

# **ILLINOIS STATE WATER PLAN**

## **1981 PROGRESS REPORT**

### **JANUARY 1982**

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# EXECUTIVE SUMMARY

## Introduction

The "Illinois State Water Plan, 1981 Progress Report" reports activities and progress by the Water Plan Task Force during 1981. It documents evolving guidance for policy on programs, their coordination, and budgets.

This planning activity was begun in 1980 with appointment of State agency representatives to the Task Force by Governor Thompson. This action reflected a widespread feeling that the previous Water Plan issued in 1967 had become obsolete. The decision to proceed was also prompted by funding support from the U.S. Water Resources Council.

Activities during 1980 included adoption of statements of Task Force mission, tentative goals, and initial focus as follows:

Mission and Tentative Goals - Develop a total water management system that is socially acceptable and that operates within resource constraints, with tentative goals to achieve more efficient resource utilization through (a) coordinated planning and implementation, (b) using meaningful public participation, and (c) establishing any needed mechanisms for conflict resolution.

Initial Focus - The Water Plan will focus initially on significant water issues not being sufficiently addressed by current programs, or emerging issues which can be anticipated to lead to future problems or conflicts.

During 1980, two advisory groups were established - one representing federal agencies and another representing diverse statewide interests. Five regional committees were also named, and a series of public forums were conducted throughout the state.

The product of 1980 efforts was a report "Plan of Study, Illinois State Water Plan". It identified 10 water issues and two cross-cutting topics which then became the principle focus of attention during 1981. Other topics such as navigation, hydropower, and hazardous wastes were deferred for a variety of reasons.

#### Task Force Activities During 1981

The Task Force met monthly, and its efforts are reported in this report. It adopted a statement on "consistency", which affirms that agency programs are not in conflict with the State Water Plan. The recent reports "Illinois: The Future" and "Illinois 2000" were reviewed and accepted, with recognition of their limitations, as broad projections of the social and economic futures in which water planning should be conducted. The Task Force prepared a summary of Illinois water resources and current use, which was incorporated in the present report and is an essential base for planning. Through a special Drought Task Force it assisted local communities during an emerging drought in the late winter and spring.

The two advisory groups and the five regional committees remained active and helpful. The Water Plan activities were also made publicly visible through a newsletter and various releases and appearances by Task Force members. National and regional water planning and parallel activities in neighboring states were monitored.

The missions and programs of Illinois State agencies with their lead agency responsibilities for issues and the names of individuals participating in any aspect of the Water Plan are contained in appendixes.

Principle attention during the year was directed to the 10 water issues and two cross-cutting topics of statewide importance for which summaries and recommendations follow.

### Water Resources Problems, Programs, Findings, and Recommendations

#### Erosion and Sediment Control

This issue has been identified as the number one water resource problem facing the State. Erosion from all sources is estimated at 181.4 million tons annually, of which more than 86 % is from crop land.

Erosion has reduced soil productivity, although improved production techniques have masked this effect. Off-site losses resulting from stream and reservoir siltation, filling of road ditches, increased water treatment costs, and aquatic habitat degradation are very large. Quantifiable losses alone in Illinois probably exceed \$30,000,000 annually.

Although there has been an active program of erosion and sediment control for 45 years, rates of erosion are probably increasing. This is the consequence of several factors: land use has shifted to more row crops, which create greater erosion; government programs for cost sharing and technical assistance have been reduced; short term economic considerations have discouraged adoption of conservation practices; and assistance programs have not been focused on areas of greatest need.

In 1980, Illinois renewed its commitment to promote soil erosion and sediment control, with a program of achieving reductions to sustainable rates by the year 2000. The State Water Plan has adopted the developed 1980 plans and guidelines, and will support their achievement through the following recommended actions:

#### SUMMARY OF RECOMMENDATIONS FOR EROSION AND SEDIMENT CONTROL

##### The Task Force Recommends:

- That there be a full integration of effort to establish common goals and objectives among agencies at the local, state, and federal levels.
- Coordination of policy, research, and implementation programs.
- Targetting financial and manpower resources into areas of high priority need.
- That funding be provided to meet established soil erosion goals that all lands meet "T" values (the average annual loss which will permit maintained productivity). Evaluate non-conventional funding options.
- Establish the criteria by which to evaluate the current voluntary program.

#### Integration of Water Quality and Quantity Management

Various water programs in Illinois have historically approached water management from multiple perspectives. One can cite quantity programs such as flood control and navigation on one hand, and water pollution abatement programs on the other hand, while water conservation programs have been concerned with agricultural land management.

This program fragmentation has resulted in inadequate linkages between water management and various social aspirations, conflicting priorities, and other undesirable consequences.

An improved understanding of program elements involved in water quality and quantity management can be reached by reviewing ongoing programs in water quality, public water supplies, water quantity, aquatic biota and riparian lands, and research in water and related resources.

SUMMARY OF RECOMMENDATIONS FOR INTEGRATION OF WATER QUALITY AND QUANTITY MANAGEMENT

The Task Force Recommends:

- That there be a comprehensive integration of multiple programs, policies, and procedures with respect to water quality and quantity management, and that this process be institutionalized in the basic planning mechanisms of the participating agencies.
- That the program integration might be initiated by an Executive Order.
- That the integration result in a basin-by-basin interagency agreement with annual review on the beneficial water uses and their priorities for which the State is managing water resources.
- That the Executive Order, program integration, and management priorities be reassessed after five years.

## Water Conservation

There are increasing signs that serious water shortages loom in the future for this nation. This is somewhat in contrast to past Illinois experience where supplies have generally been adequate to meet demands. Exceptions in the State have occurred for limited geographical areas and during occasional periods of drought. Our water conservation efforts have been limited to those communities sharing in Lake Michigan allocations or during periods of drought.

The State agencies have participated in intermittent water conservation efforts by developing educational materials and practical information, by conducting workshops, and by working with local communities.

While a wide range of possible State involvement is possible, the Water Plan has developed a program it believes is cost effective. With major emphasis on education, program elements will include marketing conservation devices, revision of plumbing codes, pilot projects, and data collection.

### SUMMARY OF RECOMMENDATIONS FOR WATER CONSERVATION

The Task Force Recommends:

- A sustained and coordinated program to promote water conservation in Illinois.
- Education, as the most important element of the recommended program, to be carried out through the schools and the various media for which specific material will be prepared.
- Marketing of water conservation devices by working with appropriate trade associations and retailers.

- Revision of plumbing codes to be recommended for new construction.
- Successful industrial experience be exchanged, pilot projects at State institutions be proposed, and a close program relationship maintained with local governments and agencies.
- That the curriculum for water plant operators be enlarged to encompass water conservation practices.
- That the effectiveness of water conservation programs be monitored through a water use inventory program.

#### Flood Damage Mitigation

Flooding has long been a serious problem in Illinois. Damages from flooding have tripled since 1974, yet State expenditures for mitigation have lagged.

Urban floods now cause an estimated \$300 million in average annual flood damages in Illinois. There is a backlog of \$250 million of identified flood control projects.

Rural flood damages total more than \$50 million annually, but programs to alleviate such losses have virtually come to a halt.

Urban stormwater flooding due to inadequate drainage in many of our municipalities is causing rapidly increasing damages and hardships. State initiatives can assist through coordination and the application of available technology.

SUMMARY OF RECOMMENDATIONS FOR FLOOD DAMAGE MITIGATION

The Task Force Recommends:

Urban Flood Control

- The State must direct an increased level of resources toward an accelerated construction program for the backlog of flood control projects presently planned.
- State and local governments must strengthen their floodplain control programs in order that the increases in flood damages caused by new and unwise developments are eliminated.

Rural Flood Control

- The State must develop and maintain a strong coordination program with local, State, and Federal agencies for the implementation of needed rural projects.

Urban Stormwater Management

- The State must provide an increased level of technical assistance to local governments in order to strengthen their ability to solve urban drainage and related flood problems.
- Improved storm and flood forecasting systems and warning procedures are needed. A radar and satellite-based forecast system developed for the Chicago Metropolitan Area needs to be used in a long-term demonstration project.

Competition for Water

Although water supplies have not generally been considered a constraint on development, recent trends and proposals suggest that future competition for water may lead to regional conflicts. In addition to expanded traditional urban and industrial uses, the potential for energy-related and irrigation uses should not be ignored.

Options exist for managing the supply and demand components of any projected future regional competition for water, and the choice of policies and programs for various levels of government can be examined.

#### SUMMARY OF RECOMMENDATIONS FOR COMPETITION FOR WATER

The Task Force Recommends:

- An intense 3-year study to identify on a regional basis the water supplies and the future demands related to energy, irrigation, urban, industrial, and other demands.

#### Aquatic and Riparian Habitat

Illinois possesses a variety of aquatic environments including streams, lakes, and wetlands. Associated with each of these natural or artificial environments are specialized plant and animal communities which depend on the quality of a complex array of habitats. The health of these ecosystems are also important to the well being of man.

A thorough knowledge and understanding of aquatic habitats is essential to their intelligent management. Numerous studies exist, but the results are in scattered locations and need to be brought together in a computerized resource information system for ready, cost-effective use in decision making.

State goals and objectives need to be established for managing aquatic resources through interagency coordination, and a mechanism developed for future research management.

In-stream flow requirements need to be assessed and regulatory goals and objectives for the wise management of aquatic resources considered.

#### SUMMARY OF RECOMMENDATIONS FOR AQUATIC AND RIPARIAN HABITAT

The Task Force Recommends:

- That a computerized water resource information system be established and maintained to organize existing natural and cultural resource information for cost-effective statewide resource decision making.
- That the various studies and implementation programs for the management of Illinois' impoundments, streams, and wetlands be coordinated and prioritized.
- An amendment to "An Act in Relation to Rivers, Lakes, and Streams" which allows appropriate consideration of environmental concerns in water resources planning and permitting be developed.
- That completion of the statewide in-stream flow data base be accelerated, and regulatory goals and objectives with respect to in-stream flow reservations be considered and discussed with the interested public.

#### Water-Based Recreation

Outdoor recreation is greatly enhanced by the presence of a quality water environment. There has been a large increase in recreational demand, which has created a major business sector in Illinois and elsewhere.

To date, there has been no comprehensive assessment of the magnitude and diversity of recreational water use by activity, or to determine the carrying capacity of lakes and streams. This information is needed to develop management strategies.

There are continuing uncertainties over the public's rights to use, and riparian owners liabilities with respect to natural streams. These legal questions need to be resolved to give direction to programs of providing access sites and developing other management strategies.

The potential exists for creating attractive recreational and commercial sites in renovated urban waterfronts. How the state can assist local and regional agencies in these renewal activities should be explored.

#### SUMMARY OF RECOMMENDATIONS FOR WATER-BASED RECREATION

The Task Force Recommends:

- That information on the magnitude of existing and potential for water-based recreation locations be cataloged to guide management strategies for recreational carrying capacities, for approving access site development, for in-stream flow requirements, and for water quality standard setting.
- That the public rights to use natural water for recreation be clarified for various purposes including the provision of access sites.
- A State-wide analysis of urban waterfronts for recreation and commerce be conducted to identify how the state can assist local agencies in their renewal activities.

### Atmospheric Changes and Management Issues

The quality and quantity of Illinois water resources as well as their uses are closely linked to climate through such factors as precipitation, soil moisture, evaporation, and temperature.

Climate is not static, but is constantly varying and we are now in a period of declining temperatures and fluctuating but heavier precipitation. Knowledge of such shifts, their impacts, and their prediction are important to the State and to its climate-sensitive industries.

Man is contributing substantially to climate modification through changes in land use from prairie and forests to row crops, through the combustion of fossil fuels, the building of large cities, and from jet aircraft whose paths concentrate over Illinois.

Planned weather modification, generally cloud seeding for rainfall increases, has been conducted in the State. Illinois farmers and agribusinesses have spent \$0.5 million in the past five years to support such projects. These projects should continue to be regulated while their effects are evaluated. Most needed is a carefully designed field experiment by the State and federal government to answer major remaining questions about the effectiveness of cloud seeding.

