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Illinois
Environmental
Protection Agency

Public Water Supplies
2200 Churchill Road
Springfield, IL 62794-9276

February 1994

Illinois Groundwater Protection Program:

Volume II: Biennial ProgramReport

Prepared by the

Interagency Coordinating Committee

on Groundwater

February 1994

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Submitted to the Governor, and
Illinois General Assembly

ILLINOIS GROUNDWATER PROTECTION PROGRAM

VOLUME II: A BIENNIAL PROGRAM REPORT

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EXECUTIVE SUMMARY

As described in the Volume I Report the Illinois Groundwater Protection Act is a comprehensive law which responds to the need to manage groundwater by a prevention-oriented process. The following provides a summary for each of the major program elements of the IGPA.

Interagency Coordination

The IGPA required the establishment of the Interagency Coordinating Committee on Groundwater (ICCG) to direct the efforts of State agencies and to facilitate implementation of the state-wide groundwater protection program. Ten state agencies actively participate in the ICCG and work together on a regular basis. The ICCG has met quarterly during the past two years and has held one joint meeting with the Groundwater Advisory Council (GAC). The Director of the Agency serves as the Chair of the ICCG.

The ICCG has established a number of subcommittees to work on various special projects. The Pesticide Subcommittee, chaired by the Illinois Department of Agriculture (IDOA) has been very active during the past two years working on the development of a State Pesticide Management Plan (SMP). Additionally, the ICCG's Education Subcommittee continues to be active in implementing statewide groundwater educational efforts, and has worked with the three Groundwater Protection Planning Committee's to establish local groundwater education programs . The Education Subcommittee is chaired by the Department of Energy and Natural Resources (ENR).

Education and Resource Evaluation

An extensive groundwater education effort continues to be implemented and is directed toward those affected by the IGPA. Major initiatives have been undertaken to integrate with the Regional Groundwater Protection Planning Committees and many successful activities have been accomplished. A major effort in cooperation with the University of Illinois to develop a comprehensive manual for Planning and Zoning officials has been completed.

The ENR also has the responsibility for developing a comprehensive groundwater evaluation program. A long-term plan was developed by ENR's State

Water and Geological Survey Division's and has been adopted by the ICCG. The plan includes data collection and automation, groundwater quality monitoring, resource mapping and groundwater quantity assessments. Groundwater resource assessments are underway in many areas of the state, and within two of the priority groundwater protection planning regions. The ENR completed the pilot assessment of agricultural chemicals in rural private water supply wells in distinctively different hydrogeologic settings. This study was also augmented by a similar study of rural private water supply wells for agricultural chemicals conducted by the IDOA, the Cooperative Extension Service, University of Illinois at Urbana-Champaign (CES), and the Illinois State Geological Survey (SGS). In addition, the Illinois State Water Survey (SWS) is conducting a survey of agrichemicals in large diameter rural private water supply wells.

The statistical methodology developed by ENR was utilized to design an implement a pesticide monitoring program for community water supply wells.

Wellhead Protection

The IGPA established a prevention based groundwater protection policy. A wellhead protection program (WHPP) focuses on protecting the local recharge area of a drinking water well. A key part of implementing the IGPA policy involves the WHPP for both public and private water supply wells. The IGPA utilizes a phased in approach to progressively protect well recharge areas as more data is collected that describes the area. The IGPA established minimum setback zones between water wells and potential sources or routes of contamination. All potential sources, routes of contamination and potable water supply wells have minimum setback zones established. It also provided that communities can expand this area with some additional hydrogeologic information to a maximum setback zone. Thirty four communities have adopted maximum zone ordinances, and 22 additional community applications are currently being reviewed for approval. The last phase of protecting community water supply wells involves establishing a recharge area protection program. The IGPA provides the authority to establish recharge area regulations. No recharge are petitions have been submitted to the Illinois Pollution Control

Board (Board) to date.

The IGPA also requires the Agency to conduct well site surveys or inventories of potential sources and routes of contamination within a 1,000 foot radial area of each community water supply well in the State. Reports that summarize this information for the community are prepared following the survey. Ninety seven percent of these wells have been field surveyed, and 70 percent of the final reports have been completed and submitted to the communities.

The Agency has completed a pilot groundwater protection needs assessment for the City of Pekin. This assessment determined the recharge areas for the wells; evaluated the existing land use zoning; identified potential contamination sources; and provided comments on the water supply's contingency plan. The assessment also provided recommendations for protecting the recharge areas of the wells. Additionally, the Agency also administered funding for two other pilot assessments that were completed and provided the same type of useful information. A fourth groundwater protection needs assessment is in the process of being completed by ENR. The Agency and ENR are in the process of preparing a Groundwater Protection Needs Assessment Guidance Document, and are organizing a workshop with the GAC and the Groundwater Protection Planning Committees. These efforts will be used to promote groundwater protection needs assessments at the community level.

A small community can also request the Agency to conduct a groundwater hazard review in lieu of conducting a groundwater protection needs assessment. The Agency applies the same approach utilized in the pilot needs assessments to prepare hazard reviews. To date, seven requests to conduct hazard review reports have been received and prepared by the Agency. Two groundwater hazard advisories were also issued during the past two years for potential contamination sources threatening the communities of Loves Park and Belvidere.

Regional Groundwater Protection Programs

A regional planning and protection program has been established by the IGPA.

By the time of the second Biennial Report, two regional groundwater protection regions and their associated committees were established. The counties of Winnebago, Boone and McHenry are included in the Northern Groundwater Protection Planning Region, while Tazewell, Peoria, Woodford and Mason counties comprise the Central Groundwater Protection Planning Region. During the past two years, the IEPA Director designated new committees for the previously mentioned regions and a new Southern Groundwater Protection Planning Region and associated committee was designated. The Southern Groundwater Protection Planning Region is comprised of Madison, Monroe, St.Clair and Randolph Counties. A great deal of progress has been made in each of these regions to formulate an approach for advocating groundwater protection programs. The committees are meeting with each county board followed by meetings with selected municipal boards in their respective regions. The purpose for making these initial contacts is to follow-up with meetings regarding site specific groundwater protection programs and recommendations.

A special work group comprised of local elected officials, planning and zoning officials and engineering, water company, business and educational representatives has been established by the Central Groundwater Protection Planning Committee. This special work group will evaluate options for protecting the City of Pekin's community water supply wells. The same approach will be utilized in the other regions to encourage the establishment of local groundwater protection programs.

The Agency is currently evaluating the feasibility of establishing a new regional groundwater protection planning area. Additionally, the Agency is focusing its technical assistance efforts on the communities prioritized by the Planning committees.

The Agency is integrating the hydrogeologic, potential route and source inventory, existing land use zoning and modeled groundwater recharge areas for community water supply wells onto digital base maps. The digital base maps were developed by the U.S. Census Bureau for navigational purposes for the

census takers, and are referred to as TIGER File Maps. A Geographic Information System (GIS) is being utilized to prepare and automate the data described above. These maps provide a focus for discussions with communities on the various options that can be utilized to protect these critical groundwater resources.

Groundwater Standards and Technology Control Regulations

The IGPA required the Agency to develop and the Illinois Pollution Control Board (Board) to adopt new groundwater quality standards and technology control regulations. The first set of groundwater standards became effective November 25, 1991 and the technology control regulations were effective January 1, 1992. Since this time, a great amount of progress has been made in implementing and integrating the groundwater standards into Agency and other agency programs. The Agency has also initiated a comprehensive review of completed well site survey reports to determine activities that are subject to the technology control regulations relative to community water supply wells. Additionally, the Agency has met with the Illinois Department of Public Health. A cooperative program to evaluate compliance performance is being developed for the activities regulated by the technology regulations relative to private, semi-private and non-community water supply wells. A data base to track and evaluate the compliance information generated under the technology regulations is near completion.

The Agency, IDOA and various interest groups developed a cooperative groundwater protection program for agrichemical facilities regulated under the technology control regulations described above. This cooperative program provides an alternative to the technology regulations. A set of rules has been developed for this program, and was in Second Notice at the end of October, 1993.

Agricultural Control Program

The Pesticide Subcommittee of the ICCG spent a great deal of time preparing a draft State Management Plan for Pesticides (SMP). This plan is being prepared in two phases: first as a generic plan; and secondly as a constituent

specific plan. The SMP is being developed in response to USEPA's "Pesticides and Groundwater Strategy". This requires that if a particular pesticide has or is likely to contaminate vulnerable groundwater as a result of normal use, and that labeling and other national-level restrictions are insufficient to ensure adequate protection of groundwater, USEPA may require individual SMP's as a condition of continued use of that pesticide. SMP's are essentially an alternative to cancellation. The Illinois' generic SMP is still under development.

Groundwater Quality Protection Future Directions

The priorities for the groundwater protection program for the next two years are as follows:

- Continue and expand efforts in each of the priority regions to meet with communities utilizing vulnerable groundwater supplies;
- encourage establishment of local groundwater protection programs in well recharge areas;
- further integrate and apply voluntary pollution prevention, local zoning and IGPA protection measures to protect these areas;
- Develop and implement a SMP;
- Conduct a groundwater protection needs assessment and regulated recharge area forum in cooperation with the GAC;
- Integrate regional groundwater protection programs with SDWA compliance monitoring program;
- Integrate surface and groundwater protection programs;
- Continue implementation of the CWS pesticide monitoring program and evaluation of the effectiveness of immunoassay testing methods;
- Continued implementation of groundwater standards and technology control regulations; and
- Provide input into the development of alternative groundwater monitoring and cleanup guidance for agricultural chemical facilities.

The first six years of the groundwater protection program involved a significant amount of time being designated towards the collection of well

site survey data and basic hydrogeologic data for the community water supply wells. The next two years will involve the utilization of this data to establish regional groundwater protection programs for the vulnerable recharge areas of community water supply wells. Considerable follow-up activities with the Regional Planning Committees will be conducted to assist with this program. This program will be integrated with other programs such as the SMP and Safe Drinking Water Act compliance waiver program. Continued implementation of the quality standards and technology control regulations will also occur.

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INTRODUCTION

The IGPA established a comprehensive program for the protection of groundwater. Some parts of the program, such as minimum setback zones for wellhead protection, became effective January 1, 1988. Other parts of the program, however, required more developmental work or rulemaking in order to be implemented. The comprehensive groundwater quality standards and the recharge area planning program are examples of these provisions. The Interagency Coordinating Committee on Groundwater (ICCG) was established by the IGPA as a means to foster greater coordination among state agencies. Section 4(b)(8) requires the ICCG to report biennially to the Governor and the General Assembly on groundwater quality, groundwater quantity, and the State's enforcement efforts. The biennial report has been divided into three volumes to help simplify the review process and provides a new approach for evaluating progress. This report is entitled Volume II: A Biennial Groundwater Protection Programs Report. Volume III contains the technical appendices.

The legislation establishes a general policy on groundwater, as follows:

> "It is the policy of the State of Illinois to restore, protect and enhance the groundwater of the State, as a natural and public resource. The State recognizes the essential and pervasive role of groundwater in the social and economic well-being of the people of Illinois and its vital importance to general health, safety and welfare. It is further recognized as consistent with this policy that groundwater resources of the State be utilized for beneficial and legitimate purposes, waste and degradation of the resource be prevented, and underground water be managed to allow maximum benefit for people of the State of Illinois."

This is the third report prepared since the adoption of the IGPA, and it is intended to set a meaningful comprehensive status report on the groundwater of the State. This can serve as a base upon which to compare the progress and status of program responses to the groundwater issues. The overall report is presented in the general order of the IGPA.

The report presents a status on these elements. In addition, the report also includes information on the status and direction of groundwater quantity initiatives in Illinois.

INTERAGENCY COORDINATING COMMITTEE ON GROUNDWATER (ICCG)

The IGPA requires the creation of the ICCG. This Committee is chaired by the Director of the Agency or designee and has members from ten State agencies which have some jurisdiction over groundwater. The Agency, Illinois Department of Public Health (DPH), Department of Energy and Natural Resources (ENR), Department of Mines and Minerals (DMM), Office of the State Fire Marshall (OSFM), Illinois Department of Transportation - Division of Water Resources (IDOT/DWR), Department of Agriculture (DOA), Emergency Management Agency (EMA), Department of Nuclear Safety (DNS), and the Department of Commerce and Community Affairs (DCCA). The Committee is required to meet at least twice a year to review and coordinate the State's groundwater protection policy as well as evaluate regulations that relate to groundwater and assess the effectiveness of the State's efforts to protect and improve groundwater. The Committee must also review and make recommendations on groundwater research and data collection and dissemination programs. Table I lists the Agency director or designee on the Committee during the past two years:

Table I. Interagency Coordinating Committee on Groundwater (ICCG)

ENVIRONMENTAL PROTECTION AGENCY
Mary Gade, (Chair)
Roger Kanerva, Designee

DEPT. OF ENERGY & NATURAL RESOURCES
Jack Moore
David Baker, Designee

DEPT. OF PUBLIC HEALTH
John Lumpkin
David Antonacci, Designee

DEPT. OF MINES AND MINERALS
Ronald Morse
Gwenyth Thompson
Greg Pinto, Designee

STATE FIRE MARSHAL
Jim McCaslin

DEPT. OF TRANSPORTATION
Kirk Brown
Gary Clark, Designee

DEPT. OF AGRICULTURE
Becky Doyle
Warren Goetsch, Designee

EMERGENCY MANAGEMENT AGENCY
John Mitchell

DEPT. OF COMMERCE & COMMUNITY AFFAIRS
Jan Grayson
Stewart Schrodt, Designee

DEPT. OF NUCLEAR SAFETY
Thomas Ortciger
Dave Ed, Designee

GOVERNOR'S OFFICE
Allen Grosboll

Section 4(b) of the IGPA provides that the Committee shall:

"(1) review and coordinate the State's policy on groundwater protection;
(2) review and evaluate State laws, regulations, and procedures that relate to groundwater protection;
(3) review and evaluate the status of the State's efforts to improve the quality of the groundwater and of the State enforcement efforts for protection of the groundwater and make recommendations on improving the State efforts to protect the groundwater;
(4) recommend procedures for better coordination among State groundwater programs and with local programs related to groundwater protection;
(5) review and recommend procedures to coordinate the State's response to specific incidents of groundwater pollution and coordinate dissemination of information between agencies responsible for the State's response;
(6) make recommendations for and prioritize the State's groundwater research needs;
(7) review, coordinate, and evaluate groundwater data collection and analysis; and
(8) beginning on January 1, 1990, report biennially to the Governor and the General Assembly on groundwater quality, quantity, and the State's enforcement efforts."

An Implementation Plan and regulatory agenda was developed by the ICCG pursuant to the IGPA, and the ICCG has met quarterly to address these issues since 1988. The Committee has had success in coordinating and assisting in many aspects of the groundwater protection program. The Committee has established several subcommittees to facilitate program implementation such as the Education Subcommittee and Pesticide Subcommittee. The Education Subcommittee conducts a program which addresses groundwater-related topics to educate the general public, business, agriculture, government, and private water supply owners, users and operators. The Pesticide Subcommittee, chaired by Illinois Department of Agriculture, addresses the effects of pesticides on groundwater and is in the process of developing a State Pesticide Management

Plan. In addition, the Committee reviewed and provided input on the United States Environmental Protection Agency's (USEPA) Comprehensive State Groundwater Protection Program ("CSGWPP"). The ICCG as well as its subcommittees and work groups have helped to provide a cooperative process to develop and implement programs.

GROUNDWATER ADVISORY COUNCIL

The IGPA also calls for the formation of the Groundwater Advisory Council (GAC). The Council is designed to allow the public, industry, and local governments to meet with the State government. Specifically, the Council is composed of nine public members appointed by the Governor, two people representing environmental interests, two people representing industrial and commercial interests and one person each representing interest groups in agriculture, local government, regional planning, public water supply, and water well drilling. The members, who serve three-year terms, elect a chairman from among their members, by majority vote. The diversity of the Council members' backgrounds provides unique points of view when the Council reviews and evaluates groundwater protection policy, program implementation and research/data collection. Table II lists the GAC members on the Council:

Table II. Groundwater Advisory Council

BUSINESS AND PROFESSIONAL PEOPLE FOR THE PUBLIC INTEREST
Bob Jones

ILLINOIS ENVIRONMENTAL COUNCIL
Johnny Leuthold

UNO-VEN COMPANY
Catherine Barnard

ROCKFORD PRODUCTS CORPORATION
Roy Morris, P.E.

POTASH AND PHOSPHATE INSTITUTE
Dr. Harold Reetz

WESTERN IL REGIONAL COUNCIL
Susan Nash

NORTHERN IL WATER CORP.
Bob Shierry

WATER WELL DRILLERS INDUSTRY
John Pitz

CITY OF EDWARDSVILLE
Paul McNamara

Section 5(a) of the IGPA provides that the Council shall:

"(1) review, evaluate, and make recommendations regarding State laws, regulations and procedures that relate to groundwater protection;

(2) review, evaluate, and make recommendations regarding the State's efforts to implement this Act and to generally protect the groundwater of the State;

(3) make recommendations relating to the State's needs for groundwater research; and

(4) review, evaluate, and make recommendations regarding groundwater data collection and analyses."

The first term Council participated in the review and evaluation of various efforts and provided recommendations regarding many aspects of the groundwater program. The new GAC is providing input to the following: State Pesticide Management Plan, New Groundwater Standards, and Minimal Hazard Certification Rules. In addition, the GAC is organizing a Workshop on the aspects of Groundwater Protection Needs Assessments and regulated recharge areas.

EDUCATION PROGRAM FOR GROUNDWATER PROTECTION

Overview

The IGPA required the Department of Energy and Natural Resources, with the cooperation of the Environmental Protection Agency, the Department of Public Health, the Department of Agriculture and others as needed, to develop, coordinate and conduct an education program for groundwater protection.

The program is to include, but not be limited to, education for the general public, business, agriculture, government, and private water supply owners, users and operators.

This program is coordinated by the education subcommittee of the ICCG. A total of fifteen state and federal agencies, and over twenty-five state-wide organizations have directly participated. An interagency protocol, annual work plan, and annual evaluation direct the program to the educational needs of five identified constituencies:

1.General audience (through fairs and mass media);

2.Private well owners;

3.Professionals, elected officials, association representatives;

4.The regulated business community; and

5.Illinois teachers.

A partial list of the Groundwater Education Program achievements for September 1987 to December 1993 and the associated lead agencies follows:

Produced or published materials using the interagency protocol

·'Safeguard' - general brochure and "Questions and Answers on IGPA" (Rev. 91) (ENR)

·'Primer' - detailed explanation of IGPA as related to community water wells (IEPA)

·'The Act' and index - over 3,200 copies of IGPA were distributed (LRB, ENR)

- Displays - colorful presentations of groundwater protection for meetings and fairs (ENR)
- Overhead slide set - 80 concept slides related to hydrology, groundwater threats, and IGPA (ENR)
- Slide set ' "Protecting Illinois' Invaluable Hidden Resources" (ENR)
- "Suggested Activities for Groundwater Protection" (ENR)
- Bulletin: "Planning Your Well" (WRC-CES)
- Groundwater Standards: "Issues and Options" and "Discussion Paper" documents (ICCG, IEPA)
- Videos - "Community Groundwater Protection" (IEPA); "Invisible Resource" (ENR), "Sealing Abandoned Wells" (ENR); "Designing a Field Demonstration" (ENR)
- Brochures: "Community Water Supply Planning" and "Maximum Setback Zones" (IEPA)
- Posters: Three posters on sealing abandoned wells and wellhead protection (ENR)
- Library displays: twenty displays currently circulating in the library systems (ENR, Sec. of State)
- "Maximum Setback Zone Workbook" (IEPA)
- Bulletin: "Safe Drinking Water: Testing and Treating Home Drinking Water" (CES)
- "Campaign Primer for Sealing Abandoned Wells" (Prairie Hills RC & D, ENR)

- "Progress in Groundwater Protection": workshop proceedings (ENR, 11 other agencies)
- Produced 3 Field Day proceedings (Mason County, Belvidere, Madison County) (ENR)
- Video and audio press releases and public service announcements (ENR)
- Obtained and distributed twenty other brochures from various sources on groundwater protection measures
- Conducted twelve media events on wellhead protection and on sealing abandoned wells
- Conducted ten statewide workshops with average attendance of just over 100
- Conducted nineteen workshops for public health officials and water well drillers (DPH)
- Conducted three discussion meetings on groundwater quality standards (IEPA, ENR)
- Conducted sixteen workshops for county agricultural staffs (IDOA, CES, SCS, IFCA)
- Developed and distributed "Buried Treasure - Education Activity Guide" to over 4,800 K-12 teachers (EEAI, ENR)
- Conducted about 110 workshops for teachers (EEAI, ENR)
- Responded to thousands of requests for information through contacts and an '800' hotline
- Distributed multi-agency groundwater protection month packets to 650 news outlets, 210 association contacts, 201 legislators, and more than 3,000 local government units
- Maintained a groundwater speakers bureau with over 40 speakers statewide (ENR)
- Made presentations or had displays on groundwater protection at about 680 professional, trade and civic association meetings
- Notified legislators of groundwater educational materials and services
- Distributed seventeen issues of the newsletter "Groundwater Gazette" on a quarterly basis to about 350 newsletter editors, teachers, agency officials, academics, and association executives (ENR)
- Developed and distributed seven (of twelve planned) groundwater protection articles for weekly newspapers (SGS, SWS, DPH, EPA, OSFM)
- Conducted over 25 county-based well-sealing demonstrations through a coalition of 10 statewide associations
- Developed an electronic bulletin board: Groundwater Education Network (GWEN) for newsletter editors, teachers, and groundwater specialists

Current Groundwater Protection Education Initiatives

The 1992 annual evaluation identified and prioritized six areas needing special emphasis. These are incorporated in the FY 1993 Work Plan:

1. Educational and technical assistance to small, public water supply systems - This was addressed through a Rural Affairs Council grant to the Illinois Rural Water Association, which hired a circuit-rider to help small towns with groundwater protection. The circuit-rider helps determine the lateral areas of influence (L.A.I.) of wells so the communities can adopt maximum setback zones. Although the funding ran out, this program resulted in numerous L.A.I. determinations for communities. Applications for additional funding are pending.

2. Regional groundwater education programs - The three regional groundwater protection planning committees have formed education subcommittees. ENR provided each with funding to support their educational activities, which target community officials, business groups and teachers. Teacher workshops, cooperation among numerous agencies and associations, and field days have resulted from these programs.

3. Business and industry educational outreach - Following the adoption of the groundwater quality standards and the regulations for certain activities in setback zones and regulated recharge areas, the education program has planned for the development of compliance guides for business and industry officials.

4. Revision and expansion of groundwater education materials for schools - The Environmental Education Association of Illinois (E.E.A.I.) recently developed a revised edition of its very popular: Buried Treasure: Education Activity Guide. Following field testing, it was provided to teachers through workshops conducted by E.E.A.I. trained facilitators.

5. Planning, Zoning and Groundwater - A contract was developed with the University of Illinois-Department of Urban and Regional Planning to produce two guidance documents. They will demonstrate to both lay and professional planning and zoning officials methods of incorporating groundwater protection into local government operations. An educational campaign will follow their publication.

6. Well-sealing demonstrations - An estimated 50 to 150,000 abandoned wells dot the rural and urban landscape of Illinois. They present both safety and groundwater contamination liabilities, often not recognized by the wells' owners. A coalition of 10 associations established a goal of conduccting well-sealing demonstrations in each Illinois county. The coalition initiated an incentive program in Spring 1993 with funds provided by the Environmental Protection Trust Fund through ENR. An incentive payment of up to $300 is paid to local sponsors of well-sealing demonstrations. Coalition members include:
   - Association of Illinois Soil and Water Conservation Districts
   - Illinois Environmental Health Association
   - Illinois Farm Bureau
   - Illinois Assocation of Groundwater Professionals
   - Illinois Rural Water Association
   - Illinois Society of Professional Farm Managers and Rural Appraisers
   - Illinois Chapter of the Soil and Water Conservation Society
   - Illinois Land Improvement Contractors Association
   - Illinois Groundwater Association
   - Illinois Association of Resource Conservation and Development Councils.

