AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

NO. 510. SEPTEMBER 1968 AGRICULTURAL EXTENSION SERVICE UNIVERSITY OF MINNESOTA

Minnesota AGRICULTURAL ECONOMIST

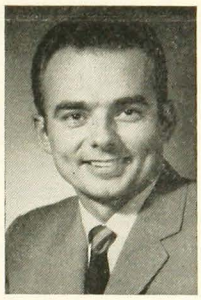
Walte Memorial Book Collection
Division of Agricultural Economics

The Look is Different

With this issue, "Minnesota Farm Business Notes" becomes the "Minnesota Agricultural Economist." However, the general content and scope of this monthly publication will not be changed. There was general agreement in the Agricultural Extension Service and the Department of Agricultural Economics that the old title, adopted in 1928, did not fully convey the broad range of subjects now covered by our authors. The new title, we feel, does convey it. We hope you'll like the new title and the new masthead and format.

Statewide Water Resource Planning in Minnesota

John J. Waelti



Our rapidly growing, mobile, and affluent population has put mounting pressure on natural resources in Minnesota as well as throughout the United States. The crux of the problem is that alternative uses often are competitive. For example, drainage of swampland for agricultural use precludes its use as a breeding ground and habitat for waterfowl. Likwise, damming a stream is competitive with its use as a natural scenic waterway and using a stream for waste dilution is competitive with its use for recreational activities.

Under democratic capitalism, resource allocation is accomplished by decisions made through the price and market system and through political processes. Because of the interdependent nature of water resources, each decision made by an individual or agency profoundly affects the choices available to others. There is, therefore, an overridding need for coordination of decisions. In short, there is need for coordinated planning processes in which all interested parties can participate.

Minnesota generally is viewed as a "water rich" state. Perhaps because of this image, little comprehensive water resource planning at the state level has been done until recently. But, as we now know, even a water rich state can encounter serious problems. Foremost among these problems is water quality — an issue of much public concern today. Pollution from livestock feedlots and runoff containing herbicides and pesticides are potential sources of agricultural pollution. Another problem is the eutrophication, or aging, of Minnesota lakes.

Minnesota is unique in that it cannot blame other states for its polluted waters: Its location makes it the origin of waters that flow out of the state. Although this headwater location also is advantageous in that it generally minimizes flood problems, several Minnesota streams, including the main stem of the Mississippi, the Minnesota River, and the Red River of the North, are subject to flooding.

The entire western part of the state and the north-central portion are areas of low ground water storage. They have low precipitation, high evaporation, and very poor ground water recharge and storage. The northeastern corner of the state has a small ground water supply because of poor infiltration and ground water storage.

What is being done in the way of planning for Minnesota's water resources?

FEDERAL ACTIVITY

A major step toward coordinated federal-state-local water resource development was the enactment of PL 89-80, the Water Resources Planning Act, in 1965. The act provides for the establishment of a Water Resources Council, local-state-federal river basin commissions, and financial assistance to states for planning activities.

The Water Resources Council is composed of the Secretaries of Interior; Agriculture; Army; Health, Education, and Welfare; and Transportation and the chairman of the Federal Power Commission. The Council's functions include cooperating with the river basin commissions and assisting states in developing comprehensive statewide plans.

The act authorizes the President to declare the establishment of river basin and related land resources commissions. Formation of a commission is contingent upon the request of not fewer than half the states within the basin. A commission's basic objective is to encourage the conservation, development, and utilization of water and related land resources in its area. Commission efforts are coordinated with those of the federal, state, and local governments and private enterprise.

Each river basin commission includes a full time chairman appointed by the President, one member from each relevant federal department or independent agency, and one governor-appointed member from each state that is wholly or partially in the basin.

The act also authorizes the appropriation of up to $5 million for state grants for 1966-74. Grants are awarded on a matching basis to assist states in developing comprehensive water and related land resource plans. Minnesota was granted $26,000 in federal funds for 1967 and $40,000 for 1968. Grants will be requested for the remaining years in accordance with the act.

Receiving federal funds for planning purposes is contingent upon the formulation of a state program providing for comprehensive planning of intra- and interstate water resources. A further stipulation is that the state designate an agency to administer the program and provide training to develop additional technical planning capabilities.

STATEWIDE PLANNING

Until recently, Minnesota had no agency responsible for comprehensive water and related land resources planning. Activity was centered around federal programs and state agencies with narrowly defined objectives. At the state level, individual agencies were concerned with such things as flood control, water supply systems, sewage disposal systems, fish and wildlife projects, and small watershed programs. The University of Minnesota was researching water problems, and the Agricultural Extension Service was assisting farmers and community leaders with state water problems.

