

# *Integrated Water Quantity Planning and Management*

**January 2004**

**Report**

Illinois Department of Natural Resources  
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## DNR's Water Quantity related Authorities and Duties

The Illinois Department of Natural Resource (DNR) is the lead state agency governing water quantity planning and management decisions in Illinois. The DNR Office of Water Resources' (OWR) key water quantity management and planning powers cited under 20 ILCS 801/5-10 are (a) *To study and investigate ways and means by which the various water uses may be coordinated to the end that the water resources of the State be put to their maximum beneficial use . . .* (b) *To coordinate, determine and provide ways and means for the equitable reconciliation and adjustment of the various conflicting claims and rights to water users and uses.* (c) *To recommend legislation for the most feasible method or methods of conserving water resources and putting them to the maximum possible use . . .* The DNR has jurisdiction over all lakes and streams which the State has any rights or interests. Under the "Level of Lake Michigan Act" (615 ILCS 50) the DNR is designated as the agency to control and regulate the diversion of Lake Michigan water and is responsible for apportionment of water diverted from the Lake Michigan watershed. The OWR manages the Lake Michigan Allocation Program, which provides water supply to approximately one-half of the state's population. It also owns and manages the state's water supply storage in the three federal surface water reservoirs in Illinois, being Shelbyville, Rend, and Carlyle Lakes.

The DNR Illinois State Water Survey (ISWS) has been providing research and data since 1895 to help ensure safe drinking water and beneficial uses of our water resources in Illinois. The mission of the ISWS is *to characterize and evaluate the availability, quality, and use of the atmospheric, surface waters, and groundwater resources of the state and to make resulting data and information available to the public, decision makers, planners, and managers.* It has been a national and international leader in water-related research for over a century. In November of 2001, the ISWS prepared "A Plan for Scientific Assessment of Water Supplies in Illinois." This plan along with most of the recent water quantity planning and assessment documents pertinent to water quantity planning can be found on the ISWS internet site under Highlights-Water Supply.

The DNR Illinois State Geological Survey (ISGS) also has been instrumental in providing mapping, research and data collection on the state's groundwater resources. The mission of the ISGS Groundwater Geology division is *to investigate and report on the hydrogeology of Illinois and to provide the people and institutions of Illinois with a scientific basis for the protection and beneficial use of its groundwater resources.*

Though the above offices serve as the DNR core for this agency's water quantity management duties and responsibilities, water resource issues have few bounds and spill over into all DNR offices and into other State Agencies as well. For example, the Natural History Survey and the Office of Realty and Environmental Protection provide data, analysis and research on sensitive and endangered species, critical habitat . . . , and the Waste Management and Research Center performs research on topics such as sediment removal and arsenic concentrations, all of which are directly impacted by water resource decisions. ***Water is our most precious natural resource.***

The Groundwater Education Program, currently in the DNR Office of Realty and Environmental Planning, has coordinated an education program related to water since 1987, as mandated by the Illinois Groundwater Protection Act (414 ILCS 55/4). With the cooperation of other agencies, DNR develops, coordinates, and conducts an education program for the general public, business, agriculture, government, and private water supply people. It addresses hydrologic principles, potential problems, policies, issues, well protection measures, and water testing. The program cooperates with local governments, regional committees and agencies, as well as a number of statewide institutions, agencies, and associations, to expedite the exchange of water information.

State Water Plan Task Force (SWPTF) - The SWPTF was created in 1980 to guide policy decisions regarding the adequacy of programs to deal with an increasing number of water issues. In consideration of public and advisory group views, the SWPTF originally identified the following ten issues upon which to proceed:

1. Erosion and Sediment Control
2. Integration of Water Quality and Quantity Management
3. Water Conservation
4. Flood Damage Mitigation
5. Competition for Water
6. Aquatic and Riparian Habitat
7. Water-Based Recreation
8. Atmospheric Changes and Management
9. Drought Contingency Planning
10. Illinois Water Use Law

The SWPTF is an interagency group composed of management level representatives from state resource agencies, the University of Illinois, and the Governor's Office. The SWPTF is chaired by the director of the DNR Office of Water Resources. The following agencies are generally represented at the meetings:

Illinois Department of Agriculture (IDA)  
Illinois Department of Commerce and Economic Opportunity (IDCEO)  
Illinois Environmental Protection Agency (IEPA)  
Illinois Department of Natural Resources  
- State Geological Survey (ISGS)  
- Office of Mines and Minerals (OMM)  
- Office of Resource Conservation (ORC)  
- Office of Water Resources (OWR)  
- State Water Survey (ISWS)  
Illinois Department of Public Health (IDPH)  
University of Illinois - Water Resource Center (WRC)

The SWPTF meets quarterly and had its one hundred and nineteenth (119) meeting on November 17, 2003. Over the course of its existence, the SWPTF has published the State Water Plan (in 1984) and 28 reports from 19 special work groups.

Drought Response Task Force (DRTF) - The State's DRTF was first organized in 1983 under the recommendation of the SWPTF. The DRTF is co-chaired by the Director of the DNR Office of Water Resources and the Manager of the Public Water Supply Section of the IEPA. Other members include the IDA, IDCEO, Emergency Management Agency, ISWS, DNR Division of Fisheries, and the Office of the Governor. Each agency has technical expertise and capabilities in specific areas of drought management. It has been activated eight times, most recently during a period from August of 1999 through June of 2000.