Future Initiatives

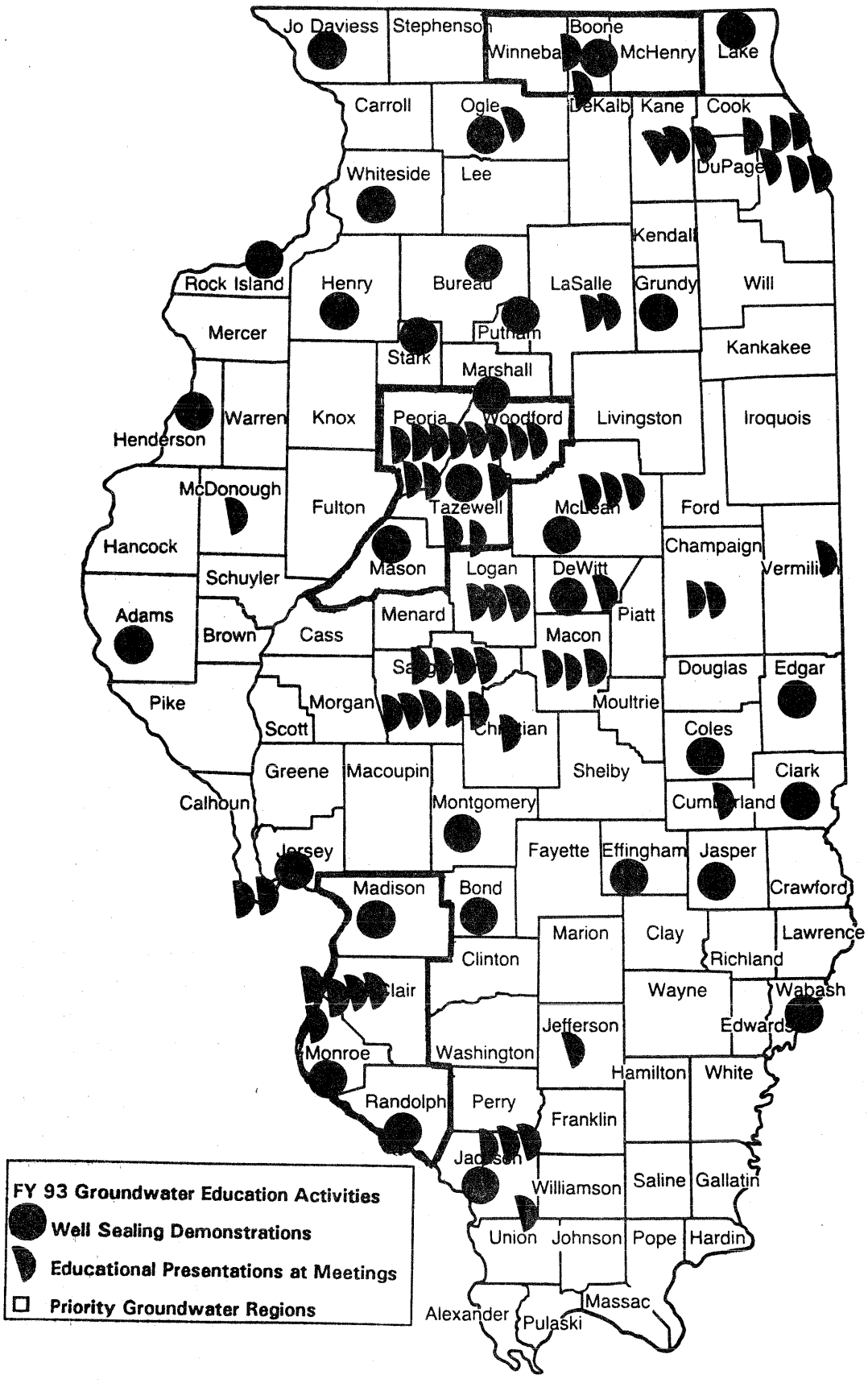
The work carried out by each agency and organization is dependent on the availability of staff, resources and funds. Anticipated initiatives include:

- Major expansion of the business and industry component
- Expanded groundwater workshop opportunities for teachers
- A campaign to help farmers become aware of their potential eligibility for the USDA Conservation Reserve Program if their land is within the state designated wellhead protection area of a public water supply well (there are about 9,600 in the state).

Summary

The groundwater protection education program is actively adapting to public needs as the overall IGPA work proceeds and matures. The process developed for interagency and association coordination appears to work very well. The five identified constituencies are provided educational materials and services appropriate for their needs. A summary of FY 1993 groundwater educational activities including well sealing demonstrations and educational presentations is provided in Figure 1.

Figure 1 – FY1993 Groundwater Education Activities



GROUNDWATER EVALUATION PROGRAM

Section 7 of the IGPA requires ENR, in consultation with the ICCG and the GAC, to develop a groundwater program consisting of resource assessments, data collection and automation, and groundwater monitoring. The information generated by this comprehensive program will be useful to both state and local government and will lead to better understanding, protection and management of Illinois groundwater. A long-term plan, developed by ENR's Water and Geological Surveys and approved by the ICCG, is being implemented as funds become available. In addition to the long-term evaluation program, the legislature mandated two short-term studies -- statewide recharge area mapping, and an initial report on the impacts of pesticides on groundwater.

Over the last six years, information generated by the groundwater evaluation program has enhanced the ability of state and local government to protect and manage groundwater resources. The Illinois State Geological Survey (SGS) and Illinois State Water Survey (SWS), Divisions of the Illinois Department of Energy and Natural Resources, have completed, or have underway, regional groundwater assessments in several areas of the state, have completed necessary mapping and most of the groundwater assessments for a pilot groundwater protection needs assessment in Woodstock, Illinois, and are conducting a county-wide groundwater mapping and assessment study in McHenry County. The Geological and Water Surveys are also continuing to assess the impact that agricultural chemicals have had on groundwater in Illinois, and to automate groundwater-related data.

In order to conduct the research described below, the Surveys and the Department have supplemented IGPA program appropriations with funding from other sources and programs.

The groundwater assessments mandated by the IGPA include both resource assessments (aquifer mapping and hydrologic characterization) and evaluation of baseline groundwater quality. Regional assessments are underway in the following areas of the state.

ENR Resource Assessments

WOODSTOCK. The State Water Survey and State Geological Survey have completed necessary mapping and most of the groundwater assessment for a pilot groundwater protection needs assessment for Woodstock, Illinois. This needs assessment is being conducted within the Northern Priority Groundwater Protection Planning Region. The project has involved detailed 1:24,000-scale geologic and hydrologic mapping to define potential contamination and evaluate aquifer characteristics. Four geologic cross sections, isopach maps showing the areal distribution and thickness of the four aquifers in the area, a geologic stack-unit map to a depth of 100 feet, and an aquifer contamination potential map were developed for the study. Potentiometric surface (i.e., static groundwater level) maps of each of the four aquifers have been constructed and used to help determine groundwater flow directions. In addition, a groundwater flow model will be used to determine the capture zones of the city wells. The needs assessment methodology presented in this pilot study will assist the IEPA, counties, municipalities, and consultants in determining the necessary requirements for groundwater protection needs assessments in other areas. A final report will be released during 1993.

MCHENRY COUNTY. The Woodstock pilot assessment provided the methodological approach for a groundwater protection mapping program of McHenry County. This three-year project will increase knowledge of the hydrologic and geologic framework of the county at a level of detail useful for county decision-making. In addition, the project will provide the regional groundwater flow information critical to McHenry County communities that wish to conduct more detailed groundwater protection needs assessments.

Each of the 15 topographic quadrangles covering the county have been evaluated for their data. Water well and test boring logs have been plotted, stratigraphic relationships have been determined, and over 40 cross sections have been constructed. During the late summer and fall of 1992, 12 test borings were made to a maximum depth of about 250 feet, with piezometers constructed in the deepest holes. Soil samples from these borings have been

analyzed to determine grain-size and clay-mineral composition of tills.

NORTHWESTERN ILLINOIS. The Geological Survey has completed aquifer, bedrock topography and contamination potential maps of the Green River Lowlands area of northwestern Illinois. This is a heavily agricultural area with shallow aquifers in portions of Bureau, Henry, Lee, Rock Island, Whiteside Counties.

A three-year investigation of the hydrogeology of the Silurian dolomite aquifer in northwestern Illinois was completed by the SGS in 1993. The aquifer, which underlies part of Whiteside, Rock Island, Henry, Bureau, Lee, and Carroll counties, was divided into two units. The northern aquifer unit is less than 100 feet thick and less productive than the southern aquifer unit, which is up to 300 feet thick in the south and central parts of the area. The aquifers are used primarily for domestic supply; reports of yields greater than 100 gallons per minute are rare. Because of abundant vertical fractures exposed at or near the surface, most of the dolomite aquifers are moderately to highly susceptible to contamination.

Also in this area, the SWS is constructing regional potentiometric surface maps in order to describe the dominant groundwater flow directions in the major sand and gravel aquifers in Lee, Whiteside, and Bureau Counties. This new exploration of the Green River Lowlands began during Fiscal Year 1991 with the review of thousands of well logs. Approximate aquifer boundaries were determined, and new observation wells were installed at 22 sites. The wells have been monitored through an entire hydrologic year, and drawdowns during two irrigation seasons have been documented. The project is now moving into its final stage of analysis and report writing.

STATEWIDE BEDROCK MAP. A bedrock topography map of the state was recently updated to better define valleys in the bedrock surface. This map was last updated in the 1950's. Bedrock valleys commonly contain deposits that can be important sources of groundwater in scattered locations. Working with the United State Geological Survey (USGS), the SGS has digitized the map to make future updates easy.

KANE COUNTY. Two SGS studies have used seismic refraction surveys to identify aquifers in the glacial drift and shallow bedrock in Kane County that have the potential to be principle groundwater supplies. The study areas were North Aurora and the Village of Gilberts. Gilberts is planning a test drilling program based on the seismic results.

WILL AND SOUTH COOK COUNTIES. This study evaluated the heavily used shallow aquifer system in Will and southern Cook Counties and ascertained its ability to meet the present and future water supply needs of the communities it serves. The hydrogeologic evaluation involved an examination of existing data to determine the aquifer's geology and hydraulic properties as well as the amount of water withdrawn from the aquifer. New data gathered for the project included collection of 429 water-level measurements and 186 chemical samples. The new data were used to determine ground-water flow directions, existing aquifer recharge rates, the potential yield of the aquifer, and the general ground-water quality.

Among the important results of the project was a new method of analyzing aquifer recharge data which revealed that the rate of ground-water recharge increases from roughly 25,000 gallon per day per square mile (gpd/mi2) under natural conditions to 230,000 gpd/mi2 in areas of very heavy ground-water pumpage. The potential yield of the shallow aquifer system for a typical township in the study area is conservatively estimated to be 6.0 million gallons per day. The level of ground-water use in 1990 did not exceed the estimated potential yields for any of the townships. Most of the communities should be able to continue using the aquifer at their expected growth rates well into the next century. A problem area may develop in extreme northwestern Will County where substantial population growth is expected.

LAKE CALUMET. The purpose of this project is to determine the ground-water quality of the Lake Calumet area and its effect on the quality of the surrounding surface water bodies. The types of contaminants, their potential sources, and their rates of movement through the shallow unconsolidated materials have been investigated. As part of the study, a network of 21 wells

were set up to assess the regional ground-water quality of the Lake Calumet area. Some of the results of this study are quite dramatic and have generated considerable public interest. Results of the organic analysis show that a third of the wells are contaminated with one or more of 28 different volatile and semivolatile compounds. One of the wells had a cis-1,2-dichloroethene concentration of 55,000 parts per billion while two other wells had benzene concentrations over 3,700 parts per billion. Results of the inorganic analyses show that the major ion chemistry of the aquifer varies dramatically throughout the region and that significant road salt, slag, and heavy metal contamination is occurring. The calculated ground-water flow rates and directions show very complex flow system complicated by the low topography and the numerous wetlands and ditches.

NORTHEASTERN ILLINOIS. SWS staff, assisted by three students from Northern Illinois University, measured water levels in 558 deep wells in 15 counties in the Cambrian-Ordovician (deep sandstone) aquifer system of northeastern Illinois during the Fall 1991. The measurement was the Water Survey's ninth detailed study of water levels in this deep system since 1958.

Pumpage data are still being collected in the Water Survey's Illinois Water Inventory Program. A potentiometric surface (aquifer water level) map has been constructed, along with a map depicting water-level changes since Fall 1985, when the last previous measurement was made. Water levels in several areas have risen since 1985 in response to a reduction in pumpage resulting from the recent allocation of Lake Michigan water to many communities in DuPage County. The largest rise measured directly in wells, 218 feet, was observed in Cook County, while other areas show water-level declines of up to 60 feet, for an average recovery of 73 feet overall. This information is essential for the management of the water resources in Northeastern Illinois.

PEORIA. An SWS study sponsored by the Illinois-American Water Company to study the ground-water availability in the southern part of the city of Peoria was completed in July 1992. The need to meet water demands for the year 2005 was of particular concern.

To estimate well-field yields, two strip-aquifer models were studied -- one 8,000 feet wide representing conditions in the southern part of the area and another 4,000 feet wide for the northern part of the area. The aquifer models were based on data in Water Survey files and from two long-term aquifer tests conducted during the past year. Calculations indicate that well-field yields from 1.9 to 4.4 million gallons per day (mgd) may be reasonable for the 4,000-foot aquifer, and yields of 4.8 to 6.5 mgd may be reasonable for the 8,000-foot aquifer.

There was concern that increased withdrawals would significantly lower ground-water levels in existing well fields along a two-mile reach of the Illinois River below Lower Peoria Lake. Riverbed samples collected along this reach indicated a high infiltration rate, suggesting that existing well fields would not be greatly affected. Data collected for this study will be invaluable in modeling the river-aquifer system in the Peoria area, a long-term goal of SWS hydrologists.

EASTERN KANKAKEE and NORTHERN IROQUOIS COUNTIES. Irrigation is the major use of ground water in Kankakee and Iroquois Counties. The SWS is developing a digital flow model of the region to predict water levels in the heavily pumped dolomite aquifer. The model and also be used to develop ground-water management strategies if withdrawals grow to a point that the dolomite aquifer can no longer be maintained. The digital model has been modified to allow more flexibility during calibration of variables that were constants in the original model design. Calibration is in progress, and a final report will be completed in FY 1993.

SOUTHERN TAZEWELL COUNTY. The Sankoty and Mahomet sands are part of a major regional flow system in Tazewell County and surrounding areas. In a multi-year project, the SWS is developing a detailed understanding of this system.

During Year 1, a relational database was created which linked spatial geographic data to its accompanying hydrogeologic information. Because this information revealed gaps in existing geologic data, 16 observation wells were

drilled. The wells, and the geophysical logs of the boreholes, have provided information about aquifer thickness, bedrock surface elevation, and ground-water levels.

In the future, the project will, 1) inventory existing wells; 2) measure water-levels of selected wells; 3) test the aquifer production of a municipal well; 4) estimate ground-water use; 5) survey well elevations; and 6) report on the general findings, develop estimates of aquifer yield, and estimate the potential for aquifer use in the area.

PEORIA-PEKIN. A ground water quality assessment of the Peoria-Pekin region has been completed. The principal conclusions are that ample supplies of excellent quality ground water exist in the Peoria-Pekin region. The water is hard, but free from contaminants. These waters attain their chemical composition through a variety of chemical interactions between the water and the minerals contained within the rock materials through which the ground water flows. Climatic and geologic factors have been at work and are responsible in large measure for the equilibrium composition.

Site-specific water-quality degradation has occurred near some old artesian bedrock wells. The physical integrity of those well casings appears to have been compromised by the corrosive nature of the ground water found in the much deeper bedrock aquifer. Other contamination has been reported by the Illinois Environmental Protection Agency in a small area near an oil-terminal facility along the Illinois River.

SOUTHWESTERN ILLINOIS. This study is a coordinated effort between staff in the SWS's Hydrology and Chemistry Divisions in support of a U.S. Army Corps of Engineers plan to reduce ground-water flooding in the American Bottoms area of southwestern Illinois. The plan calls for discharging ground water from the shallow alluvial aquifer into surface-water bodies to lower the aquifer water-table elevation. The Water Survey is assessing the quality of surface and ground water to determine if treatment of the ground water will be required before it can be discharged to the surface water bodies of the area.

Based on chemical analyses of ground-water samples and a conceptual model of the ground-water flow system, it was concluded that several of the proposed dewatering wells might draw contaminated ground water. In addition, concentrations of iron were observed at concentrations above the Illinois effluent standard over most of the study area. The elevated level of iron will likely necessitate treatment of the ground water prior to discharge to surface water. Adding hydrogen peroxide followed by precipitation was found to be the most effective method of removing the iron.

From a detailed study of the limnological characteristics of Horseshoe Lake, it was found that the discharge of ground water, if treated to remove excess iron, will benefit the lake by the flushing action on algal growth, increased lake clarity, and probable improved sport fisheries.

MASON COUNTY REGION. Meetings during Fiscal Year 1991 (FY91) and early FY92 with the Board of Trustees, Imperial Valley Water Authority, resulted in an agreement to sponsor an ISWS study of ground-water levels in the Havana Lowlands. The field effort has identified a network of private wells for the measurement of ground-water levels. The ground-water level measurements will be used to prepare maps of the ground-water table to compare to a map of the ground-water levels in 1960. The comparison will help determine if there have been resource impacts as a result of the intensive development of the ground-water resource for agricultural irrigation. The number of irrigation systems has increased from 11 in 1960 to more than 1100 now. The IDOT, Division of Water Resources, is a co-sponsor of the study.

ENR Data Collection and Automation

The data collection and automation program mandated by the IGPA is proceeding. Water well record information (well location, depth, and date drilled) for more than ninety-seven counties and geologic information for sixteen counties has been computerized by the SWS for the groundwater database. In addition, a statewide system has been set up by SGS to automate key stratigraphic locations. This system was used to automate data collected during the Woodstock pilot needs assessment and is currently being used for

the larger McHenry County project, and in a large mapping project in east-central Illinois.

In 1993, the SGS began automating data from informal Water-Use Act, groundwater possibilities, and electrical resistivity reports. The Water Use Act and groundwater possibilities reports contain interpretation of well log data; electrical resistivity reports contain original geophysical data for small areas and the interpretation of that data. Entering this information into the database will allow access to these unpublished information sources.

PRIVATE INDUSTRIAL, COMMERCIAL, AND MUNICIPAL WELL DATABASE DEVELOPMENT. A Geographic Information System (GIS) coverage was developed by the ISWS during Fiscal Year 1992. For each of the more than 24,000 private industrial, commercial, and municipal well identifications reported to the ISWS throughout Illinois, a Standard Industrial Classification (SIC) code (of the owning facility) was assigned. These codes can be used as a tool to investigate possible contamination of a certain category of facility. For example, we can now identify all wells associated with dry cleaners and use that information to help assess if ground water contamination is occurring.

WELL AND AQUIFER TESTS. The ISWS conducts well production and aquifer tests free of charge on municipal and other large supply wells. As part of the well and aquifer testing program, the ISWS provides advice on well design to municipal and industrial well owners, their consulting engineers, or both. The main goal of staff members is to ensure that the well will yield sediment-free ground water from an aquifer at the pumping rate desired by the authority requesting assistance. In addition, the staff frequently suggest optimal well spacings, pumping rates, and pumping schedules for a well or well field to prolong well and aquifer service life. Over the past two years, aquifer tests have been performed at Alvin, Cisco, Dongola, Fairbury, Fithian, Geff, Gridley, Effinghan-Jasper, Old Shawneetown, Pocahontas, Ramsey, Silvis, Urbana Country Club, Vermilion, and Williamson. In addition, the ISWS has analyzed the data from numerous other communities that conducted their own aquifer tests.

OBSERVATION WELL NETWORK. An integral part of the SWS data management activity is the collection of ground-water-level data. This information is readily obtainable for use by the media, government agencies, consulting engineers, well-drilling contractors, the general public, and Survey scientists. The SWS is the only state or federal agency in Illinois that maintains a statewide observation well water-level monitoring program. Ground-water-level data are continually collected from a statewide network of approximately 113 active observation wells. Historical data on 127 nonactive observation wells are also available. Of the active observation wells, 49 are equipped with continuous water-level recorders. Ground-water levels in the remaining wells are measured on a monthly basis.

Shallow ground-water levels in 19 selected observation wells in rural areas remote from pumping centers delineate both short-term and long-term trends of the shallow water-table levels under natural conditions. These water-table measurements are an important aid to understanding the severity of the 1988 drought and its lingering effects. These data are also a component of monthly statewide water and climate summary reports. The remaining observation wells are located near pumping centers to monitor the response of local and/or regional aquifers to pumpage. These regions include the Metro-East, Peoria, and Chicago areas.

ILLINOIS WATER INVENTORY PROGRAM. Water use throughout the state is inventoried and entered into a database that includes locations and amounts of water withdrawn from surface and ground-water sources. Public water supplies and self-supplied industries (mining, manufacturing, electrical power generation, commercial, state parks, and conservation areas) are being inventoried. Rural water usage can be estimated from census data combined with municipal population served.

Data are summarized geographically by county and drainage basin, as well as by various water use and water source categories for inclusion in the USGS National Water Use Data System. These data have proven invaluable in the recent SWS effort to predict the ground water level rises that will result

from the allocation of Lake Michigan water to Northeastern Illinois as well as to other regional and local assessment projects.

ENR Evaluation of Agrichemical Impacts on Groundwater

Several studies are underway which evaluate the impact of agricultural chemicals on groundwater. These studies examine both the extent of groundwater contamination caused by agricultural chemicals and the physical phenomena which govern pesticide movement.

PILOT STUDY--AGRICULTURAL CHEMICALS IN RURAL, PRIVATE WELLS. The Illinois State Geological Survey (SGS) and the Illinois State Water Survey (SWS), in cooperation with the Illinois Department of Agriculture, recently completed the Pilot Study. The Pilot study was an outgrowth of the plan (as described in SGS/SWS Cooperative Groundwater Report 14) for determining the occurrence of agricultural chemicals --pesticides and nitrate fertilizers -- in rural, private wells in Illinois, . SGS/SWS Cooperative Groundwater Report 15 contains information regarding the detailed characterization of the surficial hydrogeology, hydrology, and land-use of the five study areas.

STATEWIDE SURVEY. In addition to the pilot study, a similar study is being conducted statewide by the Illinois Department of Agriculture, and the Cooperative Extension Service - University of Illinois at Urbana-Champaign with technical assistance from the SGS. Groundwater samples are being collected from 340 randomly selected wells and analyzed for nitrate and several pesticides and metabolites. Results of the sampling provide statistically reliable estimates of agricultural chemical contamination in rural wells.

PESTICIDE CONTAMINATION GUIDELINES. Another SGS study is developing procedures and guidelines for addressing pesticide contamination at agrichemical facilities in Illinois. Data collected by engineering firms at 49 agricultural chemical facilities was analyzed by SGS scientists to determine whether groundwater contamination is a problem at these sites. Two sites were sampled in detail by SGS to determine the adequacy of current assessment practices and provide a basis for recommendations on cost-effective

site studies. DOA is using the results of the study to develop guidelines and recommendations regarding long-term financial resources necessary to remediate potential pesticide contamination. Final reports on the various aspects of the project were completed in 1993.

PREFERENTIAL TRANSPORT OF AGRICHEMICALS TO GROUNDWATER. A three-year SGS field study is determining new ways to describe the soil macropore structures which allow pesticides and nitrates to rapidly leach to the water table. The project will help future researchers more accurately monitor and predict the occurrence of agrichemicals in the soil and water of the unsaturated zone and in the groundwater system.

MODELING TRANSPORT OF AGRICULTURAL CHEMICALS IN A DUAL POROSITY SYSTEM RESULTING FROM MACROPORES. This two-year ISWS project was funded by the U. S. Department of Agriculture through the Illinois Groundwater Consortium at the Southern Illinois University at Carbondale to develop a computer model for simulating water flow and agricultural chemical transport in macroporous field soils. Macropores in field soils develop from dead roots, cracks, fissures, animal burrows, and other climatic and ecological factors. These macropores provide pathways for the rapid movement of agrichemicals from the land surface to ground water. This model can be used to help guide farm management practices to minimize agrichemical contamination of ground water.

AGRICULTURAL CHEMICAL CONTAMINATION OF SHALLOW BORED AND DUG WELLS. The SWS launched a multiple-year effort in 1990 to evaluate the magnitude and extent of agricultural chemical contamination of shallow-bored and dug wells. Christian and Edgar Counties were selected for sampling based on extensive crop production and a high number of shallow large diameter wells. Twenty-five wells in each county were sampled in January and June 1991. Preliminary results found that 32% of the wells had nitrate levels over the USEPA Maximum Contaminant Level (MCL). In addition, 28% of the wells contained one or more pesticides with 8% being over the MCL. The SWS is sampling a subset of these wells every 2 - 3 months to determine temporal changes in water quality. The project has expanded to include a third area in

Sangamon County where differences in Soil type and glacial history will provide a broader picture of the vulnerability of these shallow-bored and dug wells.

ENR Other Basic and Applied Groundwater Research

As part of their overall research mandate, the SWS and SGS conduct other basic and applied research related to groundwater. The following are recent studies which support groundwater resource protection.

The SGS has completed work with the USGS, Reston, VA, to develop a methodology for contamination potential mapping throughout the Midwest. This was an out-growth of SGS contamination potential mapping for Illinois. The project was conducted to provide Region V - USEPA with the potential factors and data necessary to evaluate aquifer contamination on a regional basis. The final map product entitled, "Using Regional Geologic Information to Assess Relative Aquifer Contamination Potential - An Example from the Central United States:" USGS-OFR-92-694, was published by the USGS in 1993. In October, 1992, the SGS began a two-year investigation into the location of karst areas within the state. This type of topography poses a special problem to water quality because surface recharge to underlying carbonate aquifers is direct. Surface drainage flows through sinkholes and associated fractures into a large-scale plumbing system that moves water as rapidly as city sewers. Thus, residents relying on groundwater from the carbonate aquifer are potentially exposed to agrichemicals and septic effluent. During the first year, the SGS mapped the karstified carbonate rock that occurs at and near the surface of the state. During the second year, it will quantify the degradation of water quality in areas of karstic terrain.

A computer program which will estimate aquifer properties from a limited number of measured values is being developed by the SGS. When fully developed, the model will provide planners with a scientific basis for making decisions on groundwater resource management.

A computer program was developed by the SGS to evaluate the heterogeneity of aquifer properties. The program evaluates pumping test data from a minimum

of three observation wells to determine an ellipse describing the heterogeneity of transmissivity.

The SGS continues to monitor a field scale clay liner, similar to those used on the bottom of state-of-the-art landfills. A foot of water has been ponded on the three-foot liner since 1988. No water has moved through it yet, making it the most successful experimental liner built to date and proving that liners can be built to meet USEPA criteria for rate of liquid movement from a landfill.

The Water Use Act of 1983 (P.A. 83-700) directs the State Water and Geological Surveys to furnish technical support to the Illinois Department of Agriculture's Division of Natural Resources and the local Soil and Water Conservation Districts (SWCDs). The primary role of the SWS is to evaluate the ground-water resource impacts of proposed high-capacity wells and to assist the SWCDs with complaints received when ground-water supplies are interrupted in Iroquois, Kankakee, McLean, and Tazewell Counties.

During the 12-month period ending June 30, 1992, the SWS received requests from the SWCDs to evaluate the ground-water resource impacts of 97 proposed or new high-capacity wells. Reports discussing the impacts of 49 high-capacity wells were prepared during this period. A total of 784 high-capacity wells requiring ground-water resource impact evaluations have been reported since the SWCDs officially began filing procedures in January 1985. In addition, ten complaints of ground-water supply interruptions were investigated in Iroquois County during August and September 1991. Reports discussing the validity of these complaints on the basis of criteria given in the Water Use Act were prepared and forwarded to the Iroquois County SWCD shortly after the investigations. None of these complaints was judged to be valid under the act's provisions.

