stated desire to minimize or reduce the environmental impacts of withdrawals and protect the environment and long-term productive yields.

Drinking water quality and the protection of water quality in the environment also are important considerations in water supply planning. All public water supplies are treated to meet drinking water standards, but there are no requirements for treating water withdrawn from private domestic wells. Treating water to reduce the concentration of naturally occurring chemicals, such as iron and arsenic, and man-made pollutants involves costs that are borne by the consumer. Natural and man-made pollutants also can cause adverse non-monetary impacts to the environment. In turn, preventing adverse environmental impacts can necessitate additional monetary costs to the consumer.

Determining monetary and non-monetary costs that users are willing and able to accept in the provision of dependable and adequate supplies of clean water and protection of the environment is a key management consideration.

Other factors also must be considered in water supply planning. These include equity and a desire for future generations as well as all current residents to have access to dependable and adequate supplies of clean water at reasonable cost. As climate variability and the possibility of climate change can affect water availability, water quality and water demand, the risks and opportunities associated with climate variability and change also must be identified and considered.

It is clear that many complex factors need to be considered and weighed in developing a water supply plan. Acknowledging that everything is related to everything else is perhaps a truism, but provides too large, complex and unwieldy a framework for this pilot study. Given the time and resources available, the Committee focused on the impacts of withdrawing water from the Mahomet Aquifer System and the major river basins to meet water demand scenarios to 2050. The Committee has not addressed the following important topics in any substantial manner:

- Economics;
- Social and cultural factors;
- Law and regulation;
- Water infrastructure;
- Water treatment;
- Water losses;
- Water efficiencies and conservation;
- Water rates and prices;
- Consumptive water use;
- Storm water and floods;
- Effluent water and water reuse;
- Water utility operations;
- In-stream and riparian water uses (ecosystems, recreation, navigation etc);

- Ecosystem management;
- Water quality;
- Land-cover changes; and
- Land-use, transportation, and development planning.

Future water supply planning and management efforts require detailed consideration of these important factors.

Guidelines

The Committee recommends a set of guidelines for regional water supply planning and management. Guidelines are a combination of laws, rules, concepts, principles and standards that reflect legal, moral and operational values and perspectives. A list of primary and secondary guidelines, a vision statement and a goal are provided, followed by a set of planning and management standards. Together with the above findings, these guidelines are used to shape the identification of recommended action items.

Primary guidelines

- The concept of the sustainability of water supplies is adopted as a foundation for regional water supply planning and management. The sustainability of water supplies is defined as the provision of dependable and adequate supplies of clean water to meet the demands of all users "in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social costs"[5].

- The concepts of shared responsibilities, self-governance, adaptive management by stakeholders, and an informed public also are adopted as foundations for planning and managing regional water supplies.

- Regional water supply planning and management should be based on sound science.

Consistent with Executive Order 2006-01, recommendations for regional water supply management are made within existing laws, regulations and property rights.

Secondary guidelines

- Adequate supplies of water to meet demand means the use of water to meet the natural wants of people (i.e., domestic uses) and a fair share for artificial wants, without using water in a wasteful or malicious manner. Adequate supplies of water also are required to meet the needs of riparian and aquatic ecosystems. Inherent in the word "adequate" is an assumption of dependability, security and low risk such that sufficient water to meet reasonable demand also will be made available during periods of drought (when water availability is reduced and demand is higher) and other contingency situations.

- An indefinite time means for all future generations. The time horizon adopted for the study – 2050 – allows consideration of present generations and two future generations. The future beyond 2050 is much more uncertain, but is considered.

- The water cycle and water budgets provide appropriate frameworks for planning and managing regional water supplies.

    - Water is a precious renewable natural resource with limits and vulnerabilities that needs to be managed wisely.

    - At specific locations, the natural dynamics of the water cycle, ecological dependencies on the natural water cycle, and human-induced changes to the water cycle need to be well documented, recognized as an integrated system, and considered as a balanced water economy.

