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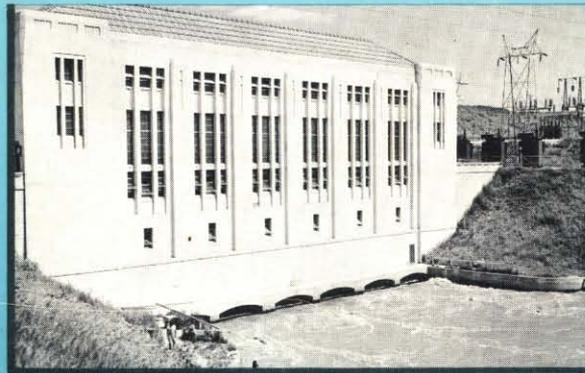
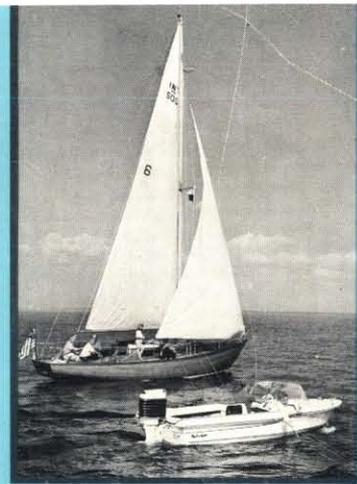
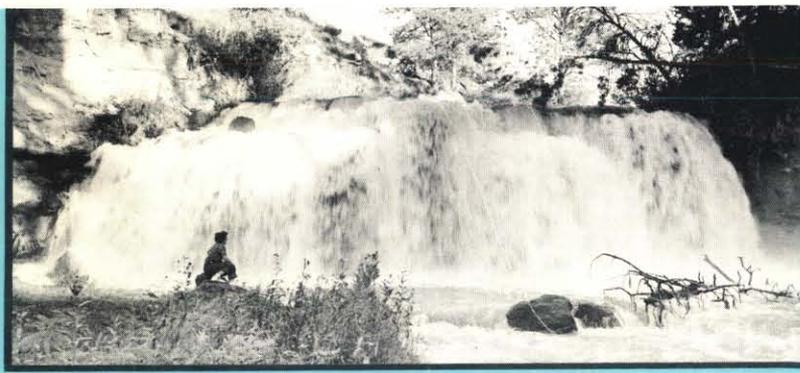
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SWP5

*A design for Nebraska's
State Water Plan*

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STATE SOIL AND WATER
CONSERVATION COMMISSION
Box 94725, St. Louis, Mo.
Lincoln, Nebraska 68580

LEGISLATURE OF NEBRASKA
SEVENTY-SEVENTH SESSION

LEGISLATIVE RESOLUTION 5

Introduced by Maurice A. Kremer, 34th District; Arnold Ruhnke, 31st District; Stanley A. Matzke, 24th District; George Syas, 13th District; Jerome Warner, 25th District; Pat Moulton, 8th District; Ross H. Rasmussen, 15th District; William M. Wylie, 40th District; George C. Gerdes, 49th District; Albert A. Kjar, 39th District; Fred W. Carstens, 30th District; Herb Nore, 22nd District; Harold B. Stryker, 23rd District; Glenn Viehmeyer, 45th District; W. H. Hasebroock, 18th District; Rudolph C. Kokes, 41st District; Leslie Robinson, 36th District; S. H. Brauer, Sr., 21st District; Florence B. Reynolds, 14th District.

WHEREAS, the water supplies of Nebraska are not so located or of such a quantity to satisfy all present and future needs; and

WHEREAS, the state has a responsibility to guide the development of resources so that maximum benefits accrue to the citizens of the state; and

WHEREAS, the orderly development and utilization of water and land resource of Nebraska is essential to the fullest utilization of these resources and the economic development of the state; and

WHEREAS, such orderly development can only be realized by implementation of a comprehensive water and related land plan; and

WHEREAS, no such plan now exists.

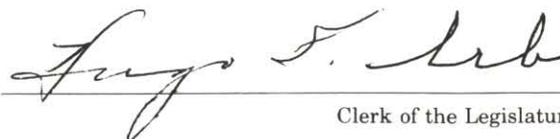
NOW, THEREFORE, BE IT RESOLVED BY THE MEMBERS OF THE NEBRASKA LEGISLATURE IN SEVENTY-SEVENTH SESSION ASSEMBLED:

1. That the Nebraska Soil and Water Conservation Commission is directed to analyze the soil and water resources of the state and to prepare a comprehensive water and related land plan for the State of Nebraska, such framework plan to be completed no later than June 30, 1971, and to be known as the State Water Plan.
2. That this State Water Plan, in addition to an evaluation of the land and water resources, will also include an examination of legal, social and economic factors which are associated with resource development.
3. That a progress report on such plan be submitted to the Legislature during the regular session in 1969 and the final report be submitted to the Legislature promptly upon its completion.



President of the Legislature

I, Hugo F. Srb, hereby certify that the foregoing is a true and correct copy of Legislative Resolution 5, which was passed by the Legislature of Nebraska in Seventy-seventh regular session on the eighteenth day of January, 1967.