The SWS has developed and demonstrated the theoretical and operational aspects of determining optimal pumping rates for a well field so that the risk of contamination is minimized and a specific total withdrawal from the well field is maintained. The coupled simulation-optimization model is completed

and was applied to several hypothetical examples and to the well field of Pekin, Illinois. Pekin obtains its water from an alluvial aquifer associated with the Illinois River.

A number of sites of potential contamination were identified, and the pumpage from the city wells was optimized to minimize the number of potential contaminant sites in the capture zones of the wells.

The SWS is working to improve the borehole flowmeter method for measuring hydraulic conductivity in heterogeneous aquifers. Our ability to understand and predict the transport of solutes in heterogenous aquifers relies on our ability to measure the variability of aquifer characteristics such as hydraulic conductivity. The borehole flowmeter method has emerged as one of the most promising new methods for measuring the distribution of hydraulic conductivity in heterogeneous aquifers. This work will help to better predict ground water and contaminant movement and aid in making clean up of ground water more cost effective.

The primary goal of an SWS cooperative agreement with the U.S. Environmental Protection Agency Environmental Monitoring Systems Laboratory (Las Vegas) is to improve the overall reliability of site characterization methods for volatile organic compounds (VOCs). Over 40 monitoring wells ranging in depth from 45 to 100 feet have been constructed by ISWS personnel in and around a large VOC plume in what is now designated as the Southeast Rockford Superfund Site. Preliminary results suggest more of the contaminants are attached to the solid aquifer material than are present in the water. This has great implications because it makes ground water clean up more difficult and costly.

An SWS project attempted to determine whether existing global climate models could be used to examine climate change impacts in Illinois and the Midwest, and, if so, to evaluate the effects of a climate change (due to the greenhouse effect) on the hydrologic cycle of the state and the Midwest in general.

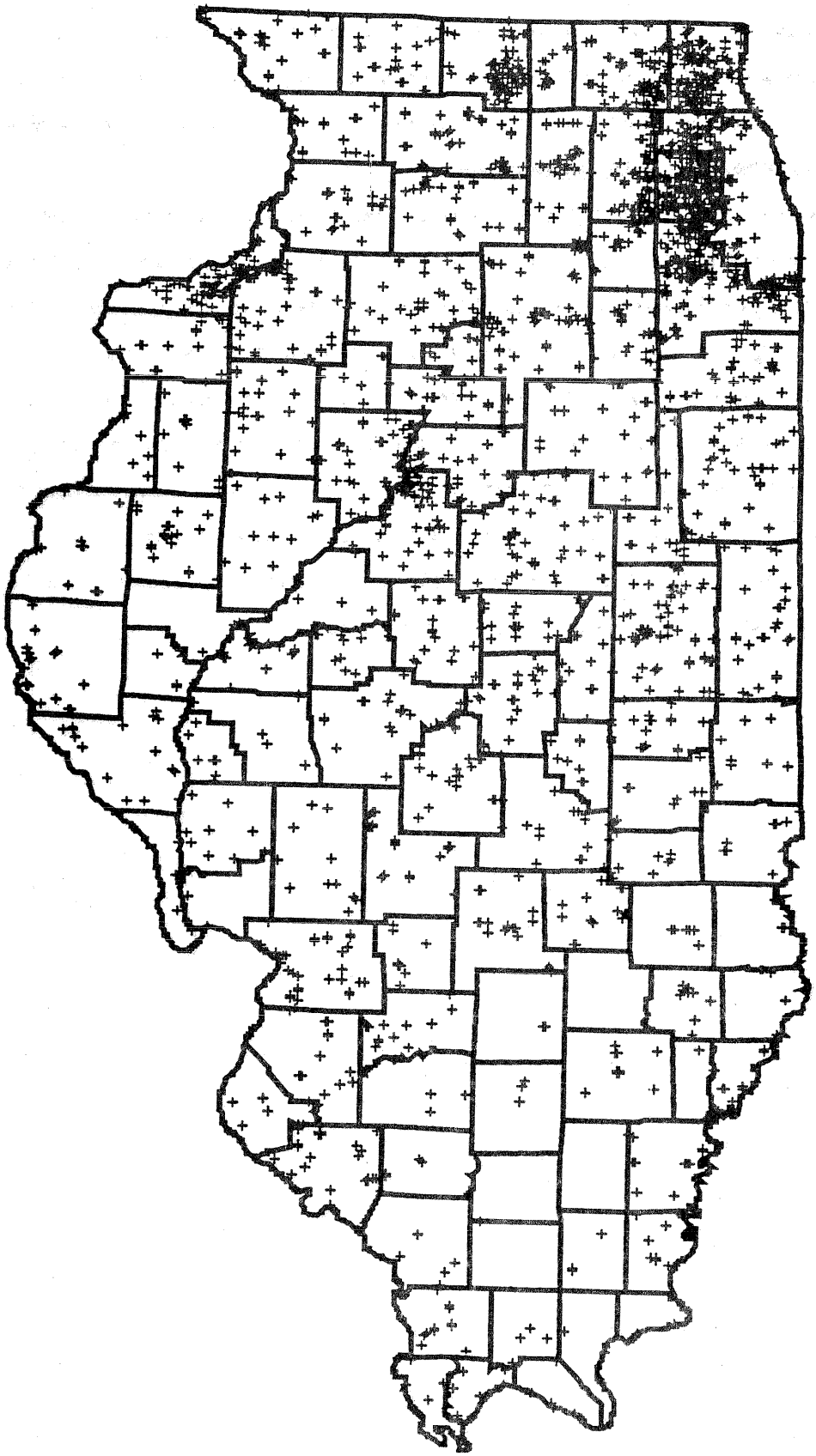
The conclusions of the work were: 1) existing global climate models may

not be reproducing current regional climates well enough to use them to simulate changed climates; 2) one of the reasons the climate models do not perform properly is their portrayal of the land surface hydrology; and 3) the climate models could be improved in several simple ways, resulting in better simulation of precipitation, evaporation, and soil moisture estimates.

Agency Groundwater Quality Assessment

The Agency established a statewide groundwater monitoring network for community water supply wells in 1984. This program included the first comprehensive analyses for volatile organic chemicals (e.g., solvents) and inorganic compounds (e.g., heavy metals) in community wells utilizing groundwater. Approximately 2,700 community wells were sampled and analyzed for these chemicals (see Figure 2). In addition, special monitoring has been conducted for synthetic organic compounds such as pesticides. Approximately 850 analyses of community wells have been performed for pesticides or synthetic organic compounds (SOCs). The 850 analyses represent 580 community wells. Some wells were sampled more than once.

Figure 2 – Public Water Supply Wells Sampled for Inorganic and Volatile Organic – Aromatic Consituents



The 580 wells represent principal aquifers utilized by over 400 public water facilities statewide.

The results of this sampling program indicated that although in-situ aquifer quality is generally good, a number of naturally-occurring inorganic parameters (i.e., iron, manganese, TDS) exceed water quality standards. The 2,700 community water supply wells sampled for inorganic constituents are statistically summarized in Volume III: Appendix A. This appendix clearly illustrates that many inorganic constituents occur naturally in Illinois groundwater resources.

The following information is indicative of the organic chemical groundwater contamination problems which were documented in Illinois community water supply wells:

- 117 community water wells have shown detectable levels of VOC/VOA chemical contamination based upon sampling and analysis of raw water performed by the IEPA over the past several years. This represents about 4.3% of the 2,700 community water wells which have been analyzed. Some of these wells have since been abandoned or inactivated.
- Thirty-eight active wells of the 2,700 PWS wells, or 1.4 percent, exceed the Illinois Class I: Potable Resource Groundwater Standard for one or more VOC/VOA contaminants (see Volume III: Appendix B). Volume III: Appendix E.3 presents the distribution of community water wells affected by VOC/VOA chemical constituents and displays them on a per-county basis with the five-digit number that correlates each well to Appendix E.2. These samples were taken at the wellhead, and do not represent PWS system compliance at points of entry to the distribution system.
- Twenty-five wells at twenty-one communities or 4.3 percent of the 580 community wells sampled have indicated detectable levels of pesticides. One of these wells has two pesticide constituents that exceed their respective Class I groundwater standard. Figure 3 illustrates the location of these wells, and the following provides a description of these communities.

1. Allendale-Wabash County - Groundwater monitoring at two PWS wells detected levels of picloram at .111 and .148 ug/l and pentachlorophenol in one well at .043 ug/l, no resample.

2. Arenzville-Cass County - Monitoring results from both of the Village's PWS wells indicate atrazine and alachlor at levels up to 0.53 ppb, analysis confirmed.

3. Chandlerville-Cass County - The Village of Chandlerville currently has only one PWS well. Monitoring results of this well have detected a maximum level of atrazine at 4.8 ppb, metolachlor at 12.0 ppb, cyanazine at 4.5 ppb, and up to 18.0 ppb of alachlor, analysis confirmed. The USEPA drinking water standard and state groundwater standard for atrazine and alachlor are 3.0 and 2.0 ppb, respectively. The State of Illinois provided a $192,000 DCCA grant to Chandlerville to find an alternative source of water supply. Chandlerville has been granted a permit to drill and construct two new wells.

4. Creve Coeur-Tazewell County - Monitoring results conducted by the Agency on a PWS well located in the Village of Creve Coeur has detected a maximum level of alpha chlordane at 0.012 ppb, gamma chlordane at 0.013 ppb, and up to 0.070 ppb of atrazine, not confirmed.

5. Crossville-White County - Monitoring results from one of the community wells detected trifluralin at 0.012 ppb, atrazine at 0.80 ppb and alachlor at 0.12 ppb, no resample.

6. Davis-Stephenson County - Monitoring of one of the community wells at Davis detected 0.53 ppb atrazine, no resample.

7. Forrest-Livingston County - Monitoring from the Forrest PWS indicated low levels of chlordane to 0.01 ppb, not confirmed.

8. Galesburg-Knox County - Monitoring from one well detected levels of dalapon at 3.24 ug/l, no resample.

9. Good Hope-McDonough County - Groundwater monitoring conducted at the Good Hope PWS detected maximum levels of 0.057 ppb of the pesticide alachlor, not confirmed.

10. Heyworth-McLean County - Monitoring results from one of Heyworth's wells indicates trace levels of atrazine and alachlor, not confirmed.

11. Karnak-Pulaski County - Monitoring results from one of the community wells detected 0.035 ppb of metolachlor, no resample.

12. Kirkwood-Warren County - The Village of Kirkwood has a PWS well contaminated with up to 0.17 ppb metolachlor, not confirmed.

13. Lincoln Water Co. - Logan County - Groundwater monitoring by the Agency at one of Lincoln's PWS wells detected atrazine at 0.12 ppb, not confirmed.

14. Mackinaw-Tazewell County - Monitoring results from one of the Village's PWS wells indicates atrazine at levels up to 0.23 ppb, analysis confirmed.

15. Monmouth-Warren County - Analysis conducted on a PWS well located in the City of Monmouth has detected a maximum level of 0.250 ppb of metolachlor, not confirmed.

16. Petersburg-Menard County - Monitoring results conducted by the Agency at one PWS well detected 0.058 parts per billion ppb atrazine, no resample.

17. Plainville-Adams County - Monitoring results conducted by the Agency detected a maximum level of gamma chlordane at 0.012 ppb and up to 0.840 ppb of atrazine in one of Plainville's PWS wells, analysis confirmed.

18. Pleasant Hill-Pike County - Monitoring results from one of the Village's wells indicates atrazine and alachlor at up to 0.17 ppb and 0.08 ppb respectively, analysis confirmed.

19. Rockford-Winnebago County - Groundwater monitoring at one of Rockford's PWS wells detected 0.22 ppb alachlor, no resample.

20. South Pekin-Tazewell County - Monitoring results from both of the Village's PWS wells indicate atrazine, alachlor, metolachlor and cyanazine reaching maximum levels of 1.2 ppb, 1.1 ppb, 2.2 ppb and 0.38 ppb respectively, analysis confirmed.

21. Union/York Public Water District (PWD)-Clark County - Monitoring results conducted by the Agency on both of Union/York PWD wells detected a maximum level of 0.03 parts per billion (ppb) alachlor, no resample.

Figure 3 – Pesticides Detected in PWS Facility Wells

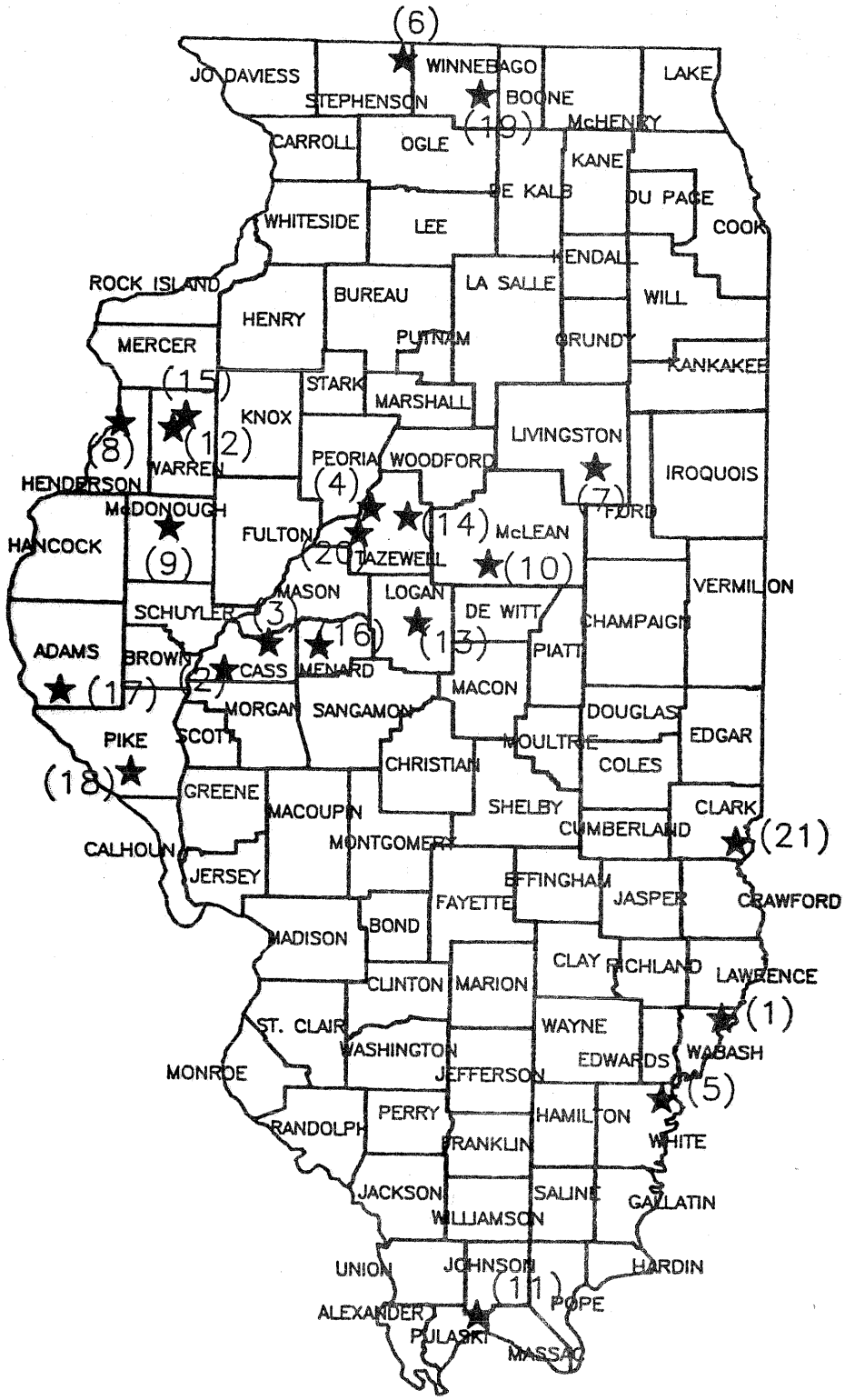


Table III summarizes the levels of detected pesticides in community wells

Table III Summary of Pesticide Analyses in Groundwater

Pesticide	No. of Analyses	No. of Detections	No. of** Wells with Detections	Concentration (ppb) Min.	Max.	Mean	Percentiles* 50%	75%	95%
Alachlor	631	29	9	0.020	18.0	3.2	.17	6.0	15.0
Atrazine	631	33	12	0.050	4.8	0.85	.23	1.0	3.7
Cyanazine	628	11	5	0.050	4.5	1.12	.31	2.0	4.5
Metolachlor	629	21	5	0.100	12.0	4.03	2.2	7.6	11.9

ppb = parts per billion

* Percentiles are a way of expressing the distribution of a sample population over a range. In this instance, the range is the range of detection concentrations. For example, in the table above, for the pesticide alachlor, 95% of all analytical results fall below 15.0 ppb, 75% below 6.0 ppb, and 50% below .17 ppb.

** Well Analyses that contained more than one compound are counted more than once.

The pesticide contamination of the twenty-five community water supply wells can generally be attributed to relatively shallow wells located in moderate to high geologically susceptible areas. In addition, up to twenty of these wells have potential point sources (ag-chem mixing and loading operations) located within either the minimum setback zone (200 or 400 feet) and within or adjacent to the well site survey area (1,000 feet), refer to Appendix C. Preliminary assessments and screening site inspections conducted by the Division of Land Pollution Control's Pre-remedial Program has identified potentially responsible parties (ag-chem mixing and loading operations) for six of the contaminated community water supply wells. For a summary of pesticides detected in public water supply wells, in relation to the information described above, refer to Volume III: Appendix D.

For a detailed account of other organic chemical contamination problems at community water supply wells from ambient community well network testing conducted from 1985 - present, and Safe Drinking Water Act (SDWA) monitoring, and remedial response action taken by the Agency to date, see Volume III: Appendix E.

Evaluation of Safe Drinking Water Act compliance monitoring for synthetic organic chemicals from groundwater supplies in Illinois Community water supply systems are required to monitor for synthetic organic chemicals (SOC's) under the SDWA. The monitoring requirement of the SDWA represent finished water (ie., after treatment application point) quality prior to entering the distribution system. Since treatment application points (TAP) commonly treat water from multiple wells, water quality data representing a specific well may not always be distinguished. Monitoring data (pesticide detections) for groundwater supplies was compiled by the Compliance Assurance Section of the Division of Public Water Supplies and utilized by the Groundwater Section to evaluate potential point-sources (agricultural chemical facilities) and non-point sources in relation to land-use data and geologic vulnerability information obtained from community well site survey reports. The following list provides a summary of the SDWA compliance monitoring for SOC detections from groundwater supplies in Illinois in relation to the well site surveys completed under the IGPA.

Arenzville-Cass Co. - The land use surrounding the wells is agricultural. There were no potential point sources of pesticides observed in the well site survey report dated January, 1989. There was one detection of atrazine at 0.14 parts per billion (ppb). The wells are located in an area of high geologic vulnerability.

Beaverville-Iroquois Co. - The land use surrounding the wells is a mixture of residential, commercial and agricultural. There was one potential point source of pesticides noted in the September, 1991 well site survey report. There was one detection of 2,4-D at 0.11 ppb. The wells are located in an area of moderate geologic vulnerability.

Chandlerville-Cass Co. - The land use surrounding the well is primarily agricultural with some residential and commercial use. There was one observed potential point source of pesticides in the well site survey report dated January, 1989. There were two detections of atrazine, alachlor and metolachlor at levels of 0.86 and 2.40, 1.50 and 3.0, and 2.20 and 3.80 ppb,

respectively. The well is located in an area of high geologic vulnerability.

Chenoa-McLean Co. - The land-use surrounding the wells is a mixture of residential and commercial with a small amount of agricultural crop land. Within the survey area of the community wells, a potential point source of pesticides was identified as noted in the June, 1991 well site survey report. Review of the SDWA monitoring data has shown atrazine at 0.10 ppb. The community wells are located in an area of low geologic vulnerability.

Cherry View Apartments-Winnebago Co. - The land use surrounding the wells is primarily agricultural with some residential use. There were no potential point sources of pesticides noted in the well site survey report dated September, 1989. Atrazine was detected at 0.12 ppb. The well is located in an area with moderate geologic vulnerability.

Clifton-Iroquois Co. - The land use surrounding the wells is mainly residential with some commercial use. Information from the well site survey report dated July, 1991 indicates a potential point source of pesticides within the survey area. Atrazine was detected at 0.14 ppb. The wells are located in an area of low geologic vulnerability.

Davis-Stephenson Co. - The land use surrounding the wells is primarily residential and commercial with some agricultural use. There were no potential point sources of pesticides observed in the well site survey report dated August, 1992. There were two detections of atrazine at 0.14 ppb and one detection of dalapon at 1.60 ppb. The wells are located in an area of high geologic vulnerability.

Downs-McLean Co. - The land use surrounding the wells is residential, commercial and agricultural. A potential point source of pesticides was observed in the well site survey report dated April, 1991. Dalapon was detected at 1.10 ppb. The Downs wells are located in areas with moderate geologic vulnerability.

Ellsworth-McLean Co. - The land use surrounding the wells is a mixture of residential, agricultural and some commercial use. There is one potential

point source of pesticides observed in the well site survey report dated April, 1991. There was one detection of ethylenedibromide at 0.02 ppb. The wells are located in an area of low geologic vulnerability.

Flanagan-Livingston Co. - The land-use surrounding the wells is mostly residential and commercial with some agricultural uses. There was one potential point source of pesticides located within 1,000 feet of the wells as noted in the well site survey report, dated July, 1991. Review of the SDWA monitoring data has shown atrazine at 0.10 ppb. The community wells are located in an area of low geologic vulnerability.

Galesburg-Henderson Co. - The land use surrounding the wells is agricultural. No potential point source of pesticides were observed using available information. Atrazine was detected at 0.11 ppb. The Galesburg wells are in an area with high geologic vulnerability.

Good Hope-McDonough Co. - The land use surrounding the wells is primarily residential and commercial. There was one potential point source of pesticides noted in the well site survey report dated May, 1989. There has been one pesticide detected, dalapon at 1.90 ppb. The wells are located in an area of moderate geologic vulnerability.

Harmon-Lee Co. - The land use surrounding the well is a mixture of residential, agricultural and some commercial use. There was one potential point source of pesticides observed in the well site survey report dated August, 1993. There was one detection of 2,4-D at 0.11 ppb. The well is located in an area of moderate geologic vulnerability.

Hickory Hills Subdivision-Tazewell Co. - The land use surrounding the well is a mixture of agricultural, residential and some woodlands. There were no potential point sources of pesticides observed in the well site survey report dated January, 1992. There was one detection of 2,4-D at 0.11 ppb. The area where the well is located has low geologic vulnerability.

Kinderhook-Pike Co. - The land use surrounding the wells is primarily agricultural with some residential and commercial use. There was one

potential point source of pesticides observed in the well site survey report dated July, 1991. There were two detections of atrazine at 0.12 and 0.27 ppb. The wells are located in an area of high geologic vulnerability.

Knoxville-Knox Co. - The land use surrounding the wells is residential and commercial with a small amount of agricultural use. A potential point source of pesticides was observed in the well site survey report dated December, 1989. Review of the SDWA monitoring data indicated that (2,4-D) was detected at 0.19 ppb. The Knoxville wells are in an area with low geologic vulnerability.

La Harpe-Hancock Co. - The land use surrounding the well is residential with some commercial use. There were no potential point sources of pesticides noted in the well site survey report dated August, 1989. There have been two detections of atrazine at 0.31 and 0.48 ppb, and one detection each of cyanazine, hexachlorocyclopentadiene, and dalapon at 0.63, 0.10 and 3.80 ppb, respectively. The well is located in an area of low geologic vulnerability.

Lincoln-Logan Co. - The land use is primarily woodlands with some heavy industrial use. There were no potential point sources of pesticides observed in the well site survey report dated March, 1991. Atrazine has been detected four times with a range from 0.10 to 0.28 ppb and Picloram once at 0.14 ppb.

Long Creek Township-Macon Co. - The land use surrounding the wells is woodland with some agricultural use. No potential point sources of pesticides were observed in the well site survey report dated March, 1990. Monitoring data has indicated that (2,4-D) was detected at 0.17 ppb. The Long Creek Township wells are located in an area with low geologic vulnerability.

Mackinaw-Tazewell Co. - The land-use surrounding the wells is mostly agricultural with some woodland areas. There was one potential point source of pesticides located within 1,000 feet of the wells as noted in the January, 1988 well site survey report. Review of the SDWA monitoring data has shown 2,4-D at 0.35 ppb. The community wells are located in an area of high geologic vulnerability.

McLean-McLean Co. - The land use surrounding the well is a mixture of

residential and commercial use. There were no potential point sources of pesticides noted in the well site survey report dated January, 1991. There was one detection of three pesticides, dalapon at 2.40 ppb, pentachlorophenol at 0.04 ppb and 2,4-D at 0.90 ppb. The well is located in an area of low geologic vulnerability.

Neponset-Bureau Co. - The land use surrounding the wells is mixed residential and commercial, with minor industrial use. Information from the well site survey reported dated April, 1990 indicates a potential point source of pesticides was identified within the survey area. There was a detection of 2,4-D at 0.12 ppb. The wells are located in an area with low geologic vulnerability.

Ohio-Bureau Co. - The land use surrounding the well is a mixture of commercial and residential. There was one potential point source of pesticides noted in the well site survey report dated July, 1992. There was one detection of 2,4-D at 0.11 ppb. The well is located in an area of low geologic vulnerability.

Orion-Henry Co. - The land use surrounding the wells is mixed residential, commercial and agricultural. There was one potential point source of pesticides located within 1,000 feet of the wells as noted in the well site survey report dated January, 1992. Atrazine was detected at 0.10 ppb. The wells are located in an area with low geologic vulnerability.

