Illinois
Environmental
Protection
Agency

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

February 1996

Illinois Groundwater Protection Program:

Volume I: Biennial Policy Report

Prepared by the
Interagency Coordinating
Committee on Groundwater

February 1996

Printed on Recycled Paper

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/782-3397

The Honorable Jim Edgar
Governor
State of Illinois

The Honorable Members
of Illinois General
Assembly

I am pleased to transmit our two volume report, "Illinois Groundwater Protection Program", which has been prepared pursuant to Section 4(b)(8)of the Illinois Groundwater Protection Act (P.A. 85-0863). This is the fourth biennial report of the Interagency Coordinating Committee on Groundwater. The report has been streamlined down to a two volume report from the previous three volume report to simplify the review process. The Volume I report is intended to provide a policy perspective on groundwater protection in Illinois, and Volume II provides a comprehensive status and assessment of the program.

The Act created a comprehensive, prevention-based policy focused on beneficial uses of groundwater and preventing degradation. As shown in the reports, much progress has been made but much more is needed, especially in regard to vulnerable regional groundwater supporting potable uses.

The reports give the status of various elements of groundwater protection organized in the general order of the Future Directions of the 1994 Biennial Report. The report also includes several figures and tables to help document our progress.

Sincerely,

Mary A. Gade
Director

Printed on Recycled Paper

Submitted to the Governor
and Illinois General Assembly

Illinois Groundwater Protection Program

Volume I: Biennial Policy Report

February 1996
Prepared by the Interagency Coordinating Committee on Groundwater

TABLE OF CONTENTS

INTRODUCTION ..... Page 1
What Groundwater Means to Illinois ..... Page 1
Cost of Groundwater Contamination ..... Page 1
Illinois Groundwater Protection Act ..... Page 1

CHAPTER I. COMMUNITY WATER SUPPLY GROUNDWATER PROTECTION ASSESSMENT METHODS ..... Page 3

CHAPTER II. OVERALL GROUNDWATER QUALITY PROTECTION INDICATOR ..... Page 6
Groundwater Standards ..... Page 6
Regional Groundwater Protection Program ..... Page 6
Wellhead Protection Program ..... Page 9
Quantitative Assessment of Groundwater Protection for Community Water Supply Wells ..... Page 9

CHAPTER III. SUMMARY AND CONCLUSIONS ..... Page 13

CHAPTER IV. RECOMMENDATIONS ..... Page 15

FIGURES

Figure 1. Unconfined and Confined Aquifer Systems.....Page 5

Figure 2. Priority Groundwater Protection Planning Regions.....Page 8

Figure 3. Overall Groundwater Quality Protection Indicator.....Page 10

ACRONYM GLOSSARY

BMP	Best Management Practice
Board	Illinois Pollution Control Board
CWS	Community Water Supply
DNR	Department of Energy and Natural Resources
ICCG	Interagency Coordinating Committee on Groundwater
IEPA	Illinois Environmental Protection Agency
IGPA	Illinois Groundwater Protection Act
ISGS	Illinois State Geological Survey
ISWS	Illinois State Water Survey
OECD	Organization for Economic Cooperation and Development
PWS	Public Water Supply
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemical
U.S.EPA	United States Environmental Protection Agency
UIC	Underground Injection Control
VOC	Volatile Organic Chemical

INTRODUCTION

The Interagency Coordinating Committee on Groundwater (ICCG) has evaluated the previous three Illinois Groundwater Protection Act (IGPA) Biennial Reports, and has streamlined a three volume report down to two volumes. This report is intended to provide a policy perspective on groundwater protection in Illinois, and Volume II is intended to provide a comprehensive status and self assessment of the program.

What Groundwater Means to Illinois

Approximately 95 percent of eleven and one-half (11.5) million people in Illinois rely on public water supplies as a source of drinking water. About 4.1 million people use groundwater as a source of public water supply. There are 6,252 public water supply (PWS) systems in the State, of which 5,534 are groundwater dependent. There are 1,826 Community Water Supply (CWS) systems in the State, of which 1,195 are groundwater dependent. There are approximately 4,446 non-community groundwater dependent systems that serve schools, restaurants, parks and other businesses. Further, it is estimated that approximately 400,000 residences in Illinois are served by their own private wells.

Protecting this vital resource is critical to ensure potable water for current and future generations. As will be demonstrated, protecting our groundwater resource is also essential to avoid economic repercussions that are a result of groundwater contamination. This biennial report to the Governor and General Assembly presents an overview regarding Illinois' reliance on groundwater resources, the growing problems of groundwater contamination, potential sources of future adverse impacts to groundwaters, and preventive approaches to groundwater protection.

Cost of Groundwater Contamination

The cost of groundwater contamination is significant. In contrast, the cost of implementing a local groundwater protection program can be off-set in relation to the costs of contamination. Therefore, the vulnerable CWSs discussed in this Policy Report would all benefit from establishing protection programs in recharge areas that extend beyond the minimum setback zones established under the IGPA. Groundwater protection in these areas could be achieved by applying certain design and/or operating practices for new potential sources of contamination. In addition, certain best management practices (BMPs) could be established for nonpoint sources of contamination. Another method that could be utilized to protect these critical resource areas in relation to new and existing potential contamination sources is being implemented by many companies and is referred to as pollution prevention. Pollution prevention involves reviewing the use of all hazardous and liquid chemicals in plant or company processes, and when possible, adjusting the process to replace hazardous with non-hazardous materials.

Illinois Groundwater Protection Act

The Illinois Groundwater Protection Act (P.A. 85-0863, 1987) responds to the need to manage groundwater quality by emphasizing a prevention oriented process. The Illinois Groundwater

Protection Act (IGPA) is a comprehensive law which relies upon a State and local partnership. Although the IGPA is directed toward protection of groundwater as a natural and public resource, special provisions target drinking water wells. The IGPA responds to the need to protect groundwater quality and establishes a unified groundwater protection program, by:

- Setting a groundwater protection policy;
- Enhancing cooperation;
- Establishing water well protection zones;
- Providing for surveys, mapping and assessments;
- Establishing authority for recharge area protection;
- Requiring new groundwater quality standards; and
- Requiring new technology control regulations.

The groundwater policy sets the framework for management of this vital resource. The law focuses upon uses of the resource and establishes statewide protection measures directed toward potable water wells. In addition, local governments and citizens are provided an opportunity to perform an important role for groundwater protection in Illinois.

CHAPTER I. COMMUNITY WATER SUPPLY GROUNDWATER PROTECTION ASSESSMENT METHODS

The groundwater program has initiated both long and short-term efforts to protect groundwater resources in Illinois. However, quantifying the amount of groundwater protection that has occurred for critical groundwater resources that support potable use, and for determining the amount of threatened resource is more difficult. Therefore, the Illinois Environmental Protection IEPA (IEPA) determined that an estimate could be made based on the most current and accurate information available. Certain qualitative indicators of groundwater protection progress were considered. These can be broken out into what locals can do given the authority and information provided as a result of the IGPA versus programs implemented under state authority. The qualitative assessment of groundwater quality protection progress considered the impact of the following three key IGPA program elements:

- groundwater quality standards;
- regional groundwater protection planning; and
- local and state community wellhead protection programs.

Quantitative indicators were estimated by relating detailed information and data with the CWS Ambient Groundwater Monitoring Network (CWS Ambient Network). This network was statistically designed to represent the entire population of CWS wells. The quantitative assessment of groundwater protection has been divided into three separate but interrelated issues, as follows:

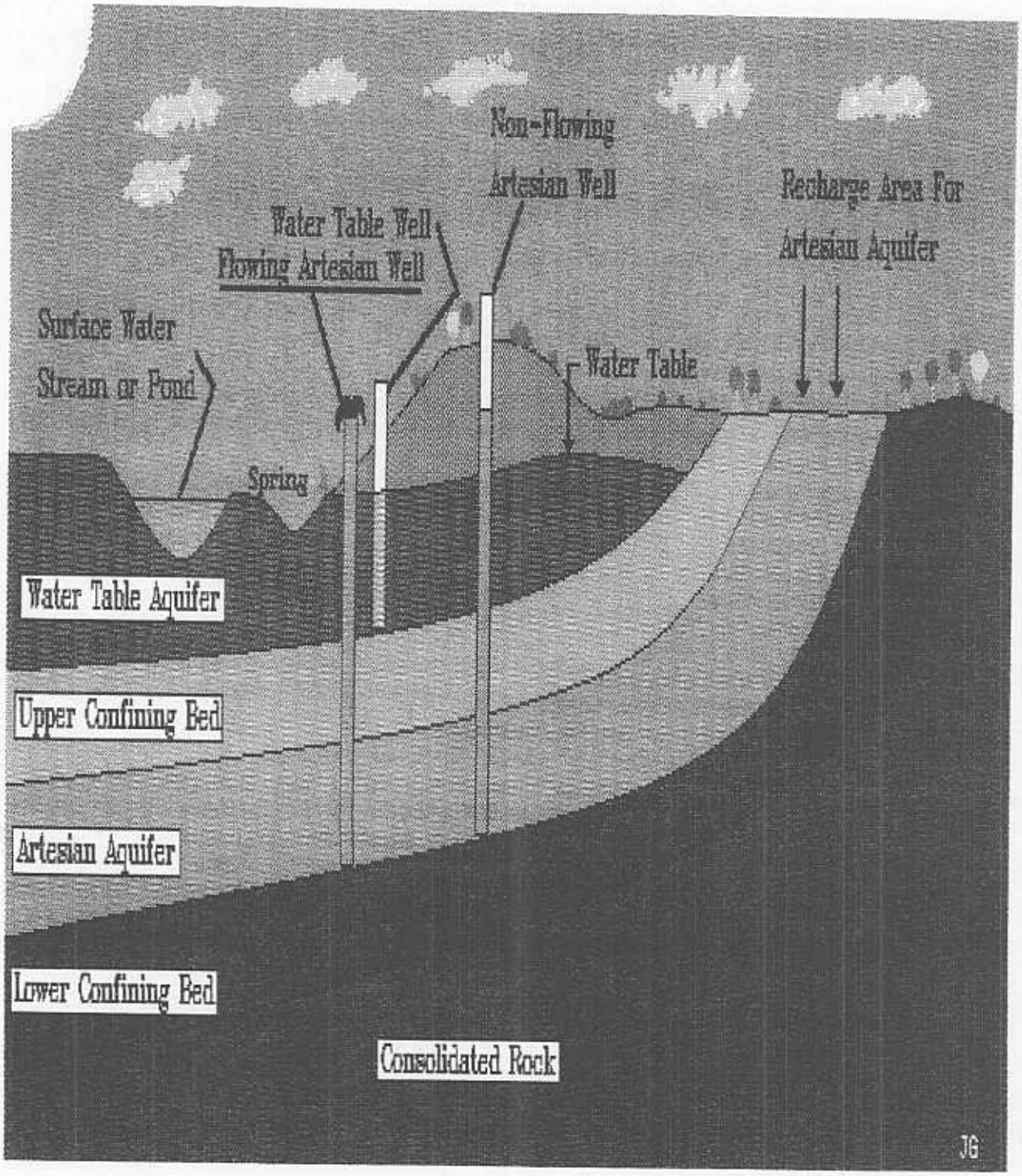
- critical potable resource groundwater protection;
- potential contamination sources; and
- impacted groundwater quality.

Data from the CWS Ambient Network was utilized to quantitatively estimate the amount of groundwater protection that has occurred in Illinois over the past eight years relative to the overall resource. This network, as stated previously, was designed to represent the 1,195 CWS that utilize groundwater in the State. The potable water supply wells used by these groundwater CWS's pump from geologic materials below the land surface, and these geologic materials are referred to as aquifers. Figure 1 graphically illustrates the differences between confined versus unconfined aquifer systems. In some areas of the State, aquifers are overlain by soils and other geologic materials that provide natural protection to the groundwater. These aquifers are referred to as confined aquifers. This natural protection can be circumvented by improperly abandoned wells, injection wells and poor well integrity. In other areas such as the City of Rockford or Mason county, there is no natural protection overlying the aquifers. These are referred to as unconfined or water table aquifers. Therefore, under these conditions the groundwater is very vulnerable to any type of contamination that is released on or below the land surface.

Many of the 2,988 CWS wells in the State utilize aquifers that are unconfined, and it is estimated that there are 965 such wells representing 386 CWSs. Over the past eight years the IEPA has estimated the recharge area for over 100 of the CWS wells utilizing unconfined aquifers, and has determined

that the land surface expression for an average 5 year recharge period is approximately 99 acres per well. This area ranged from a minimum of 3.7 to 1,401 acres in size. Thus, if this is extrapolated to the 965 community water wells or 386 systems using unconfined aquifers, there are 164,762 recharge area acres associated with these systems.

Figure 1. Unconfined and Confined Aquifer Systems



CHAPTER II. OVERALL GROUNDWATER QUALITY PROTECTION INDICATOR

Three IGPA programs were considered to qualitatively assess groundwater protection progress with respect to the protection of CWS wells.

Groundwater Standards

Establishment of comprehensive groundwater quality standards is a critical component of a 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. Illinois adopted comprehensive groundwater quality standards that became effective November 25, 1991. Since then, adoption of these sixty standards have:

- served as a general water quality goal;
- been used to determine performance expectations and characteristics of control technologies used by certain facilities and activities with the potential for contaminating groundwater;
- assisted with usage determinations considering the compatibility or suitability at specific geographic locations;
- assisted in the development of site cleanup objectives where significant contamination has occurred; and
- been utilized in conjunction with groundwater management zone provisions to give consideration to complex evaluations of applicable treatment technology, institutional mechanisms and economic implications of alternative cleanup scenarios.

During the first year of this biennial reporting period the IEPA amended the standards to include sixteen additional constituents that have been found as contaminants in Illinois groundwater, and that have adopted federal drinking water standards. These amendments were adopted on August 11, 1994.

Although, these standards apply state-wide they can have a direct effect on the protection of CWS wells at the local level. Thus, it is estimated that the expanded standards have had a positive impact on the protection of CWS wells.

Regional Groundwater Protection Program

The IGPA required the formation of "Priority Groundwater Protection Planning Regions". Priority regions were selected based on statewide mapping of "appropriate recharge areas" conducted by the Department of Natural Resources (DNR). The regional program emphasizes information transfer, education and advocacy rather that regulation. Under the IGPA a framework was established for pursuing regional protection but no pre-determined regulatory template was imposed. This aspect was left open by the IGPA for more analysis and development as the program unfolded. Local areas differ in the extent of vulnerability to contamination depending on geologic conditions and land use patterns. These geographic areas differ in the appropriate mix of protective measures that should be applied.

Four Priority Groundwater Protection Planning Regions have been established to date (see Figure 2). The Northern and Central regions were established in 1991, the Southern in 1992, and the Northeastern in 1995. Since the regional planning process has started three pilot "groundwater protection needs assessments" have been completed, and a comprehensive guidance document has been produced by DNR and IEPA staff. This guidance provides the technical foundation for regulated recharge area determinations. Several communities (e.g., Fairview, Shelbyville, Mackinaw, St.Charles, etc.) began using this guidance in 1995 to initiate groundwater protection needs assessments. In 1995 the IEPA received its first petition from a Priority Groundwater Protection Planning Committee for developing a regulated recharge area proposal. Additionally, a comprehensive local recharge area protection program was developed and implemented primarily due to collaboration with a regional planning committee. The regional committees have also facilitated pollution prevention workshops for small businesses, FarmAsyst pilots, groundwater middle school educational efforts, groundwater protection field days, Clean Water celebrations, and other educational events. The regional committee members have also participated in presentations to local communities for the purpose of influencing them on the benefits of establishing setback and recharge area protection.

Thirty communities within the four Priority Groundwater Protection Planning regions, representing multiple wells, have established or are awaiting final approval of maximum setback zone ordinances. This represents 35 percent of the number adopted or awaiting approval statewide.

These efforts continue to provide major groundwater protection progress. Thus, although the next Section of this report shows that there is still a significant gap in recharge area protection the regional planning program provides a means to make progress.

Figure 2. Priority Groundwater Protection Planning Regions

Wellhead Protection Program

Under the IGPA the authority for implementing protection programs for community water supplies using groundwater is split between State and local governments. A balance was sought between the State and local responsibilities under the IGPA. A well site survey program was developed and has been implemented by the IEPA. This program provides a means of generating needed information that local governments could use in adopting minimum and maximum setback zone ordinances. The IGPA also authorized, not mandated, local governments to adopt maximum setback zones. Eighty five communities (representing multiple wells) have adopted or are waiting on approval of they're maximum zone ordinance(s). After a two year period (1990) of adoption of the IGPA, the IEPA was authorized to propose regulations for needed maximum setback zones in instances where local governments choose not to act. To date the IEPA has prepared initial proposals for establishing such regulations for six communities. However, in the majority of these instances the local government has proceeded on they're own in adopting local ordinances. The IEPA has not fully utilized this authority under the IGPA to date, and there are some significant gaps given that only 85 out of 1,195 communities that use groundwater have adopted these ordinances.

The IEPA was also provided the authority to propose that "regulated recharge areas" be established and managed for protection of groundwater. The IEPA received its first petition in 1995 to develop such a proposal.

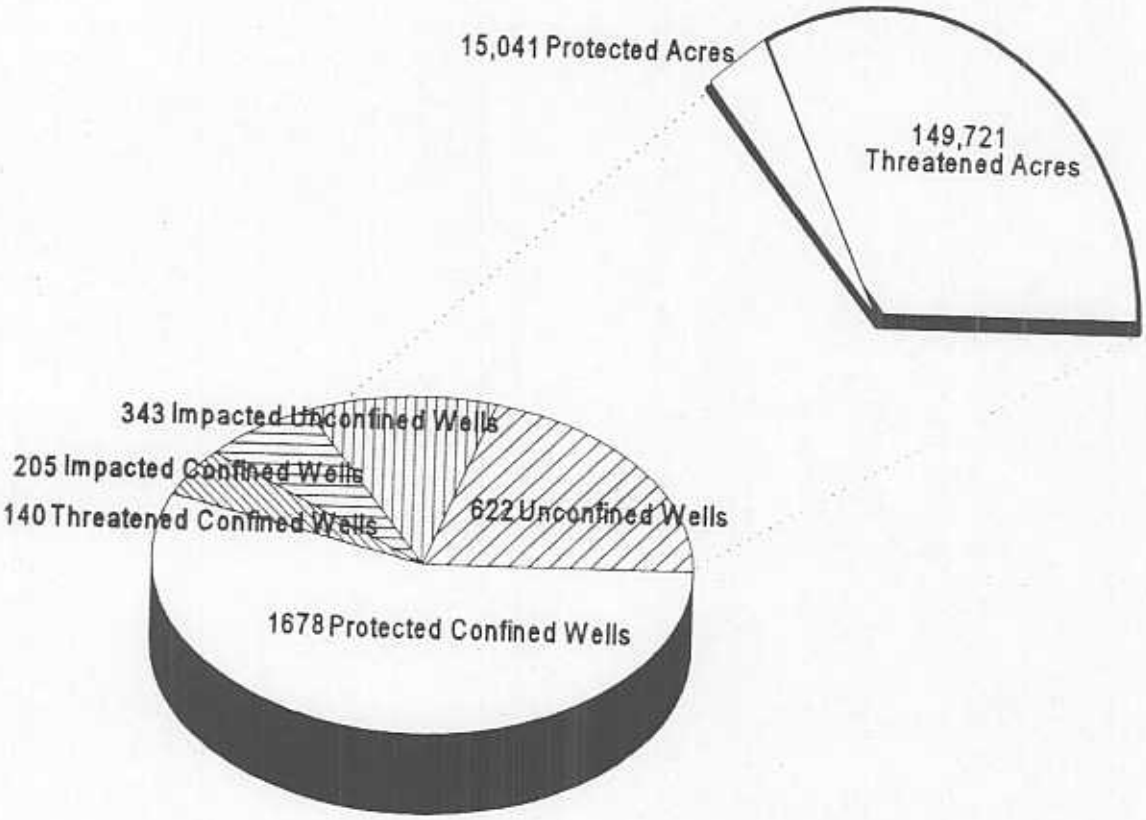
Quantitative Assessment of Groundwater Protection for Community Water Supply Wells

In order to quantitatively measure the progress made on groundwater protection for CWS wells, it was determined that the information associated with the critical potable resource groundwater protection, potential contaminant sources and impacted groundwater quality needed to be combined into one overall groundwater quality protection indicator. This overall indicator should also incorporate several common conceptual tools for identifying types and quality of indicator data that has been embraced by the Organization for Economic Cooperation and Development (OECD). OECD has embraced the following indicators:

- pressure indicators or data collected on potential sources and routes of groundwater contamination from the well site surveys for CWS wells;
- state indicators or information collected and analyzed in association with the ambient network of CWS wells; and
- response indicators or progress made by local governments to develop and implement proactive groundwater protection programs.

Thus, the overall indicator combines pressure, state and response indicators to help assess groundwater quality protection progress. For further detail, the information supporting the development of this indicator is fully described in the Volume II-Comprehensive Status and Self-Assessment Report. Figure 3 graphically illustrates the IEPA's overall groundwater protection indicator for CWS wells in the State of Illinois.

Figure 3. Overall Groundwater Quality Protection Indicator



In order to describe what this indicator tells us about the amount of groundwater protection progress made. The previous discussion indicated that the IGPA established a three-tiered approach for protecting or supporting the aforementioned groundwater uses in Illinois. The first tier implemented minimum setback zones of either 200 or 400 feet. The latter minimum setback zone was established for the more vulnerable CWS wells in the State. Minimum setback zones prohibit new potential primary sources, potential secondary sources and potential routes of contamination from locating in this area.

The second tier of protection provides authority to local units of government to extend this zone up to a maximum of 1,000 feet radially from the well, which also expands the prohibition of new potential primary sources of contamination. Maximum setback zones are established by local governments in conjunction with an IEPA review procedure. The IGPA also provides the IEPA with the authority to propose maximum setback zones to the Illinois Pollution Control Board (Board). The last tier of protection can be accomplished by establishing a regulated recharge area. Regulated recharge areas are established through a Board rulemaking procedure. The Illinois State Water Survey (ISWS) worked with IEPA staff to analyze 300 CWS wells utilizing unconfined aquifers, and determined that 80 to 90 percent of the recharge areas were greater than 1,000 feet. Under the Illinois program, each of these protection measures provides a different degree of protection or use support to vulnerable potable resource groundwater.

The IEPA has determined that minimum setback zones provide a baseline of protection for potable use support. Maximum setback zones provide supplemental protection for potable use support and regulated recharge areas could theoretically provide protection for full use support for unconfined CWS's.

The data described above indicates that there is approximately 15,041 acres out of 164,762 acres that have baseline and/or supplemental protection measures in place. This overall indicator does not include a measure for new CWS wells. There are approximately 100 new CWS wells permitted every year. It is unknown what percentage of new wells are utilizing confined versus unconfined aquifers. The permit process does not require these determinations. Eighty six percent of the critical resource groundwater for the State lacks adequate protection. This provides a response indicator of the groundwater protection progress made for this critical resource. Further, no recharge area evaluation process is included. Thus, some percent of these new wells are also threatened. The overall groundwater quality protection indicator also tells us that there is a 3:1 ratio between detections in unconfined versus confined aquifer system wells. Thirty-five and a half percent of the unconfined aquifer wells have already been impacted by one of the three contaminant groups assessed in this report. Potential nonpoint sources of agricultural chemicals appear to be primarily responsible for impacts from triazine/alachlor and nitrates in CWS.

Many common materials such as gasoline, oil, paint and industrial solvents are potential groundwater contaminants. Among those most often occurring in public groundwater supply systems in Illinois are chemical solvents commonly used by dry cleaners, automotive service stations, metal finishing and fabricating facilities, and other industrial activities. The health effects of VOCs/industrial solvents are addressed in terms of "acute toxicity" (effects from immediate, short-term exposure), and "chronic

toxicity" (effects from long-term exposure). Acute health effects from VOCs/Industrial solvents include unconsciousness, circulatory collapse, and a central nervous system depressant. The major concern is potential chronic effects which may include increased cancer, birth defects, damage to the kidneys, heart, liver and lung.

Many common materials, such as pesticides and fertilizers, are also potential groundwater contaminants. Most of these contaminants are compounds containing carbon, known as synthetic organic chemicals (SOCs). Other common groundwater contaminants include pathogens (bacteria and viruses) and nitrates. The most serious groundwater contaminants which pose a significant health risk come from human activities and land uses. For example, agricultural point source (i.e., distribution centers) and non-point source (i.e., farm field applications) pose potential hazards to groundwater. The widespread occurrence and persistent toxicity of pesticides is of great concern for public health. Acute health effects from pesticides include burns, nausea, and/or vomiting. The major concern is potential chronic effects including increased cancer, birth defects, genetic mutations, damage to kidneys, and damage to the central nervous system.