    - Variations and changes in climate, especially precipitation and temperature, affect the demand for and availability of surface water and groundwater and need to be considered. It is important to use long-term climate records and consider natural and human-induced changes in climate.

    - Surface water and groundwater are linked physically and should be managed as a common resource.

    - The rate at which water is replenished after it is withdrawn varies from seconds in a high-flow stream of free water to decades to centuries between packed sand grains in deep aquifers. Temporal and spatial variations in groundwater recharge rates and the replenishment of surface waters need to be considered.

    - Local water availability and withdrawals are strongly influenced by local climatic, geographic, geologic, economic and social factors and by regional, national and global climatic, economic and social factors. Examples of regional, national and global factors are climate change and economic conditions that influence the demand for Illinois products. Interrelationships between local, regional, national and global conditions need to be considered.

    - There are marked local and sub-regional differences in the availability and use of water and water demand that need to be recognized.

    - Withdrawals of water at individual points can have local impacts on surface waters and groundwater. The impacts of multiple withdrawals at many points can accumulate over larger regions, such as in the large cone of depression centered in Champaign County. Both local and cumulative regional impacts need to be considered.

    - Water withdrawals usually are reported as the average amount of water withdrawn each day throughout the year. The impacts of water withdrawals usually are calculated using average day withdrawals. However, more water generally is withdrawn in summer and during periods of drought. The largest amount of water withdrawn on any specific day exceeds average day and peak season withdrawals. When calculating water demand

and the impacts of withdrawals, peak-season and peak-day withdrawals should be considered along with average day withdrawals.

- The amount of water that can be withdrawn in a sustainable manner is not a fixed amount; it is a function of local conditions and the value judgments of stakeholders. Withdrawing water from streams and aquifers produces benefits (social and economic) and costs (economic and environmental), and competition among users can produce conflicts. Benefits, costs and competition among users need to be considered in determining sustainable (or unsustainable) water supplies.

- Withdrawing any amount of water from streams and aquifers has environmental impacts. Impacts can be small, hardly measurable and inconsequential for small withdrawals, such as from a domestic well. Impacts increase as larger amounts of water are withdrawn. Ultimately, large withdrawals can cause streams and some shallow aquifers to go dry locally. Whereas stakeholders may find it easy to determine that extreme and dramatic impacts are unacceptable, a more difficult challenge is to agree upon what may constitute possible thresholds for subtle unacceptable impacts. Stakeholders with different values may have differing views on acceptable and unacceptable impacts and a range of stakeholder values need to be considered.

- As dependable and adequate supplies of clean water are necessary for all people and ecosystems, fair treatment of these diverse stakeholders and future generations needs to be considered and calculated in balance sheets when managing water supply. Water is required to meet human needs and wants, and water withdrawals are viewed as benefits to a society that are chargeable as immediate costs to consumers in its economy. Water prices include the measurable costs of withdrawing, treating and distributing water and providing the dependable, secure supplies of the quality that consumers demand. Water prices also are influenced by consumer resistance to paying prices they see as unreasonable. However, there can also be less tangible, indirect, and deferred costs – real costs – usually unaccounted in water prices and consumer concerns. These are the costs water withdrawals impose on a society's supporting ecosystems and its future generations. Aquatic and riparian ecosystems can be affected by water supply withdrawals and discharges. Unsustainable water use would place future generations and their environment in jeopardy, leaving them an inheritance of loss and high cost.

- Below is a generic list of possible indicators of unsustainable water supplies that the Committee has considered.

  - Drawdown in aquifers resulting in:
    - ✓ Long-term reduction in storage;
    - ✓ Wells going dry or water levels falling below the pumps;
    - ✓ Partial or complete dewatering in portions of aquifers;
    - ✓ Changes in regional groundwater flow;
    - ✓ Surface subsidence; and
    - ✓ Reduction in surface water caused by groundwater withdrawals.
  - Changes in stream geomorphology caused by changes in streamflow.
  - Sedimentation in lakes and reservoirs.

- Water quality degradation.
- Loss of aquatic and riparian ecosystem integrity and diversity.
- Population changes due to water availability, or lack thereof.
- Inadequate infrastructure capacity to meet increasing water demands, and to be prepared for drought and possible climate change.
- Economic, social and demographic stresses due to the above changes.