## SUMMARY OF RECOMMENDATIONS FOR ATMOSPHERIC CHANGES AND MANAGEMENT ISSUES

### The Task Force Recommends:

- A research and monitoring program be maintained for study of climate trends and for developing understanding of climate changes including those due to man-made effects including acid rain, land use changes, and jet contrails.
- Research and a major field experiment in planned weather modification should be pursued, in concert with the federal government, to determine how to increase precipitation in a predictable fashion and within a societal and environmentally sound framework.
- The state should regulate weather modification activities, and cooperate in providing scientific evaluations of projects.
- The Climate Information Center should be enhanced to develop direct user access to climate data and long range predictions.
- A Climate Detection and Assistance Board be created to develop contingency plans for dealing with climate extremes, to devise a warning dissemination means, and to develop policy positions and possible regulatory recommendations regarding unfavorable weather and climate modifications including acid rain.
- Create a public and institutional awareness of natural and inadvertent climate modification and planned weather modification through an information program including continuing education.

### Drought Contingency Planning

Observations over the past 100 years document the recurrence of droughts. The absence of relatively severe drought events during the past 25 years may have decreased public awareness of their inevitable return.

Drought is variously defined and has differing effects on rural households, public water supplies, livestock, crops, and numerous uses of our streams.

A number of State and federal programs exist for the understanding and prediction of droughts, for public education and advanced planning, and for assistance during droughts.

Relatively little additional effort will bring Illinois drought planning and response to an excellent position.

#### SUMMARY OF RECOMMENDATIONS FOR DROUGHT CONTINGENCY PLANNING

The Task Force Recommends:

- The continuation and refinement of the drought planning and response framework. This step-wise procedure for identification of the onset of drought, its severity and prediction of duration, public notice and response, and assistance by State and federal agencies is largely in place.
- That various media be employed to maintain a sustained educational program regarding possible future droughts, steps that can be taken, and the impacts of droughts.

### Illinois Water Use Law

There are differences in Illinois between the rules of common law with respect to water rights and certain statutory law. There are also uncertainties in water rights because statutory law changes and because riparian rights along streams are shared with other riparian owners. Also the powers of the State with respect to public waters need definition.

There are various possibilities for changing water laws in Illinois including a move to a permit system, as numerous other eastern states have done. A program of activity is recommended which should lead to definite proposals after two years of study.

#### SUMMARY OF RECOMMENDATIONS FOR ILLINOIS WATER USE LAW

The Task Force Recommends:

- An initial study effort in which various reasonable scenarios of regional water supply deficits be tested to determine the applicability of present law, the laws of other states, or a range of modifications in present law for resolving conflicts.

### Conflict Resolution

Illinois has been remarkably free of water disputes because of its generally ample supplies. Growing and potential new demands for water, however, could change this.

During the course of water plan development, including making future projections it would seem prudent to remain sensitive to issues which could lead to the need for conflict resolution.

#### SUMMARY OF RECOMMENDATIONS FOR CONFLICT RESOLUTION

The Task Force Recommends:

- That during the dynamic Water Plan process, those involved remain alert to possible future water resources conflicts, and consider whether adequate mechanisms are available for their resolution.

### Meaningful Public Participation

Water Plan development is being conducted in an open manner with early and frequent public involvement to improve plan quality and increase the likelihood of acceptance and implementation of the plan.

A variety of means have been employed to involve the public in the Water Plan effort. Some of these are through the existing mechanisms of participating State agencies. In addition, the Water Plan Task Force has organized expert advisory and regional committees, publishes a newsletter, and its members make speaking appearances. Additional means of meaningful public participation will continue to be explored.

## SUMMARY OF RECOMMENDATIONS FOR MEANINGFUL PUBLIC PARTICIPATION

The Task Force Recommends:

- That after the advisory groups, regional committees, and public hearings presently scheduled are completed, public participation be continued with any needed adjustments. It is particularly intended that the question of education be examined.

### IMMEDIATE AND LONGER RANGE ACTIVITIES

Review of Current Report - After Task Force review a draft of the present report was reviewed by the advisory groups and regional committees. Numerous resulting suggestions were either incorporated into the 1981 report or were placed on the 1982 agenda for Task Force consideration.

This executive summary will become the substance of an early Water Plan newsletter. Seven public meetings throughout the state during February and March 1982 will present the results of the 1981 report and invite comments.

Activities for 1982 and Beyond - Suggestions growing out the advisory and public review process will be considered for the 1982 Water Plan agenda. Further activity is anticipated at least until October 1983. This will permit a further progress report in one year and a comprehensive report in two years. By October 1983, it is expected that consideration of issues and topics will have been completed or institutionalized in the form of agency or interagency activities, subject to continuing periodic review.



# PREFACE

## Introduction

The report which follows is a summary of continuing activities in the State of Illinois which will lead to a State Water Plan. This effort began during the spring of 1980 with the appointment of a Water Plan Task Force by Governor Thompson. Activities and accomplishments during 1980 are contained in the report "Plan of Study, Illinois State Water Plan," dated March 1981 as well as in minutes of the monthly Task Force meetings. The 1980 activities are also summarized here in this Preface.

## Need for State Water Plan

The need for an Illinois State Water Plan has been increasingly evident for several years. The most recent plan was published in 1967 and has become obsolete in a number of respects. During the intervening years a number of events on a state, national, and international scale have resulted in changing and competing demands upon the available water resources. Among these can be cited the energy crisis and the strong demand for Illinois crop production. There was also a decade of environmental concern which has resulted in changed values. More recently attention has focused upon conservation and nonstructural approaches to solving water problems. On the state level a number of changes in water-related agencies have taken place, and the lack of adequate program integration is still present.

Under consideration for about two years, the decision to proceed with a State Water Plan was triggered by action of the Executive Branch of the U.S. Government. Through administration by the Water Resources Council, funding under Title III of P. L. 89-80 was substantially increased. This provided a grant to Illinois and other states to increase planning and management of water and related land resources at the state level. For the federal fiscal year 1980 an amount of \$245,200 was made available to Illinois with the requirement of at least equal non-federal funds.

#### Action of the Governor

Early in 1980, Governor Thompson appointed a special Task Force to prepare a State Water Plan. Membership of the State Water Plan Task Force consists of policy level individuals from the water agencies. The Governor designated the Director of the Division of Water Resources in the Department of Transportation as Task Force Chairman. The Chairman, in turn, retained an Executive Director and provided professional and supporting staff.

The Task Force met first on May 6, 1980, and has met monthly since that time.

### Development of Plan Concept

The Illinois Water Plan is intended for policy guidance, and deals with the adequacy of programs and their coordination rather than projects.

An early decision of the Task Force was that the Plan would not be a one-time effort, but instead, would be a dynamic process which can be updated periodically. Thus, it will address problems in some order of priority and current relevance. The product or Plan will reflect current problems, and guide policies, programs, and budgets.

It was decided not to focus directly upon institutions or agencies with respect to organization or reorganization. It was also decided not to concentrate upon traditional and well-established programs, but instead to focus on problems at the margin of attention. That is, consideration will be directed toward programs that are ineffective in meeting current problems or have not yet addressed emerging issues.

Similarly it was decided that circumstances in Illinois do not require major attention to an inventory of water resources at this time. The 1967 report remains generally useful with regard to resource evaluation, and numerous additional sources of data are available. A brief summary of Illinois water resources and uses is included in the present report.

By a process of concensus, the Task Force assumed responsibility for the Plan of Study and the Annual Work Plan. Minimal staff was established for the plan development, and responsibilities for development of elements of the Plan were established through a system of assignments to lead agencies and supporting agencies.

It was decided that the initial partial year would be devoted to preparation of a Plan of Study to be completed by December 1980.

From Task Force deliberations there emerged agreement on the Water Plan mission, tentative goals, and initial focus as follows:

Mission - Develop a total water management system that is socially acceptable and that operates within resource constraints.

Tentative Goals - Achieve more efficient resource utilization through (a) coordinated planning and implementation, (b) using meaningful public participation, and (c) establishing any needed mechanisms for conflict resolution.

Initial focus - The Water Plan will focus initially on significant water issues not being sufficiently addressed by current programs, or emerging issues which can be anticipated to lead to future problems or conflicts.

A preliminary list of 18 issues which emerged did not include a number of potential issues which were considered, but deferred for a variety of reasons. Such issues may become timely in subsequent years as a result of public concern or recognition of growing importance. For example, it was decided to defer consideration of navigation pending completion of "The Master Plan for the Upper Mississippi River" by the Upper Mississippi River Basin Commission. Similarly, the topics of hydropower, and the complex of issues involving toxic substances, hazardous waste disposal, and ground-water pollution were deferred because they were receiving intense agency attention.

#### Public Participation and Advisory Groups

Considerable Task Force time was devoted to the subject of the need for and nature of public participation in the program. Although it was decided that responsibility for Water Plan decisions would remain in the Task Force, it was decided that outside advice would be clearly beneficial, if not mandatory. It was further decided that a series of public meetings would be conducted before the Plan of Study was finalized so that public response could be considered from the start. It was also decided to organize two Advisory Groups to provide additional advice. The results of these two advisory mechanisms is summarized below.

Public Forums - Arrangements were made to have the first public forum in Chicago on September 12, 1980 as part of the annual meeting of the Illinois Municipal League. Four subsequent public meetings were held at Peoria, DeKalb, Carbondale, and Edwardsville between September 16 and October 1, 1980. The four later meetings were preceded by the formation of local steering committees which were of considerable assistance, and which will continue to function.

The format of each public meeting was to have brief presentations on the water resources of Illinois and on the proposed Plan of Study. Presentations were illustrated by slides, and material was distributed to those in attendance. The average attendance at the five forums was about 60. The attendees were then asked for comments and questions which have been summarized in minutes for each meeting. The attendees were also requested to complete a questionnaire indicating their priority rating of the preliminary list of 18 issues.

It can also be said that in verbal statements, questionnaire responses, and written statements, the public in attendance was in strong support of agency coordination and the State Water Plan. Although there was a range of views, there was a predominance of feeling in opposition to further regulations or the imposing of state decisions on local matters. There was strong representation at each meeting from irrigation interests.

There was also widespread concern with toxic waste disposal and its impact upon groundwater pollution. There was also a prevalent view that 18 issues may be too many to deal with adequately in one year of study and planning effort and, that a number of issues are considered of low, current priority.

Advisory Groups - A Federal Agency Advisory Group was established and held its first meeting on October 16, 1980. Minutes of that meeting indicated that this group will continue to be useful in coordinating state and federal planning efforts.

Similarly, a Future Development Advisory Group was established and held its first meeting on October 21, 1980. This is a diverse group of Illinois citizens and representatives of interested groups and associations. The purpose of this group is to ensure that the State Water Plan is developed with full consideration of the directions of larger trends of environmental and developmental views.

#### Water Planning Issues

In consideration of the public and advisory group views and its own maturing judgment, the Task Force agreed upon the following outline of issues upon which to proceed in the Plan of Study. The topics contain the preliminary list of 18 issues, but the subjects have been somewhat modified. Their order represents an approximation of State-wide importance. Regional priorities may vary in the order of importance assigned to the issues.

### Water Issues

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

### Cross-Cutting Topics

The following two topics are not listed in priority order, but are of a cross-cutting nature and will receive continuing attention throughout the planning process:

Conflict Resolution

Meaningful Public Participation

# SUMMARY OF TASK FORCE ACTIVITIES IN 1981

## Introduction

As summarized in the preceding Preface, major decisions regarding the issues and means of development of the State Water Plan were made during 1980. These included the mission, goals, initial focus, agency participation and responsibilities, and anticipated activities during 1981.

The initial activity during 1981 was to refine and publish The Plan of Study which was largely completed in December 1980. Through monthly meetings, for which minutes report greater details, and through the work of subcommittees, the Task Force effort was directed toward completion of the present report. The principal means of accomplishing this end was through a series of intermediate progress reports. Each established issue and cross-cutting topic was the subject of a first progress report and discussion during the February, March or April meetings of the Task Force. Second progress reports and discussion for each issue and topic were conducted during June, July, and August.