### Background

Since June of 2000, the DNR and the Illinois EPA have worked together toward formulation of a means and strategy to better identify, plan for and address the numerous and diverse water quantity issues in the State. In June of 2000, a Water Resources Advisory Committee (WRAC) was established to prepare a strategy to address water management in Illinois. The WRAC comprised 27 individuals representing a cross section of water users and water suppliers, which was co-chaired by the DNR and the EPA. As a result of five meetings, in January of 2001, the WRAC developed 12 consensus principles (which are highlighted in the following report by the Subcommittee on Integrated Water Planning and Management). The Governor's Executive Order #5 (2002) directed the Interagency Coordinating Committee on Groundwater (ICCG) to designate a subcommittee, chaired by the Department of Natural Resources, to develop an integrated groundwater and surface water resources agenda and assessment report also to be considered by the Committee and the Groundwater Advisory Council (GAC) for establishing a water-quantity planning procedure for the State. In December of 2002, the DNR-chaired Subcommittee on Integrated Water Planning and Management provided the ICCG and GAC with a comprehensive groundwater and surface water assessment report with recommendations. This report included a draft strategic plan for water quantity planning and management, and a prioritized agenda and timetable for producing specific required scientific assessments. The report also included detailed information on key water resource concerns, critical water issues, needed water management powers, and the availability of water management tools and technologies. The report highlighted ongoing water quantity assessment activities being conducted at the Illinois Scientific Surveys and provided detailed information with respect to various state agencies, committees and groups which have involvement with or possess authorities relating to water quantity issues. In January 2003, the ICCG concurred with the following six recommendations as cited in the Subcommittee Report:

1. The ICCG should develop a detailed Statewide Strategic Plan for Water Quantity Planning and Management over the next 12 months (a suggested outline is provided in Appendix IV of the Report).
2. The plan should receive broad public review and input.
3. The plan should have an initial focus on securing and making easily accessible the scientific data that will be needed to designate Priority Water Quantity Planning Areas, areas that can be identified as being at risk for water shortages based on existing data or as new data become available.
4. As Priority Water Quantity Planning Areas are identified, the state should nurture the development of voluntary, cooperative regional water management consortia in those areas by providing technical and financial assistance for planning and management efforts.

5. The legislature should address an immediate need to grant the Governor expanded emergency powers to deal with major region-wide droughts or water-related disasters. Under the Emergency Services and Disaster Agency Act of 1988, the Governor has broad emergency powers for 30 days to suspend statutes, regulations and even take real estate. A study of this law suggested that these emergency powers were not sufficiently focused to respond to a drought emergency. The Subcommittee believes seeking appropriate authority is the strategy most likely to avoid both prescriptive regulatory water allocation frameworks and future water quantity crises.
6. The state should consider voids in current law like instream flow and well interference by initially developing guidelines identifying best management practices (BMPs) for voluntary adoption. Experience with voluntary implementation of such BMPs will clarify whether it is necessary to adopt them statutorily.

Owing to the history and legislated mandates encompassed by DNR, the Office of Water Resources, the State Scientific Surveys, and the long-standing State Water Plan Task Force (SWPTF), responsibility for the creation and implementation of a Water Supply Planning and Management Strategic Plan was transferred from the ICCG back to the DNR. The DNR will report its water supply related activities on a regular basis to the SWPTF and the ICCG.

### DNR Actions in 2003

FRAMEWORK - The DNR has prepared the following framework for administrative and housekeeping activities critical to organization, management and implementation of the Integrated Water Quantity Planning and Management Team.

! Gary R. Clark, P.E., Director, Office of Water Resources and Dr. Derek Winstanley, Chief, Illinois State Water Survey, will serve as co-chairmen and will coordinate and lead all meetings, set detailed agendas, review and approve all task assignment, timetables and all final reports. They will also be responsible for reporting and coordination with the SWPTF, the ICCG, and for reporting to other agencies, regional groups, organizations and the Governor's Office.

! prepare a Table Listing (able to be sorted) of all Integrated Water Quantity Planning and Management Plan task assignees, phone numbers, e-mail, addresses which will have any input or assignment, identifying their roles/areas of responsibilities and work team identification.

! establish quarterly meeting dates for review of accomplishments, setting of tasks, and assignments for meeting short and long-term priority goals.

! identify a key person as Planning Administrator to maintain the above Table Listing, summarize meeting discussions, prepare status reports and updates for distribution and use at planning committee meetings.

! identify a key person to create and maintain a visual ROAD MAP of what has been done and which identifies the what, who and when of short-term tasks, scientific studies and projects (putting the puzzle together).

! identify a public input and regional planning team and team leader for establishment of the various public interest and constituent groups which will enable broad public review and input. This will involve identifying the various means (web-site, mailings, forums, meetings) and criteria for seeking public input. This group will also address the coordination, delineation, composition, authorities and responsibilities of regional planning teams which will maintain the public list, key stakeholders, and comments etc.

! identify a legislative and funding work team and team leader which will work toward drafting legislation, e.g., emergency powers, amending the Water Use Act, and identify/prioritize key scientific studies which require new funding, determine the level of funding needed, and work toward obtaining legislative support or sponsors to assist in obtaining the new funds.

! identify a best management practices (BMP) work teams and team leaders to identify voluntary BMP's needed to address areas of conflict resolution, e.g., instream flow protection levels and well interference. Technical staff within the OWR, the ISWS, the ISGS and the EPA will develop guidelines to apply BMP's for voluntary adoption. Experience with these practices will clarify whether further levels of implementation may be beneficial.