- The Committee has insufficient measures to document the current status of all these indicators. Indeed, some indicators are not expected to be significant in the region. Other potential impacts, such as water level in a well falling below the pump, can be mitigated – at cost. Some data and information relevant to understanding the impacts of withdrawals can be found in Chapter 2 and Appendix 1.

- There are many sources of uncertainty in water supply planning and management and uncertainty can be a major source of risk to managers and the entities and communities they serve. Sources of uncertainty include incomplete scientific understanding, inadequate methods of data analysis, and a lack of ability to predict with confidence the values of future demographic, economic and social factors that influence water demand and climate change. Uncertainty is not a reason not to plan ahead. Water supply planning and management need to embrace the best scientific data available and reasonable assumptions about future demographic, economic, social and climatic factors, while maintaining an ability to deal with change, new information, and complexity.

- A lesson learned from earlier efforts to strengthen water supply planning and management in Illinois is that attempts to add new laws and regulations as a means to improve the management of water supplies have met with strong resistance. Stakeholders should be given the opportunity and incentives to participate in regional planning and management and solve their own problems through individual and collective actions, with some level of accountability and oversight.

- The following principles provide a sound basis for the conduct and reporting of science for water supply planning and management:

  - Data, models and reports should be in the public domain;
  - The strengths and limitations of data, analyses and assessments should be documented;
  - Data, analyses, assessments and documents should be peer reviewed thoroughly; and
  - Uncertainty should be specified.

KEY COMPONENTS

Vision of the future

In the years ahead, others will view East-Central Illinois as a model for regional water supply planning and management. This is because future generations will inherit a legacy of responsible water supply planning and management that will allow them to continue to be good stewards and managers, rather than inheriting diminished resources and chronic problems. The provision of dependable and

adequate supplies of clean water for all users at reasonable economic and environmental cost will enhance public health and the quality of life, reduce conflict, and preserve and enhance economic, agricultural and environmental resources and opportunities.

Goal

The goal is to make recommendations that will be adopted and implemented by stakeholders to improve the planning and management of water supplies in East-Central Illinois.

Planning and management standards

Ensuring the sustainability of water supplies requires consideration of spatial variations in hydrogeology and climate, temporal variations in climate, environmental, economic and social factors, future generations, and management authorities and responsibilities. Drawing on sustainable indicators and, where possible, identifying thresholds and criteria of acceptable and unacceptable impacts, the Committee recommends the standards below for planning and managing water supplies in East Central Illinois. The standards should be implemented voluntarily. Because of close linkages among surface water and groundwater resources and current data limitations and uncertainties, certain standards will require resolution through balance, compromise and further study, and possible revision.

Compliance with existing laws, regulations and property rights

- The Committee recommends that water supplies continue to be planned and managed to meet demand in compliance with existing laws, regulations and property rights, and with due consideration of acceptable and/or unacceptable impacts. Planning and managing water supplies to meet demand will ensure that water shortages do not occur.

- The Committee recommends that water supplies be planned and managed with enhanced regional cooperation and coordination to address shared responsibilities and the interests of future generations. Enhanced regional cooperation and coordination should be achieved through voluntary efforts in the spirit of self-governance.

Sustainable water supplies

- There is no consistent agreement on definitive, objective criteria to define the sustainability of water supplies. In states that have attempted to incorporate sustainability in water supply planning and management, indicators and criteria for sustainable water supplies vary widely. Determining acceptable or unacceptable impacts of withdrawals requires consideration of a balance between benefits and costs and the exercise of subjective judgment. In the absence of full benefit and cost analyses, the Committee has drawn on scientific and engineering data and information, and members of the Committee have exercised personal and collective judgments in making recommendations about the sustainability of water supplies.