This piecemeal approach indicated the need for a unit to coordinate agency activities for the entire state. The legislature responded by creating the Minnesota State Planning Agency in 1965.[1]

[1] Minnesota Laws 1965, C 685, amended 1967, C 898.

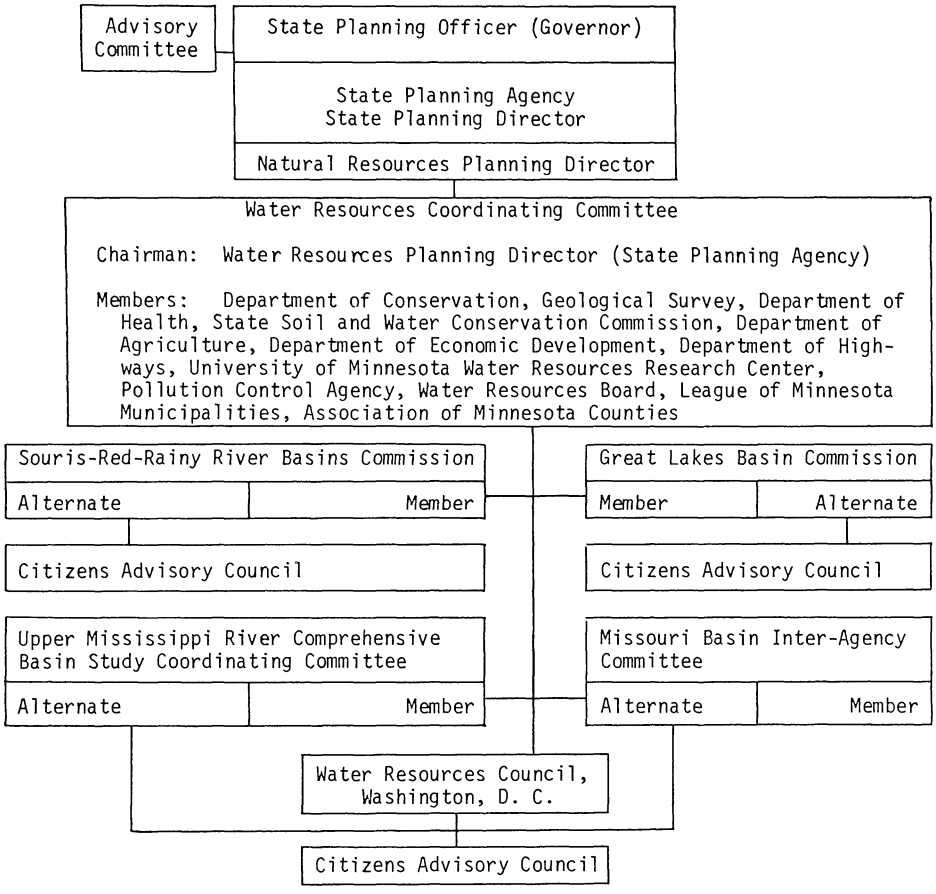


Figure 1. Organization of Water Resources Coordinating Committee

Objectives of this agency include coordination and administration of the four river basin commissions in which Minnesota has an interest, administration of federal funds obtained through the Water Resources Planning Act, and, in particular, preparation of a comprehensive statewide water and related land resources plan.

The natural resources planning director provides ongoing review and coordination of planning programs in natural resources. In 1967, a Water Resources Coordinating Committee was established to assist the State Planning Agency with its duties and responsibilities. The committee, which functions primarily in an advisory and coordinative capacity, consists of representatives from the agencies shown in figure 1.

Most of the committee's routine work is done by a task force presently consisting of the water resources planning director, an assistant water resources planner, an engineering aid, and representatives of several state agencies.

THE PLANNING PROCESS

At the federal level, the river basin is the basic planning unit. River basin studies can be conducted by a river basin commission formed under provisions of the Water Resources Planning Act as described above, by an ad hoc coordinating committee, or by a river basin interagency committee. All three of these methods are used in Minnesota's river basins. The Great Lakes and the Souris-Red-Rainy River Basins are being studied by recently formulated basin commissions. The Missouri Basin is being studied by an interagency committee and the Upper Mississippi by an ad hoc committee.

The general planning procedures for river basins at the federal level involve three steps.