Paw Paw-Lee Co. - The land use surrounding the well is a mixture of residential and commercial use. There were no observed potential point sources of pesticides in the well site survey report dated August, 1992. There was one detection of atrazine at 0.63 ppb. The well is located in an area of low geologic vulnerability.

Pekin-Tazewell Co. - The land use surrounding the wells is a mixture of commercial and residential. There were no potential point sources of pesticides observed in the well site survey report dated March, 1989. There were three detections of endothal ranging from 13.00 to 25.00 ppb. The wells are located in areas of high geologic vulnerability.

Petersburg-Menard Co. - The land use surrounding the wells is a mixture of agricultural, commercial and residential. There were no observed potential point sources of pesticides noted in the well site survey report dated January, 1989. Two analyses detected atrazine at levels of 0.26 and 0.27 ppb. The wells are located in areas of high geologic vulnerability.

Plainville-Adams Co. - The land use surrounding the wells is a combination of residential, commercial and agricultural. A potential point source of pesticides was observed in the well site survey report dated September, 1989. Atrazine was detected at 0.47 ppb. The Plainville wells are in an area with high geologic vulnerability.

Roanoke-Woodford Co. - The land use surrounding the wells is primarily residential and commercial with some agricultural use. There was one potential point source of pesticides observed in the well site survey report dated June, 1989. There was one detection of atrazine at 0.10 ppb. The wells are located in an area of moderate geologic vulnerability.

Rockford-Winnebago Co. - The land use surrounding the wells is a mixture of residential, commercial, industrial, some agricultural and open areas. There were no potential point sources of pesticides observed in the well site survey report dated April, 1989 and none were noted from additional information that was reviewed. There was detections of two pesticides. Atrazine was detected five times ranging from 0.10 to 0.36 ppb and dalapon was detected once at 2.00 ppb. The wells are located in areas with both high and low geologic vulnerability.

Roseville-Warren Co. - The land use surrounding the well is rural, composed entirely of agricultural row crops. There were no observed potential point sources of pesticides noted in the February, 1990 well site survey report. Review of the SDWA monitoring data has shown atrazine detected at 0.18 ppb. The well is located in an area of moderate geologic vulnerability.

South Pekin-Tazewell Co. - The area surrounding the South Pekin wells is mainly residential and commercial with some agricultural use. There was one potential point source of pesticides noted in the well site survey report

dated March, 1989. There has been one detection of atrazine at 0.23 ppb. The wells are located in an area of high geologic vulnerability.

Stanford-McLean Co. - The land use surrounding the wells is primarily residential, with some commercial and agricultural use. There was one potential point source of pesticides noted in the well site survey report dated March, 1989. There was one detection of dalapon at 1.10 ppb. The wells are located in an area of low geologic vulnerability.

Stockton-Jo Daviess Co. - The land use surrounding the wells is a mixture of residential, commercial and industrial use. There were multiple potential point sources of pesticides observed in the well site survey report dated August, 1989. There was one detection of atrazine at 0.14 ppb. The wells are located in an area of low geologic vulnerability.

Tuscola (Douglas Water Co. Inc)-Douglas Co. - Land use surrounding the wells is residential and commercial with some agricultural use. A potential point source for pesticides was observed in the well site survey report dated March, 1990. The constituent 1,2-dibromo-3-chloropropane (DBCP) was detected at 0.02 ppb. The Tuscola wells are located in areas with low geologic vulnerability.

Review of the pesticide contamination results from the SDWA compliance monitoring program indicates that of the thirty-five community water supplies with detectable levels of pesticides, twenty-one supplies had at least one potential point source (agricultural chemical facility) located within the survey area (1,000 feet) of their wells. Fourteen of the thirty-five supplies did not have any observed potential point sources located within the survey area. However, the above information was based upon available data. All public water supply facilities have not been sampled for pesticides pursuant to SDWA compliance monitoring. Hence, extrapolations based on this data may not be valid on a statewide basis.

Design of an Ambient Network for Community Water Supply Wells

Section 7(b)(1) of the IGPA requires the development of a long term statewide monitoring well network. This network is to be composed of public

water supply wells sampled by the Agency, non-community wells sampled by DPH, and a representative sampling of other existing private wells and newly constructed monitoring wells.

After consultation with the United States Geological Survey, SGS and SWS, the Agency developed a random stratified network intended to represent pesticide contamination levels in all active community water supply wells. The community well network is stratified by depth, aquifer type and the presence of aquifer material within 50 feet of surface. Additionally, the network is based on a probability of occurrence that will provide a 95 percent statistical confidence in the data with an associated plus or minus 5 percent precision and accuracy level. In order to randomize the sampling schedule spatially and temporally, 17 random groups of 21 wells, with alternates, were selected from all the active wells in the State. Each of these 17 random groups is a sample period. To further assure maximum temporal randomization within practical constraints, the samples from each sample period will be collected over a three week period. Figures 4, 5 and 6 illustrate the distribution of wells (primary sites and alternates) that occur in a typical sampling schedule. In addition, different symbols are used to display the associated stratification criteria.

The Agency has evaluated and purchased immunoassay equipment as a cost-effective screening technique to assess the 350 network wells for triazines and alachlor. Immunoassay testing costs one-twentieth what normal analytical procedures cost for pesticides. The Agency initiated the community well network in July. Detections obtained through the immunoassay screening will be quantified with gas chromatography and mass spectrophotometery.

In addition, each of these wells will be sampled for inorganic and volatile and aromatic constituents.

Agency Community Well Trend Network

The Agency has begun analysis of the community well trend network results. Over a two year period, the Agency analyzed quarterly samples from 50 community water wells for IOCs, VOCs, and SOCs. The wells were selected from a

group of previously studied wells utilizing single aquifer systems as their water source. These wells were classified by aquifer system, and water usage by county. The fifty wells selected had the same ratio of aquifer types as the group from which they were selected. The purpose of the community well trend network was to determine if water quality parameters varied seasonally within a year or over a period of years. Figure 7 illustrates the locations of the trend wells and their associated aquifer type.

IDOA Rural Private Well Survey

This statewide survey was a statistically-designed sampling program to estimate the occurrence of agricultural chemicals in rural, private water-supply wells in Illinois. Groundwater samples were collected one time from 337 randomly selected wells and analyzed for nitrate, nitrite, and a number of pesticides and pesticide metabolites. Sampling began in March 1991 and was completed in April 1992. The IDOA, the Cooperative Extension Service-University of Illinois at Urbana-Champaign (CES), and the SGS conducted the survey as a cooperative interagency project.

Approximately 12 percent of the 360,000 rural, private wells in the State are estimated to contain detectable concentrations of at least one pesticide or pesticide degradation product.

Figure 4 – Ambient Network Well Stratification
(Aquifer within 50 Feet of Surface)

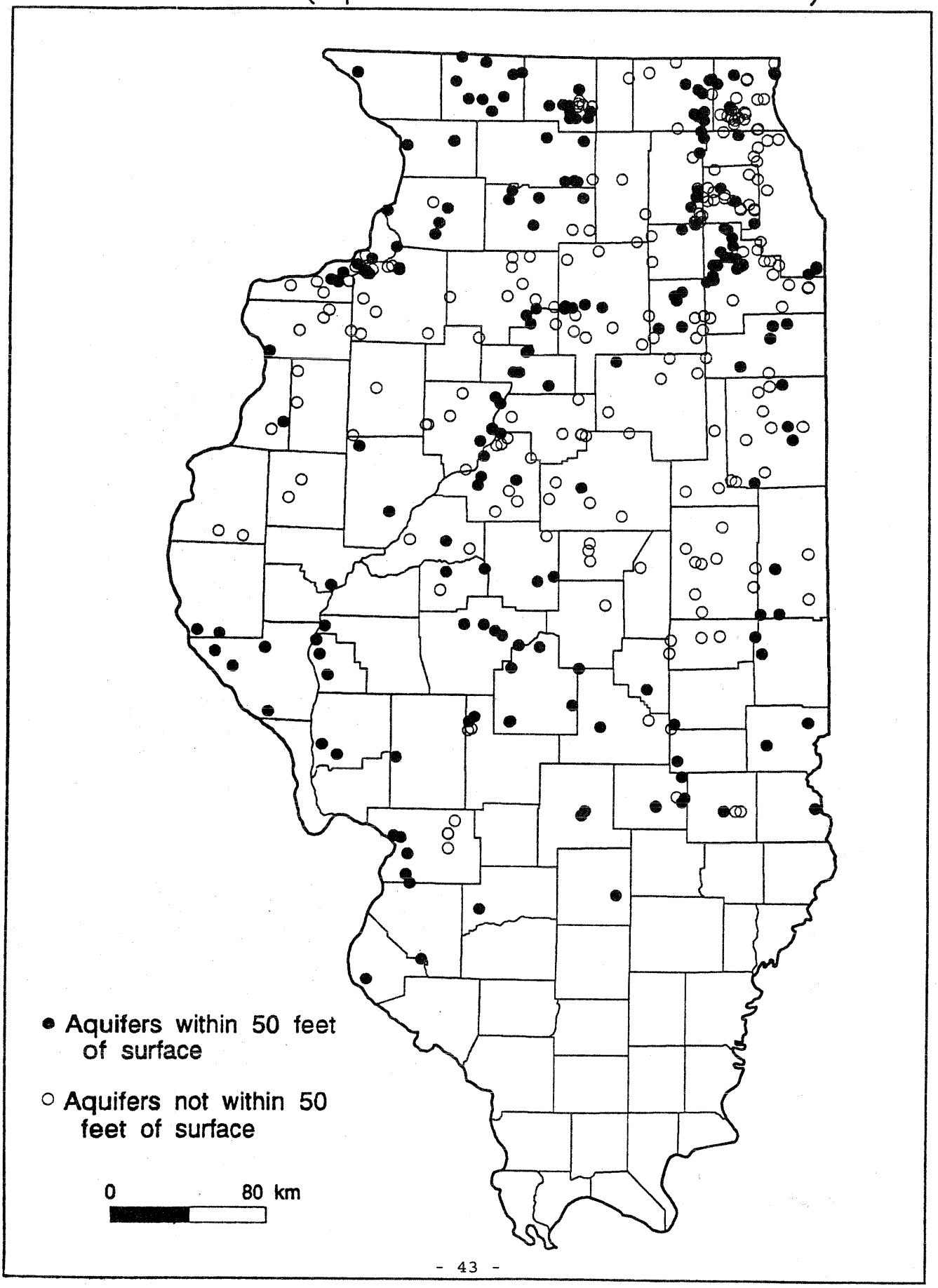


Figure 5 — Ambient Network Well Stratification
(Well Depth Range)

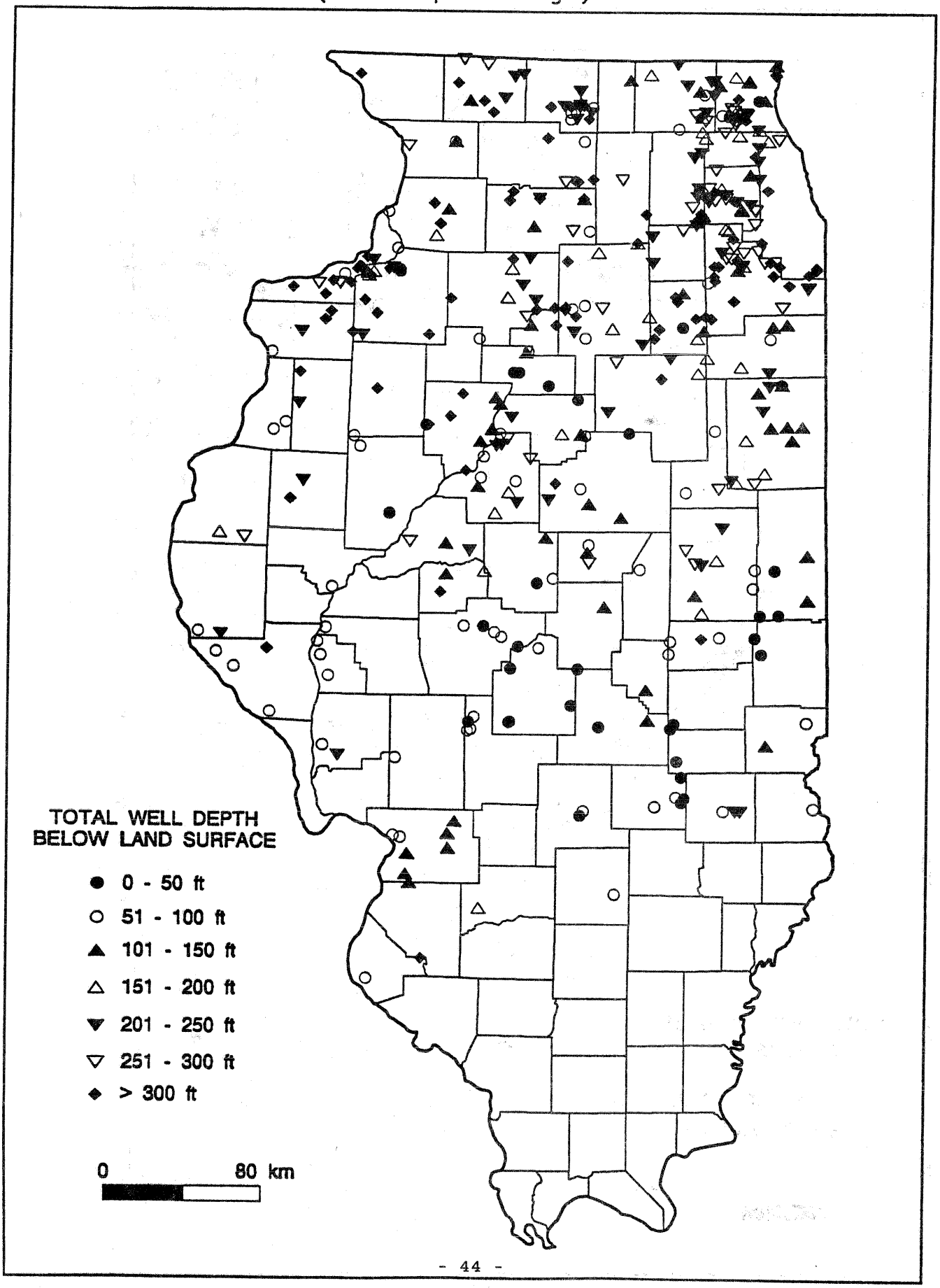


Figure 6 — Ambient Network Well Stratification (Aquifer Type)

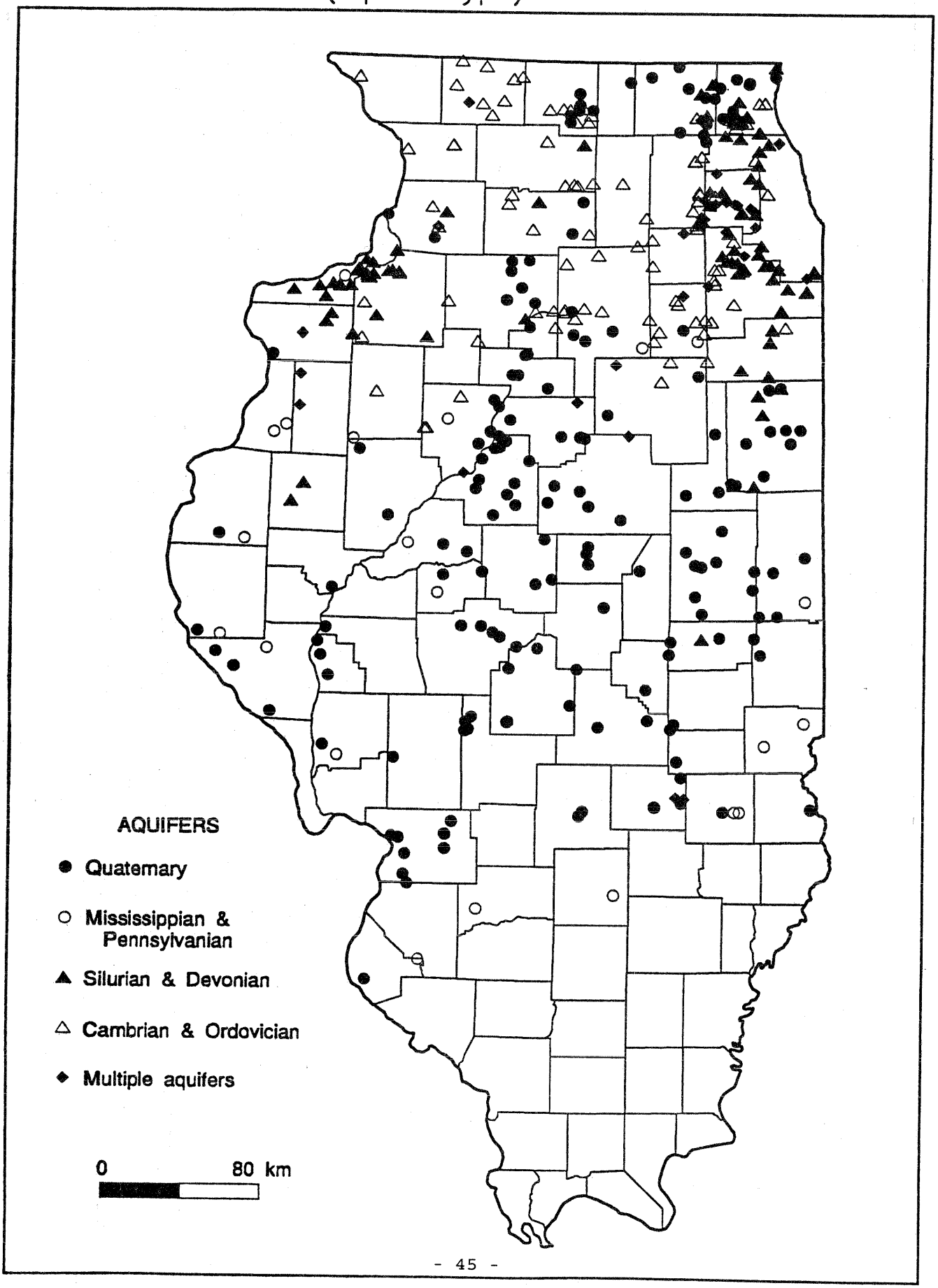
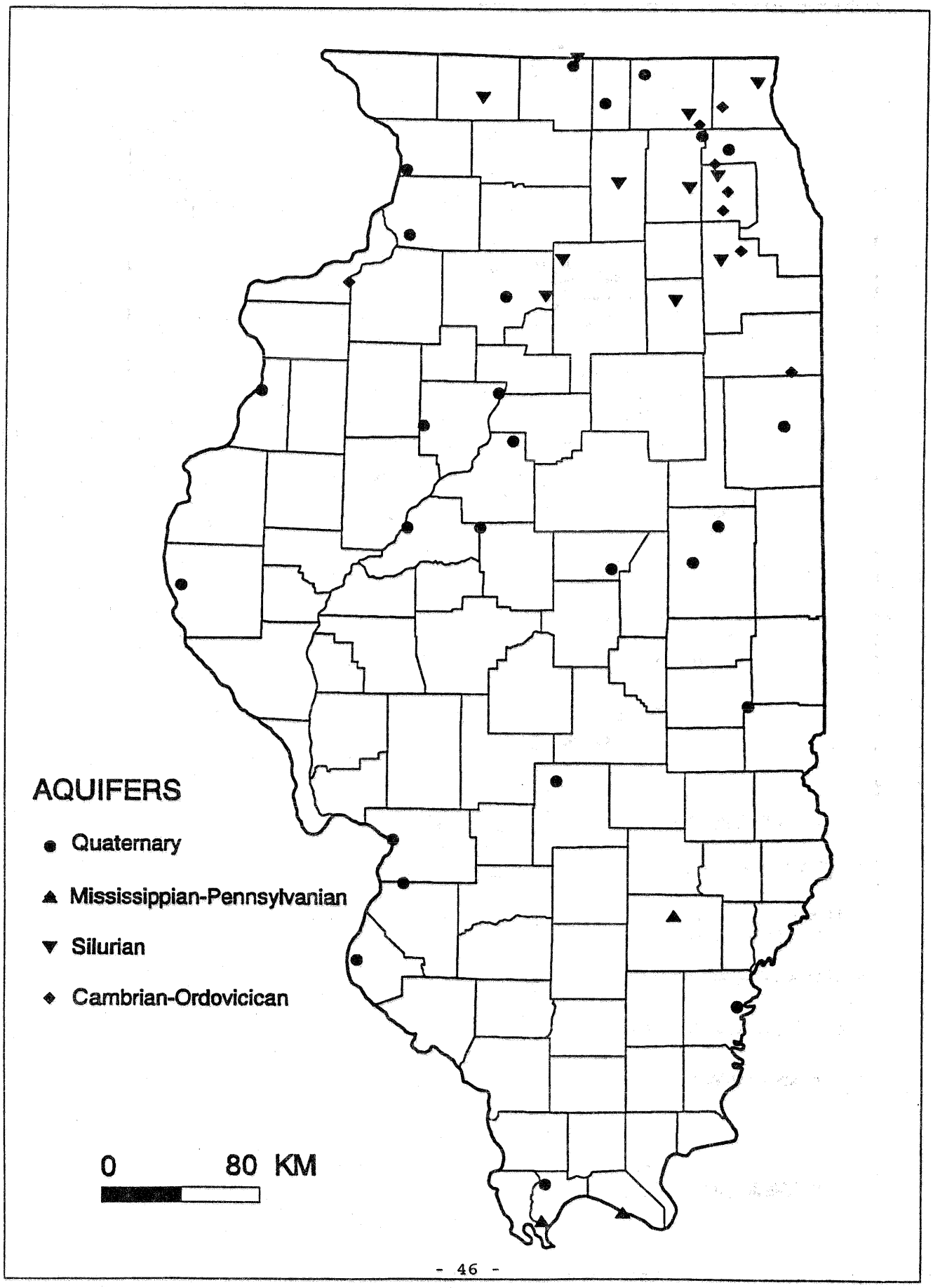


Figure 7 – Trend Site Network



However, only a portion of wells (about 2 percent) contained concentrations of pesticides that exceed health-based guidelines for drinking water. More than one fourth of rural wells contained nitrate at levels greater than 3 parts per million (mg/L). These concentrations frequently indicate contamination from sources such as nitrogen fertilizer, septic systems, or animal wastes. About 38,000 wells (10.5 percent) are estimated to contain nitrate at levels exceeding the drinking water standard (MCL) of 10 mg/L. Contamination of sampled wells was determined to be related to the type of well construction and the well depth. Sampled wells in areas where aquifers occur within 20 feet of land surface are more likely to contain high levels of nitrate.

Groundwater Quantity, Use and Expansion Efforts

The issues of groundwater quantity, use and expansion were initially considered by the Illinois State Water Plan Task Force in the publication of the Illinois State Water Plan in January of 1984. This plan made numerous policy recommendations concerning the need for improved protection and management of the groundwater resources of the State. These policy level recommendations were reviewed and expanded on, at the request of the Governor's Office, by a committee of the Illinois State Water Plan Task Force. This Committee initiated its efforts to study groundwater quantity issues in March of 1988. After eleven months of study, the groundwater quantity committee prepared a 200 page report describing twenty-three significant groundwater quantity issues in Illinois. The committee also developed a report on groundwater supplies versus demands in Illinois as well as legislative initiatives.

The groundwater quantity committee held public meetings on groundwater quantity issues in February of 1989 and worked with 18 interest groups during the spring of 1989 to develop acceptable legislative language to address the most pressing groundwater quantity issues. The administration and agencies continued to work with interest groups through the end of the 1989 spring legislative session without reaching an agreement on legislative language that

was acceptable to all interests.

Legislative initiatives to address groundwater quantity issues were again considered by the administration, agencies and interest groups during the 1990 spring session. The legislature and interest groups continued the debate concerning groundwater quantity issues into the 1991 spring session. The main interest in groundwater quantity issues during the 1990 and 1991 sessions of the legislature centered on the proper form of authority and management powers that should be granted to locally organized special purpose groundwater management districts.

Since the late 1980's, ten special purpose groundwater management districts were formed in Central Illinois. These districts were organized under the Water Authorities Act which was passed in 1951. The main purpose for the formation of these special water authorities was to protect local groundwater resources from the development of well fields by municipalities located outside the water authority. Water authorities vary in size from single township to multi-county. It is anticipated that there will be a continuing interest in developing proper legislative revisions to the Water Authorities Act in upcoming sessions of the General Assembly.

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GROUNDWATER REGULATIONS

COMPREHENSIVE WATER QUALITY STANDARDS FOR GROUNDWATER

Establishment of comprehensive groundwater quality standards is a critical component of the groundwater protection program. Such standards are ultimately necessary to provide a practical means of defining expectations for groundwater quality and determining the adequacy of the protection program. In particular, groundwater standards are useful in four ways:

1. General water quality goals (e.g., drinking water) must be translated into chemical and microbiological parameters which can be monitored and analyzed. Using scientific "standards," we then have a way of determining the relative "goodness" or "badness" of actual groundwater around the State. Over time, we can also keep track of the progress being made to achieve or maintain desirable groundwater quality.

2. Certain facilities and activities need to be designed and operated so as to minimize the potential for contaminating groundwater. Groundwater standards can be used to determine the performance expectations and characteristics of control technologies which are utilized. In setting such standards, one must work out many procedural details. For example, at what point or location do the standards become applicable to a facility or portions thereof? How does one sort out changes in background water quality as opposed to site related impacts?

3. Use of groundwater at specific geographic locations, such as withdrawal of water from a well for municipal usage, should be compatible with the characteristics or suitability of such waters. Thus, determinations regarding the particular characteristics of quality to be ascribed to groundwater has direct implications for the acceptable uses which may be pursued at some point.

4. Where significant contamination of groundwater has occurred, water quality standards can be useful in setting site cleanup objectives. Such restoration of groundwater often involves complex evaluations of applicable treatment technology, institutional mechanisms and economic implications of alternative cleanup scenarios. Central to these considerations are cost-effective decisions regarding the suitability of resultant groundwater. As part of this process, standards serve as a necessary reference point.