Clerk of the Legislature



State Senator Elvin Adamson
Speaker, Nebraska Legislature
State Capitol Building
Lincoln, Nebraska

June 6, 1967

Dear Speaker Adamson:

The Legislature has assigned the Nebraska Soil and Water Conservation Commission the responsibility to "plan, develop, and encourage the implementing of a comprehensive program of resource development, conservation, and utilization for the soil and water resources of this state in cooperation with other local, state, and federal agencies and organizations." (Nebr. Rev. Stat. S 2-1507 (8) (Supp. 1965)

On January 18, 1967 the Legislature unanimously endorsed Legislative Resolution No. 5 calling for development of a State Water Plan by the Nebraska Soil and Water Conservation Commission. The Commission will extend every effort to develop a State Water Plan that will be an effective "blueprint" for the long range management, development, conservation, and utilization of the land and water resources of the state. However, many avenues are available by which to proceed under such a directive. The following memorandum was prepared to indicate to the Legislature the Commission's preliminary response to the Resolution.

The attention of the Legislature to this memorandum is appreciated and comment is invited as to whether the several years effort proposed is satisfactory. Specifically, does this proposal provide the information that was envisioned when you approved Legislative Resolution 5?

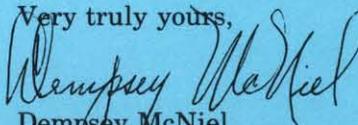
Assistance was given by many in developing the proposed work plan summarized in this memorandum. Representatives of the following agencies gave substantial help in furnishing information.

U.S. Department of Interior
U.S. Army Corps of Engineers
U.S. Department of Agriculture

University of Nebraska
Department of Water Resources

The commission is looking forward to cooperating with both the Legislature and the Office of the Governor in this endeavor.

Very truly yours,


Dempsey McNiel
Chairman

CONTENTS

On the following pages are brief summaries of Nebraska's water resources and problems, the procedures to be followed and the assistance available from other agencies in developing a plan, and the four parts proposed for Nebraska's Water Plan. The last section of the memorandum includes specific items toward which this study will be directed. It must be recognized, however, that the time schedule and present funding limits the detail to which each item can be studied.

NEBRASKA'S WATER RESOURCE

Water is the state's most valuable mineral resource. Next to land, it is the most abundant. Nebraska is so situated that only about 1,700,000 acre feet flows into the state annually while over 6,000,000 flows out each year. In addition about 20,600,000 acre feet flows in the Missouri by Omaha annually. Without importation of water, development is limited to that which falls as rain or snow less all the losses and inefficiencies of collection and distribution.



WATER RESOURCES AND PROBLEMS

1

PRECIPITATION

THE RESOURCE

Precipitation patterns in Nebraska are extremely variable both on a monthly and annual basis. Annual precipitation has varied from less than 50 percent to 600 percent of normal at some locations. The long-term average ranges from 14 inches in the western semi-arid regions to 34 inches in the southeast.

Although annual precipitation is variable, nearly 80 percent occurs between April 1 and September 30.

Snowfall averages just over two feet annually. This snowfall varies considerably across the state and is not a major part of the total precipitation in any area of the state.

THE PROBLEM

The rainfall during the summer months occurs irregularly as high intensity thunderstorms resulting in extended dry periods causing reduction of crop yields.

While floods occur more frequently on streams in the eastern third of the state, no part of Nebraska is flood free. Most flooding is the result of either thunderstorms or spring ice jams which restrict stream flows.

Precipitation amounts are generally adequate for production of most crops in the eastern one-third of the state. But even in this area, available moisture limits cropland production each year and severe droughts do occur on occasions. The distribution and total amounts of precipitation in the western areas severely limits field crops and range production under dry land conditions.