Although the Task Force as a whole is responsible for the report and its recommendations, much of the work was accomplished through subcommittees for the several issues and topics with lead and support agencies. The missions and programs of State agencies who participated in the Water Plan development are in Appendix A. The individuals who represented the agencies are given in Appendix B.

Activities and actions of the Task Force which appear to be of independent importance are organized into the subsections which follow.

#### Water Resources Council Grant

A request for support of the Water Plan effort under Title III of the Water Resources Planning Act was directed to the U.S. Water Resources Council. The request was for federal fiscal year 1981 funds and was consistent with the adopted Plan of Study. An initial grant plus a supplemental amount eventually totaled \$192,300, which is 75% of the amount originally anticipated. The start of the grant year was established by the Task Force as June 1, 1981. Grant funds were allocated by action of the Task Force among the several issues and topics according to priorities and needs.

Title III planning support beyond FY 1981 and the future of the Water Resources Council were in doubt as this report was written.

#### Current Water Situation and Drought Task Force

During an approximately 18-month period extending through April 1981 precipitation was consistently below normal, and the accumulated effect developed serious concern, particularly in southern Illinois.

A special Drought Task Force drawn from State agencies participating in the Water Plan was formed under the chairmanship of the Director of the Division of Water Resources in the Department of Transportation. Work of the special Task Force made it possible for the Governor to announce late in February that the State:

(1) Will monitor emerging drought conditions through monthly reports by the State Water Survey.

(2) Sent information packets to 625 communities in southern and central Illinois most likely to feel a major impact from drought conditions.

(3) Provided to local governments materials pertinent to development of water conservation programs.

(4) Made available a list of sewage treatment plants with discharge effluents of sufficient quality to permit their use by farmers for stock watering.

(5) Found that by developing early, voluntary conservation programs communities can in most cases avoid harsh measures such as water rationing.

(6) Through the Emergency Service and Disaster Agency would as a last resort assist communities who have exhausted their water supplies by providing pumps, pipe, and trucks to bring in emergency supplies.

The late winter and early spring drought provided a valuable exercise of the State's readiness to assist in contingency planning and action.

During May of 1981 near record rainfall began to erase the accumulated deficits, and with continuing above normal rainfall through August, attention shifted to concern with excessive soil moisture and flooding.

### Advisory Groups and Regional Committees

During 1980, the Task Force had established a Federal Agency Advisory Group, a Future Development Advisory Group, and Regional Advisory Committees. These several groups were extremely valuable in reviewing the proposed Plan of Study and in indicating the priorities of various issues. The individuals who continue to serve on these groups and their affiliation or location are given in Appendix B.

Regional Advisory Committees - A second issue of the Water Plan newsletter "Illinois Water" was distributed to these committees, legislators, agency personnel, and interested citizens during May of 1981 as one means of maintaining their awareness of continuing progress in water resources planning. State coverage was strengthened by the addition of the Technical Advisory Committee on Water Resources of the Northeastern Illinois Planning Commission to represent the six counties of the Chicago Metropolitan area.

Federal Agency Advisory Group - The Federal Agency Advisory Group met on January 22, and reviewed the Plan of Study. It made a few relatively minor suggestions for Task Force consideration. It expressed a need for greater detail before it could make further inputs. There was extensive discussion of the Water Resources Council report, "Improving the Planning and Management of the Nation's Water Resources." This report is of particular interest because of its attention to state planning.

A second meeting was held on May 14. The Group was augmented by membership additions from the Department of Housing and Urban Affairs and from the Farmers Home Administration.

The meeting began with a discussion of possible impacts in the various agencies of current changes in Washington, and their effects on state programs.

There followed a general discussion of the reports "Illinois the Future" and "Illinois 2000" and their meaning for the State Water Plan under development.

Finally there was a detailed discussion of the major issues now under investigation by the Task Force, and suggested modifications were offered.

Future Development Advisory Group - This group met on January 29 and was primarily concerned with a detailed review of the Plan of Study. A number of suggested changes were offered.

The group met again on June 2. Changes made in the Plan of Study were reviewed, as were changing federal/state relations in water resources planning. Major attention was directed to the reports "Illinois the Future" and "Illinois 2000" and their implications for the water plan. There also were discussions of the water plan issues and of alternative means for communicating with the public. It was recommended that a representative of the banking/lending industry be added to the group.

### Consistency of Water Plan with Agency Programs

At its July meeting, the Task Force considered and adopted a Statement on Consistency for the Illinois State Water Plan.

Consistency is interpreted to mean that agency programs are not in conflict with the agreed State Water Plan. Consistency provisions are used in four major ways: (1) to achieve consistency within a program having diverse elements, (2) to achieve consistency among programs carried out by different agencies, (3) to achieve consistency in the use of certain procedures or processes, and (4) to achieve consistency in the substance of the plan and agency programs. The uses of consistency are, then, either internal or external, and either procedural or substantive.

Since developing the State Water Plan is not an end in itself, the value of the plan rests in whether or not there is a commitment on the part of the planning participants to seek to implement the plan. Moreover, the plan is to be utilized as the basis for coordinated, consistent, and informed decision making through agency programs. Associated issues are:

1. An obligation to transmit Task Force plans to the Governor and the Legislature which allows them to use the information as a basis for decisions that are not mutually in conflict.

2. Commitment on the part of the planning participants and their agencies to implement the plan.

3. The allocation of financial and other resources in accordance with the identified needs and priorities of the plan.

4. A procedure to update plans in response to changing conditions so that the plan can continue to guide agency programs.

5. Some form of long-range schedule for implementation of plan elements should be part of the plan and be implemented by the agencies. Such sequencing of actions is necessary to reflect the logic, interrelations, and relative importance of problems.

The process by which the State Water Plan is developed and approved is important to its eventual implementation. Thus, meaningful participation of all affected parties during the planning and consensus processes is critical.

Meaningful participation requires:

1. Participation on a continuing, regular basis rather than a pro forma or sporadic basis.

2. Representation by agency personnel familiar with agency policies and activities, who can state agency positions, and have sufficient authority to speak for the agency and/or negotiate with others on behalf of the agency.

3. Commitment to bring agency knowledge, views, and problems into the process.

4. Willingness to deal with hard issues and make difficult decisions to resolve conflicts.

5. Consistent representation by identified staff; avoidance of constant changes in representatives.

## Reports on the Future of Illinois

The State Water Plan must consider broad social and economic trends and the future problems and opportunities of the State. This was done by accepting two recent and authoritative reports, "Illinois: The Future" and "Illinois 2000" which are briefly referenced here, while summaries and interpretations are in Appendix C.

The report "Illinois: The Future" dated January 1980 was authored by a statutory Task Force. It presents a future of the State and its government, projects population and the economy to the year 2000, and considers transportation, natural resources, and energy. An updated State Water Plan is recommended.

The report "Illinois 2000" was released in 1979 by an organization affiliated with the Illinois State Chamber of Commerce. It projects population, considers resources and various influences for future growth. It is particularly concerned with Illinois' economic climate.

# ILLINOIS WATER RESOURCES

## Introduction

To plan the wise use and to solve and anticipate our future water problems, it is necessary to know the quality and quantity of the water resources available and what uses are presently being made of them. This section is intended to give a brief summary of these resources and uses to serve as that background. Far more detailed information is available in published reports, in libraries and data banks, and in the files of water agencies.

This section contains brief discussions of precipitation, surface supplies, groundwater, water quality, and present uses.

## ILLINOIS WATER RESOURCES

Water is not uniformly distributed over Illinois, and furthermore, it is constantly changing. It may be available from surface streams and lakes or from ground water sources. The extremes of flood and drought are of particular importance.

## Precipitation

Precipitation is the original source of all our water and includes both rainfall and snowfall. Snowfall produces about 10% of the average annual precipitation in northern Illinois and only 2% to 3% in southern Illinois.

Variability is the most significant characteristic of annual precipitation in

Illinois. The average ranges from a low of 32 inches in the northeast to more than 46 inches in the extreme south. It also varies from year to year, and the 32 and 46 inch averages may vary in the order of 40% once in 50 years.

Heavy rainstorms which produce floods may occur at any time, but the frequency is greatest from late spring to early fall. Winter storms of flood proportions are restricted mostly to the southern part of the State.

Historically, the most severe rainstorms have occurred in the south-central or southeast portions of the State. Observed heavy storms, for example, on a 1000 square mile area have ranged from 7 inches in 6 hours to 15 inches in 5 days.

Droughts are difficult to define because the critical precipitation deficits and durations vary with the use, such as agriculture and water supply.

However, it can be said that droughts have been observed in all sections of the State and are most frequent in the southern and southwest regions. The usual drought periods vary from 6 to 36 months. Three of the four worst drought periods of record occurred from 1930 to 1936. The periods of 1953-1954 and 1976-1977 were the most severe in more recent times. One of these droughts for the 12-month period ending in May 1934 affected the entire State, and only 50%-70% of normal precipitation occurred. For the year ending in July 1954, portions of south-central Illinois experienced only half of normal precipitation while the north-central part of the State had normal or above conditions. Again, the variability of precipitation is evident.

It is important that Illinois has a long record of observing precipitation, because this is the best guide to what the future will be. However, precipitation is only about 5% of the moisture flowing over us in the

atmosphere, and the possibility exists that through weather modification (cloud seeding) we may some day be able to increase the supply.

### Surface Supplies

Streamflow - In order to predict how much water is available for use or for carrying treated wastes, it is important to know how much water flows in Illinois streams at various times. Streamflow is recorded at about 150 locations in the State.

The average runoff of streams is equivalent to about 9 inches of depth over the land surface per year in northern Illinois and about 15 inches in southern Illinois. In many instances, water can be taken directly from a stream, in which case the measurement program is important in indicating the amounts available at various times.

Water quality is also an important factor, and will be briefly and separately discussed. However, in terms of streamflow, it can be mentioned that low flow is particularly important to water quality. The low flow which occurs once in 10 years and averaged over a week is used as a measure of the dilution available for permits of treated waste discharges.

Lakes and Reservoirs - These surface water bodies are filled during high flow for subsequent use, and thus, represents an important means of water conservation, while reducing floods, reducing the impact of droughts, and serving other purposes.

Illinois has a number of large man-made lakes or reservoirs including Rend, Carlyle, Shelbyville, and Crab Orchard. There are numerous lakes of intermediate size such as Lakes Springfield and Decatur which are primarily for municipal water supply. The number of small lakes and farm ponds total more than 80,000. Natural lakes are confined to the northeastern portion of the State and are the result of the last glacial period. Most of these are in the Fox Chain of Lakes region in Lake and McHenry Counties.

There are more than 800 sites for additional man-made lakes of more than 40 acres in size. If they were built, it would create water storage equivalent to a depth of 2.85 inches over the State, in contrast to existing lakes which have an equivalent storage of about 0.5 inches. However, for environmental and other reasons the number of major lakes being created has come to a virtual halt. It is probable that additional dams and lakes will be required in the future, but their design will involve constraints which were generally not present in the past.

A major problem with reservoirs is the excessive rate of siltation from erosion on the watersheds. There commonly are also problems with eutrophication or over-enrichment of the water which gives rise to growth of algae and other aquatic weeds.

Lake Michigan - This is the single most important water body available to the State. It supplies water to Chicago and numerous suburbs, as well as providing navigation and recreation. The amount of water which Illinois can divert from Lake Michigan is limited by a U.S. Supreme Court decree which is open to review by the Court as circumstances may change.

Extent of Surface Waters - There are measures of surface waters beyond quality and quantity which are of particular interest to recreation. These are the miles of streams and the areas of ponds, lakes and reservoirs. Such information is shown in the following Table which was taken from the Department of Conservation report "1978 Inventory of Illinois Surface Water Resources", dated September 1979.