Nitrate is a naturally occurring inorganic ion which makes up part of the nitrogen cycle. Nitrates occur naturally in a number of foods, particularly vegetables. Both nitrate and nitrite also are added to meat products as preservatives. The major use of nitrate is in inorganic fertilizers.

The United States Environmental Protection IEPA (U.S.EPA) has set a standard for nitrate in drinking water at 10 milligrams per liter and standard for nitrite in drinking water at 1 milligram per liter. The standard for the combination of nitrate and nitrite in drinking water is 10 milligrams per liter. These levels include a margin of safety to protect human health. A recent study for U.S. EPA was conducted by National Research Council (NRC) to evaluate nitrates and nitrites in drinking water. The study found that data from laboratory studies are inadequate to support increased cancer rates in humans when exposed to nitrates or nitrites in drinking water. U.S.EPA believes that water containing nitrate or nitrite at or below the levels described above are acceptable for drinking every day over the course of one's lifetime and are adequate to protect human health.

However, in infants, exposure to nitrate at levels in excess of 10 milligrams per liter can result in a blood condition called methemoglobinemia. Methemoglobinemia, also known as blue baby syndrome, is characterized by a reduced ability of the blood to carry oxygen. Methemoglobinemia related to drinking water contamination has only been observed in infants up to the age of about six months.

CHAPTER III. SUMMARY AND CONCLUSIONS

Illinois has made progress in implementing groundwater protection programs by the adoption of groundwater standards, and establishing minimum setback zones. Well site survey reports have been completed and provided to the majority of the 1,195 public water supplies using groundwater in Illinois. These reports assist in generating needed information that local governments use in adopting minimum and maximum setback zone ordinances. Eighty five communities have or are in the process of adopting maximum setback zones. However, a great deal of work needs to be done to establish addition maximum setback zones in the areas of greatest need. The Regional Groundwater Protection Planning Committees have made very good progress, and received national recognition for their efforts. The IEPA received its first petition from a regional planning committee to develop the first regulated recharge area in Illinois.

A great deal of work remains to be done to protect the 149,721 acres of threatened critical potable resource groundwater utilized by CWSs. This qualitative and quantitative assessment of groundwater protection progress relative to the protection of one of the State's most critical resources indicates the following:

- 4.1 million people use groundwater as a source of public water supply;
- 1,195 CWS (2,988 wells) utilize groundwater in the State;
- 386 CWSs (965 wells) utilize aquifers that are unconfined;
- 100 of the CWS wells utilizing unconfied aquifers have mapped recharge areas;
- the land surface expression for an average 5 year recharge period is approximately 99 acres per well (this area ranged from a minimum of 3.7 to 1,401 acres in size);
- 35.5 percent of the CWS wells using unconfined aquifers have already been adversely impacted by groundwater contamination from VOCs, SOCs, or nitrates;
- 10 percent of the CWS wells using confined aquifers have already been adversely impacted by groundwater contamination from VOCs, SOCs, or nitrates;
- 3:1 ratio between detections in unconfined versus confined aquifer system wells;
- 14 percent of the recharge area acres that support CWS unconfined aquifer wells have baseline, supplemental, and full recharge area protection in place or under development;
- 85 out of 1,195 communities that use groundwater have adopted or are awaiting approval of maximum setback zone ordinances;
- 30 communities within the four Priority Groundwater Protection Planning regions, representing multiple wells, have established or are awaiting final approval of maximum setback zone ordinances;
- new CWS wells constructed in unconfined aquifers are not fully protected to assure the provision of a long-term safe and adequate supply of drinking water;
- the IEPA has not fully utilized its authority to propose maximum setback zones where local action has not been taken;
- approximately 86 percent of the recharge area acres that support unconfined aquifer wells are threatened by potential contamination sources;

- VOC contamination appears to be due to commercial and industrial sources; and
- the majority of SOC and nitrate contamination appears to be due to agricultural nonpoint sources of contamination.

The pollution of groundwater can have wide-ranging economic implications to communities and businesses. Groundwater contamination can produce the following adverse economic hardships:

- devalued real estate;
- diminished home sales or commercial real estate sales;
- loss to the tax base;
- consulting and legal fees;
- increased maintenance costs;
- deterioration in drinking water quality and quantity;
- increased health risks;
- waterborne disease outbreaks; and
- increased water rates for alternative water supplies as well as the cost of new equipment and treatment.

All of these costs have a potential to adversely affect local economic development. The CWS of Illinois that have been impacted by groundwater contamination have incurred some or all of these costs.

CHAPTER IV. RECOMMENDATIONS

A local groundwater protection program established in community well recharge area(s) allows a community to focus its management efforts, avoid excessive management and regulation in areas that do not contribute to the wells, and avoid spending time and funds on protecting non-critical areas. This type of prevention program has allowed the State to provide waivers to reduce the community well monitoring required under the Safe Drinking Water Act (SDWA).

The IGPA provided setback zones and surveys of potential sources and routes of contamination for CWSs. It also authorized large communities served by groundwater to conduct "groundwater protection needs assessments". A groundwater protection needs assessment defines the critical recharge area(s), identifies the existing potential contamination sources and/or potential routes located in this area, and also relates this information to the existing land use zoning. An assessment also evaluates the water supply contingency plans in the event of contamination incidents. The combination of this data will allow for the application of a balanced management plan for the protection of these groundwater resources.

From the pilot groundwater protection needs assessments that have been completed, the IEPA, ISWS, and Illinois State Geological Survey (ISGS) have developed a *Groundwater Protection Needs Assessment Guidance Document*. The IEPA, Illinois Rural Water Association and others are also providing technical assistance to communities using available resources, however, this assistance does not keep pace with the rate required to assist rapidly growing communities in certain parts of the State.

Communities need to incorporate regional groundwater protection concerns as a key component of planning and zoning issues, since zoning is frequently a blueprint of growth. However, resources in the form of financial assistance or other incentive programs from the state or federal government may be required to assist in performing groundwater protection needs assessments and to make local wellhead protection programs truly effective. The IEPA has initiated pilots in the Central and Northern Priority Groundwater Protection Planning Regions to assist with performing groundwater protection needs assessments. This assistance needs to continue and be expanded. This type of assistance would further leverage the resources available from the State to protect these critical resource groundwaters. In the long run, a local technical assistance program could lead to cost savings and economic growth for many companies and communities. The companies and the community must have an uncontaminated source of drinking water to remain economically vital. Better collaboration with the Clean Break Program, and P2 techincal assistance would assist the Regional Planning Committees in advocating community based groundwater protection programs for CWSs.

The IEPA should develop a prioritization process to determine areas with the greatest need for the development of maximum setback zone proposals. This prioritization should be conducted in coordination with the Interagency Coordinating Committee on Groundwater, Groundwater Advisory Council, and the Groundwater Protection Planning Committees. The IEPA should develop up to five maximum setback zone proposals during the next two year period.

A state management plan for the protection of groundwater from agricultural chemicals needs to be developed and implemented to encourage the voluntary protection of these critical potable resource groundwaters. The IEPA should conduct up to four pilot demonstration grant projects to work with stakeholders to establish voluntary agricultural BMPs in delineated CWS well recharge areas. In addition, there is a continued need for establishing prevention programs and targeted cleanup/restoration of other groundwater contaminant sources or routes within these high priority water resource areas of the State.

During the next four years, the environmental goal of this program will be to increase recharge areas with full protection programs established or under development, 15 percent by the year 2000 as compared to 1995.

Illinois Groundwater Protection Program

Volume II: Biennial Comprehensive Status and Self-Assessment Report

February 1996

Prepared by the Interagency Coordinating Committee on Groundwater

TABLE OF CONTENTS

Introduction And Background . . . . . Page 1

CHAPTER I. GENERAL GROUNDWATER PROTECTION PROGRAM INITIATIVES . . . . . Page 1

CHAPTER II. INTERAGENCY COORDINATING COMMITTEE ON GROUNDWATER OPERATIONS . . . . . Page 12

CHAPTER III. GROUNDWATER ADVISORY COUNCIL OPERATIONS . . . . . Page 16

CHAPTER IV. EDUCATION PROGRAM FOR GROUNDWATER PROTECTION . Page 18

CHAPTER V. GROUNDWATER EVALUATION PROGRAM . . . . . Page 23

CHAPTER VI. GROUNDWATER QUALITY STANDARDS AND TECHNOLOGY CONTROL REGULATIONS . . . . . Page 53

CHAPTER VII. WELLHEAD PROTECTION PROGRAM . . . . . Page 57

CHAPTER VIII. REGIONAL GROUNDWATER PROTECTION PLANNING PROGRAM . . . . . Page 68

CHAPTER IX. NON-COMMUNITY AND PRIVATE WELL PROGRAM . . . . . Page 73

CHAPTER X. MINIMAL HAZARD CERTIFICATION . . . . . Page 74

CHAPTER XI. GROUNDWATER QUALITY PROTECTION RECOMMENDATIONS AND FUTURE DIRECTIONS . . . . . Page 75

FIGURES

Figure 1. Nonpoint Source Only Targeted Watersheds....Page 6
Figure 2. Statewide Distribution of CWS Wells....Page 28
Figure 3. Ambient Groundwater Monitoring Network....Page 29
Figure 4. Population Served by Ambient Groundwater Monitoring Network Wells....Page 30
Figure 5. Ambient Network Stratification Criteria....Page 32
Figure 6. Confined versus Unconfined Ambient Network Wells....Page 33
Figure 7. Summary of Predicted Statewide Land Use and Contaminant Sources and Routes....Page 35
Figure 8. Summary of Predicted Statewide Land Use and Occurrence of VOC Sources....Page 36
Figure 9. Summary of Predicted Statewide Land Use and Occurrence of Pesticide Sources....Page 37
Figure 10. Summary of Predicted Statewide Land Use and Occurrence of Nitrate Sources with Detections of 3-10 ppm....Page 38
Figure 11. Summary of Predicted Statewide Land Use and Occurrence of Nitrate Sources with Detections Greater than 10 ppm....Page 39
Figure 12. Distribution of Ambient Network Wells with Potential Routes of Contamination....Page 40
Figure 13. Summary of Predicted Rank of Contaminants Detected (in Percent %)....Page 43
Figure 14. Distribution of Confined and Unconfined Wells....Page 44
Figure 15. Hydrogeology of Contaminated Unconfined Ambient Network Wells....Page 45
Figure 16. Hydrogeology of Contaminated Confined Ambient Network Wells....Page 46
Figure 17. Unconfined CWS Well Protection Status....Page 49
Figure 18. Overall Groundwater Protection Indicator....Page 51
Figure 19. Regional Groundwater Protection Planning Committees....Page 58

ACRONYM GLOSSARY

Act	Illinois Environmental Protection Act
AFRAP	Agrichemical Facility Response Action Program
BMP	Best Management Practices
BOL	Bureau of Land
BOW	Bureau of Water
CAS	Compliance Assurance Section
CDC	Center for Disease Control
CSGWPP	Comprehensive State Groundwater Protection Program
CWS	Community Water Supply
DNR	Department of Natural Resources
EPTF	Environmental Protection Trust Fund
GAC	Groundwater Advisory Council
GIS	Geographic Information System
GMZ	Groundwater Management Zone
HWRIC	Hazardous Waste Research and Information Center
IAWC	Illinois American Water Company
ICCG	Interagency Coordinating Committee on Groundwater
IDNS	Illinois Department of Nuclear Safety
IDOA	Illinois Department of Agriculture
IDPH	Illinois Department of Public Health
IEPA	Illinois Environmental Protection Agency
IGA	Illinois Groundwater Association
IGPA	Illinois Groundwater Protection Act
IPCB	Illinois Pollution Control Board
ISGS	Illinois State Geologic Survey
ISWS	Illinois State Water Survey
JCAR	Joint Committee on Administrative Rules
MCL	Maximum Contaminant Level
MHC	Minimal Hazard Certification
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NPS	Non-Point Source
NRCS	Natural Resources Conservation Service
OSFM	Office of the State Fire Marshal
P2	Pollution Prevention
ppb	parts per billion
ppm	parts per million
PWD	Public Water District
RCRA	Resource Conservation Recovery Act
SCS	Soil Conservation Service

SDWA	Safe Drinking Water Act
SEGIP	State Environmental Goals and Indicators Project
SIU	Southern Illinois University
SMCL	Secondary Maximum Contaminant Levels
SMP	State Pesticide Management Plan
SOC	Synthetic Organic Chemical
SOP	Standard Operating Procedure
TARP	Tunnel and Reservoir Project
TCE	Trichloroethylene
UICES	University of Illinois Cooperative Extension Service
U.S. EPA	United States Environmental Protection Agency
U.S.G.S.	United States Geologic Survey
USDA	United States Department of Agriculture
VOC	Volatile Organic Chemical
WHPP	Wellhead Protection Program

Introduction And Background

The Interagency Coordinating Committee on Groundwater (ICCG) has evaluated the previous three biennial reports, and determined that a more streamlined, performance based report is needed. Hence, the intended purpose of this report is two fold. First, the report is intended to provide a comprehensive status report on the implementation of the Illinois Groundwater Protection Act (IGPA). Secondly, the report is intended to provide a self-assessment of program initiatives in relation to the goals and objectives of the program recommended in the 1994 IGPA Biennial Report. Additionally, this report is intended to provide environmental and programmatic indicators to help measure and demonstrate program performance.

The current report has been organized according to the following recommended goals:

- General groundwater protection program initiatives;
- ICCG operations;
- Groundwater Advisory Council (GAC) operations;
- Groundwater protection education program;
- Groundwater evaluation program;
- Groundwater quality standards and technology control regulations;
- Wellhead protection program (WHPP);
- Regional groundwater protection planning program;
- Non-community and private well program; and
- Minimal Hazard Certification (MHC) program.

CHAPTER I. GENERAL GROUNDWATER PROTECTION PROGRAM INITIATIVES

Section 1. 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 P2 programs, and local zoning and IGPA regulatory programs to protect these areas

The Illinois Environmental Protection Agency (IEPA), Illinois State Geological Survey (ISGS) and Illinois State Water Survey (ISWS) are primarily responsible for this activity. Progress on this activity has been good. A successful local recharge area protection program has been established in the City of Pekin. This project has received national recognition by the Groundwater Foundation and United States Environmental Protection Agency (U.S. EPA). The project was a success primarily due to the efforts of the Central Groundwater Protection Planning Committee and the Pekin Groundwater Protection Education Team. In addition, the IEPA received its first regulated recharge area petition from the Central Groundwater Protection Planning Committee. The IEPA is in the process of developing this regulatory proposal.

Technical assistance to the committees has been expanded. A graduate intern has been tasked by the IEPA to conduct recharge area delineations in the Central Planning Region. In addition, interns have

been tasked by the IEPA to work with the Planning Committee to provide pollution prevention (P2) technical assistance to small businesses located within community water supply (CWS) well recharge areas located within the Northern and Central Groundwater Protection Planning Regions. Several additional regional groundwater management initiatives have been started in the Priority Groundwater Protection Planning Regions. The Priority Groundwater Protection Planning Regions are comprised of the following: Northern Region - Winnebago, Boone, and McHenry counties; Northeastern - Kane, Kendall, Kankakee, and Will counties; Central Region - Peoria, Tazewell, Woodford, and Mason counties; and Southern Region - Madison, St. Clair, Randolph, and Monroe counties. The IEPA has been performing the technical recharge area delineation for CWS wells in the Northern and Southern Groundwater Protection Planning Regions. The majority of recharge area delineations for unconfined aquifer wells with aquifer property data have been completed for the Northern Region. The work has been initiated in the Southern Region and is just beginning in the new Northeastern Region. See Chapters VII and VIII for further details.

The ISGS has continued to characterize the geology and hydrology of McHenry County. In addition, work is proceeding on research on the geology of northwestern Illinois.

Section 2. Develop and implement a State Pesticide Management Plan

The Illinois Department of Agriculture (IDOA) is the lead in developing the Generic State Management Plan (SMP) for Pesticides in Groundwater. An initial draft, dated May 1994, was developed by a subcommittee of the ICCG which included representatives of IDOA, IEPA, ISWS, ISGS, Illinois State Natural History Survey (ISNHS), Illinois Department of Public Health (IDPH), University of Illinois Cooperative Extension Service (UICES) and Soil Conservation Service (USDA-SCS). That draft described the proposed framework to be used by the State of Illinois for addressing the risks of groundwater contamination by pesticide chemicals. The proposal was developed in response to the U.S. Environmental Protection Agency's (U.S.EPA) Pesticides and Groundwater Strategy. This strategy had been under development for the past several years and became final in 1991. The U.S.EPA's adopted approach is one of continued nationwide regulation of pesticide use and disposal augmented by strong state roles in the local management of pesticide use to protect groundwater. That strong state role is to come from the individual state development of management plans which considers local variations in use, vulnerability and management.

The incentive for states to prepare these plans came from the federal pesticide registration process. The future use of registered pesticides, identified by U.S.EPA as a threat to groundwater, would depend on the presence and adequacy of a state's management plan. In some situations, U.S.EPA might require a state-specific label or supplemental labeling with the SMP - prescribed, pesticide management measures. In other cases, the U.S.EPA might have to take steps, including statewide cancellations, to control the use of a pesticide that posed a significant groundwater threat if there was no adequate SMP that could reasonably be expected to prevent or reduce the threat of contamination. The possibility of special state management measures in lieu of U.S.EPA cancellation and the prevention of groundwater contamination has been the driving force behind the plan's development.

The current draft plan incorporates twelve components ranging from the State's groundwater protection philosophy, agency responsibilities and resources to assessment/planning, monitoring, enforcement, public education/awareness and reporting. The approach used in the draft utilizes statewide geologic mapping augmented with soil association information developed by the ISGS to predict aquifer sensitivity to pesticide leaching and serve as a basis for assessment and planning. As a result of comments received on the first draft, the IDOA, in cooperation with the ISGS and ISWS, has developed and is installing a dedicated monitoring well network to serve as a validation of the aquifer sensitivity mapping in moderate to high sensitivity areas as well as assist in the evaluation of overall plan effectiveness. A second draft SMP is under development by the ICCG pesticide subcommittee and is expected to be released for public comment in the near future. The IDOA anticipates formal submittal of a final Generic SMP to the U.S.EPA before the end of the 1996 federal fiscal year.

Section 3. Conduct a groundwater protection needs assessment and regulated recharge area forum in cooperation with the GAC

The GAC, in cooperation with the IEPA and the Regional Groundwater Protection Planning Committees sponsored a **Policy Forum on Regional Groundwater Protection Programs** in April 1994. The Policy Forum proved to be quite successful in increasing awareness and knowledge in state and local groundwater protection options and initiatives.

The Policy Forum was conducted by a suite of speakers including representatives from, but not limited to, the following:

- Groundwater Protection Planning Committees
- Groundwater Advisory Council
- Interagency Coordinating Committee on Groundwater
- Private Consulting Firms
- Illinois Environmental Protection Agency
- Planning Associations
- Local and County Government

The Policy Forum was designed to facilitate input, and to provide information, regarding local and regional groundwater protection issues. Local and state groundwater protection issues and presentations were made on the Groundwater Protection Needs Assessments conducted for Pekin, Cary and Woodstock. In addition, the activities of the Regional Groundwater Protection Planning Committees were highlighted along with presentations on local efforts in Pekin. Presentations were also made on guidelines for developing and implementing groundwater protection regulations.

The proceedings of the Policy Forum were written and distributed to each attendee. In addition, the document is available upon request from the IEPA.

Section 4. Integrate regional groundwater protection programs with SDWA compliance monitoring program

The IEPA was the lead agency in this effort. Six hundred and seventy-one out of 1,195 groundwater supplies have opted into this program. The IEPA developed and implemented a plan to integrate regional groundwater protection, with Safe Drinking Water Act (SDWA) compliance monitoring. Technical assistance has been provided by the IEPA, ISGS and the ISWS.

The SDWA provides that CWSs may be relieved of all or a portion of their synthetic organic (SOC) and volatile organic chemical (VOC) monitoring, if certain source water vulnerability conditions are met. By receiving a waiver, a CWS saves a significant sum of money in not having to perform as many analyses. In an effort to promote wellhead protection, a vulnerability assessment was developed which takes into consideration past contamination, geologic vulnerability to contaminants, existing sources of contamination and well construction integrity. Every CWS which applied for a monitoring waiver is reviewed relative to these criteria.

Water supplies with low geologic vulnerability, which favorably met the aforementioned criteria were approved to receive complete SOC/VOC monitoring waivers. Any low geologic vulnerability CWS that had a deficiency was provided the opportunity to correct the problem and receive a conditional monitoring waiver.

High geologic vulnerability CWSs with no apparent deficiencies were required to initiate recharge area protection to receive a conditional monitoring waiver. In addition, to recharge area protection programs, high vulnerability sites with deficiencies must correct all apparent problems. Because the monitoring waiver is linked to wellhead protection, any CWS that fails to correct a deficiency, or fails to adopt an IEPA approved recharge area protection program, will loose its conditionally approved status. Water supplies which meet all of the criteria, whether initially or by further activities through the conditional approval process, can receive a waiver for up to nine years, provided wellhead protection is maintained.

Section 5. Integration of surface and groundwater protection programs (e.g., State Management Plan for Pesticides)

The departments and agencies involved in this effort are IDOA, IEPA, ISGS and ISWS. Groundwater-surface water interaction investigations are an emerging field of study. Considerably more future efforts must be focused on these interactions in Illinois.

The U.S.EPA/IEPA-funded cooperative study by the ISGS and ISWS is evaluating groundwater-surface water interactions on a statewide basis. Watersheds or regions with high low-flow conditions are being compared to hydrogeologic settings. High low-flow values generally indicate significant contributions from groundwater. Areas containing sand and gravel or bedrock (sandstone/fractured

carbonate) aquifers within 15 meters of the surface are being delineated as having the highest probability for discharging shallow groundwater into surface-water bodies.

Data assembled thus far appear to support the idea that hydrogeologic scenarios can influence base flow conditions of surface water bodies. This work should help better characterize some of the relationships for specific streams and/or watersheds where large quantities of groundwater discharge contribute to high low-flow conditions. In addition, inferences can be made regarding potential threats of pesticide/nitrate contamination of surface water bodies by discharging groundwater.

The IEPA has worked to integrate source water (e.g., ground and surface sources of drinking water supply) factors into a Targeted Watershed Program. Existing data on water quality, potential contamination sources, hydrogeologic susceptibility settings, and the IEPA's delineated Targeted Watershed boundaries relative to CWS wells were used as the starting point for determining the ground and surface water interaction relationship.

Analysis of this data appears to indicate a strong relationship between areas with a high potential for aquifer recharge, detections of pesticides and/or nitrates in groundwater, no known potential point sources of agricultural contamination, and overlying or up gradient watersheds that have been prioritized due to nonpoint sources of agricultural contamination.

Priority One Watersheds

- CWS surface water intakes which currently have SDWA MCL violations;
- groundwater sources with SDWA monitoring detections over the Class I groundwater quality standard for atrazine; and
- ambient monitoring network detections over the Class I groundwater standard for nitrate.

