

PLAN OF STUDY
ILLINOIS STATE WATER PLAN
MARCH 1981

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INTRODUCTION

This document is a Plan of Study (POS) which describes the need for an Illinois State Water Plan which is to be developed in 1981 and subsequent years. It will describe the Plan concept which has evolved and outlined the work plan, agency responsibilities, schedule, and budgets required to reach the Plan objectives.

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 a minimum of equal matching funds. Fiscal Year 1981 grant amount will be \$270,000.

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 of the following agencies:

- Department of Agriculture
- Bureau of the Budget
- Capital Development Board
- Department of Commerce and Community Affairs
- Department of Conservation
- Emergency Services and Disaster Agency

Institute of Natural Resources
Environmental Protection Agency
Department of Mines and Minerals
Office of the Governor
Department of Public Health
Department of Transportation/Division of Water Resources
Water Resources Center
Water Resources Commission

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 Task Force organized itself and began the process of identifying the nature of its task.

An early decision was that the Illinois Water Plan would not be a one-time effort, but instead, would be a dynamic process which can be updated annually. Thus, the Plan will address problems in some order of priority and current relevance. The product or Plan will guide and reflect current problems, 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, attention 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. The option was left open that an improved data repository and retrieval system may subsequently become important.

By a process of consensus the Task Force will assume responsibility for the Plan of Study and the Annual Work Plan. Minimal staff will be established for the plan development, and responsibilities for development of elements of the Plan will be 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. This is the present document which is intended to guide

activities in subsequent years and also form the basis for a grant application to support activities during the year 1981.

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 related to currently marginal programs or emerging issues which can be anticipated to lead to future problems or conflicts.

A preliminary list of significant issues was developed from agency nominations. These were considered by the Task Force in the light of several criteria. These were that issues to be considered must affect the entire state or a major portion of it. They must be of concern and involve the programs of two or more agencies, and they must be issues which require an initiative by the state.

By this process numerous suggestions were proposed, tested against the criteria, and either accepted, deferred, or rejected. What emerged was a preliminary list of 18 issues as follows, which are not shown in any priority order.

- Floodplain management
- Integration of water quality and quantity management
- Erosion and sediment control
- Recreational use
- Energy
- Navigation
- Urban competition
- Drought
- Planned weather modification
- Illinois water use law
- Irrigation
- Instream flow needs
- Regional competition
- Aquatic and riparian habitat degradation
- Atmospheric deposition and climatic change
- Conflict resolution mechanisms
- Water conservation
- Meaningful public participation

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 will 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 can 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 next summarized.

Public Forums

Responsibility for the public forums was assigned to the Water Resources Commission and the University of Illinois Water Resources Center--both of which are represented on the Task Force. Arrangements were made to have the first of these public forms 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. The results of these weighted ratings are given below.

Results of Public Forums

| <u>Issues</u> | <u>Weighted Rating of Importance</u> | <u>Rank</u> |
|---|--|-------------|
| Erosion and sediment control | 284 | 1 |
| Integration of water quality and quantity management | 271 | 2 |
| Water conservation | 215 | 3 |
| Floodplain management | 185 | 4 |
| Illinois water use law | 150 | 5 |
| Energy | 112 | 6 |
| Irrigation | 101 | 7 |
| Meaningful public participation | 97 | 8 |

| <u>Issues</u> | <u>Weighted Rating of Importance</u> | <u>Rank</u> |
|---|--|-------------|
| Urban competition | 94 | 9 |
| Conflict resolution mechanisms | 92 | 10 |
| Drought | 56 | 11 |
| Aquatic and riparian habitat degradation | 51 | 12 |
| Recreational use | 51 | 13 |
| Regional competition | 50 | 14 |
| Navigation | 27 | 15 |
| Instream flow needs | 25 | 16 |
| Atmospheric deposition and climatic change | 18 | 17 |
| Planned weather modification | 11 | 18 |

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 making of local decisions at the state level. 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, as reflected in the summary table above, that a number of issues are considered of low, current priority.

The local steering committees at DeKalb, Peoria, Carbondale, and Edwardsville have each met subsequent to the public forums. Minutes of their discussions are available and their suggestions have been considered in the preparation of the Plan of Study. The existing steering committees see the need for a similar group in the Chicago area, and believe such committees can and should provide local inputs into Water Plan decision making. Among numerous suggestions they also express a strong conviction that the Plan develop an integrated management structure.

Advisory Groups

A Federal Agency Advisory Group was established and held its first meeting on October 16, 1980. Minutes of that meeting are available which make clear 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 partially regrouped and are listed in an order which reflects both importance and sequence of consideration.

Case studies may be used in the Water Plan to illustrate inter-relationships among various issues.

Water Issues

1. Erosion and Sediment Control
2. Integration of Water Quality and Quantity Management
3. Water Conservation
4. Floodplain Management
 - (a) Regulatory Program
 - (b) Rural Flood Control
 - (c) Urban Stormwater Management
5. Competition for Water
 - (a) Irrigation
 - (b) Energy
 - (c) Instream Needs
 - (1) Navigation
 - (2) Water Quality
 - (3) Aquatic Organisms, Fish, and Wildlife
 - (d) Urban Uses
6. Aquatic and Riparian Habitat Degradation
7. Recreation
8. Atmospheric Controls
 - (a) Atmospheric Deposition and Climate Change
 - (b) Planned Weather Modification
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

WATER RESOURCES PROBLEMS AND

PROGRAMS UNDER THE PLAN OF STUDY

Introduction

During 1980 the Water Plan Task Force identified a preliminary list of 18 critical issues for incorporation in the Plan of Study. These issues were considered at five public forums and at meetings of two advisory groups. With the benefit of this advice the Task Force has formulated an amended and reorganized list of 10 issues in priority order and two cross-cutting topics which form the basis upon which it will proceed in the Plan of Study. These issues, which are identified by title only in the previous section, are elaborated in the present section. In general, these 12 topics are organized in the material which follows by an initial statement of the problem, followed by a summary of ongoing activities, and concluded with an outline of the Plan of Work for 1981 and subsequent years.

Water Issues

1. Erosion and Sedimentation

- Statement of the Problem - The problem of erosion which causes loss of the soil resources and productivity has been the subject of federal, state, local and private attention and programs for 45 years. Much remains to be done. More recently, and particularly under Section 208 of the Water Pollution Control Act Amendments of 1972, we have come to realize that sedimentation resulting from erosion is our greatest remaining source of water quality degradation. Recent studies have determined that over 8 million of Illinois' 23.8 million acres of cropland now suffer from serious water induced soil erosion. The judgment of the Task Force, strongly reinforced by public and outside advice, identifies erosion and sedimentation as the single most important water resources problem. The focus of the State Water Plan will be to address the complex interrelationship between soil erosion and water quality/quantity and to develop a soil erosion implementation strategy for priority areas.

- Ongoing Activities - Following the intensive study and planning efforts under Section 208, and prior to initiation of the State Water Plan, Illinois erosion and sedimentation and related water quality management programs were extensively reorganized and accelerated.

The 1980 Illinois Soil Erosion and Sedimentation Control Guidelines along with the 1979 Illinois Water Quality Management Plan Volume III have served as the focal points by which the state has 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 working in conjunction with private concerns and other units of local, state and national government.

Intermediate and long term statewide soil erosion control goals have been established. It is the policy of the state to meet those goals through a coordinated soil erosion and sediment control program which will conserve and protect our natural resources.

