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Prioritizing Illinois Aquifers and Watersheds for Water Supply Planning

by
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July 2006

Illinois State Water Survey
Center for Groundwater Science
Center for Watershed Science
Champaign, Illinois

A Division of the Illinois Department of Natural Resources

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Abstract

Four aquifer systems and five watersheds in Illinois are identified as most in need of attention for water supply planning and management purposes. The aquifers and watersheds are identified on the basis of limited water supply availability and substantial population and economic growth. Improved water supply planning and management of these aquifers and watersheds will help ensure current and future water demands can be met and conflicts minimized. Aquifers and watersheds are listed in order of priority regarding the potential benefit and relative urgency of water supply planning. In addition to potential planning needs for these aquifers and watersheds at regional scales, there is a need to also evaluate the adequacy of individual community water supply systems scattered throughout southern and central Illinois that likely will be susceptible to water supply shortages during a major drought.

The following aquifer systems are recommended as most in need of study and planning:

the deep bedrock aquifer system of northeastern Illinois,
the sand and gravel and shallow bedrock aquifers of northeastern Illinois,
the Mahomet Aquifer of east-central Illinois, and
the American Bottoms of southwestern Illinois (MetroEast area),

and the following watersheds are recommended for study and planning:

the Fox River watershed,
the Kaskaskia River watershed,
the Sangamon River watershed,
the Kishwaukee River watershed, and
the Kankakee River watershed.

Acknowledgments

This work was conducted under the general supervision and technical review of Derek Winstanley, Chief of the Illinois State Water Survey (ISWS). Input was also provided by members of the Illinois State Water Plan Task Force. The views expressed in this report are those of the authors and do not necessarily reflect the views of the ISWS or the State of Illinois. Graphics were prepared by numerous individuals, including Kathy Brown, Tim Bryant, Linda Hascall, and Sean Sinclair. Pamela Lovett assembled the final text. Their efforts are greatly appreciated.

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Introduction

In June 2000, Governor Ryan established a Water Resources Advisory Committee (WRAC) to examine the issue of water supply planning and management in Illinois. Although the WRAC never formally reported-out, 12 Consensus Principles were identified. These Principles were presented in the 2002 Report to the Interagency Coordinating Committee on Groundwater from the Subcommittee on Integrated Water Planning and Management (pursuant to Executive Order No. 5, 2002): http://www.sws.uiuc.edu/docs/iwqpm/docs/

The Consensus Principles are:

1. Better science and more funding for science is needed.
2. A system for identifying water resource problem areas is needed.
3. Water resource problem areas:
    - should not be too large,
    - could be based on ground or surface water sources or both,
    - should be based on supply and demand,
    - a drop below sustainable yield should be a criteria,
    - pollution could be a criteria.
4. Need to see details of how such areas will be identified both short-term, based on existing information, and long-term, as better data become available.
5. Emphasize regional water management authorities—boundary should have some relationship to scale of the water resource (watershed and/or aquifer boundary).
6. State's role:
    - for later resolution,
    - should support, provide science, establish or appoint regional authorities.
7. The role of existing water authorities established under the Water Authorities Act should be examined carefully.
8. Phased approach to implementation would be received better by a broader group of interests.
9. Immediately begin pilot programs in "willing" areas; pilots programs should be site-based and located in problem areas.
10. Sunsets should be established for #8 and #9.
11. There should be an ongoing role for the Water Resources Advisory Committee in developing the details associated with establishing regional water management authorities.
12. Both groundwater and surface water should be considered.

The following report addresses Consensus Principles 2, 3, and 12 by identifying priority areas worthy of more detailed study and possible pilot water management areas. As the Consensus Principles recommend, both priority aquifers and priority watersheds are identified, based on water supply, demand, yield, and quality criteria, and using natural aquifer or watershed boundaries. A summary map of the prioritized aquifers and watersheds is presented in figure 1.

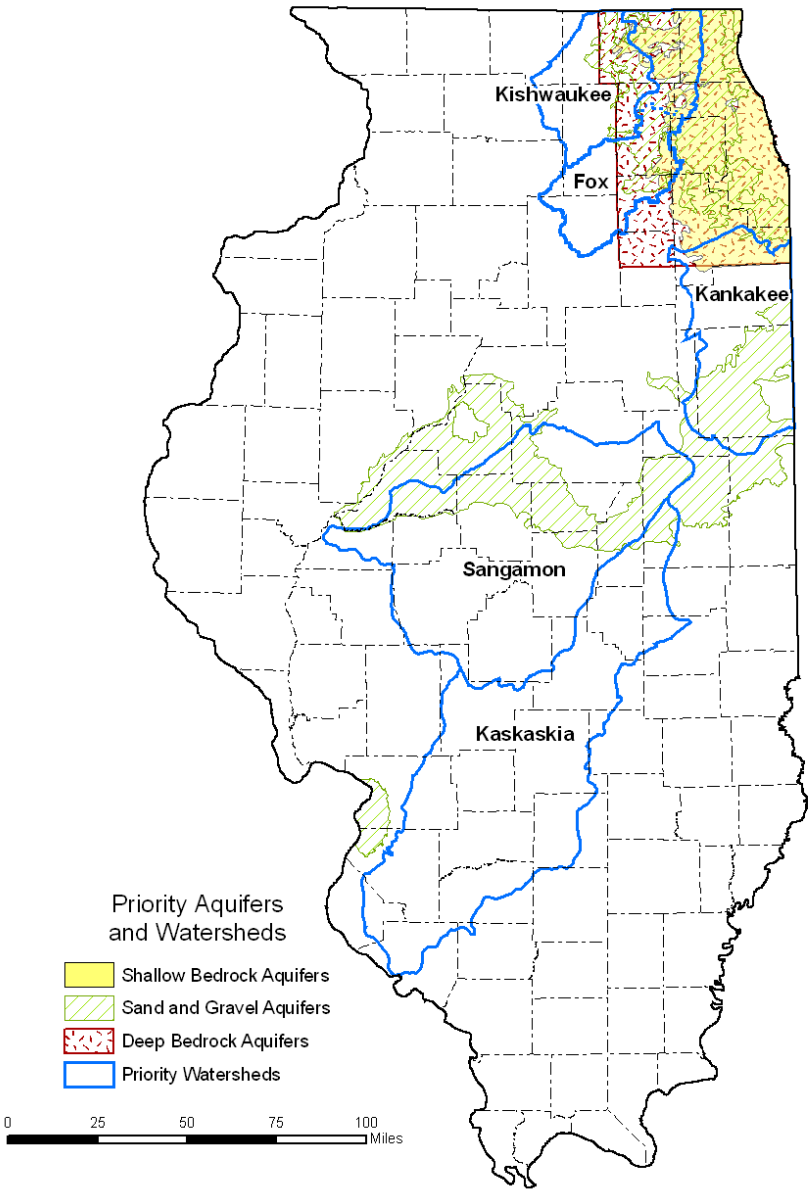

Figure 1. Priority aquifers and watersheds for water supply planning

Identification of Priority Aquifers for Illinois

The Illinois State Water Survey's *A Plan for Scientific Assessment of Water Supplies in Illinois* (2001) provides a preliminary list of 14 major aquifers that serve the drinking water needs of thousands of Illinois citizens. The *Plan* states that priority will be placed on those aquifers most in need of study and management attention, based on an assessment of groundwater use to aquifer potential yield. Such a use-to-yield study has been completed and coupled with a general historical knowledge of the aquifers, and the potential for future demands on those aquifers, the following areas or aquifer systems are recommended as most in need of study and planning:

1. the deep bedrock aquifer system of northeastern Illinois
2. the sand and gravel and shallow bedrock aquifers of northeastern Illinois
3. the Mahomet Aquifer of east-central Illinois
4. the American Bottoms of southwestern Illinois (MetroEast area)

The locations of the state's major aquifers and these four prioritized aquifers are shown on figures 2-4. Of principal interest for each of these prioritized aquifer systems is how much water can be withdrawn safely, the consequences of long-term development (on groundwater levels and surface flows, groundwater quality, recharge, etc.) at current or higher rates, and the effects of drought and possible climate change on aquifer yield estimates.

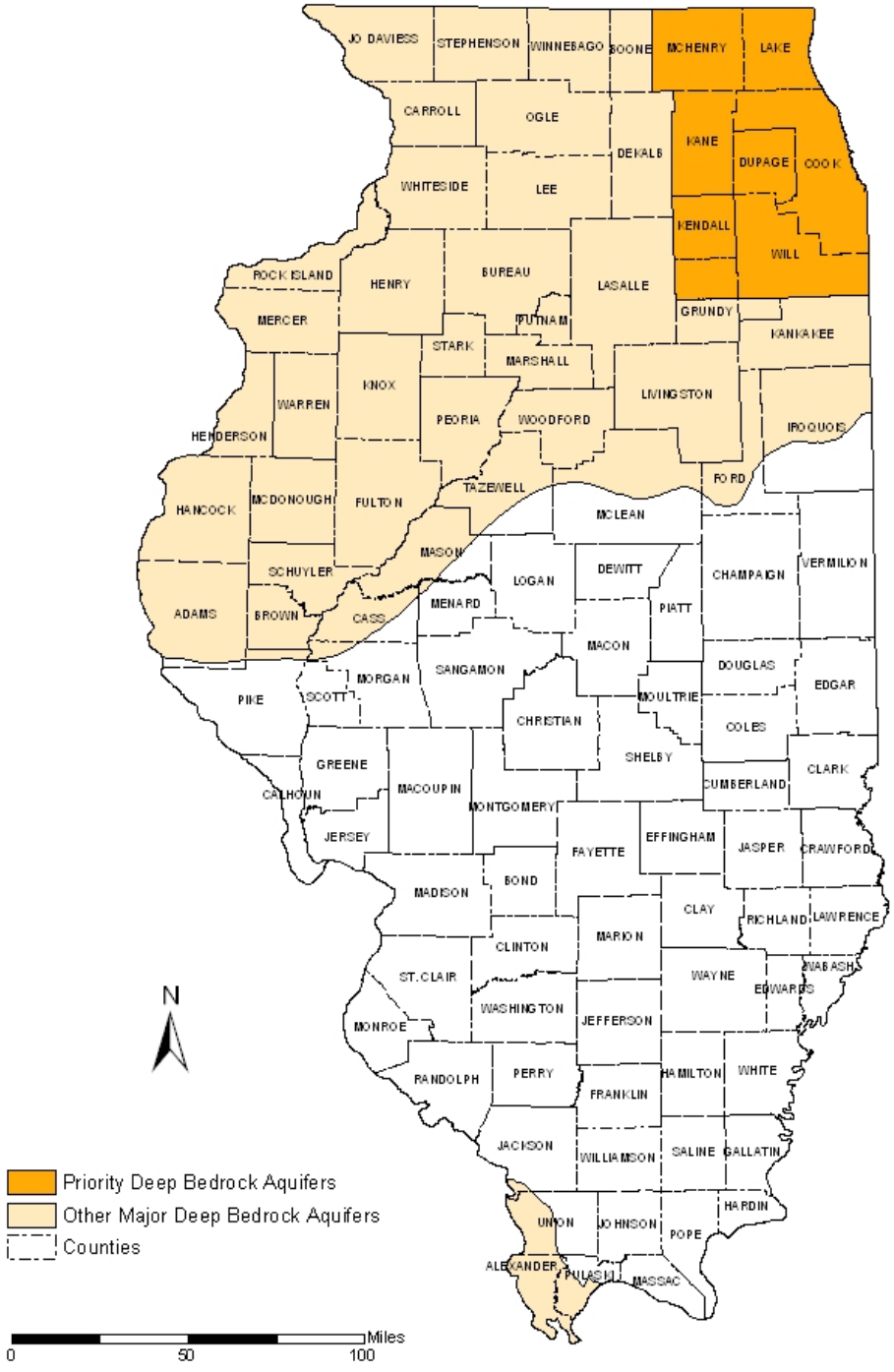

Figure 2. Priority deep bedrock aquifers for water supply planning.