#### DNR Priority Water Quantity Planning and Management Areas

On November 12, 2003, the Office of Water Resources and the State Water Survey met and outlined several priority areas for water quantity planning and management in which the DNR should focus on in the near-term, given the current limited resources (staff and funding) of the DNR:

1. Work toward development of a Regional and Multi-state pilot plan for Kane and McHenry Counties, working with NIPC and the Tri-State Water Consortium. Develop a new groundwater model for the deep aquifer and piggyback off of NIPC's initiative.
2. Work toward development of a pilot or model aquifer management plan, working with local and regional authorities.
3. Work toward development of a pilot management plan for the Fox River, working with the existing Fox River Study Group coalition, which includes the Fox River Ecosystem Partnership, NIPC et al.
4. Work at updating the "Mitigative Measures for At-Risk Public Surface Water Supply Systems in Illinois" report done by Singh and McConkey in 1990.
5. Continue work on analyses of Groundwater Use to Aquifer Yield statewide.
6. Begin planning strategies and data collection for addressing the worst-case drought (100-year or worse).

The above list was provided and discussed at the November 17, 2003 SWPTF meeting. The DNR discussed these priority management areas at the ICCG meeting on December 18, 2003 and also discussed and provided a list of Water Supply Planning and Management Projects for the State Water Survey related to implementation of the DNR Integrated Water Quantity Planning and Management Program. This project list was prepared by the State Scientific Surveys and identifies projects currently underway that are related to effective water quantity assessment and management. A summarized list of these projects is as follows (a more detailed description is available and can be viewed at the ISWS web site at <http://www.sws.uiuc.edu/docs/wsfaq/>):

*Summary of*  
**Water Supply Planning and Management Projects for the Illinois State Water Survey**  
*related to implementation of the*  
**DNR Integrated Water Quantity Planning and Management Program**

**ISWS Statewide Planning and Management**

**Water supply web site** - The State Water Survey (ISWS) has developed a new web site for water supply information at <http://www.sws.uiuc.edu/docs/wsfaq/>. The web site is intended to be the primary decision support site in the state for water supply information and includes a “hot button” to receive public input and comments specific to water planning issues.

**Climate studies** - Studies of climate variability and change have been a core research area for many decades. Three specific research thrusts are: 1) the frequency and intensity of extreme precipitation events which have exhibited considerable temporal variability will be compared to natural variations 2) past and projected fluctuations in Lake Michigan levels and the associated economic impacts and legal problems 3) the threat to future water supplies due to potential natural and human-induced climate changes.

**Planning for a worst-case drought** - We can better prepare for the next major drought by studying the occurrence of historical droughts over the longest available climatological and hydrologic records and quantifying the precipitation deficits that can be expected in the future. These data can be translated into reduced water availability in lakes, reservoirs, rivers, and shallow aquifers, and to increased water demand. Water supply managers will then be able to evaluate the capacity of their water systems and identify alternative water supplies (if problems exist) with appropriate levels of risk and cost. The update would identify the PWS systems at risk of failing to provide sufficient water during worst-case droughts and propose an alternative supply source. ISWS is preparing the drought scenarios.

**Illinois Water Inventory Program (IWIP)** - Documentation of annual water withdrawals (water use) for all of Illinois began in 1978 under a cooperative agreement with the U.S. Geological Survey (USGS). Fiscal support by the USGS ended in 1991, but the IWIP continues under the general oversight of the Groundwater Section. Surface water and groundwater withdrawal data are collected annually by voluntary submission of a form tailored to each (known) major water user in the state (<http://www.sws.uiuc.edu/gws/gwinfo.asp>).

**Water Supply System Capacity and Demand Forecast** - The Midwest Technology Assistance Center has funded a project through SIU-Carbondale to develop a countywide assessment of water supply capacity and future demand. This project includes the collection of relevant water use data and identification of the water supply capacity of the existing water supply systems. The study will

provide demand forecasts at 5-year intervals through 2025 (<http://mtac.sws.uiuc.edu/>) and the report will be produced in spring of 2004.

**Adequacy of surface water supply systems** - An update of the 1989 study “Adequacy of Illinois Surface Water Supply Systems to Meet Future Demands,” is addressing water supply issues in central and southern Illinois. The development of (Illinois Streamflow Assessment Model) ILSAM models (<http://gismaps.sws.uiuc.edu/ilsam/>) provides the framework needed for updating the basic hydrologic information. An extension of these models for determining reservoir yield is envisioned. Each public water supply system will be contacted to obtain information on current facilities, water use, service areas, and plans for dealing with water supply shortages, if any.

**Instream flow assessment** - Defining instream flow needs for aquatic ecosystems, navigation, and recreation is crucial to determining the availability of surface water resources during drought conditions. Although instream demands must often be defined by biologists, determination of protected flow levels must also be based on hydrologic considerations, such as how much water is available, how often, and at what times of the year. The ISWS is in a unique position to conduct such studies to analyze the hydrologic aspects of protected flow.

**Statewide aquifer use-to-yield analysis** - ISWS has conducted a comparison of Year 2000 groundwater withdrawals against estimated aquifer potential yields. The comparison is presented as a ratio of groundwater use (withdrawals) to groundwater yield on a township basis. GIS was used to determine township use-to-yield ratios for three aquifer types (sand-and-gravel, shallow bedrock, and deep bedrock). A high use-to-yield ratio (e.g., >0.9) suggests an area where groundwater availability problems exist or could be impending and should be considered as a means for calling attention to areas to prioritize for water resources planning and management (<http://www.sws.uiuc.edu/iswsdocs/gws/ISWSAofGUtoAPYinIL.pdf>).