Space does not permit a detailed reporting of a series of current program activities directed toward improving program credibility and efficiency of implementation. These activities can be characterized as being directed toward (1) an adequate data base, (2) the transfer of such information, and (3) the implementation of control strategies for problem resolution.

- Work Plan - The State Water Plan will not replace the ongoing program or establish a parallel program for erosion and sedimentation. Instead, it will adopt the current program, coordinate related activities closely with it, and seek ways to accelerate ongoing activities. Specifically the Work Plan for 1981 is to:

- a. Continue to support the program of sediment transport and deposition observations by the INR State Water Survey.
- b. Develop a state level advisory committee to assist the IDOA, DNR in identifying priority soil erosion areas and provide a multi-disciplined approach to formulating soil erosion implementation strategies.
- c. Review and monitor the Rural Clean Water Program as it relates to a comprehensive evaluation of the effect of Best Management Practices (BMP's) on water quality.
- d. Initiate a comprehensive literature search on cost/effective application of BMP's.
- e. Initiate a comprehensive literature search to evaluate incentives for BMP application.
- f. In cooperation with other state and federal agencies evaluate the accuracy and usability of computer modeling techniques to identify tracts of land with high erosion potential.
- g. Promote land treatment projects through the Watershed Protection and Flood Prevention Act, Agricultural Conservation Practice (ACP), Special Projects, Rural Clean Water Program (RCWP), and Section 314 of Clean Lakes Act programs.

2. Integration of Water Quality and Quantity Management

- Statement of the Problem - Within recent years there has been a heightened recognition that water quality and water quantity management programs have developed along and follow largely separate paths. We have also come to realize that the two characteristics of water resources are so interrelated that efficiency requires that their management be integrated. In fact, there is a reasonable probability that these separated programs are at times at cross purposes.

Water quality management programs have been directed toward achieving state and national water quality goals. This has included control of point and non-point pollution, administration of construction grant funds, development of standards and institutional mechanisms, and program accountability.

Water quantity programs of measurement and development are directed toward such typical applications as navigation or for municipal, industrial, and agricultural water supplies including cooling and irrigation. For some of these applications raw water quality is satisfactory, while for other uses water can be treated to an adequate quality.

Water quality/quantity relationships involve hydrologic features such as groundwater and surface water including physical, chemical, and biological parameters. The relationships also involve programmatic applications of water use and disposal. The relationships are numerous, but perhaps can be illustrated by a few examples. Withdrawal of groundwater from a shallow aquifer may reduce the low flow of a stream and result in higher concentrations of dissolved chemicals. Navigation, which is primarily concerned with the quantity of instream flow, may cause the suspension of bottom materials and degrade water quality. On the other hand, water quality restrictions on the discharge of cooling water to streams and lakes lead to closed-cycle cooling, greater water consumption, and reduced quantity of stream flow. Many other examples could be cited.

-Ongoing Activities - The integration of water quality and quantity has not been addressed formally or comprehensively. However, there are probably examples where current awareness of the relationships have influenced program decisions. Research is beginning to be funded in this area, and considerable progress has been made toward the integration of quality and quantity observation programs.

-Work Plan - No known precedent is available to guide an approach to comprehensive consideration of water quality/quantity management. Thus 1981 will be devoted to an identification and analysis of the hydrologic and programmatic circumstances where such interactions potentially exist. In the following year, 1982, water management objectives and existing program decision processes will be examined to develop considerations and constraints which need to be built into the water management processes in Illinois. The first year of activity will also identify those areas where water quality/quantity relationships are inadequately understood and further study is required.

It is likely that under this and other topics case studies will be used to illustrate interrelations, trade-offs, and potential solutions to problems.

3. Water Conservation

-Statement of the Problem - The historical attitude toward water conservation has been one of indifference on the part of the public and governmental agencies. There is evidence, however, that this attitude is changing and that we may be entering a decade of conservation.

Attention to conservation has become a federal policy and this has resulted in changed attitudes and programs. It has resulted in the requirement of various agencies that conservation be considered as an option to development to qualify for federal funding. The new perception is evident in the Illinois public as well, and at the public forums conducted under the Water Plan, conservation was rated third in importance among 18 issues.

It is a present reality that new developments are expensive and are often delayed by environmental considerations. Other factors which incline decision making to conservation are the cost of energy and the overdevelopment of existing water sources in northeastern Illinois and in scattered other locations.

Another aspect of the problem is the limitation of state authority under present Illinois law. Such authority to require conservation is limited to Lake Michigan water and a few other locations where the state has created or purchased reservoir storage.

-Ongoing Activities - During the past two years the Department of Commerce and Community Affairs and the University Water Resources Center each have conducted local or regional workshops to increase awareness and to communicate water conservation technology.

-Work Plan - It is proposed that the State develop and implement a program of technical assistance in water conservation and improved water system management during 1981. It is believed that sufficient technology exists from research, demonstration, and implementation in Illinois and in the U.S. to do this. The principal thrust of the program will be a voluntary and educational one with the municipalities.

Attention will be given also to industries which are large water users. It is recognized that many industries are unique in their water requirements and also that many industries have already achieved considerable water conservation. However, studies will be carried out on the economic and hydrologic impacts of modified water withdrawal and consumptive uses.

Two additional elements of the 1981 Work Plan will be to consider (1) inclusion of conservation elements in the Illinois Plumbing Code and (2) the standards used for state-funded building construction by the Capital Development Board.

4. Floodplain Management

Flood damages have increased over time despite the years of state and federal effort and hundreds of millions of dollars spent on flood control works. Urban development in floodprone areas have simply outpaced damage reduction measures, and only a part of existing damages can be reduced economically. Obviously, floodplain regulation and flood insurance programs, both urban and rural, must be prerequisite to and synchronized with project planning.

(a) Regulatory Program

-Statement of the Problem - Floods cause \$300 million in urban damages and \$50 million in rural damages, annually. In 1975, a multi-agency task force recommended policies and procedures for addressing the problem in a "Report on Flood Control in Illinois".

The floodplain management program consists of traditional structural measures and of non-structural measures including: statewide regulation of construction in watercourses; regulation of construction in floodplains, when defined by formal processes (6 basins so far); flood insurance technical assistance; and disaster assistance.

Despite the adoption of an excellent Illinois program following from the 1975 report, flooding damages continue to accelerate.

-Ongoing Program - The floodplain regulatory program continues to be administered by the Division of Water Resources with hydrologic/hydraulic and data repository functions being carried out by the State Water Survey. It is the conviction of those involved that the program is falling further behind actual and potential flood experience.

-Work Plan - The Task Force will review the regulatory program during 1981 to determine the causes of inadequate progress. Elements of this review may include:

1. Determine a desirable level of funding.
2. Determine whether inadequate enforcement of floodplain and watercourse construction is taking place.
3. Find the means to end federally funded floodplain encroachment.
4. Quantify the natural values along streams and lakes and assure there are adequate legislation and programs to protect these values.
5. Insure that state facilities or state-supported facilities are not constructed in floodplain areas.

(b) Rural Flood Control

-Statement of the Problem - Rural flood damages are estimated to total over \$50 million annually in Illinois. This includes the losses in agricultural income due to flood damages of products, facilities, transportation, and soil and land improvements. It also includes the flood damages occurring in small, rural communities.

Little or no progress appears to be occurring to reduce rural flooding losses. The small watershed program has come to a virtual halt in the state. There are some 1,000 miles of agricultural levees built without much consideration for resultant flood stage increases in other locations.

-Ongoing Program - Traditional approaches to rural flood control are proceeding at a slow pace and therefore the benefits of these approaches are not being realized.

