IMPLEMENTATION OF WATER AND LAND RELATED RESOURCES MANAGEMENT PROGRAMS

Thesis for the Degree of M. S.

MICHIGAN STATE UNIVERSITY
JOHN HARRINGTON KENNAUGH

1971

ABSTRACT

IMPLEMENTATION OF WATER
AND LAND RELATED RESOURCES
MANAGEMENT PROGRAMS

By

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Regional management of the water resources is emerging as one of the most critical issues of the political and social systems of the Grand River Basin. Associated with water resource problems is the proper utilization and development of the land related resource areas.

It is the premise of this thesis that regional management of water and land related resources is to be approached through the efforts and full cooperation of the local governmental units throughout the basin. Failure to define goals and accomplish objectives by the coordinated efforts of the local units will result in total recovery and management of the sovereignty at the state level. This alternative should be implemented only when it has been determined local governmental units are either unwilling or unable to responsibly satisfy the needs of the people in the basin, and in a way that will serve the best interests of the people of the State.

The backdrop for the thesis is the Type II--Comprehensive Water Resources Planning Study that is being conducted on the Grand River Basin under the auspices of the National Water Resources Council. This study was conducted as joint effort by six federal agencies and the state of Michigan to formulate "a Comprehensive Plan for the Grand River Basin to provide the best use, or combination of uses, of water and land related resources to meet all foreseeable short and long range needs"[1].

The Grand River Basin Study developed a report that contained the following elements:

1. Identified the water and land problems in the basin.
2. Prepared an inventory of the water and land resources.
3. Identified a multiude of water and land management programs that might be used to satisfy the projected demands.

Management of the natural resources can be accomplished through various institutional arrangements from the private and public sectors. However, the increasing demand for governmental oriented services indicates a need for local governmental units, working independently and through regional programs, to develop expanded public services.

The Grand River Basin Study has identified the kinds of water and land management programs that can be developed to fulfill most of the projected needs of the people. It is the purpose of this paper to provide guidelines to local public officials for the implementation of these programs. Policy decisions for the management of the natural resources will need to be made by all levels of government to safeguard the welfare of state and nation, as well as the local community. The democratic process is best assured when effective decisions are made by all levels of government with particular emphasis at the local level. This thesis is designed to provide local public officials a resource planning tool that they may be better equipped to adopt objectives, goals and resource management programs.

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[1] Plan of Investigation, Grand River Basin Coordinating Committee, U. S. Army Engineers, Detroit, Michigan, 1964, p. III.

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Resource Development

1971

ACKNOWLEDGEMENTS

The author wishes to express his most sincere appreciation to Dr. Clifford R. Humphrys of the Department of Resource Development, Michigan State University, for his encouragement, advice and assistance leading to the accomplishment of this academic pursuit. Special gratitude is also expressed to Dale W. Granger, P.E., Water Resources Commission, Michigan Department of Natural Resources for his contribution to my knowledge and development in water resource management.

I also wish to express my appreciation to the Michigan Grand River Watershed Council for its continued support to improve my capability as a public servant.

Finally, I would like to express my appreciation to my wife, Jean, and children, Carole, John, Laurie, and Paul, for their sacrifices and enthusiastic support.

John H. Kennaugh

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CHAPTER I

INTRODUCTION

Management of the water resources is becoming one of the most critical issues facing man. Even though there is estimated to be over 326,000,000 cubic miles of water on our planet, less than 0.4% is available as fresh water[1]. The problem becomes more apparent when it is realized the annual precipitation in Michigan and in the Grand River Basin averages approximately 31 inches per year[2]. Because of the wide range of climatic conditions in the basin, flooding and drought conditions are not uncommon. Complete management of the precipitation is not possible because of the manner in which much of it is lost. Approximately 3/5 of all the precipitation is lost by evaporation and transpiration. Only about 1/3 of all the precipitation reaches the streams. Only 1/20 of all the precipitation is actually withdrawn, used, and returned to the streams[3].

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[1] The Water in Your Life, William Laas and Dr. S. S. Beicos, Popular Library, New York, 1967, p. 18.

[2] Guidelines for the Management of Michigan's Water Resources, Michigan Water Resources Commission, 1963, p. 6.

[3] Ibid.

During the past 60 years the population in the Grand River Basin has tripled, and projections indicate the population will approximately triple within the next 50 years[4]. The increased water demands for this same period is estimated to be four times as great for municipal purposes alone[5]. In addition to an increase in the consumptive use of the water resources, the demand for water surface recreation is estimated to increase approximately six times within the next 50 year period[6].

The increasing demands on a limited resource is evidence that effective management of the natural resources and the people that use these resources is needed. It is also becoming evident that management of a resource such as water, is not just local but is regional in nature. As a regional problem, cooperation and coordination between the local governmental units is necessary. It is also necessary to establish close working relationships between all levels of government including state and federal, in order that the goals and objectives of all parties will harmonize.

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[4] Appendix O - Economic Base Study, Grand River Basin Coordinating Committee, U. S. Army Engineers, Detroit District, 1966, p. I-134.

[5] Appendix G - Water Supply and Stream Quality, Grand River Basin Coordinating Committee, U. S. Army Engineers, Detroit District, 1970, pp. 3-5.

[6] Appendix J - Recreation, Grand River Basin Coordinating Committee, U. S. Army Engineers, Detroit, Michigan, 1964, p. J-23.