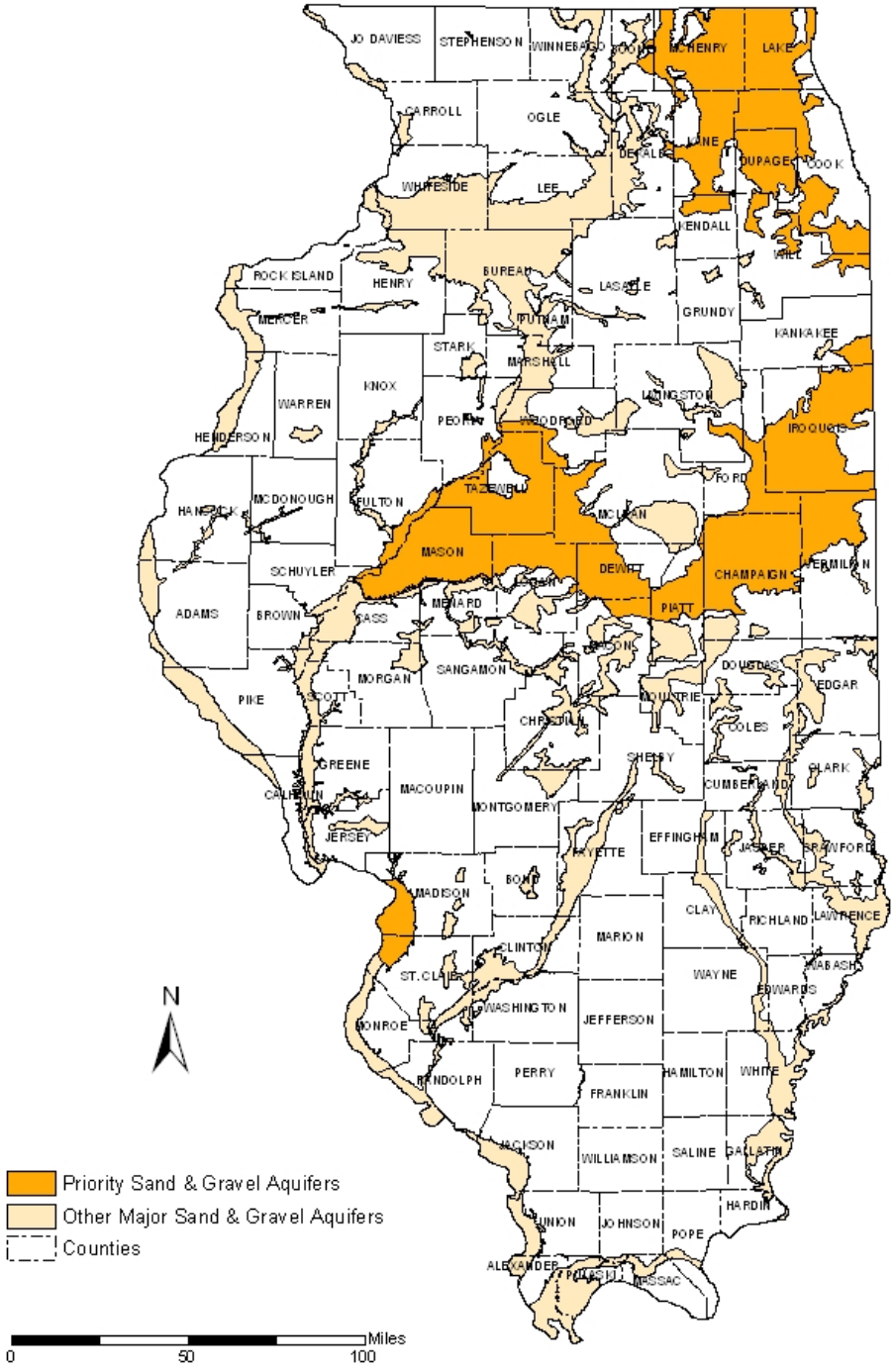

Figure 3. Priority sand and gravel aquifers for water supply planning.

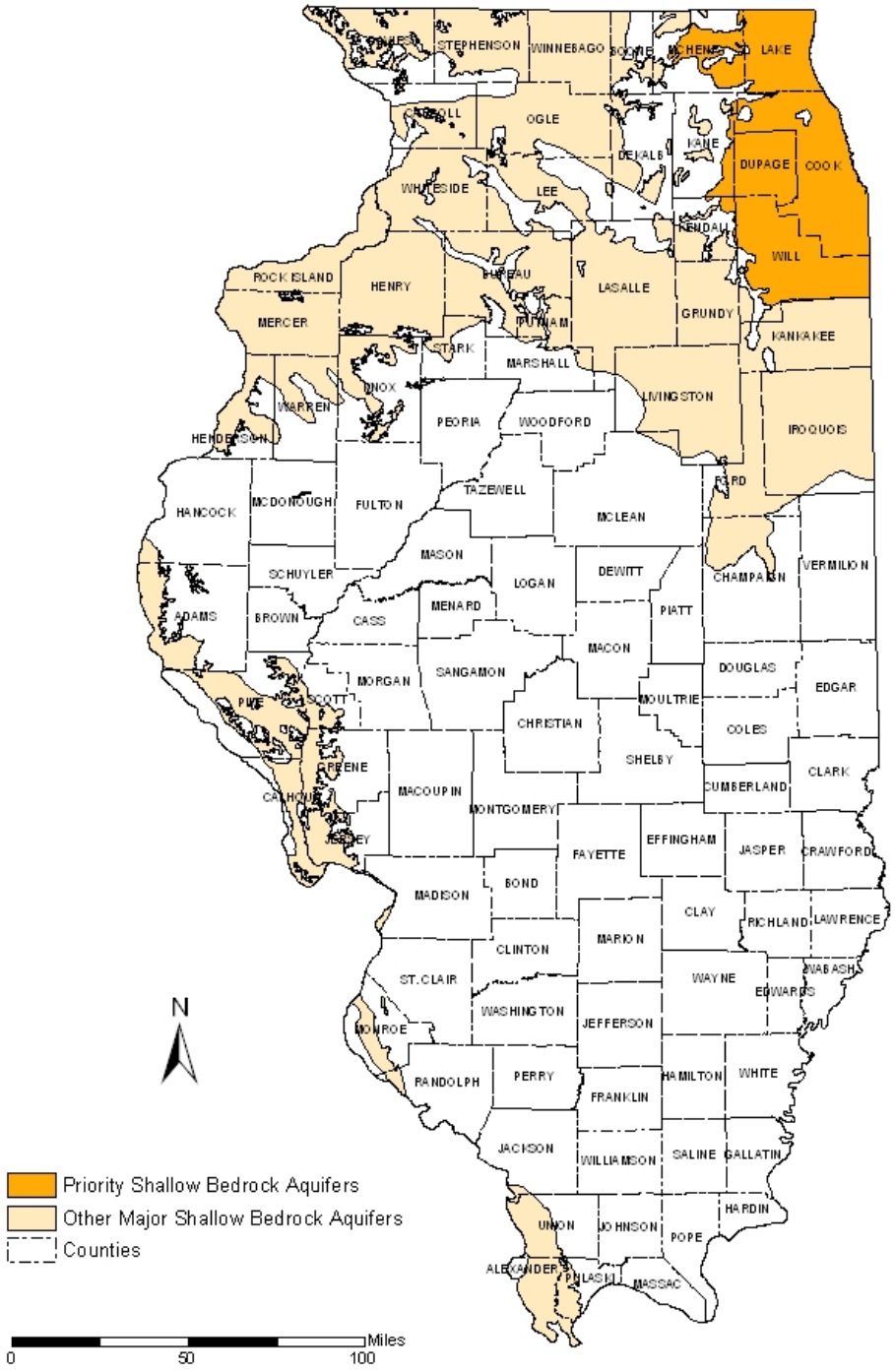

Figure 4. Priority shallow bedrock aquifers for water supply planning.

1. Deep Bedrock Aquifers of Northeastern Illinois

Even though our understanding of the potential yield of the deep bedrock aquifers is limited (potential yield being defined as the rate at which groundwater can be continuously withdrawn without lowering water levels to critical stages, exceeding recharge, or causing undesirable changes in water quality), the use of this resource (figure 5) continues to exceed the estimated potential yield in many townships in northeastern Illinois (figure 6). We know that the deep aquifers have provided much more water than is currently being withdrawn (figure 7), but significant declines in deep aquifer confined (artesian) heads and water quality were experienced when withdrawals were at their peak (figures 8 and 9), a signal that withdrawals may have been exceeding recharge.

Modern groundwater modeling techniques are now being employed to assess a variety of questions related to deep aquifer usage. Of particular concern are the consequences of long-term withdrawals at current or higher rates on water levels (confined heads) and quality (e.g., total dissolved solids, radium) in the deep aquifers. Also, recent Annex 2001 discussions regarding Great Lakes diversions (water withdrawn from the lake as a result of leakage through lakebed deposits and groundwater captured prior to natural discharge to the Lake) suggest that an assessment of those diversion amounts is a topic of concern to the Great Lakes States and Canadian Provinces.

Issues

- Projected period of viability of the deep bedrock aquifers if pumping continues at current and projected rates.
- Deep bedrock groundwater quality.
- Availability and quality of alternative water sources.
- Protection of recharge areas.

Tasks

- A regional model of groundwater flow in northeastern Illinois has been constructed assimilating appropriate geologic and hydrologic data from the northern half of Illinois as well as portions of Wisconsin, Indiana, and Michigan (figure 10). Parameter calibration based upon predevelopment conditions of the deep aquifers (i.e., prior to significant groundwater withdrawals) has been completed.
- By 2007, transient simulations will be completed to examine questions regarding the impacts of long-term withdrawals for current and selected plausible future pumping scenarios.
- Data collection efforts on water withdrawals and water levels will continue and be coordinated with similar efforts in Wisconsin.
- The building of databases in support of the regional model, including entering historical water-level data, checking GIS coordinates, and adding metadata also will continue.

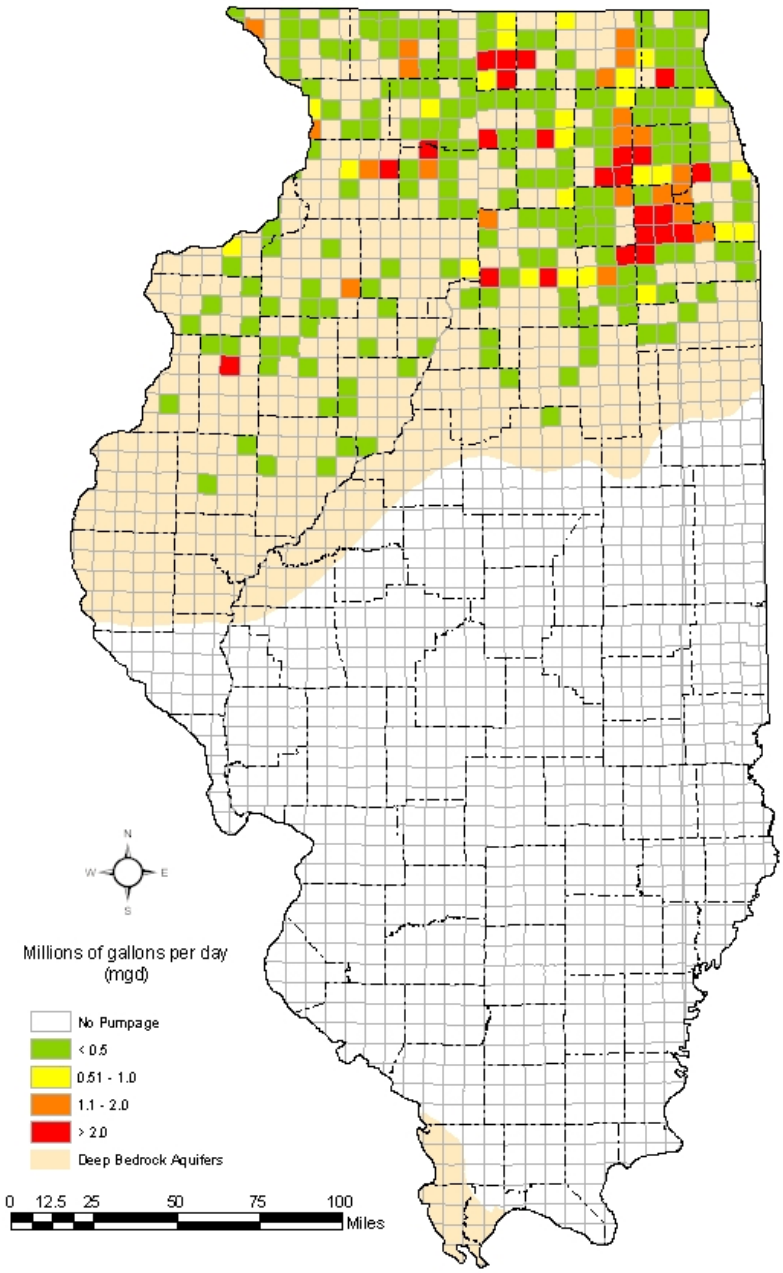

Figure 5. Withdrawals from deep bedrock aquifers by township.