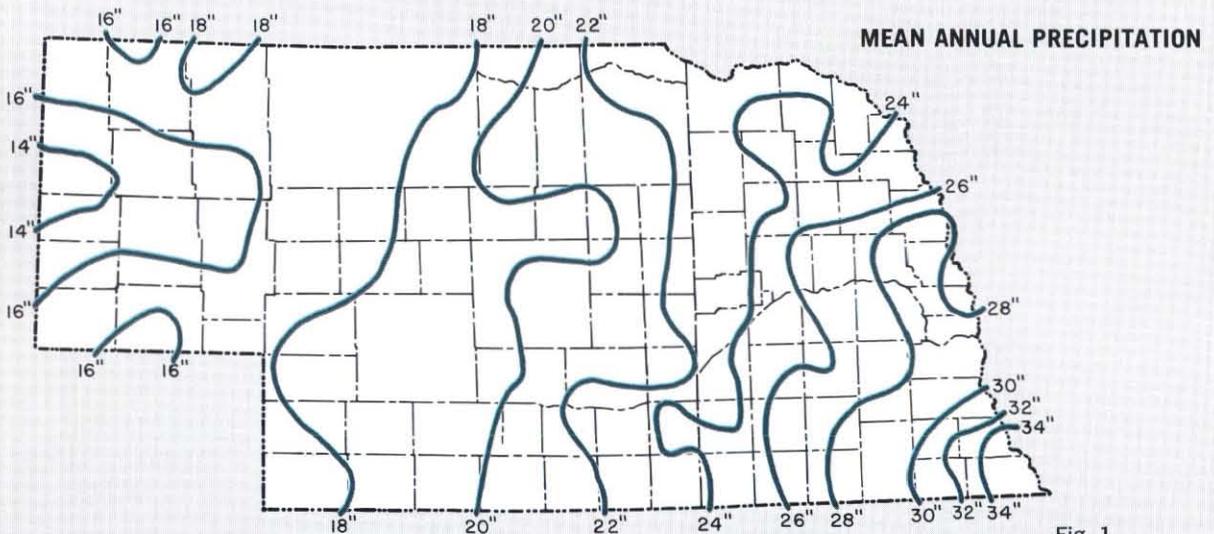
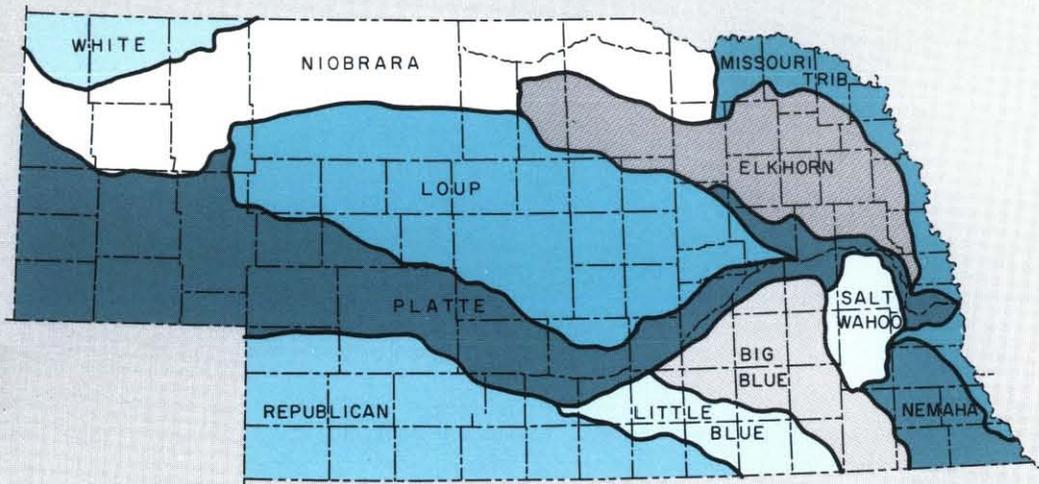


Fig 1



MAJOR RIVER BASINS

Fig 2

RIVERS

THE RESOURCE

Precipitation eventually is collected and carried by a well distributed stream system. (Figure 2.) The flow of each stream is composed of "base" or dry weather flow which skims excess water from aquifers. Direct flow or surface runoff occurs during and immediately following rains or snowmelts.

The sandhill streams are primarily base flow streams and are among the most stable in the world. The Platte Basin dominates the central portion of the state and, with its tributaries of the Loup, Elkhorn, Salt and others, forms one of the major basins of the Missouri.

The rivers of Nebraska provide water supplies for irrigation, municipalities, industries, hydro-electric power, and recreation. Too often the streams are being used as carriers for the refuse of our growing society.

THE PROBLEM

The Nebraska streams meander through the fine textured Nebraska soils. In only a few isolated areas have these streams exposed the bed rock. Stream bank erosion, aggrading and degrading is prevalent. Sediment from the unprotected watershed traveling as both "suspended" and "bed load" is the major pollutant of our rivers. Water quality, while satisfactory in most reaches at the present time, can be expected to deteriorate unless a concerted effort is made to abate further pollution.



SOURCE: CONSERVATION & SURVEY DIVISION, U. OF N.

AVAILABILITY OF GROUNDWATER

Fig 3

GROUNDWATER

THE RESOURCE

Nebraska's groundwater supply is abundant and comparatively well distributed. This supply is free from evaporation and contamination and normally available in amounts sufficient for domestic and livestock needs. The quality of groundwater supplies is generally excellent. Vast amounts of water are stored in aquifers and can be used to overcome seasonal rainfall deficiencies.

THE PROBLEM

Large quantities of groundwater are being used for irrigation. In some localities the supply is being severely depleted. In other areas the importation of water for irrigation is contributing to rising groundwater problems. Some local areas have difficulty obtaining supplies sufficient for even domestic use. A popular misconception is held that Nebraska's groundwater reservoir is so extensive as to defy exhaustion. Contamination of this resource by insecticides, pesticides, fertilizer, etc., is also a real possibility.

SPOTLIGHT ON PROBLEMS

FLOODING—Although flood control projects have been and are being installed in many locations, there remains an economic loss in the state from floods amounting to over 15 million dollars each year. The project developments, largely Federally financed, depend upon local initiative and financial support. Many worthwhile opportunities are delayed or foregone because local communities do not have the resources to provide the necessary support. The establishment of soil and water conservation measures on farms causes some reduction in flood flows but an adequate degree of protection cannot be achieved by this method.