- The Committee finds that partial dewatering of a confined aquifer, even locally, is a sign of stress that should be avoided. The Committee recommends that withdrawals from the confined Mahomet Aquifer be managed so that head in any well (pumping or non-pumping) finished in the confined Mahomet Aquifer does not fall below the top of the aquifer, i.e., there is no loss of saturated thickness. This will ensure that the entire confined aquifer is protected from becoming dewatered, even locally. The Committee recommends that pumps in new and refurbished wells be placed at the top of the aquifer, or higher, although wells could penetrate the full depth of the aquifer. In some existing wells, pumps are placed below the top of the aquifer. The Committee recommends that when head in any well (pumping or non-pumping) drops to 30 feet above the top of the aquifer, a review be undertaken and management strategies implemented to ensure that head does not drop below the top of the aquifer. It will be important to monitor heads in pumping and non-pumping wells and provide a water-level watch for all stakeholders.

- Available head between the current head and the top of the aquifer can be consumed by public and/or private withdrawals. Drawdown can be reduced and withdrawals increased by, for example, increasing the distance between production wells. Drawdown also can be reduced by demand-side management. Current engineering practices in confined aquifers often try to avoid dewatering an aquifer, although there is evidence that parts of the deep bedrock aquifers in northeastern Illinois have been partially dewatered.

- The Committee recommends that implementation of the recommended standard to protect the confined Mahomet Aquifer not be delayed until other standards (below) are developed.

- The Committee recommends that the earlier evaluation of the sustainability of pumping to capacity by Illinois American Water (51.1 mgd) be reevaluated to include additional withdrawals from the Mahomet Aquifer by other communities and industries out to 2050, with consideration of drawdown in pumping and non-pumping wells. The 2006 study by Wittman Hydro Planning Associates, Inc. did not include additional withdrawals by other communities and industries beyond 2004 (see Chapter 2 and Appendix 1) in concluding that water levels were predicted to remain above the top of the Mahomet Aquifer.

- 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 Committee recommends that the transition zone be defined and an appropriate standard(s) be developed to protect the aquifer, surface waters and ecosystems, while allowing for groundwater development.

- The Committee recommends further study to develop a standard(s) to protect shallow confined aquifers and related surface waters and ecosystems, while allowing for groundwater development. Geological and hydrological characteristics of shallow confined and unconfined aquifers vary over small spatial scales and a standard(s) for acceptable or unacceptable impacts of withdrawing water from these aquifers cannot

be set at this time due to the highly variable conditions and paucity of data. Heads in some wells finished in shallow confined aquifers – the Glasford Aquifer in and around Champaign-Urbana, for example – are likely to continue to decline and more wells finished in the Glasford Aquifer are likely to go dry with increased withdrawals from the Mahomet Aquifer. Implementing a standard to prevent dewatering of the upper portions of the confined Mahomet Aquifer is expected to reduce further adverse impacts in the Glasford Aquifer.

- Hydrogeology in the unconfined Mahomet Aquifer in the Havana Lowlands is different than in the confined Mahomet Aquifer to the east of the Havana Lowlands. Current engineering practices typically allow for loss of about one half of saturated thickness in high-capacity production wells in unconfined aquifers. The Committee recommends a standard(s) be developed and implemented to limit the reduction of saturated thickness in the unconfined aquifer and protect surface waters and ecosystems, especially in summer under drought conditions, while allowing for groundwater development. Such a standard(s) cannot be developed at this time due to lack of data and information. A method needs to be developed to separate out the influences of low precipitation and heavy pumping on drawdown and reduced streamflow. More data and analyses are needed to better understand the influence of variations of flow in the Illinois River on groundwater elevation. Acceptable instream and riparian impacts of reduced streamflow due mainly to irrigation pumping also need to be determined.

- The Committee recommends that key aquifer recharge areas, key stream reaches, and ecosystem-sensitive stream flows be identified and preserved and/or restored.

- The Committee 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 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[6].