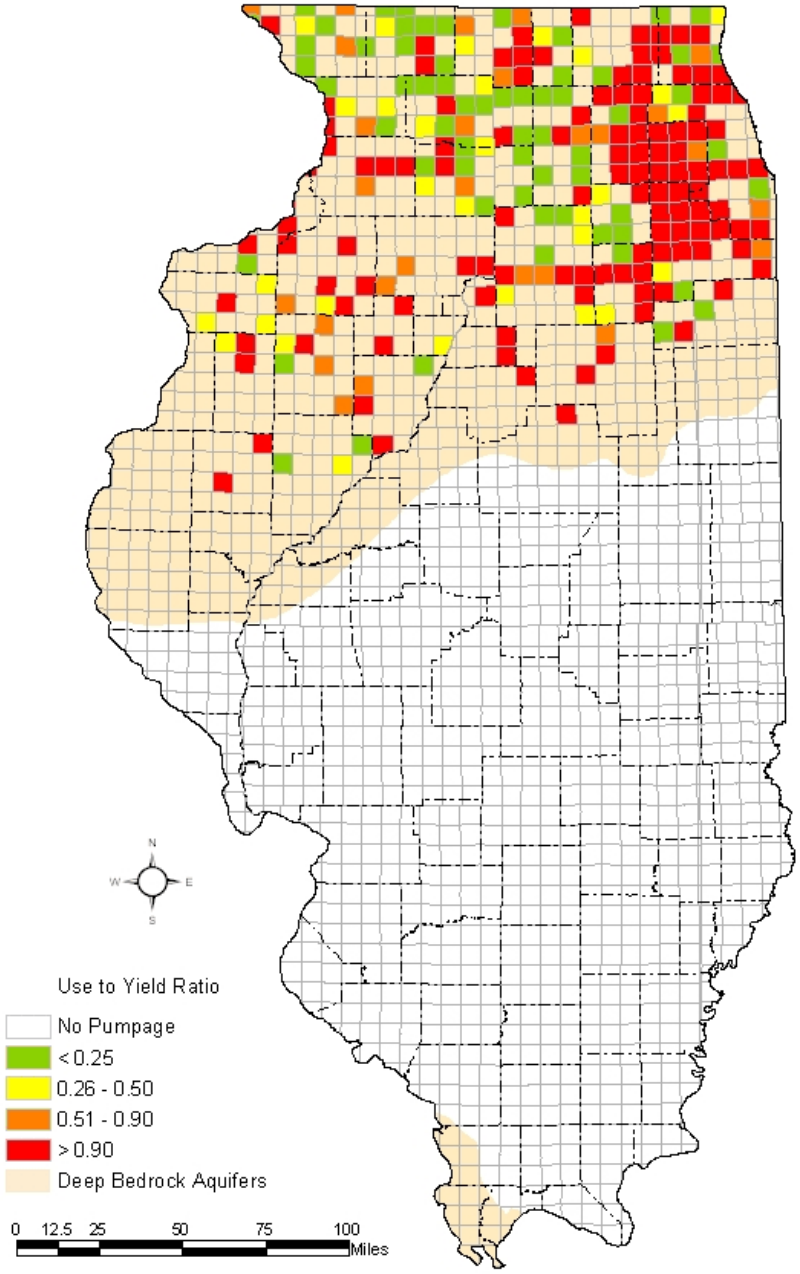

Figure 6. Comparison of groundwater use to potential yield for the deep bedrock aquifers.

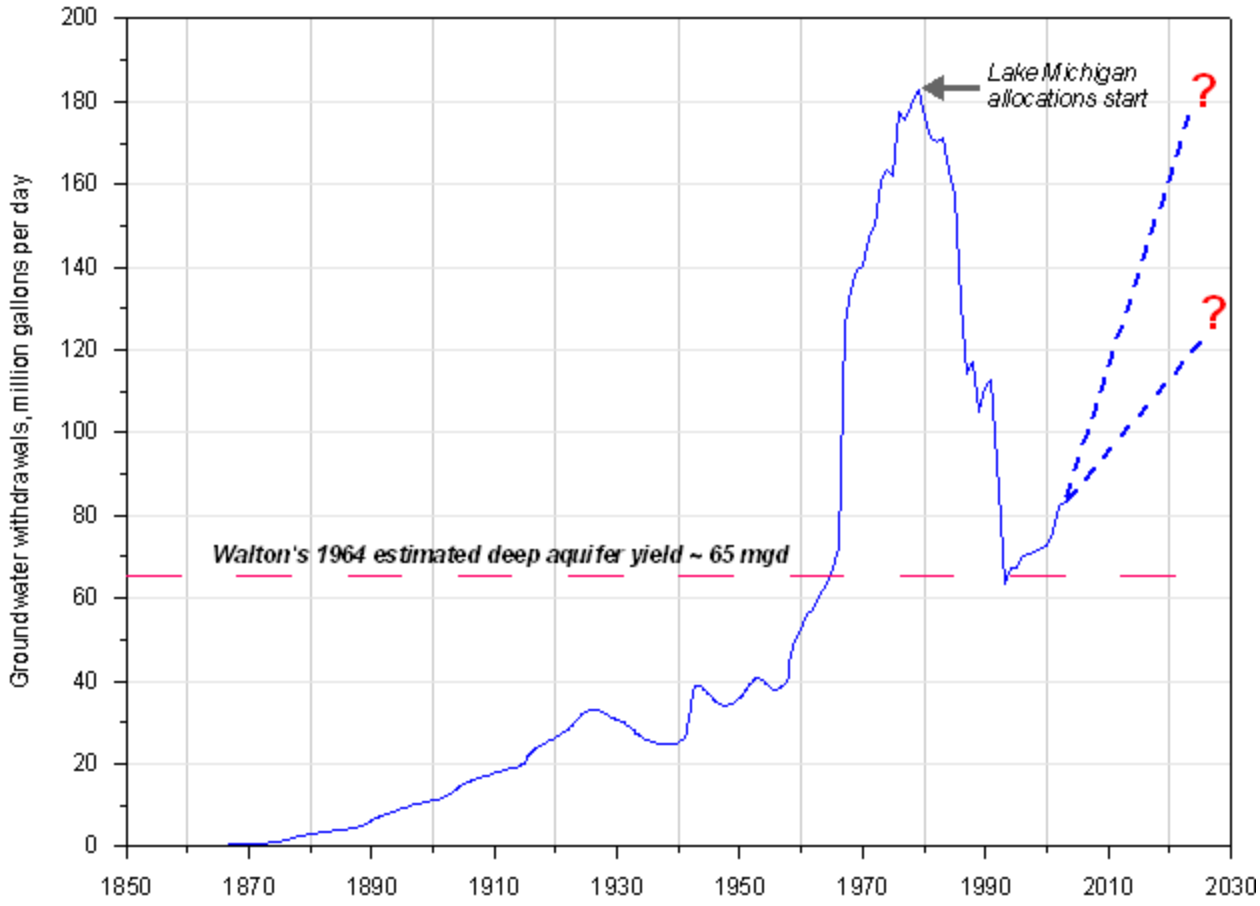

Figure 7. Groundwater withdrawals from deep aquifers in NE Illinois.

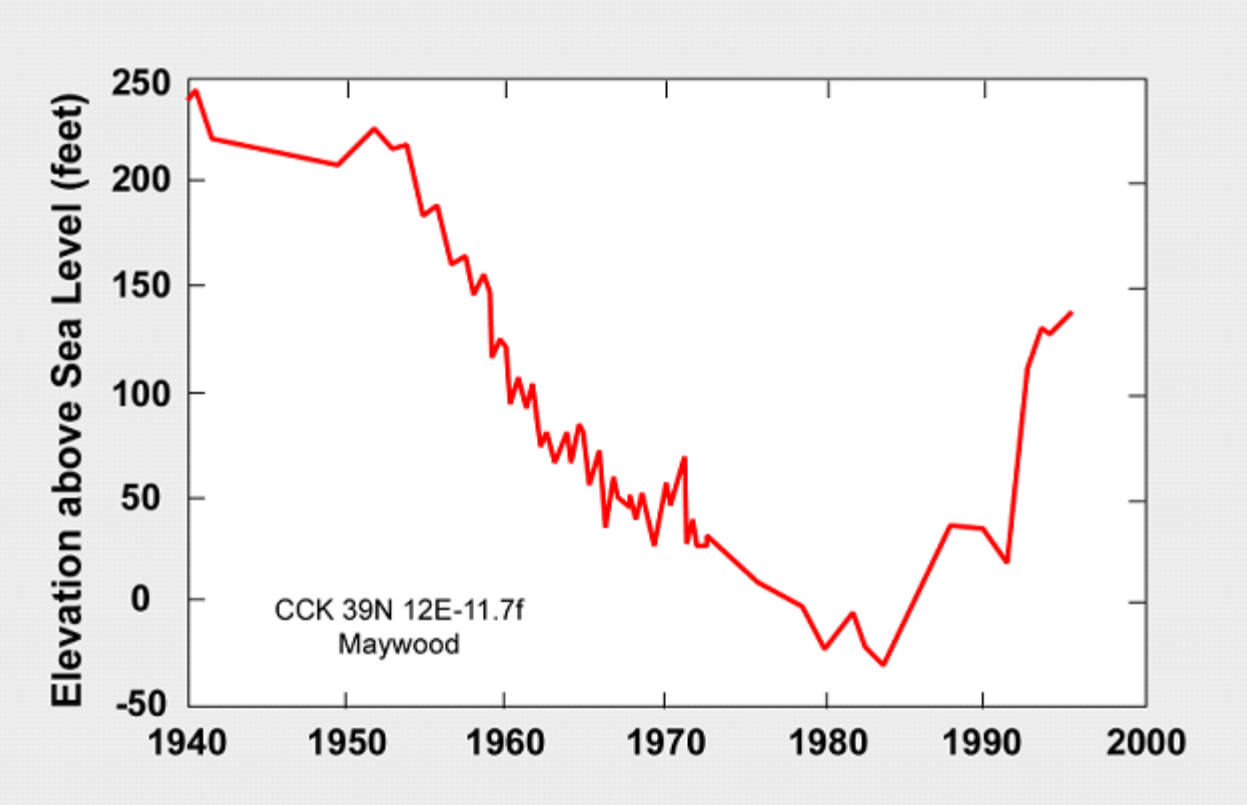

Figure 8. Elevation of deep well confined head in a well in Maywood, Cook County. The confined head has risen dramatically since the early 1980's after Lake Michigan allocations were initiated. Confined pressure in this area was around 700 feet msl in the mid-1800's when groundwater was just starting to be tapped from the deep bedrock aquifers (Visocky et al., 1985). That places pre-development head elevations far above this graph's y-axis and indicates today's confined head elevations are about 550 feet below pre-development head elevations.

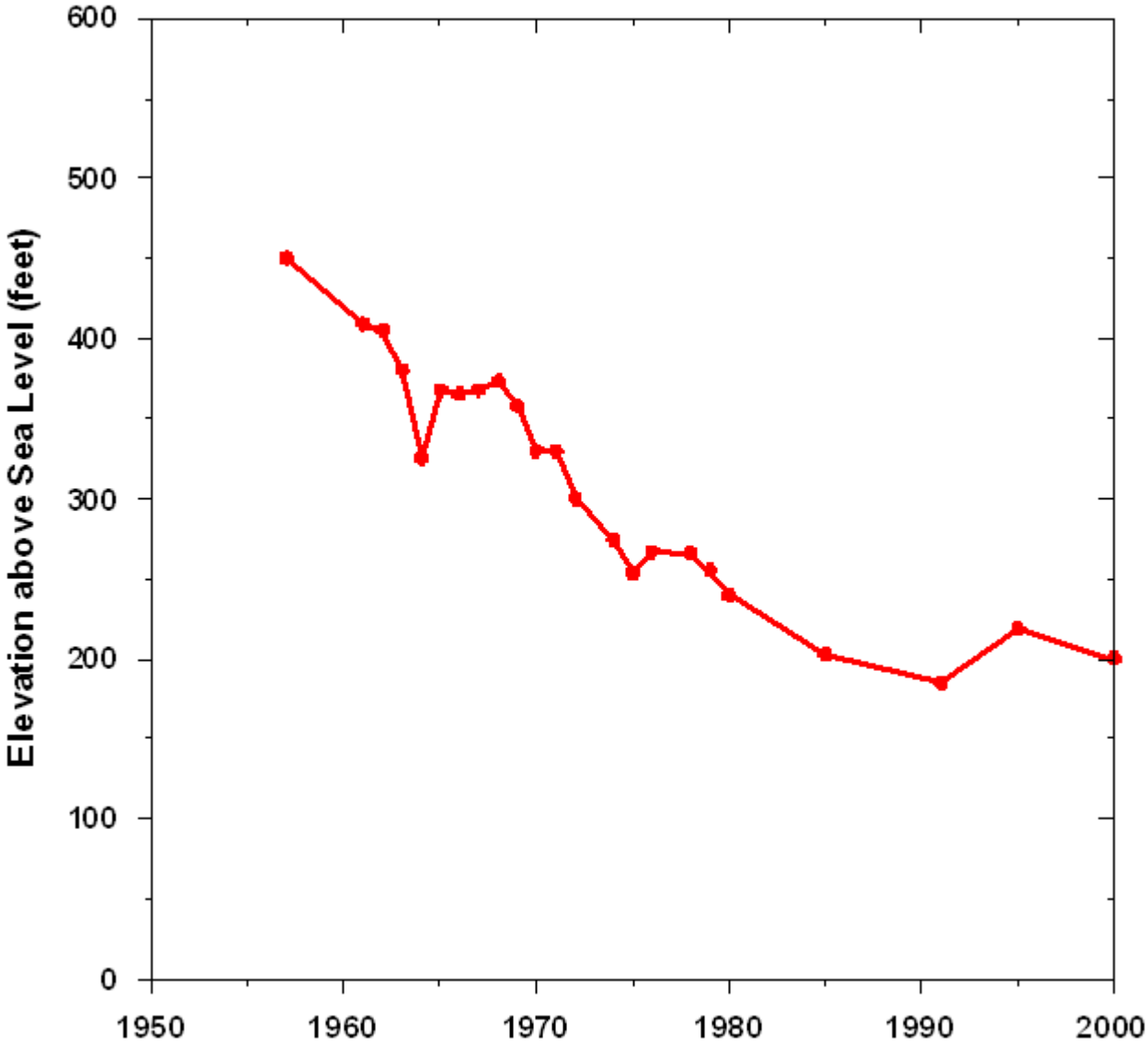

Figure 9. Elevation of deep well confined head in a well in Oswego, Kendall County, located between Joliet and Aurora. The confined head has continued to decline in this area because deep aquifer pumpage has continued or increased in areas that did not receive Lake Michigan water allocations. Note that the rate of head decline is less after Lake Michigan water allocations were initiated in the late 1970's and early 1980's. Confined pressure in this area was around 725 feet msl in the mid-1800's before significant groundwater withdrawals from the deep bedrock aquifers started.