EROSION—Countless acres of land over the state are subject to severe damage by sheet, rill and gully erosion. Although the long range benefit of conservation treatment is well recognized, the establishment of conservation practices has been slow. At the present rate of application of treatment measures over a hundred years will be required to adequately treat Nebraska lands.

WATER USE—Per capita water use in Nebraska is approximately 3,260 gallons per day. The greatest water use is for irrigation. (Figure 4) Some areas of high quality lands suitable for irrigation have insufficient water while the waters of other basins are relatively unused. Full development may require adjustments between water short and water surplus areas.

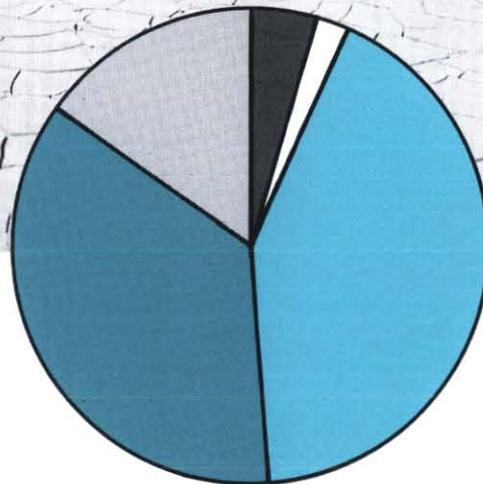
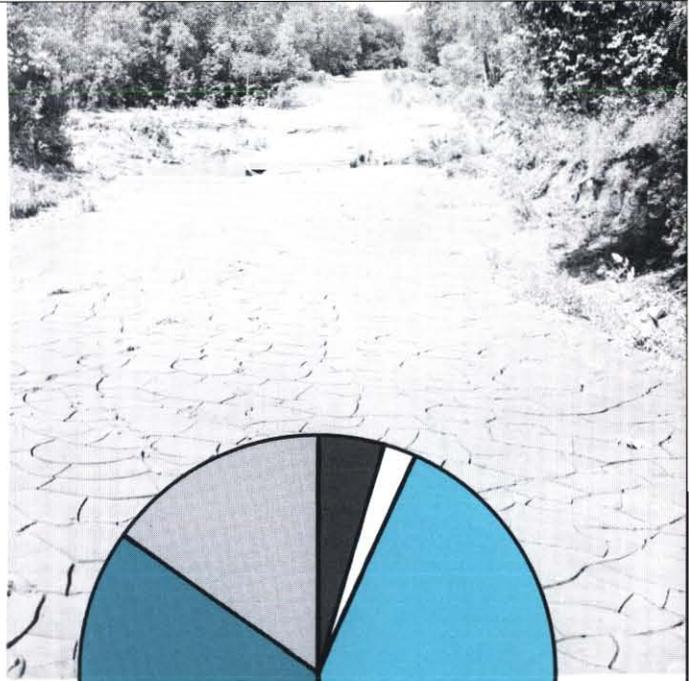
GROUNDWATER RESOURCE MANAGEMENT—There is now evidence that groundwater is being withdrawn faster in some areas than the rate of recharge. In some areas the rate of groundwater depletion is becoming serious. It is a matter of concern to the state to determine the allowable rate of withdrawal for the various areas, methods for increasing recharge rates and the regulations required to properly manage the groundwater supplies.

RECREATION—There has been a tremendous increase in the demand for outdoor recreational facilities for single day users. The problem in Nebraska is that presently most of the recreation areas are about a day's travel one-way from a great majority of the potential one-day users.

HYDROPOWER—Hydropower does not provide a significant portion of Nebraska's power requirements. It does, however, remain as a large nonconsumptive water user. The use of water for power production may interfere with its greater economic use at another place.

WATER RESOURCE AGENCIES—Several agencies at the State, Federal and local levels of government are involved in development and management of the state's water resources. Also numerous water oriented special purpose districts exist at the local level with few having sufficient authority and areal coverage to properly manage the water resources. The combination, realignment or coordination of these activities may obtain more efficient use of the water.

DATA COLLECTION—The water data collection of the various state agencies should be broadened and coordinated in order to obtain desirable information which is not now collected.