Section 8(a) of the IGPA required the IEPA, after consultation with the Interagency Coordinating Committee on Groundwater and the Groundwater Advisory Council, to propose, and the Board to adopt within two years:

> ...comprehensive water quality standards for the protection of groundwater. In preparing such regulations, the Agency shall address, to the extent feasible, those contaminants which have been found in groundwater of the State and which are known to cause, or suspected of causing cancer, birth defects, or any other adverse effect on human health according to nationally accepted guidelines...

After much evaluation, a specific group of constituents including pH, were selected to be regulated by groundwater quality standards. These were selected because they had health or welfare based limits according to nationally accepted guidelines. The recommended health criteria are primarily based upon federally adopted or proposed drinking water standards, while the remainder are based upon other uses such as irrigation and livestock watering. Taste and odor factors were also considered. The resulting chemicals listed in the regulation were also confirmed to be present in Illinois groundwater.

The Agency proposed, and the Board adopted these standards within the time frames specified in Section 8(a) of the IGPA. The Board subsequently issued its final order adopting the groundwater quality standards as a final Rule on November 7, 1991. The groundwater standards regulation became effective on November 25, 1991.

Implementation of Groundwater Quality Standards Within the Agency's Groundwater Programs

In the February 1992 Biennial Report on Groundwater Protection, the ICCG summarized the groundwater standards regulations. The past two years have been devoted to integrating and implementing these regulations within the Agency and other State programs where appropriate. The Agency's Bureau of Land (BOL) and Bureau of Water (BOW) programs have integrated the groundwater standards into permit and design standards where appropriate.

The preventive management and response provisions of the groundwater quality standards regulation are also being incorporated into DLPC's programs.

New Groundwater Standards Proposal - In an attempt to constantly update groundwater standards, the Agency has developed a proposal for adding new constituents and standards to the existing regulations. In general, the new standards are being proposed primarily in response to new drinking water standards adopted by USEPA. These drinking water standards were used as a basis for groundwater standards where the constituents have been found as contaminants in Illinois groundwater.

Preventive Notice and Response Program for Community Water Supply Wells -

The groundwater standards regulation (35 Ill. Adm. Code 620) provides protection for current and future beneficial uses of groundwater. Subpart C sets forth a narrative nondegradation standard for all resource groundwater. Pursuant to Section 620.305, groundwater monitoring can trigger preventive notification procedures which involve resampling of monitoring well(s) or water well(s) in Class I or III groundwater.

The purpose of a preventive notice is to provide an assessment of potentially responsible contamination sources for community water supply wells which have had detections of organics or metal levels below the groundwater standard(s). It is intended to be a preventive measure where the Agency has the authority to require nearby potential primary or secondary sources to sample on-site monitoring wells within 30 days of the date of issuance of the notice and provide the information back to the Agency based on a detection in a community water supply well. If the analyses indicate a detection of one or more of the preventive notice constituents, the Groundwater Section will notify the owner or operator of the potential primary or secondary sources identified within 2,500 feet of a community well as to the resampling responsibilities of the potential source. The owner or operator of the potential primary or secondary source must resample each water or monitoring well for the contaminant identified in the notice if the contaminant or material containing such a contaminant is or has been stored, disposed of or otherwise handled at the site.

The objective of this process is to determine a potential source of contamination and to initiate a response before the community well becomes contaminated with organics or metals above the groundwater standard(s).

The Groundwater Section has established a process to review all of the Safe Drinking Water Act (SDWA) compliance and ambient monitoring data. The organic chemical constituents and heavy metals that are being detected in community water supply wells are being evaluated in relation to the well site surveys that have been completed for community wells.

Preventive Response Activities - When the Groundwater Section receives

analytical results indicating detection in the sampling completed by the owner or operator of a potential primary or secondary source required under Section 620.310(A)(1)(B), the Section may be required to conduct a well site survey and identify sites or activities that represent a hazard to the availability of groundwater unless a needs assessment has been previously prepared. This would initiate work on relating groundwater advisories to the preventive notice and response procedures.

Groundwater Management Zones - Groundwater Management Zone (GMZ) provisions are established under the groundwater quality standards (35 Ill. Adm. Code 620) regulation as a means of dealing with contaminated groundwater that are in the process of being remediated. A GMZ can be established within any class of groundwater. The goal of a GMZ is remediation, if practicable, of the groundwater back to the level of the standards applicable to that class of groundwater.

Both the Agency's Bureau of Land and Bureau of Water have developed and implemented a standard operating procedure for evaluating and approving GMZ applications.

Implementation of the Groundwater Quality Regulations Within Other State Agency and Regulatory Programs

The efforts made to date in implementing the groundwater quality regulations by regulatory programs within other state agencies is summarized below.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH - Implementation of Groundwater Quality Standards Within the Illinois Department of Public Health Regulations - The Illinois Department of Public Health (IDPH) is responsible for regulating all non-community and private potable water supply wells in the State. The IDPH has integrated and is working to incorporate the groundwater quality standards as they apply to their regulatory programs in a number of areas, including:

1) IDPH is required to issue permits for new well construction (except for community water supply wells) per Illinois Water Well Construction Code

(Chapter 111 1/2, par 116.111). Current rules in the Water Well Construction Code (Ill. Adm. Code 920) allow the IDPH to deny a permit where information indicates the aquifer contains contamination. The IDPH is working to amend this rule to define contamination as water quality which exceeds standards adopted by the Board under 35 Ill. Adm. Code 620.

2) The Code also requires that the owner of a contamination source provide an acceptable source of water to any well owner where the groundwater quality exceeds "the groundwater quality standards which are adopted by the Board." The IDPH is working to amend the Illinois Water Well Construction Code to incorporate the groundwater quality standards as a definition for contamination and require a new water supply be provided where these standards are exceeded.

3) The IDPH has signed agreements with 69 local health departments to conduct the water program. As part of this agreement, the local health department must pass an ordinance which adopts the Water Well Construction Code. By adopting the groundwater quality standards in the IDPH's Water Well Code, the local ordinance will also have adopted the groundwater standards.

ILLINOIS DEPARTMENT OF MINES AND MINERALS (IDMM) - and the Agency have been cooperatively developing an industry wide memo to describe the impacts of the new regulations on the coal mining industry. After the guidance memo described above is completed, a standardized reporting form will be developed. In addition, all current applications which involve potential impacts to groundwater are currently being evaluated using the new regulations. One site has been identified which requires the establishment of a groundwater management zone.

ILLINOIS DEPARTMENT OF NUCLEAR SAFETY - In addition to siting a low-level radioactive waste disposal site, the Illinois Department of Nuclear Safety is involved in a groundwater remediation effort. The groundwater remediation effort is summarized below.

The Sheffield low-level radioactive waste disposal site (LLW site) is

located about 40 miles northwest of Peoria and about 35 miles southeast of Moline/Rock Island. The LLW site is 20 acres in size and is surrounded by another 170 acres that serve as a buffer zone between the site and adjoining property. The LLW site operated from 1966 until 1978. During that time, about 3.2 million cubic feet of low-level radioactive waste were buried in 21 shallow earthen trenches.

In 1976, tritium (a radioactive form of hydrogen) was discovered in shallow groundwater beneath the 20 acre site. This was the first evidence of radioactivity leaking from the burial trenches. In 1981, tritium was discovered in groundwater just to the east of the site. This was the first evidence of radioactive material moving off the 20 acre site. Since then, tritium movement has been traced farther to the east where it discharges into a small lake (Trout Lake) located about 1,000 feet from the site. The groundwater carrying the tritium away from the site and Trout Lake are both located within the 170 acre buffer zone that surrounds the site. Trout Lake serves to both dilute and impound the vast majority of tritium moving from the site. To date, only minute quantities of radioactive material have been detected beyond the buffer zone. No known exposure to nearby residents has occurred.

The above-described tritium movement was the subject of several studies spanning nearly a decade. As a result of these studies, specific remedial actions were required by the Illinois Department of Nuclear Safety. A key component of these activities is a highly-compacted, low-permeability clay cap designed to reduce significantly the amount of water entering the waste trenches and thus eliminate waste leaching at the source. During 1989, the new cap and other remedial activities were completed at the site operator's expense. At that time, the maximum tritium concentration in groundwater was about 400 nanocuries per liter (nCi/L...see Note 1). Concentrations continued to increase until August, 1990; at that time the maximum concentration was almost 900 nCi/l. Since then however, concentrations have decreased dramatically; as of July, 1993, the maximum concentration was 370 nCi/l.

Tritium levels in Trout Lake are typically about 1% of the groundwater concentrations are likewise decreasing. These data indicate that the reductions in contamination observed over the past few years are due to the remedial actions required by the Department.

In summary, the Sheffield LLW site operated for a period of about 12 years. Since then, some radioactive materials have been observed leaking from the disposal trenches and into groundwater beneath the buffer zone that surrounds the site. In 1989, remedial actions were completed that were designed to reduce this leakage. Data collected to date indicate that the remedial activities are indeed functioning as designed.

Note 1: For the purposes of this synopsis, it isn't necessary to understand precisely what nCi/L means... understanding the changes (increases and decreases) is what's important. In any event, a nanocurie (nCi) is a measure of radioactivity equal to 37 nuclear transformations per second; a liter (L) is a measure of volume equal to about one quart.

GROUNDWATER TECHNOLOGY CONTROL REGULATIONS

Section 14.4 of the Illinois Environmental Protection Act, as amended by Section 14.4 of the IGPA, required the IEPA to propose, to the Board, regulations pertaining to the following activities:

"1. landfilling, land treating, surface impounding or piling of special waste and other wastes which could cause contamination of groundwater and which are generated on the site, other than hazardous, livestock and landscape waste, and construction and demolition debris;

2. storage of special waste in an underground storage tank for which federal regulatory requirements are not applicable;

3. storage and related handling of pesticides and fertilizers at a facility for the purpose of commercial application;

4. storage and related handling of road oils and de-icing agents at a central location; and

5. storage and related handling of pesticides and fertilizers at a central location for the purpose of distribution to retail outlets."

Section 14.4 required the Board to consider (1) appropriate programs for water quality monitoring; (2) reporting, record keeping and remedial response measures; (3) appropriate technology-based measures for pollution control; and (4) requirements for closure or discontinuance of operations at the activities described above.

On December 6, 1991 the Board unanimously adopted these regulations.

The groundwater technology control regulations establish requirements for activities which were not addressed by the setback provisions of the IGPA. Thus, the legislative focus was directed at specific activities that pose significant potential for producing groundwater contamination, and which were not otherwise currently subject to all of the groundwater protection requirements described in Section 14.4 of the IGPA. Since these regulations only apply to certain activities within setback zones regulated by the Act or within regulated recharge areas, the primary intent is to assure that all sources have appropriate monitoring, reporting, technology controls and closure requirements. The regulation consists of two parts, (35 Ill. Adm. Code 615) applies to existing activities located within minimum setback zones, maximum setback zones, or regulated recharge areas, while (35 Ill. Adm. Code 616) regulates new activities located in such areas.

The Agency is currently evaluating all well site surveys to compile an inventory of who is regulated and is also concurrently developing an integrated tracking and compliance database. The data base is also being designed to be integrated into the Agency's Geographic Information System (GIS). This compliance database is being designed as a public domain software, and will allow distribution of this data base to regulated owners/operators free of charge. Hopefully this will reduce the burden on regulated activities, many of which are small businesses, and also facilitate information exchange. After inventory efforts are complete, field inspections will be conducted to determine compliance.

In addition, the Agency is developing a cooperative with IDPH for activities located within the setback zone of wells regulated by IDPH. This process will involve local health departments and the Agency working to educate the local public to implement the groundwater technology control regulations. A database is being designed to track this progress and the Agency is looking into public domain software to acquire the information associated with the database. After inventory efforts are complete, field inspections will be conducted to determine compliance.

AGRICULTURAL CHEMICALS AND GROUNDWATER PROTECTION PROGRAM

The past two years have been exceptionally busy and challenging ones for the Department in terms of activities associated with the protection of groundwater. During this time period, the Department completed the multi-agency "Statewide Survey for Agricultural chemical in Rural, Private Water Supply Wells" and the "Agrichemical Facility Site Contamination Study". The Department, as chair of the Pesticide Subcommittee of the Interagency Coordinating committee on Groundwater (ICCG), continued the development of a Generic State Management Plan for Pesticides in Groundwater and the Department continued the administration of the Agrichemical Facility Containment Program established under the Illinois Pesticide Act and 8 Illinois Administrative Code 255. Amendments to the Lawncare Products Application and Notice Act and subsequent rule promulgation created the Lawncare Containment Program. Also during this period the legislature mandated the Department and the Illinois Environmental Protection Agency to develop a Cooperative Groundwater Protection Program for agrichemical facilities located within the setback zone or regulated recharge area of a community or private well. Short descriptions of each of these activities follow.

Statewide Survey for Agrichemicals in Rural, Private Water Supply Wells. The statewide survey was a statistically-designed sampling program to estimate the occurrence of agricultural chemicals in rural, private water-supply wells in Illinois. Groundwater samples were collected one time from 337 randomly selected wells and analyzed for nitrate, nitrite, and a number of pesticides and pesticide metabolites. Sampling began in March 1991 and was completed in April 1992. The Illinois Department of Agriculture, the Cooperative Extension Service-University of Illinois at Urbana-Champaign (CED), and the Illinois State Geological Survey (ISGS) conducted the survey as a cooperative interagency project.

A fact sheet which summarizes the overall design and implementation of the study, significant results, and preliminary interpretations of the results of water-quality analyses was developed and distributed.

Results of the statewide survey provide the first statistically reliable estimates of the extent of pesticide and nitrate contamination of rural, private water-supply wells in Illinois.

Initial results indicate that:

- About 12 percent of the estimated 360,000 rural, private wells in the state contained detectable concentrations of at least one pesticide or pesticide degradation product. However, only a small portion of wells (about 2 percent) contained concentrations of pesticides that exceed health-based guidelines for drinking water.
- More than one fourth of rural wells contained nitrate at levels greater than 3 parts per million (mg/L). At this concentration, contamination from sources such as nitrogen fertilizer, septic systems, or animal wastes is frequently found. About 38,000 wells (10.5 percent) are estimated to contain nitrate at levels exceeding the drinking water standard (MCL) of 10 mg/L.
- Contamination of sampled wells was related to well construction and well depth.
- Sampled wells in areas where aquifers occur within 20 feet of land surface wee more likely to contain high levels of nitrate.

Copies of the factsheet which summarizes the results of the statewide survey are available from the Bureau of Environmental Programs, Illinois Department of Agriculture, State Fairgrounds, Springfield, IL.

Agrichemical Facility Site Contamination Study - In August of 1990, the Illinois Pesticide Act was amended to require the Department to develop "procedures, methods, and guidelines for addressing agrichemical pesticide contamination at agrichemical facilities in Illinois." Based on that mandate, the Department consulted with the Illinois State Geological Survey and various industry groups to arrive at a study design which would provide the necessary information which would allow development of "guidelines and recommendations regarding the long term financial resources which may be necessary to remediate pesticide contamination at agrichemical facilities in Illinois."

The design of the program included six areas of study: (1) an investigation of the occurrence and distribution of pesticides in unconsolidated geologic materials (referred to collectively as "soils") at agrichemical facilities, (2) an investigation of pesticides in well water and groundwater at agrichemical facilities, (3) the development of definitions of "contamination" regarding pesticides in soils at agrichemical facilities, (4) the development of cost-effective procedures for facility site assessments, (5) an investigation of cost effective technologies for site remediation, and (6) the development and operation of a Department program to authorize the land application of pesticide contaminated soils at agronomic rates originating from agrichemical facilities.

The field work associated with the project was completed in late 1992. The final report was approved by the Pesticide Control Committee on June 11, 1993 and by the Interagency Pesticide Committee on July 7, 1993. It was then submitted to the governor and leaders of the General Assembly in late July. Copies of the final report can be obtained from the Bureau of Environmental Programs, Illinois Department of Agriculture, State Fairgrounds, Springfield, IL.

Generic State Management Plan for Pesticides in Groundwater - The United States Environmental Protection Agency in its Pesticides and Groundwater Strategy has put forth the concept that States should have the major role in determining whether a compound present a hazard to its groundwater resource and that States should have the flexibility of designing protection programs that will be specifically effective in protecting its resource. The Pesticide Subcommittee of the ICCG continues to develop generic program components to be considered as principles or concepts to be incorporated in compound specific state management plans as they are required in future years. Also, the generic plan provides preventative guidance measures which, if followed, may allow the State to address possible groundwater problems associated with pesticides even before USEPA would determine that a compound specific plan was warranted. The components are not all inclusive and may require adjustment or

refinement over time, depending on the specific compound under study. They are built on the premise that the people of the State of Illinois are willing to support the development, implementation and enforcement of compound specific management plans that my limit the use of certain compounds to certain areas of the state in the name of groundwater protection. The components are built on compromises between an ideal basis for assessment and planning and what is practical using available resources. It is understood that possible use limitations resulting from a compound specific management plan may potentially place some areas of the state at a competitive disadvantage. However, in the long term, the potential economic implications resulting from unchecked aquifer contamination in areas particularly vulnerable will place the entire state at an even more severe economic disadvantage for generations to come. The subcommittee anticipates the presentation of a final draft to the ICCG in early 1994. At that time, the final draft will be re leased to interested parties of the general public for comment. It is also anticipated that USEPA will publish proposed rules at or near the same time which will name the compounds which will require state compound specific plans as a condition of continued registration.

Agrichemical Facility Containment Program and Lawncare Containment Program

The Department, under the authority granted in the Illinois Pesticide Act and the rules of 8 Illinois Administrative Code 255 and 256, administers the Agrichemical Facility Containment Program and the Lawncare Containment Program. The agrichemical facility containment program provides for various structural and operation/management practices targeted at ground and surface water protection at the approximately 1300 facilities across the state. The rules affecting these facilities became effective on January 1, 1990 and provided for phased-in requirements from 1990 through 1997, depending on the type and condition of the facility. The rules require a facility apply for and be issued a construction and operating permit. Through October, 1993, the Department has received 2,412 permit applications and modification requests and has issued 895 permits. As of this time, all facilities except those with

both operational and secondary containment in place at the time of registration must have all containment requirements in compliance. Facilities with both operational and secondary containment at the time of registration have until January, 1995 to be in total compliance. Facilities with large tanks (>100,000 gallons) must notify the Department of intent to remain in service and have until January 1, 1995 to submit a permit application. Non-commercial facilities and the dry bulk fertilizer components of commercial facilities must be in total compliance by January 1, 1995.

Amendments to the Lawncare Products Application and Notice Act passed in 1992 required the Department develop rules regarding the construction and operation of wash water containment areas at lawncare facilities not affected by the agrichemical facility containment program. This rulemaking was completed in early 1993. As of October, 1993, the Department had received 42 permit applications and had issued 8 permits. The Department anticipates application submittal to greatly increase as the 1993 business season ends and owner/operators have an opportunity to develop proposals.

Cooperative Groundwater Protection Program - In April 1993, the Department and IEPA jointly developed and released a discussion document relative to the development of a cooperative groundwater protection program for agrichemical facilities, lawncare facilities, central distribution facilities and other affected facilities located within a setback zone or regulated recharge area of a community or private water supply well. This document was intended to further facilitate the process of establishing a cooperative groundwater protection program, for facilities or sites in response to public Act 87-1108, passed and signed into law in 1992. Several meetings with affected interest groups were held prior to the adoption of P.A. 87-1108 that discussed a series of issues and options for an alternative program to the current Illinois Pollution Control Board (Board) regulations. These issues and options were further narrowed by P.A. 87-1108 that required that a cooperative program be developed which at a minimum adequately addresses the following considerations:

- a facility review process, using available information when appropriate to determine those sites where groundwater monitoring will be implements;
- requirements for groundwater quality monitoring for sites identified above;
- reporting response, and operating practices for the types of designated facilities; and
- requirements for closure or discontinuance of operations.

These components were to form the basis for an integrated and functional alternative program rulemaking proposal. Using those components, the document presented a focused and cohesive framework for the cooperative program rules. In this manner, it was hoped that the document would achieve orderly development of the final rulemaking proposal to be filed by the Illinois Department of Agriculture with the Joint Committee on Administrative Rules (JCAR).

After a series of meetings with various interest groups and organizations and the development of several intermediate proposals, a rulemaking proposal was filed with JCAR during September 1993. The proposal was truly an alternative to 35 Ill. Adm. Code 615/616 in that the groundwater monitoring requirements were considered by the Department and the IEPA to be somewhat less stringent then those contained in the current Pollution Control Board regulations. Facility structural and operational requirements beyond those already included in either 8 Ill. Adm. Code 255 (agrichemical facility containment program) or 8 Ill. Adm. Code 256 (lawncare containment program) were included in the proposal as a substitute to the more restrictive groundwater monitoring requirements of the Pollution Control Board regulations. At the time this manuscript was prepared, the proposal was in the second public comment period and was scheduled for consideration by JCAR at its December 1993, meeting.

ILLINOIS WELLHEAD PROTECTION PROGRAM

In the long run, groundwater protection needs to be more prevention-oriented to be truly effective since full restoration of groundwater quality can be very difficult and costly once contamination occurs. Under the IGPA, drinking water supplies (public and private) receive protection from potential routes and sources of groundwater contamination by use of setback zones. Such protection regulates the spatial relationships between water supplies and potential contamination routes and sources. In all cases, existing water supply wells are protected from encroachment by new potential routes or sources of contamination. In a like manner, new water supply wells may not be located so as to create a threatening situation with respect to existing potential routes and sources. This approach ensures a baseline program that will prevent, or greatly lessen, the likelihood of well contamination by the most direct means.

Under Section 1428 of the Safe Drinking Water Act (SDWA) as amended in 1986, states were required to prepare and submit a Wellhead Protection Program (WHPP) to the United States Environmental Protection Agency (USEPA). USEPA fully approved the Illinois WHPP on September 27, 1991.

Wellhead Protection Area Delineation

The Illinois Wellhead Protection Program establishes delineation of Wellhead Protection Areas (WHPAs) in two phases. The term delineation only refers to the establishment of an area. In Phase I, all 10,000 community and non-community water supply wells are delineated using the fixed radius method with a distance criteria of 1,000 feet, the Phase I WHPA is shown in Figure 8. The 1,000 foot threshold will remain the WHPA for all confined aquifer systems and non-community wells.