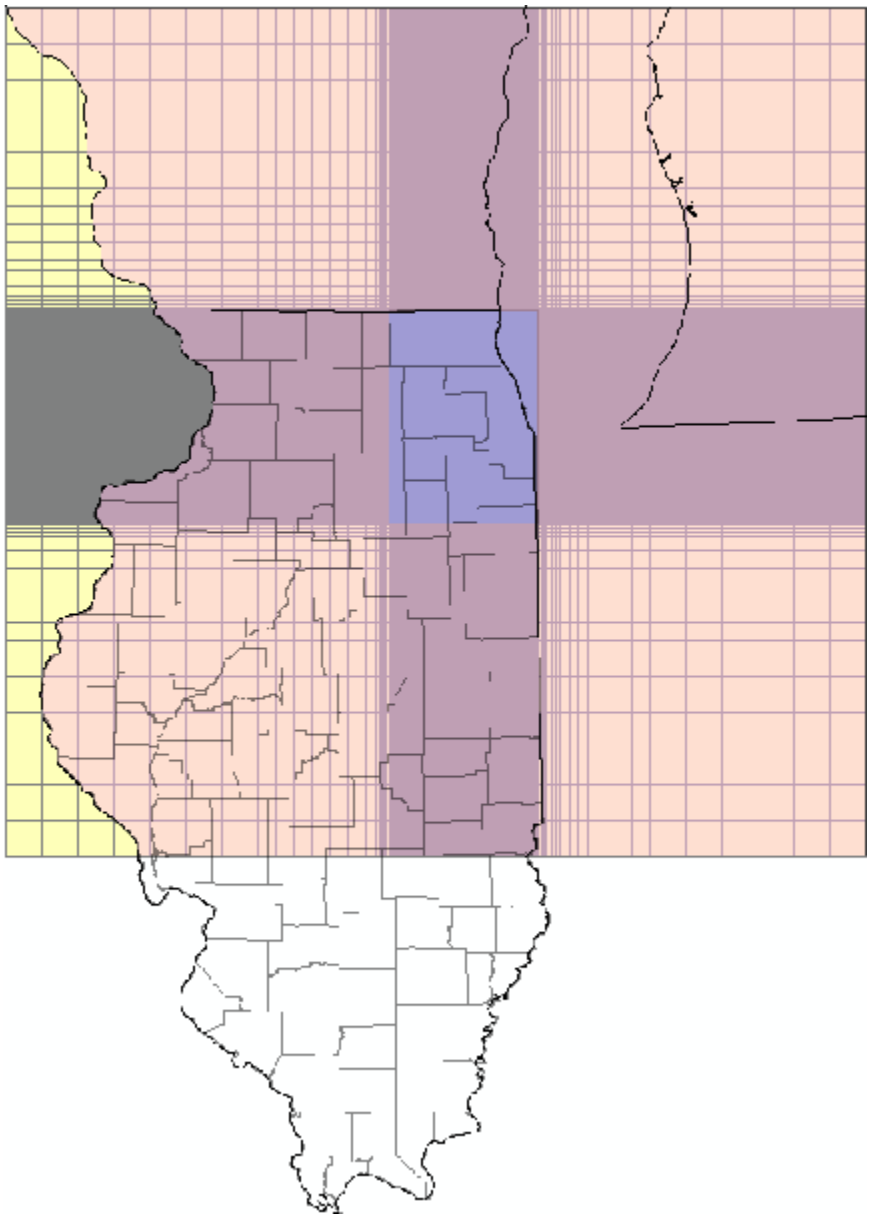

Figure 10. Extent of ISWS northeast Illinois regional groundwater flow model, containing 226 rows, 174 columns, and 18 layers. The regional model will be primarily used to address questions surrounding the use of the deep aquifers, but also will provide boundary conditions to a nested model of the shallow sand and gravel and shallow bedrock aquifers in Kane County.

2. Shallow Aquifers of Northeastern Illinois

With the continued rapid growth of population, commerce, and industry in northeastern Illinois, the need for water continues to grow. The Northeastern Illinois Planning Commission's *Strategic Plan for Water Resource Management* (2002) has been quoted widely for its depiction of 11 townships that will face water shortages by 2020 if steps are not taken to accommodate increasing demands (figure 11). The limitations on expanding the use of Lake Michigan and the regional deep bedrock aquifer system will force the increased use of the shallow bedrock and sand and gravel aquifers of the area. Kane County has embarked on studies to comprehensively examine the viability of their shallow water resources, both groundwater and surface water. Kendall and McHenry Counties, which are 100% dependent upon groundwater, also are examining groundwater resource sustainability. Other counties in the region have been slow to follow, even though many counties repeatedly face use conflicts of those resources.

A greater understanding of the availability of shallow groundwater resources throughout this region is needed so that the managers can make better water use and growth decisions, and the public can better understand the impacts of development including impacts on surface water (e.g., Fox River) and wetlands. Figures 12 and 13 show that current groundwater withdrawals in two townships along the Fox River are nearing or exceeding the potential yield (use-to-yield ratio, UTY > 0.9) of the sand and gravel aquifers in that area. Several other townships exceed 0.5 UTY. An examination of current withdrawals from shallow bedrock aquifers (figure 14), often considered to be in hydraulic connection to overlying sand and gravel aquifers, shows an additional township in NE Illinois with a UTY > 0.9 (figure 15). Given the need to meet additional water demand as a result of limits on Lake Michigan withdrawals and the yield of the deep bedrock aquifers, new withdrawals of water from the shallow aquifers will be necessary and more townships can be expected to approach or exceed shallow aquifer yields in the future.

Issues

- Availability of shallow groundwater resources to alleviate existing demands on deep bedrock aquifers and meet increasing demands for water in the region.
- Linkages with surface waters and impacts of increased shallow groundwater withdrawals on surface water resources and ecology.
- Shallow groundwater quality.

Tasks

- Work with ISGS to improve shallow aquifer maps for the region, particularly for sand and gravel aquifers and follow-up ISGS mapping efforts with hydrologic investigations.
- Compile historical water level and withdrawal data and continue new data collection efforts such as was recently completed for regional dolomite water levels.
- Compile aquifer hydraulic property data, identify recharge areas and rates, and links to surface waters.
- Develop models of selected shallow aquifers within the context of the regional aquifer model (figure 10).
- Work with local governmental agencies and citizen groups to secure funding for a large-scale investigation of the aquifers.

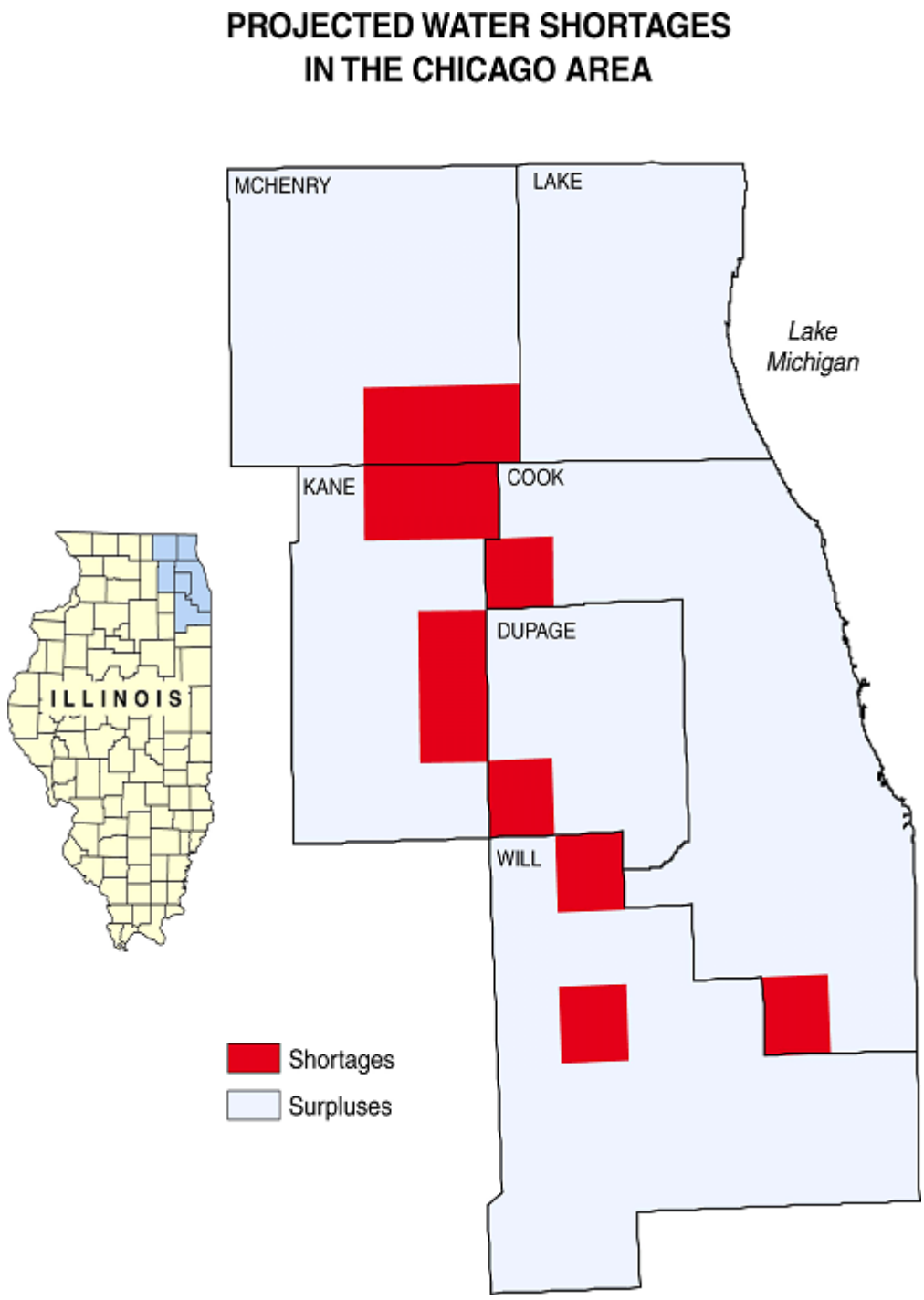

Figure 11. Projected 2020 water shortages in NE Illinois (NIPC, 2002).