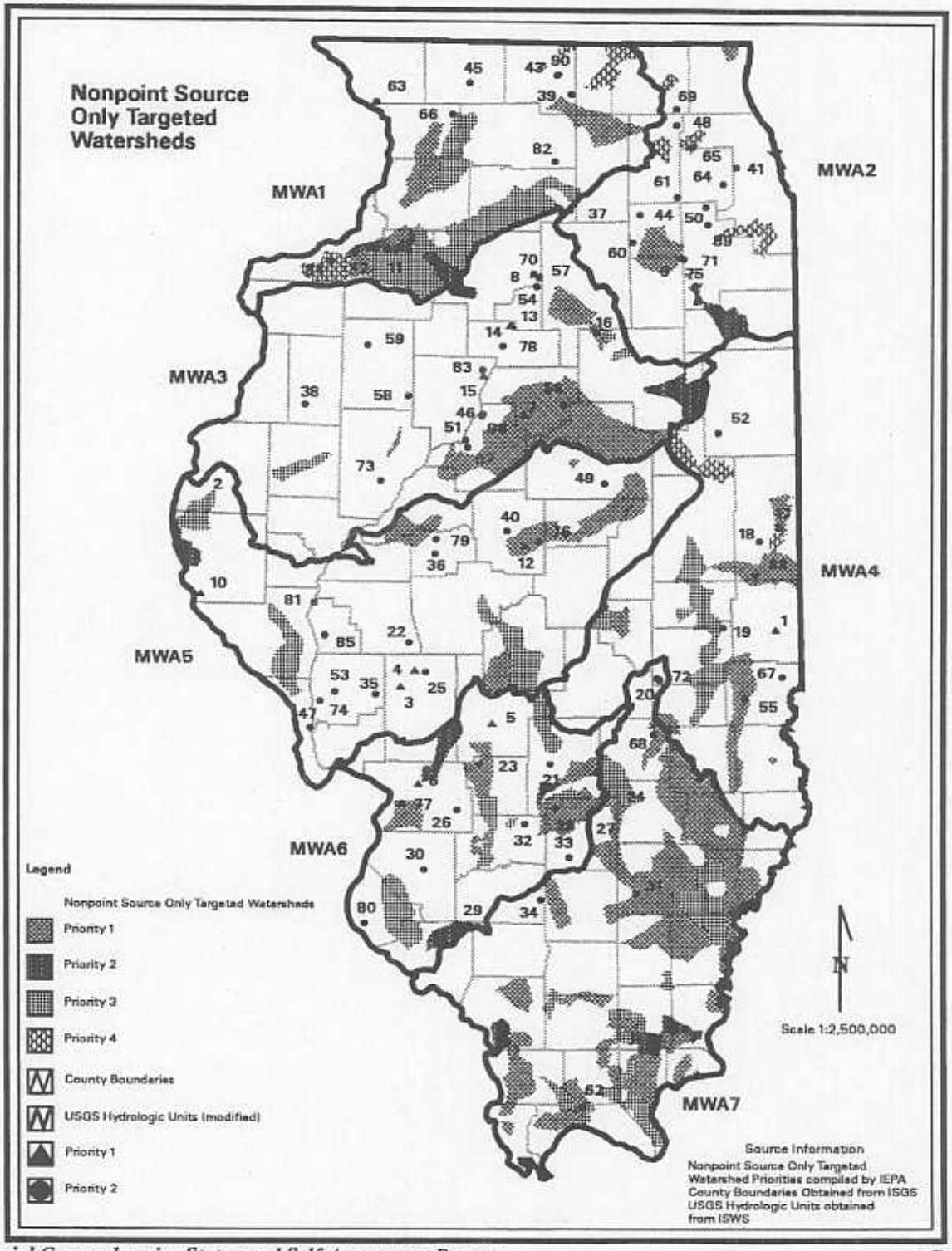
Priority Two Watersheds

- CWS surface water intakes with previous SDWA MCL violations;
- groundwater sources with SDWA data with monitoring detections below the Class I groundwater standards for atrazine and alachlor; and
- ambient network nitrate detections between a concentration of 3-10 parts per million (ppm).

The IEPA has also applied to the U.S.EPA for a Section 319 Nonpoint Source Management Grant to provide an incentive for development and implementation of voluntary best management practices (BMPs) for CWS wells. Thus, this is the IEPA's first cut effort at integrating source water protection factors into the Targeted Watershed Program.

The IEPA's Bureau of Water's (BOW) Program Plan for SFY96 included the following new elements under the Targeted Watershed Program (see Figure 1.):

FIGURE 1.



Section 6. Continue pesticide monitoring programs and further evaluate the effectiveness of immunoassay testing methods

The departments and agencies involved in this effort are the IDOA, IEPA, IDPH, ISGS and ISWS. Pesticide monitoring efforts of the ISGS and ISWS began with a pilot study to determine agricultural chemicals in rural, private wells. The pilot study, which was completed in 1992, recommended a stratified, random sampling program to cover the entire state. Due to the high cost, the plan was not carried out.

For the state *Generic Pesticide Management Plan*, the ISGS developed a map predicting the vulnerability of shallow aquifers to contamination by pesticides. The IDOA has recently funded the ISGS and ISWS to begin a monitoring program for the most vulnerable areas shown on the map to find out how well the map works as a predictive tool. This project will involve the installation of 225 dedicated monitoring wells over the next three years. Beyond verifying the vulnerability map, data from the wells will be used to assess pesticide contamination in vulnerable areas.

Since 1993, the IEPA has utilized immunoassay testing kits for the analysis of triazines and alachlor in the CWS Ambient Groundwater Monitoring Network, described in Chapter V of this report. This procedure was implemented in 1993, as a result of funding shortfalls. Immunoassay testing costs approximately one-twentieth what normal analytical procedures cost for pesticides and may provide data on degradation products thought to be a significant groundwater contamination concern.

During the first year of sampling, immunoassay was utilized as the exclusive test method for pesticides. Since a number of samples had pesticide detections, the IEPA determined that a confirmation process was necessary. Phase one of this process was to re-analyze, utilizing standard analytical techniques, those wells with immunoassay detections in the second year of monitoring. This process was completed in the fall of 1995.

Phase two, 1995 and 1996, of the confirmation process will involve further laboratory analyses of samples from sites which have historical immunoassay detections. Currently negotiation with the IEPA Division of Laboratories to adjust its methodologies to analyze for the degradation products of both alachlor and atrazine is occurring. A recent study, conducted by the United States Geological Survey (U.S.G.S) entitled "Herbicides and Metabolites in Surface Water , Rain Water, and Ground Water in the Midwestern United States", found that degradation products may be a significant groundwater concern. If standard analytical procedures confirm this low cost monitoring alternative, the IEPA will see a major cost savings in future sampling initiatives.

Section 7. Continue implementation of groundwater standards and technology control regulations

The IEPA is responsible for this program objective. This effort continues to show improvement. The IEPA proposed and the Illinois Pollution Control Board (IPCB) adopted new numerical standards for 16 additional contaminants that have been found in Illinois groundwater. These constituents are part of the U.S.EPA's recently promulgated drinking water standards required by the SDWA. The

SDWA requires the U.S.EPA to adopt 15 new drinking water standards every three years. The IEPA will continue to use the procedure it developed to evaluate each new set of U.S.EPA drinking water standards as they are promulgated, to determine if any of the contaminants have been detected in Illinois groundwater. In addition to numerical standards, the IEPA added some of the 16 new chemicals to the preventive notice list of constituents. Carcinogens are not added to the preventive notice list since their numerical standards are set at levels equal to their practical quantification limit (i.e. the lowest statistically valid level for an analytical methodology).

The IEPA primarily works with the programs and provisions under Sections 14.2, 14.4 and 14.6 of the Illinois Environmental Protection Act (Act) and the regulations adopted there under (35 Ill. Adm. Code Parts 615 and 616, and 8 Ill. Adm. Code 257) with the IDOA, the Office of the State Fire Marshal (OSFM) and the IDPH. The IEPA has developed a good working relationship with IDOA during the co-review process for agrichemical facilities located within public well setback zones, established under Part 257. Approximately 15 public well reviews have been completed or are in progress for the Part 257 program. Each of these reviews submitted by an agrichemical facility represents voluntary compliance with the regulations.

Additionally, the IEPA has also successfully educated CWS officials on the requirements of the regulations. Three communities in this reporting period have petitioned the IPCB for an exception from the setback requirements of their own wells for improvements to the community's infrastructure. Where communities have complied with regulations, the IEPA has reviewed other activities within appropriate setback zones to insure all regulated sites are in compliance. The IEPA has insured a complete record is presented, but has not opposed the improvements in regard to two of the three exception petitions.

Work with the OSFM has resulted in proper siting of numerous underground storage tanks, because the tank owners and/or consultants are aware of the siting restrictions under the Act. Within the IEPA, protocols exist to expedite the relay of permit information for review in regard to Part 615 /616 and Part 620, thereby forestalling possible improper siting and operation of prohibited activities and expediting compliance review.

IEPA interaction with IDPH has been limited in regard to compliance issues. However, limited contacts have been made with IDPH and local health departments, primarily when seeking further information regarding the setback waiver program or citizen concerns with regard to private wells.

Section 8. Provide assistance in the evaluation of the alternative monitoring and cleanup procedures developed for agricultural chemical facilities

The IDOA primarily works with agrichemical facilities regarding the various issues associated with the proper handling and storage of pesticides and fertilizers through the provisions of the Illinois Pesticide Act, Illinois Fertilizer Act of 1961, the Lawncare Products Application and Notice Act, the Environmental Protection Act and the various regulations adopted thereunder (8 IAC 250, 8 IAC 255, 8 IAC 256 and 8 IAC 257).

The focus of the Department's activities at agrichemical facilities in the last decade has grown to include groundwater issues as can be demonstrated by the development and adoption of the "containment rules" (8 IAC 255) and the "cooperative groundwater protection program" (8 IAC 257). The expansion of focus is also demonstrated by the passage of legislative initiatives providing for the "Agrichemical Contamination Study", the "land application authorization" program and the recent creation of the Agrichemical Facility Response Action Program (AFRAP) and oversight board.

Under the containment rules, agrichemical facilities have been required to construct various forms of secondary and operational containment structures. Facility owners/operators are required to submit permit applications relative to both the construction and operation of these facilities prior to the initiation of construction. These applications are then jointly reviewed by the IDOA and the IEPA (BOW and Bureau of Air). The IDOA and IEPA have worked together very closely during this process. At this time the state has approximately 1,300 active agrichemical facilities. One thousand of them have received permits from the Department; 136 facilities have ceased operations and are closed; and approximately sixty are currently in various stages of the permitting process.

The "cooperative groundwater protection program" (8 IAC 257) was created to provide agrichemical facilities the opportunity to comply with the groundwater protection mandates contained in section 14.2 of the Act through an industry-specific program. This program, designed as an alternative to 35 IAC 615/616, is administered by the IDOA in cooperation with the IEPA and attempts to balance the need for expensive groundwater monitoring at agrichemical sites with additional structural and operational containment requirements beyond those required under the IDOA containment program. To date, the IDOA has received 37 applications (facility review reports), approved six projects, and is currently reviewing ten additional ones. The IEPA Groundwater section and the IDOA staff have worked well together in the implementation of this program.

The General Assembly, in 1990, amended the Illinois Pesticide Act and mandated the IDOA to conduct a study relative to contamination at agrichemical facilities across the state. The Department, in cooperation with researchers at the Illinois State Geological Survey, completed the study in early 1993. That same legislation created the Department's authority to issue written authorizations for the land application of pesticide contaminated soil at agronomic rates. The Illinois Pesticide Act was later amended to include pesticide contaminated groundwater in this program. The IDOA has issued 48 authorizations through September 1995. Forty-six of the authorizations have dealt with soils while two have included the land application of pesticide contaminated groundwater. At this time, there remain some unresolved issues relative to this program. The IDOA has committed to pursue the development of regulations relative to this program and hopes to resolve these outstanding issues during that process.

During the 1995 legislative session, the General Assembly amended the Illinois Pesticide Act to create the AFRAP and an associated board to be administered by the IDOA. The intent of the program is to provide for a mechanism by which agrichemical facilities can voluntarily perform property investigations, develop remediation programs and conduct actual cleanup activities with governmental oversight provided by the IDOA and the AFRAP Board. The legislation provides authority for soil-related activities to the IDOA while allowing for joint IDOA-IEPA efforts relative to groundwater

activities. Currently, the program is in the Board member appointment phase with rulemaking activities associated with general program administration and site cleanup procedures expected in 1996.

Two additional IDOA activities associated with groundwater protection are the "Agricultural Clean Sweep Program" and the "Pesticide Container Recycling Program". The clean sweep program resulted from the Great Flood of 1993 when the IDOA requested assistance from the U.S.EPA relative to the disposal of flood-orphaned pesticides. Due to absence of large amounts of orphaned materials, the IDOA requested and received permission to redirect funds to the general collection and disposal of unusable pesticides from federally-declared disaster counties in Illinois. The IDOA, in cooperation with local Farm Bureau, Cooperative Extension Service and Soil & Water Conservation District Offices, conducted collections in 37 counties. Five hundred four individuals or entities participated in the events which resulted in the collection of 134,990 pounds of unusable pesticide materials at an estimated cost of $3.21 per pound.

The IDOA has, in cooperation with various industry groups, pesticide container collection and granulation events since 1990 with large expansions to the program occurring in 1993, 1994 and 1995. The number of single-day collection sites were increased from 44 in 1993 to 82 in 1995. The number of containers collected per year has grown from 57,000 containers to 188,000 in 1993 and 1995, respectively. Containers are granulated at the collection site, transferred to a storage facility in the St. Louis, Missouri area and then either used as a fuel source or used as raw material in the manufacturer of parking lot stops, fence posts, drainage tubing or other products. The IDOA is attempting, through a small business loan program, to attract product manufacturing facilities to locate within the state. The Department has also purchased a potable granulation machine for use in the program. These program expansions have been made possible through a grant from the United States Department of Agriculture (USDA).

Section 9. Monitor the long-term effects of the 1993 flood on groundwater quality

As part of a federal Centers for Disease Control (CDC) and Prevention study, the IDPH sampled 818 private water wells. These samples were analyzed by the IDOA for atrazine and alachlor during 1994 utilizing immunoassay methods. Owners/users whose wells tested positive for atrazine were given the opportunity to have their wells resampled by the IDOA and analyzed for the presence of atrazine and three atrazine metabolites as part of a CIBA Corporation sponsored atrazine water well study. Ninety-two wells were sampled in this secondary study which will assist the U.S.EPA in the evaluation of re-registration issues relative to atrazine. Also during 1994, water samples from 73 non-community water systems which were affected by the flood of 1993 were tested for atrazine and alachlor utilizing a triazine screening method as part of U.S.EPA study. Through another study sponsored by the CDC, water samples from 147 private water wells, which were affected by the flood of 1993, were tested for the atrazine group of compounds using an immunoassay testing method. This testing methods proved effective as means of screening detections and in the determination of ranges of concentration for both alachlor and triazine herbicides.

Through the above mentioned studies, 73 non-community water systems and 428 private water wells,

which were affected by the flood of 1993, were surveyed. Water samples from these same wells were tested for bacterial contamination and nitrate concentration. Tests for pesticides were also performed as mentioned above. A report on the flooded 73 non-community supplies is in final preparation at this time. Affected residents will continue to be advised of any health concerns and any remedial measures they may take through October of 1995. A report on the private water wells affected by the flood of 1993, will be completed by the end of 1995.

CHAPTER II. INTERAGENCY COORDINATING COMMITTEE ON GROUNDWATER OPERATIONS

Section 1. Continue to review and update the Implementation Plan and Regulatory Agenda

The IGPA required the creation of the ICCG. The Committee is chaired by the Director of the IEPA or designee and has members from ten State Agencies/Departments which have some jurisdiction over groundwater. The ICCG continues to review and update an implementation plan and regulatory agenda pursuant to the IGPA. The following is a list of the director or designee of the Agencies/Departments on the Committee for the past two years:

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

DEPARTMENT OF ENERGY AND NATURAL RESOURCES*
John Moore
David Baker, Designee

DEPARTMENT OF PUBLIC HEALTH
John Lumpkin
David Antonacci, Designee

DEPARTMENT OF MINES AND MINERALS*
Greg Pinto, Designee

STATE FIRE MARSHAL
Jim McCaslin

DEPARTMENT OF TRANSPORTATION
Kirk Brown
Gary Clark, Designee (Division of Water Resources*)

DEPARTMENT OF AGRICULTURE
Becky Doyle
Warren Goetsch, Designee

EMERGENCY MANAGEMENT AGENCY
John Mitchell

DEPARTMENT OF COMMERCE AND COMMUNITY AFFAIRS
Dennis Whitstone
Stewart Schrodt, Designee

DEPARTMENT OF NUCLEAR SAFETY
Thomas Ortciger
Dave Ed, Designee

GOVERNOR'S OFFICE
Allen Grosboll

*A reorganization of these Departments was initiated in July, 1995. The result was a restructuring of the denoted Departments and the Department of Conservation under a new Department of Natural Resources (DNR).

Section 2. Continue to hold quarterly meetings

The ICCG continues to hold quarterly meetings. The Committee has met regularly since 1988 to address groundwater protection issues.

Section 3. Begin the development of a comprehensive status report for 1996

The ICCG has started the development of a comprehensive status and self-assessment report for 1996. This biennial report has changed to a more streamlined approach , providing a self-assessment for the Agencies/Departments on the Committee as a performance measurement. The report allows the audience to become aware of the progress the Committee has made in groundwater protection via projects worked on during the past two years.

Section 4. Provide liaison for the GAC

The ICCG has continued to assist with coordination associated with the GAC by providing Committee meeting agendas and minutes. The ICCG has also continued to review and make recommendations on groundwater research and data collection and dissemination programs. The Committee has had success in coordinating and assisting in many aspects of the groundwater protection program.

The ICCG Groundwater Standards Subcommittee, chaired by the IEPA, was established in 1994. The subcommittee has started work on the development of a discussion document for karst terrain and cave issues. This subcommittee is analyzing the issue of developing special groundwater standard provision for karst and cave related resources. Upon completion of this document, groundwater standards could be developed for protection of the State's karst and cave resources.

The ICCG as well as its subcommittees and work groups have helped to provide a cooperative process to develop and implement programs.

Section 5. Assist the Agency with the endorsement of Illinois Groundwater Protection Program in relation to U.S.EPA's Comprehensive State Groundwater Protection Program core adequacy criteria

The ICCG reviewed and provided input on the U.S.EPA's Comprehensive State Groundwater Protection Program (CSGWPP). The process for developing a CSGWPP was initiated by conducting a self-assessment of the State's programs in relation to the six strategic activities and the core program adequacy criteria. The IGPA worked with the ICCG and GAC to prepare a self-assessment. The ICCG voted to continue pursuing a CSGWPP at the core level. The self-assessment was submitted in October 1993 to U.S.EPA Region V for their review. On April 15, 1994, U.S.EPA Region V's comments were received by the IEPA. One June 30, 1995, a draft core CSGWPP application was submitted for U.S.EPA Ground Water Protection Branch review prior to official submission to the Regional Administrator. On September 8, 1995, the U.S.EPA Ground Water Protection Branch provided comments back to the IEPA Groundwater Section. The comments will be addressed, and it is anticipated that the official submittal will be provided to U.S. EPA during 1996.

Section 6. Oversee, review and provide input to the preparation and implementation of a SMP

The ICCG has established a number of subcommittees to work on various special projects. The Pesticide Subcommittee, chaired by the IDOA has been active during the past two years working on the development of a SMP. This plan is being prepared in two phases: first as a generic plan; and secondly as a constituent specific plan. The SMP being developed in response to U.S.EPA'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, U.S.EPA may require individual SMPs 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.

This effort was lead by the IDOA. Other participating departments and agencies included the ISGS, IEPA, IDPH and ISWS. The plan is based on the potential for the contamination of shallow aquifers by agricultural chemicals as mapped by the ISGS.

In 1991, the ISGS published a map entitled *Potential for Agricultural Chemical Contamination of Aquifers in Illinois*, which was based mainly on the depth to the uppermost aquifer. The Soil Conservation Service has since released a computerized soil association map and database for Illinois. The detail and accuracy of this map were well suited to the statewide evaluation of soil factors relevant to agrichemical leaching. Thus, the 1991 map was updated, resulting in the publication of *Potential for Agricultural Chemical Contamination of Aquifers in Illinois: 1995 Revision* in April 1995. This publication includes leaching index and aquifer vulnerability maps for both pesticides and nitrates. Also produced was a series of county maps at a larger scale (1:250,000) designed for the

SMP. As noted above, a project was recently begun to verify the vulnerability ratings shown on the statewide maps.

Section 7. Review and support the annual groundwater education work plan

The ICCG's Education Subcommittee continues to be active in implementing statewide groundwater educational efforts and has worked with the three Groundwater Protection Planning Committees to establish local groundwater education programs. 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 ICCG reviews and provides input on the Groundwater Education Work plan. The Education Subcommittee is chaired by the DNR.

CHAPTER III. GROUNDWATER ADVISORY COUNCIL OPERATIONS

Section 1. Sponsor a forum in cooperation with the Regional Groundwater Protection Planning Committees and IEPA on groundwater protection needs assessments and regulated recharge areas

(Please refer to Chapter I, Section 3)

Section 2. Conduct policy related meetings and provide input to programs, plans, regulatory proposals and reports as appropriate

The GAC conducts meetings to review policy and provide input on programs, plans, regulatory proposals and reports related to groundwater protection issues. The GAC is composed of nine members that represent public, industry and local governments. IGPA mandates that the Council members are appointed by the Governor to serve three year terms. The current members are listed below:

Water Well Drillers Industry
John Pitz, Chair

Business and Professional People for Public Interest
Robert Jones

Illinois Environmental Council
John 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 Corporation
Duane Cole

City of Edwardsville
Paul McNamara

The GAC conducted several policy-related meetings during the past two years. As previously mentioned, the GAC had an active role in sponsoring the Policy Forum on Regional Groundwater Protection Programs. The Council members also reviewed and provided input on the SMP, CDC's Private Well Study and Karst-related issues. In coordination with the ICCG, the GAC reviewed and evaluated the CSGWPP. The GAC is currently preparing to sponsor a policy forum on the proposed Regulated Recharge Area Regulation for Pleasant Valley Public Water District (PVWD).

CHAPTER IV. EDUCATION PROGRAM FOR GROUNDWATER PROTECTION

Section 1. Continue to conduct statewide long-term and short-term educational initiatives, including primary and secondary school programs. The DNR chairs the Groundwater Education Subcommittee of the ICCG and is responsible for implementing this program.

Both long-term and short-term groundwater protection education programs have been very successful in this two-year period. The achievements of this program appear to be based on several factors including:

- The dedication and enthusiasm of teachers, regional groundwater committee members, association staff, municipal officials, county and state agency personnel, and well owners to learn and teach others about this often forgotten and neglected "inner space" resource.

- The local usefulness and applications of groundwater science, particularly the modeling of time-related capture zones for community wells and other groundwater research.

- The generosity of Foundations and Associations, especially the W.K. Kellogg Foundation, in supporting the Illinois Middle School Groundwater Project. This project, coordinated by Southern Illinois University (SIU) at Edwardsville, is integrated with the regional groundwater committees and the state groundwater protection program. As of October 1995 all three priority regions have educational coordinators who organize teacher workshops, conduct field-days, help teachers build groundwater demonstration models, and otherwise support teachers through liaison activities with local and state agencies.

  About 500 teachers and 75,000 students have been involved with this project so far and many more will be involved as groundwater education is fully integrated into the school curricula. The curricular supplement, entitled "H_2O Below" emphasize testing water and researching well histories, helping students make the connection between groundwater quality and land use in the wells' protection area.

- The excellent work of regional groundwater committees and their education subcommittees. Since 1990, these committees, with minimal state funding, have donated or secured thousands of hours of volunteer help from numerous organizations and individuals. Examples of their work are listed in Section 3 below.
- The usefulness of local education programs in supporting community groundwater management and regulations. Community officials consider a soundly-based, locally-developed education program as a component of their community groundwater management. In practice, a broadly-based groundwater education committee is developed after a capture zone map is developed, community officials have reviewed it, and related recommendations are considered.

- Continued press coverage of water quality problems and clean-ups. Adults, particularly those who drink water from private wells, appear to be genuinely concerned about their water

(frequently due to press coverage of water problems) and receptive to wellhead protection and well maintenance recommendations. Although myths about underground rivers from faraway places are difficult to dispel, most adults appear to respond positively to local recharge, wellhead setback and regular water testing principles.

- The groundwater flow model. Whether the audiences are county board members, graduate students or third grade students, the groundwater flow model has proven very useful in demonstrating groundwater principles. Until 1994, models were purchased from Iowa, Michigan, and Wisconsin sources, for prices ranging from $200 to $500. A popular educational supply catalog currently lists the model at about $600. Since 1994, the shells of the groundwater models are produced at SIU-Edwardsville for $125. Teachers, agency staff and professors pack the sand, bentonite, and gravel into the models in a pattern similar to the geology under their own community. Professional geologists assist the teachers (typically in a workshop) to create an underground image, based on well logs, geologic mapping and needs assessments available for that community. With this common sense, cost-efficient, and community-based system, close to 250 flow models have been placed in schools or agencies. The model builder gains a sense of ownership, an understanding of scientific methods of groundwater research, and very useful teaching and demonstration tool. Most models have been underwritten by local businesses and service organizations. Often the groundwater models are used outside schools at community fairs, expos, and service organization programs, with students making the demonstrations.