**Arsenic in Illinois groundwater** - The USEPA lowered the arsenic maximum contaminant level for arsenic in drinking water from 50 µg/L to 10 µg/L to be effective by 2006. The IEPA estimates that approximately 50 utilities that use groundwater may be out of compliance without additional treatment. Thousands of private wells likely exceed this health-based standard. To address this issue, the ISWS is conducting research on the occurrence and distribution of arsenic in community, non-community, and private wells in Illinois and potential arsenic removal treatment alternatives. The ISWS provides free arsenic analysis of water samples (<http://www.sws.uiuc.edu/gws/arsenic/>).

**Aquifer testing for water supplies in Illinois** - One of the most unique services provided by the ISWS is conducting aquifer tests for communities and large facilities to provide estimates of well and aquifer yield. Testing typically consists of pumping a well at a constant rate over a pumping period of 3 to 24 hours and measuring the groundwater level decline in the pumped well and nearby observation wells, if available. Within the last two years, aquifer tests have been conducted on new wells drilled for seven separate entities located in Grundy, McLean, Sangamon, Piatt, Champaign, Woodford, and Edgar Counties. A 30-day-long test was conducted as part of research on the Mahomet aquifer near Monticello (<http://www.sws.uiuc.edu/gws/gwinfo.asp>).

**Water well record keeping** - A long-term effort at the ISWS involves archival of construction reports for all water wells drilled in Illinois. Data on the construction reports includes well location, owner, driller, depth of well, well yield, water level when the well was drilled, and geologic formations penetrated. While historical water well data are known to be incomplete, the ISWS possesses records for over 300,000 water wells drilled in Illinois since the turn of the 20<sup>th</sup> Century. The ISWS receives numerous calls from the public on a daily basis for copies of records or for interpretation of information contained on these records (<http://www.sws.uiuc.edu/data/gwdb/>).

**Groundwater level observation network** - The ISWS maintains various networks of observation wells for groundwater-level monitoring (<http://www.sws.uiuc.edu/gws/gwinfo.asp>). One statewide network of about 30 wells is being used to evaluate long-term trends in the water table, data for which can provide a link between climate conditions and shallow groundwater levels, part of the Water & Atmospheric Resources Monitoring (WARM) Program (<http://www.sws.uiuc.edu/warm/>). Other networks are used to provide periodic glimpses of aquifer conditions as a result of development, for example, water levels in approximately 400 wells completed in the deep bedrock aquifer wells are measured en-mass every five years (<http://www.sws.uiuc.edu/pubs/abstract.asp?PID=2346>).

**Increasing access to groundwater data** - A cooperative effort between the ISWS and the IEPA is enhancing access to three important statewide databases on groundwater quality, aquifer hydraulic properties, and water use in Illinois maintained by the ISWS. An ISWS Internet Map Server (IMS) site has been developed to improve internal accessibility to the databases. The IWIP database is already on the IMS site. The Groundwater Quality database and the Aquifer Hydraulic Properties database will be on the site soon. Improved data access will allow users to map specified data, view the map, print information, and download specified data for further analysis.

### ISWS Regional Studies

**Southern Lake Michigan Water Supply Consortium** - The ISWS is working closely with the Northeastern Illinois Planning Commission (NIPC), representatives from local, state and federal agencies, professional organizations, universities, and the business community to establish an organizational structure, process and detailed plan for water supply planning around southern Lake Michigan. Components of the plan include education, outreach, scientific studies, and funding. With support from the Joyce Foundation, a water supply conference will be held in 2004.

**Chicago area rain gage network** - The Cook County Precipitation Network is a 25-site raingage array operated year-round since 1989 by the ISWS for the COE. The network is located in the Lake Michigan and Des Plaines River watersheds of Cook County and is laid out in a grid with a spacing of approximately 10 km between gages. The primary purpose of the network is to produce consistent, accurate data for Lake Michigan diversion accounting. The volume of water diverted from Lake Michigan into the state of Illinois is monitored to ensure that the diversion does not exceed a long-term average as imposed by a 1967 U.S. Supreme Court Order, as updated in 1980.

**Water use planning and management for the Fox River** - Two current ISWS projects that will play a crucial role in water use planning and management for the Fox River are the water quality evaluation of the Fox River being conducted for the Fox River Study Group, and the water resource evaluation study for Kane County. The ILSAM for the Fox River will serve as a basis for the interactive flow accounting model. The customized model will include enhanced modeling options and post processing of generated flow data. Water quality constraints will be incorporated into the surface water accounting and availability model. These studies will need to be expanded for developing a water supply management plan for the entire Fox River region.

**Assessment of water resources availability for Kane County** - The ISWS and ISGS are conducting studies to provide technical support for management and protection of water resources in Kane County. The objectives are to help preserve groundwater availability, protect quality, provide a basis for formulating policy and management strategies, and also provide baseline data and a framework for future studies. This past year, the ISWS inventoried, surveyed and measured water levels in over 1,000 public and private shallow aquifer wells. The water-level data will be

used to create potentiometric surface maps depicting groundwater elevations for identification of changes in groundwater levels from increased withdrawals, land-use changes, or climate change (<http://www.sws.uiuc.edu/gws/neilproj.asp>).