-Work Plan - The area of rural flood control needs a thorough re-evaluation leading to initiatives which will reduce the present high annual damages. The evaluation will need to consider commodity prices, production costs, and taxes as these apply to farming flood-prone rural lands. Facilities in place need to be surveyed, and a program of structural and nonstructural measures devised for the economical reduction of damages. During 1981 a detailed, multi-agency work plan will be developed and agreed upon.

(c) Urban Stormwater Management

-Statement of the Problem - It is estimated that average flood damages to urban areas in Illinois exceed \$300 million per year. Flood damages occur in more than 700 municipalities and numerous unincorporated urban areas.

Increasing urbanization throughout the state has led to a corresponding increase in stormwater runoff and often to increased stormwater induced property damages. Existing design procedures vary among municipalities and counties and often lead to locally expedient solutions which are detrimental to downstream areas. Responsibilities for improper drainage have become fractionalized and in many cases the affected citizens are left with neither answers nor solutions to their problems. In addition, the effects of future upstream developments are frequently not considered in the design of local systems. Sophisticated management systems in the Chicago area require better input information to anticipate events so as to optimize operations.

Management of urban stormwater has been largely the responsibility of landowners, developers, and local government. The role of the state has been small.

-Ongoing Program - The subject of flood hazard mitigation is undergoing intense evaluation on the national level. Much of this attention is being focused on urban damages.

Here in Illinois an initial test has been conducted in the Chicago area during two months which has suggested the value to urban stormwater management of highly accurate, short-range, rainfall forecasts and near real time information on observed rainfall.

-Work Plan - It is clear that the national assessment will lead to an increased role for the states in flood hazard mitigation. Even without assuming direct responsibility there is much that the State of Illinois can do. The rain prediction system for the Chicago metropolitan area needs a major demonstration to produce a full measure of value to diverse urban and suburban institutions. During 1981 a detailed plan will be adopted which includes hydrologic and programmatic guidelines for the municipalities of design procedures which are efficient and effective and do not adversely affect downstream areas. An example of this is stormwater detention basins. Institutional solutions for bridging local and regional barriers need study.

5. Competition for Water

(a) Irrigation

-Statement of the Problem - In 1979, about 125,000 acres of cropland were irrigated in Illinois. Historically, Illinois has increased its irrigated acres by around 15 percent annually. Although this is insignificant in terms of total crop acreage (<.5%), there are signs that irrigation could eventually become a major consumptive water user. Therefore, it has the potential for creating huge supply deficits, especially during critical drought periods.

-Work Plan - The issue to be addressed by the State Water Plan Task Force will be to assess the potential for future expansion of irrigation in Illinois and how this will compete with other demands for our water resources. The other major issue is the capacity of current surface and subsurface water supplies to meet current and future water demands as well as the potential for developing new supplies in the context of climate variability.

During 1981 irrigation activities will include meeting with irrigation interests to receive more detailed input for developing an implementation and assistance strategy. Having developed the overall strategy, which it is anticipated will include soils, crops, water sources and use, climate, and economic relations, a start will be made on accumulating the data necessary to define potentially suitable areas and to predict the rate and geographical distribution of expanded use.

Eventual activities beyond the first two years will be a consideration of the statutes with respect to the meeting of irrigation requirements. Also required will be water quality/quantity considerations, and possibly, conflict resolution.

(b) Energy

-Statement of the Problem - National energy policy to achieve energy independence will stimulate development of energy sources requiring major allocation of water in competition with industrial, agricultural, municipal, and aquatic habitat needs. The State Water Plan must anticipate the location, magnitude, and impacts of energy development, etc. Water constraints must become an integral part of State and federal energy policy. The following aspects must be addressed as a minimum:

1. Development of synthetic fuels could involve several major plants with water use at each reaching a possible 30 billion gallons per year. Water quality and habitat are affected by withdrawals and by-product disposal, and must be considered in plant siting.

2. Evaluate hydrogeologic effects of surface and deep coal mines on long-term water supply. State promotion of coal development must be cognizant of the direct effects of mining on water supply. Site-by-site analysis is inadequate to address the total impact on the State. Extensive data collection must precede analysis of spoil, dewatering, washing, and impacts on groundwater supplies.

3. Economics and environmental conflicts must be assessed with regard to coal transportation by barge or slurry pipeline. Accurate assessment of coal demand, coal supply, and water availability must precede establishment of mining goals.

4. Evaluate hydropower potential and effects on instream flow needs. Economic and environmental tradeoffs between developing new sites and retrofitting old sites must be evaluated and policies established.

-Work plan - In the first year it is planned to initiate a resource and technology assessment for synthetic fuel development and use. This study involving water resources availability is aimed at the energy-related problem which has the greatest potential to lead to water conflicts.

(c) Instream Needs

-Statement of the Problem - State, local and corporate water use planning often presumes that all water in a stream is potentially available for off-stream uses. This assumption clearly contradicts legislative mandates regarding the public

interest in preserving water in the stream for (1) navigation, (2) water quality and (3) aquatic organisms, fish and wildlife.

1. Navigation - In its location with respect to the Mississippi, Ohio, Illinois, and Kaskaskia Rivers, and Lake Michigan, commercial navigation is clearly of great importance to Illinois.

Instream flow requirements for commercial navigation are fortunately limited to lockage, since the waterways are essentially canalized and water levels are supported by a system of dams. Recreational navigation, however, includes the use of a variety of smaller streams which can be thought of as having an instream flow need.

2. Water Quality - Water quality is dependent upon the quantity of flow available for dilution, and the design of waste treatment facilities is conditioned upon the amount of receiving water. Under an earlier issue the subject of integration of quality and quantity is elaborated.

3. Aquatic Organisms, Fish and Wildlife - Thinking has only recently evolved to recognize that the needs of aquatic organisms must be known and integrated into the process of allocation of existing or potential water resources.

Instream flow analysis methodologies have been largely developed in the West and must be tested for applicability to Illinois streams and modified as necessary.

Data on the variability of flow regimes in the 18 major watersheds of the State is lacking.

The critical flow needs of the various species of aquatic organisms which inhabit Illinois streams and the riparian vegetation, which depends upon various flows for survival, need to be determined before flow reservation plans can be developed.

-Work Plan - Among the several categories of instream flow needs, the one most urgent for evaluation is that relating to aquatic organisms. Fortunately the process of evaluating such needs has begun during the past year. It will be accelerated during 1981. The work can be characterized by the following three steps:

a. Carry out sufficient research to develop information on the instream flow requirements of target species of aquatic organisms in the State's 18 major river basins.

b. Develop and modify species habitat preference curves to reflect data from fish and invertebrate collection in Illinois streams.

c. Develop sufficiently detailed information on the yearly distribution of flow to enable the determination of the impact of distribution on associated aquatic life forms.

(d) Urban Uses

-Statement of the Problem - Urban use and competition for limited water resources is most evident in northeastern Illinois. In that region Lake Michigan affords a seemingly endless water supply source for the Chicago Metropolitan area. This diversion was frozen by a U. S. Supreme Court decision in 1967 at 3,200 cfs (2,068 MGD). Many suburban communities and industries still obtain well supplies from the deep (Cambrian-Ordovician) aquifer. The current withdrawal of 150 MGD is three times faster than natural recharge. At least 100 MGD of deep aquifer extraction must be transferred to new water supply sources quickly. The Plan must address alternative institutional mechanisms to promote or accomplish this transfer.