Figure 8 – Illustration of Phase I Wellhead Protection Area

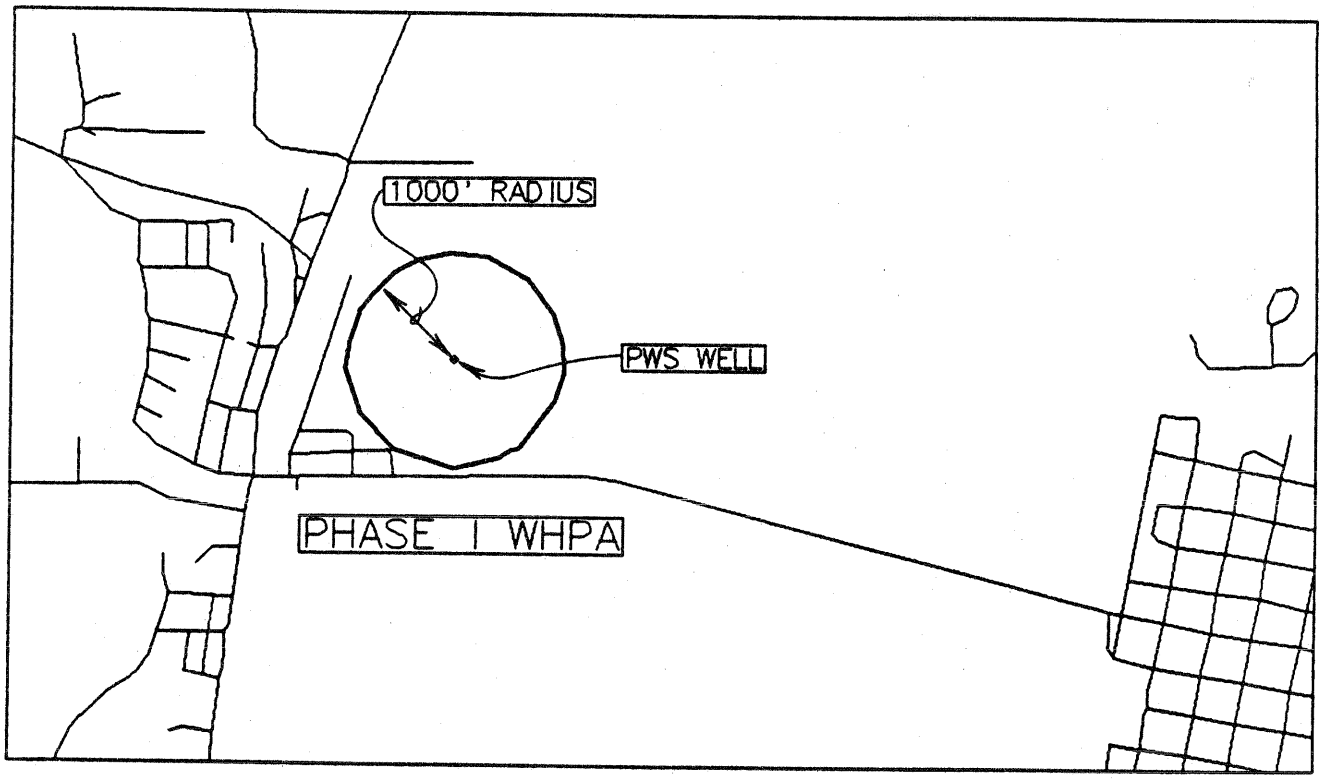
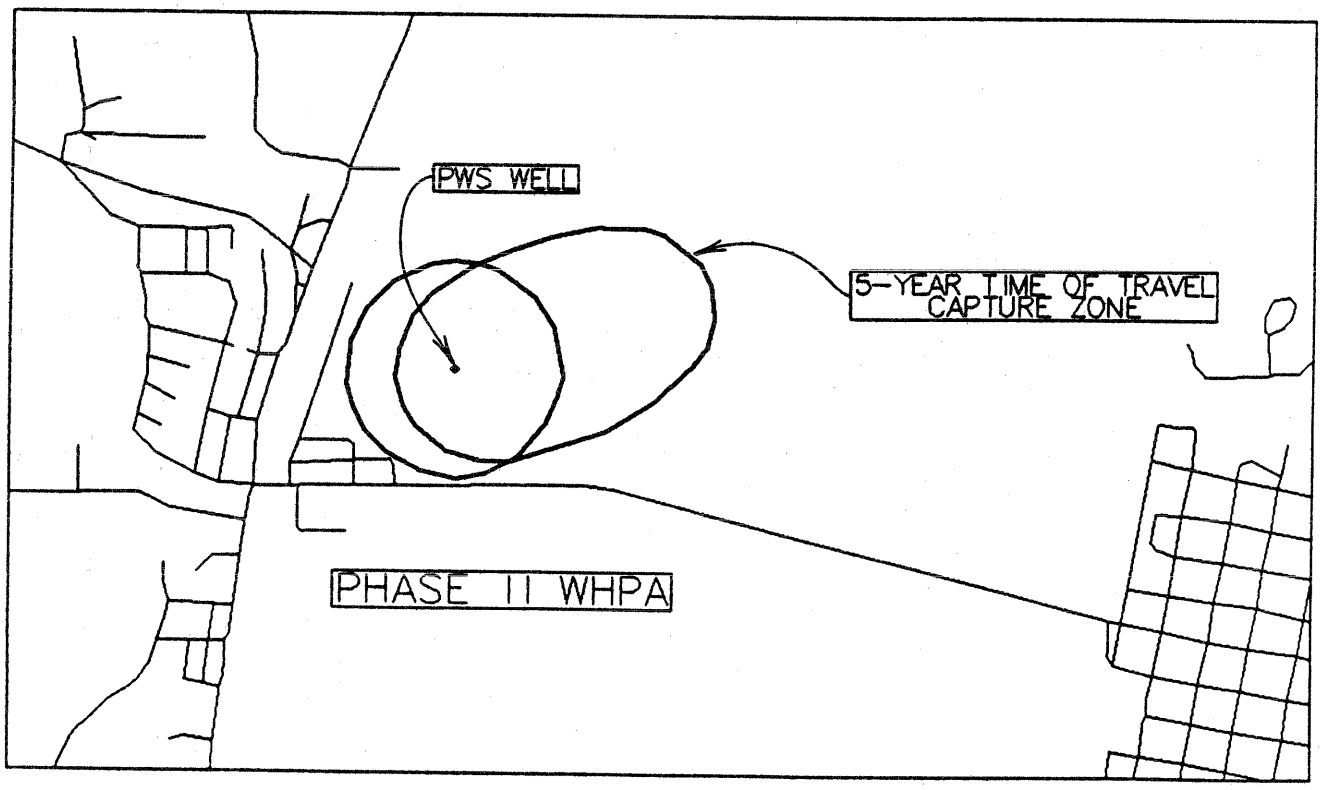


Figure 9 – Illustration of Phase II Wellhead Protection Area



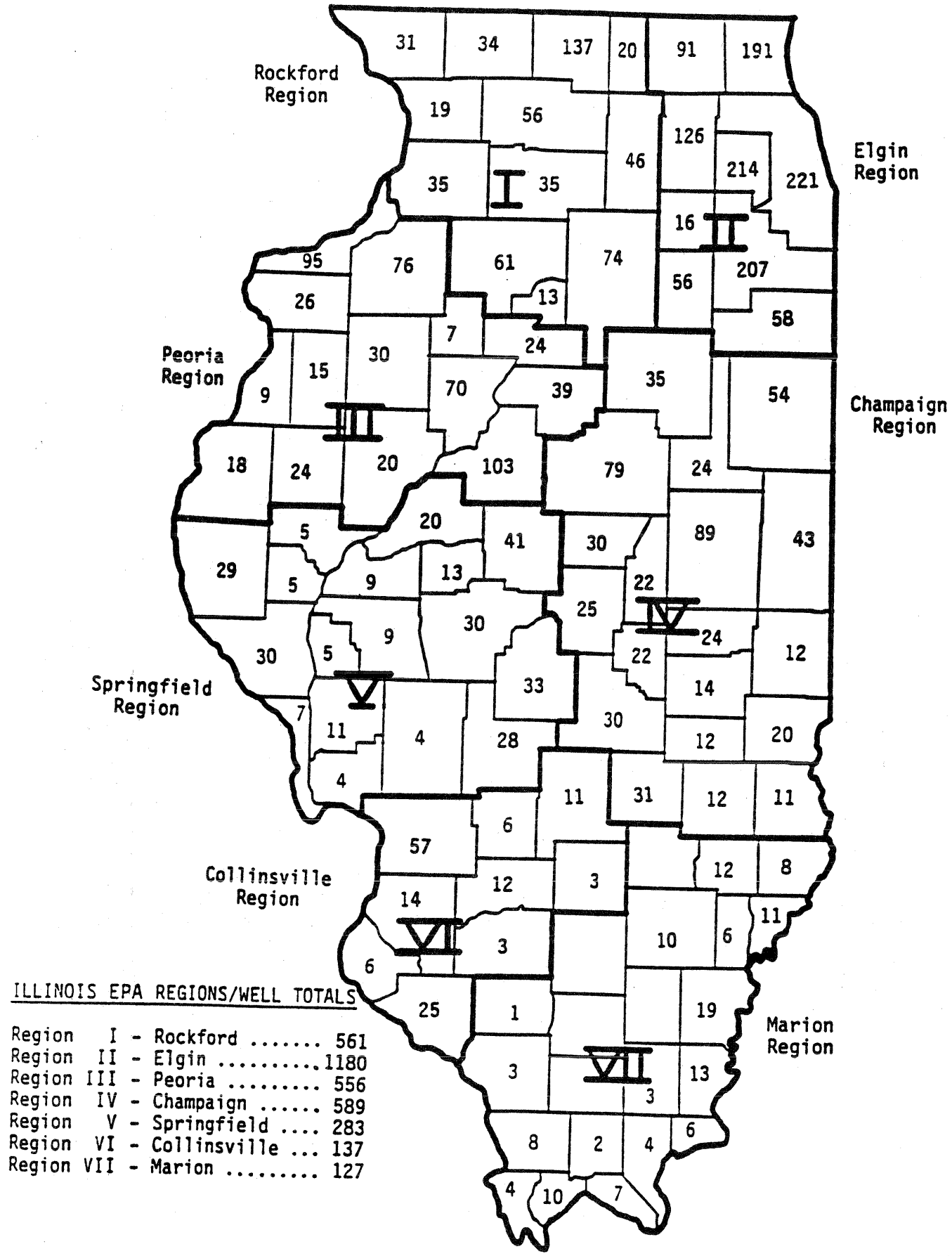
In Phase II, WHPAs for all community wells withdrawing water from unconfined aquifers will be delineated using analytical models, numerical models, or hydrogeologic mapping. The total number of CWS wells constructed in unconfined aquifers for which Phase II delineations are required, has been estimated to be 500 wells. The Phase II WHPA will be based on a 5 year time of travel capture zone. The Phase II WHPA delineation will provide a map of the approximate area which will contribute water to a community well in a five-year period. Any portion of the 5-year time of travel capture zone which exceeds the 1,000 foot fixed radius will be combined with the Phase I WHPA as illustrated in Figure 9. To date, the Agency has delineated Phase II WHPA's for 44 wells that supply twelve community water supplies. At a minimum the Agency will delineate up to 30 more Phase II WHPA's by September 30, 1994.

Potential Contamination Source and Potential Route of Contamination Identification

The Agency is conducting contaminant source inventories for all Phase I WHPAs out to a distance of 1,000 feet from a wellhead through its well site survey program. Source identification beyond 1,000 feet will be accomplished through a cooperative source identification program involving the Agency and the community water supply officials. The State continues its education efforts and technical assistance activities to promote the local source identification initiative.

Well Site Survey Program - Section 17.1 of the IGPA requires the IEPA to conduct a well site survey program for all the community water supply wells in the State. Figure 10 illustrates the distribution of community water wells per county within the State. Well site surveys provide an inventory of potential sources, routes and other activities within a 1,000 foot survey area.

Figure 10 — Number of Community Wells per County



ILLINOIS EPA REGIONS/WELL TOTALS

Region	I - Rockford	561
Region	II - Elgin	1180
Region	III - Peoria	556
Region	IV - Champaign	589
Region	V - Springfield	283
Region	VI - Collinsville ...	137
Region	VII - Marion	127

The IEPA compiles the field information for each well and prepares a formal report for each community water supply. Each well site survey report provides recommendations to the facility based upon the information discovered through the survey process. The well site survey report also contains basic hydrogeologic information about each community well such as depth, age, general surficial geologic susceptibility, geologic well logs, well construction details, and aquifer utilized. Additionally, the report contains a summary of the groundwater chemistry. This information can be used by the community to begin establishing a groundwater protection program.

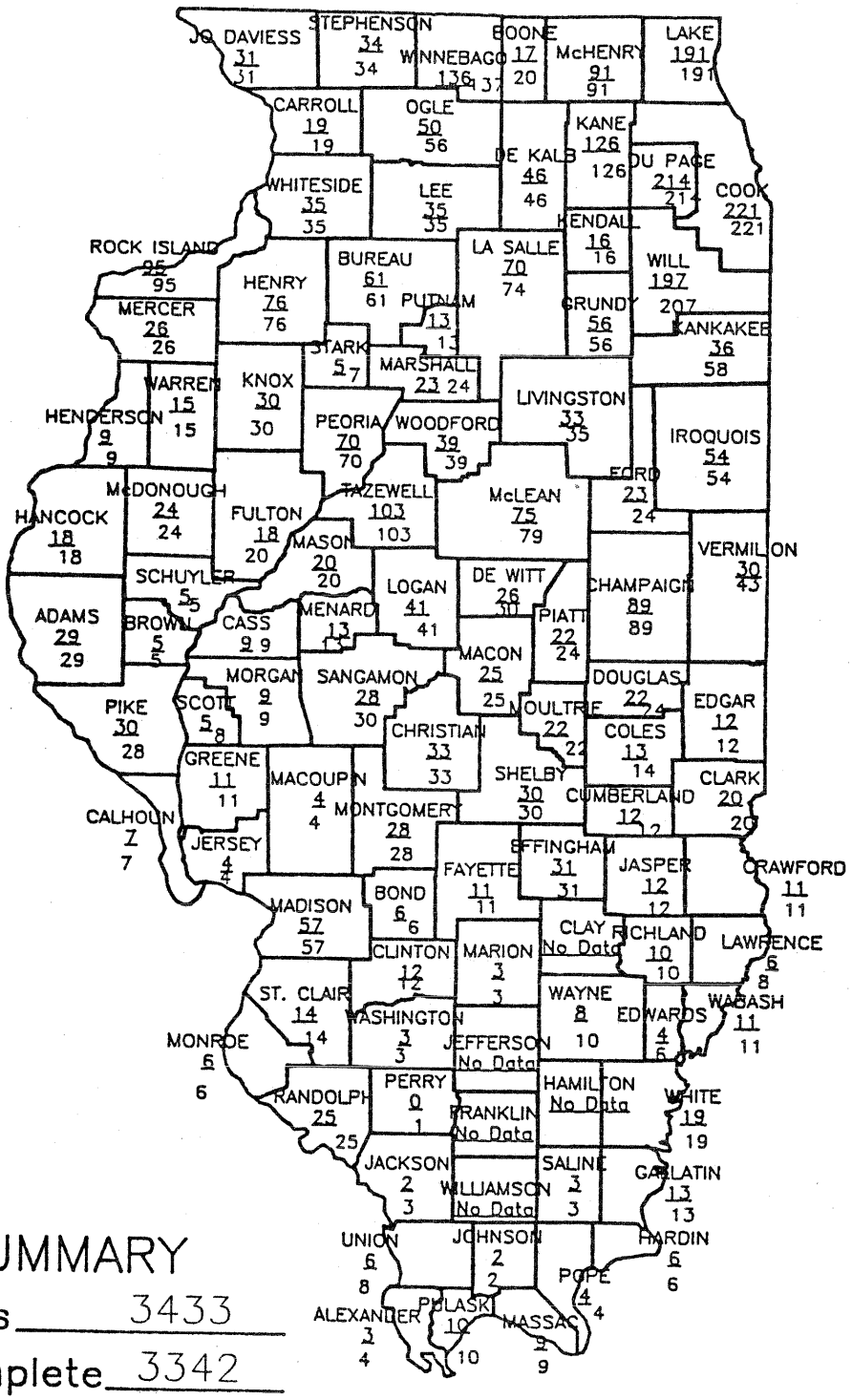
Since beginning the well site survey program in 1988 the IEPA has made significant progress. As of November, 1993 the Agency has surveyed 3,342 community wells and has completed 97 percent of the total number of well site field surveys. In addition, the Agency has completed 1,059 well site survey reports which represents approximately 78 percent of the total number of reports to be completed. Figure 11 illustrates the progress made on the well site survey program on a geographic basis. This figure indicates the total number of community wells in each county relative to the number of surveys completed. Figure 12 indicates the IEPA's progress on completion of well site survey reports relative to the total number of community supplies.

Results from the well site survey program to date clearly demonstrate the need for minimum and maximum setback zone protection. A number of wells with potential sources in close proximity have also shown organic chemical contamination.

Groundwater Reviews and Assessments

Groundwater Hazard Reviews - In accordance with Section 17.1 of the Act, a county or municipality having a population of less than 25,000 or 5,000 persons respectively, may request the IEPA to perform a hazard review after a well site survey report has been completed. While the IGPA does not directly specify how to perform a hazard review, Section 17.1(h) of the Act does list the factors the Agency is to consider as follows:

Figure 11 – Number of Well Site Surveys Completed per County



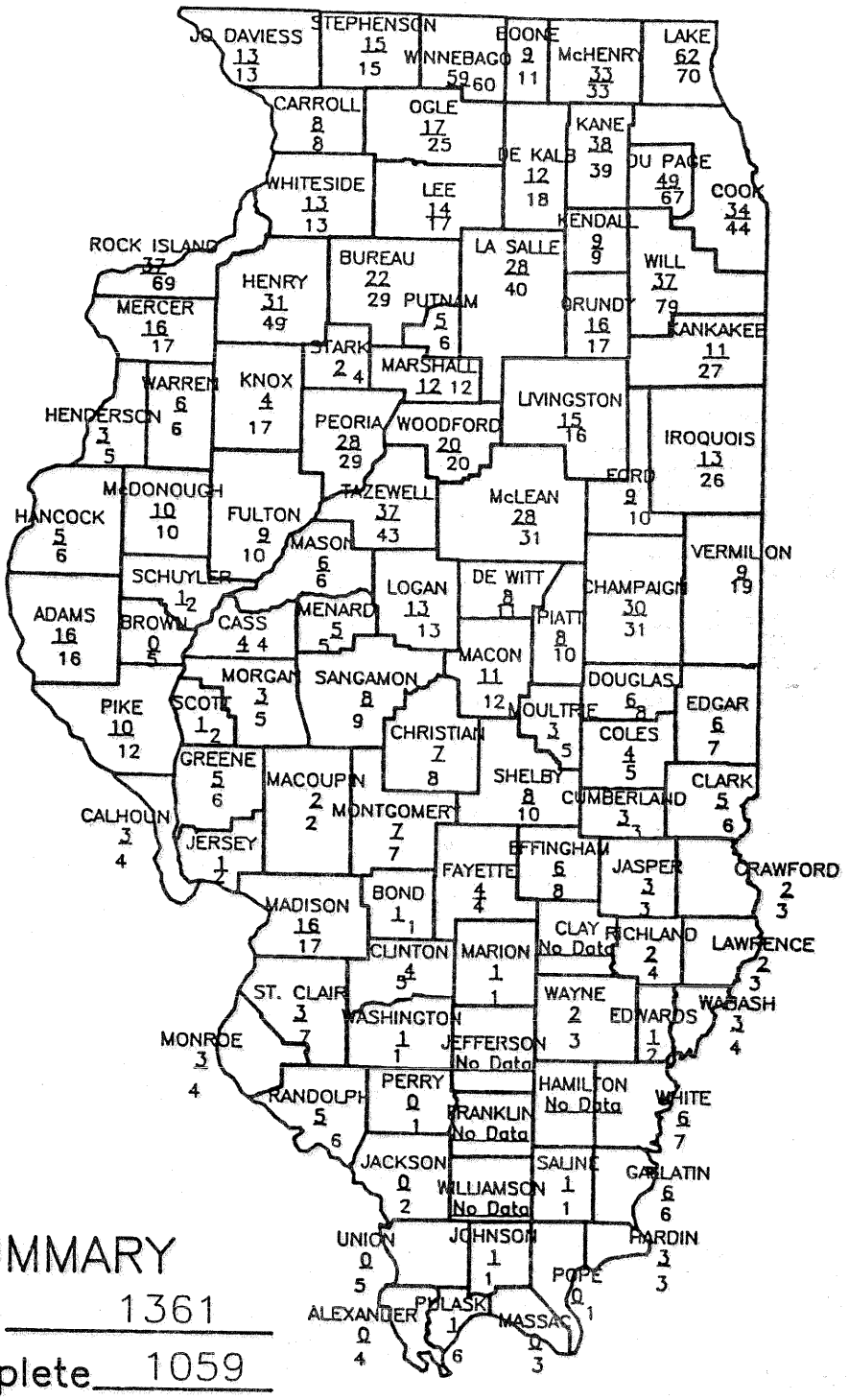
SUMMARY

Total Surveys 3433

Surveys Complete 3342

% Complete 97

Figure 12 – Number of Well Site Survey Reports Completed per County



SUMMARY

Total Reports 1361

Reports Complete 1059

% Complete 78

"identify potential primary sources, potential secondary sources, and potential routes which present a hazard to the continued availability of groundwater for public use, given the susceptibility of the groundwater recharge area to contamination."

Using this as a guide, the Agency developed a hazard review protocol consisting of the following five steps:

- a detailed survey of potential sources and routes of contamination out to a distance of 1,500 feet from the well;
- delineation, to the extent practicable, of the recharge area outside of applicable setback zones;
- an audit of permit files, cleanup site information, registered underground storage tanks, toxic chemical release reports, and groundwater monitoring data within 3,000 feet of the community well field;
- a hazard ranking according to the minimal hazard criteria of Section 14.5 of the IGPA; and
- a correlation of all the information described above to determine what poses a potential hazard to the continued availability of the groundwater for public use.

Hazard Review Reports were completed for the following communities: Geneseo (Henry County), Marengo (McHenry County), Union, (McHenry County), Richmond (McHenry County), Lacon (Marshall County), Sparland (Marshall County), and Neartown MHP (Winnebago County). Additionally, a hazard review request has been received for the City of Grandview. The Agency expects to complete this Hazard Review in FY94.

The IEPA utilizes available hydrogeologic data to perform groundwater modeling and geologic interpretation of the recharge areas for these reports. Field work involves the use of a global positioning system (GPS) and onsite evaluations of hazard potential. Each report relates a delineated recharge area to the existing zoning, potential sources and routes of contamination, and the hazard rating for each of these sources and routes.

Each hazard review recommends that communities consider the benefits of adopting maximum setback zones, establishing regulated recharge areas, and

performing further study of aquifer properties to confirm the groundwater modeling results contained in the reports. In addition, communities were advised to consider these factors and land use zoning when siting new community wells. Hazard Reviews also present an excellent opportunity for the Agency to encourage voluntary management efforts such as pollution prevention. The Agency is prioritizing these areas of increased interest and awareness for outreach and further follow-up action.

Groundwater Protection Needs Assessments

Section 17.1 of the Illinois Environmental Protection Act, as amended by Section 17.1 of the IGPA, provides the authority to every county or municipality served by a community water supply well to perform a groundwater protection needs assessment. The IGPA specifies that groundwater needs assessments shall include the following:

"1. Evaluation of the adequacy of protection afforded to resource groundwater by the minimum setback zone and, if applicable, the maximum setback zone;

2. Delineation, to the extent practicable, of the recharge area outside of any applicable setback zones but contained within any area for which the county or municipality has jurisdiction or control;

3. Identification and location of potential primary and potential secondary sources and potential routes within, and if appropriate, in proximity to the delineated recharge area for each such well;

4. Evaluation of the hazard associated with identified potential primary and potential secondary sources and potential routes contained within the recharge area specified according to subparagraph (a)(2) of this Section, taking into account the characteristics of such potential sources and potential routes, the nature and efficacy of containment measures and devices in use, the attenuative qualities of site soils in relation to the substances involved, the proximity of potential sources and potential routes and the nature, rate of flow, direction of flow and proximity of the uppermost geologic formation containing groundwater utilized by the well;

5. Evaluation of the extent to which existing local controls provide, either directly or indirectly, same measures of groundwater protection; and

6. Identification of practicable contingency measures, including provision of alternative drinking water supplies, which could be implemented in the event of contamination of the water supply."

Pilot Groundwater Protection Needs Assessments

The SGS and SWS began work on a needs assessment for the City of Woodstock in December of 1990. This report is scheduled to be completed by November of 1994. The State has also provided grants to the Village of Cary in McHenry County and the Pleasant Valley Public Water District in Peoria County for the purpose of performing pilot groundwater protection needs assessments. These needs assessments have been completed and the Agency is doing follow-up work at this time to promote groundwater protection measures at these communities.

Pekin Needs Assessment - The IEPA completed a Pilot Groundwater Protection Needs Assessment for the City of Pekin in November of 1992. The City is provided water by the Illinois American Water Company-Pekin Division (IAWC-Pekin). The assessment is a comprehensive evaluation of the hydrogeology, potential sources of groundwater contamination, contingency planning, local zoning and provides options for protecting the City's groundwater resource. The City of Pekin was primarily chosen because it is located within one of the three Priority Groundwater Protection Planning Regions. Illinois' groundwater program establishes these planning regions based on a recharge area planning map developed by the SGS and SWS. Both of these aspects of the program are also required under the IGPA.

The assessment conducted by the IEPA utilized site-specific hydrogeologic data, on-site inspections and multiple computer software programs including: ModelCad, MODFLOW, GWPATH, SURFER, for hydrogeologic characterization, Trimble global positioning system, and GRASS GIS software to evaluate the study area. The assessment also utilized the geologic stack-unit mapping methodology developed by the SGS, to characterize the surficial and subsurface geological materials.

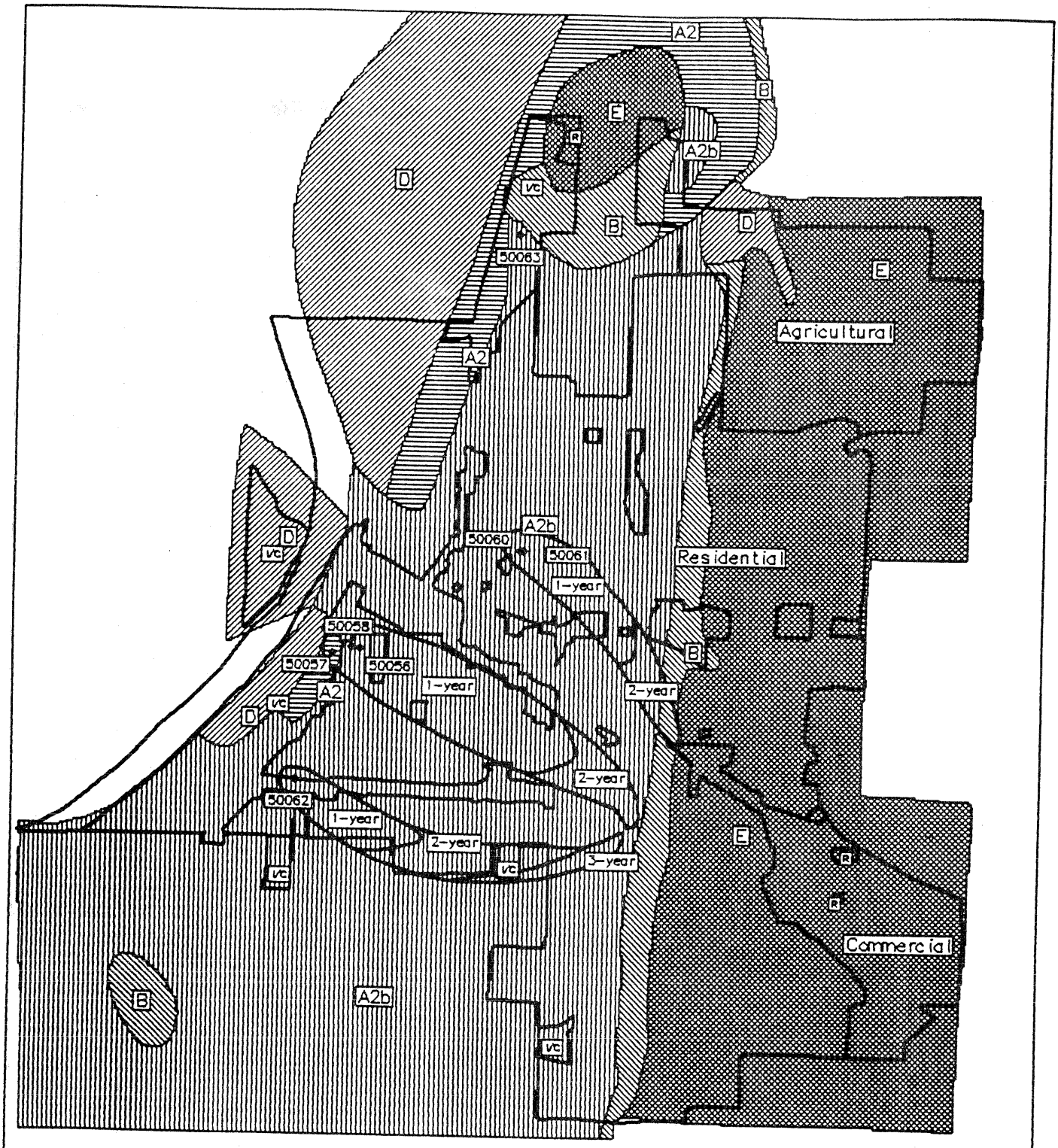
A GIS was used to interrelate and spatially evaluate different physical layers of information, including the relationship between the recharge areas of the IAWC-Pekin community wells to: local zoning, potential point sources of groundwater contamination; and evaluation of agricultural cropland for non-point source contamination (see Figures 13 and 14).