**Groundwater modeling in northeastern Illinois** - Groundwater modeling activities for northeastern Illinois include assembling an interstate geological framework, building a database of historical water withdrawals by aquifer, and assembling data for a regional three-dimensional computer model from the aquifers' deepest layers of pre-Cambrian bedrock to the land surface. Models will be used to estimate recharge rates, leakage between aquifers, aquifer responses to increased aquifer development, and aquifer yields; assess surface water/groundwater interactions; evaluate alternative management scenarios; and establish a framework for future modeling studies. The proposed modeling consists of two high-resolution groundwater flow models at a local scale nested within a lower resolution regional model. A second local model embedded in the regional model will be used to provide a high-resolution representation of the shallow aquifer system underlying Kane County (<http://www.sws.uiuc.edu/gws/docs/GFMNI-2003.pdf>).

**Water quality trends in shallow groundwater in northeastern Illinois** - Owing to legal restrictions and natural limitations on the availability of additional water from Lake Michigan and the region's deep aquifer system, the most cost-effective option for future water development in the region is likely to be the shallow aquifers. The shallow aquifers are vulnerable to surface-derived contaminants, and the increase in developed land may be increasing the rate at which groundwater quality is being degraded. Historical shallow groundwater chloride concentrations from the Chicago metropolitan area are being monitored for data quality and temporal trends. Chloride concentrations are increasing in municipal wells in the outermost counties of the Chicago metropolitan area, with road salt runoff likely the largest source of contamination (<http://www.sws.uiuc.edu/gws/docs/GSASeattle03.pdf>).

**Mahomet aquifer and the Mahomet Aquifer Consortium** - The Mahomet Aquifer Consortium is a grass-roots, not-for-profit organization whose goal is to manage the Mahomet Aquifer which is the major groundwater resource for east-central Illinois. Withdrawals in 1995 for municipal use are estimated at over 30 mgd. Withdrawals for irrigation, principally in Mason and Tazewell Counties (the Havana Lowlands area), put usage well over 100 mgd. Long-term observations of groundwater levels at Champaign show a decline in artesian head of nearly 50 feet since 1950, as a result of increasing water demand in the Champaign-Urbana area. Projections suggest that by 2020 population in the Mahomet aquifer region may increase by 100,000 people. ISWS and ISGS scientists serve as technical advisers to the Consortium and are preparing a computer model of the aquifer to examine the effects of increased development and to provide insight on development alternatives (<http://www.sws.uiuc.edu/gws/mahomet.asp>).

**Modeling aquifer heterogeneity: NCSA Fellowship** - Fractured dolomite aquifers are one of a series of bedrock aquifers that are part of the drinking- water supply for the greater Chicago area. Groundwater flow and contaminant transport in fractured rock systems are notoriously difficult to characterize because the features conducting flow do not necessarily fill the available volume that porous media (e.g., sand-and-gravel) typically do. Research is being conducted on the characterization of these aquifers through the advanced analysis of hydraulic and tracer tests. The goal is to determine the relationship between the flow dimension inferred from hydraulic tests, stochastic models of heterogenous transmissivity, and the behavior of tracer tests and thus identify plausible models of aquifer heterogeneity.

**Water levels, precipitation, and recharge in the Imperial Valley - Mason & Tazewell Counties**  
The ISWS has operated a network of rain gauges in Mason and Tazewell Counties since August

1992 and also established a network of groundwater observation wells in the Mason-Tazewell area in 1994 that is monitored by the Imperial Valley Water Authority. The purpose of these networks is to collect long-term data to determine the impact of groundwater withdrawals in dry periods and during the growing season, and the rate at which the aquifer recharges. Precipitation is recorded continuously at 20 rain gauges. Groundwater levels are measured each month at 13 observation wells. The database from these networks consists of ten years of precipitation data and eight years of groundwater observations (<http://www.sws.uiuc.edu/pubs/abstract.asp?PID=2345>).

### **ISWS Statewide Education and Outreach**

**“Water Choices” - an educational tool** - Water Choices is an educational computer program developed as an aid in teaching concepts of water resources. It presents the student with a hypothetical stream – wetland – aquifer system and calculates the impacts of management decisions on a wetland, streamflow, and groundwater levels. Water Choices is distributed with scenarios that illustrate specific water resources concepts, including Moderate Development, Predevelopment, Climate Change, and Competitive Usage scenarios. Water Choices was developed under a grant from the Illinois State Board of Higher Education.

### ***Summary of*** **Water Supply Planning and Management Projects for the Illinois State Geological Survey** ***related to implementation of the*** **DNR Integrated Water Quantity Planning and Management Program**

### **ISGS Statewide Planning and Management**

**Cross references of well logs among state agencies.** Well logs are the basis for groundwater investigations. To facilitate cross-referencing between water well databases at the ISGS, Illinois ISWS, Illinois Department of Public Health (IDPH), and Illinois Environmental Protection Agency (IEPA), the ISGS entered API well identification numbers for more than 6,000 community water-supply wells to the IDPH, IEPA, and ISWS databases. During this project, valuable locational data also were added to the ISGS database. This cross-referencing effort is ongoing.