The first step, **formulation of a study plan**, has several objectives, including:

- Definition of the objectives of basin planning.
- Delineation and definition of policies, agency responsibilities, and required cooperation that govern the conduct of the study.
- Definition of the scope and timing of the planning effort.
- Provision of an instrument for determining the adequacy of the study plan.
- Provision of a schedule for monitor and control of study progress.

The objective of the second step, **establishing a framework study**, is to provide a broad guide to the best combination of water and related land resource uses. Framework studies follow these guidelines:

- Projections and study of economic development.
- Translation of economic projections into needs for water and related land resource uses.
- Appraisals of water availability, including quantity and quality.
- Appraisals of the availability and characteristics of related land resources.
- Outline of the characteristics of projected water and related land resource problems.
- Alternative approaches that appear to be appropriate solutions.

Framework studies consist of a main report and appendixes containing specialized data on topics such as agriculture, irrigation, minerals, and power. Responsibility for appendix preparation generally is assigned to agencies with specialized competency. The main report condenses the supporting appendixes and summarizes framework plans, conclusions, and recommendations.

The third step, **establishing river basin studies**, extends the scope and intensity of the planning. These studies comprise a basis for Congressional authorization for federal and federally assisted projects to be initiated in the next 10-15 years.

The state planning process generally is similar to the federal. However, the third step at the state level is establishing a coordinated statewide plan. In Minnesota, such a plan would not be a single basin-wide plan, but would take into account the four relevant basins.

STATUS OF MINNESOTA PLANNING

Upper Mississippi. Of the four river basins in Minnesota, the Upper Mississippi contains the largest portion of the state (see figure 2). Study of this basin is being conducted by an ad hoc coordinating committee chaired by the Corps of Engineers representative.

The Upper Mississippi River Comprehensive Basin study was begun in 1963 and the framework plan, scheduled for completion in early 1969, will consist of a main report and 17 appendixes from federal agencies. Most of the appendixes are in draft form and presently are being reviewed.

For study purposes, the Upper Mississippi Basin has been divided into 17 smaller planning areas, 4 of which are relevant to Minnesota. These include the Mississippi Headwaters region above the Twin Cities; the Cannon, Zumbro, and Root River Basins on the west side of the