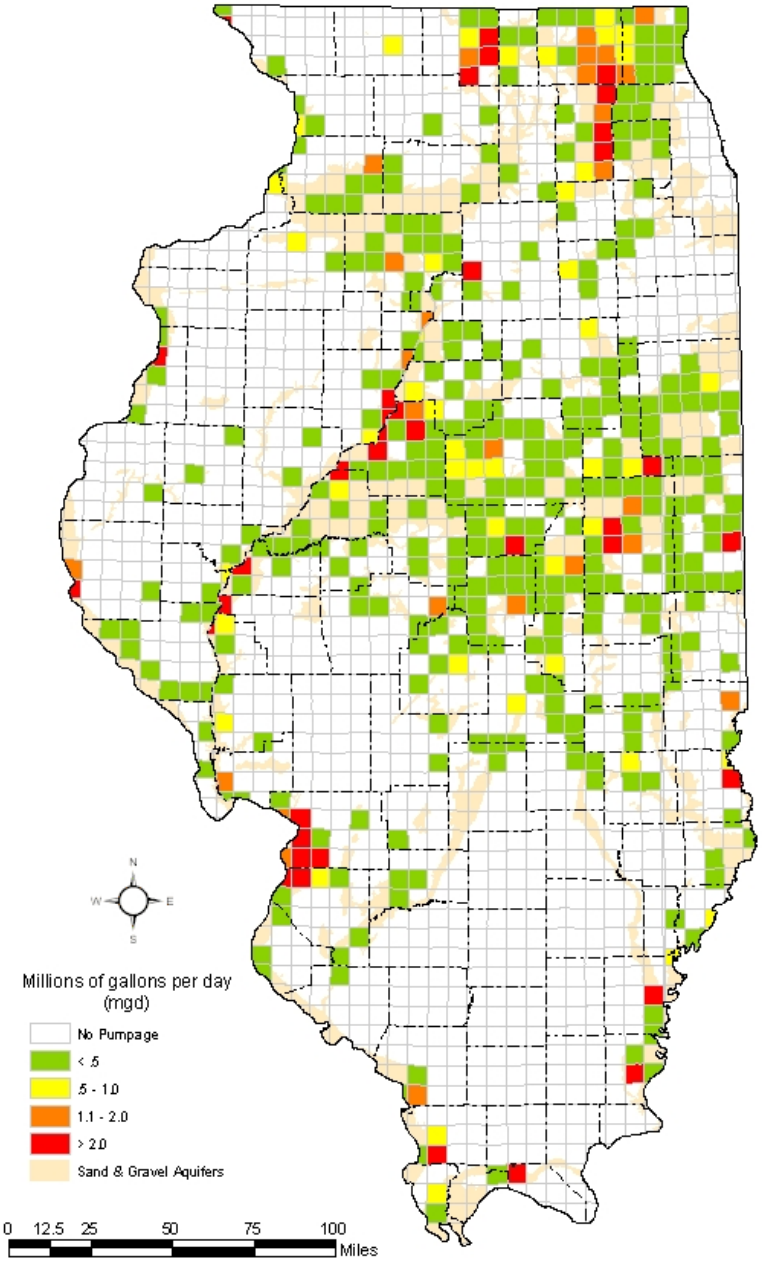

Figure 12. Withdrawals from sand and gravel aquifers by township.

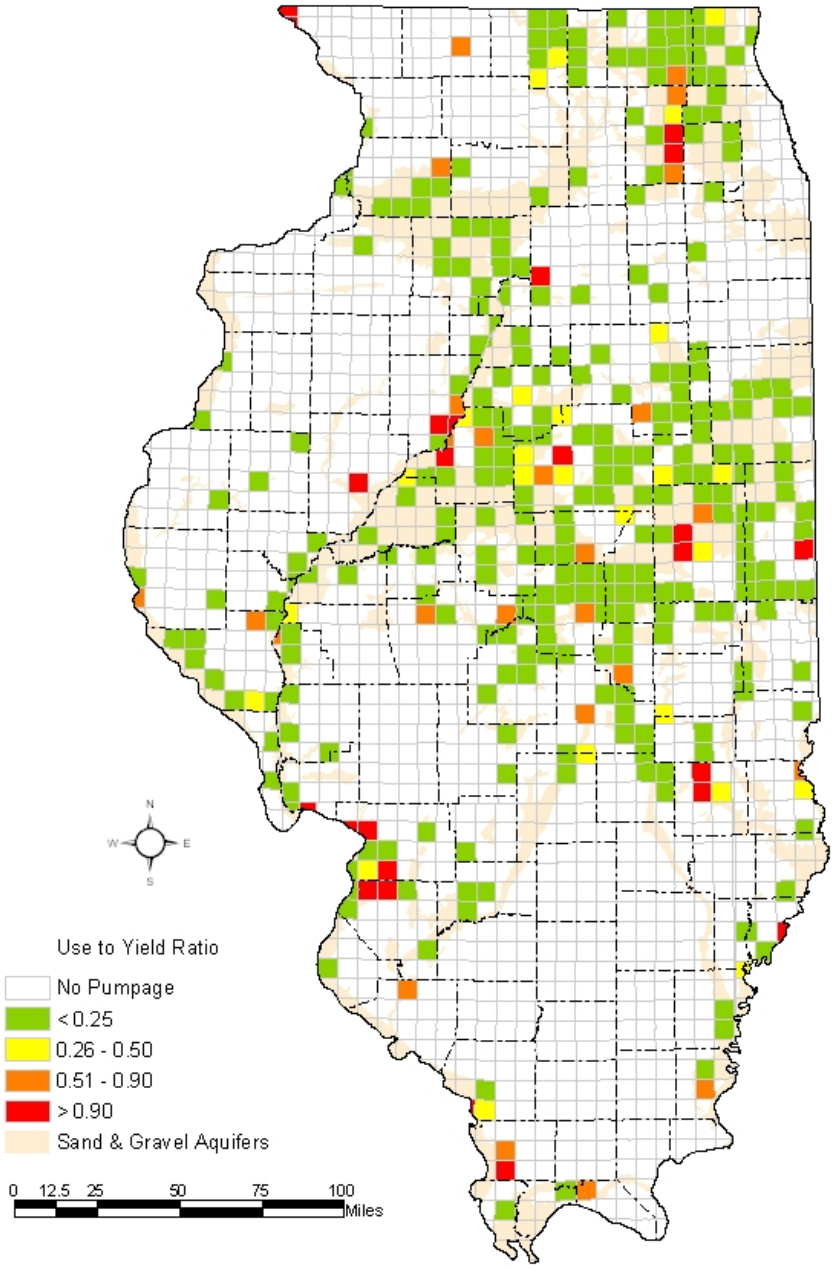

Figure 13. Comparison of groundwater use to potential yield for sand and gravel aquifers.

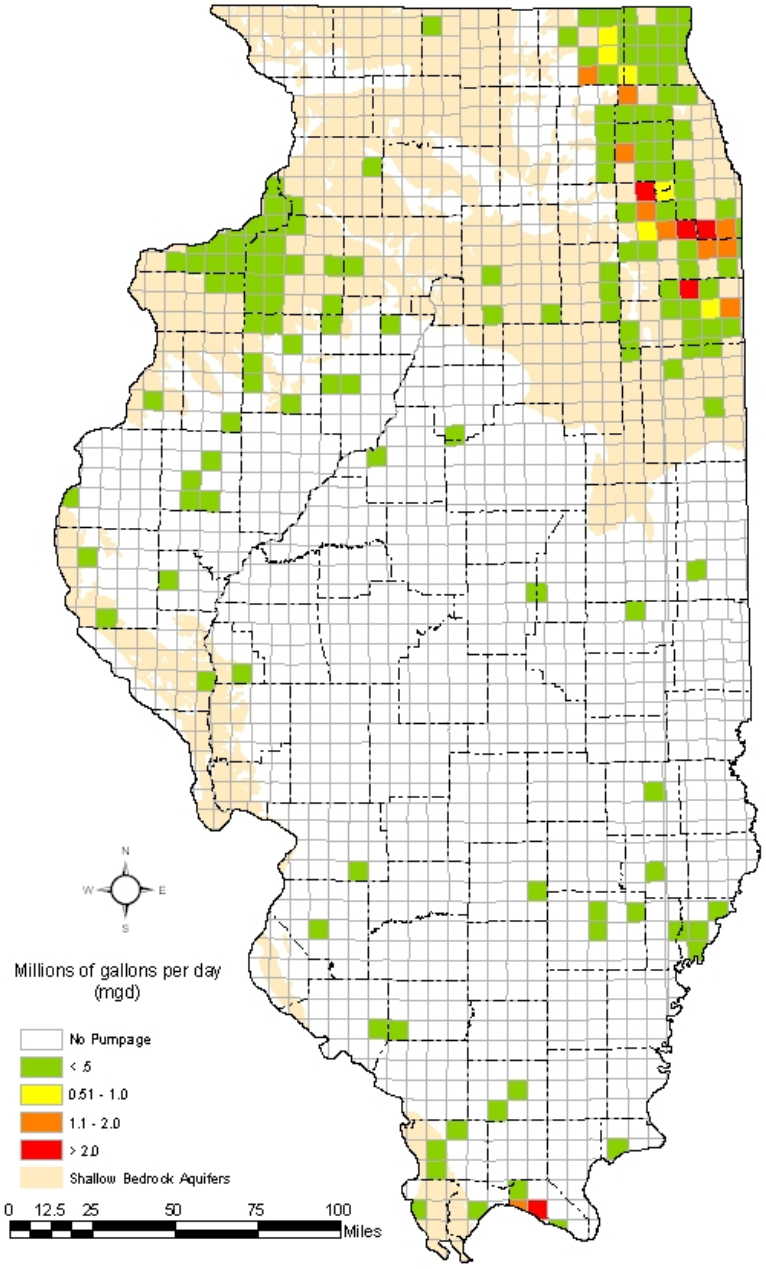

Figure 14. Withdrawals from shallow bedrock aquifers by township.

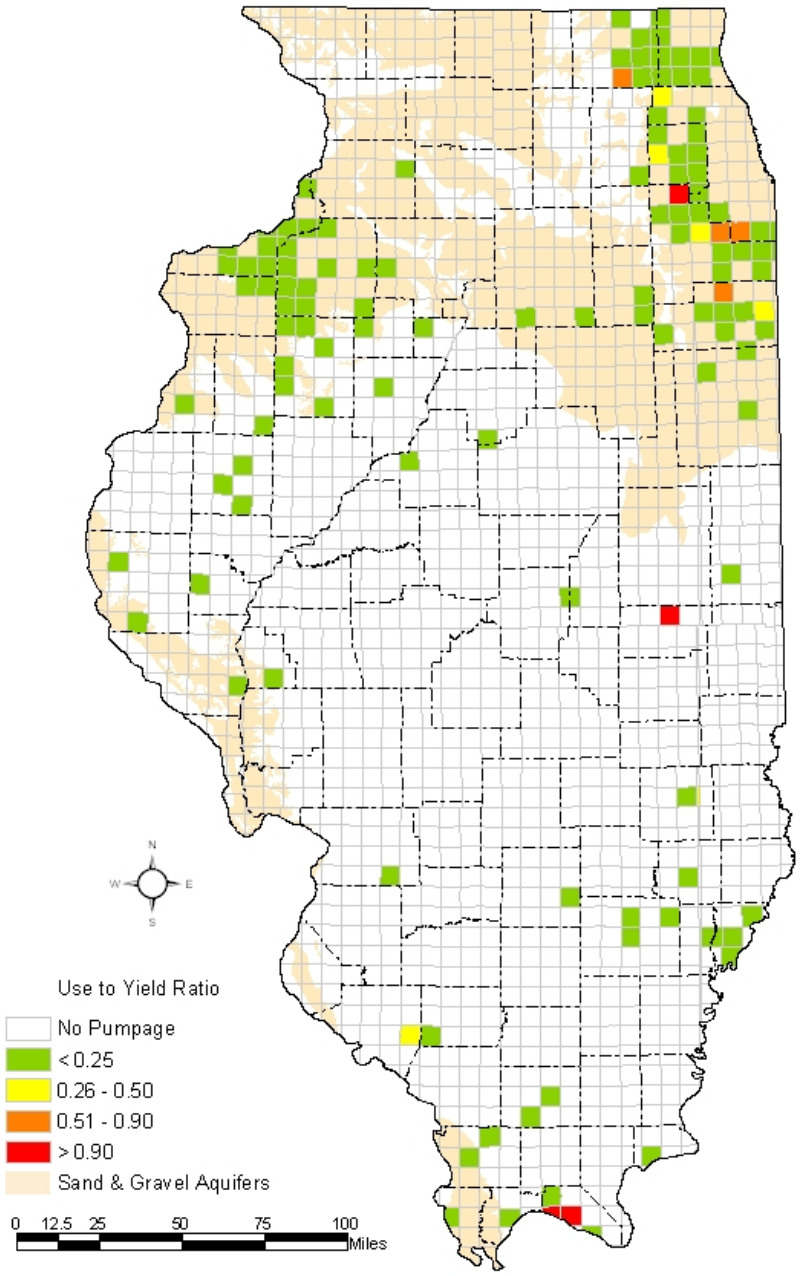

Figure 15. Comparison of groundwater use to potential yield for shallow bedrock aquifers.