**National Resources Geospatial Data Clearinghouse** - The Illinois Natural Resources Geospatial Data Clearinghouse (Illinois Clearinghouse) provides Internet access for no-cost, geographically-referenced digital data and imagery for Illinois. The on-line data holdings can be used to support a variety of GIS and remote sensing applications. The Illinois Clearinghouse, [www.isgs.uiuc.edu/nsdihome/](http://www.isgs.uiuc.edu/nsdihome/), is a multi-agency effort to make metadata and digital geospatial data about Illinois natural resources available on the Internet. ISGS established and maintains the Illinois Clearinghouse, which has been on-line since July 1997. The primary goal of this effort is to foster a climate for the cooperative development of a statewide clearinghouse network in Illinois by promoting the advantages of the National Spatial Data Infrastructure (NSDI), a worldwide effort that promotes and supports digital data access and distribution. Available data sets (with documentation) include: Digital Raster Graphics (DRG) files, Digital Orthophoto Quarter-quads (DOQ) files, geology, major bedrock aquifers, sand and gravel aquifers, Aquifer Sensitivity to Contamination by Nitrate Leaching, Aquifer Sensitivity to Contamination by Pesticide Leaching, land use, political boundaries, and more. The Illinois Clearinghouse continues to attract

considerable attention and download rates increase every month. During the first six months of 2003, the Illinois Clearinghouse recorded about 1,350,000 hits from 54,500 individual users. During the same period, about 60,500 DOQ files were downloaded from the Clearinghouse, a rate of more than 300 per day. The Illinois Clearinghouse can be accessed at <http://www.isgs.uiuc.edu/nsdihome/ISGSindex.html>.

**Technique development for improved mapping** - Techniques to improve data collection and map display were developed. High-resolution seismic reflection appears to be well suited for defining sand and gravel aquifers within the Quaternary sediments. Recent advances in data collection allow more efficient data collection. These advances are summarized at [http://www.isgs.uiuc.edu/geologicm/g\\_m19.htm](http://www.isgs.uiuc.edu/geologicm/g_m19.htm), with a more detailed report available at [http://www.isgs.uiuc.edu/servs/pubs/pdf-pubs/ibhe\\_report.pdf](http://www.isgs.uiuc.edu/servs/pubs/pdf-pubs/ibhe_report.pdf). ISGS is also evaluating different approaches for including uncertainty in geologic maps.

**Effects of agriculture on groundwater** - The ISGS and ISWS have continued studying the environmental effects of agriculture including pesticides in shallow groundwater, swine manure pits, and nitrogen in the shallow groundwater of an agricultural watershed.

### **ISGS Regional Studies**

**Mapping of groundwater resources** - ISGS scientists have been involved with mapping groundwater resources and studying the fate and transport of contaminants in shallow groundwater. *Groundwater Geology of DeWitt, Piatt, and Northern Macon Counties, Illinois* was published in 2003. Geochemical data for the shallow bedrock in Vermilion County were also released in 2003. A study of the glacial aquifers in DeKalb County was completed and will be published in early 2004. Additional efforts are underway to map the groundwater resources in McHenry and Lake Counties ([http://www.isgs.uiuc.edu/geologicm/g\\_m9.htm](http://www.isgs.uiuc.edu/geologicm/g_m9.htm)), and the MetroEast area ([http://www.isgs.uiuc.edu/geologicm/g\\_m13.htm](http://www.isgs.uiuc.edu/geologicm/g_m13.htm)).

**Southern Lake Michigan Water Supply Consortium** - ISGS is a member of the technical committee to the Consortium. See above under ISWS studies.

**Assessment of water resources availability for Kane County** - ISGS shares responsibility with ISWS for this project. See above under ISWS studies, with additional information available at [http://www.isgs.uiuc.edu/geologicm/g\\_m14.htm](http://www.isgs.uiuc.edu/geologicm/g_m14.htm).

**Mahomet aquifer and the Mahomet Aquifer Consortium** - The ISGS, ISWS, USGS/Urbana, and DNR/Office of Water Resources continued to serve as technical advisors for the Mahomet Aquifer Consortium (<http://www.mahometaquiferconsortium.org/>), which has sought funding and support to study the aquifer underlying east-central Illinois. See write-up under ISWS studies.

### **ISGS Statewide Education and Outreach**

**Education series publication on groundwater** - The ISGS developed *Groundwater: A Vital Geologic Resource* as part of their educational series to provide the citizens of Illinois with a better understanding of their state's groundwater resources and that these resources are not unlimited. This Geoscience Education Series presents an overview of the geology of Illinois and how the occurrence and behavior of groundwater relate to the geology. It also describes typical aquifer and aquitard materials, the fundamentals of groundwater movement, and the two types of aquifers — confined and unconfined. The publication presents the basics of developing a water supply using groundwater wells, and discusses the issues of well maintenance and the effects wells can have on one another when water is pumped from them. This volume will be printed in early 2004.

*Summary of Activities*  
**for the Groundwater Protection Education Program**  
*related to implementation of the*  
**DNR Integrated Water Quantity Planning and Management Program**

The DNR, in cooperation with a number of agencies and organizations, annually develops an educational work plan to address current concerns as identified through surveys and regional committees, to coordinate work, and to establish priorities. These annual plans are reviewed and approved by the ICCG and GAC. Annual and biennial reports are based on these work plans.

Since 1988, the annual work plans have evolved a great deal. Originally, the groundwater protection education program was aimed at informing water officials and professionals about the various provisions of the new law. A speakers' bureau actively aided community service organizations in identifying groundwater speakers. The Groundwater Science Award system was established with the Illinois Groundwater Association to recognize applications of this emerging, young science, especially related to protection of groundwater resources. Three statewide workshop series were conducted to bring current program information to professionals.