Many communities have developed water supply reservoirs at considerable distance upstream from a town and have used existing watercourses to transmit their releases to the treatment and distribution systems. The problem with this transmission method is that the water user must either acquire flowage easements, increasing the cost of water, or run the risk that someone else between the source and the user will divert and use the water. The Plan should investigate alternative mechanisms for protection of instream transmission.

-Work Plan - The state will develop a program with municipalities, particularly in the Chicago region, to aid them in establishing improved management including water conservation, and alternate sources where needed.

Also to be continued during 1981 will be the inventory and evaluation presently underway of water supplies for problem communities throughout the state as these relate to urban and regional uses and competition.

6. Aquatic and Riparian Habitat Degradation

-Statement of the Problem - Aquatic environments can be placed into three broad categories--streams, impoundments and wetlands. Illinois has more than 900 streams covering over 13,200 miles and 83,365 impoundments containing 1,273,909 acres. There has been no recent assessment of the magnitude of wetland environments remaining in Illinois, so acreage and numbers cannot be specified. Each of these resources have unique characteristics; however, all three types share the common problems of loss of water volume through sedimentation and degradation of water quality in influxes of organic and inorganic pollutants. Stream environments continue to be modified through canalization, substrate mining, and removal of streamside vegetation and by inundation. Impoundments are degraded by overdevelopment of shoreline, nutrient-accelerated eutrophication, excessive artificial beach development, and siltation. Wetlands are lost through draining and by utilizing them as land fills. All of these forces act to both decrease

species diversity and the compatibility of Illinois waters and their adjacent lands as quality environments for water-dependent organisms.

Efforts to protect and manage Illinois' aquatic habitats are constrained by the following obstacles:

a. While the number of impoundments is known, and the IEPA has already collected some physical and chemical information, additional data is needed to facilitate development of effective management techniques to address existing problems.

b. Although information on the water quality of some streams has been gathered for the past 15 years and occurrence records for fish, mussels and other aquatic life for approximately one half of the State's streams exists, land use information for the watershed of each stream, the extent of man's impacts on stream environments and the miles and acreage of riparian vegetation which still exists along the State's stream corridors has never been assessed.

c. Optimum flow condition for many of Illinois' stream-dwelling organisms and recreational and commercial users are unknown, making the establishment of minimum flow guidelines difficult.

d. The lack of an organized body of information on Illinois' wetland resources, including backwater and oxbow lakes seriously limits State attempts at wetland classification, protection, and management.

e. No State agency has been designated responsibility for the protection of wetlands and natural stream environments and their associated riparian lands.

f. Mechanisms are lacking in many instances to mediate conflicting water uses, and there is no clear State policy on the value and protection of healthy aquatic habitats.

g. There is an unclear State mandate and inadequate mechanisms to insure equal consideration of environmental factors in water use and development planning and permitting.

h. There are insufficient funding sources and mechanisms at both the state and local levels to finance rehabilitation of degraded aquatic environments.

-Work Plan - A long-range program has been designed which, over a period of years, will carry out the following steps:

a. Examine existing programs, institutional frameworks, and statutory authorities which affect the protection and management of riparian and aquatic environments in Illinois and recommend needed policy and improved strategies for overcoming the previously identified obstacles.

b. Carry out comprehensive, computer-based inventories of the present physical, chemical and biological characteristics of both Illinois stream and wetland environments, incorporating the work already begun by IEPA and including the collection of data on shoreline vegetation, urban encroachment and intrusions by man. Classify each type of environment and make recommendations for its protection and management.

c. Complete an analysis of gross land use in the watersheds of Illinois' more than 900 streams and develop recommendations for the management of each based upon watershed characteristics.

d. Carry out appropriate research to determine the best management practices for lake watershed management, in situ lake management, lake outflow water quality and quantity management, recovery and re-use of sediments, and techniques for the reservation of future impoundment sites and site feasibility analysis parameters.

e. Through legislation, executive order, or both, designate lead agency responsibility for the protection of wetlands, stream corridors and impoundments, and develop: a unified State policy on the protection of Illinois' aquatic habitats, State environmental guidelines for water resource development projects, and procedures to insure interagency coordination.

Activities proposed for 1981 are a detailed ~~total program~~ assessment leading to a final report. Other activities will include inventories of the streams, wetlands, instream flow needs and watershed land use.

7. Recreation

-Statement of the Problem - The opportunity to participate in outdoor recreation is a basic right of Illinois citizens. However, neither sufficient land nor water exists to satisfy the demand for outdoor recreation opportunities. There are many reasons for this supply-participation imbalance. For water-based recreation, they include: insufficient available surface water in the quantity, location and quality desired by recreators; extensive physical and chemical degradation of the aquatic environment; and the lack of properly located access.

Stream channel modification and floodplain encroachment have destroyed and continue to threaten large portions of the State's finest natural and recreationally significant stream corridors. No agency is designated by Illinois law to protect the State's recreationally significant streams, lakes, and wetlands.

A balanced program, based on an analysis of deficits, to acquire important aquatic areas, restore deteriorated aquatic environments, develop recreation facilities and institute needed controls is necessary if Illinois is to adequately address this situation.

Illinois' 1977 Statewide Comprehensive Outdoor Recreation Plan (SCORP) adopted the following five state policy objectives:

1. To provide recreation opportunities for all Illinois' citizens.
2. To preserve and enhance the environment, both natural and man-made.
3. To provide public outdoor recreation programs and opportunities which are as non-competitive with the private sector as possible.
4. To educate our citizens to internalize a conservation ethic in their environmental decision making.
5. To identify the institutional framework needed to insure that state recreational goals and objectives are achieved.

The plan identifies 32 additional policies specifically related to water-based recreation and the aquatic environment.

-Work Plan - The 1977 Statewide Comprehensive Outdoor Recreation Plan (SCORP) formulated aquatic management objectives consisting of: (1) support to local governments for sound shoreline management, (2) statutory protection to lakes and streams, (3) preservation of lake sites with prime outdoor recreation potential, (4) cost-sharing in recreational development at multiple-purpose reservoirs, (5) land treatment, (6) clarification of public access rights to streams.

The Illinois Historic Preservation Plan identifies water-related cultural sites requiring preservation as well as land sites requiring protection against water management activities, such as levees, impoundments, and floodplain encroachment.

These recent evaluations and plans become the long-term plan for water-based recreation under the State Water Plan.

During 1981 it is intended to conduct a comprehensive program assessment of existing State and Federal Programs that effect the recreational use of water. Program assessment reports will also be completed for a streams inventory, a legal study related to access, a user needs study, a conflict analysis, a Lake Michigan study, and a study of urban waterfronts.

8. Atmospheric Controls

(a) Atmospheric Deposition and Climate Change

-Statement of the Problem - Natural and man-made climate changes are taking place which affect the quality and quantity of our water resources.

One particular area of concern is the material being deposited on the surface of Illinois including acid rainfall. The sources, transport, transformation, and deposition of pollutants, plus their impacts on the water resources of Illinois represent a major unknown. Changes in temperature and precipitation, due partly to industrial activities, large cities, and jet aircraft are producing local and regional changes in climate although the future magnitude and trends are uncertain. The ability to detect climate trends and to predict trends up to five years in advance present an opportunity to adjust water resources planning and avoid later operational problems.

Obstacles to progress relate to the lack of data and research to document the reality, magnitude and impacts of these changes, to identify man's influence for management strategies, and to evolve climate predictions. Information about existing capabilities is not flowing to the user community.