3. Mahomet Aquifer of East-Central Illinois

UTY analysis shows withdrawals in the Champaign-Urbana area may be approaching aquifer potential yield (figures 12 and 13), but as noted in the original UTY analysis paper (http://sws.uiuc.edu/iswsdocs/gws/ISWSAofGUtoAPYinIL.pdf), surrounding townships supply water to those highlighted townships, distributing use over a larger area, and thus effectively decreasing the value of the use-to-yield ratio in the two high-valued townships in Champaign County (figure 13). Population and population growth in east-central Illinois do not approach current or projected levels for NE Illinois and the Mahomet Aquifer is estimated to be capable of yielding a much greater quantity of water (5 to 6 times) than the deep aquifers of NE Illinois. However, new large withdrawals may have major impacts locally.

Numerous cities in the east-central Illinois area that currently use surface water have examined or are examining the use of Mahomet Aquifer groundwater as an alternative to surface reservoirs. These communities include Springfield, Decatur, Bloomington, and Danville (figure 16) and represent a potential for more than doubling the demand on the aquifer. Additional proposals for new large supplies abound (e.g., ethanol, FutureGen). Recent research by the ISWS has shown a hydraulic connection between the Mahomet Aquifer and the Sangamon River in the Allerton Park area. Additional similar connections may occur higher up the valley. So, while the yield of the Mahomet Aquifer appears to be adequate to sustain considerable growth, there is a potential for local conflicts to occur depending upon the placement of new wells and well fields in relation

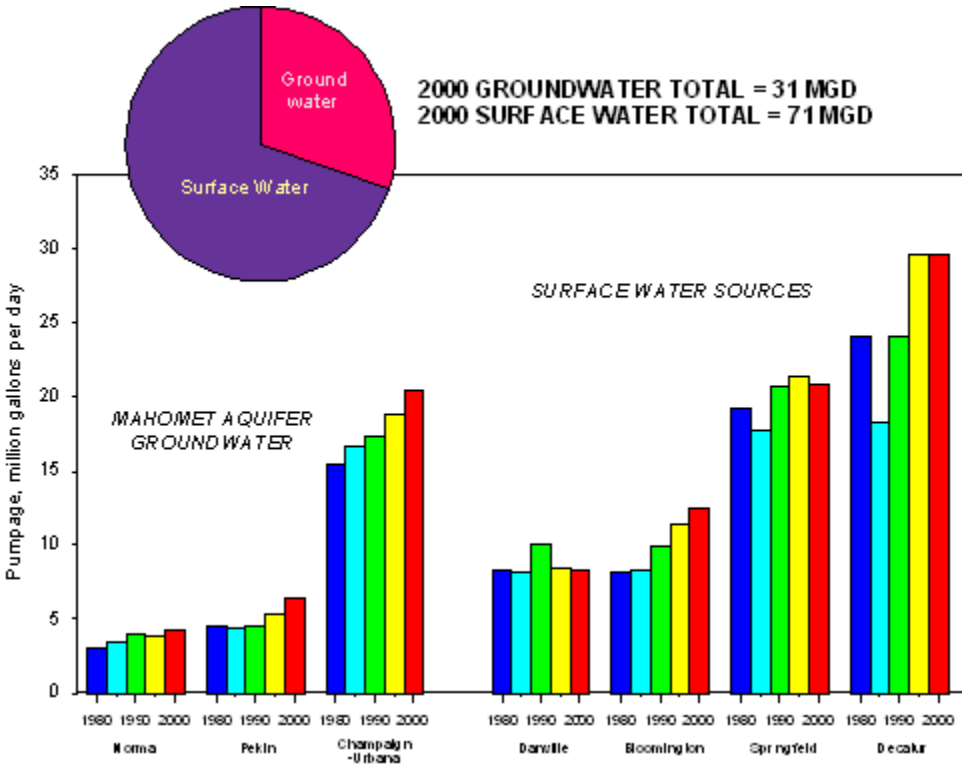

Figure 16. Comparison of groundwater and surface water withdrawals by several east-central Illinois communities.

to existing wells and surface connections. A number of large Mahomet Aquifer water users have been very active in advocating science before water management (i.e., regulation). This aquifer appears to serve as an excellent pilot case for using science to help management decision-makers.

Issues

- Expanding use of the Mahomet Aquifer groundwater.
- Connections to shallower aquifers and surface streams, such as the Sangamon River.
- Water quality, especially the occurrence of arsenic.

Tasks

- Continue and expand data collection efforts (water levels, withdrawals, etc.).
- Continue upgrading the groundwater flow model of the Mahomet Aquifer, especially incorporating the essence of new research results as they become available (e.g., Allerton Park connections to the Sangamon River) with the goal of having a three-dimensional model of the aquifer and overlying units.
- Continue cooperative efforts with local entities such as the Imperial Valley Water Authority and the Long Range Water Plan Steering Committee (McTaz).
- Continue working with the Mahomet Aquifer Consortium to secure funding for a large-scale investigation of the aquifer.

4. American Bottoms Aquifer of Southwestern Illinois

The sand and gravel aquifer of the American Bottoms provides a unique contrast to the aquifers of central and northeast Illinois. Withdrawals by industry and the public in the 1950's and 1960's far exceeded current withdrawals. As industries closed and public supplies shifted to the Mississippi River, groundwater use fell and groundwater levels rapidly rose. Infrastructure built when groundwater usage was high became inundated; sewer breakages and flooded basements in portions of the area became common. As a consequence, the Illinois Department of Transportation (IDOT) currently pumps over 20 mgd to keep groundwater levels below several stretches of below-grade highway. This can be seen as a high-withdrawal area in southwestern Illinois along the Mississippi River in figure 12. The ISWS Center for Groundwater Science has been contacted in the past by IDOT and their consultants regarding changes to pumping needs and patterns as a result of the construction of a new bridge over the Mississippi River. A large groundwater development in the American Bottoms was proposed in 2004; however, that project has stalled. Future development proposals may arise in the future. A working flow model of the aquifer could quickly answer questions regarding aquifer yield, well field design, and impacts to others and on the resource for these and any other development in the area.

Issues

- High groundwater levels.
- Potential IDOT groundwater withdrawal reductions.
- Potential groundwater use for energy production.
- Groundwater quality, especially natural high iron and industrial contamination.

Tasks

- Continue current data collection efforts (water levels, withdrawals, etc.).
- Conduct a new “mass-measurement” of water levels across the aquifer prior to large scale changes in pumpage patterns.
- Compile available data into digital format.
- Develop a flow model of the aquifer.

Identification of Priority Watersheds for Illinois

Several major watersheds in Illinois are identified, for which either available water supply is already limited, substantial population and economic growth in the near future will test available water sources, or where planning is needed to avoid overuse and local conflicts in water supply sources (figure 17). These watersheds are listed in order of priority regarding the potential benefit and relative urgency of water supply planning.

1. Fox River watershed
2. Kaskaskia River watershed
3. Sangamon River watershed
4. Kishwaukee River watershed
5. Kankakee River watershed

In addition to potential planning needs on the watershed or regional scale, there is a need to also evaluate the adequacy of individual surface-water public water systems (PWS) scattered throughout southern and central Illinois that will likely be susceptible to water supply shortages during a major drought.

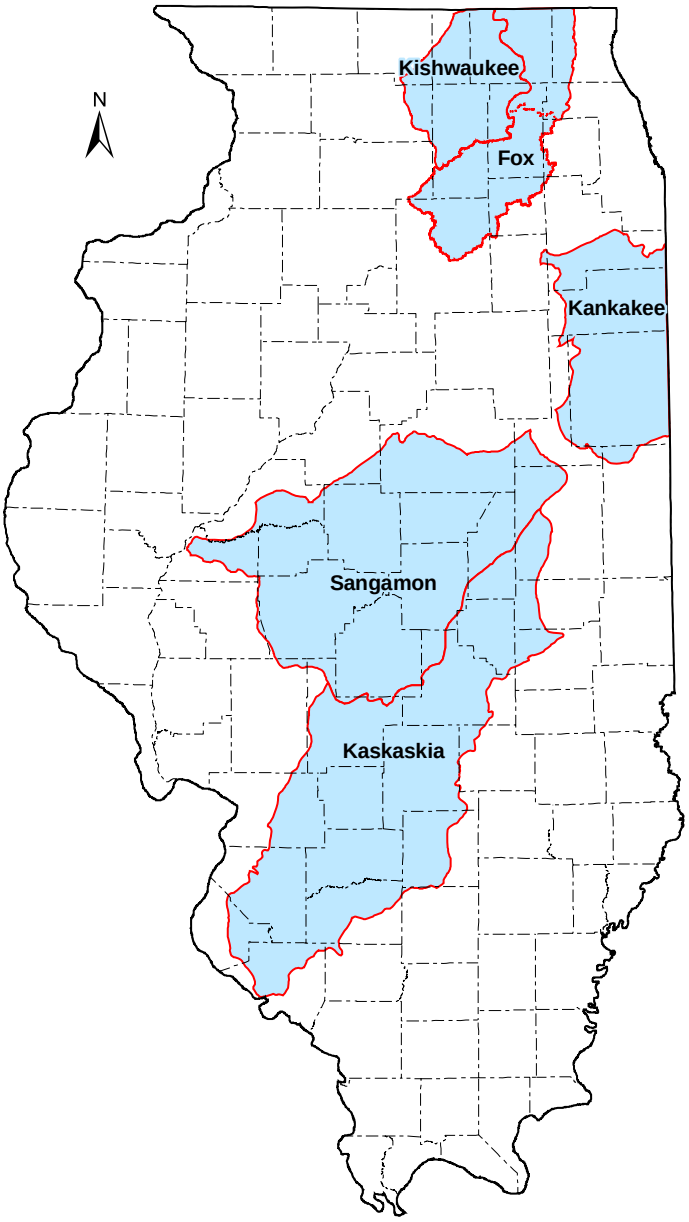

Figure 17. Priority watersheds for water supply planning.

1. Fox River Watershed

As the Chicago metropolitan area is expanding to the west, the Fox River watershed (figure 18) is experiencing significant growth in both population and water use. The 1995 water use in the Fox River watershed for public water supply was roughly 73 million gallons, and over the next 20 years that is expected to increase by more than 50 percent. Of the current use, the amount of water withdrawn from the Fox River for public water supply was roughly 22 mgd.

The current emphasis for developing additional water supply is on shallow groundwater resources. A significant concern in developing shallow groundwater is its potential effect on water levels in nearby rivers, streams, and wetlands. The deep sandstone aquifers potentially are being over-used in this region of the State and increased long-term use of this resource is a concern.

The potential use of the Fox River for additional water supply is limited by the need to maintain low flows in the river for support of aquatic habitat, recreation, wastewater assimilation, and other instream needs. The low flow concerns affect the Fox River only during very dry years, collectively less than 10 percent of the time. For the remaining time, the Fox River potentially could provide an abundant source of water for the area if alternate supplies were available during low flow periods, such as possibly could be provided by groundwater resources, storage of surface water, or interbasin transfers of water. However, the conjunctive use of Fox River water supplemented with groundwater would create significant challenges related to water treatment and distribution.

One additional concern is the effect of treated wastewaters on the quality of the Fox River and the importance of the river in assimilating this wastewater. During low flow conditions, treated wastewaters can account for 30 to 40 percent of the flow in the river. With continued growth in population and water use, this percentage can be expected to rise. The potential impact of increased wastewater levels on the river's instream uses and its use for water supply needs to be evaluated.

Issues:

- Shallow groundwater availability, and its potential connection with rivers, streams and wetlands.
- Maintaining instream flows on the Fox River.
- Effect of increased water use and wastewater on river quality.
- Mining of the deep groundwater.

Tasks:

- Develop scenarios of future water use and estimate impacts on low flows and instream uses and needs.
- Evaluate impacts of water quality on the use of the Fox River for water supply (the Water Survey is currently involved in projects that may partially support this type of assessment for the Kane County portion of the river).
- Conduct studies to evaluate the impact of shallow groundwater withdrawals on flows in the Fox River and its tributaries.