### ILLINOIS SURFACE WATERS

| Water Resource Type                      | Classification    | Number        | Acres          | Total Acres    |
|--|-------------------|---------------|----------------|----------------|
| Lake Michigan<br>(Ill. portion only)     |                   | 1             | 976,640        | 976,640        |
| Reservoirs <sup>1</sup>                  |                   | 3             | 54,580         | 54,580         |
| Impoundments <sup>2</sup>                | State             | 211           | 29,876         |                |
|  | Public            | 631           | 76,570         |                |
|  | Organization      | 1,974         | 24,808         |                |
|  | Commercial        | 505           | 3,037          |                |
|  | Private           | 79,599        | 107,887        |                |
|  | Total             | <u>82,920</u> | <u>242,181</u> | 242,181        |
|  |                   | <u>Miles</u>  |                |                |
| Streams                                  | 0-20 ft. wide     | 4,915         | 7,159          |                |
|  | 21-100 ft. wide   | 5,916         | 29,885         |                |
|  | 101-300 ft. wide  | 992           | 17,753         |                |
|  | 301 plus ft. wide | 1,379         | 201,778        |                |
|  | Total             | <u>13,204</u> | <u>256,574</u> | <u>256,574</u> |
| <u>GRAND TOTAL SURFACE WATER ACREAGE</u> |                   |               |                | -----1,529,975 |

1 The three Corps of Engineers reservoirs - Carlyle, Rend, and Shelbyville.

2 Includes all natural lakes except Lake Michigan and all man-made lakes except Carlyle, Rend, and Shelbyville.

## Groundwater

The topography and the nature of earth and rock materials largely determine the availability of groundwater. The more permeable formations serve as aquifers - that is a formation which stores and transmits water and allows it to flow into wells.

The northern one third of Illinois is more fortunate with regard to aquifers of sand and gravel in the shallow glacial material. That part of the State also has more aquifers of sandstone and limestone in the deeper-lying rock formations.

In the remainder of the State, the only aquifers of high potential yield are sand and gravel deposits along the Mississippi, Illinois, Ohio, Wabash, Kaskaskia, and Embarras Rivers, as well as the Mahomet buried valley which partially crosses the State just north of Champaign.

In portions of the State, not underlaid by principal sand and gravel or bedrock aquifers only small yields are available to wells. These may be adequate for domestic and livestock purposes and small communities.

Ground water is extremely important to the State with several hundred municipal and industrial wells taking large quantities from wells in the northern half of the State. It is the predominant source for medium and small communities, and is virtually the exclusive source for rural supplies.

The potential for groundwater development in Illinois is huge, and in the order of 7 billion gallons per day. For the most part present withdrawals are far less, with the exception of the Chicago region, where pumpage from deep sandstone wells is in excess of recharge, and water levels are declining rapidly. Means must be found to shift a portion of this demand to shallow aquifers where additional supplies exist or to seek further allocations from Lake Michigan. It may also be possible to artificially recharge ground water aquifers as has been practiced at Peoria for about 30 years. This is currently under study.

Finally, it is important to protect our aquifers from pollution, which is recognized as a growing problem.

#### Water Quality

Most of the previous discussion of precipitation, surface supplies, and groundwater has been directed to the quantitative aspects of water. Yet water quality is of equal importance. In considering water quality, it is useful to consider natural sources apart from man-made causes - although both are important.

Natural effects upon water quality can be thought of as primarily from geologic processes. Water is a solvent and therefore, as it passes over or through soil and rock it dissolves mineral matter.

The most common form of dissolved minerals in Illinois waters is referred to as hardness, and results from dissolved calcium and magnesium. Hardness

affects the use of soap in cleaning and causes scale to form in plumbing and boilers. Some 88% of public ground-water supplies would be considered hard water with levels above 200 parts per million (ppm). In some instances, the hardness is extreme. Fortunately, hardness can be eliminated or reduced in either municipal or home systems at relatively modest cost, and this is a common practice.

Iron at levels sufficiently high to cause staining is also frequently present particularly in ground waters. Fortunately, it too can be removed by methods in general use.

Excessive nitrate levels is an increasing problem, particularly from shallow wells in rural areas. This form of mineralization is not as readily treated, and if present at levels in excess of the drinking water standard of 45 ppm as nitrate, requires a desalting process or change to another source.

Less common sources of troublesome, natural constituents are methane gas which can be explosive, fluoride which occurs at excessive levels in about one percent of public supplies, and radioactivity which is present in a few deep wells.

Considerable data are available to characterize the natural constituents in both surface and groundwater, and the technology is available to treat most waters to a satisfactory quality for the various uses.

In addition to the natural constituents in water, a considerable burden is added from man-made sources. These are often thought of as point sources which originate from municipal and industrial discharges, and secondly, the non-point sources originating from agriculture, mining, construction, and urban runoff.

Illinois has long had a program of pollution control, and this activity was greatly accelerated in 1970 by the creation of a Pollution Control Board and the Illinois Environmental Protection Agency. National programs have continued to accelerate also, and particularly as a result of legislation in 1972. Both the Illinois and national programs reflected a public resolve to improve the quality of our streams, and at this time it can be said that this quality shows improvement in most respects.

Pollution control during the past decade has been directed to point sources through massive waste treatment programs. More recently we have come to realize that the remaining non-point sources from rural and urban sources are sufficient to prevent our reaching desirable goals of stream and lake water quality, and this problem is being addressed.

The Illinois program for water quality improvement is aimed at achieving a water quality which will sustain ecologically balanced streams and lakes and which will support desirable aquatic life as well as to protect human health in direct contact recreation and as a source of water supply.

A number of constituents in water resulting from pollution have been of major concern. Among these are bacterial and viral forms resulting from inadequate treatment following human and animal use. Another major problem has been organic material with its high oxygen demand which can lower the dissolved oxygen levels in streams and lakes to the point that desirable life can not exist in them. Discharges of heated water, largely from electric generating plants, also cause problems by elevating the water temperature and lowering the dissolved oxygen level. More recently, concern has increased with respect to a spectrum of toxic chemicals resulting from industrial and agricultural discharges.

A major remaining, and perhaps worsening, pollutant is sediment carried by our streams. Although erosion and resulting sediment are also natural processes, these have been greatly accelerated by row-crop farming, mining, construction, and urban runoff. The problem is now well recognized and programs are beginning to address remedial measures.

## ILLINOIS WATER USE

### Introduction

It is necessary to document current water uses to permit planning and proper management of Illinois' existing water resources. To this end the Illinois State Water Survey in cooperation with the U.S. Geological Survey has expanded water use inventory activities to include all areas of the state and all water resources. For the present, continued federal funding for this program has

ended. This data collection system is intended to document the state's total water use; assist in coordinating the management of groundwater resources in the northeastern part of the state, where a major groundwater resource system is currently being "mined" (withdrawn faster than recharge); expedite the exchange of water use information to the benefit of other state agencies; complement resource research and studies with the capability to rapidly aggregate various regional water use patterns; and facilitate planning the most effective use of Illinois water resources for the economic and social well being of the people of Illinois and the rest of the nation.

Information on water use in this section is taken from the report "Water Withdrawals in Illinois, 1980" which is in press. This report and a similar one for 1978, if continued, are expected to indicate trends in use and provide the basic data required for establishing water budgets, developing water use plans, and evaluating hydrologic unit and aquifer systems. Most previous reports on water use have emphasized the regions where water resources are extensively developed or have surveyed withdrawal by a major user category.

The following table summarizes water use in Illinois for 1980 according to the various source and use categories. It will be noted that the total withdrawal is far greater for surface water uses, and these are predominantly in the category of self-supplied industry. Much of this was used for cooling of thermoelectric power generation.

Summary of Total Water Withdrawals, 1980

In Million Gallons Per Day

| <u>Category</u>        | <u>Groundwater</u> | <u>Surface Water</u> | <u>Total</u> |
|------------------------|--------------------|----------------------|--------------|
| Public water supplies  | 475                | 1,313                | 1,788        |
| Self-supplied Industry | 226                | 40,314               | 40,540       |
| Rural                  | 312                | minor                | 312          |
| Fish and Wildlife      | 4                  | 26                   | 31           |
| Total                  | 1,017              | 41,653               | 42,671       |

The term "water withdrawals" is that water which is taken from a groundwater or surface water source and conveyed to the place of use. If the water is used more than once by recycling, such repeated use is not counted here.

In Illinois "public water supplies" are defined as systems or wells which furnish water for drinking or general domestic use in incorporated municipalities, unincorporated communities where 10 or more separate lots or properties are being served or are intended to be served, and state owned properties and institutions. Public water supplies serve domestic, commercial, and industrial users.

If a public supply is either not available or not used, the water is "self-supplied." Individual families and small communities not served by a public water supply system are categorized as "rural" with regard to water use. Industries and commercial establishments using their own water source facilities are categorized as "self-supplied industry."

Water used to generate hydroelectric power is also included as a withdrawal use in this report because of its diversion through powerplants.

Nonwithdrawal uses are not included in this report.

Water use data are reported as the average daily quantities, usually derived from the annual use. The use is expressed in million gallons per day.

The data source in the report cited above contains considerably more detail including categories by county, districts, river basins, and Standard Metropolitan Statistical Areas.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

# ILLINOIS WATER RESOURCES PLANNING IN THE NATIONAL AND REGIONAL SETTING

## Introduction

It is an old truth that nature, including the location and movement of water resources, does not respect political boundaries. Yet, our political areas such as states, are in many ways the logical units within which to organize activities including planning.

During the time since passage of the Water Resources Planning Act in 1965 this activity increasingly was based upon federal initiatives, in large part through the U.S. Water Resources Council (WRC) and the regional river basin commissions. For a number of reasons including widespread dissatisfaction, a noticeable change in this trend began in about 1980. At that time, the WRC approved a report entitled "Improving the Planning and Management of the Nation's Water Resources", dated July 2, 1980. One of its important recommendations was that water resources planning be decentralized, and that state water plans become the building blocks with which the regional and national plans will be built. This gave a great deal more importance to activities such as development of the Illinois State Water Plan.

Almost independently the Illinois Task Force concluded that it should coordinate its activities with surrounding states. Thus, communications were established with our immediate neighbors - Iowa, Missouri, Kentucky, Indiana, Michigan, and Wisconsin. In part from ensuing correspondence, but largely from the WRC report "A Summary of the States Title III Planning Activities for Fiscal Year 1981", dated July 1981, the following Table on page 24 summarizes major water resources problems facing the respective states, and 1981 program activities with support from WRC Title III funding are reported. Indicated major problems are shown as an "x". The 1981 program activities with support from Title III funds are shown as an "o", and these may or may not coincide with major problems.

#### Summary

The problems and 1981 activities in our neighboring states deserve careful study by everyone interested in the Illinois State Water Plan. The Illinois issues and topics appear among the activities of a number of other states.

The most frequently mentioned problems and activities in neighboring states are water quality including groundwater pollution, flooding problems, and water conservation. Various 1981 activities such as public information and participation, data acquisition and management, and determination of funding priorities may be essential steps in solving the major water resources problems.