-Ongoing Program - Illinois has maintained an active program of research on natural and man-made climatic change with federal support over a period of years. In addition the Illinois State Water Survey operates the Central Analytical Laboratory where wet and dry fallout samples from throughout the United States are analyzed.

-Work Plan - Atmospheric deposition and climate change are potentially of substantial importance to the management of Illinois water resources. However, at the present the processes are not sufficiently understood to determine spatial and temporal variability or to form the basis for climate prediction. Therefore, the Plan of Study will maintain this subject in a research mode with non-planning support from state and federal sources. The approach to solving the problems would include: installation of an atmospheric deposition network across Illinois (to describe the time and space variations of pollutant deposition over a period of years); the identification of the impact on the waters of Illinois of altered climate and atmospheric pollutants; study of the trends and variations of temperature and precipitation and other important weather variabilities; and concentrated statistical research to improve evolving capabilities to predict climate trends.

(b) Planned Weather Modification

-Nature of the Problem - Planned enhancement of precipitation is one emerging technology for increasing water supplies of Illinois, but it is still fraught with scientific and social uncertainties. Research has been adequate to illustrate that if it could be done, sizable economic and environmental benefits would accrue in most years but not in severe droughts or in extreme wet periods.

-Ongoing Programs - Illinois farmers and agribusinesses have spent \$0.5 million in the past 4 summers to support cloud seeding projects to increase rainfall. These operational projects are largely unevaluated as to their effectiveness.

At the same time the state with major federal support has conducted both theoretical studies and large field experiments to develop the base of knowledge for eventual implementation if weather modification proves feasible.

-Work Plan - Weather modification, and particularly cloud seeding for rainfall increases, is potentially of great importance to the management and increase of our water resources. At the present time uncertainties are too great for adoption and implementation of a major statewide operational program. Therefore, a program of research and experimentation will be encouraged with state and federal funding outside of the planning process.

On one hand is the need to perform the complex scientific research required to prove whether and how precipitation can be increased and by how much, in various seasons. This calls for a major national experiment partially launched in 1980 as a 4-state effort (Illinois, Indiana, Michigan and Ohio) with federal funding. This effort will need multi-million dollar support for up to 10 years. At this time the effect of various cloud seeding materials on the state's rain and surface water quality is unknown and needs resolution.

The other major issue of concern is the evolution of the ongoing and future cloud seeding projects. These are not experimental in nature and based on the user's belief that seeding will increase rain, ignoring the possibilities it might do nothing or even decrease rain. These locally supported projects represent both institutional and scientific opportunities and create issues for the state to address. Such projects are now regulated by a model state law, a wise early state decision. Supporters of cloud seeding are now calling for joint state and/or local tax support of projects. This could evolve into state costs of \$1 million annually.

These operational projects need to be evaluated as to their likely changes in rainfall, a difficult but important task that can inform the supporter and the state as to its general effectiveness, as well as providing useful scientific information. In addition to the results of the evolving major experiment, operational projects, if properly instrumented with certain weather equipment, in a piggyback approach, could provide considerable useful scientific information as to the approach and utility of cloud seeding.

9. Drought Contingency Planning

-Statement of the Problem - The occasional severe

droughts that occur in Illinois bring a series of predictable and repeatable problems. These include insufficient water supplies in selected communities, difficult institutional reactions to drought relief and advice, questions over use of weather modification, and water management decisions relating to the onset, severity, duration, and ending of the drought. There is a lack of local planning to avoid drought impacts as well as to deal with drought-induced shortages.

-Ongoing Activities - The state is well along in a program to identify those communities whose water supply capability is at risk during drought periods. This is being accomplished for both surface and groundwater sources and will also identify whether potential deficiencies are resource related or facility related. This program is also updating the State Water Survey Bulletin 51 of 1964 on "Low Flows of Illinois Streams for Impounding Reservoir Design."

Promising climatological research is underway at both the state and national level which hopefully will lead to the ability to predict in advance the onset, severity and duration of droughts. This will make it possible to anticipate and initiate contingency planning which will mitigate the effects of droughts.

-Work Plan - During 1981 it is planned to complete the ongoing activities of resource and facility adequacy which will set the stage for the following year in which contingency plans including institutional responses will be developed with each of the identified communities.

Every encouragement will be given to climatological research on drought forecasting by agencies at the state and federal levels.

10. Illinois Water Use Law

-Statement of the Problem - Water use rights derive primarily from state law. In Illinois, we have an uncodified collection of court decisions and statutes which define some of the rights and duties.

Court decisions have dealt mostly with water shortages affecting individual landowners along a watercourse. This part of common law is considered well settled and is called the "reasonable use doctrine" of riparian rights. A person who owns land along a watercourse has a right to use the water for his own benefit on his own land as an incident of ownership. His use is limited by an equal right of all other riparian landowners. None may use more than a reasonable share in time of shortage.

Cities and villages are rarely riparian landowners. Their rights to obtain public water supply come from legislative grant. Statutes now provide public water supply rights and powers to local governments, special districts, and regulated utilities.

The main defect in Illinois water use law is apparent. There is no means to prevent water shortages from occurring. Instead, every water user's needs are clouded by uncertainty. New users can tap a source until the supply is inadequate for all. Court allocation will only share the shortage, which is hardly a solution.

Government programs concerned with water supply do not control energy siting decisions.

No protection presently exists in law for a community which responsibly develops its water supply at an economically and environmentally optimum site--remote from its intake facilities.

Under the present law the state is limited in many ways in carrying out desirable water management.

-Ongoing Programs - At the present time there seems to be little expressed interest or activity leading to modification of existing water laws.

-Work Plan - Revision of existing water law will not be an early objective of the State Water Plan. It will remain an active discussion topic and tested against the various programs and issues which merge. Perhaps at some future time legislation will be proposed, and the timing of this is likely to be related to unusual weather events such as a drought.

Cross-Cutting Topics

Conflict Resolution

This topic is not an issue in the sense of those previously identified and discussed. Rather it is a subject for continuing attention as the Water Plan is developed.

-Statement of Problem - Illinois has been remarkably free of water conflicts in the past. This can be attributed generally to the ample water resources. Conflicts which have arisen have been resolved under existing laws and programs by public works to increase supplies, by accommodation between the parties at issue, and in rare cases, by the courts.

This circumstance of absence of conflict cannot necessarily be expected to continue. Water withdrawal in the State is now in

the same order of magnitude as average supply. This can be expected to lead to conflicts during times of limited supplies. Possible conflicts may involve traditional uses and could certainly involve the growing irrigation use or the location in Illinois of a coal conversion plant.

Conflicts which can be anticipated could be within or between the following levels of government:

- local
- local vs another local
- local vs state
- local vs. federal
- state agency vs state agency
- state vs federal
- interstate (i.e., Indiana)

In addition there could be regional conflicts or differences involving various private industries or interest groups.

-Ongoing Activities - It is probably fair to say that little attention is currently being directed to methods of conflict resolution in the field of water resources.

Meaningful Public Participation

-Statement of the Problem - A significant new facet of the administration of water resource related programs is the increasing emphasis on direct public participation in the planning processes associated with these programs. There seems to be growing recognition of the usefulness to both decision-makers and "publics" of two-way communication supported by timely information/education activities. However, it is also apparent that the concept of "public participation" means different things to different people and agencies. Most of the agencies associated with the Task Force have developed program specific approaches to public participation/education which may or may not blend well together for the ongoing process of water management in Illinois. The crux of this cross-cutting issue is not the effectiveness or appropriateness of any particular independent activity, but rather how these many efforts interrelate within the context of a matrix of programmatic activities for water management.