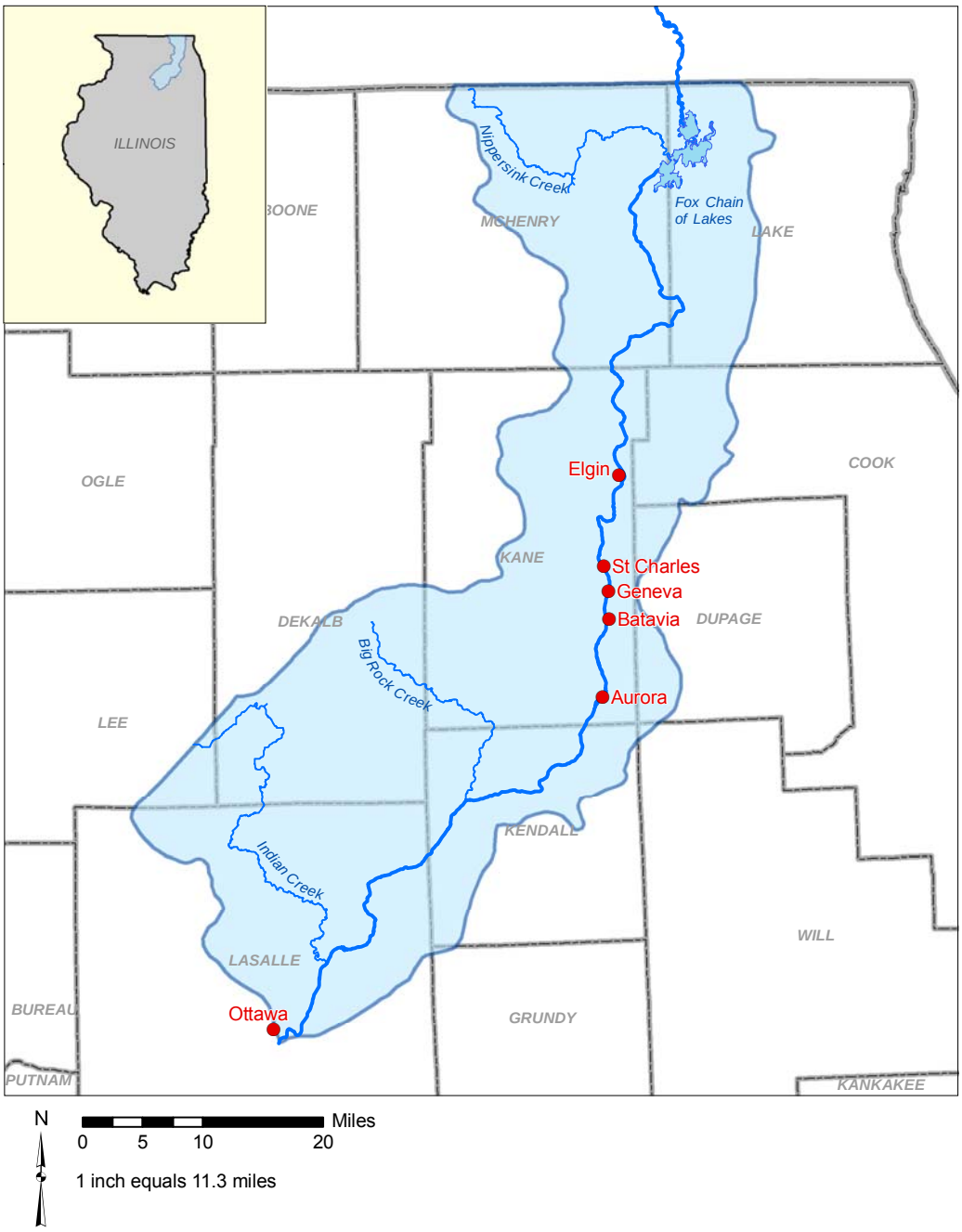

Figure 18. Location of the Fox River watershed and its major streams and cities

2. Kaskaskia River Watershed

The Kaskaskia River is the most managed river in Illinois for water supply use. As recently as four years ago, the water supply from the river and its two large federal reservoirs, Carlyle Lake and Lake Shelbyville (figure 19), was virtually untapped. However, with recent allocations administered by IDNR-OWR for use with electricity generation and regional water supplies, the available water supply from the two large federal reservoirs, amounting to roughly 50 million gallons per day (mgd), now fully is allocated.

Water for moderate growth at existing public water supplies on the Kaskaskia River has been considered in the allocation of water from the federal reservoirs, but any additional development of the Kaskaskia River for water supply source would reduce the water supply yields of these reservoirs directly. Future water supply growth in the watershed essentially must come from either: 1) sources outside the watershed, or 2) the purchase by the State of Illinois of additional water supply storage from the federal reservoirs, or 3) development of new water supply reservoirs on tributaries to the Kaskaskia River. Reallocation of the federal reservoir storage likely would require an extensive study and public review on the regulation policy for the lakes and associated environmental impacts.

Various proposals using substantial quantities of water for power generation within the basin have looked at interbasin transfers of water from the St. Louis area, including either using groundwater from the American Bottoms near East St. Louis or withdrawing water from the Mississippi River, both potentially requiring that this water be piped over a distance of up to 50 miles. Although long-distance transfers of water such as this can be developed independently, they also create the potential for developing a regional water supply system that can provide water to intermediate locations.

Groundwater resources in the region are limited, and the current groundwater use in the Kaskaskia River watershed (downstream of Lake Shelbyville) is less than 2 mgd. There is the potential for limited development of shallow groundwater aquifers in the floodplain of the Kaskaskia River. However, the affect of such groundwater withdrawals on low flows and allocated waters in the Kaskaskia River would need to be evaluated.

Issues:

- Maintaining instream flows.
- Transferring water over long distances.
- Interconnecting water supply systems.
- Shallow groundwater availability and its potential connection with low flows.

Tasks:

- Examine adequacy of PWS systems and identify alternative water supply sources for marginal or inadequate systems. Also address general water supply issues and resources for potential new and large water users in the watershed.

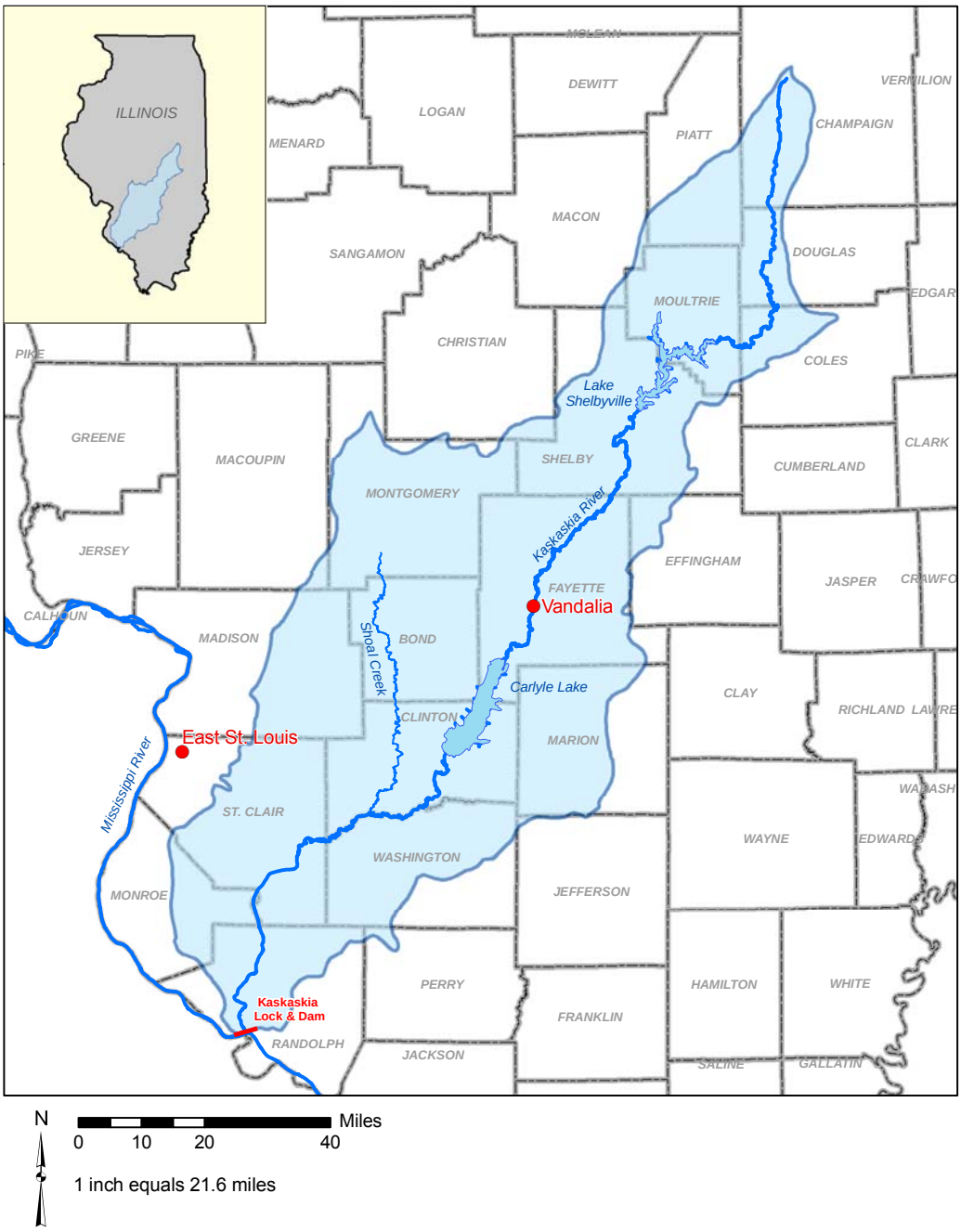

Figure 19. Location of the Kaskaskia River watershed and its major streams, lakes and cities

3. Sangamon River Watershed

Three of the largest cities in central Illinois, Springfield, Bloomington, and Decatur, are located in or border the Sangamon River watershed (figure 20). All three cities rely on reservoirs for their primary water supply, each of which may not be adequate to meet water use demands during a severe drought. The Mahomet Aquifer, which crosses the watershed, provides an abundant water supply resource for the region, but there are concerns that water use from this aquifer must be managed effectively to avoid local deficiencies and/or conflicts in its use. Decatur already has developed a well field in the Mahomet Aquifer to supplement its reservoir supply, and Bloomington and Springfield have both investigated the potential use of the aquifer. The Mahomet Aquifer also supplies water for Champaign, Urbana, Rantoul, Mahomet, and numerous smaller cities, and supports irrigation in the Imperial Valley-Havana Lowlands.

From a regional perspective, the combination of surface and groundwater sources provides an opportunity to investigate the joint use of multiple regional water supplies. In addition, there also may be hydrologic connections between the surface and groundwater resources; for example it has been shown that the Mahomet Aquifer intersects the Sangamon River near Cisco, upstream of Lake Decatur.

Issues:

- Joint use of multiple groundwater and surface water supply sources.
- Regional management of the Mahomet Aquifer.
- Impact of groundwater withdrawals on low streamflows.
- Development of adequate supplies with minimum impacts for major cities.

Tasks:

- Examine adequacy of PWS systems and identify alternative water supply sources for marginal or inadequate systems.
- Conduct studies to evaluate the impact of shallow groundwater withdrawals from the Mahomet Aquifer on streamflows in areas where the aquifer has connections with streams (such as near Cisco on the Sangamon River).

Note: Although water supplies for several larger cities in the region are marginal and are a concern, all of these communities already are involved in their own development plans which are addressed here only within the context of larger regional issues.

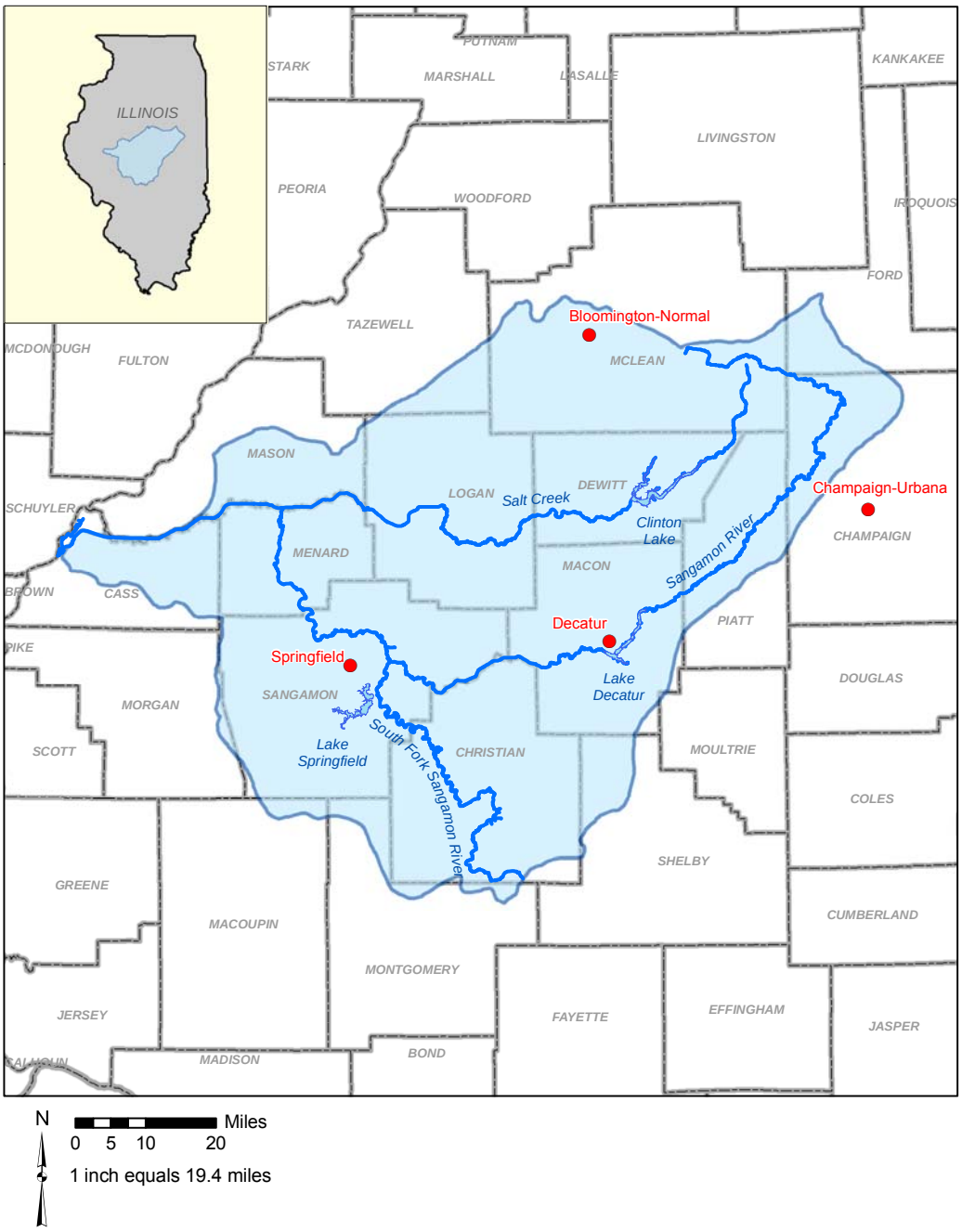

Figure 20. Location of the Sangamon River watershed and its major streams, lakes and cities