MAJOR WATER RESOURCES PROBLEMS  
AND  
1981 PROGRAM ACTIVITIES  
REPORTED BY NEIGHBORING STATES

| Major Water Resources Problems (x)<br>And<br>1981 Program Activities (o) | IOWA | MISSOURI | KENTUCKY | INDIANA | MICHIGAN | WISCONSIN |
|--|------|----------|----------|---------|----------|-----------|
| Impacts of Pick-Sloan Plan   | XO   |          |          |         |          |           |
| Water Quality  | X    | X        | X        |         | O        | X         |
| Stormwater Runoff  | XO   |          |          |         | XO       |           |
| Floodplain Management  | XO   | XO       | X        | XO      | O        | X         |
| Groundwater Pollution  | X    | X        |          |         | X        | O         |
| Public Information   | O    |          |          | O       |          |           |
| Inadequate Stream Flows  |      | X        |          |         |          |           |
| Surface Drainage in Low Lands  |      | X        |          |         |          |           |
| Water Conservation   |      | XO       | O        |         | X        | O         |
| Water Management Fragmentation   |      | X        |          |         |          |           |
| Multiple Uses of Rivers  |      | X        |          |         |          |           |
| Integration of Quality and Quantity                                      |      | O        |          |         | X        | O         |
| Carbonate Hydrology of Ozarks  |      | O        |          |         |          |           |
| Groundwater Data Acquisition   |      | O        |          |         |          |           |
| Develop State Water Plan   |      | O        | O        | X       |          |           |
| Determine Water Funding Priorities                                       |      | O        |          |         |          |           |
| Missouri Basin Hydrology   |      | O        |          |         |          |           |
| Great River Implementation   |      | O        |          |         |          |           |
| Water Supply   |      |          | X        | XO      |          | X         |
| Navigation   |      |          | X        |         | O        | X         |
| Energy Impacts on Water  |      |          | XO       |         |          |           |
| Historic, Natural, and Recreation Areas                                  |      |          | X        |         |          |           |
| Water Rights   |      |          |          | X       |          |           |
| Information Storage and Retrieval  |      |          |          | O       |          |           |
| Waste Discharge Conflicts  |      |          |          |         | X        |           |
| Inadequate Water Use Data  |      |          |          |         | X        |           |
| Erosion and Sedimentation  |      |          |          |         | XO       | X         |
| Instream Values  |      |          |          |         | XO       |           |
| Integration of Ground and Surface Water                                  |      |          |          |         | X        |           |
| Land and Water Information   |      |          |          |         | XO       | O         |
| Wetlands Management  |      |          |          |         | O        | O         |
| Recreation   |      |          |          |         | O        | X         |
| Natural River Studies  |      |          |          |         | O        |           |
| Protection of Lake Environment   |      |          |          |         | O        | O         |
| Public Participation   |      |          |          |         |          | O         |

# IMMEDIATE AND LONGER RANGE ACTIVITIES

## Review of Current Report

A draft of the current 1981 Progress Report was reviewed and revised by the Task Force. This was followed by review of the Federal Agency Advisory Group, the Future Development Advisory Group, and the several Regional Advisory Committees during October and November of 1981.

Comments and suggestions of the advisory groups and regional committees were extensive, and were considered by the Task Force at its meeting on December 7, 1981. Suggestions which were adopted fell into two categories: those which were incorporated directly into the current 1981 report, and those which were placed on the agenda for future consideration during 1982.

Revision of 1981 Report - It is not feasible to report all of the adopted suggestions of the advisory and regional committees, but several of the more important areas are mentioned here. It was made clear that the present report is a policy document and does not include specific projects. The state-wide priorities of the 10 issues do not necessarily reflect regional judgements of relative importance. The long-range mission of the Task Force which is directed toward improved total water management was clarified with respect to

the immediate consideration of issues at the margin which are not being sufficiently addressed. The intention to terminate state water planning in 1983 was revised to indicate some level of continuing activity or review beyond that date. The recommendation to propose legislation giving "equal" consideration to environmental values was modified to propose "appropriate" consideration.

The discussion of "acid rain" was revised to heighten its level of perceived importance. The discussion of erosion and sedimentation was revised in a number of respects to reflect a series of suggested changes.

There were numerous suggestions for consideration of navigation, hydropower, and a variety of concerns related to toxic materials in the environment. Consequently, language was included in the 1981 report to explain why these topics were not given extended consideration in the current year effort.

Proposed Agenda for 1982 and Beyond - A number of suggestions growing out of the review process could not be incorporated in the 1981 report because of their complexity or need for intensive consideration. The Task Force decided to consider a number of these as potential 1982 activities. The topics include (a) evaluating the costs and manpower requirements of recommended actions and programs, (b) including navigation and hydropower as issues, (c) reviewing the related concerns for toxic substances, hazardous waste disposal, and groundwater pollution to determine whether these are receiving adequate attention, (d) increase attention to the educational component of several

issues, (e) the role of local governments in the state planning process, (f) that Drought Contingency Plans be considered for publication as a special report of the Task Force, (g) that the role of the State Planning activity be reassessed in light of the termination of the regional river basin commissions, and that representation on the Task Force and advisory groups and committees be reviewed.

Further activity beyond 1982 is anticipated at least until October 1983. This will permit a further progress report in one year and a comprehensive report in two years. By October 1983, it is expected that consideration of issues and topics will have been completed or been institutionalized in the form of agency or interagency activities, subject to continuing periodic review.

# PROBLEMS, PROGRAMS, FINDINGS, AND RECOMMENDATIONS

## EROSION AND SEDIMENT CONTROL

### Statement of the Problem

The Erosion and Sediment Control issue was identified by the Task Force, Advisory Groups, and the public as the number one water resource issue facing the State of Illinois today. Water-based soil erosion degrades the soil resource base affecting long-term soil productivity and impairs water quality. The 208 Water Quality Management Plan Volume III identifies statewide soil erosion from all sources at more than 181.4 million tons annually. Erosion from cropland contributes more than 86% of the total soil loss or 155.7 million tons annually. Soil erosion from all major sources is listed in the table on the following page.

Recent studies have shown that of the 24.3 million acres of Illinois cropland, more than 8 million acres currently suffer from serious water-induced soil erosion (9.6 million acres have erosion rates in excess of "T" values)<sup>1</sup>.

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<sup>1</sup> "T value" means the average annual tons per acre of soil loss a given soil may experience and still maintain its productivity over an extended period of time. Both physical and economic factors are considered.

Estimated Gross Soil Erosion by Water in Illinois

(Revised 11/1/77)

| Soil Erosion Source                        | Acres<br>(1,000)    | Percent of<br>Total Land<br>Area | Erosion in<br>Tons Annually<br>(1,000,000) | Percent<br>of Total | Average<br>Annual Tons<br>Per Acre |
|--|---------------------|----------------------------------|--|---------------------|------------------------------------|
| Agric. land<br>(sheet & rill) <sup>a</sup> | 32,158              | 90.2                             | 156.6                                      | 86.3                | 4.9                                |
| Cropland                                   | 24,361              | 68.3                             | 138.3                                      | 76.2 <sup>b</sup>   | 5.7                                |
| Pasture                                    | 3,345               | 9.4                              | 10.4                                       | 5.7 <sup>b</sup>    | 3.1                                |
| Woodland                                   | 3,585               | 10.1                             | 5.6  | 3.1 <sup>b</sup>    | 1.6                                |
| Other Agric.<br>land                       | 867                 | 2.4                              | 2.3  | 1.3 <sup>b</sup>    | 2.6                                |
| Gully Erosion<br>(All Lands)               | -                   |                                  | 10.7                                       | 5.9                 | -                                  |
| Non-Agric.<br>(Rural Land)                 | 656                 | 1.8                              | 1.7  | 0.9                 | 2.6                                |
| Federal land                               | 413                 | 1.2                              | .5   | 0.3                 | 1.2                                |
| Urban & Built-up<br>Land                   | 2,451               | 6.8                              | 4.9  | 2.7                 | 2.0                                |
| Stream Bank<br>Erosion                     | ----                | ----                             | 7.0 <sup>c</sup>                           | 3.9                 | ----                               |
| Total                                      | 35,678 <sup>d</sup> | 100.0                            | 181.4                                      | 100.0               |                                    |

a Estimates for sheet and rill erosion.

b Percent of total soil erosion.

c The delivery ratio is 100% in the case of stream bank erosion whereas it is lower for sheet and rill erosion. Thus, this source may be more important than implied by the small percent of total estimated erosion.

d Total area of Illinois (U.S. Census), less water areas.

More than 1/3 of the original topsoil in many parts of Illinois has been lost to erosion over the past 100 years, resulting in an estimated 2.2 % reduction in potential soil productivity. Improved production techniques have masked this trend.

The Illinois Environmental Protection Agency (IEPA) has estimated the annual economic loss of farmland productivity from soil erosion to be more than 1 million dollars. In addition, reservoirs within the State lose some 8,000 acre feet of storage capacity annually due to sedimentation which would cost a staggering \$26,000,000 to remove by dredging. Statistics from township officials collected by IEPA indicate that removal of sediment from road ditches cost between 2.97 and 6.3 million dollars annually statewide.

Sedimentation damages to fish and aquatic organisms have been well demonstrated and documented; however, the total effect has not been measured. Other areas damaged by sedimentation are aquatic habitat, streams, wetlands, lakes, backwater areas along major river systems and navigation channels. Sediment in streams and lakes increases the cost of treatment for public water supply systems. The interactions of sediment and trace metals is also not well understood. Trace metals and pollutants attach to the fine sediments which may be deposited in lakes and streams.

According to the U.S. General Accounting Office, soil losses nationwide are as severe today as they were during the dust bowl years of the 1930's. In 1967, statewide soil erosion from both wind and water amounted to more than 104 million tons annually. By 1977 that figure had reached 188 million tons. Total annual gross erosion increased by 84 million tons or 80% over that 10 year period.

Factors affecting the Soil Erosion Problem - Soil erosion depends on many natural and man-made factors. Natural factors include precipitation quantity and intensity, soil type and consistency, slope, stream pattern within the watershed, and others. Man related factors include land use, land management techniques, and changing economic considerations. The increase in total gross erosion over the past decade is the result of the natural and man related factors listed above. Some critics point to this increase and the fact that current gross erosion is equal to that of the Dust Bowl years as evidence of ineffective soil conservation programs. Although this, along with reduced technical and financial program assistance may be a factor, there have been significant land use and economic changes over that period.

Early soil and water conservation programs were targeted primarily toward the high visibility wind and gully erosion problems, and on improving productivity. During the period from 1935 until the present, there has been a steady trend away from high diversity toward specialized farming. The result of this shift has been the reduction in legume and pastureland, conversion of forest and wildlife land, and reduced acres in small grains for increased row crop production.

Land Use Change - According to the Year Book of Agricultural Statistics, from 1940 until 1974 harvested cropland in the State increased by 3,247,640 acres while there was a reduction in total cropland of 733,916 acres<sup>2</sup>, pasture or grazing land of 3,079,881 acres, other cropland of 901,675 acres,<sup>3</sup> and other lands of 2,819,788 acres. The total land use shift during the period amounts to 7,478,366 acres, of which 3,247,640 acres were moved into harvested cropland.

Of the remaining 4,230,726 acres approximately 3,400,000 acres were prime agricultural land permanently converted to other uses. This has shifted row crop production onto marginal areas.

Soybeans were introduced into the United States in 1848. Their growth as a cash crop was slow until 1945. Soybean acreage was substituted as a

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<sup>2</sup> Total cropland - Total cropland consists of land from which crops were harvested or hay was cut; land in orchards, citrus groves, vineyards, and nursery and greenhouse products; land used only for pasture or grazing; land in cover crops, legumes, and soil improvement grasses; land on which all crops failed; and land in cultivated summer fallow. It also includes cropland that is idle. This item may be overstated for 1974 and 1969 as compared to earlier censuses.

<sup>3</sup> Other cropland - This category consists of land used for soil improvement crops, land on which all crops failed, and land in cultivated summer fallow. It also includes idle cropland.

cash crop when land use conversions were made from pasture, hayland, small grain, forest and other lands. Currently, Illinois farmers plant soybeans on more than 8 million acres annually. Soil erosion on row crops compared to the above land uses is normally higher. When management and other factors are kept constant, soybean compared to corn production will result in a doubling of soil erosion. The shift to soybean production has been a major factor in increased erosion rates.

Reduction in Government Programs - Prior to the early 1970's the U.S. Department of Agriculture (USDA) conducted an agriculture set-aside acreage program which paid farmers not to produce crops on certain acres. The primary purpose of the program was to control the production of agricultural products. Much of the land idled under this program was marginal and not the best on the landowner's farm. Therefore, one by-product of the program was to help reduce soil erosion. After the program was discontinued these acres were quickly planted into row crops.

The ASCS of the USDA has administered the Agricultural Conservation Program (ACP) since 1936. The ACP program is designed to provide cost-share assistance to landowners for the installation of soil and water conservation practices which would not be applied without that assistance. The national appropriation for the ACP cost-share program has steadily declined since 1940 from a high of 532 million to the FY 81 appropriation of \$190 million. This is a 64% or 342 million dollar reduction in annual appropriations.