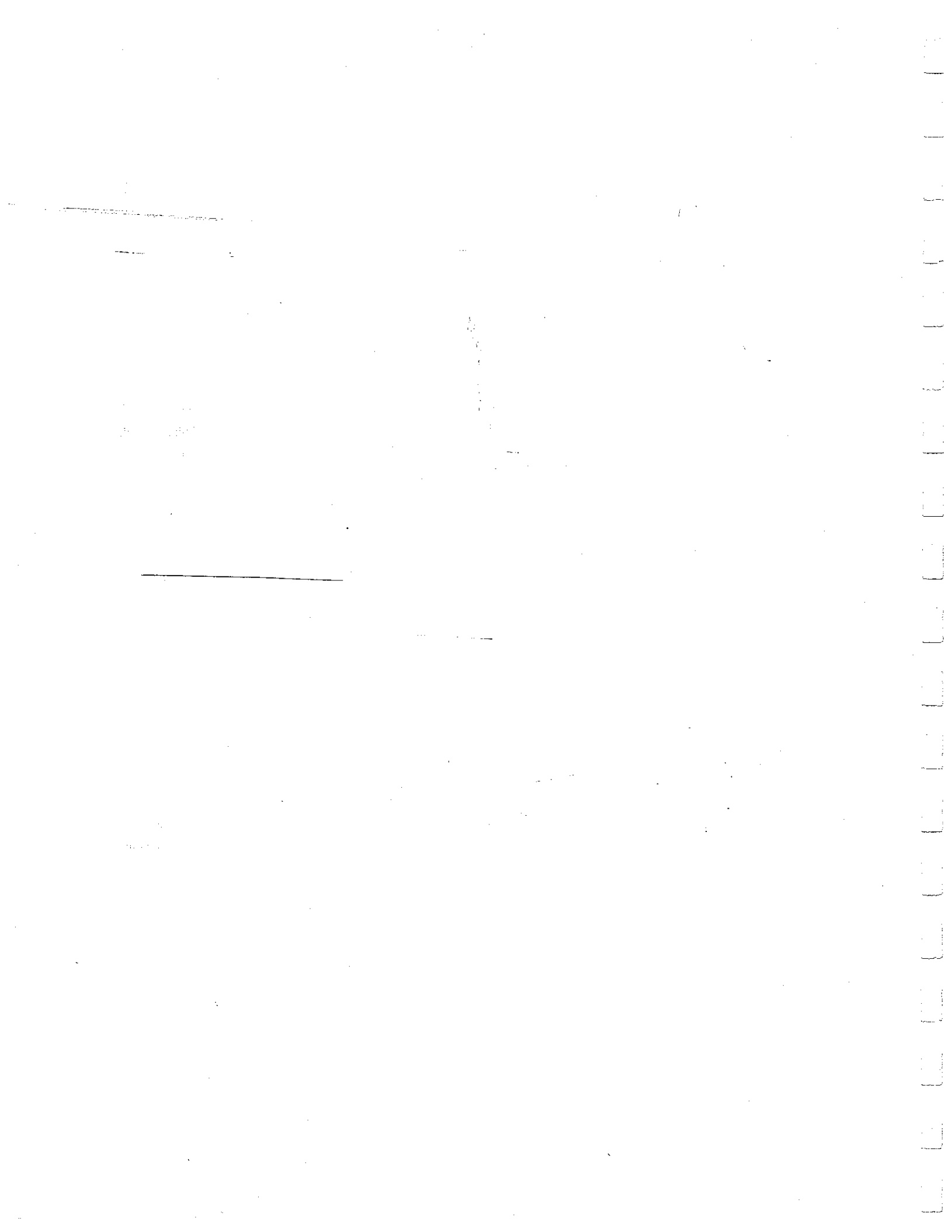
-Ongoing Activities - As has been mentioned, most agencies have some type of public participation/education program. Typical mechanisms include special advisory groups, newsletters, public notices and hearings, and various technical and general reports. Historically, regulatory agencies have used somewhat different approaches than service agencies and probably focused on different "publics". Apart from the direct line activities of the administrative agencies, lies the Water

Resources Commission which serves as a focal point for legislative involvement in water management. Another supportive role is played by the Water Resources Center which serves to tie the academic community into state water management activities.

-Work Plan - During 1981 it is planned to establish an interagency work group composed of key "public participation" staff from the agencies represented on the Task Force. In general, this group will be focusing on interrelated aspects of involving the public at selected points in the planning process prior to key decision-making activities. The Department of Commerce and Community Affairs (DCCA) will chair this work group. The Water Resources Commission and the Water Resources Center will serve in key roles as points of liaison with the General Assembly and the academic community. Special attention will be given to the use of readily available mechanisms within existing programs for enhancing and coordinating the communications process for water management in Illinois. This may involve consideration of multiple "publics", identification of public values and needs, assessment of levels of interest, and facilitation of communication and involvement. A specific assignment will involve development of the detailed public participation program to be implemented during the development of the State Water Plan.

The two advisory groups established during the Plan of Study phase will be continued, and the local steering committees will serve as regional advisory committees. The Water Resources Center will continue to serve as the liaison with these regional committees.