Section 2. Continue to develop and implement groundwater protection education work plans

Since 1988, the groundwater protection education program has developed and implemented an annual work plan. The work plan is based on a survey of a representative sample of persons involved with groundwater protection, an annual planning meeting of the groundwater education subcommittee, and on input from the ICCG and the GAC. The work plan coordinates the work of numerous agencies and organizations. A July 1995 DNR report ("The Groundwater Protection Education Program and Results of the 1995 Groundwater Education Survey") documented the participation of the following through the work plan:

- twenty-four professional, environmental and trade associations,
- ninety-one local health departments,
- numerous municipalities and their water utilities,
- ninety-eight soil and water conservation districts,
- eleven county governments,
- several special purpose units of government and commissions,
- three regional groundwater planning committees and their education subcommittees,
- ten post-secondary educational institutions,
- fourteen units of state government,
- five units of federal government, and;
- hundreds of businesses and industries at the local level.

Operationally, the ICCG Education Subcommittee meets at least quarterly, utilizes a protocol to assure interagency review of publications, reviews and updates the work plan, reviews reports on significant activities, and plans methods of implementing legislative mandates and specific work plan goals. As activities, brochures, workshops, field days, or other initiatives are completed, they are listed as achievements at the beginning of the work plan with credits for the responsible entities.

The Work Plan is divided into sections recognizing different methods of reaching five audiences. These are listed in priority order, as rated by participants in the 1995 survey:

1. Private well owners;
2. Professionals, elected officials, association representatives;
3. Illinois teachers (and their students, indirectly);
4. The regulated business community; and,
5. General audience (such as through fairs and mass media).

Each year several themes or initiatives are built into the work plan. Most require several years and the collaboration of several agencies and associations. For example, key initiatives built into the FY1996 work plan include the following listed in order of priority determined by the annual survey:

1. Community groundwater education programs-
   In cooperation with the Illinois Rural Water Association, several agencies will offer organizational assistance to communities to develop a local educational program related to their capture zone maps and groundwater protection plans.

2. Well disinfection demonstration program-
   The Illinois Association of Groundwater Professionals was competitively selected to conduct this program of field research on private wells and well disinfection demonstrations with local agencies. Emphasis will be placed on areas of the state with predominantly large diameter wells, which have the highest rates of bacterial contamination.

3. The FarmAsyst Program-
   This is a voluntary farmstead evaluation system designed to teach groundwater principles and protection measures to private well owners. Developed nationally by USDA and U.S.EPA, FarmAsyst will be conducted by the IDOA, soil and water conservation districts, the Cooperative Extension Service and other local agencies and associations.

4. Regional education programs-
   The Middle School Groundwater Education Program very successfully demonstrated the value of integrating school based programs with the state and regional programs in priority geographic areas. Funding from the W.K. Kellogg Foundation covers only the three existing groundwater protection regions and funding needs to be developed to continue the project in the two new groundwater protection regions. Funding will help pay for teacher workshops, curriculum materials (H_2O Below), a school based coordinator in each region, and management from SIU-Edwardsville.

5. Improved education for private well owners through water well contractors-
Working through a collaborative agreement of the Illinois Association of Groundwater Professionals, the Illinois Environmental Health Association, the IDPH, and the DNR, well contractors will be encouraged to provide an improved groundwater education presentation to well owners with new or renovated wells.

Section 3. 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 P2 program

Since 1990, three regional groundwater protection education subcommittees have developed and carried out locally planned education activities. State groundwater education grant funds totaling $28,200 were provided to help these committees carry out their work plans. Most activities were supported by other sources of funds from numerous other organizations and local businesses. Examples of regional educational activities include:

1. field days with demonstrations of groundwater science and protection;
2. teacher workshops;
3. purchase of groundwater flow models for agencies and schools;
4. purchase and lamination of groundwater posters;
5. sponsorship of water festivals for students;
6. exhibits at fairs, expos, malls, and conferences;
7. sponsorship of P2 workshops;
8. sponsorship of municipal groundwater education programs;
9. tours of groundwater protection measures, Karst terrain and cave water systems;
10. well sealing and well disinfection demonstrations;
11. water testing and well maintenance workshops;
12. a door-to-door groundwater education program utilizing teams of retired professionals and students through a chapter of the League of Women Voters;
13. distribution of groundwater articles to local media;
14. educational support of municipal ordinances; and
15. formation of groundwater guardian teams.

The Regional Groundwater Education Programs were strongly bolstered through the Illinois Middle School Groundwater Project. Thanks to a $500,000 grant from the W.K. Kellogg Foundation to SIU at Edwardsville, this project started in early 1994. It was designed to be integrated with the Illinois Groundwater Protection Education Program and the regional committees. An educational coordinator was hired for each of the three areas to integrate groundwater education into school curricula and community water protection efforts. Emphasis is placed on developing community and county resources so the program will continue after the grant is finished in 1998. Coordinators utilize teacher workshops, groundwater flow models, water test kits, the newly developed curriculum supplement H_2O Below, and a number of other resources to enhance middle school coverage of groundwater. Students test well water following the development of a well history and they may have a water tasting contest involving community officials. Initial evaluation results have been very

positive and the project personnel appear very enthusiastic and in great demand by teachers and schools. Project personnel and the regional education committees are coordinated, complementary, and committed to working together.

The special emphasis placed on the regional education programs has returned many dividends in developing an educated population. Anecdotal evidence from county health officers indicates more groundwater inquiries, more well sealings, and more water testing in areas with groundwater education programs. Each region has had successes with developing enhanced county or municipal groundwater management and regulatory programs. The keys to these successes appear to be geologic mapping, high resolution capture zone maps for CWS wells, strong commitments of the local governing boards to conduct educational programs, and dedicated leadership.

The work of the regional education committees has been featured on conference programs of a number of statewide organizations including: the Illinois Association of County Board Members, Illinois Municipal League, Illinois Section of the American Water Works Association, Illinois Potable Water Supply Operators Association, Illinois Groundwater Association (IGA) and Illinois Environmental Health Association.

Leaders of the regional education programs have been nominated for and received a number of awards including: Governor's groundwater protection awards, IGA groundwater science awards, Soil and Water Conservation Society merit awards, and Groundwater Guardian Awards. One element of the FY96 state education work plan is to develop with regional committees an improved method of recognizing the hundreds of people who donate their valuable time and talent to this noble undertaking.

CHAPTER V. GROUNDWATER EVALUATION PROGRAM

Section 1. Cooperate on the development and completion of a Groundwater Protection Needs Assessment Guidance Document and sponsor associated workshops

The departments and agencies involved in this effort are IEPA, ISWS and ISGS. Good progress was made on this cooperative effort to develop a guidance document. However, no workshops were held to further market the document and procedure. Additional work needs to be done to sponsor Groundwater Protection Needs Assessments.

The *Guidance Document for Groundwater Protection Needs Assessments* was finalized and printed on January 1995. This document was distributed to the following:

- Owners and operators of municipal groundwater supplies with a population of 5,000 persons or greater;
- Regional Groundwater Protection Planning Committee members; and
- consultants, engineers, planning and zoning officials and members of the general public as requested.

Section 2. Share Geographic Information System coverages in electronic format and continue to automate the groundwater resource database for Illinois

The departments and agencies primarily responsible for this activity are under DNR and include ISWS and ISGS. Good coordination has occurred in this area. The past two years have witnessed a dramatic increase in the use of Geographic Information System (GIS) technology at IEPA. Much of this increase is directly attributable to the acquisition of over a thousand digital GIS datasets from the ISGS, ISWS of the DNR. These digital GIS datasets include geological information, CWS well locations, and basic geographic reference data such as roads, railroads, and hydrography. This information has been used by IEPA for hydrogeologic investigations, planning efforts, and the production of recharge area delineation maps.

In addition to acquiring GIS data, the IEPA has also provided GIS data to other federal, state, and local agencies. A number of GIS datasets pertaining to the Ambient Groundwater Monitoring Network were provided to the ISGS. Additionally, 22 recharge area delineation coverages were provided to Region V U.S. EPA for use in a federal water quality study being prepared by the U.S.G.S. Lastly, a copy of the recharge area coverage for the City of Edwardsville was provided to the Southwestern Illinois Planning Commission for inclusion into their county zoning database.

Several initiatives have been undertaken by the ISGS to update and expand the GIS database supportive of groundwater investigations. Particular emphasis has been on improving existing regional coverages of aquifers and identifying pertinent data points (key stratigraphic control holes) that help delineate aquifers. More work, however, must be done to delineate aquifers at larger scales, particularly non-major aquifers (<100,000 gpd) deeper than 50 feet.

A statewide reassessment of the aerial extent of shallow aquifers and non-aquifer materials within 50 feet of the surface and also major glacial drift and bedrock aquifers within 300 feet of the surface was conducted as part of an effort to locate a low-level radioactive waste disposal facility in Illinois. A new automated version of the Stack-unit Map of Illinois to a Depth of 50 Feet is a product of this effort.

Entry of water well data into the GIS database is well underway. Data for Piatt, DeWitt, and parts of Tazewell County were entered under projects funded by local governments. A Water Inventory and Aquifer Assessment project resulted in the entry of data for DeKalb County. Data from 44 counties were entered for the low-level radioactive waste facility siting project. Thus, during this biennium, water well data for half of the state's counties entered the automated data base.

Two efforts, one in McHenry County and the other in the Champaign 30x60-minute Quadrangle (extends from Champaign-Urbana in the southeast to Bloomington-Normal in the northwest) have mapped/remapped aquifers, identified key stratigraphic borings, and have placed (or will place) all information in an electronic format. The McHenry County study was funded through the Hazardous Waste Research Fund, Water Inventory and Aquifer Assessment Funds and the McHenry County Board of Health. The investigation has identified upwards of four glacial drift aquifers. Structure contour maps (elevation of surfaces) and isopachous maps (thicknesses) of each aquifer were produced. Stack-unit maps to a depth of 100 feet were constructed for the entire county at a scale of 1:100,000 and for each of the 15 topographic quadrangles in the county (1:24,000-scale). An aquifer contamination potential map will be derived from the above data. In addition, hundreds of water wells, engineering borings, and test boring locations were automated.

An ISGS contract report to McHenry was released that identifies and describes in detail those borings (key stratigraphic control borings) with geologic information and laboratory data that contribute most to an understanding of the geology of the county.

The Champaign Quadrangle study, done in cooperation with the U.S.G.S., in similar in scope to the McHenry County project. However, it covers a considerably larger area and is less detailed. The main emphasis has been to construct structure contour and isopachous maps of aquifers and other 'bundles' of geologic materials as well as to identify key stratigraphic borings, at least one per township, in the region. The key feature being mapped is the Mahomet Aquifer. All data have been automated and electronically produced maps of individual surfaces and data locations have been preliminarily produced.

Section 3. Continue to conduct groundwater assessments and share the information through regular updates and completed reports

The departments and agencies responsible for these activities include ISGS, ISWS, IEPA, and DNR Division of Water Resources.

ISGS/ISWS Groundwater Assessment

In 1994, a report was released by the ISGS - *Geologic Aspects of a Groundwater Protection Needs Assessment for Woodstock, Illinois: A Case Study (ISGS Environmental Geology 146)* - that presents a model methodology, applicable to other regions of Illinois, for characterizing an area of complex geology for a Groundwater Protection Needs Assessment. In addition, it shows how aquifer mapping methods can be applied to a selected study area. Maps showing geologic material to a depth of 100 feet, bedrock topography, drift thickness, structure contour, and isopachous maps were produced, as well as an aquifer contamination potential map. The generalized methods described in this report provide communities, counties, and private consultants, with a model for conducting the geologic aspects of a GPNA.

Three projects were completed under the Water Inventory and Aquifer Assessment Program. *Hydrogeology of the Silurian Dolomite Aquifer in Parts of Northwestern Illinois (ISGS Environmental Geology 145)* was published by ISGS in 1993. This reports covers more than 1200 square miles in Carroll, Whiteside, Lee, Rock Island, Henry and Bureau Counties, where the aquifer occurs at the bedrock surface. The aquifer, which is primarily used for domestic supplies, is moderately to highly vulnerable to contamination because of abundant vertical fractures near its surface.

The ISGS published *Buried Bedrock Surface of Illinois, Third Edition (Illinois Map 5)* in 1994. It is the first statewide revision of the bedrock topography map since 1957. Because some of the most extensive and productive aquifers in Illinois are located in thick glacial sediments of major buried bedrock valley, specially attention was given to these valleys during the mapping. The map was produced by hand and digitized before publication to allow easier future updates.

Hydrogeology of the Green River Lowland and Associated Bedrock Valleys in Northwestern Illinois (ISGS Environmental Geology 149) was published by ISGS in 1995. The Green River Lowland coincides with the ancestral Mississippi River valley and includes a large surficial aquifer that is particularly vulnerable to contamination. It underlies parts of Bureau, Lee, Ogle, Rock Island and Whiteside Counties. The report includes maps of the aquifers, bedrock topography and vulnerability to contamination. Digital coverages are available for the latter two maps. The report should be especially useful for the proposed Northwest Groundwater Protection Planning Region.

The ISGS started a fourth Water Inventory and Aquifer Assessment in DeKalb County. This study will fill the void between previous studies to the north, west, and east. To date, locations shown on the well logs have been verified according to plat books and the well data were entered into the ISGS data base. A limited seismic refraction survey was conducted along the Troy Valley and more research is planned in this area.

Two local governments are funding groundwater resource studies. The Long-Range Water Plan Steering Committee, funded by Bloomington, Normal and McLean County is funding a 3-year study by ISGS and ISWS of groundwater availability in southeast Tazewell and southwest McLean Counties. It will determine whether a large water supply could be developed in the area and what

the impacts of such development would be. The study will be completed in 1996.

The Mahomet Valley Water Authority in Piatt and DeWitt Counties is funding aquifer projects by the ISWS. Preliminary bedrock topography and aquifer maps, taking advantage of work done on the Champaign 1:100,000 quad, were produced and digitized by ISGS in 1995. ISWS completed a mass water level measurement in 1995 to provide baseline information on water levels. They will form the basis of more detailed mapping, which should be completed in 1998.

The ISGS has been conducting studies in Monroe, Randolph and St. Claire counties to evaluate groundwater contamination of karstic areas. Water samples have been collected from wells, springs, caves and surface streams. The data will be used to improve mapping of the area and identify the contamination potential or aquifer vulnerability of a karst aquifer.

IEPA Groundwater Assessment and Environmental Indicators

Under a May 17, 1995, oversight agreement between U.S.EPA and the states "a common set of environmental goals and indicators to measure the effectiveness and success of environmental programs" were developed. This State Environmental Goals and Indicators Project (SEGIP) has identified 17 indicators. The report also outlines several common conceptual tools for identifying types of indicators and the quality of indicator data that have been embraced by the Organization for Economic Cooperation and Development, as follows:

- pressure indicators: measures of pressures on the environment caused by human activity;
- state indicators: measures the current quality of the environment and characterizes the natural resources;
- response indicators: measures how and how much society is doing or what progress is being made to establish prevention programs to respond to environmental changes and issues.

The Groundwater Section at IEPA has utilized this conceptual framework to describe:

- pressure indicators or data collected on potential sources and routes of groundwater contamination from the well site surveys for CWS wells;
- state indicators or information collected and analyzed in association with the ambient network of CWS wells; and
- response indicators or progress made by local governments to develop and implement proactive groundwater protection programs.

In addition, the IGPA combines each of these indicators into one overall groundwater quality protection indicator. The Ambient Network of CWS wells were used as the basis for "state indicators". Thus, before providing a discussion of the indicators, background on the design of this network is necessary. The goal of this network is to represent the detection of pesticides and other chemical contamination in the population of CWS wells across the state.

There are approximately 2,988 active CWS wells to assess. Figure 2 illustrates the location of these wells across the state. It is not economically feasible to sample all of these wells. Thus, to represent the entire population of community wells, without sampling them all, the statistical approach described above has been utilized. The *Ambient Groundwater Monitoring Network for Community Water Supply Wells* was implemented in 1992. Figure 3 illustrates the location of the 353 ambient network wells, and Figure 4 shows the corresponding population served by the associated CWS wells.

FIGURE 2. Statewide Distribution of CWS Wells

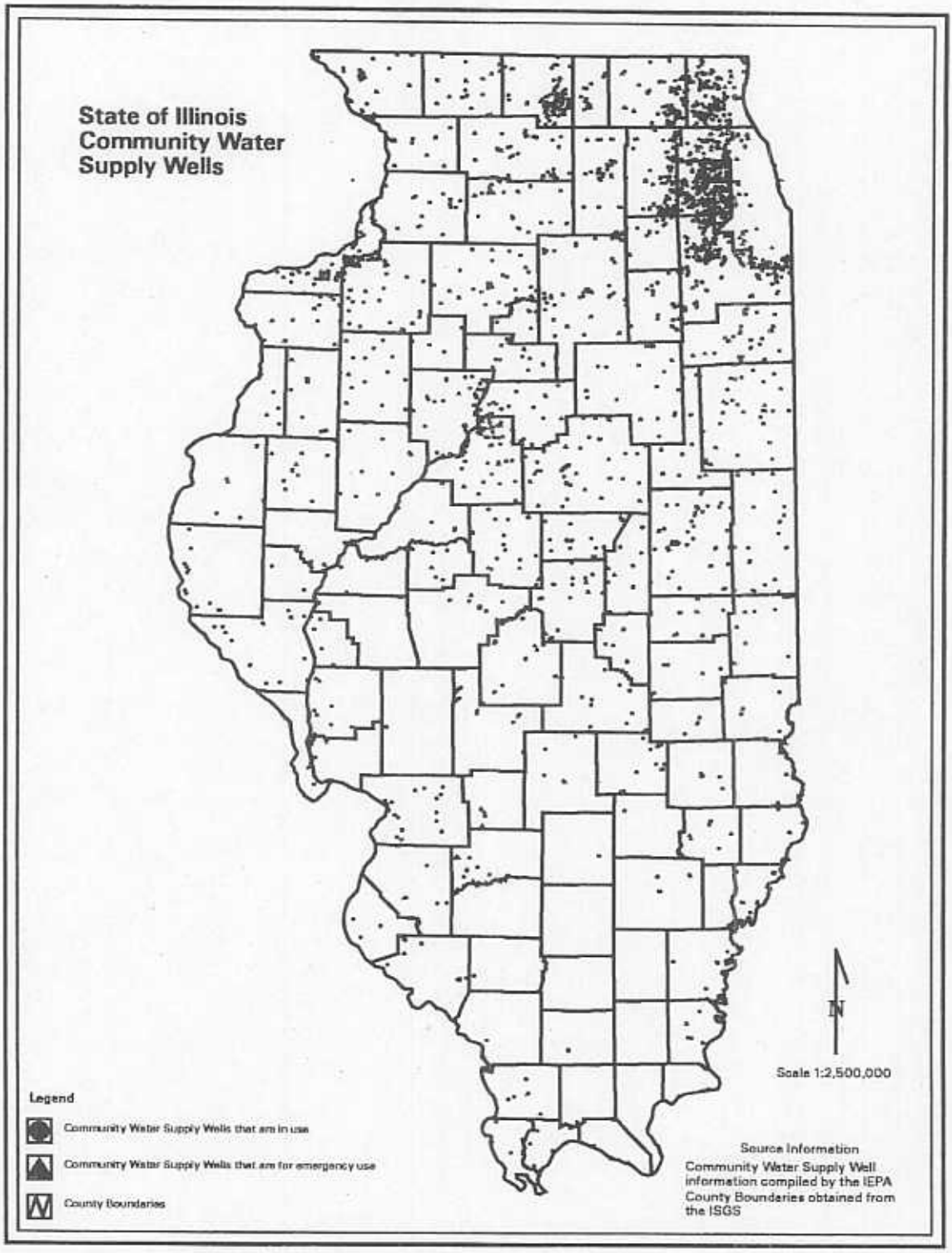


FIGURE 3. Ambient Groundwater Monitoring Network

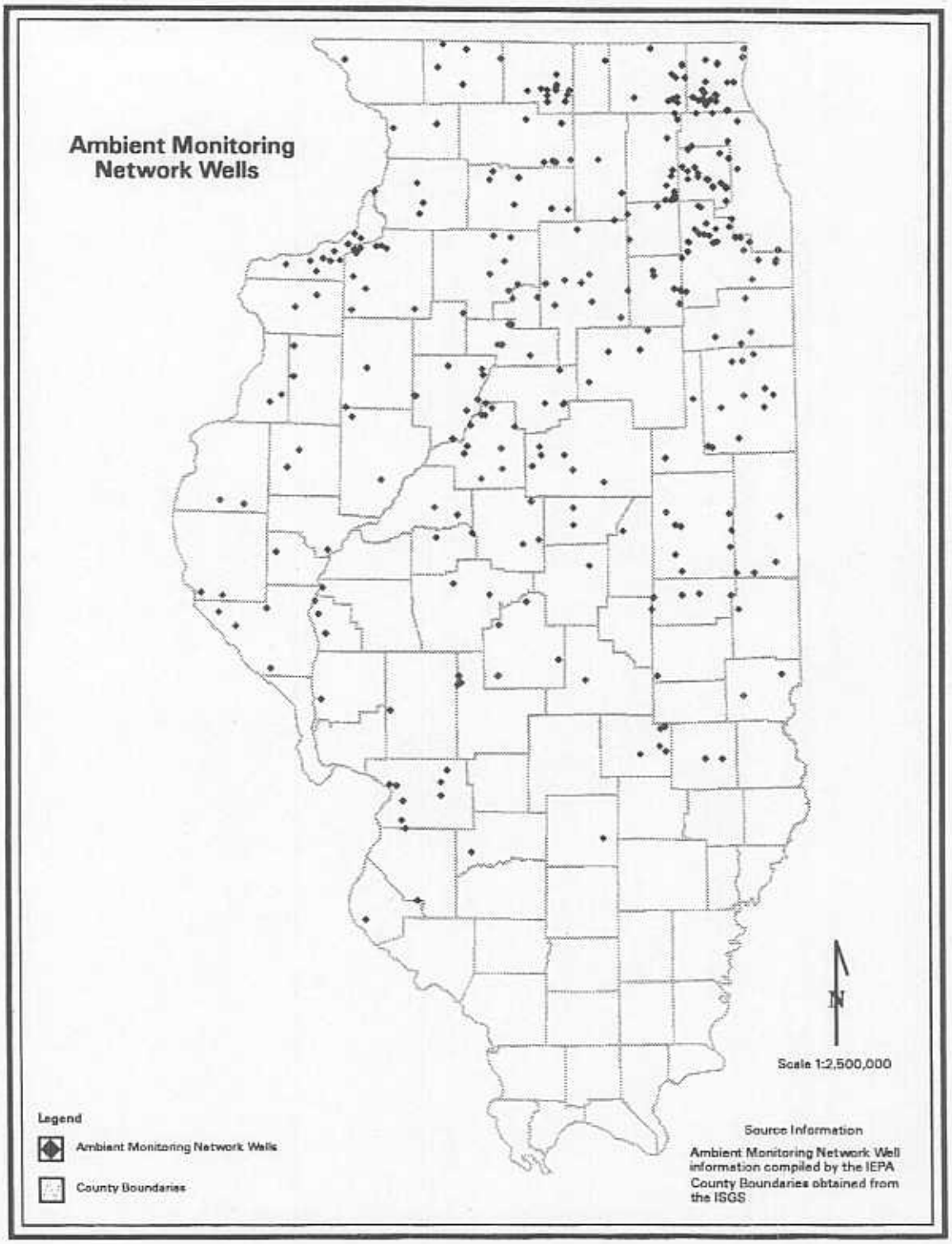
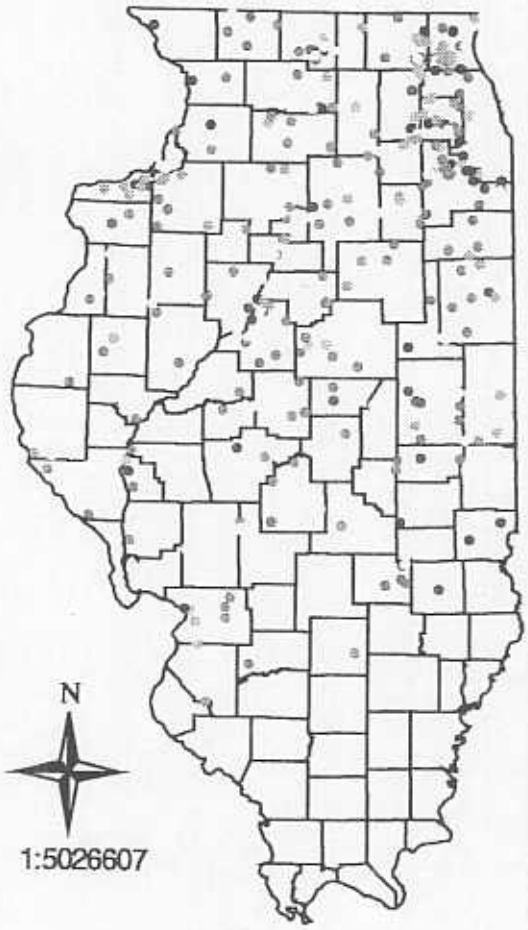