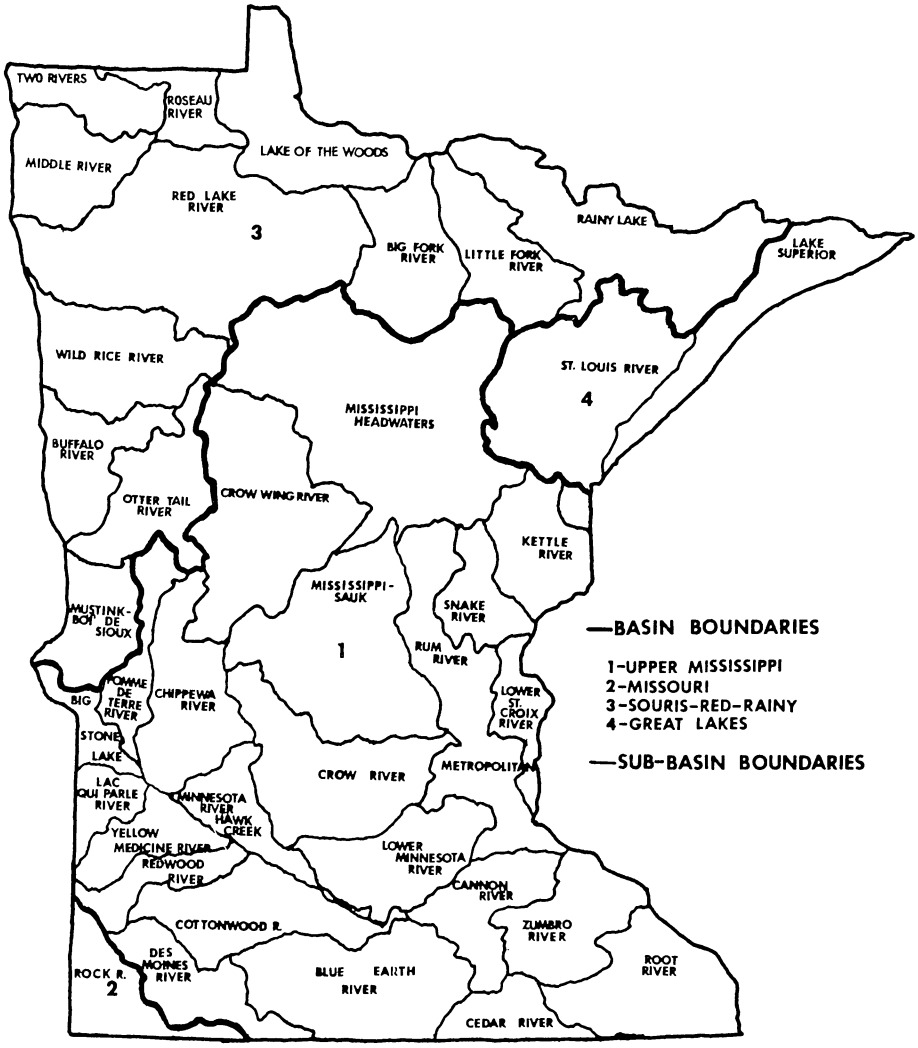


Figure 2. River basin boundaries in Minnesota

Mississippi just downstream from the Twin Cities; the Minnesota River Basin; and the main stem of the Mississippi (from the mouth of the Ohio River to just upstream of Minneapolis-St. Paul).

Missouri. The Missouri River Basin covers 539,000 square miles. Although only 1,800 of those miles are in Minnesota, the economy of the basin is extremely important to our state because of the Twin Cities' position as the basin's main financial hub. Especially significant is the processing of agricultural products sent to the Twin Cities and other food processing centers from portions of the Missouri Basin.

The Missouri River Basin study, begun in 1963, is being conducted by an interagency committee. The framework phase is scheduled for completion in mid-1969.

Souris-Red-Rainy and Great Lakes. Both the Souris-Red-Rainy and the Great Lakes Basin studies are being undertaken by basin commissions. The establishment of the Souris-Red-Rainy River Basin Commission was declared by President Johnson in June 1967 in response to requests by Minnesota and North Dakota.

The plan of study for the Souris-Red-Rainy Basin Commission recently has been completed. Federal funds are expected to be available for a comprehensive framework study during 1969-70. The framework study is scheduled for completion by July 1, 1970 and the comprehensive plan by June 1972.

The Great Lakes Basin Commission, established in 1967, includes representatives of eight states and nine federal agencies. The comprehensive plan is scheduled for completion in 1973.

State Water Plan. Considerable work has gone into formulating the state water plan. The Water Resources Coordinating Committee prepared and submitted to the Federal Water Resources Council a formal application for a grant under the Water Resources Planning Act for 1967-71 and is expected to request funds for the 4 years following 1971.

The committee now is preparing a report on background information for statewide framework water and related land resource planning in Minnesota. The report will deal with all facets of water and related land resources. Included will be such items as economic and demographic considerations, information availability, climate, surface water, ground water, water quality, management, floods and flood control, navigation, water-based recreation, power development, and water laws and government.

This year, the committee has been developing statewide water and related land resources planning objectives, a work plan, schedules, and a budget program. Together with the background information report, these developments will provide the basis for the framework plan, all of which is to be incorporated into a comprehensive, consistent statewide plan scheduled for completion in 1971.

NEED FOR CITIZEN PARTICIPATION

Because of the competitive and occasionally mutually exclusive uses of water and related land resources and because of the complexities of the planning process, maximum citizen participation must be obtained. Natural resources planning is not simply devising an optimum blueprint; it is developing a number of feasible alternatives from which people in each river basin can choose.

Because of the unpredictability of future conditions, plans must be flexible. The essential element is coordination: Plans most likely will be operational and acceptable if local citizens help with planning and review both at the federal and state level.

To insure citizen participation in water resource planning, three citizens' advisory councils will be appointed in Minnesota: one for the Souris-Red-Rainy Basin, one for the Great Lakes basin, and one for the Upper Mississippi and Missouri Basins. The 25 people on each advisory council will be appointed by the Governor. The members will come from areas geographically distributed throughout the basins and will represent a variety of occupations and professions.

The members of the citizens' advisory councils must give close attention to the planning effort if Minnesota is to be fairly represented in river basin plans. Basically, the councils' duties will be to:

- Consider projects, recommendations, and questions they think should be brought to the attention of their respective basin committee or commission.
- Study and evaluate basin plans with respect to effects on Minnesota portions of the basin.
- Alert Minnesotans about water and related land resource planning activities.