As various elements of the act were institutionalized and rules adopted, emphasis has switched to communities, regionally sponsored events, well owners, Illinois teachers, and their students. Regional field days emphasize local groundwater protection challenges and opportunities, and the Shining Star Awards Program identifies and promotes community successes. Agencies and associations cooperate in staffing a Water Well Clinic at the two Illinois state fairs where well owners receive professional advice about their private water supplies. Two educational activity books were developed for Illinois teachers and over 800 groundwater teaching models (resembling ant farms) have been built by teachers showing local geologic and hydrologic features. Local sponsors were found for many educational workshops and teacher materials. Over \$1.5 million in educational materials and services related to groundwater have been paid for by sources outside of state agencies.

Currently, the Illinois groundwater education program annually reaches over 30,000 people, distributes over 100,000 educational pieces, and assists with the educational work of over 30 agencies, 20 associations, and several regional water committees. One goal of building groundwater science into the state curricula has largely been achieved.

Since 1998, virtually all presentations and materials of the Groundwater Education Program have included Illinois water budgets and water conservation messages, in an effort to integrate groundwater and surface water due to their interaction. Tens of thousands of Illinois students participate annually in a fun water relay race featuring historic water use and a water conservation message. Over 8000 localized Illinois water budget meter sticks have been prepared for and distributed to Illinois teachers. Despite successes, only five of eight outreach and education goals during the past biennium were achieved, due to staff, travel, and budgetary limitations.

## 2003 DNR Attended Meetings & Activities

### Meetings:

State Water Plan Task Force (SWPTF)

Meetings held on: *February 10, 2003 May 6, 2003 August 18, 2003 November 17, 2003*

Interagency Coordinating Committee on Groundwater (ICCG)

Meetings held on: *March 14, 2003 July 17, 2003 December 18, 2003*

Groundwater Advisory Council (GAC)

Meetings held on: *July 17, 2003 December 18, 2003*

Northeastern Illinois Planning Commission (NIPC) & Tri-State Consortium (Illinois, Wisconsin, Michigan)

- *NIPC meeting on April 29, 2003 to organize the Tri-State (Regional Water Supply) Consortium*
- *Additional consortium meetings held on September 25, 2003 and January 21, 2004*
- *Tri-State Subcommittee on Education held on November 5, 2003*
- *Tri-State Subcommittee Meeting on Technical Issues held on December 8, 2003*

### Activities:

**December 20, 2002** - DNR chaired Subcommittee on Integrated Water Planning and Management prepares Report to the Interagency Coordinating Committee on Groundwater.

**September 2003** - DNR prepares an ACTION PLAN and TIMETABLE for finalization of the Statewide Strategic Plan for Water Quantity Planning and Management.

**September 2003** - DNR prepares a preliminary STAFFING PLAN for implementation of DNR Integrated Water Quantity Planning and Management.

**November 12, 2003** - OWR and ISWS meet to discuss ongoing activities relevant to water supply planning and develop a preliminary list of DNR Priority Water Quantity Planning and Management Areas.

**November 17, 2003** - List of preliminary Priority Planning and Management Areas provided and discussed at the State Water Plan Task Force meeting.

**December 17, 2003** - The ISWS prepares a comprehensive list of Water Supply Planning and Management Projects for the State Water Survey related to implementation of the DNR Integrated Water Quantity Planning and Management Program.

**January 9, 2004** - A draft annual report for presentation to the Governor's Office is handed out, discussed, and comments/revisions solicited.

**EDUCATION** - DNR staff assigned to groundwater education attended 15 meetings of regional groundwater committees; made field day presentations to almost 21,000 people from 53 counties; staffed exhibits at seven public events or fairs where more than 6000 people were provided information on drinking water supplies; spoke to over 5000 people on water issues at meetings of elected officials and water professionals; and conducted 6 teacher workshops for 560 teachers.

### DNR Organization Action Plan for 2004

The following identifies several key organizational and implementation tasks which the DNR proposes to address within calendar year 2004. Most of these tasks serve to support the six recommendations as cited in the Subcommittee Report and the consensus principles developed by the Water Resource Advisory Committee. The Plan below is outlined in the structure of the FRAMEWORK identified on page 4 which will be used as the template for task development.

**ADMINISTRATION** - In order to effectively execute any plan, it is necessary to establish goals, set realistic objectives, establish accountability, monitor and evaluate the progress, make recommendations and report the findings. A clear understanding of the who, what, when, where, why and how of the plan elements is essential in dealing with such a comprehensive subject matter and which involves so many different professionals from various organizations and units.

! Quarterly Meetings - Recognizing the value of face-to-face meetings and the scheduling difficulties and travel impositions which often arise, the DNR proposes to hold all Water Quantity Planning and Management meetings from 10:00 a.m. to 12:00 a.m. on the mornings of the State Water Plan Task Force (SWPTF) Meetings. Doing so will minimize the trips necessary by key people from the State Water Survey and State Geological Survey, since many of them normally attend SWPTF meetings which convene at 1:30 p.m. This structure will also allow providing a summary of the morning activities to the SWPTF members which would not necessarily attend these meetings. Thus, **the next Water Quantity Planning and Management Program meeting is set for 10:00 a.m. to 12:00 a.m., February 18 in the DNR Illinois River Conference Room.** The agenda for this meeting will be to discuss the framework and housekeeping measures and begin to establish/identify the planning team, the work teams, the work team leaders, the public interest groups and individuals.