FIGURE 4. Population Served by Ambient Groundwater Monitoring Network Wells

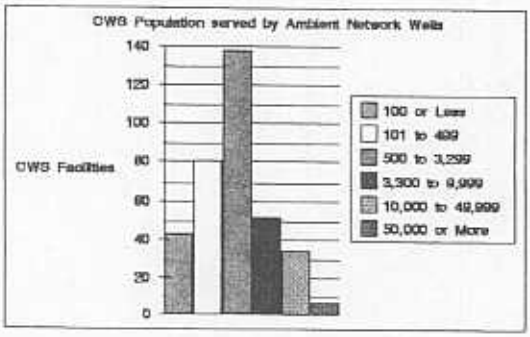
CWS Population served by Ambient Network Wells

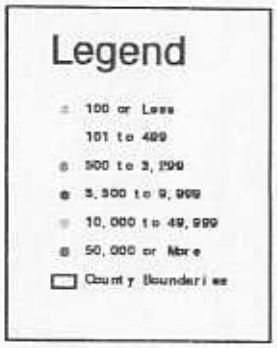
Population Range	CWS Facilities
100 or Less	43
101 to 499	80
500 to 3,299	138
3,300 to 9,999	51
10,000 to 49,999	34
50,000 or More	7



Source Information

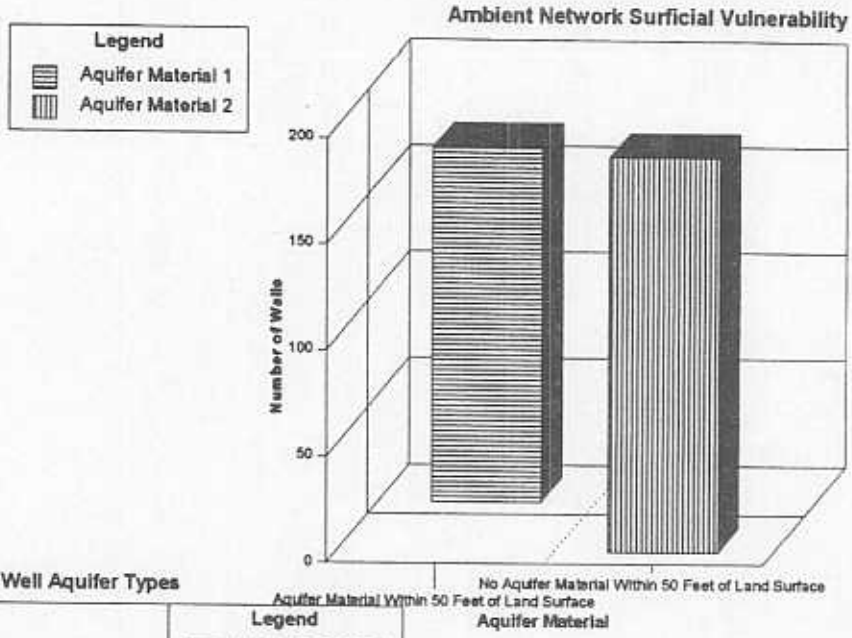
Population information compiled from IEPA inspection reports
County boundaries obtained from the ISGS

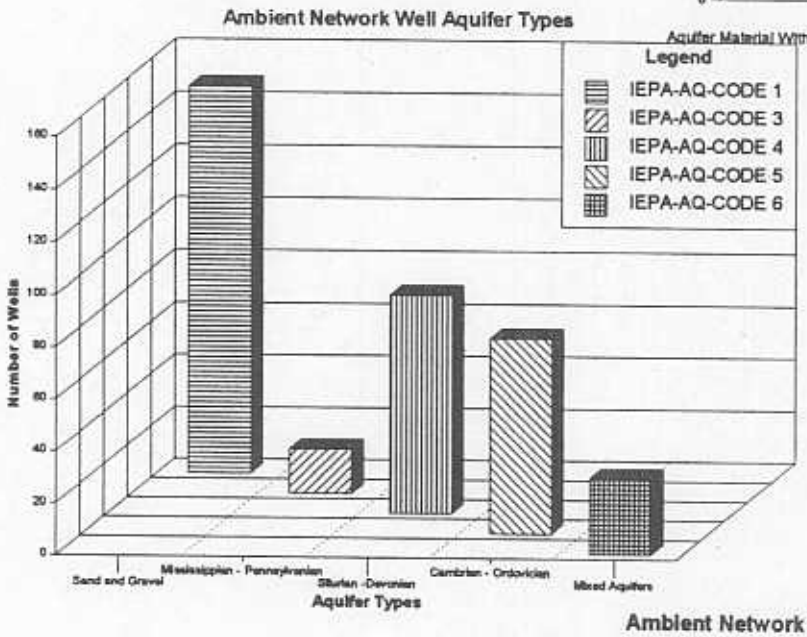




This network of community wells was randomly selected, and stratified according to 3 variables to improve statistical accuracy. The network was also designed to account for temporal and spatial bias. Figure 5 shows the stratification variables incorporated in the network design.

Figure 5. Ambient Network Stratification Criteria





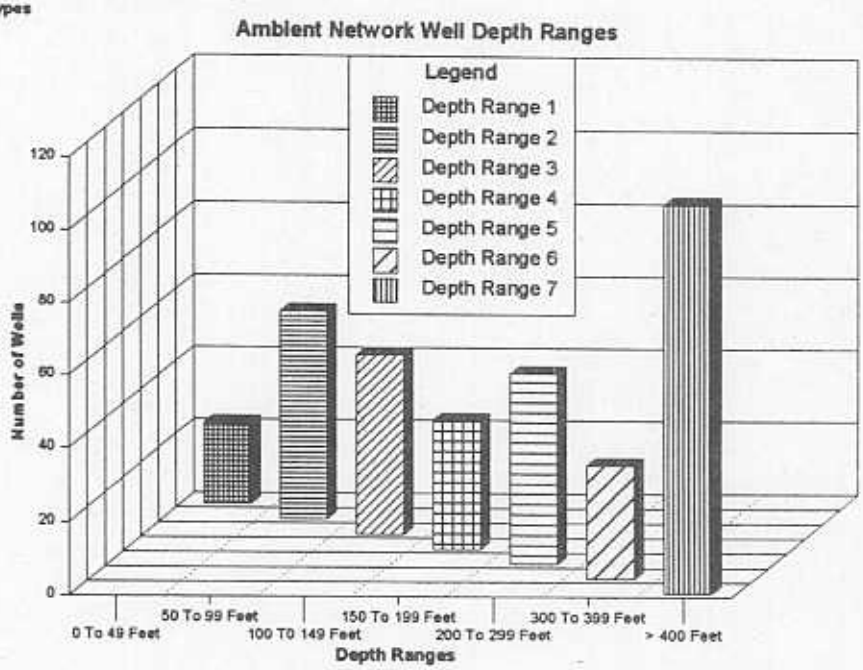
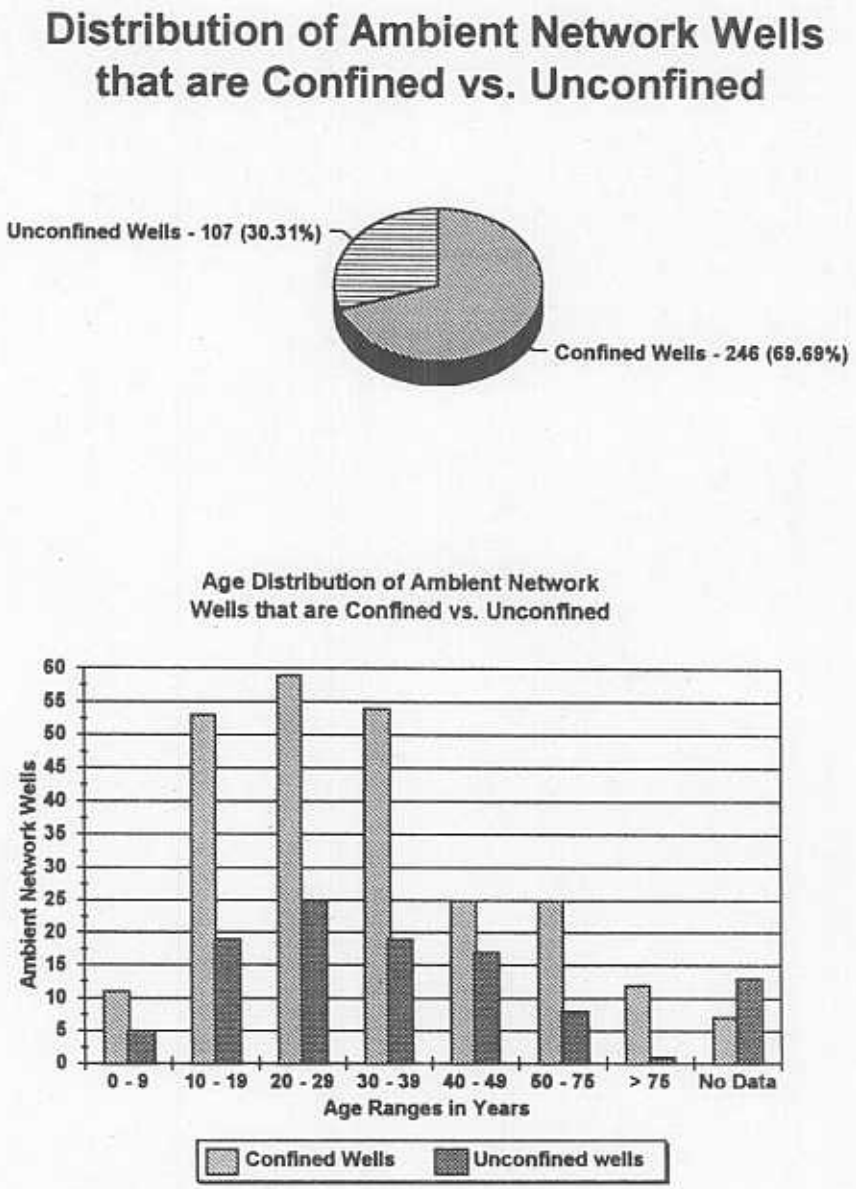


FIGURE 6. Confined versus Unconfined Ambient Network Wells

Figure 6 shows the distribution of confined and unconfined wells in the ambient network. Figure 6 also illustrates the age distribution between confined and unconfined aquifer wells in the ambient network. Figure 6 shows the distribution of wells in the ambient network by the following hydrogeologic criteria: confining unit thickness, depth to aquifer for confined versus unconfined aquifer wells, and depth to open interval of the wells using confined versus unconfined aquifers.



The survey of potential contamination sources and potential routes demonstrated in the well site survey reports for the ambient network wells was used as a basis for providing "pressure indicators". The field phase of the IEPA's well site survey reporting process was completed in 1994, and 90 percent of the associated reports have been issued to the municipalities and counties being served by the respective CWS wells. During the past two years an effort has been initiated to develop a relational FoxPro® data base to electronically store and manipulate the data from these well site survey reports. A pilot has also been initiated to electronically scan the aerial photographs used in the well site survey reports and link this image in GIS with the information stored in the relational data base. These aerial photographs have been interpreted to provide land use data for the well site surveys. This data has also been entered into the database used for this report.

The well site survey information in the data base described above and associated with the ambient network wells provided the data for the "pressure indicator". The groundwater protection progress assessment method described in the Volume I Policy Report was used to describe the "Response Indicator".

PRESSURE INDICATOR

Figures 7 thru 12 graphically illustrate Illinois' assessment of "pressure indicators".

FIGURE 7. Summary of Predicted Statewide Land Use and Contaminant Sources and Routes

Land Use

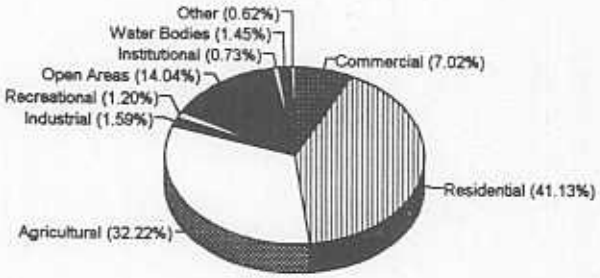


Figure 7.1 illustrates the predicted land use within a 1,000 foot radius of CWS wells.

Land Use Where No Contaminants Were Detected

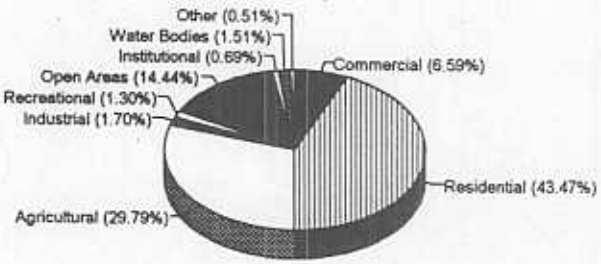


Figure 7.2 illustrates the predicted land use within a 1,000 foot radius of CWS wells where no contaminants have been detected.

Land Use Where Contaminants Detected

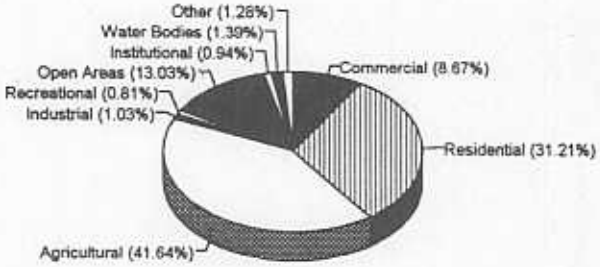


Figure 7.3 illustrates the predicted land use within a 1,000 foot radius of CWS wells with detections of nitrates, VOCs or pesticides.

Potential Contaminant Sources and Routes

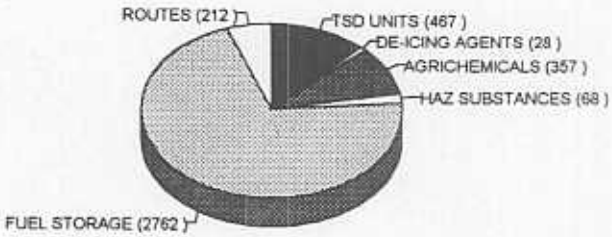


Figure 7.4 illustrates the predicted number and type of potential contaminant sources and routes within a 1,000 foot radius of CWS wells.

FIGURE 8. Summary of Predicted Statewide Land Use and Occurrence of VOC Sources

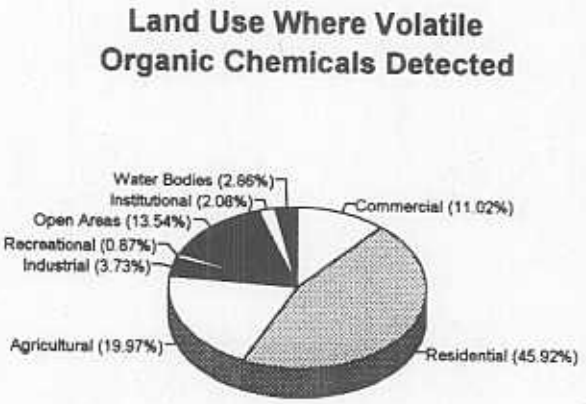


Figure 8.1 illustrates the predicted land use within a 1,000 foot radius of CWS wells with VOC detections.

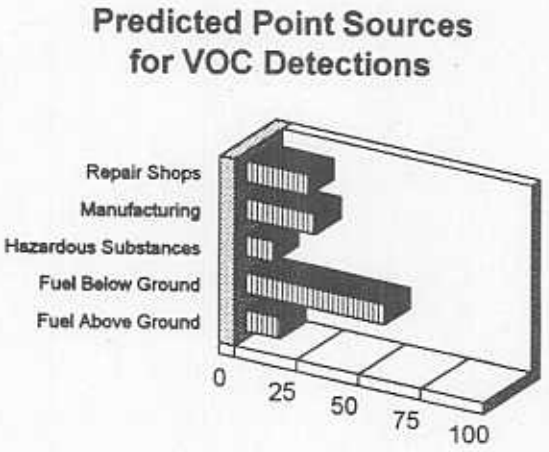


Figure 8.2 illustrates the type and number of sources that occur in association with CWS wells with VOC detections.

FIGURE 9. Summary of Predicted Statewide Land Use and Occurrence of Pesticide Sources

Land Use Where Pesticides Detected

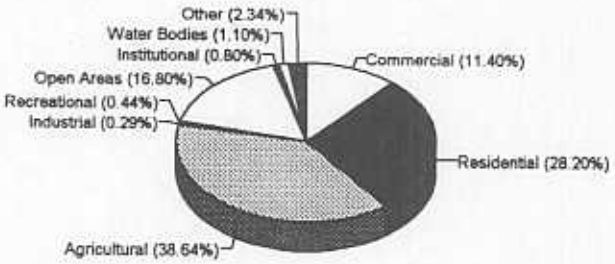


Figure 9.1 illustrates the predicted land use within a 1,000 foot radius of CWS wells with pesticide detections.

Wells with Pesticide Detections

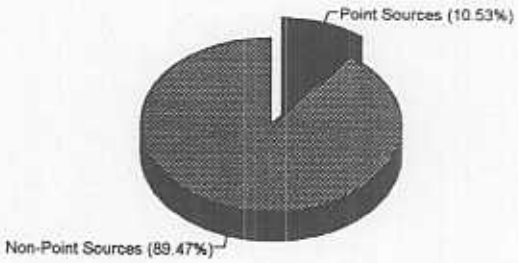


Figure 9.2 predicts the distribution of point sources and nonpoint sources for CWS wells with pesticide detections.

Land Use for Nonpoint Sources for Pesticides

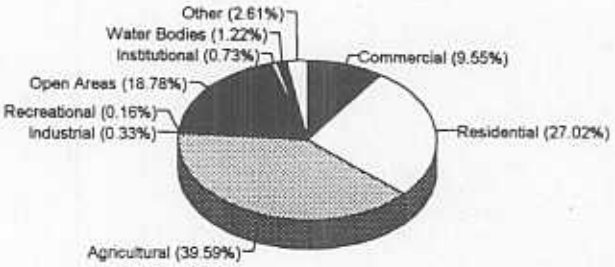


Figure 9.3 predicts the land use associated with the 89.5% of CWS wells that have pesticide detections with only nonpoint sources.

FIGURE 10. Summary of Predicted Statewide Land Use and Occurrence of Nitrate Sources with Detections of 3-10ppm

Land Use Where Nitrates Detected 3-10 ppm

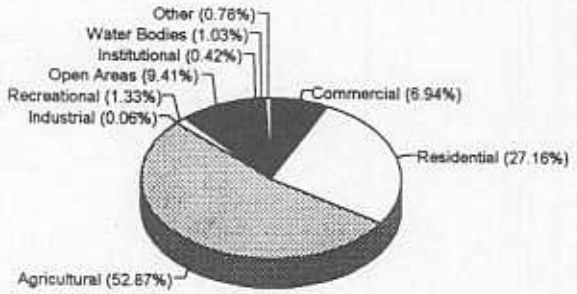


Figure 10.1 predicts land use for CWS wells with ntrate detections ranging from 3-10ppm.

Wells with Nitrate Detections Between 3-10ppm

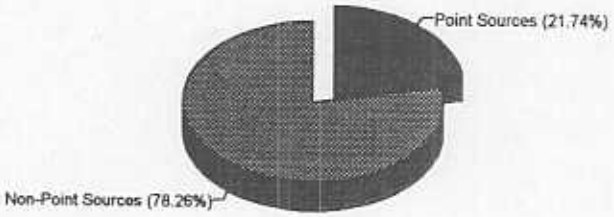


Figure 10.2 illustrates the predicted distribution of point sources and nonpoint sources for CWS wells with nitrate detections in the 3-10ppm range.

Predicted Point Sources for Nitrates Between 3-10ppm

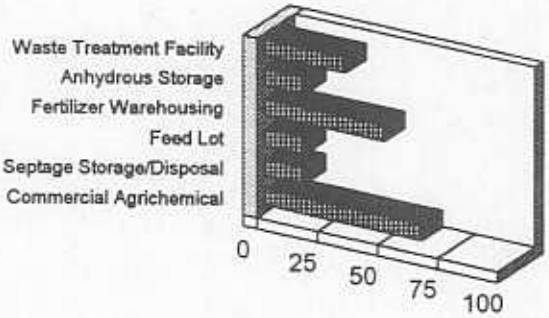


Figure 10.3 illustrates the predicted type and number of nitrate point sources associated with CWS wells with nitrate detections in the 3-10ppm range.

Land Use for Nonpoint Sources for Nitrates Between 3-10ppm

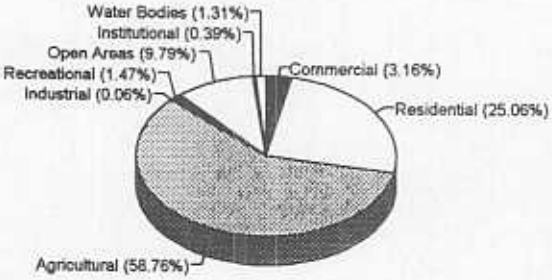


Figure 10.4 predicts the land use associated with the CWS wells that have only nonpoint sources with nitrate detections ranging from 3-10ppm.

FIGURE 11. Summary of Predicted Statewide Land Use and Occurrence of Nitrate Sources with Detections Greater Than 10ppm

Land Use Where Nitrates Detected >10 ppm

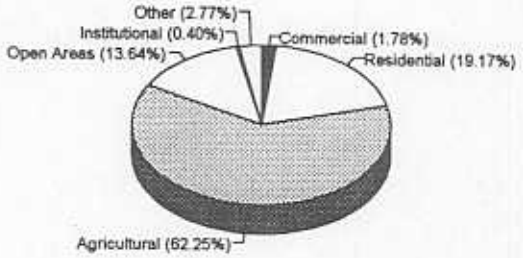


Figure 11.1 predicts land use for CWS wells with nitrate detections greater than 10ppm.

Wells with Nitrate Detections > 10ppm

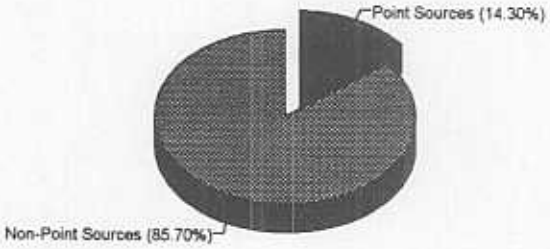


Figure 11.2 illustrates the predicted distribution of point sources and nonpoint sources for CWS wells with nitrate detections greater than 10ppm.

Land Use for Nonpoint Sources for Nitrates > 10ppm

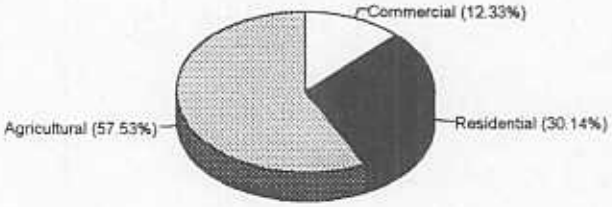
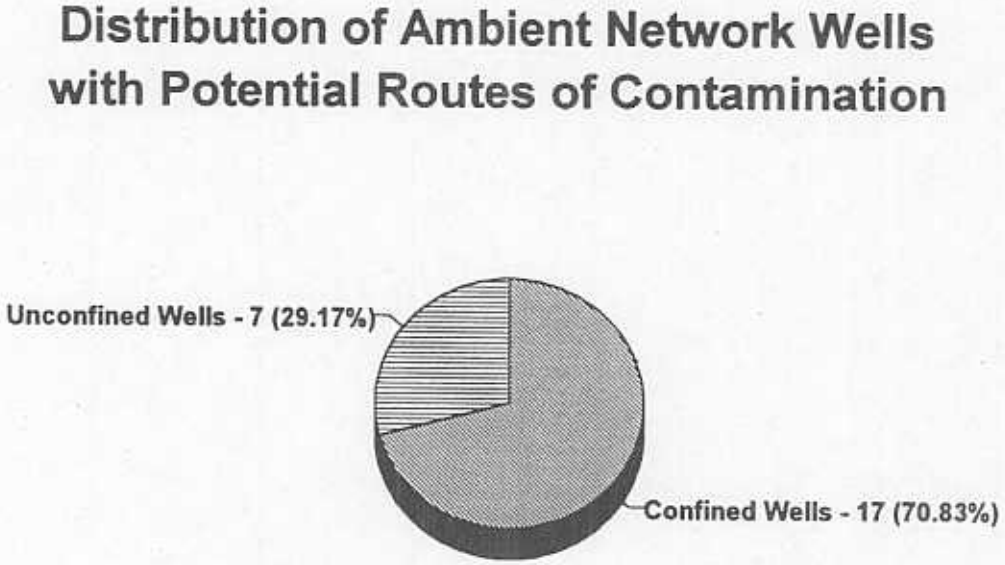


Figure 11.3 predicts the land use associated with the CWS wells that have only nonpoint sources with nitrate detections greater than 10ppm.