STATE TOTAL
4595 MGD

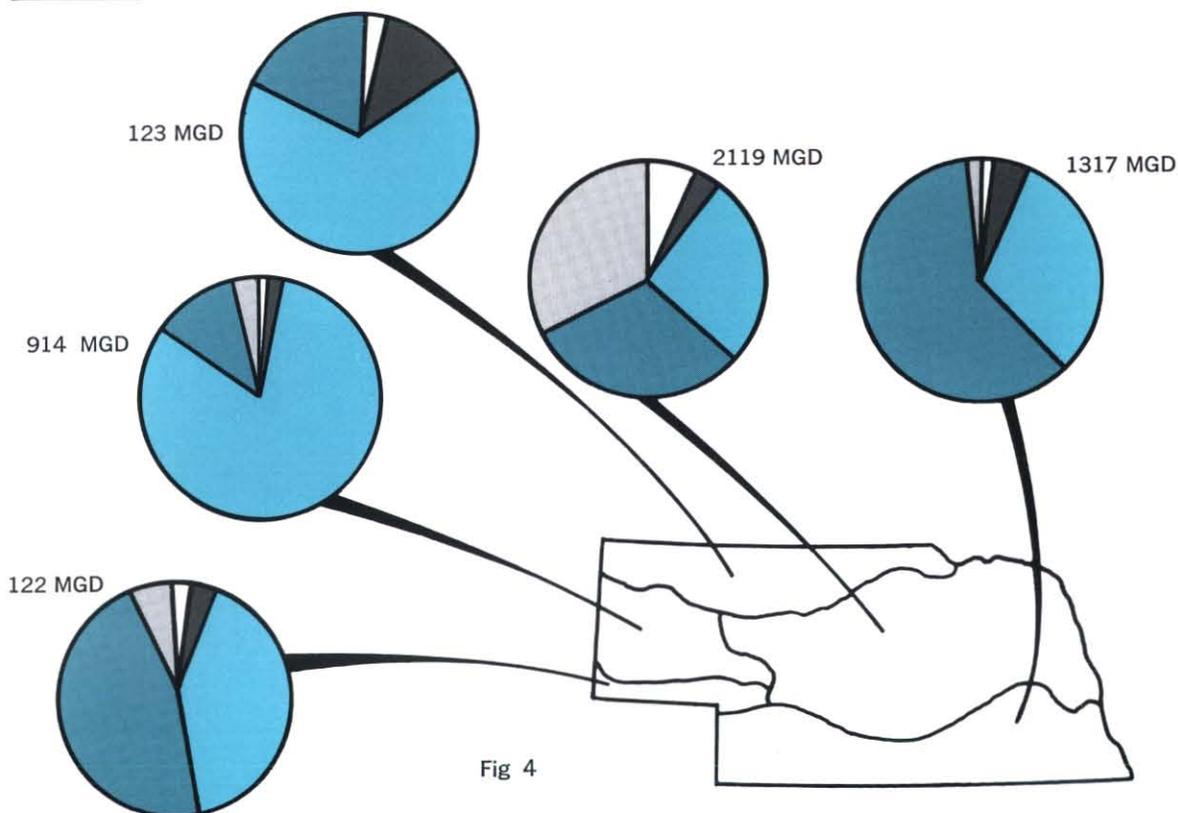


Fig 4

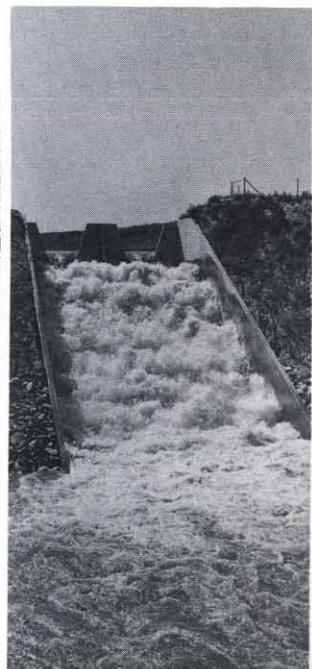
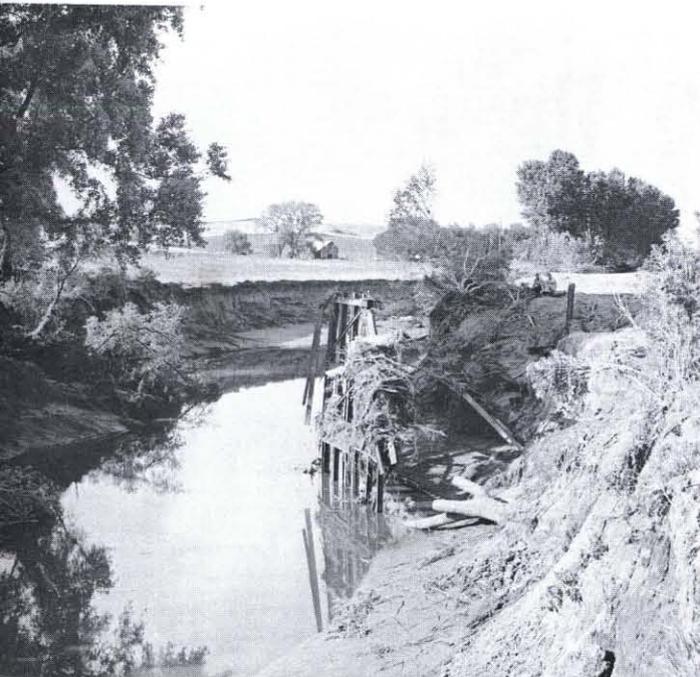
Water use in Nebraska

PROPOSED STATE WATER PLAN

2

The State Water Plan* is a program for surface and groundwater conservation, development, utilization and management, formulated to satisfy the state's needs for water during the foreseeable future. A written plan stimulates knowledgeable thought and discussion resulting in continuing refinement and modification. The State Water Plan should, therefore, be flexible and accommodate details of development as they evolve and adjustments warranted by changing circumstances. Proposed developments will be based upon studies that provide long-run projections of economic development, the translation of the projections into demands for water and an inventory of water and land resources so as to recommend appropriate action to meet the most urgent water and land resource problems.