Technical assistance to landowners through a conservation plan which includes agronomic and engineering practices is an important component for controlling soil erosion. According to Warren Fitzgerald, former State Conservationist for the Soil Conservation Service in Illinois, the total SCS man years has varied since 1958, but the long term trend has been a steady decline from a high in 1958 of 395 man years to the 1980 level of 320 man years.

The above changes in land use, farming practices and reduced technical and financial assistance have dictated that soil and water conservation programs be more efficient. A 1980 report by the USDA found that, nationally, 52% of the acres which receive cost-share assistance through the ACP program had a soil loss at or below "T" value before conservation measures were applied. Therefore, programs must be directed into high priority areas in order to achieve maximum benefits.

Land Owner Support - One problem in the promotion of soil erosion programs is the development of a strong conservation ethic in the agricultural community when it competes with farm economics. The problem of promoting and implementing these programs is the dynamics of interplay between economics, the conservation ethic, available financial and manpower resources, and the coordination and targeting of resources into the high priority areas.

In the implementation of any soil erosion prevention measure, it must be remembered that each stream naturally possesses the capability to transport a certain sediment load. If this loss is reduced, the stream may erode its bed or banks.

Identification of the Problem - Erosion affects the soil resource base, sedimentation affects the soil resource, and water quality and reservoir capacities. The relationship between soil erosion and water quality is recognized but is presently not quantified. Therefore, the absolute benefits of an effective soil erosion program on water quality are not precisely known.

Quantification of the soil erosion in relation to water quality problems is an important first step for program development. Water quality data for sediment have been collected on many water resource areas statewide; however, for most areas it is not sufficient to identify critical problem areas or determine trends.

An important component of the water plan effort will be to identify the location, source, and magnitude of soil erosion; evaluate water quality impacts from sedimentation; and develop a strategy to solve the identified problem.

Coordination/Cooperation - Before the problem of soil erosion can be adequately addressed, all local, state, and federal agencies responsible for the implementation of soil and water conservation programs must coordinate their efforts in a systematic manner. Communications between agencies has historically been for the purpose of information exchange, review and comment on specific proposals and limited coordination on specific programs. However, until now there has not been a concerted effort to coordinate the total program response of these agencies.

The focal point for the coordination, acceleration and implementation of soil and water conservation practices is the local soil and water conservation district, ASCS County Committee and the county personnel of technical support agencies. The local SWCD's serve as the coordinators for the targeting of resources at the local level. The districts are controlled by locally elected officials, knowledgeable of local soil and water conservation needs, but more importantly, they have a vested interest in a successful conservation program - their livelihood. They are however, dependent upon the technical and financial resources of state and federal agencies which support their program.

The 1980 Illinois Soil Erosion and Sedimentation Control Guidelines, along with the 1979 Illinois Water Quality Management Plan, Volume III, served as the means by which the state renewed its commitment to promote soil erosion and sediment control programs. Leadership for this responsibility lies with the Illinois Department of Agriculture and local Soil and Water Conservation Districts.

State leadership is essential in order to insure uniformity, coordination, and agency cooperation which will allow Soil and Water Conservation Districts to carry out their responsibilities in an effective manner.

#### Ongoing Programs

The ongoing soil and water conservation programs can be examined in five ways: (1) the total annual expenditure for all purposes, (2) manpower

availability by agency, (3) cost-share dollars available to the landowners, (4) soil erosion and water quality related research, (5) information/education programs (radio, television, newspaper, magazine, tours, newsletter, etc.), and (6) acres affected by technical assistance.

The most important component in the promotion of soil and water conservation practices is direct personal contact with landowners to provide them with planning, technical, and education assistance. Throughout the State there are a number of employees who deal with soil and water conservation programs and practices. The agency breakdown includes:

- (1) IDOA, 20 employees;
- (2) Local Soil and Water Conservation districts, 98 full and 99 part-time employees (including support staff);
- (3) Soil Conservation Service, 355 man years;
- (4) ASCS, 472 employees (including support staff, acceptance of applications, acting on applications, and the processing of payments);
- (5) IEPA, 12 employees, and,
- (6) Illinois Cooperative Extension Service, 15 man years (based upon county reporting forms. This does not include the total county effort or research and specialist time).

In addition, there is voluntary promotion, direction, and support for conservation programs by 490 directors and 216 associate directors of the State's 98 Soil and Water Conservation Districts, 297 members of the ASCS County Committees, numerous volunteers which support the County Cooperative Extension programs, and farm organizations. Many state universities and other state agencies conduct both basic and applied research and monitoring programs which provide data and information for program development.

For FY 81, a total of 7,177,474 cost-share dollars were available for soil and water conservation practices throughout the State. The majority (6,677,575 dollars) of these funds are administered by ASCS through their ACP program, and \$500,000 was available for the first time through the IDOA for reduced tillage practices.

In addition to the general cost-share program, there are special programs designed to target assistance into specific areas. The major programs available are the ACP Special and Rural Clean Water Programs (RCWP) administered by ASCS, and the Public Law 566 Small Watershed Program administered by the SCS.

There is one Rural Clean Water Program project within the state. Total cost for that project over a 4-year period will be \$1,186,000 for monitoring and evaluation, and \$377,000 for socio-economic studies.

Expenditures for the planning and installation of P.L. 566 projects are listed in the following table. These costs include expenditures for both urban and rural projects.

Annual Planning and Installation Costs  
for 566 Projects

Planning

Soil Conservation Service \$ 140,000

State of Illinois 160,000

Installation 1,700,000

Technical Assistance 1,400,000

TOTAL \$3,400,000

The cumulative effort of all agencies and groups working to promote soil and water conservation resulted in more than 231,000 people attending a wide variety of tours, meetings, and workshops; 2,991,715 people reached through newsletters; 7,048 published newspaper articles; and 3,126 radio spots.

The SCS reports that through applied conservation practices, soil erosion rates were brought to "T" value on 265,000 acres in 1981 (the reported acreage of benefited and adequately treated acres are those which received technical assistance). Conservation practices applied without that assistance have not been measured. It is assumed that the information/education efforts resulted in some conservation practices (especially conservation tillage) being applied.

Approximately 9,600,000 acres of Illinois cropland need conservation treatment. The SCS estimates that 1,500 acres of land are adequately protected per staff year. Based on this level of accomplishment, it will take 6,500 staff years to meet the goal of all land adequately protected to "T" by the year 2000. The Present SCS effort toward this goal is 200 staff years or 300,000 acres per year. At this rate it will take 32 years to reach "T" value on cropland. Therefore, an additional 155 staff people will be needed for the period between 1982 and 2000. The treatment of forest, pasture, and other land will require additional manpower.

The 1979 208 Water Quality Plan and 1981 Soil Erosion and Sediment Control Guidelines helped provide direction and focused the need for interagency cooperation and organizational participation in conservation program development. The soil erosion goals for all lands to meet "T" values by the year 2000 cannot be met without the involvement of all affected groups. The implementation of conservation practices can be accelerated under current resource constraints through improved agency coordination and cooperation, the targeting of resources, effective use of cost-share dollars, and the development of a comprehensive implementation plan.

Comparison with Iowa Program - The State of Illinois developed its soil erosion program based upon the voluntary compliance of landowners and operators to meet established goals. The State of Iowa adopted a mandatory soil erosion program in 1973. Four important differences exist between the legal mandates of the two state programs. These are: (1) who may file complaints, (2) mandatory regulations, (3) court penalties and (4) differential cost-share rates. Although Iowa has a mandatory program which

carries possible court penalties, they restrict who may file complaints and provide a higher level of cost-share assistance on complaint related practices.

Not only have the two states taken a different position on the type of legal machinery needed to implement an effective program, but their manpower and financial support is also different.

Iowa is the leading state nationwide in the number of state employees, total budget, and cost-share dollars for erosion control programs. Illinois ranks 9th, 4th, and 3rd respectively in the same areas. Nationwide, Illinois ranks 2nd in providing grant money to Soil and Water Conservation Districts while Iowa provides no such funds. The total soil conservation budget for the State of Iowa in 1980 was \$11,207,276 as compared to Illinois \$2,883,300.

The mandatory program in Iowa has been in existence since 1973, and since then, more than 600 complaints have been filed, resulting in 25 court cases (15 were related to agriculture and 10 to urban problems), one of which was heard by the Iowa Supreme Court.

A quantitative evaluation of Iowa's program is not currently available. However, the qualitative evaluation by Iowa personnel working with the program indicate that significant progress has been made. Primary reasons given for

the increased application of conservation practices are:

- (1) Improved Information/Education Programs,
- (2) Increased state cost-share funding,
- (3) Threat of legal penalties resulting from violations; and,
- (4) Increased efficiency of technical personnel.

Data and Funding Needs - There are a number of installation, funding, and data gaps needed for landowners and administrative agencies:

- (1) In order to determine the effect of soil conservation practices on water quality, there must be a documentation of soil delivery rates from eroded fields and the effect on water quality when erosion standards are met using various conservation practices.
- (2) The on-site and off-site economics of soil erosion must be examined.
- (3) The effect of soil erosion on short and long-term soil productivity.
- (4) Meaningful incentives which will make the installation of soil and water conservation practices economically feasible.
- (5) The installation of cost-effective soil and water conservation practices so that capital intensive practices will be used as a matter of landowner preference and not cost-share economics.
- (6) Installation of a comprehensive statewide sediment monitoring network to identify the suspended sediment load in selected stream systems.

- (7) Identification of the relative magnitudes of suspended sediment load originating from cropland, stream banks and stream bottoms.
- (8) Quantification of the sediment carried by Illinois streams by continuation of the monitoring network at the 1981 level.
- (9) Conduct a research program on sediment as follows:
  - (a) Calibrate and verify computer based mathematical model or models for estimating soil erosion, delivery ratios and effectiveness of soil conservation practices for typical Illinois watersheds. Show the application of the verified model or models to other watersheds.
  - (b) Determine the sediment load of Illinois streams at various times of the year. Estimate the excess sediment load that can be reduced by conservation practices.
  - (c) Determine the actual contribution of bank erosion and gulley erosion toward the sediment load of the streams.
  - (d) Determine the rates of sedimentation of Illinois lakes.
  - (e) Develop mathematical models to quantify the affinity and the transport characteristics of trace metals and other pollutants with fine sediments. Develop a strategy to reduce the movement of pollutants with sediments.

(f) Determine the impacts of surface mining on sediment erosion and sedimentation of streams and lakes.

Relationship of Ongoing Program to the State Water Plan - Water Plan activities vs. ongoing programs are divided by established and new program development. The four specific areas related to water plan effort are:

- (1) Targeting of resources.
- (2) Coordination and cooperation between agencies and programs.
- (3) Evaluation of incentives.
- (4) Development of a soil and water conservation implementation strategy.

#### Options and Recommendations for Policies and Programs

The options for policies and programs should be evaluated in three separate areas which may be combined for final program initiatives. These are the coordination of effort, increased resources, and evaluation of the voluntary implementation strategy.

Coordination - The effective targeting of resources, and coordination and cooperation between local, state, and federal agencies is needed to address the problems of soil erosion related water quality and to accelerate the implementation of conservation practices. Three levels of coordination have been considered. These are: (1) a reduction in the current level of cooperation and coordination between agencies, (2) a continuation of present limited coordination and cooperation between agencies, and (3) the recommended

option of full integration of effort to establish common state and local goals and objectives between agencies. This includes the targeting of financial and manpower resources into high priority areas, and program coordination which will complement policy, research, and the legal objectives of each agency.

The recommended option is the primary mechanism by which the State can accelerate the installation of soil and water conservation practices, significantly reduce soil erosion in critical areas and improve water quality problems caused by non-point source pollutants, with or without increased resources.

A number of assumptions have been made in selecting this option:

- (1) It is mutually advantageous for all agencies to work toward commonly established goals and objectives,
- (2) Agencies are willing to shift emphasis in some areas of program authority,
- (3) Cooperation and coordination can be accomplished at all organizational levels; and,
- (4) That legal and program authorities will allow this coordination to occur.

The full integration of efforts will not occur immediately. An effective framework must be established where all agencies and groups are given equal

status in the development of goals, objectives, and an implementation strategy. Therefore, a six-step process has been developed to achieve the recommended option.