DIVISION OF RESPONSIBILITY FOR PLAN DEVELOPMENT



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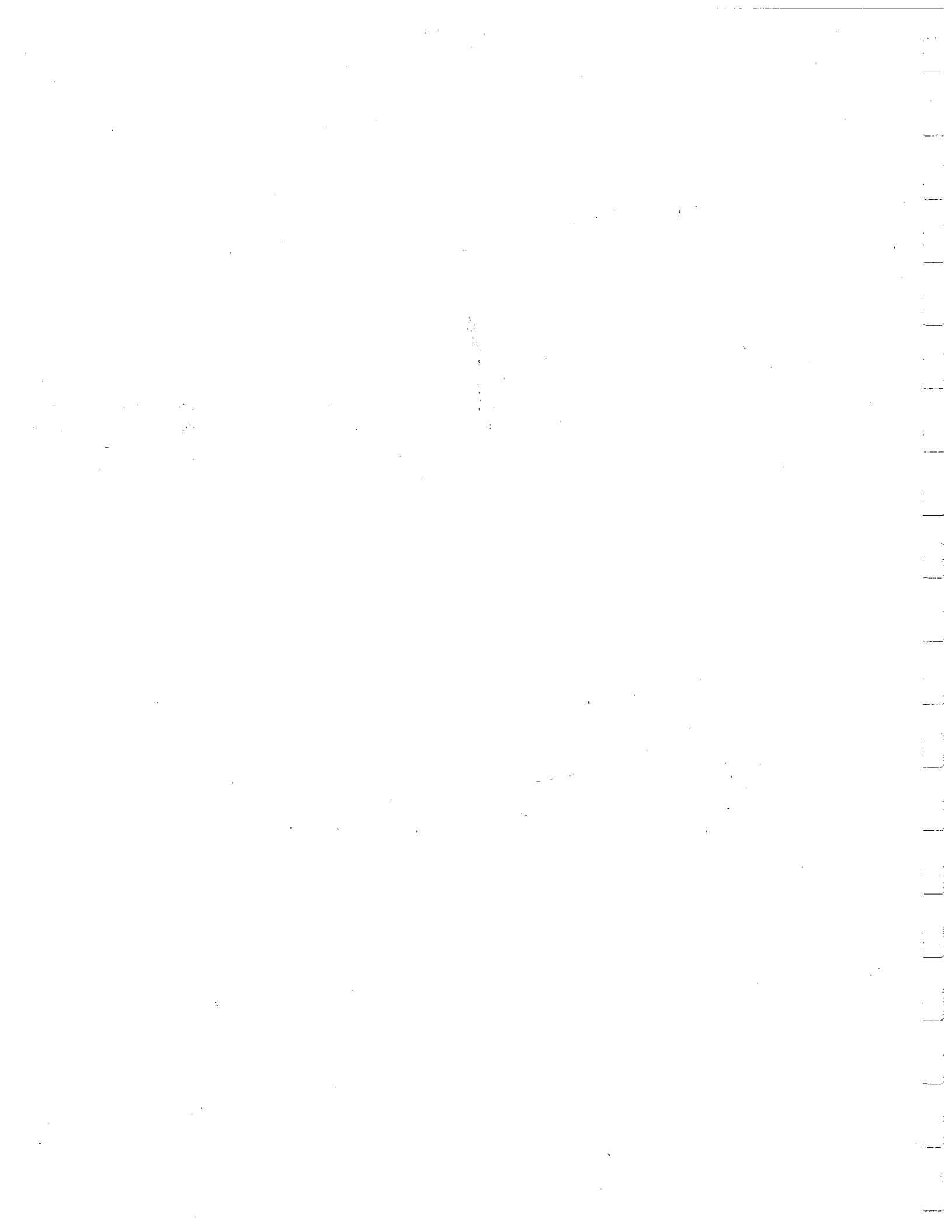
| Issue | Lead Agency | Support |
|---|-------------|---------------------|
| 1. Erosion & Sediment Control | IDA | INR, IEPA, IWRC |
| 2. Integration of Water Quality and Quantity Management | IEPA | DWR, INR |
| 3. Water Conservation | DCCA | WRC, CDB, IDPH, DWR |
| 4. Floodplain Management | DWR/IDA | |
| (a) Regulatory Program | DWR | |
| (b) Rural Flood Control | IDA | |
| (c) Urban Stormwater Mgmt. | INR | DWR |
| 5. Competition for Water | OG | INR |
| (a) Irrigation | IDA | INR, DWR, WRC |
| (b) Energy | INR | |
| (c) Instream Needs | DWR | DOC, IEPA |
| (d) Urban Uses | DWR | |
| 6. Aquatic & Riparian Habitat Degradation | DOC | INR |
| 7. Recreation | DOC | |
| 8. Atmospheric Controls | INR | |
| 9. Drought Contingency Planning | DCCA | INR, ESDA |
| 10. Illinois Water Use Law | DWR | IWRC |

CROSS-CUTTING TOPICS

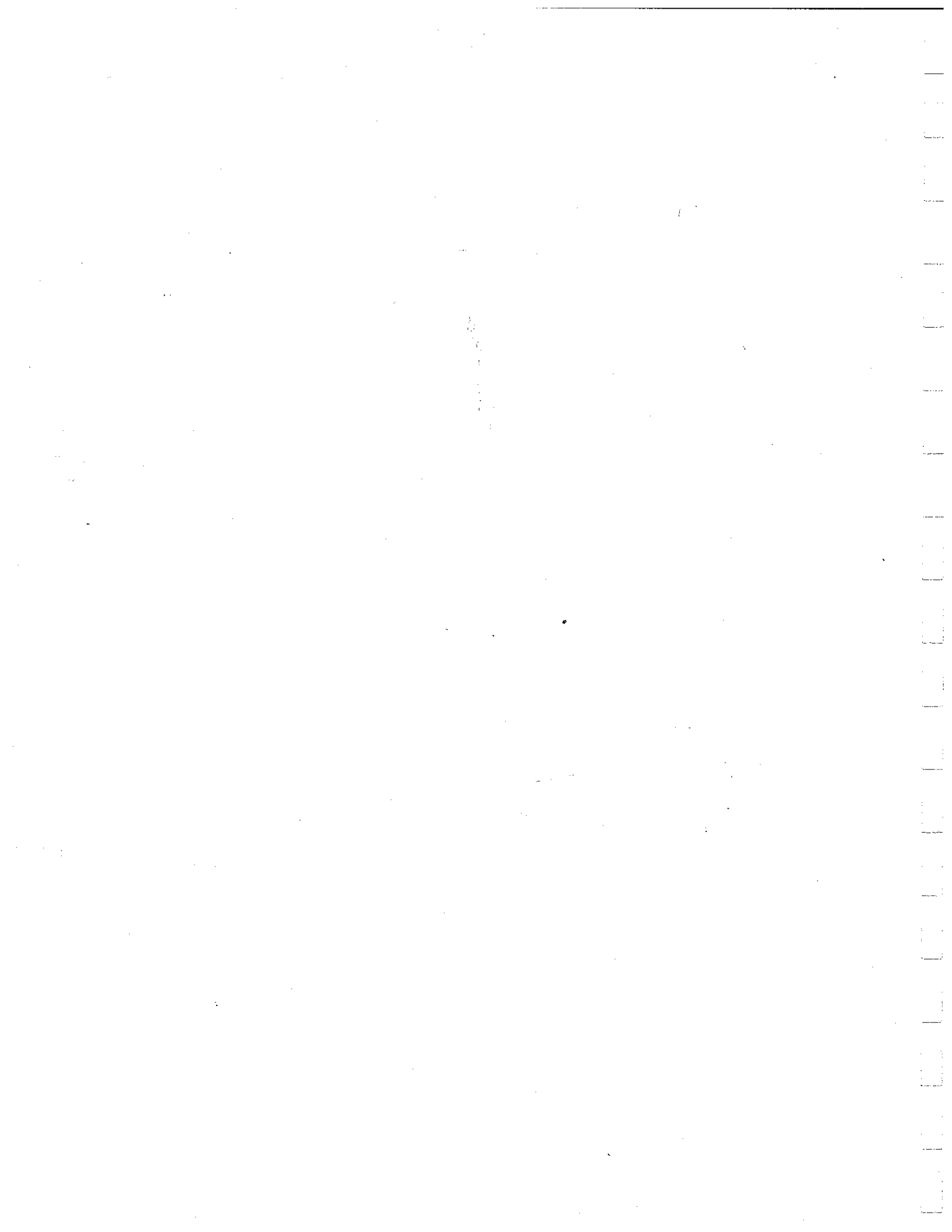
| | | |
|---------------------------------|------|---------------------|
| Conflict Resolution | OG | Task Force Agencies |
| Meaningful Public Participation | DCCA | Task Force Agencies |

Key

| | |
|------|--|
| IDA | Illinois Department of Agriculture |
| CDB | Capital Development Board |
| DCCA | Department of Commerce and Community Affairs |
| DOC | Department of Conservation |
| ESDA | Emergency Services and Disaster Agency |
| INR | Institute of Natural Resources |
| IEPA | Illinois Environmental Protection Agency |
| DMM | Department of Mines and Minerals |
| OG | Office of the Governor |
| IDPH | Department of Public Health |
| DWR | Department of Transportation/Division of Water Resources |
| WRC | Water Resources Center |
| IWRC | Illinois Water Resources Commission |