- The magnitude of droughts and their impacts on water availability and water demand vary across the region. The Committee recommends that public water supplies be managed to provide dependable and adequate supplies of water during, at a minimum, recurrence of the multi-year droughts-of-record, similar to those that occurred in the 1930s and 1950s. A 90 percent confidence level should be used for yields. Bloomington, Decatur and Springfield urgently need additional sources of water and/or need to reduce water demand to be able to provide adequate supplies of water during a drought-of-record, which can recur at any time. The Committee also recommends that emergency response plans be updated or prepared to provide adequate supplies of water in low-probability situations in which adequate water supplies cannot be provided

by normal operations and capacities. The objectives are to minimize the risk of water shortages and adapt to the possibility of climate change.

- The Committee recommends that efficiencies of water withdrawal, treatment, distribution and use, and use of water from alternative sources (such as reused water, detained stormwater, and conjunctive use of surface water and groundwater) be increased. This should include obtaining maximum feasible efficiencies in all existing, committed and planned water supply facilities, which should be supplemented with additional facilities only as necessary to serve anticipated water supply needs. Identification and uniform implementation of best management practices for water supply facilities, where feasible, will help minimize the sum of water supply system operating and capital investment costs and increase water use efficiencies and sustainability. Examination of water pricing policies and practices may lead to identification of additional strategies to reduce water demand.

Adaptive management

- The Committee recommends that water supply facilities be designed for staged or incremental construction, where feasible, to permit maximum flexibility to accommodate changes in population and economic growth, changes in technology for water supply management, new scientific understanding, and possible new or revised management standards.

- Surface water and groundwater resources are linked through the water cycle. Even though the confined aquifer can be protected from dewatering, surface waters will continue to be captured by groundwater withdrawals. It has not been determined in any locality whether a reduction in streamflow due to groundwater pumping will result in unacceptable impacts to surface waters and aquatic and riparian ecosystems. The Committee recommends that criteria and standards to protect the aquifers be reevaluated when criteria and a standard(s) are developed to protect surface waters and aquatic and riparian ecosystems from possible unacceptable impacts of groundwater withdrawals.

- The Committee 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.

Shared responsibilities

- The Committee recommends that all water supply managers and other stakeholders in the region be encouraged to review a regional plan, suggest modifications, and become partners in regional water supply planning and management.

- The Committee recommends that local water supply management plans be developed to be in compliance with guidelines contained in a regional plan, and that the local plans be reviewed independently.

Sound science

- The Committee recommends that research and data collection, analysis, management and exchange be planned cooperatively by academic institutions, appropriate units of government, the private sector, and other stakeholders.

Informed public

- The Committee recommends that public knowledge of water resources, water demand, and water supply planning and management be increased, particularly when plans are made, reviewed, and updated.

Action items

The Committee's recommended action items are a set of strategies to implement the guidelines contained in the framework for action.

The main recommendation is to establish a permanent process and structure for regional water supply planning and management involving a diverse set of stakeholders.

The foundations for the recommendation are sustainable water supplies, self-governance, shared responsibilities, adaptive management, sound science and an informed public. The focus is on leadership and coordination. Key recommended strategies are identified below.

- Articulate the need for and benefits of regional water supply planning and management.
- Improve education and outreach so that local decision makers and the public are better informed about regional water supply issues.
- Coordinate voluntary participation in regional water supply planning and management and integrate diverse opinions.
- Encourage and facilitate all water supply operators to participate in a review of the plan and, with guidance, have an opportunity to modify the plan, including the water demand scenarios. As the regional plan addresses both groundwater and surface water supplies, major communities such as Bloomington, Decatur, Springfield, Danville and Champaign-Urbana should be encouraged to participate in regional planning.
- Encourage, facilitate and provide technical assistance to water supply operators in the preparation of local water supply and management plans that are consistent with the

guidelines in the regional plan. Review of the local plans will result in a collective regional plan.

- Recommend best management practices for water supply management.

- Coordinate implementation of a regional plan - with monitoring and reporting of progress to establish accountability.

- Identify key indicators relevant to water supply planning and management (e.g., population, the economy, the environment, water withdrawals and uses, streamflow, groundwater levels, climate and land-use changes, regulations etc.), monitor and report changes, and assess their implications for water sustainable water supplies.

- Continuously engage in regional water supply planning and update the regional plan on a periodic basis, at least every five years.