FIGURE 12. Distribution of Ambient Network Wells with Potential Routes of Contamination



What does this indicator tell us?

The land use within the 1,000 foot well site survey area for CWS wells in the network is predominately by residential and agricultural cropland. The land use for network wells with no contamination is similar to the overall land use associated with the network. However, there is an increase in agricultural cropland (29.8% to 41.64%), and commercial land use (6.6% to 8.7%) for CWS wells with detection of nitrates, VOCs or pesticides. Land use categories help to describe the potential threat from nonpoint versus point sources. Point source pollution is that pollution which can be readily identified as coming from a specific point. Nonpoint source pollution is the diffuse, intermittent runoff of pollutants from various sources. The exact location of the source is not readily identifiable. Water from precipitation moving over and through the ground picks up pollutants from various sources and carries them into rivers, lakes and groundwater.

Above and below ground fuel storage tanks are the highest potential threat, in terms of numbers. The state indicator also shows that xylene which is a constituent of gasoline is equivalent with trichloroethylene (TCE) as the top ranked VOC detected.

The land use for wells where VOCs were detected contrasts with that associated with all three groups of contaminants. There is a decrease in agriculture cropland (41.6% to 19.95%), increase in commercial (8.7% to 11.6%), increase in industrial (1.03% to 3.7%), and an increase in residential (31.21% to 45.9%) for wells where VOCs were detected. All of the network wells with VOC detections had associated potential point sources of contamination. Figure 8.2 illustrates the type and number of these potential point sources.

Commercial and agricultural cropland increased (6.6% to 11.4%, and 29.8% to 38.6%, respectively), and residential land use decreased from (43.5% to 28.2%) for wells with triazine/alachlor detections versus the land use where no contaminants were detected. Nonpoint sources of agrichemical contamination appear to be the primary threat of pesticide contamination in CWS wells. The ratio of triazine/alachlor detections that appear to be related to nonpoint versus point sources is 9:1.

The land use associated with wells having nitrate concentrations, between 3-10 ppm, indicates a significant increase in agricultural cropland (29.8% to 52.9%) versus the land use with no detections. The percent increased to 58.7% for wells with no nonpoint sources. In addition, 80% of these detections appear to be related to nonpoint sources of agrichemical contamination where no point sources of contamination are present. Twenty-one percent of the detections appear to be related to potential point sources. Fertilizer warehousing and commercial agrichemical facilities rank the highest among the potential point sources. The potential point sources of contamination are characterized by Figure 10.3.

The pressure indicators for CWS wells with nitrate concentrations greater than the Class I groundwater standard of 10 ppm further corroborates the previous data. The land use shows an increase of (29.8% to 62.2%). Eighty-five percent of these nitrate detections appear to be related to potential nonpoint versus point sources of contamination. The detections that appear to be associated with potential point sources all appear to be related to commercial agrichemical facilities.

STATE INDICATOR

Figures 13, 14, 15 and 16 graphically illustrate IEPA's assessment of state indicators. These indicators also relate groundwater quality to hydrogeologic characterization of the resource and the age of the wells.

FIGURE 13. Summary of Predicted Rank of Contaminants Detected (in Percent %)

Summary by Rank of Groundwater Contaminant Groups

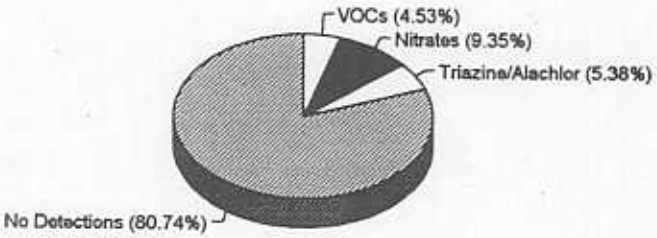


Figure 13.1 illustrates the predicted occurrence and distribution of contaminants in CWS wells.

Rank of VOC Contaminant Detection

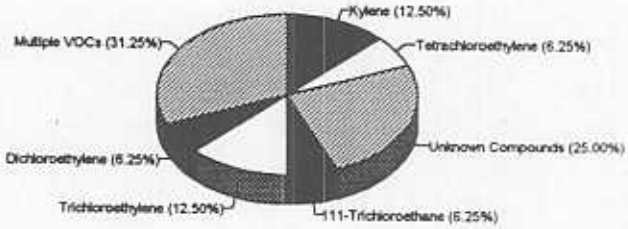


Figure 13.2 illustrates the rank of VOC contaminants for 4.53% of the CWS wells predicted to have detections

Rank of Triazine/Alachlor Detection

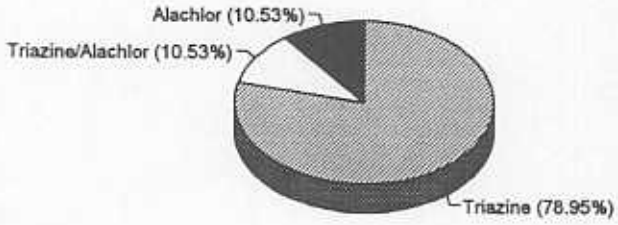


Figure 13.3 illustrates the rank of triazine/alachlor contamination for 5.38% of the CWS wells predicted to have detections.

Rank of Nitrate Contaminant Detection

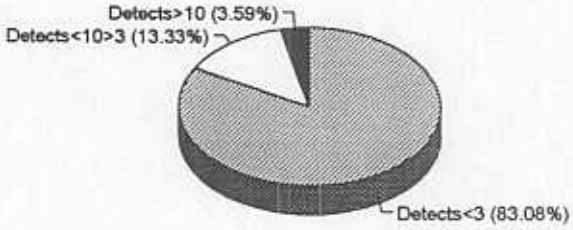
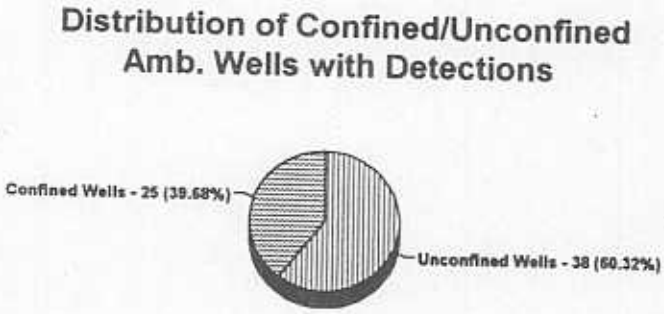
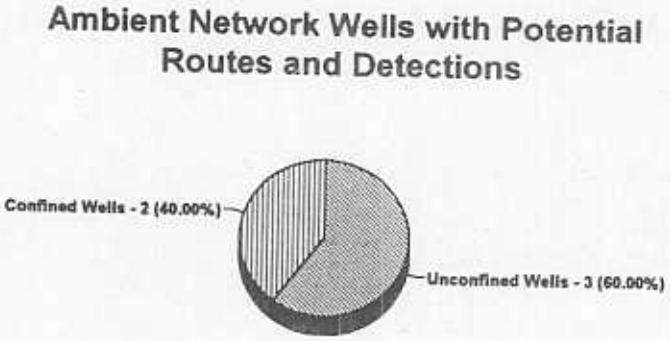
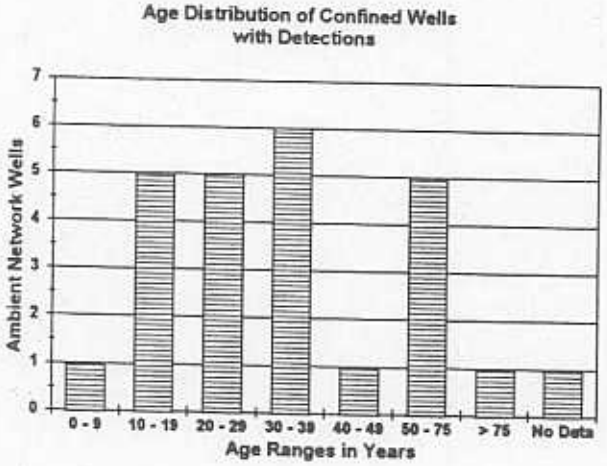


Figure 13.4 illustrates the rank of the CWS wells predicted to have nitrate contaminant detections.

FIGURE 14. Distribution of Confined and Unconfined Wells







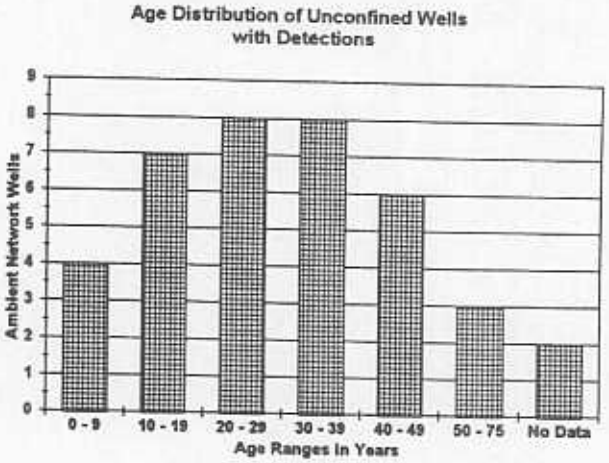
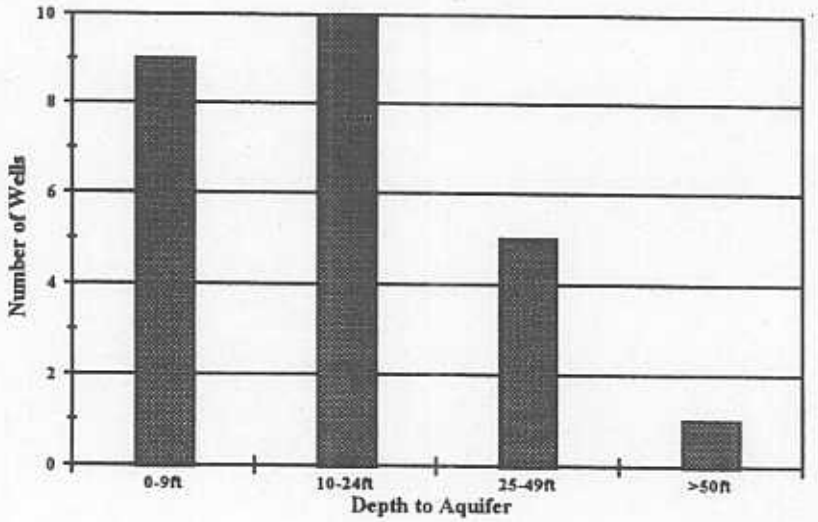


FIGURE 15. Hydrogeology of Contaminated Unconfined Ambient Network Wells

Contaminated Unconfined Wells
Breakdown by Depth to Aquifer



Contaminated Unconfined Wells
Breakdown by Depth to Open Interval

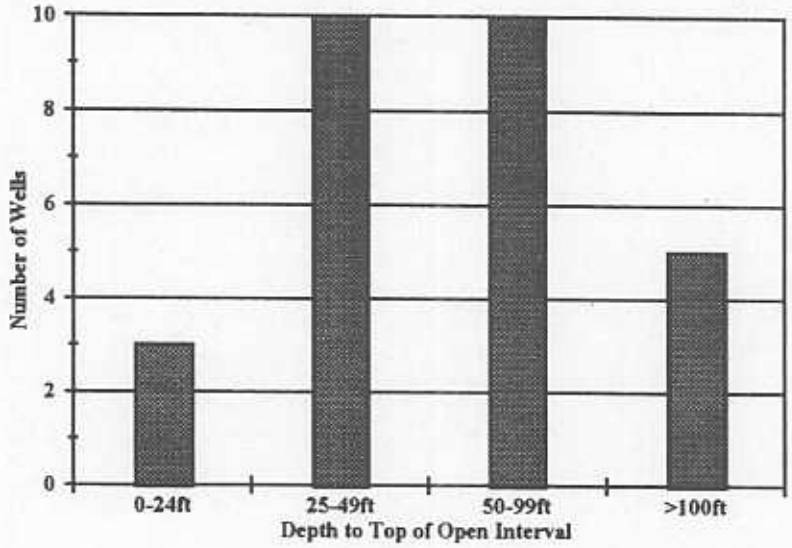
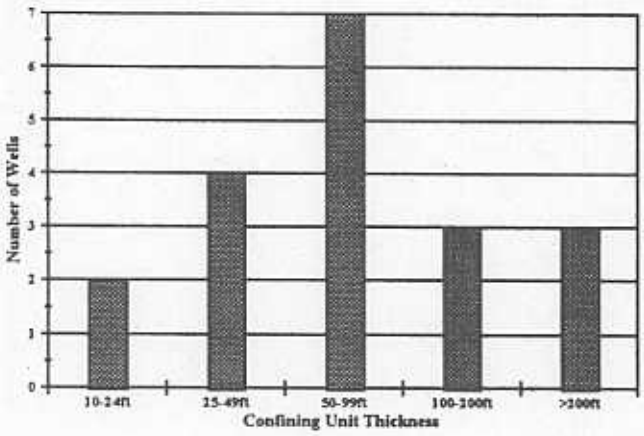
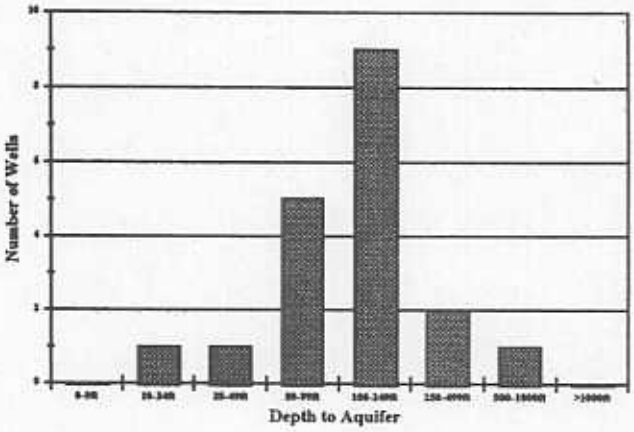


FIGURE 16. Hydrogeology of Contaminated Confined Ambient Network Wells

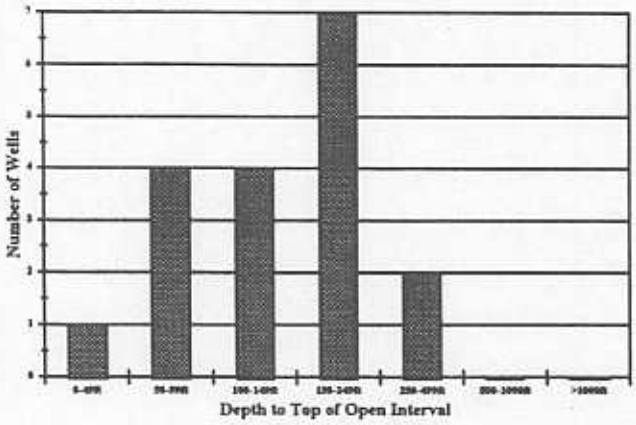
Contaminated Confined Wells
Breakdown by Confining Unit Thickness



Contaminated Confined Wells
Breakdown by Depth to Aquifer



Contaminated Confined Wells
Breakdown by Depth to Open Interval



What does this indicator tell us?

This indicator characterizes the quality of groundwater utilized by CWS wells in Illinois. This indicator shows that 19 percent of the CWS wells in the State have been impacted by one of the three contaminant groups assessed in this report.

The ratio of contamination in unconfined versus confined aquifers is 3:1. Thirty-five and half percent of the CWS wells using unconfined aquifer systems have already been impacted. This indicates that natural geologic protection is a factor in groundwater protection in Illinois. Evaluation of the age of CWS wells using confined aquifers with contaminant detections reveals that the majority of wells is greater than 20 years in age. Therefore, well integrity can circumvent natural geologic protection. Ten and a half percent of the unconfined aquifer wells with contamination were less than or equal to 9 years old. This shows the necessity of widening the scope of hydrogeologic assessment and groundwater protection planning for new CWS wells.

Further evaluation of hydrogeologic criteria in relation to impacts from the three contaminant groups evaluated in this report reveals similar findings. The depth to the top of the aquifer in 76 percent of the unconfined aquifer network wells with contaminant detections is less than or equal to 25 feet from land surface. Ninety-six percent of these wells had a depth to the top of aquifer less than or equal to 50 feet from land surface. Similarly, sixty percent of these wells had a depth to the top of the well screen or open interval intake of less than 100 feet from land surface.

Analysis of contamination that occurred in confined aquifer wells indicated that 74 percent of these impacts occurred in wells with a confining layer thickness of 25-200 feet. In addition, the depth to the top of the aquifer for 74 percent of these wells occurred in a depth range of 50-250 feet below land surface. Additionally, 83 percent of these wells had a depth to the top of the open interval between 50-250 feet from land surface. This data appears to further substantiate the importance of well integrity. It appears that the majority of detections appear to be at depths that could correspond to leakage along casing to between 50-200 feet from land surface, since the depth ranges for two of the criteria evaluated correspond or match with this minimum and maximum depth range. In addition, depending on where you start measuring from, the confining layer thickness might also correspond.

The state-wide detection rate for triazines/alachlor in CWS wells is 5.4 percent. Eleven percent of the wells with detections exceed the Class I groundwater standard for alachlor of 3 parts per billion (ppb). Eighty-nine percent of the wells with detections contained triazine (the triazine group of compounds includes atrazine) at a concentration less than 50 percent of the Class I standard for atrazine.

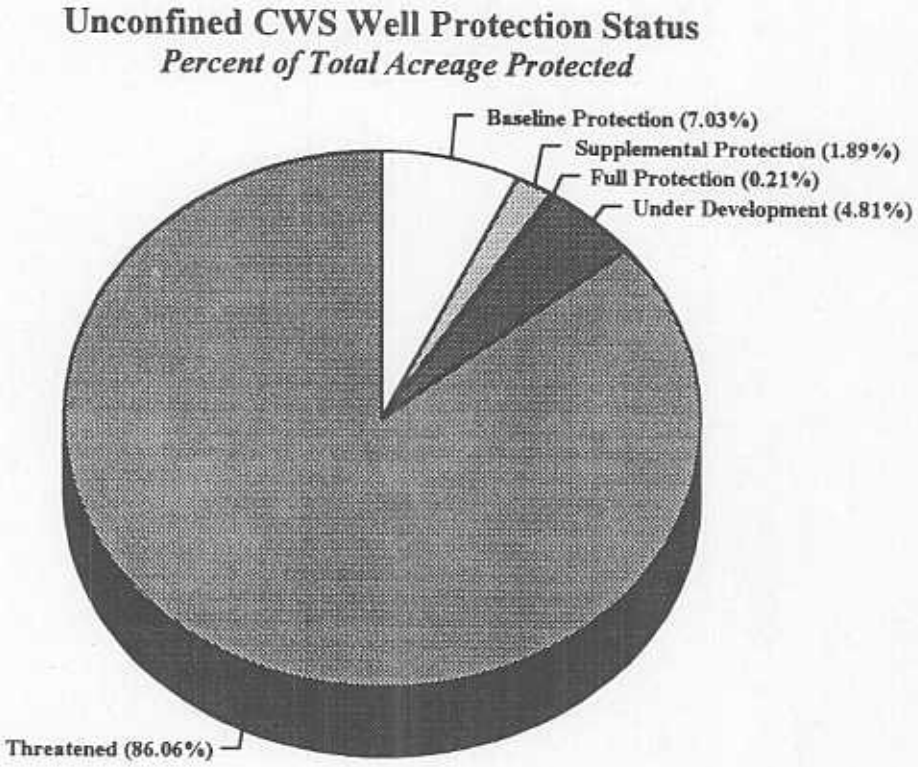
The state-wide detection rate for nitrates in CWS wells is 55 percent. However, 84 percent of the wells with detections were at levels below 3 ppm. Based on existing research, these levels may be the result of naturally occurring contaminants. The state-wide detection rate for nitrate resulting from man-made contamination appears to be 16 percent. Twelve percent of these detections are between 50 percent of the standard and 10 ppm. Four percent of the nitrate detections are at or above the Class I standard of 10 ppm.

The state-wide detection rate for volatile organic chemicals (VOCs) in CWS wells is 5 percent. This compares favorably with the one-time, statewide monitoring program for all of the CWS wells that was conducted from 1985 thru 1988. TCE was the most frequently detected VOC. This also corresponds with the one time study results previously described. The state-wide detection rate for VOCs in CWS wells does not appear to have increased since 1988.

RESPONSE INDICATOR

Figure 17 graphically illustrates IEPA's assessment of "response indicators".

FIGURE 17.


Unconfined CWS Well Protection Status
Percent of Total Acreage Protected
Baseline Protection (7.03%)
Supplemental Protection (1.89%)
Full Protection (0.21%)
Under Development (4.81%)
Threatened (86.06%)

What does this indicator tell us?

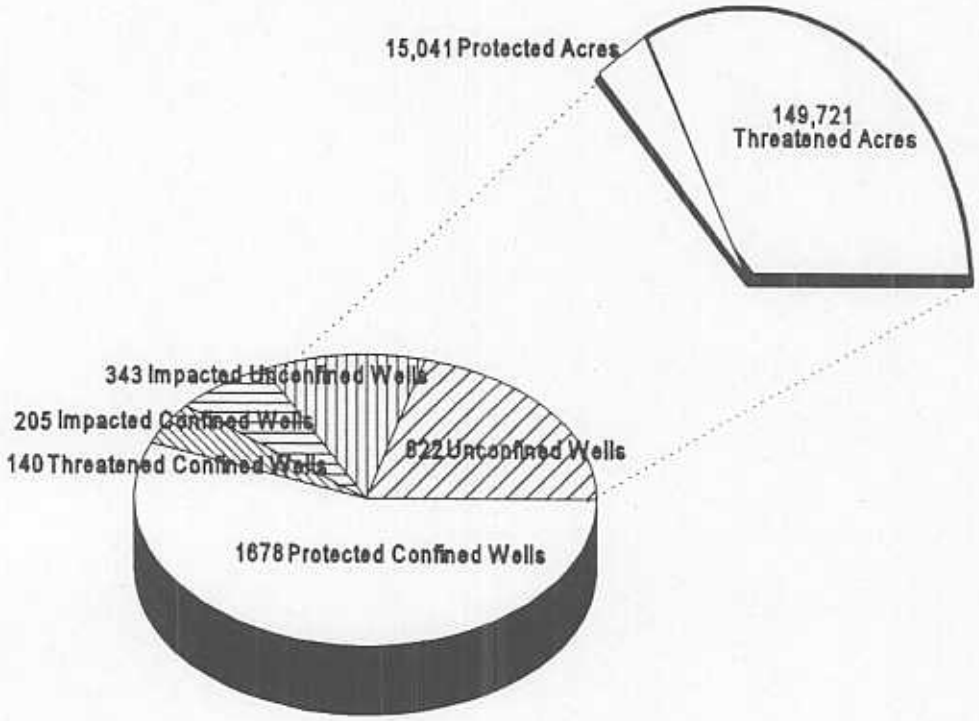
This indicator tells us that there is a significant amount of recharge area protection still needed for CWS wells using unconfined aquifers in Illinois. One area that could help this progress is associated with the SDWA vulnerability waiver program. IEPA's criteria for this program is based directly on wellhead protection criteria. Six hundred and seventy-one out of 1,195 CWS using groundwater have applied for obtaining a vulnerability waiver. Thus, there could be a substantial increase in groundwater protection progress as a result. The data from this program is not readily available for this report.

Baseline protection is associated with minimum setback zones with supplemental protection representing maximum setback zone protection. Full protection has been implemented at Pekin through development of the recharge area delineation, source identification, and management planning that has occurred in the Priority Groundwater Protection Planning Regions.

During the next four years, the environmental goal will be to increase recharge acres with full recharge area protection programs established or under development 15 percent by the year 2000 as compared to 1995.

OVERALL INDICATOR

Figure 18. Figure 18 graphically illustrates IEPA's overall groundwater protection indicator for CWS wells in the State of Illinois.



What does this indicator tell us?

The data shown above indicates that there are approximately 15,041 acres that have baseline and/or supplemental protection measures in place. Thus, 149,721 acres of the critical resource groundwater for the State still lacks adequate protection. Good progress is being made with the regional groundwater protection planning programs, but a lot of additional work is needed.