With respect to the provisions of Section 17.1 of the IGPA, the pilot groundwater protection needs assessment concluded that the establishment of an ordinance for an irregularly shaped maximum setback zone as well as a regulated recharge area or local regional groundwater protection program would further protect the IAWC-Pekin wells. Evaluation of the hazard associated with the identified sources and routes within the recharge area indicated that potential secondary sources pose a significant hazard to the IAWC-Pekin wells. Evaluation of the protection provided by the existing local controls indicated that some indirect protection is provided because the majority of the recharge area for the IAWC-Pekin wells is zoned residential. However, there are also areas of commercial and industrial zoning within and proximate to the recharge areas. No municipal ordinances or planning documents related specifically to groundwater protection were identified.

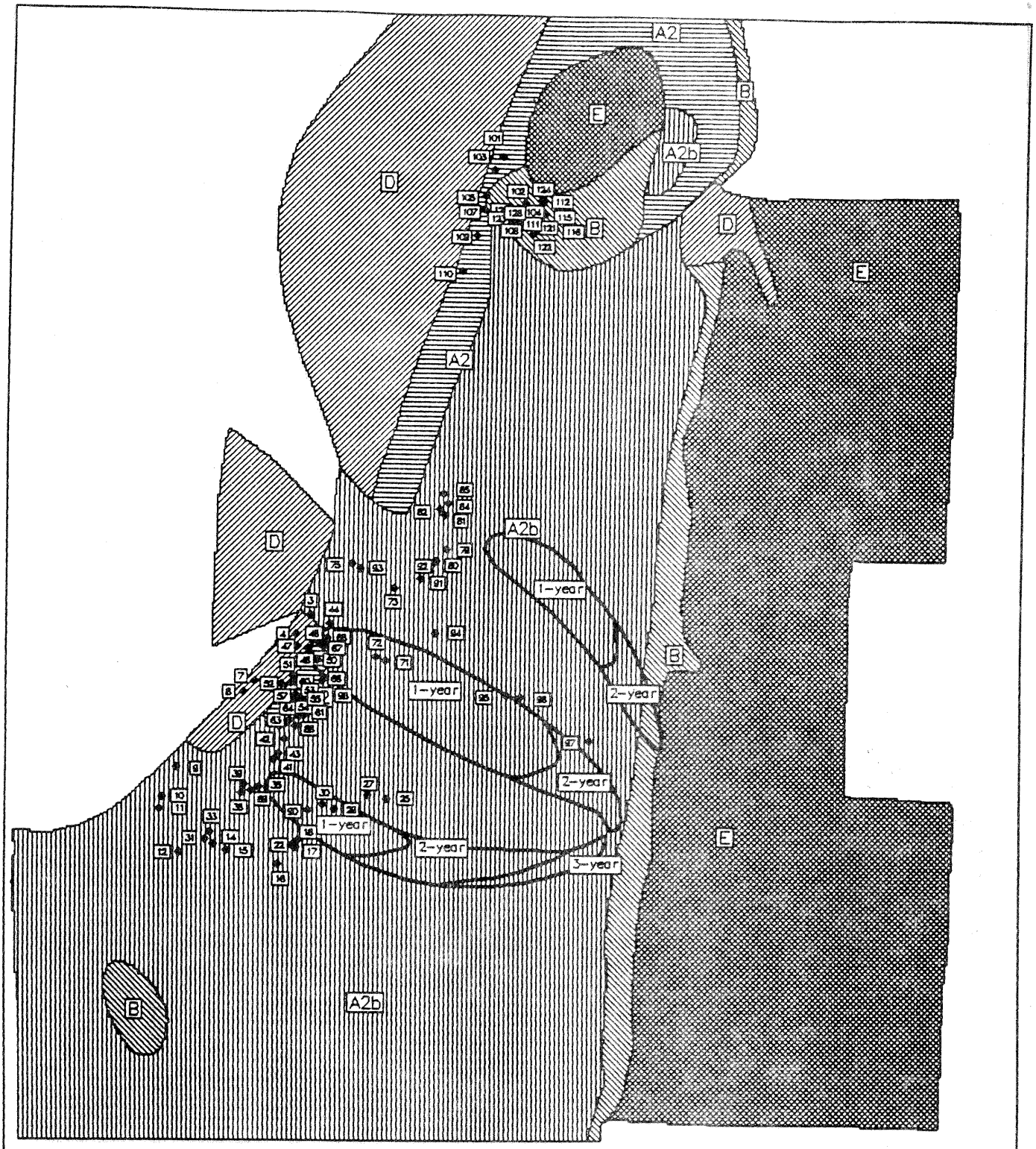
The pilot needs assessment revealed that five of the IAWC-Pekin wells' recharge areas have a very high geologic susceptibility and contain soils with very low attenuative capacity due to very low organic carbon content.

Because of the industrial, commercial and residential makeup of the land uses in the recharge areas for IAWC-Pekin wells, the use of pollution prevention techniques would lend itself to successful long-term groundwater protection. Pollution prevention projects usually save companies money, decrease liability and increase worker/community safety.

The Agency recommended that the City of Pekin cooperate with IAWC-Pekin to consider establishing irregularly shaped maximum setback zones and pursue regulated recharge areas or a local groundwater protection program for IAWC-Pekin wells 1, 2, 3, 5 and 7. As an alternative, the City of Pekin should also consider non-regulatory options for re-zoning areas which pose a threat to groundwater and may want to consider certain best management practices on existing activities within the commercially and industrially zoned districts. In addition, incentive and education programs were



MAP OF AGRICULTURAL CROPLAND IN RELATION TO ZONING, GEOLOGIC SUSCEPTIBILITY AND RECHARGE AREA	SCALE 1:45,000
	FIGURE 13



MAP OF HYDROGEOLOGY IN RELATION TO POTENTIAL CONTAMINATION SOURCES	SCALE 1:45.000
	FIGURE 14

recommended to be established in cooperation with the Central Regional Groundwater Protection Planning Committee-Education Subcommittee and the Education Subcommittee of the ICCG to educate the public and businesses in the Pekin area about groundwater protection.

A Pekin Groundwater Protection Education Committee has been established to assist in the development/coordination of the wellhead protection management options described above. This committee is a "grass roots" effort that will evaluate and provide recommendations to the City of Pekin and the IAWC-Pekin on the best management practices to adopt for protecting the community water supply wells from current and future potential sources of contamination. The Agency will continue working with the Pekin Groundwater Protection Education Committee and with the City of Pekin to encourage the use of the Pekin Needs Assessment to implement further groundwater protection measures.

Pleasant Valley Needs Assessment - The Pleasant Valley Public Water District Needs Assessment was completed on September 24, 1992. It was recommended that a Regulated Recharge Area be established. This area should include the 5-Year Time-Related Capture Zone and the 1,000 foot maximum setback zones. Within this Regulated Recharge Area, the applicable technology controls detailed in 35 Ill. Adm. Code, Parts 615 and 616 would be enforced up to 2,500 feet from the wellhead(s).

There are at least five potential routes within the 5-Year Capture Zone in the form of improperly abandoned wells. These wells must be properly abandoned immediately. In addition to this, the 5-Year Capture Zone must be monitored to assure no existing wells, now in use, become potential routes.

As previously stated, there is a large portion of the area within or near the recharge area which is zoned industrial. The businesses located within this industrial zoning are small commercial facilities which do not require industrial zoning. This area should be re-zoned for commercial use. This re-zoning would have no detrimental affect on the existing businesses and it would prohibit several potential sources from locating within the area. The allowable use groups of this commercially zoned property could then be

controlled to exclude potential sources.

Protection of some sort must be provided from the existing petroleum filled underground storage tanks within the recharge area. Leaks in these tanks could quickly contaminate the aquifer. Immediate compliance with the Agency's requirements for corrosion protection, leak detection, and spill prevention must be sought. Compliance with these regulations could prevent a contamination incident. Once these regulations are met, these facilities must be monitored to assure continued compliance with these regulations.

The regulated facility was found to be subject to the Ill. Adm. Code, Part 615 regulations. This facility must be monitored to insure compliance with these regulations or be subject to alternative requirements pursuant to Section 14.6 of the Act. Interviews with personnel at this facility have shown that they have not been informed of the requirements of the code.

The businesses within the 5-Year Capture Zone that use hazardous materials should use proper methods to dispose of these materials to prevent runoff from contaminating groundwater. These potential non-point sources should be checked periodically to insure proper disposal methods are being used.

The runoff of de-icing agents is another potential non-point source of contamination. To reduce the amount of salt and/or chemicals applied, plowing the streets in the area and using sand or other non-hazardous materials should be a top priority of the county.

As the only potential source of water for the District, the groundwater supplies in the area of the Pleasant Valley wells must be protected from contamination. The present 1,000 ft. maximum setback zones do not protect the entire 5-year-time-related capture zone and they do not regulate some of the existing potential sources.

Village of Cary Needs Assessment - The Agency received a draft copy of the Village of Cary's Needs Assessment on September 30, 1993. The Village expects to issue a final report in January, 1994. The Agency and the Northern Regional Planning Committee are developing a program to encourage the development and implementation of a groundwater protection program for Cary.

City of Woodstock Needs Assessment - In 1994, the Illinois State Water and Geological Surveys will complete a pilot groundwater protection needs assessment for Woodstock, IL, which lies within the Northern Priority Groundwater Protection Planning Region. The project involves detailed geologic and hydrologic mapping to define areas of potential contamination and evaluate aquifer characteristics. Work completed so far includes the preliminary geologic cross sections; isopach maps (e.g., geologic formation thickness) of the four aquifers in the area; a geologic stack-unit map to a depth of 100 feet; and, an aquifer contamination potential map. Potentiometric surface maps (i.e., groundwater elevation) of the different aquifers will be constructed and used for recharge area delineation. A groundwater flow computer model will be used to determine the capture zones of the City of Woodstock wells.

Management Approaches within Wellhead Protection Areas

Under the IGPA, management in WHPAs is provided through the minimum and maximum setback zone prohibitions, technology regulations and the regulated recharge area provisions.

Minimum Setback Zones - The first level of protection provided under Section 14.2 of the IGPA involves the use of a minimum setback zone for community and private water supply wells and potential sources and routes. The minimum zone is 200 feet in radius for any potable water supply well or potential sources or routes. Therefore, minimum setback zones apply to new wells and new sources or routes. The setback zones determine the allowable distances between potential sources and routes and drinking water supply wells. However, for community water supply wells tapping vulnerable geologic formations, the minimum zone is expanded to 400 feet in radius. The setbacks are applied as lateral distances on the land surface and are measured between a potable water supply well and a potential source or a potential route.

A comprehensive community water well location effort has been completed by the Agency. Field verified well locations have been mapped and data has been incorporated into the SAFE computer system. The Agency and ENR developed the

community water well susceptibility procedure to determine the minimum setback zone. The Agency developed an automated Setback Zone Directory and notified all owners of community water supplies of the setback zone requirement. A confirmation notice was also given. All Permit Sections of the Agency are implementing the minimum setback zone provisions.

The Agency developed "A Primer Regarding Certain Provisions of the Illinois Groundwater Protection Act". This primer was intended to provide local officials, consultants, and the public with a better understanding of the IGPA and its particular significance to community groundwater quality protection. Nearly 20,000 copies of this document have been sent. Numerous responses have been provided to local government questions and concerns. Further details can be found in the Education Program summary.

Maximum Setback Zone - The second level of protection provided under Section 14.3 of the IGPA involves the use of a maximum setback zone for community water supply wells. This maximum zone may be established up to 1,000 feet from the wellhead of a community water supply well. Maximum setback zones prohibit the location of new potential primary sources of contamination up to 1,000 feet from the wellhead. Based upon well drawdown characteristics, counties and municipalities may, by ordinance, establish a maximum setback zone. After July 1, 1989, the Agency was allowed to initiate rulemaking before the Pollution Control Board to establish such a zone.

This extra protection is only available for community water supply wells and is based upon a pumping test and estimation techniques adopted in Board regulations (35 Ill. Adm. Code 671). A request to determine the technical adequacy of a maximum setback zone determination must first be submitted to the Agency by a county or municipality. After the Agency confirms the technical adequacy of the determination, a county or municipality is authorized to establish a maximum setback zone ordinance under the authority of the Act. Thus, for local governments the establishment of a maximum zone remains a voluntary process.

The Agency has also published a "Maximum Setback Zone Workbook" and

companion brochure which describes the maximum setback zone program and its benefits to the community water supply. Examples of how to establish maximum zones are provided. An additional publication "Questions and Answers", produced by the Interagency Coordinating Committee on Groundwater, contains a brief description about maximum setback zones.

The IGPA also provides for expansion of the 1,000 foot maximum setback up to 2,500 feet in special cases. A community water well is eligible for a maximum setback zone up to 2,500 feet when the well is utilizing an alluvial aquifer, and the wellhead is within a 1,000 feet from Public Waters[1]. The additional protection out to 2,500 feet prohibits the location of new potential routes of contamination. The Cities of Jacksonville and Athens have passed 2,500 foot maximum setback zone ordinances.

To date, the following 35 local governments have passed maximum setback zone ordinances protecting 99 wells.

County	Community	# of PWS Wells
Boone County	Poplar Grove	1
Bureau County	Princeton	3
Carroll County	Thomson	1
Cass County	Virginia	1
Champaign County	Ogden	3
	Sadorus	2
Christian County	Morrisonville	1
Clark County	Marshall	3
Edwards County	Albion	3
Kane County	Geneva	2
Livingston County	Fairbury	5
Logan County	Mt. Pulaski	3
McHenry County	Harvard	2
	Marengo	1
McLean County	Lexington	3
	Normal	14
Macon County	Blue Mound	1
Madison County	Alhambra	3
	Bethalto	7
	Edwardsville	6
	Hamel	4
	Wood River	5
Mason County	Havana	2
Menard County	Athens	1
	Greenview	2
	Petersburg	2
Morgan County	Jacksonville	1

[1] "Public Waters" means any body of water that is or was navigable and is open or dedicated to public use (section 18 of an Act in relation to the regulation of rivers, lakes, and streams of the State of Illinois, approved June 10, 1911).

County	Community	# of PWS Wells
Peoria County	Chillicothe	5
Peoria County	Pleasant Valley PWD	3
Peoria County	Trivoli PWD	1
Piatt County	Bement	1
Scott County	Winchester	2
Tazewell County	Green Valley	2
White County	Carmi	4
Whiteside County	Tampico	1
Totals:	35	99

Additionally, 22 communities have maximum setback zone ordinances for 60 wells which are pending, currently undergoing technical review by the Agency. The communities in this category are described below:

County	Community	# of PWS Wells
Calhoun County	Hardin	2
Cass County	Beardstown	4
Christian County	Taylorville	3
DeKalb County	Kirkland	2
DeWitt County	Ridgeview MHP	2
Ford County	Gibson City	4
	Piper City	2
Gallatin County	Old Shawneetown	1
Grundy County	Braceville	1
Kendall County	Plano	4
Lee County	Sublette	2
	Lee	1
Livingston County	Chatsworth	2
McLean County	LeRoy	4
Macon County	Niantic	2
Madison County	Hartford	2
	Roxana	3
Peoria County	Peoria Heights	3
Tazewell County	Morton	8
Vermilion County	Potomac	2
White County	Norris City	2
Winnebago County	North Park PWD	4
Totals:	22	60

Maximum Zone Technical Assistance - Maximum setback zone technical assistance is provided by the Agency as an additional method to encourage local governments to establish maximum setback ordinances. The technical assistance was focused on selecting community water supplies (CWS) primarily using relatively shallow unconfined aquifers, with available hydraulic properties data. Recent selections concentrated on water supplies located in the Priority Groundwater Protection Planning Regions which will be discussed later. The technical assistance provided included a mathematical estimation of the lateral area of influence for each working potable well that the community designated as needing further protection. Preliminary telephone

conversations with the water treatment plant operators of each CWS provided current well pumping information, and some limited hydraulic data. The Illinois State Water Survey provided most of the well driller's logs and aquifer property data. Presently, technical assistance has been provided for 160 potable water wells representing 60 CWS.

Further technical assistance, including speaking engagements explaining the maximum setback zone program, has also been conducted for 22 communities.

Quarterly Wellhead Protection Status Report - In April 1991, the Agency began publishing the "Quarterly Wellhead Protection Status Report" (QWPSR). This report serves as a regular public update regarding the status of efforts by local governments to adopt maximum setback zones. The QWPSR is intended to encourage the establishment of maximum setback zones. The QWPSR classifies communities into one of four categories: (1) maximum setback zones adopted; (2) adoption of such zones pending (those currently awaiting the Agency's determination of technical adequacy as well as those awaiting local approval); (3) no maximum zone application on file; and (4) local decision not to adopt an ordinance. For each entry in category 3, a number in parenthesis following the name will be used to identify the total quarters in that status. This classification will be based upon review of responses to written inquiries sent to each local government which has received a well site survey report.

The initial inquiry to each community is sent six months after receipt of the community well site survey report. If a community fails to respond, then the Agency will assume that the status has not changed since the previous quarter. In essence, this reporting system will be used as a management tool to ensure steady progress with the maximum setback zone program.

The implementation of the QWPSR program has proven successful. Following the implementation of the QWPSR Program, the Agency received maximum setback zone applications from 45 community water supplies. Eleven of these applications were received prior to the implementation of the QWPSR process.

The Agency is currently refining this process to specifically address facilities that have remained under category 3. Category 3 represents

facilities that have not responded to the Agency's inquiry letter. These facilities will be prioritized for state rulemaking if warranted.

Conservation Reserve Program - The Conservation Reserve Program (CRP) is a program that could potentially help protect the groundwater utilized by a facility in relation to agricultural chemicals applied to cropland near CWS wells.

The United States Department of Agriculture (USDA) has offered a CRP for the purpose of protecting community water supply wells. The CRP is a federal program that provides for funding assistance to agricultural producers to establish and maintain a permanent vegetative cover on cropland for the length of the contract. The length of the CRP contract is generally for a 10-15 year period where agricultural commodities were grown during at least two (2) years between 1986 and 1990. The CRP is available for cropland within 1,000 feet of a public water supply well.

Over 1,500 communities in Illinois obtain drinking water from wells, and about 10,000 wells serve community and non-community supplies. Many of these wells are located near cropland fields that are eligible for CRP. Established by the 1985 Federal Food Security Act, the CRP provides annual rental payments and cost-sharing to establish permanent cover for areas enrolled. This cover may include grasses or trees that can be managed to reduce soil erosion, improve water quality and benefit wildlife.

During the 12th sign-up (June 15-26, 1992) a total of 22 bids for wellhead protection were accepted. The average annual rental rate was $125/acre/year with the highest at $155 and the lowest at $80. The average acreage was 16 acres per wellhead.

If there is another CRP sign-up, it will probably be announced in the spring of 1994. Individuals who want to find out more about the Conservation Reserve Program can contact the Office of the Agricultural Stabilization and Conservation Service (ASCS) or Soil Conservation Service (SCS) in their county.

Regional Groundwater Protection Program

Section 17.2(a) of the IGPA requires the Agency to establish a regional groundwater protection planning program. The Agency, in cooperation with ENR, must designate priority groundwater protection planning regions. The IGPA requires that such designations shall take into account the location of recharge areas that are identified and mapped by ENR.

The Department completed the mapping of appropriate recharge areas in early 1989 and provided a prioritization map in October 1989, to assist the Agency in designating priority groundwater protection planning regions.

Section 17.2(b) of the IGPA also requires the Agency to establish a regional planning committee for each priority groundwater protection planning region. Each committee is to be appointed by the IEPA Director and include representatives from among the following:

- counties and municipalities in the region;
- owners or operators of public water supplies which use groundwater in the region;
- at least three members of the general public which have an interest in groundwater protection; and
- the Agency and other State agencies as appropriate.

From among the non-state agency members, a chairperson shall be selected by a majority vote. Members of a regional planning committee shall serve for a term of two years.

The Agency utilized the priority recharge area map, groundwater pumpage data, population affected, water supply characteristics, solid waste planning efforts, and other factors to select three priority groundwater protection planning regions. The IEPA Director has designated the associated committees for these planning regions. Figure 15 illustrates these three regions, and Table IV lists committee members.

Section 17.2(c) of the Illinois Environmental Protection Act, as amended in Section 17.2(c) of the IGPA, specifies that the regional planning committee is responsible for the following:

"1. identification of and advocacy for region-specific groundwater protection matters;

2. monitoring and reporting the progress made within the region regarding implementation of protection for groundwater;

3. maintaining a registry of instances where the Agency has issued an advisory of groundwater contamination hazard within the region;

4. facilitating informational and educational activities relating to groundwater protection within the region; and

5. recommending to the Agency whether there is a need for regional protection pursuant to rulemaking before the PCB. Prior to making any such recommendation, the regional planning committee must hold at least one public meeting at a location within the region. This meeting may be held after not less than 30 days notice is provided, and must provide an opportunity for public comment."

The Northern and Central Groundwater Protection Planning Committees were established in April 1991, while the Southern committee was established in October 1992. The Northern Planning Committee has established four subcommittees: an Education Subcommittee; a Public Relations Subcommittee; a Technical Subcommittee; and a Planning and Zoning Subcommittee.

The Central Planning Committee has established an education subcommittee and the Pekin Groundwater Protection Education Committee. The Southern Planning Committee has established an education subcommittee and a public relation subcommittee. The Agency has established an intergovernmental agreement with a county health department in each of the priority planning regions to help support the process.

Currently, the Agency is working with the regional planning committees to establish local groundwater protection programs by determining county and municipal target audience contacts within their respective regions. The Agency and committee members follow-up with one-on-one meetings/workshops with target audiences after initial contacts are made to encourage the development and implementation of local groundwater protection programs. Local groundwater protection programs that have been encouraged include: voluntary pollution prevention; enhanced performance/operation standards; local zoning options; and IGPA regulatory actions.