- Consider incorporating in future plans subjects not addressed in the current plan, e.g., water quality, instream and riparian water needs, ecosystems, infrastructure, land-use, water pricing etc.

- Coordinate the identification of technical objectives and requirements for major data collection, analysis and distribution efforts and continue to receive technical assistance in water supply planning and management.

The Committee recommends that the Mahomet Aquifer Consortium retool to provide leadership, administrative structure and process to fulfill an expanded role for regional water supply planning and management in East-Central Illinois.

The Committee is impressed with the foresight and dedication of the Mahomet Aquifer Consortium for over a decade in providing leadership to support sound science and the identification of options for managing groundwater resources in the region. No other group has a similar credential in the region. The Committee recommends a number of changes to the Mahomet Aquifer Consortium.

- Broaden the mission to include leadership and coordination of regional water supply planning and management activities – for surface water as well as groundwater – in the 15-county region.

- Broaden membership of the Board of Directors and its Technical Advisors to include the type of stakeholder and geographical diversity represented on the Regional Water Supply Planning Committee.

- Establish an appropriate committee structure to implement the regional plan.

- Engage in a continuous process of regional water supply planning and management and facilitate implementation a regional plan.

- Encourage broader participation in Members' meetings and rotate the meetings throughout the region.

- Continue and improve a website to provide information to the public.

The Committee believes that the Mahomet Aquifer Consortium does not need authority to fulfill this new role and recommends that the Mahomet Aquifer Consortium simply assume this expanded role.

- To be effective, the Mahomet Aquifer Consortium will need a permanent staff and appropriate financial and operating resources.

While encouraging the Mahomet Aquifer Consortium to identify its own means to implement the regional plan, the Committee recommends to the Mahomet Aquifer Consortium, the Illinois Department of Natural Resources, and the University of Illinois at Urbana-Champaign the following two strategies:

- A critical early step is for the Mahomet Aquifer Consortium to identify its resource needs and to take action to secure them. Stable and adequate funding from state government through the Illinois Department of Natural Resources and local entities is essential to support efforts to implement a regional plan. Federal funds also should be pursued as a possible source.

- Funding is needed for the operation of the Mahomet Aquifer Consortium, continuance of the Illinois Water Inventory Program, providing technical assistance to water supply operators, and data collection, analysis, management and distribution. The Committee recommends establishing an *ad hoc* group to investigate opportunities for creating incentives to water supply operators to participate in implementing the regional plan and in funding some of the needed activities.

- The University of Illinois at Urbana-Champaign is encouraged to consolidate and strengthen its important role as a partner with local entities and state agencies, especially the Department of Natural Resources, in regional water supply planning and management.

The Committee recommends that the four divisions of the newly created Institute of Natural Resource Sustainability and other departments, in coordination with the Mahomet Aquifer Consortium, develop a plan to assist the Mahomet Aquifer Consortium; the four divisions are the Illinois State Water Survey, the Illinois Geological Survey, the Illinois Natural History Survey and the Illinois Sustainable Technology Center. Recognizing that there can be no higher priority for Illinois than providing sustainable supplies of clean water, the Committee recommends that the University give appropriate high priority to assisting the Mahomet Aquifer Consortium. One manifestation of its commitment could be the use of a small amount of core state resources to keep the groundwater flow model operational and to conduct and report on assessments of the impacts of new high capacity wells, in coordination with Soil and Water Conservation Districts, if additional state funds are not available. Such assessments (an average of about 16 per year since 1992, mainly in Tazewell, Mason and Cass Counties[7]) should include evaluations of proposed compliance with the guidelines established in a regional plan. This would implement for the region the increasingly important, but unfunded 1983 Water Use Act mandate to conduct and report on impact assessments for new high capacity wells.

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   [Note: This definition is consistent with the broader definition of sustainable development that "*meets the needs of the present without compromising the ability of future generations to meet their own needs*" (Bruntland, G. (ed.), 1987. "Our common future: The World Commission on Environment and Development", Oxford, Oxford University Press.
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