**ROAD MAP** - The first two Consensus Principles of the WRAC were as follows: *1. Better science and more funding are needed, and 2. A system for identifying water resource problems is needed.* The third recommendation of the Subcommittee's Report (on page 3) states "*The plan should have an initial focus on securing and making easily accessible the scientific data that will be needed to designate Priority Water Quantity Planning Areas, areas that can be identified for being at risk for water shortages based on existing data or as new data become available.*" A ROAD MAP which outlines and provides basic status information on all the scientific studies, the Priority Planning Areas, the legislative/funding efforts, and other major or ancillary efforts would be helpful to track the progress and identify gaps of whatever nature.

! It is currently envisioned that the ROAD MAP may first be developed as a skeletal outline of ongoing major efforts, perhaps in a simple spreadsheet format, giving basic information by column headings, e.g., project title, project manager/or key contact, organization, funded by, funds needed, completion dates, planning area etc. This Road Map spreadsheet could be placed on the ISWS Internet site and updated on a quarterly basis. In addition to the simple spreadsheet, a more detailed informational database system, i.e., Access, Paradox . . . can be possibly developed to incorporate many additional fields, providing links and report generation capabilities. A goal of the February 18 meeting will be to better define the development of the ROAD MAP parameters, the type of information we would want to include and the database management tools. We also hope to identify the key person(s) who would be responsible for development and maintenance of the ROAD MAP.

PUBLIC INPUT AND REGIONAL PLANNING TEAM - The second recommendation of the Subcommittee's Report (on page 3) states "*The plan should receive broad public review and input.*" A resounding theme expressed by the WRAC, the ICCG and the GAC was to make the scientific data and water quantity plan accessible and useable by all governmental agencies and the public. Perhaps the second most resounding theme was the identification of Priority Water Quantity Planning Areas and to work with and support existing (regional) authorities. The DNR has identified Northeastern Illinois, the Mahomet Aquifer and the Fox River Basin as three geographical areas for Priority Water Quantity Planning and Management (see page 5).

! ISWS water supply web site - As noted on page 5, the ISWS has developed a new web site for water supply information. This ISWS web site is the logical place for overall reporting of activities and providing data and reports. In 2000, the ISWS web site received an award as one of the top 50 "Government" Web sites in the world, and was also awarded "The Hot Link Zone Site Award" that year. With the large number of stakeholders involved in water quantity planning and management, the ISWS proposes to continue the further development of this web site to house the data and status reports and to serve as the "information hub" for public access. Upon development of a Table Listing of all individuals in government, from regional groups, and the general public that have an interest in water quantity management, this listing could be placed on the Web site as a resource directory along with the ROAD MAP described earlier.

! The DNR will continue to report on the water planning activities at the SWPTF and the ICCG meetings. A report on activities by a DNR attendee at other meetings (regional) will be provided at quarterly planning meeting in order to keep the planning team informed. The stakeholders involved in the regional planning efforts (NIPC, Tri-State, Mahomet, Fox etc.) will be identified on the Table Listing.

! DNR will work with the Illinois Municipal League and Illinois Potable Water Supply Operators Association in developing substantial panel discussion presentations as well as exhibits featuring local information, at their annual September conferences. These will be aimed at providing scare and success stories, information on water quantity issues, regional efforts, and available agency assistance and contacts. Following these statewide meetings, regional subgroups of both associations can be addressed with similar but more local information.

LEGISLATION AND FUNDING WORK TEAM - Appendix 1 of the December 20, 2002 ICCG Subcommittee Report identified *Critical Water Issues* and Appendix 1V, *Draft Strategic Plan*, pages 49, 50 & 51, provides a thorough description of the recommended funding and legislative efforts needed to respond on a statewide level for better water resource management and development. These issues and recommendations are not repeated here.

! Recommendation No. 5 of the Subcommittee's Report (on page 3) states "*The legislature should address an immediate need to grant the Governor expanded emergency powers to deal with major region-wide droughts or water-related disasters.*" Since this issue has been identified as such a priority issue, the DNR is proposing that the Team work to develop a legislative proposal for an *Emergency Powers Statute* in 2004 which has a broad level of a consensus. The Team will then work to obtain legislative support of the proposed statute for introduction in the Spring 2005 General Assembly.

! This Team will also identify the top three water management priority areas requiring funding. These high priority funding projects will be prepared as proposed scope of work plans which describe the need for the project, the expected deliverables, a time line, the cost and the staffing plan. The Team will then work to find funding sources for the projects.

BEST MANAGEMENT PRACTICES WORK TEAMS - Recommendation No. 6 of the Subcommittee's Report (on page 3) states "*The state should consider voids in current law like instream flow and well interference by initially developing guidelines identifying best management practices (BMPs) for voluntary adoption.*"

! This effort may best be handled by establishing separate Work Teams for in-stream flow and well interference BMP's. The Teams will develop a draft of BMP's for public review and comment with the goal of producing a list of BMP's for voluntary adoption by the end of the calendar year. Consideration should be given to a reference of the voluntary BMP's in the legislative proposal for the Emergency Powers statute. Separate Team leaders should be identified for each discipline but should coordinate their efforts with each other for public comment and input and product consistency.

**The Work Teams and Team Leaders need to be identified. This will be one of the agenda items for the first meeting.**