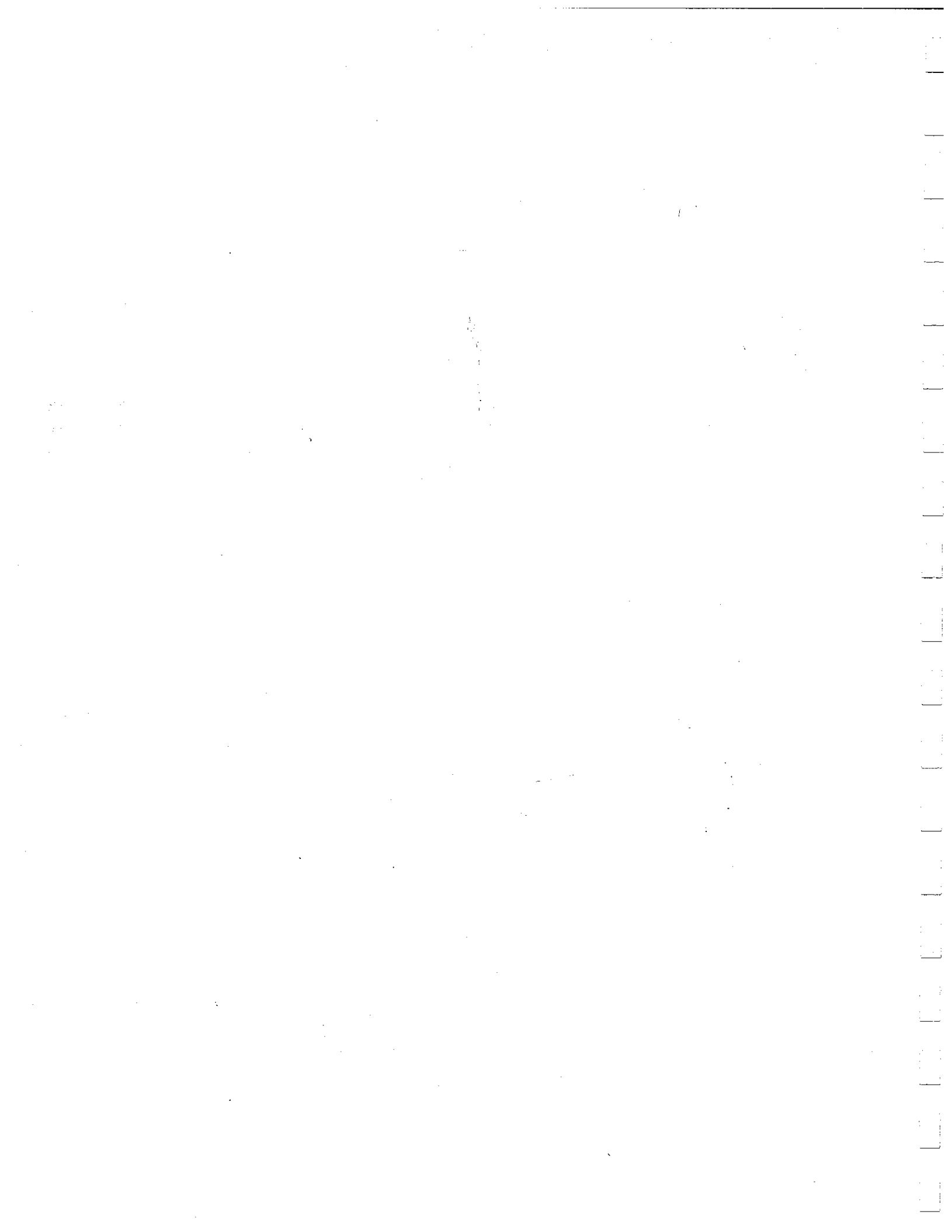
RESOURCES AND EXISTING PROGRAMS



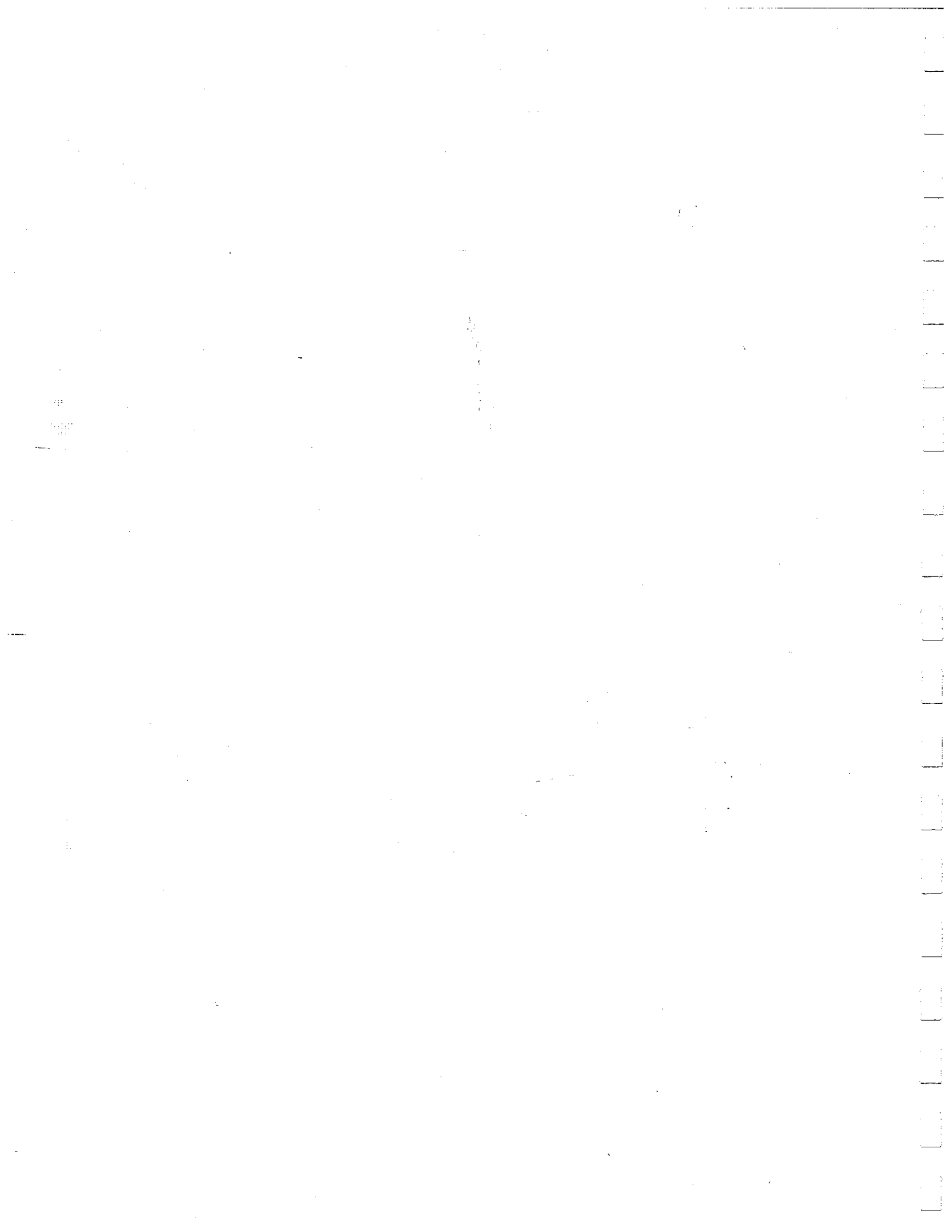
The thrust of this water plan is to identify problems which require timely action to avert future crisis. The emphasis on emerging problems may falsely impress the reader with their importance in relation to existing problems and programs. For comparison, it is sufficient to note here that existing problems represent nearly a quarter billion dollar annual effort while the emerging issues represent only a small fraction of that amount.

The Plan will contain a limited description of the State's resources plus ongoing management programs excerpted from great volumes of documentation generated annually. A bibliography will be provided for the interested reader.

APPENDIX



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