*Includes lands directly concerned with water resource development and utilization such as reservoir sites, flood plains, irrigable lands, etc., referred to as "related lands" in Legislative Resolution 5.



OBJECTIVES

The primary objectives in formulation of the State Water Plan shall be to:

1. Point out the most urgent problems of water resource development.
2. Develop and present available knowledge regarding water resource development problems.
3. Propose a framework plan, with appropriate alternatives, for the use of Nebraska's water resources.
4. Specifically recommend action to improve the use and management of water resources through changes in laws, policies, institutional and organizational arrangements, and programs of education and research.
5. Coordinate current studies of specific areas and recommend state and local action for implementation.
6. Summarize the present status of proposed development with sufficient information to determine the state's interest in each.



GENERAL STUDY PROCEDURE

Nebraska Soil and Water Conservation Commission.

The Commission will take leadership in the preparation of the State Water Plan. State and Federal agencies now engaged in water and related land resource development have been asked to assist in the studies and have responded as described in a following section. Local units of government will be consulted during the planning program.

The State Water Plan will depend largely on basic data available from past studies or to become available from studies now in progress. The Missouri River Basin study now in progress is expected to be the principal source of data. River basin studies now being made will be utilized to the fullest extent. The Bureau of Reclamation is now engaged in a study of the potential for project type irrigation in the state. Although this study is not scheduled for completion by June 30, 1971, it is expected to furnish considerable information on future irrigation potential.

The Commission proposes a two level organization to develop the State Water Plan (Figure 5). The first level would consist of a Steering Committee made up of technical advisors representing State and Federal agencies engaged in planning, research and informational activities of water resource development. This committee will suggest and interpret policy, and provide guidance to those preparing the State Water Plan. The Commission suggests that the State Legislature establish a subcommittee under the Legislative Study Council to provide legislative liaison with the Steering Committee. The Commission also proposes to establish a committee to provide a forum for established organizations having a particular interest in resource development.

Under the Steering Committee will be six work groups in the areas of Planning and Implementation. The work groups under Planning will be: (1) Needs and Problems, (2) Inventory & Data Collection, (3) Development Plans. Those under Implementation will be: (1) Legal, (2) Education and Information, and (3) Program Operations. State and Federal agencies will be invited to assign representatives to work groups where appropriate and to which they can make contributions. The work groups will be responsible for assembling and analyzing study materials, coordinating study activities and preparing study reports. Work elements or jobs, within the work groups, will be performed by individual agencies (or jointly by two or more agencies working together) or by the Commission's planning staff as may be advisable.

PROPOSED ORGANIZATION CHART

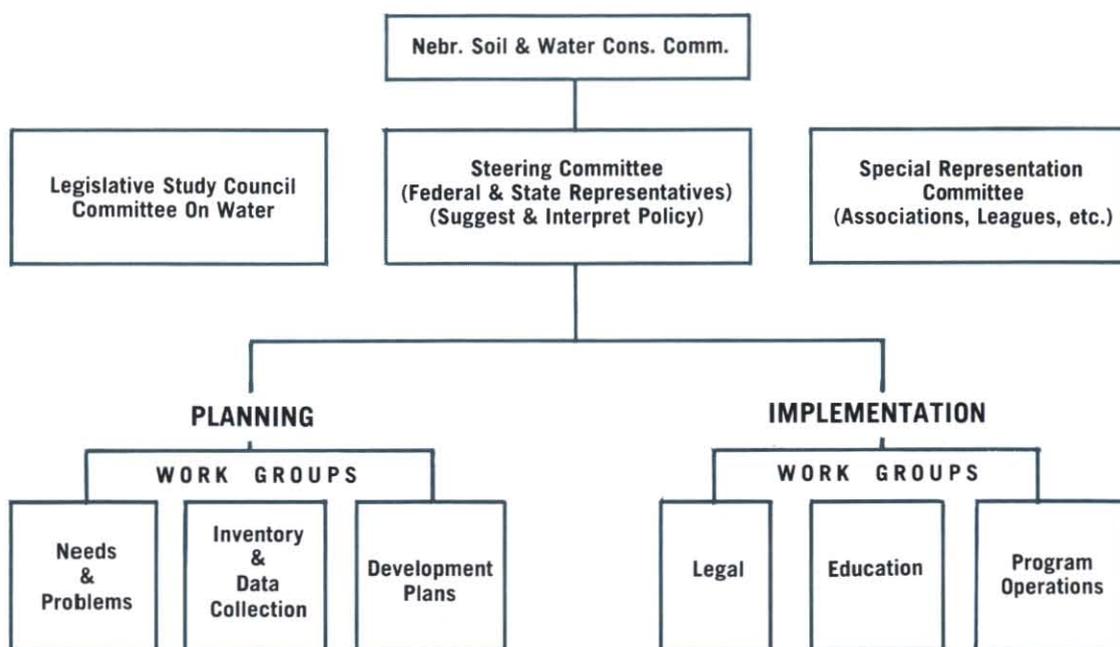


Fig 5

ASSISTANCE AVAILABLE

Federal and State agencies involved in water resource planning activities have indicated their desire to cooperate with the State Commission and participate in the State Water Plan. This participation will be limited by funding and personnel available under their respective programs.