IN PERSPECTIVE

Joint Products of Natural Resources

Lee R. Martin

Investment and management decisions for natural resources have proved to be difficult for two reasons.

First, natural resources almost always yield more than one service. A single dam and reservoir, for example, may yield electric power, water for irrigation, flood control protection, water for municipal and industrial uses, water for navigation, water for recreation, and water for waste dilution. To some extent these services compete with each other. Irrigation water may not be used for waste dilution or for municipal and industrial purposes and seldom may be used to generate hydroelectric power. Also to some extent these purposes may complement each other. That is, water impounded to reduce floods may be used for any of the other purposes. But a reservoir managed for flood control will not yield as great a value for any other service as it would if it were managed entirely for that other purpose. A flood control reservoir may produce some electric power, but not as much as if it were managed only for power. Neither is the unit value of power likely to be as high in such a case, since flood control needs do not always allow water to be released when that power is most valuable.

Even after a resource system has been designed and built, there is some degree of flexibility in shifting from one purpose to another. A project or system can be **designed** to produce any combination of services that is technically feasible and economically desirable. Two pertinent questions are: What volume of investment should be made in different river basins (and at what sites)? What capacity for each purpose should be installed in each system and what values should be placed on the different services produced?

So far the problem is not unlike that of any large multiple product firm. Ford Motor Company, for example, must determine how much to invest in the capacity to produce and how much to invest in the production of Fords, Mercuries, and Lincolns. The company also must estimate how many 1969 Fords, Mercuries, and Lincolns to produce. The answer depends on the demand schedules for the different makes; that is, the number of each make that can be sold during the year at each feasible price. Eventually the value of these cars to society comes from the market. If investment and management decisions are guided by market prices (and forecasts based on market conditions), Ford is likely to allocate resources satisfactorily.

No such reference to the market is available to those who make decisions regarding natural resources. Only electric power is priced in the market and this market usually is a regulated one. Irrigation water and water for municipal and industrial uses might be priced in the market, but the other services are public goods.

Public goods (or collective consumption goods) can be defined as goods that everyone enjoys in common, since one individual's consumption of such a good does not subtract from any other person's consumption of it. Some examples of public goods include national defense; administration of justice; provision of security of person; and use of highways, roads, parks, libraries, and museums that are not overutilized. We can see that most of the services of water resources qualify as public goods.

By their nature, public goods cannot be priced effectively in the market. Users (or groups of users) can gain economically by not revealing their true preferences for public goods, and many people effectively conceal or misrepresent their preferences.

Thus, the second reason for the difficulties surrounding natural resource decisions is that many of the services of natural resources are public goods, and users will not reveal their true preferences for them. Some other means must be found for establishing the value of these services. No consensus has been reached on methods for making such estimates, although the area of disagreement may not be as wide as it once was.

By way of summary, let us ask ourselves again why we need estimates of the value of natural resource services. First, we need them in order to estimate the total benefits from a resource investment. As one criterion for making an investment, we require that the present value of future benefits exceed the total costs of the investment, including a reasonable charge for the use of the funds for the time they're invested. Thus we need to know the benefits for each level of investment before we can decide whether or not to invest and how much to invest.

In addition, benefits and costs need to be estimated for each service before the optimum combination of services can be incorporated into the design. These estimates of benefits and costs need to be made simultaneously, because allocating total fixed costs rationally among the different services requires some information on the flow of benefits from each service at different production levels.

Finally, the benefits of these different services are distributed throughout our society to individual consumers, to groups of consumers, to private firms, to municipalities and unincorporated places, to counties and metropolitan areas, to states and multi-state regions, and to society as a whole. If costs and benefits are known reasonably well for each level of each service, then charges can be levied successfully against some of the identifiable beneficiaries. And cost-sharing arrangements that are not totally inequitable can be worked out for some of the beneficiaries. ■

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Roland H. Abraham, Director of Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55101.

Minnesota AGRICULTURAL ECONOMIST

Prepared by the Department of Agricultural Economics and the Agricultural Extension Service.

Published by the University of Minnesota, Agricultural Extension Service, Institute of Agriculture, St. Paul, Minnesota 55101.

Views expressed herein are those of the authors but not necessarily those of the sponsoring institutions.

Agricultural Extension Service
Institute of Agriculture
University of Minnesota
St. Paul, Minnesota 55101

Roland H. Abraham, Director

Cooperative Agricultural Extension Work
Acts of May 8 and June 30, 1914

OFFICIAL BUSINESS

8-68 2,700

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF
AGRICULTURE