This indicator further shows that a significant portion of the CWS wells using unconfined aquifers in the State have already been impacted (35.5 percent) by groundwater contamination. Additionally, the pressure indicator shows that 64.4 percent of the recharge areas of unconfined wells are threatened by potential point and/or nonpoint sources of contamination.

In addition, this response indicator does not include a measure for new CWS wells. There are approximately 100 new CWS wells permitted every year.

The good news is that there appears to be a significant number of CWS wells using fully protected confined aquifer systems. The confined aquifers that are threatened have potential routes of contamination located within the well site survey area. The vulnerability waiver program, previously described, is also resulting in a significant number of potential routes (primarily improperly abandoned wells) being sealed.

4. Continue to utilize innovative and cost effective methods to implement statewide groundwater quality monitoring.

This information is represented in Section 1(6) above.

CHAPTER VI. GROUNDWATER QUALITY STANDARDS AND TECHNOLOGY CONTROL REGULATIONS

Section 1. Continue to implement and integrate the groundwater quality standards into environmental programs

The State agencies and departments associated with implementing this recommended goal are the IEPA, IDPH, IDOA, Illinois Department of Nuclear Safety (IDNS), and IDOT. The progress on this groundwater protection goal has been good to date.

The IEPA's Water and Land Bureaus are utilizing the groundwater quality standards in various groundwater related programs. The Voluntary Cleanup, National Priorities List (NPL), Solid Waste (both federal and state), and Resource Conservation Recovery Act (RCRA) programs utilize the groundwater quality standards for target cleanup goals for groundwater. In order to protect both the current and future use of groundwater at a remediation site, soil cleanup values are determined based on the leachability of remaining wastes to groundwater using the appropriate groundwater quality standard.

The Groundwater, Planning, Mine Pollution Control Program and Permit Sections of the IEPA's BOW work together to integrate the groundwater protection program components with the Total Maximum Daily Load (TMDL) process, Non-Point Source (NPS) Management plan, watershed planning, National Pollution Discharge Elimination System (NPDES) permitting program, and best management plan development. The IEPA has held technical workshops on the groundwater quality standards, specifically for the BOW Permit Section.

There is no NPDES permit system for groundwater in Illinois. Title 35: Environmental Protection Subtitle C: Water Pollution, Chapter I: Pollution Control Board Subpart B Section 309 requires compliance with the Act and the regulations adopted thereunder. Thus, 35 Ill. Adm. Code 309 Subpart B requires compliance with Section 12 of the Act, and 35 Ill. Adm. Code 620. The review process for these State permits includes evaluation for impacts on groundwater, and requires treatment or management to assure compliance with 35 Ill. Adm. Code 620. Illinois was one of the first programs to include groundwater concerns in the State permit review process. Prior to the adoption of new federal NPDES program requirements, Illinois had an increased awareness with respect to groundwater contamination concerns.

The Groundwater Section of the IEPA's BOW has provided hydrogeologic and groundwater remediation assistance to the BOW Mine Program and the Permit Section for the past two years. For example, the Groundwater Section has evaluated and approved groundwater monitoring systems and the design for: NPDES permit systems; surface impoundments at coal preparation plants; sites with land applied municipal sludge; the Tunnel and Reservoir Project (TARP); including the McCook Reservoir and Elmhurst Flood Control System; and numerous other sites permitted by the BOW. The Groundwater Section also works with the Permit and Mine Pollution Program to remediate groundwater contamination through the establishment of GMZs at existing sites. One GMZ has been approved for a site under a BOW permit, one under a negotiated consent decree, and several others

are being negotiated for approval. The GMZ process requires detailed geologic and groundwater modeling to map contamination within a three dimensional region. In addition, source removal and groundwater cleanup is required. A statistically based groundwater monitoring program is also utilized under the GMZ to evaluate the on-going adequacy of corrective actions.

Section 2. Continue to update and amend the groundwater standards to parallel the drinking water standards adopted by U.S.EPA

The drinking water standards developed under the SDWA will be tracked and evaluated so that coincident with State passage of a drinking water standard, a groundwater standard is also being promulgated. Chemicals will be selected which have federal MCLs and have been found in Illinois groundwater. A cooperative effort with the IEPA's Office of Chemical Safety's Toxicity Assessment Unit has been established to help assist in the process.

The evaluation and review process will continue to process U.S.EPAs Phase II and Phase V drinking water standards for constituents that do not yet have groundwater standards. All other phases (e.g., III, IV, etc.) of U.S.EPA drinking water regulations will be evaluated for this purpose as they are adopted. Constituents promulgated for drinking water standards that do not have groundwater standards in 35 Ill. Adm. Code 620 will be identified. If the constituents identified have been found in Illinois groundwater, the IEPA will propose a rulemaking to the IPCB pursuant to Section 8 of the IGPA. One of the requirements of this Section is that contaminants have been found in Illinois groundwater. In addition, taste and odor thresholds or secondary maximum contaminant levels (SMCL) will be evaluated for proposing additional preventive response levels.

A new Groundwater Standards Subcommittee of the ICCG established in 1994 will be utilized to assist with this program. This sub-committee will also address special issues (e.g., karst and cave systems). A discussion document for karst and cave systems will be completed during this time period for inclusion of Groundwater Standards for these systems.

In addition, the groundwater quality standards regulations provide for an expedited process to designate certain unique and valuable groundwater as Class III: Special Resource Groundwater. These waters may include groundwater which contributes to a dedicated nature preserve or other groundwater designated by the IPCB. It is anticipated that the IEPA will begin to receive numerous requests to review technical adequacy and list dedicated nature preserves within the next few years.

The IEPA will develop a standard operating procedure (SOP) for reviewing Class III Groundwater designation requests at dedicated nature preserves, and will develop a data base of listed sites. The IEPA's Groundwater Section will review all requests within the specified regulatory time frame and will publish an annual list of sites in the Environmental Register during the planning period.

Section 3. Continue to implement preventive notice and response programs and integrate with environmental programs

35 Ill. Adm. Code 620.305: Preventative Notification Procedures specifies the procedures by which

Class I or Class II groundwater is assessed and conditions which trigger this assessment. The IEPA's Bureau of Land (BOL) programs regulate the management of waste in land based units. These land based units are required to monitor groundwater based on a nondegradation standard. The procedures are nearly identical to those in 35 Ill. Adm. Code 620. Facilities that are found to have impacted groundwater, or pose a threat to human health or the environment through groundwater pathways are required to conduct monitoring to define the extent of contamination and incorporate the groundwater management zone (GMZ) requirements of 35 Ill. Adm. Code 620.250 as part of their program.

The IEPA's BOW Permit Section and Mine Program coordinate with the IEPA's Groundwater Section to incorporate preventive measures and to assure compliance of new and existing sites with the groundwater quality standards. The Groundwater Section has also worked with the Permit Section to condition new permits for units to be in compliance with the setback zone requirements established under the IGPA. Additionally, these two Sections have worked together to review agricultural chemical facility secondary containment permits when facilities were adjacent to potable water supply wells. Furthermore, IEPA co-reviews Facility Review Reports required for agricultural chemical facilities located within the setback zone or regulated recharge area of community and non-community water supply wells.

A *Groundwater Standards Guidance Document for Coal Mining* is also being prepared with the BOW Mines program and the Illinois Department of Mines and Minerals to address groundwater contamination.

Section 4. Continue to implement the technology control regulations and establish a database for tracking and evaluating compliance data

A compliance program for the adopted technology control regulations for existing and new activities within setback zones and regulated recharge areas has been implemented. A pilot data management system was designed to track activities subject to these regulations. In 1994, the IEPA began coding data from Well Site Survey Reports. To date, data for over 4,000 sites have been entered into the relational database using the following prioritized approaches:

1) In relation to wells in the statewide ambient network.
2) In relation to wells with synthetic organic chemical (SOC) detections.
3) In relation to wells with VOC detections.
4) In relation to wells with nitrate detections.
5) In relation to wells with recharge area delineations completed.

In 1995, additional portions of the database were designed to integrate the compliance information with WHPPs. The WHPPs include the technology control regulations as one management tool, but also include voluntary measures that can augment these regulations. WHPPs can be evaluated using data about wells and sites from the compliance database. The IEPA will continue to evaluate completed well site survey reports on a prioritized basis for entry into the compliance database.

Section 5. Work with the DPH and County Health Departments to coordinate the implementation of the technology control and groundwater standards regulations

The IEPA and the IDPH are the primary state agencies responsible for implementing this groundwater protection goal. Coordination between IEPA and IDPH has been good and there has been some success with implementing this activity. However, there is a great deal of work to be done in this area.

Through the SDWA, the IDPH inspects non-community public water systems. Pesticide monitoring requirements for approximately 600 non-transient non-community water systems took effect in 1993. By the end of 1994, approximately 40 percent of these water systems were sampled for pesticides. During the next two years, the goal is to increase the rate of compliance to 100 percent.

Additionally, the Illinois Water Well Construction Code was amended in November of 1994, and both the Illinois Water Well Construction Code and the Illinois Water Well Pump Installation Code are scheduled to be amended in 1995.

Further, press releases pertaining to the results of the federal Centers for Disease Control and Prevention study of private water well quality and the Department's study of private water well contamination was provided to all ICCG agencies. In 1995, reports of the Department's flooded private well study and the U.S.EPA study of flooded non-community water wells will be completed. Through six regional offices and 81 local health departments IDPH will continue to utilize efficient methods to implement statewide groundwater quality monitoring.

The Well Site Survey Reports and other regulatory initiatives under the IGPA provide a valuable avenue for implementation and prioritization of the technology control and groundwater regulations for community wells. However, fewer mechanisms are in place for other types of potable wells (i.e., non-community, semi-private and private) to which the protection afforded by the regulations applies.

The IEPA contacts the IDPH whenever the contamination or siting of a private or non-community well is a concern with regard to these regulations. Site-specific examples of the coordination between the IEPA and County Health departments on the implementation of this groundwater protection goal include:

- Agricultural chemical dealership in McDonough County;
- Salt pile concerns in McHenry County; and
- meat packaging plant in Cass County.

CHAPTER VII. WELLHEAD PROTECTION PROGRAM

Section 1. Implement and integrate the WHPP elements into protecting regional groundwater sources for CWS wells

The IEPA is the primary agency responsible for implementing this program. The IEPA has had some success with implementing this activity. However, there is a great deal of work to be done in this area. WHPPs have been implemented for CWS wells in Priority Groundwater Protection Planning Regions. Figure 19 illustrates the Priority Groundwater Protection Planning Regions in relation to the Potential for Aquifer Recharge (Appropriate Recharge Areas) Map.

There are certain programmatic indicators that show CWS groundwater protection progress within the Priority Groundwater Protection Planning Regions. In general, the first step of developing a CWS groundwater protection program involves determining the recharge area for CWS wells utilizing existing data. The second step involves determining the potential sources, potential routes, and the land use zoning within these recharge areas. The third step involves establishing a local team of stakeholders to develop a groundwater protection strategy, and the last most important step involves implementing activities to protect the groundwater resource.

Indicator 1. Recharge Area Determinations

Groundwater recharge area determinations for the following communities have been completed or are underway in the following:

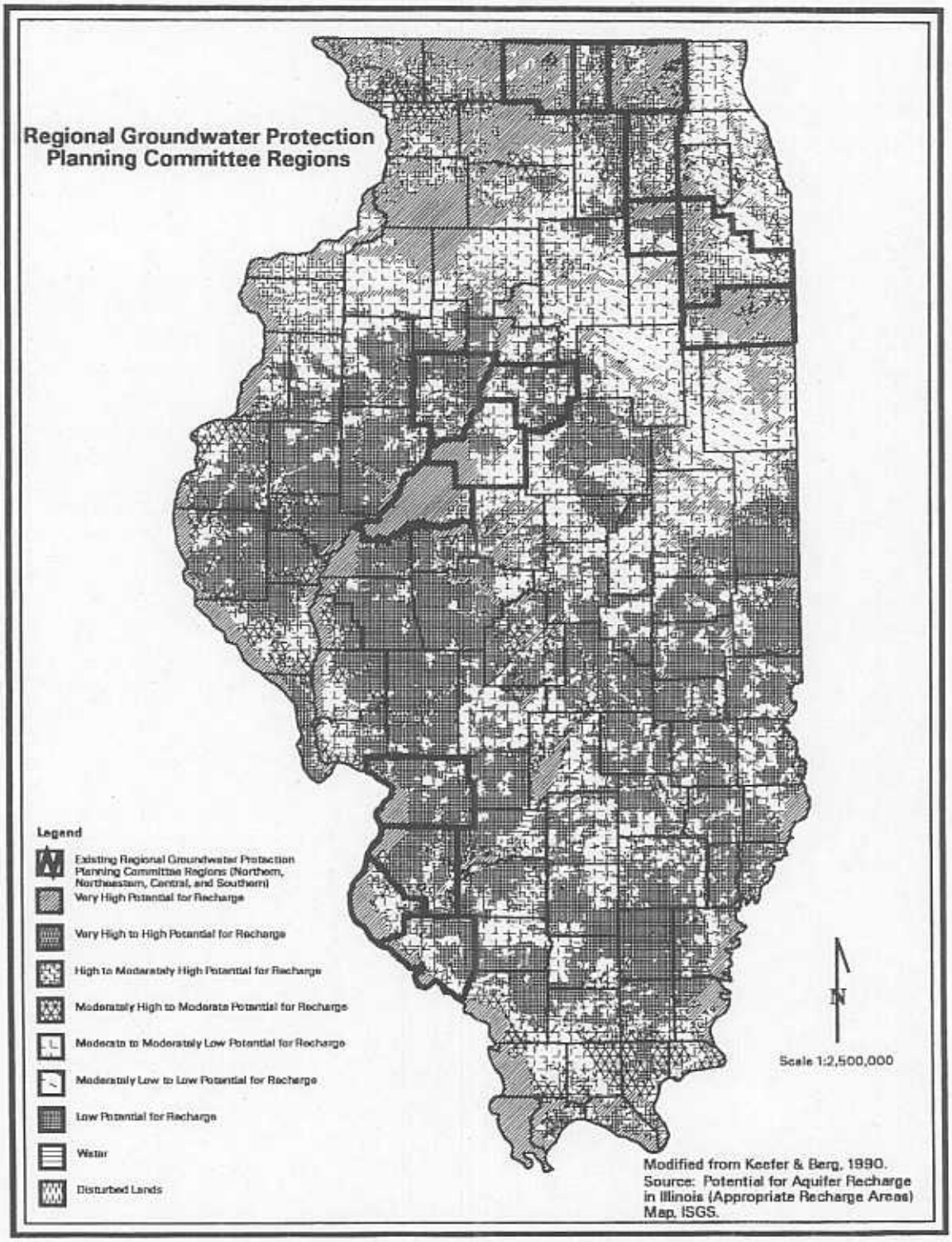
Northern Groundwater Protection Planning Region (Winnebago, Boone, and McHenry Counties):

- Rockford
- Rockton
- North Park PWD
- Marengo
- Cary
- Union
- Neartown MHP
- Belvidere (being delineated by the United States Geological Survey)
- Woodstock (being delineated by the ISWS)
- Loves Park (being delineated by the ISWS)

Northeastern Groundwater Protection Planning Region (Kane, Kendall, Kankakee, and Will Counties:

- East Dundee
- Plano
- Joliet

FIGURE 19.


Regional Groundwater Protection Planning Committee Regions
Legend
Existing Regional Groundwater Protection Planning Committee Regions (Northern, Northeastern, Central, and Southern)
Very High Potential for Recharge
Very High to High Potential for Recharge
High to Moderately High Potential for Recharge
Moderately High to Moderate Potential for Recharge
Moderate to Moderately Low Potential for Recharge
Moderately Low to Low Potential for Recharge
Low Potential for Recharge
Water
Disturbed Lands
N
Scale 1:2,500,000
Modified from Keefer & Berg, 1990.
Source: Potential for Aquifer Recharge in Illinois (Appropriate Recharge Areas) Map, ISGS.

Central Groundwater Protection Planning Region (Peoria, Tazewell, Woodford, and Mason Counties)

- Pekin
- Manito
- Green Valley
- Havana
- Easton
- Pleasant Valley PWD
- Chillicothe
- Peoria Heights

Southern Groundwater Water Protection Planning Committee (Madison, Monroe, St. Clair, and Randolph Counties)

- Edwardsville
- Bethalto
- Collinsville
- Mounds PWD

Indicator 2. Completed inventory of Potential Sources, Potential Routes, and the Land Use Zoning Within Recharge Areas

Potential source and route identification has been completed for the recharge area for the following:

Northern Groundwater Protection Planning Region (Winnebago, Boone, and McHenry Counties)

- Rockford
- Rockton
- North Park PWD
- Marengo
- Cary
- Union
- Neartown MHP

Central Groundwater Protection Planning Region (Peoria, Tazewell, Woodford, and Mason Counties)

- Pekin
- Pleasant Valley PWD

Southern Groundwater Water Protection Planning Committee (Madison, Monroe, St. Clair, and Randolph Counties)

- Edwardsville

Indicators 3 & 4. Meeting with Local Stakeholders to Develop a Local Groundwater Protection Program And Implementation of Activities to Protect the Recharge Areas

The most effective method of encouraging local groundwater protection programs is through direct meetings with local stakeholders. The Priority Groundwater Protection Planning Committees provide a mechanism of broad interest group input and networking with local community officials.

Northern Groundwater Protection Planning Region (Winnebago, Boone, and McHenry Counties)

- *Rockton*-IEPA staff met with the Rockton Water Supply Operator to discuss local WHPP options. The IEPA staff provided the Water Supply Operator with a copy of the Pekin Groundwater Protection Ordinance and a summary of the Wellhead Protection method that could be utilized in Rockton. These options were thoroughly discussed, and a strategy was determined. The Water Supply Operator then discussed this strategy with the Village Engineer who was convinced that developing this local groundwater protection program was in the best interest of the Village. The Village Engineer and Water Supply Operator then presented this information and strategy to the Village Council and Mayor. After the presentation, the Mayor was also convinced that this was a good priority work activity and instructed the Village Engineer and Water Supply Operator to carry out implementation of a groundwater protection strategy.

- *North Park PWD* -A P2 workshop was sponsored by the Regional Committee, Local Chamber of Commerce, and Hazardous Waste Research and Information Center (HWRIC) for the small businesses within the well recharge areas on February 2, 1995. North Park PWD has adopted local maximum setback zone ordinances.

- *Marengo* - The Agency, members of the Northern Regional Groundwater Protection Planning Committee and Mark Mitchell (Illinois Rural Water Association) met with the Marengo Public Works Committee to discuss a local groundwater protection program for the city. Mr. Mitchell discussed the groundwater protection services offered through the Rural Water Association including the major elements of a local protection program. The Agency and regional committee representatives (Linda Baehr and Cindy Skrukrud) provided the City of Marengo Groundwater Protection Planning map and discussed specific groundwater management and educational opportunities available to the city.

  The next step in the development of a groundwater protection program for Marengo is for the water supply operator, Mr. Greg Zickuhr, to prepare a proposal to the entire Public Works Committee for recommendation to the City Council. The next Public Works Committee meeting is scheduled for November 14, 1995.

Central Groundwater Protection Planning Region (Peoria, Tazewell, Woodford, and Mason Counties)

Central Committee Chairman Bill Compton (who represents business interests) stated "The committee recognized that early involvement of all stakeholders would be necessary if a meaningful groundwater protection program was to be developed."

The Central Committee encouraged the development of a *Pekin Groundwater Protection Education Team*, which is a "grass roots" work group composed of members from the Central Planning Committee, City of Pekin's planning and zoning department, public works director, the water company (Illinois American Water Company (IAWC)-Pekin), a school teacher, county health department, local business and representatives from the IEPA. The committee's goal was to assist in the development and coordination of a groundwater protection management program for the City of Pekin. "The Needs Assessment identified a number of potential sources of contamination presenting a potential hazard to the community's water supply wells, and the IEPA recommended several steps for Pekin to take to protect its source water," said Kief. The IEPA proposed that the City include the minimum setback zones on its zoning map, that it adopt regular and irregularly shaped maximum setback zones, evaluate the need for local zoning options to protect the recharge areas, and that steps be taken to educate both the public and businesses about groundwater protection.

The Pekin work group realized the importance of involving the public and business community as early as possible in the development of the groundwater protection program. With support from the IEPA and Illinois HWRIC, presentations were made to the City Council, the Planning Commission, city staff, and the public, while information seminars were provided for businesses (*Automotive Service Station Clean Bay Workshop Package, HWRIC*) most directly affected by groundwater protection regulatory issues.

ISGS and ISWS are keeping this group well informed of the groundwater resources project in southwest McLean and southeast Tazewell County. The planning region has offered to sponsor workshops in Tazewell County where survey scientists will present the results of this study. These are expected in 1996.

Another major goal of the Pekin work group was evaluation of site-specific management programs including: voluntary P2; enhanced performance/operation standards; local zoning options; and IGPA regulatory actions that would be best suited for protection of IAWC-Pekin's CWS wells. The City's Planning Commission Chairman and work group member, Dick Bolam, recalls the nearly monthly meetings and discussions that the work group had pertaining to the numerous management options available to the city. "The IEPA provided us with several example ordinances from around the country - that helped us formulate what types of management approaches we wanted specific to Pekin."

Pekin adopted and implemented a comprehensive recharge area overlay protection ordinance, and maximum setback zones in January 1995. While there was some initial concern that such activities

might be a deterrent to new businesses considering locating in the community, city officials came to believe that identifiable steps to protect the nearly limitless water supply would have a positive rather than a negative impact. Charles Renner, Executive Director of the Pekin Area Chamber of Commerce, said businesses prefer communities with protected water supplies. "Who wants to move a business or industry to a town where they can look to pay tax toward a multi-million dollar bond issue to clean up the groundwater?" he asked.

"This is probably one of the most - at least in my judgement, as far as public health and safety is concerned - significant pieces of legislation that this community has ever considered," City Commissioner Dave Tebben said. "Groundwater contamination has entered the national consciousness, but almost no communities have acted with preventative ordinances such as the one in Pekin."

Lee Williams, the city's Director of Economic Development, said that even though the ordinance imposes restrictions on some businesses, it will make Pekin more attractive, "Good water is essential to good business, particularly industrial or heavy users of water." Williams said. "Those industries want to come to areas where the groundwater is protected."

- The *Pekin Groundwater Protection Education Team* also continues to work on "results oriented activities" under the National Groundwater Foundation's Guardian Program These results oriented activities consist of:

  - holding additional P2 workshops for the newly elected public officials, businesses and general public as an efficient and cost effective-method of long range environmental protection;

  - to establish incentive and educational programs to educate the public, businesses, and schools in the area about groundwater protection;

  - to enact voluntary P2 measures; and to post road signs indicating the boundaries of the City's well recharge areas.

  Pekin received national recognition by the Groundwater Foundation, and was selected as one of 50 Groundwater Guardian communities in 1995.

- *Pleasant Valley PWD* - Work has been initiated on the development of regulatory management for the Pleasant Valley PWD well recharge areas. On October 19, 1994, the Pleasant Valley PWD requested the Central Groundwater Protection Planning Committee petition the IEPA to propose a regulated recharge area to the IPCB. Subsection 17.2(c)(5) of the Act provides the Committee with the authority to make such a recommendation to the IEPA. The Committee unanimously agreed to make this recommendation to the IEPA on October 19, 1994. On November 8, 1994, the Board of Trustees of the Pleasant Valley PWD passed a resolution requesting the Committee recommend to the IEPA the establishment of a regulated recharge area for wells # 2, 3 and 4. Prior to filing a formal Committee recommendation to the IEPA, Subsection 17.2(c)(5) also requires that a public meeting be

held on the request. Since there has been no precedent established for the procedures enacted under Section 17.2(c)(5), the Regional Committee Chairman requested that the meeting be held in the form of a public informational hearing. An informational hearing was subsequently held that the IEPA staff testified at on January 26, 1995. The public comment period for this hearing closed on February 25, 1995. No additional comments were received. The Committee determined that the record supports the initial motion of October 19, 1994, and the Committee officially petitioned the IEPA to proceed with proposing a regulated recharge area regulation.

Concurrent to the process being conducted by the local stakeholders, as described above, the IEPA has been reviewing the hydrogeologic characterization of the Pleasant Valley Groundwater Protection Needs Assessment. IEPA has developed a draft discussion document for the purposes of a regulatory development session.