The agencies involved in these planning activities are listed below.

FEDERAL

Department of Agriculture
Soil Conservation Service
Agricultural Research Service
Economic Research Service
Forest Service

Dept. of Defense
U.S. Army Corps
of Engineers

Department of Interior
U.S. Bureau of Reclamation
U.S. Geological Survey
Federal Water Pollution
Control Administration
Bureau of Indian Affairs
Fish & Wildlife Service

STATE

Department of Water Resources
Department of Health
Game, Forestation & Parks Comm.
Department of Roads

University of Nebraska:
Conservation & Survey Division
Extension Service
College of Agriculture
College of Law
College of Engineering

Considerable and valuable information for the State Water Plan will be available from the Type I study to be completed in 1969 by the Missouri Basin Interagency Committee.

In addition, a federal grant of funds from Title III of the Water Resources Planning Act will be available to the Commission for development of the State Water Plan.

NATURE,

SCOPE,

AND INTENSITY

3

The State Water Plan will have four principal divisions. They are described in the following subsections.

I. Framework Plan for Water and Land Resource Development

The basic objective of the framework plan is to provide a broad guide to the best uses of water and land resources to meet current and anticipated needs. Consideration will be given to: (a) the timely development and management of these resources as essential aids to the economic development and growth of the state; (b) the preservation of resources in appropriate instances, to insure that the resources will be available when needed; and (c) the general welfare of the people of the state as the overriding determinant in formulating the framework.

The framework plan will be based on reconnaissance type investigations intended to: (a) provide broad-scaled analyses of water resource problems and needs, and (b) furnish a general appraisal of the probable nature, extent and timing of measures for their solutions. Maximum use will be made of planning data already available.

II. Recommendations of Action

This section will consist of recommendations for action by the Legislature, Governor, and various units of government to improve the conservation, development, management and utilization of water resources. The recommendations will be prepared as the need for action becomes apparent and coordination with other aspects of the State Water Plan can be assured.

The "Recommendation – Flood Prevention and Flood Damage Reduction" is an example of the type of material to be prepared under this section.

III. Basin Reports

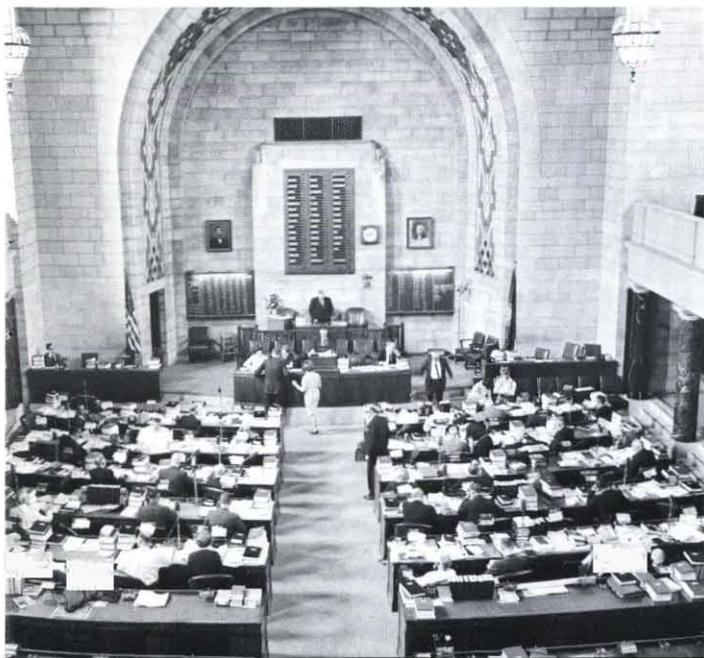
This section will consist of studies of individual river basins. The studies will be made in the detail necessary to (a) identify potential projects, (b) indicate the agency or agencies responsible for planning and installing the measures, (c) estimate the project costs and benefits, (d) suggest the order of development, (e) show the relationship of the project to the state's framework plan, and (f) recommend local action to accelerate resources development.

Studies are now in progress in the Big and Little Blue, Elkhorn, Nemaha, Niobrara and White River Basins. Reports on these basins are expected to be completed by July 1, 1971.

IV. Status Summary of Proposed Resource Developments

This division will contain a summary of projects with an appraisal of their relationship in meeting the state's objectives and goals for resource development. The summary will be in the detail necessary to adequately define the plan of development, identify the primary beneficiaries, estimate closely the costs of project installation and annual operation, maintenance and replacement and appraise the ability of the beneficiaries to meet the legal and financial responsibilities of project development.