Figure 15 – Regional Groundwater Protection Planning Committees

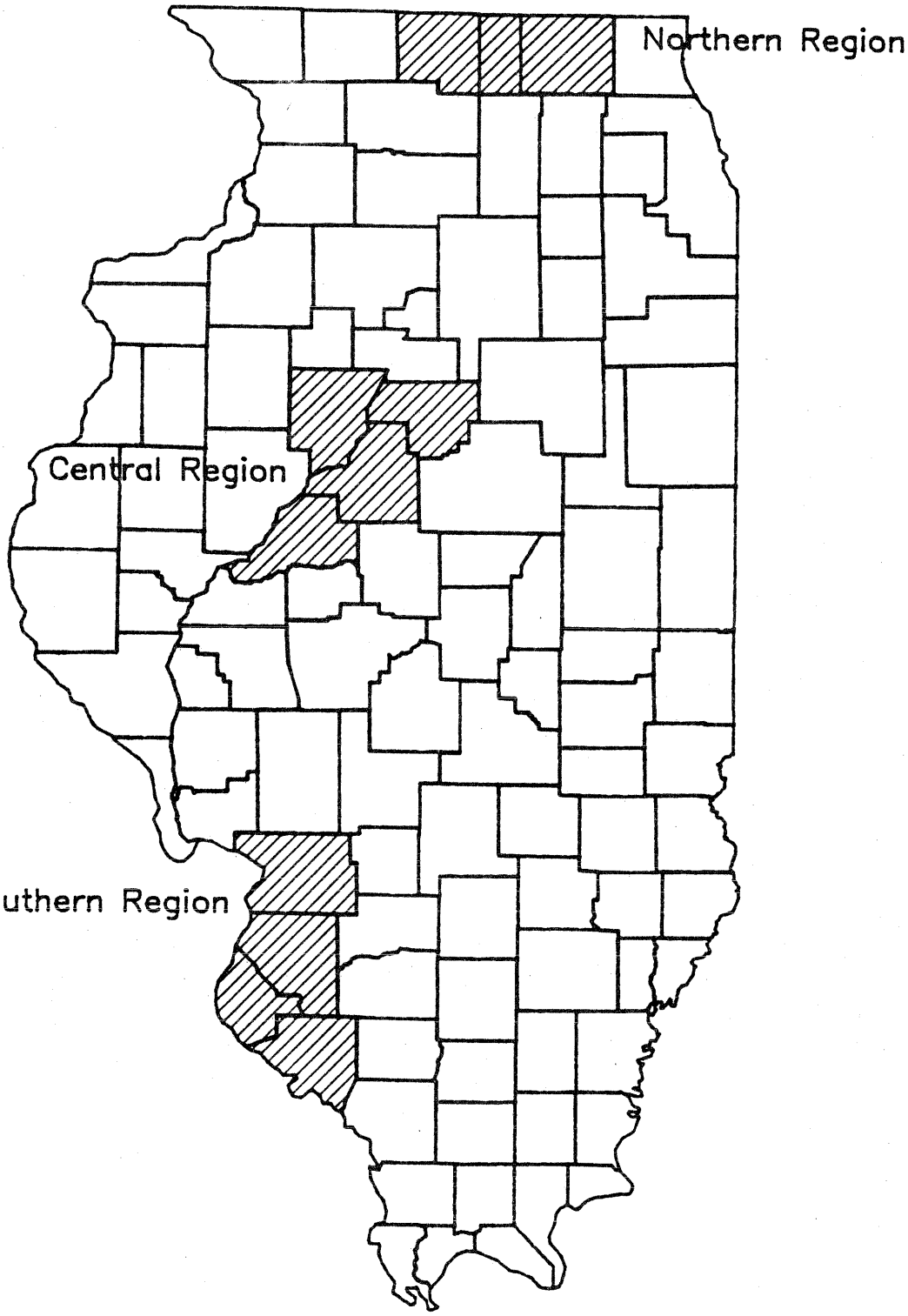


Table IV - Regional Groundwater Protection Planning Committee Members

NORTHERN PLANNING REGION

Counties - Winnebago, Boone, McHenry

Pat McNulty, Chairman - McHenry County Environmental Health
Betty Johnson, Vice Chairman - League of Women Voters, Environmental Chairman
Bill Hatfield, Secretary - Boone County Environmental Health
Suzanne Longacre - Winnebago County Environmental Health
Gene Quin - Winnebago County Board Chairman
Michael Megurdichian - Rockford Public Water Supply
Rory Peterson - Mayor, City of Belvidere
Bill Ganek, Administrator - Village of Algonquin
Scott Viger - Planning Director, City of Crystal Lake
Larry Thomas - City of Crystal Lake
Linda Baehr - Woodward Governor Company
Lawrence Cammarta - McHenry County Defenders
Ora Larson - Village Trustee, Rockton
Dennis Leslie - Manager, North Park PWD
Charles McLaughlin - Superintendant, Marengo PWS
Clay Simonson - Winnebago County Dept of Public Health

CENTRAL PLANNING REGION

Counties - Peoria, Woodford, Tazewell, Mason

Bill Compton, Chairman - Caterpillar Co. Environmental Affairs
Patricia Welch, Secretary - Tazewell Co. Health Department
Bob Weers - Administrator, Woodford Co. Zoning Department
Edward Whitaker - Mason Co. Farm Bureau
John Boyle - Tri-County Planning Commission
Neil Young - Alderman, City of Chillicothe
Neill Keneipp - President, Village of Minier
Raymond Picl - Mayor, Village of Peoria Heights
Donald Williams - Mayor, City of Pekin
Jerry Appenzeller - Citizen
Bill Ebert - Water Well Driller
Mel Pleines - Minier Public Water Supply Operator (Retired)
Mike Miller - Forrest Park Nature Center
Brent Gregory - Qater Quality Supervisor, IAWC-Peoria
David Woodson - General Manager, Pleasant Valley PWD

SOUTHERN PLANNING REGION

Counties - Madison, St. Clair, Monroe, Randolph

Don Brannon, Chairman - St. Clair Co. Environmental Health
Joan Bade - Monroe/Randolph Co. Environmental Health
Larry Firkus - Madison Co. Soil & Water Conservation Dist.
Joe Parente - Administrator, Madison Co. Bldg, Zoning & Environment
Paul McNamara - Director, Madison Co. Development Administration
Alan Mitchell - Southwestern Metro Planning Commission
Henry Bieniecki - Pallisades Alton Sierra Club Chapter
Marty Reynolds - Superintendent, Roxana Public Water Supply
Brian Johnson - Superintendent, Valmeyer Public Water Supplies
Neil Erdmann - City Council Member, City of Red Bud

Regulated Recharge Areas - The Agency may propose a regulation to the Board establishing the boundary of a regulated recharge area[2] pursuant to Section 17.3 of the IGPA if any of the following conditions exist:

1. the Agency has previously issued one or more advisories within the area;
2. the Agency determines that a completed groundwater protection needs assessment demonstrates a need for regional protection; or
3. mapping completed by ENR identifies a recharge area for which protection is warranted.

In addition, the Agency must propose to the Board a regulation establishing the boundary for a regulated recharge area if a regional planning committee files a petition requesting and justifying such action, unless the Agency:

1. determines that an equivalent proposal is already pending before the Board and so notifies the petitioner within 60 days of the receipt of the petition.
2. provides within 120 days a written explanation of why such action is not otherwise warranted.

At least sixty days prior to the filing of a proposal to establish the boundary for a regulated recharge area, the Agency must notify each affected county, municipality, township, soil and water conservation district and water district in writing, and must publish a notice of such intended action in a newspaper of general circulation within the affected area. In proposing a boundary for a regulated recharge area, the Agency must also identify each community water supply well for which protection up to 2,500 feet will be provided by operation of the regulations adopted by the Board relative to existing activities within the proposed regulated recharge area. The regulations which prescribe standards and requirements for activities within setback zones and regulated recharge areas ('Technical Standards' - 35 Ill. Adm. Code 601, 615, 616 and 617) became effective on December 6, 1991.

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[2] "Regulated Recharge Area" means a compact geographic area, as determined by the Board, the geology of which renders a potable resource groundwater particularly susceptible to contamination.

To date there have been no regulated recharge areas proposed to the Board.

Voluntary Phase II Wellhead Protection Area Program (WHPA)

The Agency has augmented its existing management programs with a cooperative management program involving the Agency and local community officials. This cooperative management program will be voluntarily performed in the Phase II WHPA that is established beyond the 1,000 foot Phase I WHPA for CWS wells. The Agency encourages these efforts for all community water supply wells, utilizing unconfined aquifer systems, where needs assessments, hazard reviews or well site surveys have been completed. The community water supply officials are voluntarily responsible for implementing management outside of 1,000 feet and within the WHPA. These management approaches generally involve mandated IGPA measures in conjunction with other protection activities including, but not limited to: voluntary pollution prevention; waste minimization techniques; enhanced performance/operation standards; and local zoning prohibitions.

The Groundwater Section staff also coordinate with the regional groundwater protection planning committees to assist county and municipal officials. The Agency and committee members hold meetings/workshops with target audiences after initial contacts are made to encourage the development and implementation of local groundwater protection programs. The Groundwater Section staff also coordinate this effort with the Agency's Office of Pollution Prevention and the ENR Hazardous Waste Research and Information Center pollution prevention staff. In addition, the Section works closely with the Groundwater Education Subcommittee of the ICCG in conducting this effort.

Voluntary Phase II Wellhead Protection Program (WHPP) Case Studies - To further advance wellhead protection in Illinois, the Agency has begun a cooperative effort with counties and municipalities to advocate local WHPPs. Through one-on-one interaction with local officials, the Agency is encouraging adoption of both voluntary and regulatory management approaches. These approaches generally involve mandated Illinois Groundwater Protection Act

measures in conjunction with other protection activities including, but not limited to: voluntary pollution prevention; waste minimization techniques; enhanced performance/operation standards; and local zoning prohibitions. The Agency is conducting these follow-up activities to meet the intent of Illinois' approved WHPP.

Case studies of this cooperative effort between the Agency and local units of government are summarized below:

Marengo - Agency staff met with officials from the City of Marengo as a follow-up to the Hazard Review Report and because of the recognition that the water supply wells are located in a highly vulnerable area. Representatives from Marengo included: the Water Supply Superintendent; City Building Inspector; and the City's Consulting Engineer.

The purpose of this initial meeting was to encourage the local officials from Marengo to begin the process of voluntary management within the Phase II WHPA delineated by the Agency. Information obtained from initial discussions with the water supply superintendent indicated that the City has cooperatively worked (with the owner) to remove some potentially leaking underground storage tanks that were discovered as a result of the Hazard Review report. It is believed that these tanks may have been the source of benzene in the CWS wells. The latest set of samples collected for these CWS wells did not detect benzene.

During the initial meeting, Agency staff presented the Phase II WHPA delineation (5-year time related capture zone) for the City's active water supply wells. The Agency also presented various management approaches that the City could implement to protect their water supply including: local zoning or ordinances prohibiting certain uses/activities from locating within the Phase II WHPA; enhanced inspections or operating and performance standards for existing/new activities located within the Phase II WHOA; and encouraging the voluntary pollution prevention (P2) program for existing commercial/industrial activities located within the City.

In addition, the Agency provided example ordinances from other local

communities from around the country in an attempt to promote this type of local involvement in wellhead protection. The Agency also provided a manual (compilation of articles/publications) dealing with the pollution prevention program. In fact, the City appeared to be very interested in promoting a voluntary P2 activities program for local business and industries. As a follow-up to this meeting, the Agency developed and sent a letter and GIS map (indicating the phase II WHPA) to City officials requesting another meeting with Marengo City Council members and other interested persons.

A follow-up meeting was held in October 1993, with Marengo City Council members, city consultants and other city officials. Again, the City appeared to be very interested in promoting a voluntary P2 activities program for local business and industries. The Agency is currently in the process of organizing a community-wide workshop sponsored by the local Chamber of Commerce and the City to encourage local businesses to pursue the voluntary P2 program.

Pleasant Valley PWD - The Agency met with the water supply superintendent, the consulting firm that conducted the Pleasant Valley PWD Needs Assessment, and Peoria County Zoning and Planning officials, to discuss the results and recommendations of that study. At this meeting, the Agency discussed potential options that Pleasant Valley PWD and the Peoria County Board could utilize to protect the WHPA of the Pleasant Valley PWD wells. Pleasant Valley had requested that the County Board consider additional protection measures as a result of the Needs Assessment showing that the recharge area (five-year time-related capture zone) is not adequately protected by the existing, regulatory management within the Phase I (1,000 foot) WHPA.

At the time of the initial meeting, both the Pleasant Valley PWD and the Peoria County Board were unclear on what measures could be taken to adequately protect this sensitive area. However, since the initial meeting Pleasant Valley PWD has asked the County Board to allow for regulation of activities within their WHPA to help insure a continued source of high quality water for the District. Currently, the following WHPA measures are being proposed by the District:

1. The District is asking the County to establish the "Pleasant Valley Wellfield Recharge Area";
2. The District would like permission to put road signs at the entry points to the recharge area. These signs will inform motorists that they are entering a protected recharge area and instruct motorists, residents, and emergency personnel to contact the District in the event of a spill of any potential contaminants. It is the belief of the District that, in addition to warning motorists, these signs will promote public awareness of the sensitivity of the area and the consequences of mismanagement of potential contaminants;
3. In addition to the signs, the District would like to have all emergency personnel instructed that the District is to be notified immediately if a potential contamination event should occur. Immediate notification will allow the District to suggest containment measures which may keep a minor spill from becoming a major contamination event.
4. The District would like to have an ordinance established requiring the District's "sign off" on any zoning change or building permit within the recharge area. This approval process will be similar to that already required by the Health Department. In approving a building permit or zoning change, the District may ask for protection measures such as groundwater monitoring or secondary containment of contaminants. The District does not want to inhibit development of this area, but it would like the opportunity to insure, as much as possible, that any potential contaminants within this recharge area do not reach the water supply; and
5. The District will establish guidelines, to be distributed to anyone applying for a zoning change or building permit, explaining the District's policy and possible measures which could be taken to obtain the District's approval. These guidelines will include protection measures such as groundwater monitoring and secondary containment.

Pekin - The Agency conducted a pilot groundwater protection Needs Assessment for the City of Pekin, Illinois American Water Company (IAWC), and

the Central Illinois Groundwater Protection Planning Committee. The Agency contacted IAWC, the Mayor of Pekin, and the Central Planning Committee to review the groundwater protection recommendations established within the Needs Assessment. The Agency has a participated in formal presentations of the Needs Assessment and recommendations to numerous groups including the Pekin-area Rotary Club and members of the Pekin City Council. In addition, the Agency coordinated with the Central Regional Groundwater Protection Planning Committee - Education Subcommittee to establish a Pekin Groundwater Education Committee. This committee is a "grass roots" work group composed of members from the City of Pekin, IAWC, the school district and local business representatives. The goal of this committee is to assist in the development/coordination of a wellhead protection management program for the City of Pekin. Currently, members of the Pekin groundwater Protection Education Committee are evaluating site-specific management programs including: voluntary pollution prevention; enhanced performance/operation standards; local zoning options; and IGPA regulatory actions that would be best suited for protection of Pekin's community water supply wells.

Hartford - The Village of Hartford volunteered to be a participating sponsor of a May 7, 1993 Groundwater Protection Field Day Demonstration. The Village sponsored a "hands-on" demonstration of voluntary potential source identification and management methods, within the phase II WHPA. In the course of preparing for this "Field Day Demonstration," Agency staff provided the Village with numerous examples of both voluntary/regulatory management approaches for potential sources identified within the wellhead protection area. As a result, the Village has begun the process of establishing maximum setback zone (regulatory) protection for their community water supply wells. In addition, the water supply superintendent has requested that the Agency provide additional information on local zoning options available to the Village.

Village of Cary - The Agency is still awaiting word that the Village of Cary's Board of Trustees has approved their needs assessment. However, the

Agency and the Northern Regional Planning Committee continue to develop a program to encourage the development and implementation of local groundwater protection and education programs for Cary, once their needs assessment becomes official.

Village of Lacon - In November, 1991, the Agency was requested to perform a Hazard Review for the Village of Lacon located in Marshall County. At this time, the well site survey report was not yet completed. The well site survey was completed and sent to the community in June, 1992, at which time work was initiated on the Hazard Review Report.

The Hazard Review was completed and sent to the Village in September, 1993. The Agency determined that the community water supply wells are exposed to potential contamination due to the susceptibility of the geology and the presence of existing potential sources of contamination within the recharge area of the wells.

As a follow-up to the recommendation contained in the Hazard Review, the Agency arranged a meeting with the Village President of Lacon and other community officials to discuss both regulatory and voluntary management programs to protect Lacon's community water supply wells. As a result of this initial meeting, the Village is interested in sponsoring a voluntary pollution prevention workshop for local business and industry representatives. In addition, the community will be evaluating and possibly updating their existing zoning ordinance to incorporate appropriate groundwater protection programs.

ADVISORIES OF GROUNDWATER CONTAMINATION HAZARD

The Agency is authorized to issue an advisory of groundwater contamination pursuant to Section 17.1(g) of the Act, which states:

> "The Agency may issue an advisory of groundwater contamination hazard to any county or municipality which has not prepared a groundwater needs assessment and for which the Agency has conducted a well site survey. Such an advisory may only be issued where the Agency determines that existing potential primary sources, potential secondary sources or potential routes identified in the survey represent a significant hazard to the public health or the environment. The Agency shall publish notice of such advisory in a newspaper of general circulation within the county or municipality and shall furnish a copy of such advisory to any applicable regional planning committee."

On seven occasions the Agency has found that such a "significant hazard to the public health or the environment" warranted the issuance of groundwater contamination advisories. These advisories were issued to the following communities: North Pekin, Marquette Heights, Creve Coeur, South Chicago Heights, Chandlerville, Belvidere and Loves Park.

North Pekin, Marquette Heights and Creve Coeur - A significant hazard advisory was issued to North Pekin and Marquette Heights in July, 1990, and at Creve Coeur in November, 1990. Each of these advisories relate to a common hazard associated with the recent and historical spills of gasoline and oils at the Amoco Oil Co. bulk terminal and the Mobil Corporation's Peoria bulk storage and distribution terminal, both located in Creve Coeur.

Chandlerville - In October, 1990, the Agency issued a groundwater contamination advisory for the City of Chandlerville, The Chandlerville well site survey report indicated that a significant hazard to the public water supply existed from an existing potential secondary source of groundwater contamination which appears to have contributed to the contamination of the groundwater from which Chandlerville draws its water. This contamination may be the result of pesticide mixing and handling practices from two agricultural chemical dealerships southeast of Chandlerville Well 2. Monitoring conducted by the Agency confirmed consistent levels of several pesticides in the groundwater, the levels of atrazine and alachlor exceeded USEPA MCL's for drinking water. The Chandlerville Well #2 was a sole source of supply for the Village. Funds were provided to Chandlerville through a Department of

Commerce and Community Affairs (DCCA) grant to assist with the construction of another community water supply well.

South Chicago Heights - In October, 1991, the Agency issued a groundwater hazard advisory for the City of South Chicago Heights. The South Chicago Heights well site survey report indicated that a significant hazard to the public water supply existed from waste disposed at a local landfill or from the light/heavy commercial activities which has contaminated the groundwater utilized by the South Chicago Heights community water supply. Groundwater sample results indicated the presence of organic contaminants in the drinking water, levels of vinyl chloride actually exceeded USEPA MCL for drinking water. The Agency advised South Chicago Heights to seek an alternate source of water.

Belvidere - In October, 1992, the Agency issued a groundwater hazard advisory for the City of Belvidere Wells #2 and #3. The Belvidere well site survey report indicated that a significant hazard to the public water supply existed from light/heavy commercial activities which have contaminated the groundwater utilized by the Belvidere water supply wells. Groundwater sample results indicated the presence of organic contaminants. The Agency advised Belvidere to install and use treatment equipment, or modify their water source.

Loves Park - In October, 1992, the Agency issued a groundwater hazard advisory for the City of Loves Park Wells #1 and #2. The Loves Park well site survey report indicated that a significant hazard to the public water supply existed from light/heavy commercial activities which have contaminated the groundwater utilized by Loves Park. Groundwater sample results indicated the presence of varying levels of organic contaminants. In addition, monitoring by the Agency indicates that the water being delivered to the distribution system shows levels of organics, although not in violation of MCL's.

DEPARTMENT OF PUBLIC HEALTH WELLHEAD PROTECTION PROGRAM

The DPH is charged with the protection of private and non-community public potable water supply wells. Wellhead protection for wells supplying a non-community public water system (such as restaurants, campgrounds, schools and industries) will be provided to the surface and subsurface area surrounding a water well or well field, through which contaminants are reasonably likely to move toward and reach such water or well field.

The DPH will establish WHPAs for non-community public water supply wells as sanitary surveys are completed and as resources permit. The source identification performed by the DPH will search for potential sources or routes of contamination within the 1,000 foot radius WHPA during the sanitary survey for each non-community public water supply well. The results will be reported to well owners. Of the 5,810 non-community public wells requiring sanitary surveys, only 291 have not yet had surveys completed. Hence, 5,519 non-community public wells have WHPAs in place. The results of these surveys will be provided to the owners/operators. The DPH may delegate this responsibility to local health departments using formal interagency agreements. At present, 69 local health departments have entered into agreements with the DPH that give them the authority to establish local wellhead protection measures. Before the IGPA was enacted, only 16 local health departments administered water programs. The DPH has developed guidelines and will provide training to local health departments concerning the procedures that must be followed to establish WHPAs for non-community wells.

The DPH and/or the local health departments will also conduct an education program to advise owners or operators of potential sources of precautionary measures to help protect the wellhead area. Written material as well as some direct contacts will be used to bring relevant information to the attention of the affected sources. In severe cases, the DPH may issue a notice to advise all pertinent parties that potentially significant hazardous conditions have been encountered. In such instances, the DPH will follow-up to ensure that

suitable progress is being made toward achieving compliance.

After several years of operating this system, the DPH has begun to evaluate their wellhead program to determine if additional statutory authority or procedural changes are needed for wellhead protection.

MINIMAL HAZARD CERTIFICATION PROCESS

The Agency is authorized by the Act to develop and administer a certification system for sites that represent a minimal hazard to contamination of groundwater by potential primary or potential secondary sources. The minimal hazard certification (MHC) system is designed to protect community water supply wells while allowing small commercial operations and businesses to achieve compliance.

The Act specifies time periods for certification and decertification procedures. Minimal hazard certification will be granted to sites meeting specific criteria for a particular time period. Any county or municipality may enter into a written delegation agreement with the Agency to administer the provisions of the MHC. The local government must adopt an ordinance if delegation is requested.

The Act requires that the owner of a site seeking a certification of minimal hazard demonstrate that the use and management of containers, above ground tanks, and waste piles are consistent with guidelines adopted by the Board. Once a site has been certified, the owner must recertify periodically according to the adopted time periods, and maintain compliance with conditions necessary for certification. The Agency will maintain a master listing, indexed by county, of those sites for which certifications are in effect. However, failure to maintain compliance may result in decertification and subjection to regulatory performance standards.

The Board adopted the Technology Control Regulations (35 Ill. Adm. Code 615 and 616) developed by the Agency on December 6, 1991. With the adoption of these regulations, the finalization of the MHC guidelines was completed for the use and management of containers, above ground tanks, and waste piles. The Agency has also developed a MHC form.

The MHC Rule proposal was sent to JCAR in October, 1993 for a decision on adopting the rules, and was published in the Illinois Register for First Notice. In addition, proposed amendments will need to be corrected and submitted to JCAR for Second Notice. Additionally, JCAR is requesting an

analysis of the economic and budgetary effects for the rule proposal to be submitted by the Agency for Second Notice of the MHC Rules into the Illinois Register.

The Agency expects that MHC will be utilized as a cost effective alternative to complying with the groundwater monitoring requirements under the Board's technology control regulations pertaining to certain activities located within the setback zones or regulated recharge areas of potable water supply wells.

GROUNDWATER QUALITY PROTECTION - FUTURE DIRECTIONS

The future of the groundwater protection efforts will be made according to the ICCG Implementation Plan and Regulatory Agenda. In some tasks, the priority may be shifted due to funding constraints. The overall progress of implementing the IGPA continues to be adequate. However, as described in the Policy Report, additional efforts and resources should be focused on the critical regional recharge areas supporting vulnerable CWSs. The past six years of implementing the IGPA have consisted of developing the following programs and regulations:

- Completing baseline quality and quantity assessments of the groundwater resources;
- Completing pilot monitoring efforts for evaluating pesticides in rural private water supply wells;
- Establishing pilot Regional Groundwater Protection Planning Programs;
- Conducting pilot Groundwater Protection Needs Assessments;
- Expanding the groundwater education program into regional planning programs;
- Enhancing hydrogeologic data base for community water supply wells utilized by the Agency;
- Beginning the development of a State Pesticide Management Plan for protecting groundwater from non-point sources;
- Continuing the well site survey process;
- Implementing and integrating the groundwater quality standards into a number of other regulatory programs;
- Implementing the technology control regulations;
- Continuing to expand the number of maximum setback zones; and,
- Initiating follow-up efforts to establish full regional groundwater protection programs.

The priorities for the next two years are as follows:

- Continue and expand efforts in each of the priority regions to meet with communities utilizing vulnerable groundwater supplies to encourage establishing local groundwater protection programs. Emphasis should be placed on geologic and hydrologic characterization of recharge areas, further integration and application of voluntary

pollution prevention programs, and local zoning and IGPA regulatory programs to protect these areas;

- Develop and implement a State Pesticide Management Plan;
- Conduct a groundwater protection needs assessment and regulated recharge area forum in cooperation with the GAC;
- Integrate regional groundwater protection programs with SDWA compliance monitoring program;
- Integrate surface and groundwater protection programs (e.g. State Management Plan for Pesticides);
- Continue pesticide monitoring programs and further evaluate the effectiveness of immunoassay testing methods;
- Continue implementation of groundwater standards and technology control regulations;
- Provide assistance in the evaluation of the alternative monitoring and cleanup procedures developed for agricultural chemical facilities; and
- Monitor the long-term effects of the 1993 flood on groundwater quality.

1) ICCG Operations

- Continue to review and update the Implementation Plan and Regulatory Agenda;
- Continue to hold quarterly meetings;
- Begin the development of a comprehensive status report for 1996;
- Provide liaison for the GAC;
- Assist the Agency with the endorsement of Illinois Groundwater Protection Program in relation to USEPA's Comprehensive State Groundwater Protection Program core adequacy criteria;
- Oversee, review and provide input to the preparation and implementation of a State Pesticide Management Plan; and
- Review and support the annual groundwater education work plan.

2) GAC Operations

- Sponsor a forum in cooperation with the ICCG and IEPA on groundwater protection needs assessments and regulated recharge areas;
- Conduct policy related meetings; and,

- Provide input to programs, plans, regulatory proposals and reports as appropriate.

3) **Education Program for Groundwater Protection**

- Continue to conduct statewide long-term and short-term educational initiatives, including primary and secondary school programs;
- Continue to develop and implement groundwater protection work plans; and,
- Provide special emphasis on working with Regional Committees to implement local groundwater protection programs, integrate with new planning and zoning educational tools and the voluntary pollution prevention program.

4) **Groundwater Evaluation Program**

- Cooperate on the development and completion of a Groundwater Protection Needs Assessment Guidance Document and sponsor workshops;
- Share GIS coverages in an electronic format and continue to automate the groundwater resource data base for Illinois;
- Continue to conduct groundwater assessments and share the information through regular updates and completed reports; and,
- Continue to utilize innovative and cost effective methods to implement statewide groundwater quality monitoring.

5) **Groundwater Quality Standards and Technology Control Regulations**

- Continue to implement and integrate the groundwater quality standards into environmental programs;
- Continue to update and amend the groundwater standards to parallel the drinking water standards adopted by USEPA;
- Continue to implement preventive notice and response programs and integrate with environmental programs;
- Continue to implement the technology control regulations and establish a database for tracking and evaluating compliance data; and,
- Work with the DPH and County Health Departments to coordinate the implementation of the technology control and groundwater standards regulations.

6) **Wellhead Protection Program**

- Implement and integrate the wellhead protection program elements into

protecting the regional groundwater sources for public water supply wells;

- Prioritize wellhead protection efforts within the Groundwater Protection Planning Regions;
- Work with the committees to implement programs and to assist with targeting local contacts and interest groups; and,
- Integrate the wellhead protection program with vulnerability waiver assessments under the SDWA.

7) **Regional Groundwater Protection Planning Program**

- Assist with conducting and supporting both new and follow-up efforts of encouraging local groundwater protection programs;
- Designate one or two new regional planning areas and associated committees; and,
- Coordinate with the GAC on sponsoring a statewide policy forum on groundwater protection needs assessments and regulated recharge areas.

8) **Non-community and Private Well Program**

- Continue to implement the wellhead protection program, and assist with implementing the technology control and groundwater quality standards regulations.
- Continue the issuance of potable and other water well permits; and,
- Continue implementation of the groundwater monitoring well, closed loop heat pump and backflow prevention code.

9) **Minimum Hazard Certification**

- With the approval of JCAR, adopt the proposed minimum hazard certification rules and begin implementing the program.