4. Kishwaukee River Watershed

The expansion of the western Chicago metropolitan area, which already has created water supply planning concerns in the Fox River watershed, is beginning to extend into the eastern portions of the Kishwaukee River watershed in Kane and McHenry Counties (figure 21). Like the Fox River watershed, this area has abundant shallow groundwater supplies which likely will be used initially for water supply development. The primary surface water resource concern in developing shallow groundwater is the connection between aquifers and nearby streams and wetlands, and potential impacts of groundwater pumping on reducing water levels in these surface water bodies.

As communities in the watershed expand and their water uses increase, there will be a greater amount of effluent discharge into the local streams from wastewater treatment plants. This will increase the low flows in the Kishwaukee River and tributaries but also create water quality concerns as the effluent discharges account for a increasingly larger percentage of the low flow. During this process, it is essential that the quality and potential use of the Kishwaukee River as a water supply source be preserved in addition to support for aquatic habitat, recreation, wastewater assimilation, and other instream uses of the stream. Since many of the water planning issues are the same as are currently being faced in the Fox River watershed, investigations and lessons learned from the Fox watershed will be instrumental in the initial stages of analysis and planning for the Kishwaukee River watershed.

Issues:

- The connection of shallow groundwater to streams and wetlands, and potential impacts of groundwater withdrawals on water levels in these surface water bodies.
- Population growth and the effect of increased water use and wastewater on river quality.
- Instream flows on the Kishwaukee River.

Tasks:

- Conduct studies to evaluate the impact of shallow groundwater withdrawals on flows in the Kishwaukee River and its tributaries.
- Evaluate impacts of water quality on the use of the Kishwaukee River for water supply and instream flows. Use studies conducted on the Fox River as guidelines in this effort.
- Develop scenarios of future water use and estimate impacts on low flows and instream needs.

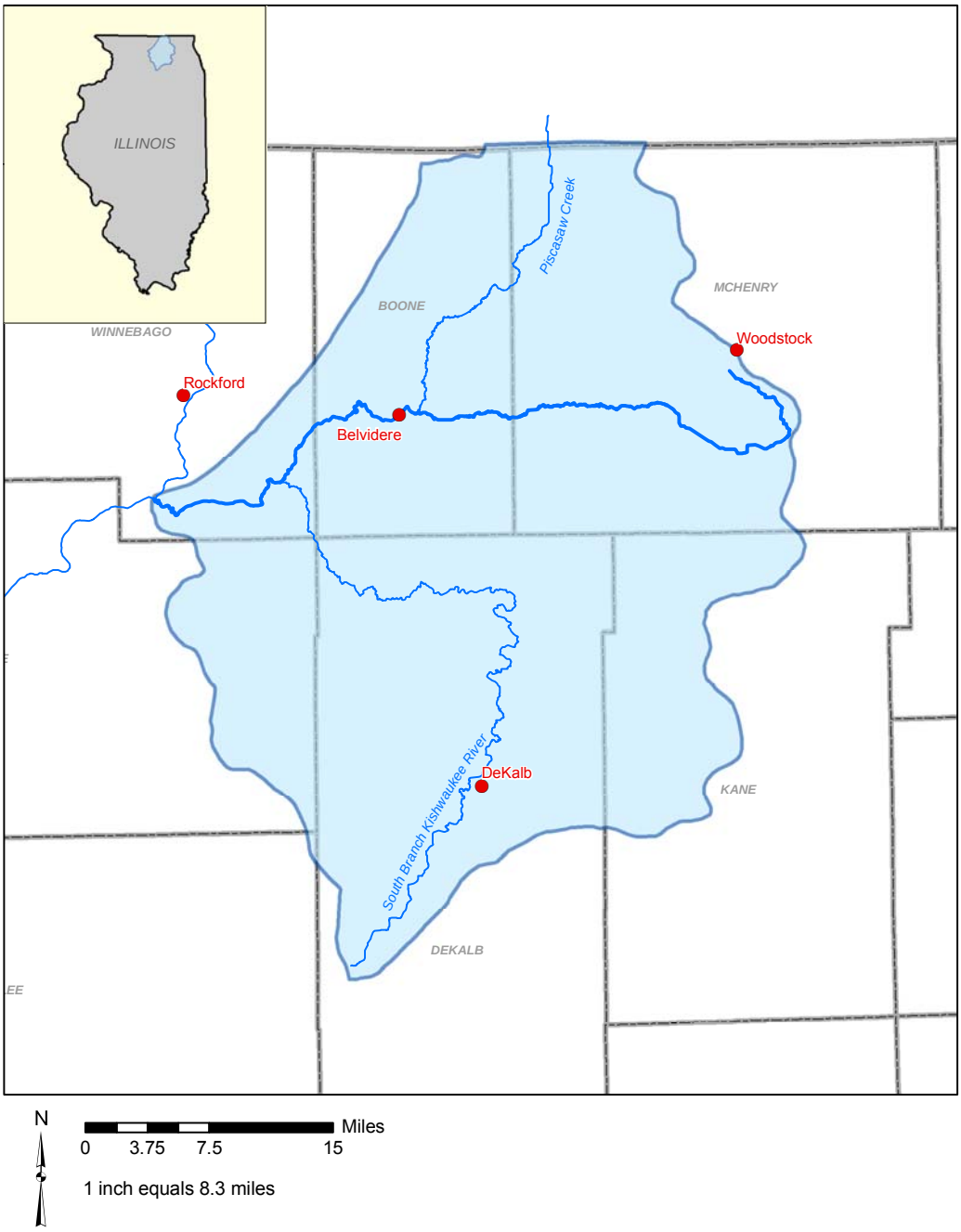

Figure 21. Location of the Kishwaukee River watershed and its major streams and cities

5. Kankakee River Watershed

Although the Kankakee River watershed (figure 22) has not yet experienced substantial increases in its level of water use, such increases likely will come about in the next two decades. Population forecasts by NIPC indicate that the population of Will County, half of which is located in the northern portion of the Kankakee River watershed, will more than double by the year 2030, with an increase in population of more than 600,000 people. As the Chicago metropolitan area moves closer to the Kankakee River, the river will be viewed increasingly as a potential water supply for the region. Even now, the City of Joliet has identified the Kankakee River as a likely source of water to replace its current use of deep groundwater. The concern with the groundwater is high levels of radium, which in turn is related to the deep cone of depression in the deep aquifer caused by groundwater mining.

The portion of the river from Kankakee to Wilmington has significant value for fishing, other recreational activities, aesthetics, and aquatic habitat. There are already occasional fish kills and environmental concerns along the river during low flows in extremely dry years, and associated scrutiny of the existing influence of the hydroelectric power generation at Kankakee and water withdrawn for use with thermoelectric generation at Braidwood (even though both facilities cease operation during periods of low flows). Potential additional withdrawals from the Kankakee River will exacerbate these concerns. An additional concern that became apparent during the 1988 drought is the use of groundwater for use in irrigation in eastern Kankakee County (and Indiana) and its possible hydraulic connection to low flows in the Kankakee River.

Because of projected time frame for expected growth in the Kankakee River watershed, planning activities conducted in the near future have the prospect of deflecting potential water use problems and conflicts before they become acute.

Issues:

- Instream flows.
- Irrigation water use, and its potential connection to Kankakee River low flows.

Tasks:

- Update the Illinois Streamflow Assessment Model (ILSAM) for the Kankakee River basin.
- Use population projections for NE Illinois to determine potential future needs for water withdrawals from the Kankakee River.

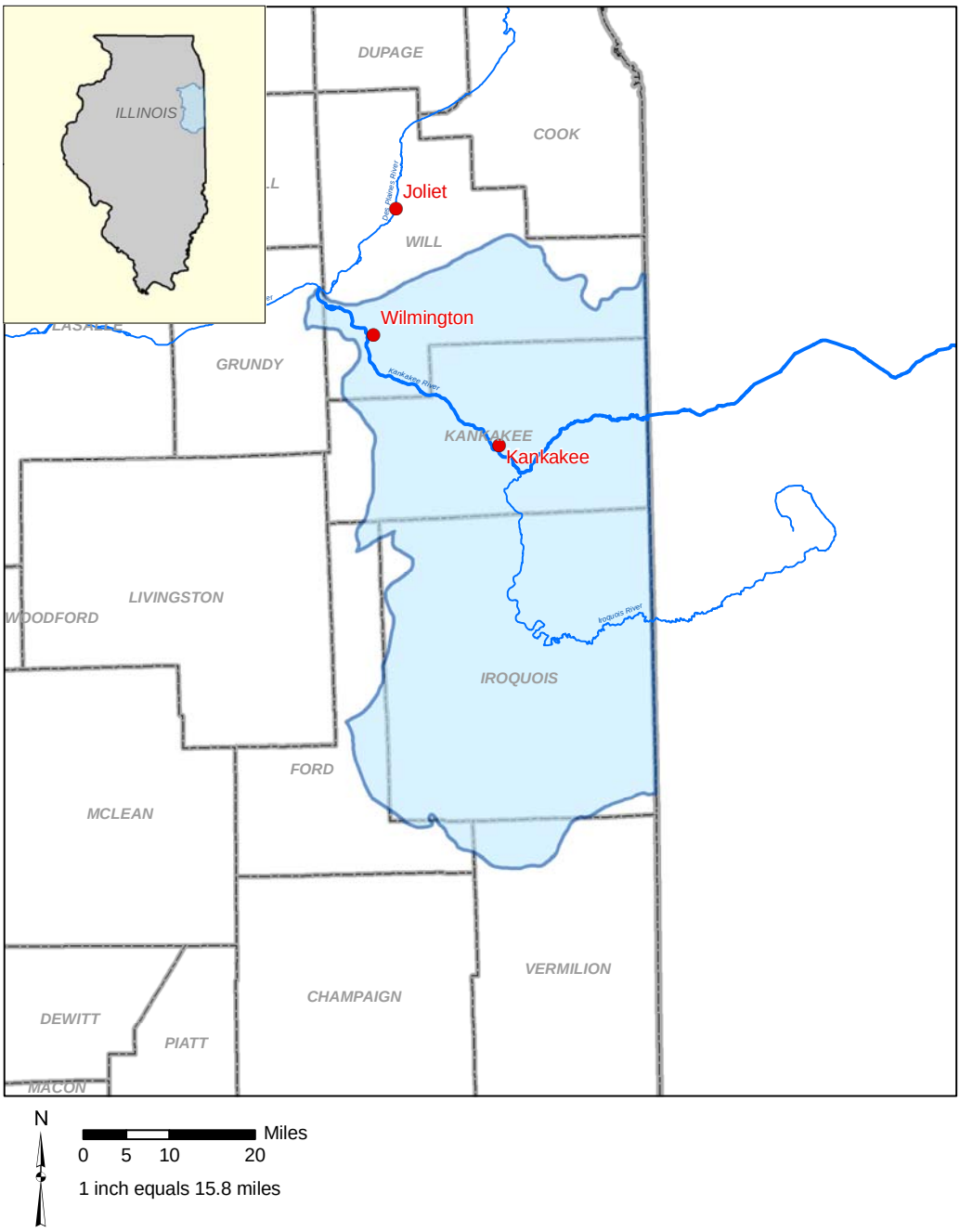

Figure 22. Location of the Kankakee River watershed and its major streams and cities.

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