These summaries will be prepared on water resource project plans received for review from State and Federal agencies. Examples are irrigation feasibility reports by the Bureau of Reclamation, flood control survey reports by the Corps of Engineers, watershed work plans by the Soil Conservation Service.



SPECIFIC

WORK

ITEMS

4

Under the "umbrella" of the general framework plan, many specific work items will be studied. These items may involve: (1) matters of policy; (2) technical investigation; (3) research; and, (4) legislation. The number of items studied and the scope of each study will be directly related to available financing and personnel. Need and experience will dictate addition and deletion of specific problems. Liaison will be maintained with the members of the Nebraska Legislature for the purpose of developing study and research priorities. Examples of specific work items are listed below:

1. Should diversion of surface waters between basins be permitted and if so, under what conditions?
2. Should the priority of water use as contained in the Constitution be modified or abolished and if so, what type of priority or system of priorities should replace it?
3. What should be the role of the state in regulating the depletion of groundwater?
4. Should surface water use be regulated so as to maintain minimum flows in streams and if so, by whom, how and what minimums should be set?
5. Should water rights be made marketable? What are the legal problems?
6. What are the best procedures and techniques to recharge and/or maintain the groundwater? What is the potential of using groundwater aquifers for subsurface storage reservoirs? What are the problems involved in maintaining the quality of the groundwater?

7. If water is not available to meet all demands, what considerations, economic and other, are involved in determining a desirable pattern of water use? (i.e. hydropower, water transportation, recreation, low flow augmentation, irrigation, etc.)
8. What are the logical types of water resource organizations at the local and state level?
9. What is the appropriate level of state participation in water resource programming?
10. When, how, and under what conditions should resource regulation, such as (a) flood plain; (b) irrigation water management; (c) industrial water management, and (d) soil and water conservation, be adopted and enforced?
11. How can the land treatment program be accelerated?
12. To what degree should state water planning become involved with related areas such as, (a) chlorination and fluoridation of water, (b) emergency operation, and (c) air pollution?
13. How can extensive stream pollutants such as sediment and refuse from feed lots be best handled?
14. What water oriented research is most urgently required?



AIDS IN

FUTURE PLANNING

Time limitation will prevent collection, tabulation and summarization of certain basic physical facts as part of the general framework plan. These facts are of extreme value and will be needed in the future as the State Water Plan becomes more detailed and sophisticated. Such reports should be of value to many in our local and state units of government. Possible subjects are:

1. Lake location, sizes, and uses.
2. Potential reservoir sites.
3. Reservoir sedimentation rates.
4. Present land use.
5. Potential sites for artificial recharge.
6. Identification of special interest areas requiring preservation.



OTHER PROGRAMS *of the* NEBRASKA SOIL AND WATER CONSERVATION COMMISSION

The Commission has been given primary responsibility for the planning of soil and water resource development in Nebraska. Following are brief descriptions of some of the Commission's programs through which this responsibility is carried out.

STATE WIDE COMPREHENSIVE PLANNING

The Commission has been designated as the coordinator of Federal, state and local resource planning and development in Nebraska. This responsibility includes administration of Federal grant funds, disbursement of state funds to local units of government and participation in interstate planning programs and activities.

BASIN PLANNING ACTIVITIES

Comprehensive reports for each river basin in Nebraska are being prepared to point out the reasons, the needs, and the potential development within each basin area. These reports will contain specific recommendations for appropriate local action to best utilize the soil and water resources of that area.

FLOOD CONTROL

Many areas of Nebraska are subject to recurrent flooding and related loss of life and property. In recognition of this, the Legislature has assigned control of floods as one of the Commission's major responsibilities.

Flood plain studies defining high flood risk areas are made by designated Federal Agencies. Application for these studies must be made through the Commission in order that a study priority may be assigned.

STATE MAPPING

Extensive information on a state wide and a river basin basis has been compiled on maps. This information includes impoundment structures, irrigation systems, well locations, basin boundaries, project status, and project locations.

POLLUTION ABATEMENT

The 1967 Legislature added the Nebraska Soil and Water Conservation Commission as a member to the Nebraska Pollution Control Council. The Council's activities concern water pollution abatement, sewage disposal system construction grants, classification of streams, and enforcement of stream standards.

SOIL AND WATER CONSERVATION

Nebraska has been in the forefront in the soil and water conservation movement for the past 25 years. The "Cornhusker State" was the first state west of the Mississippi and the ninth in the nation to be completely blanketed by soil and water conservation districts. This organizational effort was completed in 1950. The Commission provides guidance and assistance to these districts.

Since the organization of the first district in 1938, nearly three-fourths of the state's farmers and ranchers have signed as district cooperators.

WATERSHED PROTECTION

Never in the history of the state has a water program received such widespread public acceptance as has the "Small Watershed Program". Since 1954 the Commission has received 101 applications totaling 6,916,968 acres or 14.1 percent of the total land area of the state. Commission personnel assist local sponsor in the planning and operation of these projects.

*Additional information on any of the above programs may be obtained by addressing an inquiry to: Nebraska Soil and Water Conservation Commission, P. O. Box 94725, State House Station, Lincoln, Nebraska 68509.