- (1) Formation of a Soil Erosion and Water Quality Advisory Committee. The Illinois Department of Agriculture organized this Committee on March 16, 1981. It is made up of 24 members which represent gubernatorial appointees, farm organizations, state and federal agencies and statewide organizations. The primary goal of the committee is to develop a long range state soil erosion and water quality implementation strategy. The committee will be the focal point for the implementation of the recommended option.
- (2) Formation of the State Watershed Priority Committee. This Committee was formed to develop a uniform process by which to identify, screen, and prioritize rural water resource and lake rehabilitation projects. The Committee is comprised of 8 State and Federal Agencies, the Association of Soil and Water Conservation Districts, and the Water Resource Commission (WRC). The goal is to coordinate the resources of the Clean Lakes 314 program, rural land treatment projects, ACP Special Projects, Cooperative River Basin Studies and RCWP programs to promote interdisciplinary selection of projects and improve project implementation.
- (3) Development of an agreement which affirms the support of all agencies to participate in the establishment of soil and water conservation goals and objectives for targeting manpower and financial resources. (This agreement was implemented in August of 1981).

- (4) Implementation of a soil erosion and water quality priority setting procedure and uniform method to identify, screen, and prioritize, rural water resource and lake rehabilitation projects.
- (5) Completion of a statewide soil erosion and water quality implementation strategy.
- (6) Semi-annual coordination and reevaluation meetings to monitor the progress of the developed implementation strategy.

Manpower and Financial Resources - The full range of options from program elimination to full funding for financial incentives and additional manpower were considered. The recommended option is to provide funding to meet established soil erosion goals. It is recognized that limited funding may force a re-evaluation of program goals.

A manpower analysis conducted by the Soil Conservation Service indicated that the addition of 155 staff years annually would allow that agency to provide the technical assistance necessary to meet the state soil erosion goals by the year 2000. In addition, local Soil and Water Conservation Districts and the IDOA will need additional personnel.

In the research area, it is estimated the \$7 million will be needed for data collection, analyses, and studies in the general fields of erosion, sedimentation, and control of soil movement.

The 208 Water Quality Management Plan provides the only estimates on the potential cost to install conservation practices to meet these goals. The plan identified two funding options. One involved the predominate use of structural practices and the second used primarily cultural practices. The potential costs were \$1.6 billion and \$748 million, respectively.

Traditional funding sources available to accomplish the soil and water conservation goals will not provide the necessary resources or incentives; therefore, an evaluation of potential "non-conventional" funding options will be evaluated. These include:

- (1) Tax incentives
- (2) Low/No Interest loans
- (3) Matching funds/grants
- (4) New Taxes or Taxing authorities
- (5) Check-off Programs
- (6) Market Development
- (7) Award Programs
- (8) Purchase of Cropping Rights
- (9) "CCC/:Job Corps" - Construction Projects

Evaluation of the Voluntary Program - The other area for policy and program evaluation is the voluntary program currently in effect. The voluntary state program is the result of an intensive public participation program conducted for the 208 Water Quality Plan and the Soil Erosion and Sediment Control

Guidelines. Possible strategies for a mandatory and voluntary soil erosion program were examined during that process. Strong opposition by some of the agricultural community to the proposed mandatory program and the prohibitive cost of program administration resulted in the current voluntary program. Two options considered are: (1) no critical evaluation of the current program, and (2) the recommended option establishing the criteria by which to evaluate the current program.

The merits of a voluntary vs. mandatory program have been discussed at length by the public and State and Federal agencies. As with every program, there must be a mechanism to measure effectiveness and progress. Therefore, it is recommended that the Task Force encourage the development of criteria by which to evaluate the current program. One method of determining the effectiveness and progress of any program is to develop and maintain a monitoring project for the area of program implementation. Effectiveness must be measured to establish its credibility and transferability to other areas.

The establishment of baseline conditions should also be done through the input of all affected private, public, and agency groups. The Soil Erosion and Water Quality Advisory Committee recently organized by IDOA should consider these criteria as part of its planning effort.

#### Potential Conflicts

There are two major conflicts which may occur from implementation of these options: (1) lack of cooperation and coordination between local, state and

federal agencies, because each unit will lose some established turf, and (2) philosophical differences between agencies will require compromise by all parties. The goals, objectives, and legal responsibilities of each group need to be understood by all parties in order to compromise.

Any funding increase would have to come from public funds. With all agencies competing for the same public dollars, there will be the typical conflicts and competition for these finite resources at all levels of government. In addition, there will be jurisdictional conflicts between local, state and federal agencies. We currently find that the local agencies resent state and federal agencies mandating programs for which they have limited input. The leadership of state agencies in promoting more effective coordination and targeting of federal resources may also cause conflicts.

#### SUMMARY OF RECOMMENDATIONS FOR EROSION AND SEDIMENT CONTROL

The Task Force Recommends:

- That there be a full integration of effort to establish common goals and objectives among agencies at the local, state, and federal levels.
- Coordination of policy, research, and implementation programs.
- Targetting financial and manpower resources into areas of high priority need.
- That funding be provided to meet established soil erosion goals that all lands meet "T" values (the average annual loss which will permit maintained productivity). Evaluate non-conventional funding options.
- Establish the criteria by which to evaluate the current voluntary program.

## Work Plan for 1981 and Beyond

Continuing evaluation of the Interagency Soil Erosion Program by action of the state level advisory committee to assist the IDA, DNR in identifying priority soil erosion areas will provide a multi-disciplined approach to formulating soil erosion implementation strategies. The Soil Erosion and Water Quality Advisory Committee was established in March 1981. By September 1982, it will complete a long range soil erosion control implementation strategy.

All groups will continue to promote program accessibility and accountability.

By September 1, 1981, the State Watershed Priority Committee will have developed a uniform method for all districts to establish priority areas. In cooperation with other state and federal agencies, the accuracy and usability of computer modeling techniques to identify tracts of land with high erosion potential will be evaluated.

The interrelationship of soil erosion, sediment delivery, and water quality and quantity will be evaluated by monitoring the Rural Clean Water Program as it relates to a comprehensive evaluation of the effect of best management practices (BMP's) on water quality. This will include a yearly update for Blue Creek Watershed and the Rural Clean Water Program at Highland Silver Lake.

Initiate a comprehensive evaluation of incentives for BMP application by December, 1981.

Examine the effectiveness of State Cost-Sharing for Minimum Tillage.

Evaluate the cost effective application of BMPs by June, 1982.

Continue monitoring sediment loads of Illinois streams to identify trends.

Determine the sediment carrying capacity of Illinois streams.

Develop a strategy to reduce sedimentation rates of Illinois lakes.

Initiate research into the general areas of soil erosion, sedimentation, sediment transport, and control of sediment movement.

The entire program will be evaluated annually and reported to the Task Force and to the public.

INTEGRATION  
OF  
WATER QUALITY AND QUANTITY MANAGEMENT

Statement of the Problem

Various water programs established in the State have historically approached water management from multiple perspectives. For example, the Illinois Division of Water Resources (IDWR) has focused primarily on water quantity in programs concerned with water supply, navigation, and flood control. The Illinois Environmental Protection Agency (IEPA) has been concerned with water quality and with the adequacy of public water supplies. The Illinois Department of Conservation (IDOC) has focused on recreational uses of water and on the management of aquatic biota. Meanwhile, the Illinois Department of Agriculture (IDOA) in working through the local soil and water conservation districts has been concerned principally with land productivity. For statutory, institutional, and constituency reasons, these programs and others which could be cited have evolved rather independently without the degree of integration required to manage effectively what is a single resource--water.

The general concerns which arise from the fragmentation cited above can be characterized by the following results:

- (1) Fragmented information base.
- (2) Inadequate consensus on attainable uses of water in specific geographic areas.

- (3) Conflicting management priorities
- (4) Unilateral regulatory decision making.
- (5) Highly variable accessibility to the public policy process.
- (6) Insufficient linkage between water management and other socio-economic aspirations.
- (7) Measurement techniques that need refinement to ensure accountability for results.

The mission statement adopted by the Task Force provides a clear contrast to past practice in Illinois. Further, the tentative goals serve to direct attention to the major needs relating to an integrated water management effort. It should also be noted that feedback from the public forums held in the Fall of 1980 showed considerable support for developing a more integrated water management system in Illinois.

#### Ongoing Programs

An improved understanding of the program elements involved in water quality and quantity management can be reached by describing key features of major ongoing programs as follows:

A. Water Quality - Illinois has had an active water pollution control program since 1929. A renewed effort to enhance the state's waters was initiated with the adoption of the Environmental Protection Act in 1970. In general,

water quality conditions have steadily improved over the long term. More recently, ambient monitoring data seem to indicate that a plateau has been reached where water quality conditions have remained fairly constant.

Key features of this program that impact the integration issue are water quality standards, a project priority system for construction grants, formal regulatory authorities, continuous planning mechanisms, and public participation activities. Perhaps of most importance are current efforts to develop the following:

- (1) More site-specific, "designated beneficial uses" as part of a comprehensive reassessment of instream water quality standards.
- (2) More adequately define non-point source pollution problems and solutions.
- (3) Assess the potential toxicity of trace organic compounds.
- (4) Establish a data base and management program for lake quality.

B. Public Water Supplies - The main goal of the IEPA public water supply program is to assure that those persons served by public water supplies receive water which is safe in quality, clean, adequate in quantity and of satisfactory mineral character for ordinary domestic consumption. Illinois' program to protect public water supplies was begun in 1915. The IEPA supervises approximately 2,000 drinking water supplies in the State, serving 95% of the State's population.

The State Water Survey, in cooperation with the State Geological Survey, provides well design services to individuals, industries, and public water

supply agencies which need to develop ground water. For communities which rely on surface water impoundments, the Water Survey has identified potential reservoir sites, developed reservoir capacity design methods, and conducted lake sediment surveys.

Activities in the public water supply program include facility inspections; assistance to facility operators; construction and operating permit procedures; operator certification programs; microbiological, organic and inorganic chemical; and radiological sampling; and formal and informal enforcement efforts. Agency field personnel inspect public water supply treatment and distribution systems during regularly scheduled visits and when complaints or requests for assistance are received. New public water supplies and existing public water supplies which wish to construct new equipment or modify existing equipment are required to obtain a construction permit. All public water supplies are also required to have an operating permit before placing new construction into operation.

Key elements of the IEPA water supply program that impact the integration issue are:

- (1) Investigation and control of organics in drinking water,
- (2) Groundwater source protection program,
- (3) Assuring an adequate supply of acceptable raw water for public water supply,
- (4) Proper disposal of water treatment plant waste displaying a low level of natural radioactivity,

- (5) Resolution of long-standing environmental standards, issues and conflicts related to fluoride, barium, nitrate, radioactivity and organics in drinking water,
- (6) Establish a common computerized repository of water quality and public water supply chemical parameter data for a comprehensive environmental assessment,
- (7) Response to environmental emergencies, such as hazardous material spills, which threaten public water supplies to assure protection of public health.

C. Water Quantity - Illinois' water quantity management was initiated back in 1911 with the passage of the Rivers and Lakes Act. Through this legislation, the State expressed its interest to preserve navigability, prevent increased flood stages due to encroachments, and protect other public rights and interests in the waters of the state. The Flood Control Act of 1945 gave the Division of Water Resources further authority to plan, design and construct improvements for regulating floods and protecting low flows of the waters of Illinois.

More recently, the state has become active in evaluating and regulating the quantity of water for water supply purposes. Water from Lake Michigan is, therefore, allocated pursuant to a Supreme Court decree and state owned water storage in four major reservoirs is regulated through permits and contracts. Further programmatic activities are underway to identify and inventory regional water supply availability, and demand statewide to identify impending shortages.

D. Aquatic Biota and Riparian Lands - The DOC bases both its programs and management strategies for aquatic and riparian environments on its statutory mandates to insure the survival of Illinois' natural diversity of plant and animal species and the natural environments upon which they depend for life support. (See DOC mission statement in Appendix A for details).