A pilot P2 initiative is being conducted in the Pleasant Valley PWD recharge areas. The IEPA worked to obtain additional financial support for the Central Groundwater Protection Planning Committee under the Environmental Protection Trust Fund (EPTF). The EPTF funding has been used to provide a graduate environmental engineering student intern to assist the Regional Committee in its groundwater protection efforts for Pleasant Valley. Three small businesses within the well recharge area are participating in a voluntary effort to assess their existing BMPs. The existing BMPs are being assessed using a "Waste Reduction Assessment Checklist". This information will be evaluated and follow-up on-site visits will be conducted. If there are P2 opportunities identified, these will be provided to the participating businesses.

Southern Groundwater Water Protection Planning Committee (Madison, Monroe, St. Clair, and Randolph Counties)

- *Edwardsville*-The City of Edwardsville's community wells are located outside of their municipal boundaries, but within the jurisdiction of Madison County. The IEPA and Southern Committee representatives met with the Madison County Board to discuss a strategy for protecting the 5-year recharge areas of Edwardsville's community wells. Madison County would have to amend their County Ordinance to allow a municipality to develop a recharge area overlay within county jurisdiction. In addition, IEPA met with the Mayor and City Council to generate their awareness and get their buy in and local support. The City seemed very interested in pursuing a local WHPP. The City-Council adopted a resolution on March 7, 1995, authorizing the mayor to work with Madison County to "...work on the development of a protection plan for the five-year recharge areas of their wells." Madison County has developed a draft ordinance that is currently under review.

- *Bethalto*-The Village is interested in developing a local WHPP. IEPA met with the Water Supply Operator to discuss the delineation of the 5-year recharge area that the IEPA had completed for their community wells. In addition, IEPA assisted and instructed him on how to conduct a source identification within the WHPA. The next step will be to meet and

discuss management strategy options. Additionally, there will also have to be meetings with several other local stakeholders. The Bethalto well recharge area overlaps into the Villages of Wood River and East Alton. The effort described above regarding amendment to the Madison County zoning ordinance will also be important in this effort, since Bethalto's wells are located outside of their municipal boundaries, but within Madison County.

ISGS has been working with the Southern Groundwater Protection Planning Committee to keep them informed on progress being made in the groundwater contamination study and mapping of the karstic areas.

A successful cooperative has been developed between the IEPA and IDOT to post road signs at the entry and exit of state routes crossing CWS recharge areas. Signage is an approach that has been used by local governments and European countries as a form of education. Use of signs along roadways or at public facilities are used to increase awareness of where recharge area protection areas are located. Signs serve to educate individuals and also provide a mechanism and additional impetus for notification in cases of an accidental contaminant release.

The sign that has been developed in cooperation with IDOT is as follows: entering-"Drinking Water Supply Protection Area-Report Spills"; and existing-"Drinking Water Supply Protection Area-Leaving".

The IEPA has used GIS to determine that 68 signs could be produced for state routes crossing CWS recharge areas. The communities are now being contacted to determine their interest and to begin implementation.

Section 2. Prioritization of the Delineation of Five-Year Recharge Areas for CWS wells within the Groundwater Protection Planning Regions

During the past two years, the IEPA has established a process for prioritizing the delineation of five-year recharge areas for CWS wells that are located in the Groundwater Protection Planning regions. The IEPA has made adequate progress on this effort. These criteria are based on hydrogeologic vulnerability assessments made by the IEPA and the availability of aquifer properties data from the ISWS.

Prioritization Process

The first step in the delineation selection process is to determine which CWS wells in the Groundwater Protection Planning Regions have aquifer properties data on file at the ISWS. Section 1428 of the SDWA states in part that the delineation of wellhead protection areas should be "based on all reasonably available hydrogeologic information on groundwater flow, recharge and discharge and other information the State deems necessary to adequately determine the wellhead protection area." In 1994, the IEPA obtained electronic access to the ISWS's Aquifer Properties Database.

Since that time, the IEPA has taken this data and created lists of CWS wells with aquifer properties for the three current and one proposed Groundwater Protection Planning Regions.

The second step is to determine which CWS wells in the Groundwater Protection Planning Regions utilize unconfined aquifers which are vulnerable to contamination. Under Illinois' approved WHPP, five-year recharge area delineations are conducted only for CWS wells that utilize unconfined aquifers. In early 1995, the IEPA developed a standard procedure for conducting hydrogeologic vulnerability assessments for CWS wells. This assessment process scores CWS wells on a scale of 0 to 10, with 0 representing a CWS well that utilizes a highly vulnerable (i.e., unconfined) aquifer and 10 representing a CWS well that utilizes a highly protected (i.e., confined) aquifer. The data collected from these hydrogeologic vulnerability assessments are entered into a relational database and then related back to the list of CWS wells that have aquifer properties data. Once this data is compiled, the IEPA then can recommend a list of CWS facilities and accompanying wells to the Regional Planning Committees for delineation and community outreach efforts.

Section 3. Work with the committees to implement programs and to assist with targeting local contacts and interest groups

The IEPA is the primary Agency responsible for implementing this groundwater protection goal. The IEPA continues to work very closely with the regional planning committees to establish groundwater protection programs at the local level, however, these programs are very time consuming and much more work is needed in this area.

The Groundwater Section has coordinated with the regional groundwater protection planning committees to implement programs and assist with targeting local contacts and interest groups. Each regional committee has adopted specific mission goals and objective statements to advocate groundwater protection practices and procedures to municipal, county, state and other local units of government throughout their respective region. These mission statements are useful in the prioritization and development of local groundwater protection programs, many of which have been described in the beginning of this Chapter.

Although each region has specific priorities and areas of concern, their mission statements all have common goals and objectives as described below:

GOALS

1. Provide education materials and programs regarding general groundwater protection.

2. Promote the use of groundwater protection "tools" to county and other local units of government that implement groundwater protection programs throughout the region.

3. Assist the state jurisdictions in accomplishing specific regional groundwater protection programs.

4. Provide a forum for the development of recommendations that address committee recognized regional protection needs.

OBJECTIVES

1. Maintain an on-going general education subcommittee to work with citizen groups, schools, governing agencies and other interested parties on the importance of groundwater protection.

2. Promote the use of voluntary P2 programs for businesses and residences located within groundwater recharge areas.

3. Work with county, municipal, and other special units of government to implement groundwater protection tools such as the following:

   - Local Zoning;
   - Maximum setback zones;
   - Technology control regulations; and
   - Defining regulated recharge areas.

Develop procedures that implement the recommendation/petition process for establishing regulated recharge areas.

STRATEGIES

1. Act as a catalyst for implementation of groundwater protection tools including meeting one on one with local officials and businesses.

2. Conducting workshops for education and assistance.

3. Develop and distribute a newsletter.

4. Annual self evaluation review of program effectiveness.

Section 4. Integrate the WHPP with vulnerability waiver assessments under the SDWA.

The IEPA is the primary agency responsible for implementing this program. The Groundwater Section has worked cooperatively with the BOW, Compliance Assurance Section (CAS) to develop and administer a monitoring waiver program for the SDWA Phase II and V constituents. The progress and participation on this groundwater protection goal has been good to date.

Community water supplies can potentially reduce the number of water sample analysis required by

conducting a vulnerability assessment and implementing a WHPP. The intent of this integrated program is to accelerate the adoption of local recharge area protection programs and to assure compliance with the SDWA monitoring requirements. Monitoring waivers are being used as an incentive mechanism for encouraging the establishment of local prevention programs. The goal of the monitoring waiver program is to protect WHPA's from contaminants which may have an adverse effect on public health or the environment.

This program has been developed to recognize areas where natural protection exists by differentiating between confined versus unconfined aquifer systems. Key elements of the waiver program include mapping the 5 year recharge area for unconfined wells; identification of potential sources and routes of contamination located within the recharge area of unconfined aquifer wells; identification and sealing of potential routes of contamination located within 1,000 feet for confined aquifer wells, contingency planning; and a program to manage potential sources and potential routes to reduce the vulnerability to contamination. In order to obtain a waiver the CWS will evaluate the vulnerability of their wells to potential contamination sources. The systems vulnerable to contamination must develop a management program for potential contamination sources to obtain a waiver.

As previously stated, the participation on the SDWA monitoring waiver program has been good to date. The IEPA has received over 671 waiver applications. Thus, over 671 WHPP plans have been submitted from the approximately 1,195 communities utilizing groundwater. The 671 applications consist of multiple entry or treatment application point (TAP) and associated well combinations. To date 658 TAPs and the associated wells have been reviewed and approved. This translates to a 70.6 percent approval rating for the waiver review applications.

The Groundwater Section will be responsible for reviewing waiver renewal applications every three years. Re-authorization of waivers will be based on implementation of local WHPP's. In addition, the IEPA will retrofit the waiver program to include new constituents as they are adopted by U.S.EPA.

CHAPTER VIII. REGIONAL GROUNDWATER PROTECTION PLANNING PROGRAM

Section 1. Assist with conducting and supporting both new and follow-up efforts of encouraging local groundwater protection programs

As previously described in Chapter 7, the IEPA is the primary agency responsible for developing and implementing this program. To date, the IEPA has had some success related to the establishment of this activity. However, there is still much to be done.

The regional groundwater protection process has resulted in successful local coordination and outreach efforts that have benefited both private citizens and businesses in these high priority areas of the state (e.g., P2 workshop for auto repair shops located in the City of Pekin's well recharge areas.) As the City of Pekin's local WHPP gains more national and State recognition, it is anticipated that a number of other communities will parallel such efforts. This will result in accelerated regional groundwater protection programs.

Southern Groundwater Protection Planning Committee

The Southern Groundwater Protection Planning Committee has been meeting monthly since its inception in 1992. The Southern Committee is continuing with its efforts to protect groundwater resources in the four county region. The committee, with support from the IEPA, is meeting with city and county governments to generate awareness and support for groundwater protection. They are targeting communities for public outreach and assistance in development of local WHPPs. The committee is encouraging Madison County and the City of Edwardsville to work on a protection plan for the 5-year recharge areas of the Edwardsville municipal wells.

The Southern Regional Education Subcommittee participates in an on-going groundwater education program. They have purchased groundwater flow models for every county and key educational agencies and provide demonstrations on request. They have participated in and co-sponsored several field day tours including the Ag Expo, Conservation Day and the Karst Tour to name a few. Groundwater related educational booths are set up at local fairs and expos. Well sealing demonstrations have been held in every county. The Educational Subcommittee will continue to educate the general public, businesses, agriculture and government on groundwater related topics.

U.S. EPA Section 319 Grant was funded for Karst Education and Research in the three counties of Monroe, St. Clair and Randolph. The grant funds will be used to hire a full time educator to educate the public on groundwater related issues in the sinkhole plain area. The project also involves groundwater testing and dye tracing to delineate recharge areas.

Additional public and political education on groundwater related issues and regulations in the Southern Region is needed and plans are being developed. The committee is currently in the process of recruiting additional members. Having a greater number of actively involved committee members will enable us to make a better effort toward protecting groundwater resources in the Southern Planning Region.

NORTHERN REGIONAL GROUNDWATER PROTECTION PLANNING COMMITTEE

The Northern Committee planned to accomplish a number of tasks over the past two years. Two main goals were identified by the committee, public education, and local government assistance.

In addressing the first goal, the Committee looked at ways in which it could best educate the public. One way public education was facilitated by the Committee was through availability of educational materials in a lending library. These materials are cataloged and made available to teachers, researchers, and interested parties upon request. The available materials include video tapes, audio tapes, groundwater models, and published material from many different sources. The county health departments maintain inventories for distribution. One major educational effort was the Groundwater Protection Field Day held in Winnebago County. This one day workshop was attended by 118 individuals and 127 students from area schools. A 6 station rotation moved groups through demonstrations of various groundwater protection measures.

The second goal, local government assistance, was an effort to work with local governments and water supplies to assist them with groundwater protection programs. Committee members addressed the three County Boards in the planning region, and provided an overview of committee assistance capabilities. Members also worked with the Village of Rockton, City of Marengo and the North Park PWD in Machesney Park, and assisted in their WHPPs. This assistance included presentation of maps and reports prepared by the IEPA Groundwater Section.

The Northern Regional Committee plans to continue these efforts over the next two years. Additional communities have been identified for assistance with WHPPs, and local governments will continue to be targeted for groundwater protection assistance. The library of available educational material will continue to grow, and made available to interested parties. A groundwater intern is being sought to work with area businesses and governments on groundwater protection and P2 programs. Two more "Groundwater Protection Field Days" are being planned, and the Committee is interested in scheduling additional P2 workshops for businesses located within well recharge areas.

1. *Wellhead Protection Outreach Program* - This program was a cooperative effort with the League of Women Voters and the City of Loves Park. The program utilized senior volunteers to go door-to-door conducting a survey of potential sources of groundwater contamination and providing educational materials to the public.

2. *Groundwater Protection Field Day* - The Committee sponsored a one day workshop on groundwater protection. There were 118 individuals who attended this activity along with 127 students from area schools. A six station rotation moved groups through demonstrations of various groundwater protection measures. Participants from the IEPA, IDPH, Illinois Farm Bureau, and county and local governments assisted at each station. The explained such topics as minimum setback zones, well drilling techniques, stream testing, non-source pollution potential, and proper well abandonment techniques.

3. *Educational Materials Distribution* - The Committee has a published list of various educational materials available to schools, governments, and interested parties. Video tapes, audio tapes, groundwater models, and laminated hydrologic cycle posters are available to educate all interested parties about groundwater protection.

4. *Illinois Middle School Groundwater Project* - The Committee has helped the middle school project through monetary contributions, the purchase of groundwater models for classrooms, and with committee volunteer assistance in training teachers about groundwater protection. This program will eventually educate over 100,000 middle school students, and hopefully their families, in groundwater protection.

5. *County Board Orientations* - Committee members have participated in orientations of regional committee activities and programs, for the three County Boards of Boone, McHenry and Winnebago.

6. *Local Government Programs* - Committee members have participated in programs explaining the importance of protecting well recharge areas, maximum setback zones, and delineations of well recharge areas. Programs were presented to the Village of Rockton, City of Marengo, and the North Park PWD in Machesney Park.

7. *Pollution Prevention Workshop* - The Committee co-sponsored, with the Loves Park/Machesney Park Chamber of Commerce, two one-half day P2 workshops. Programs were directed to local businesses and facilities located within the designated well recharge areas for the North Park PWD.

Section 2. Designate one or two new regional planning areas and associated committees

The IEPA is the primary Agency responsible for implementing this recommended goal. The IEPA designated one new regional planning area and associated committee, the Northeastern Groundwater Protection Planning Region. Thus, sufficient progress has been made on this groundwater protection goal by establishing a fourth priority planning region. The IEPA anticipates that an additional regional planning area, termed the "Northwestern Groundwater Protection Planning Region" will be designated in 1996.

Section 17.2(a) of the IGPA requires the IEPA, in cooperation with DNR, to establish a regional groundwater protection planning program. The IEPA utilized the map *Potential for Aquifer Recharge in Illinois (Appropriate Recharge Areas)* (Keefer and Berg, 1990), groundwater pumpage data, population affected, water supply characteristics, solid waste planning efforts, and other factors as a basis for establishing priority groundwater protection planning regions.

The IGPA also required the IEPA to establish a regional planning committee for each priority groundwater protection planning region. Each committee is to be appointed by the Director of the IEPA for a term of two years and shall 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 IEPA and other State agencies as appropriate.

Under the IGPA, the regional planning committees are responsible for the following:

- identification and advocacy of region-specific groundwater protection matters;
- monitoring and reporting progress made within the region regarding implementation of groundwater protection;
- maintaining a registry of groundwater contamination hazard advisories within their respective region;
- facilitating informational and educational activities relating to groundwater protection; and
- recommending to the IEPA that regional protection is needed for a specific area within the region.

The IEPA has established four Priority Groundwater Protection Planning Regions and designated the associated committees. The following provides a general profile of the newly established "Northeastern Priority Groundwater Protection Planning Committee":

Northeastern Groundwater Protection Planning Region Profile

Counties - Kane, Kendall, Will, Kankakee

Phil Peters - Executive Director for the N.E. Illinois Planning Commission
Thomas Talsma - Geneva Public Works Director
Marian Gibson - Channahon Village Administrator
Colleen Prieboy - Village of Elwood Planning Commission
Mike McCoy - Kane County Board
Fred Carlson - Kane County Health Department
Phil Bus - Kane County Development/Planning and Zoning
Dan Laube - Kendall County Soil and Water Conservation District
John Church - Kendall County, County Board Member
Phyllis Holbrook - Kendall County Health Department
Frank Kalisik - Will County Land Use Department
Brian Scanlon - Will County Health Department
William Sawyer -Kankakee County Board of Zoning Appeals
John Bevis - Kankakee County Health Department
Clifford White - St. Charles Water Superintendent

Bob Cole - Carpentersville Water Supply Operator
John McGinnis - Plano Water Supply Operator
Joe Moor - Yorkville Water Supply Operator
Allen Parsons - Plainfield Water & Sewer Superintendent
Joe Donavon - Consumers Illinois Water Company
Ann Hastert - Environmental Coordinator, Caterpillar Inc.
Greg Buffington - Layne Western Company
Fran Caffee - Sierra Club Member
John Meyer - Will County Farm Bureau/Farmer
Mary Baskerville - Will County Environmental Network

The Northeastern Groundwater Protection Planning Committee is relatively new, but should benefit from the experiences gained in the other three Priority Groundwater Protection Planning Regions.

CHAPTER IX. NON-COMMUNITY AND PRIVATE WELL PROGRAM

Section 1. Continue to implement the WHPP, and assist with implementing the technology control and groundwater quality standards regulations

IDPH has primary responsibility for inspections of approximately 6,000 non-community water systems which are performed at least once every two years. At the time of these inspections, the area surrounding the wellhead is inspected for sources of contamination. Permits for the new construction, modification or an extension of an existing non-community water system will continue to be required.

Section 2. Continue the issuance of potable and other water well permits; and,

Approximately 8,000 permits to construct private, semi-private, non-community and non-potable water wells are issued annually by IDPH and approved local health departments. All new wells are inspected to ensure location and construction specifications have been meet as per requirements of the Illinois Water Well Construction and Pump Installation Codes.

Section 3. Continue implementation of the groundwater monitoring well, closed loop heat pump and backflow prevention code

In 1992, the Illinois Water Well Construction Code was amended to include requirements pertaining to monitoring and closed loop heat pump wells. These requirements are to remain in effect. Also during 1992, the Illinois Water Well Pump Installation Code was amended to include requirements where a chemical injection system is connected directly to a water well used for irrigation and which is not used as a potable water supply. The goal of IDPH is to update the list of approved backflow devices as well as to keep the agricultural community informed of this requirement.

CHAPTER X. MINIMAL HAZARD CERTIFICATION

Section 1. With the approval of JCAR, adopt the proposed minimum hazard certification rules and begin implementing the program.

The IEPA is authorized by the Act to develop and administer a MHC program for sites that represent a minimal hazard to contamination of groundwater by potential primary or potential secondary sources. The MHC system is designed to protect CWS wells while allowing small commercial operations and businesses to achieve compliance.

The Act specifies time periods for certification and decertification procedures. MHC will be granted to sites meeting specific criteria for a particular time period. The Act requires that the owner of a site seeking a MHC demonstrate that the use and management of containers, above ground tanks, and waste piles are consistent with guidelines adopted by the IPCB.

The IPCB adopted the Technology Control Regulations (35 Ill. Adm. Code 615 and 616) developed by the IEPA 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 MHC Regulation (35 Ill. Adm. Code 670) was adopted June 17, 1994, after approval by the Joint Committee on Administrative Rules (JCAR). The MHC Regulation was then filed with the Secretary of State's Administrative Code Unit, and published in the Illinois Register on July 1, 1994. Two requests for the MHC Regulation have occurred to date.

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

CHAPTER XI. GROUNDWATER QUALITY PROTECTION RECOMMENDATIONS AND FUTURE DIRECTIONS

The following groundwater protection efforts recommended for the next two years are based on the results of the self-assessment and environmental indicators presented in this report. In some tasks, the priority may be shifted due to funding constraints. The overall groundwater quality protection indicator shows that the overall progress of implementing the IGPA continues to be adequate. However, proactive groundwater protection measures for new CWS wells is an area of "significant material weakness". In addition, efforts and resources should continue to focus on critical regional recharge areas supporting unconfined CWS wells.

ICCG Operations

- Continue to review and update the Implementation Plan and Regulatory Agenda;
- Continue to hold quarterly meetings;
- Provide liaison for the GAC;
- Continue to assist the Agency with the endorsement of Illinois Groundwater Protection Program in relation to U.S.EPA's Comprehensive State Groundwater Protection Program core adequacy criteria;
- Assist with development of a fully-integrating CSGWPP vision statement and proposed changes in U.S.EPA policies and programs in support of the vision statement;
- Oversee, review and provide input to the preparation and implementation of a SMP;
- Continue and expand the effort of providing technical assistance (CWS well recharge area delineation and P2 alternatives) to the regional groundwater protection planning committees; and
- Review and support the annual groundwater education work plan.

GAC Operations

- Sponsor a regulatory development session in cooperation with the ICCG and IEPA on the Pleasant Valley PWD regulated recharge area proposal;
- Conduct policy related meetings; and,
- Provide input to programs, plans, regulatory proposals and reports as appropriate.

Education Program for Groundwater Protection

- Coordinate and conduct a statewide education program with an annual evaluation and work plan involving local, regional and state organizations and agencies. Emphasize the integration of groundwater protection into state and local agency programs;
- Support regional groundwater protection committees with special education programs based on regional needs. Increase emphasis on community programs for wellhead protection;
- Through educational institutions and organizations, curriculum projects, and teacher workshops, integrate groundwater principles and groundwater protection into the curriculum for grades 3-12;

- Community wellhead protection education. As groundwater recharge maps become available for community water supplies, provide educational assistance in developing community wellhead protection education programs;
- Maintain an easily readable and useful newsletter and closely related electronic bulletin board for communication with newsletter editors, communicators, water professionals, committee persons, educators, and agency representatives with groundwater protection interests. Secure interesting articles from these clients for publication;
- Target private well owners for educational programs involving licensed water well contractors, local health departments, and other organizations. These programs will address well abandonment, disinfection, testing, operation and maintenance methods;
- Secure educational funding to expand the Illinois Middle School Groundwater Education Project to new state selected regional groundwater planning areas.

Groundwater Evaluation Program

- Cooperate on sponsoring Groundwater Protection Needs Assessment workshops;
- Continue to 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;
- Continue to utilize innovative and cost effective methods to implement statewide groundwater quality monitoring; and
- Continue to implement and improve overall groundwater quality indicators.

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 U.S. EPA;
- Continue to implement preventive notice and response programs and integrate with environmental programs;
- Continue to implement the technology control regulations and improve a database for tracking and evaluating compliance data;
- Evaluation of activities located proximate to CWS where local groundwater protection management efforts are completed or in progress will be given priority;
- Evaluation and compliance determinations for activities referred by permit programs will also be given priority; and,
- The IEPA should work cooperatively with the IDPH to provide statewide education seminars on the implementation of the technology control and groundwater standards regulations.

Wellhead Protection Program

- Increase the percentage of recharge acres with full protection progress established or under development. The goal is to increase this percentage 15 percent by the year 2000.
- Continue to implement and integrate the WHPP elements into protecting the regional groundwater sources for public water supply wells;
- Develop and implement source protection criteria to use in the planning, construction and location of new community water supplies;
- Continue to prioritize wellhead protection efforts within the Groundwater Protection Planning Regions;
- Continue to implement groundwater protection programs for CWS and assist with targeting local contacts and interest groups; and,
- Continue integration and implementation of the WHPP under SDWA vulnerability waiver assessments.

Regional Groundwater Protection Planning Program

- Assist with conducting and supporting both new and follow-up efforts of encouraging local groundwater protection programs;
- Assist with coordination of Section 319 grant best management plan implementation for nonpoint sources of contamination within community well recharge areas;
- Continue to develop and integrate a source water protection component under the IEPA's Watershed Management Program;
- Coordinate with watershed protection initiatives and groups;
- Coordinate with the Clean Break Program and utilize P2 technical assistance in creating community based groundwater protection programs.
- Within the Southern Region there needs to be more coordination between NRCS Stormwater Management Committees (Metro East Watershed Planning Committee) targeting watershed delineation and IEPA;
- Designate one new regional planning area and associated committees;
- Develop a prioritization process to determine areas in most need for the development of maximum setback zone proposals; and
- Develop up to five maximum setback zone proposals in coordination with the ICCG and GAC.

Non-community and Private Well Program

- Continue to implement the WHPP, 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.

Printed by Authority of
the State of Illinois
Feb-96 26407 300