The DOC carries out studies annually on a variety of aquatic and terrestrial environments to establish population trends for both economically significant species and those whose prime values are aesthetic and scientific. DOC biologists and foresters also inventory plant community diversity, density, and occurrence. This data collection and resultant analysis provides a baseline for the development of both species and ecosystem management plans. While the DOC's prime responsibility in the area of aquatic and riparian habitat management is for the lands and waters over which it has direct control, it annually assists in the management of over 250 public and association water areas as well as numerous private, commercial and club waters.

1. Management - State efforts to manage lakes and ponds for recreational purposes have until recently been primarily responded to by the DOC's Division of Fish and Wildlife Resources. As early as 1935 the DOC provided fish, wildlife, recreational, and environmental management recommendations for Illinois' aquatic environments and their associated wetlands and riparian lands. The DOC regulates the taking of sport, commercial and forage fish, and licenses and sets seasons, and catch and bag limits for waterfowl and furbearers. Fish for stocking purposes are

provided free of charge for public water areas and at a modest fee to association, club and private water owners.

Over the past forty years, the Illinois EPA and the State Scientific Surveys have become increasingly involved with lake, pond and stream management and research, and are now providing much information useful for the management of these dynamic ecosystems.

2. Technical Studies - The State of Illinois enjoys a wide range of very diverse aquatic ecosystems including large rivers, wetlands, floodplains, Lake Michigan, reservoirs, lakes, streams and ponds. The equally diverse aquatic flora and fauna, as well as the associated terrestrial organisms utilizing these systems, are valuable economic and recreation resources for the people of Illinois. These resources depend upon water of sufficient quality and quantity to sustain adequate habitats for organisms and the aquatic-terrestrial ecosystems. An understanding of the complex interactions of these ecosystems and associated organisms may best be developed only by long-term ecological studies which have focused on important resource components over a widespread geographical scale.

Fortunately, studies which reveal and clarify such interactions and changes have been conducted on Illinois aquatic ecosystems by the Natural History Survey for many years. Such studies as the dynamics of waterfowl populations of the Illinois River and the Keokuk Pool, the census of fish populations of the Illinois River, the invertebrate populations of several State rivers, and the water quality of the Illinois River have been conducted consecutively or intermittently for decades by Survey

scientists. Information derived from these studies has provided the basis for regulatory and management decisions which were made by various State agencies.

As a result of these long-term and continuing research, monitoring, and survey efforts, the Natural History Survey now has on-going programs which relate to the major issues which should be addressed in the State Water Plan. The continuation and enhancement of these scientific programs are important and essential to the development and implementation of a water plan which will adequately address and resolve the critical, high-priority issues facing the people of Illinois.

E. Water Studies - On-going programs at the Illinois State Water Survey (ISWS) in surface and ground water relate to major issues being addressed in the State Water Plan. Goals for each pertinent program are given below.

a) Surface Water Quality

With few exceptions all of the lakes and impoundments in Illinois have a common characteristic - poor water quality. The overall goal of all state agencies involved in work related to lakes and impoundments is to enhance water quality. Each agency has its own methods, dictated by legislative mandates and internal policy. The ISWS program is consistent with and complimentary to the activities of other state agencies. Its principal goals are:

- (1) to better identify the interrelationships of the components of the watershed of impoundments that will permit the application of more effective watershed management techniques, and
- (2) to better define in-lake mechanisms that govern water quality in impoundments that will permit the design and application of in-lake treatment processes.

The ISWS currently maintains four program areas dealing with the water quality of surface waters. The program areas are:

- (1) Lake Eutrophication and Restoration
- (2) Aquatic Toxicity Assays
- (3) Wastewater Treatment Assessments
- (4) In-stream Water Quality Investigations

b) Aquatic Organic Chemistry

The Aquatic Organic Chemistry Program has the following general goals:

- (1) To determine the sources, transformation, and fates of soluble organic compounds in the surface and groundwater resources of Illinois and,
- (2) To evaluate the impact of soluble organic compounds on the chemistry and water quality of the state's water resources, emphasizing the potential for protection, resource assessment, and remedial action in appropriate situations.

c) Surface Water Resources

The general goals of this program are to collect the basic data required for the evaluation of the surface water resource of the State; to evaluate that resource in relation to present and future demands; to identify areas of the state in which shortages of or conflicts for water are likely to occur; to provide tools for engineers and planners to use in the proper design, preservation and management of water related projects; and to provide guidance in the resolution of conflicts between competing water uses.

d) Surface Water Information and Flood Studies

The general goals of this program are:

(1) to develop a comprehensive data management system to provide surface water information such as streamflow, flood levels, floodplain boundaries, flood forecasts, drought forecasts, reservoir data, public water supply data, lake and wetlands inventories, and related information to the public, consultants, and other governmental agencies; and

(2) to investigate the dynamic nature of flood frequency, duration, and intensity; to understand how man's activities have influenced flooding; and to provide the information and management tools necessary to minimize flood damage and at the same time optimize use of land resources within the floodplain and watershed.

e) Hydraulics and Sediment Studies

The general goals for this program are:

(1) to investigate and define the natural dynamic processes of erosion, sediment transport, sedimentation, flow hydraulics, lake hydrodynamics, surface and groundwater interaction, and runoff hydrodynamics in the surface waters of the State of Illinois including streams and rivers, waterways, lakes, wetlands, and floodplains.

(2) to quantify, analyze, and investigate the impacts on watersheds and surface waters of Illinois of human activities such as land management practices, construction of hydraulic structures including control and hindrance structures, vessel movement in constricted waterways, dredging of lakes and waterways, channelization, surface mining, and pollutant disposal.

f) Groundwater Quality and Quantity

It must be recognized that to integrate water quality and quantity management, surface water - groundwater interrelationships must be fully understood. Groundwater and surface water must be managed as a system. Groundwater resource evaluation is a main program of the State Water Survey. The basic elements of the program address the availability of groundwater resources in Illinois and the impacts of groundwater developments on those resources. Special studies are conducted in identified problem areas. Research is also conducted to develop new techniques for groundwater resource evaluations. The products of this program are geared for use by the general public, industry, business, and other governmental agencies.

The goals of the Water Survey's groundwater quality program are to understand the natural and man-induced effects on groundwater quality and to summarize this information for use of government, industry, business, and the general public and to provide technical support to regulatory and management agencies to insure the orderly development and protection of the state's groundwater resources.

### Options and Recommendations for Policy and Programs

Status Quo or Less - Relative reductions have already been happening due to severe inflation and minimal increases in program resources over the past several years. For the purposes of this evaluation, it has been assumed that this indirect type of reduction will continue to impact some programs over the next few years. Another approach to reducing efforts involves significant deregulation where formal control programs are in operation. Without extensive modification of related federal regulatory programs, this option does not appear particularly viable. A more likely alternative, at least in the near term, is selective regulatory reform directed at streamlining requirements and procedures.

Even maintenance of the status quo in programs and funding is not likely to lead to progress in the integration of quality and quantity programs since existing agency activities will be protected over activities of broader integration. The consequence would be to deny attention to this issue which received a high priority from within the Task Force as well as from all external advice.

Limited Interagency Coordination - This approach calls for various procedural means of enhancing interagency coordination for water management. For example, the IDWR, IEPA, IDOC and the Corps of Engineers recently developed a joint application form for processing Section 10, Section 404, and related state permits. Also several years ago the IEPA worked out a cooperative ambient monitoring program involving several state, federal and local entities. Another program activity ripe for more procedural coordination is permitting of major new energy facilities in the State. A more rigorous coordination effort could result from extensive interaction during the annual preparation of the state budget. At that time, special emphasis could be focused on opportunities for resource sharing such as multi-purpose field inspection activities. Research, data base, and water use projections need to be integrated with management, policy, and each other.

The up-front costs for achieving such coordination do not seem to be prohibitive. It does require the solid backing of upper management from the agencies to ensure success. There may be, however, a high price to pay over the longer term with respect to maintenance of the bureaucratic superstructure and constant attention needed to ensure a workable degree of coordination.

Comprehensive integration - This approach which is the recommended one, is based upon comprehensive integration of multiple program policies as well as development of procedural coordination. Such a process must be founded in the basic planning mechanisms of the participating agencies. For example, under federal law, the IEPA must maintain a "continuous planning process" which sets

forth procedures for definition of roles, assessment of problems, development of management strategies and tracking of implementation activities. Such a mechanism or others could serve as a prototype for a continuous planning process for water management in Illinois. A key output of this process could be an annual interagency agreement for water management to be approved by the respective agency directors and the Governor. Such a process could be initiated by Executive Order from the Governor. In some instances, it could prove useful to have certain elements of such an agreement cover more than one year.

Under this option, the cooperating agencies would need to focus management attention on the fundamental policy issue of the goals we are attempting to achieve. In other words, basin by basin we need a common agreement regarding beneficial Water Uses that we are managing for and the relative priority to be given such uses. This cross-cutting policy issue lies at the very heart of the water management issue.

It is anticipated that the up-front costs for achieving such integration are much higher than the previous option. A significant commitment of staff resources, including upper management time and possibly legislative enhancements will be necessary to implement this option. The chance of significant conflict is much higher than previous options due to the need to transcend traditional program boundaries to develop a water management web among the agencies. On the other hand, the potential benefits of overcoming one-dimensional, often cross-purpose management should be well worth the price.

Institutional Realignments - This option represents the most extreme case for achieving integrated water management, and has not received intensive consideration as part of this effort. There are, however, a wide range of combinations of agencies or subparts thereof which could be considered in the future. Perhaps one end of such an institutional continuum is represented by a super agency for natural resources management, and the other end by a single unified water management agency. In theory, at least, most of the problems identified could be addressed by an organizationally unified program. However, organizational changes do not always bear the fruit intended by the designer. A number of points of exposure would need to be examined in great detail prior to serious consideration of this option. A few items of concern include parochial attitudes among staff of long-standing, discrete programs, strongly held prerogatives of various constituencies relating to agencies, practical logistics of relocations/assignments, potential losses in program momentum, and political perceptions of relative balances of power and impact. Perhaps this option is best viewed as a long range alternative that is available should other options prove ineffective.

#### Work Plan for 1981 and Beyond

If the recommended option for program integration is adopted, it could be initiated shortly by an Executive Order with provision for periodic reassessment within some such period as five years.

Meanwhile, the IEPA and IDOC conducted, during the summer of 1981, a pilot effort in the Sangamon River Basin to coordinate field data collection for mutual purposes.

The IEPA will propose a comprehensive set of beneficial use designations for the Sangamon basin based upon existing and this newly-acquired data.

Consideration will be given to appropriate public participation activities and coordination with water quality standards revision. These would be reviewed in relation to program management implications.

During March to May of 1982, the Integration Work Group will draft the first "Annual Interagency Agreement for Water Management in Illinois".

Waiting until the spring of 1982 should provide sufficient time for substantive program changes at the federal level to be completed and available as input to the state level process. It should also be timely for providing feedback to the federal level ("bottoms up" planning) as the real operating characteristics of any restructured federal/state/local programs are defined. This first annual agreement will include project management specifications for continuation of the coordinated field data gathering and subsequent designation of water uses.

During June to September of 1982, agencies will conduct coordinated gathering of field data pursuant to agreed priorities.

During July of 1982, the first Annual Agreement will be formally adopted by the respective agency directors and the Governor. This formal agreement and the commitments contained therein will then serve as a framework for state agency budget preparations for FY 84. From October to November of 1982, Agencies will meet to assess impacts of the budget process and work out any program adjustments as necessary. In addition, the agencies will evaluate the next round of water use designations.

SUMMARY OF RECOMMENDATIONS FOR INTEGRATION OF WATER QUALITY AND QUANTITY  
MANAGEMENT

The Task Force Recommends:

- That there be a comprehensive integration of multiple programs, policies, and procedures with respect to water quality and quantity management, and that this process be institutionalized in the basic planning mechanisms of the participating agencies.
- That the program integration might be initiated by an Executive Order.
- That the integration result in a basin by basin interagency agreement with annual review on the beneficial water uses and their priorities for which the State is managing water resources.
- That the Executive Order, program integration, and management priorities be reassessed after five years.