A critical factor for effective management of the water resources in the Grand River Basin will be developing the working relationship between the local governmental units. The Grand River Basin covers an area of 5572 square miles. Within this area there are all, or parts of, 19 counties, 33 cities, 58 villages and 166 townships. In addition to the local units of government there are numerous special districts, interest groups, state and federal agencies, and private organizations that need to be involved in setting goals and objectives, and participating in the decisions to meet them. Establishment of goals and objectives is an element of the planning process preliminary to the implementation of management programs.

A planning tool available to the public officials and private sectors in the Grand River Basin is the Comprehensive Water Resources Planning Study that was initiated as a federal-state program in 1963. The basic objective of the study was to formulate a "Comprehensive Plan for the Grand River Basin to provide the best use, or combination of uses, of water and related land resources to meet all foreseeable short and long term needs."[7]

The purpose of this thesis is to explain the reason the Federal government became involved in conducting studies on river basins and then to review the procedures followed leading to the completion of the report.

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[7] Plan of Investigation, op. cit.

Included in the report are many water and land related resources management programs suggested by the federal and state planners that can be adopted by local governmental units to meet the projected needs of the basin. These programs will be addressed in the thesis to identify the enabling powers for implementing the various programs, and to provide guidelines and resource materials for convenient reference aids.

CHAPTER II

COMPREHENSIVE WATER RESOURCES PLANNING STUDY FOR THE GRAND RIVER BASIN

Regional assessment of water needs was first approached in a comprehensive manner by the Water Resources Committee of the Natural Resources Committee between 1935 and 1937. Long-range plans for the construction of public works projects were developed, but it was not until over 20 years later that steps were taken to conduct comprehensive plans on river basins.

History of Grand River Basin Study

The concept of comprehensive planning for the Grand River Basin began in 1959 when the United States Senate adopted Resolution 48 which authorized,

> studies to be made of the extent to which water resources activities in the United States are related to the national interest, and of the extent and character of water resources activities, both governmental and nongovernmental, that can be expected to be required to provide the quantity and quality of water for use by population, agriculture, and industry between the present time and 1980, along with suitable provision for related recreational and fish and wildlife values; to the end

> that such studies and the recommendations based thereon may be available to the Senate in considering water resources policies for the future.[1]

Pursuant to this resolution, a Select Committee on National Water Resources was created from the Senate under the chairmanship of Robert S. Kerr, Oklahoma. The Committee recognized that its task in the water field was in meeting the growing demands on water resources in the most efficient manner consistent with accepted public aims. Five major categories were cited as needs for the future in meeting prospective demands on a long range basis so as not to inhibit national or regional economic growth. These were:

1. Regulating streamflow through the construction of surface reservoirs and watershed management.
2. Improving the quality of our streams through more adequate pollution abatement programs.
3. Making better use of underground storage.
4. Increasing the efficiency with which water is used through elimination of wasteful practices, improved sewage treatment methods, recirculation, increased irrigation efficiency, and substitution of air for water cooling.
5. Increasing the natural water yield by desalting, weather modification, and other artificial means.

Several recommendations were presented by the Committee endorsing the responsibility of the Federal Government to develop research programs, studies, plans and resources management programs in cooperation with the State. The

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[1] Senate Report No. 29, 87th Congress, 1st Session, U. S. Government Printing Office, Washington, D.C., 1961, p. III.

need for river basin planning was stated as the first recommendation of the report:

> 1. The Federal Government, in cooperation with the States, should prepare and keep up to date plans for comprehensive water development and management for all major river basins of the United States. Such plans should take into account prospective demands for all purposes served through water development giving full recognition to non-revenue-yielding purposes such as streamflow regulation, outdoor recreation, and preservation and propagation of fish and wildlife, and keeping in mind the ultimate need for optimum development of all water resources. All practicable means of meeting demands should be considered. The executive branch should be requested to submit plans to the Congress in January 1962, for undertaking and completing such studies in all basins by 1970. Once prepared, the plans should be brought up to date periodically. Reports on individual projects submitted to the Congress for authorization should specify how the project fits into the comprehensive long-range program, and the range of alternative purposes that might be served by the resources needed for the recommended projects. (ibid., pp. 17-18).

Following the adoption of the Committee's Report No. 29, the President of the United States directed the heads of four Departments (Army; Agriculture; Health, Education, and Welfare; and Interior) having the principal statutory responsibility for Federal activities in water and land related resources, conservation and development, to develop

> policies, standards, and procedures for the formulation, evaluation, and review of plans for water and land related resource projects.[2]

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[2] Senate Document No. 97, 87th Congress, 2nd Session, U. S. Government Printing Office, Washington, D. C., 1962, p. III.

The report of the four concurring Departments was adopted as Document No. 97, 87th Congress, 2nd Session and would become the responsibility of the National Water Resources Council under the proposed Water Resources Planning Act, to use as standards for the formulation and evaluation of water resources projects. The Water Resources Planning Act, Public Law 89-90 was adopted by the 89th Congress, July 22, 1965. This is an act,

> To provide for the optimum development of the Nation's natural resources through the coordinated planning of water and related land resources, through the establishment of a water resources council and river basin commissions, and by providing financial assistance to the States in order to increase State participation in such planning.

According to the terms of this act, there was established a Water Resources Council composed of the Secretary of Interior, the Secretary of Agriculture, the Secretary of the Army, the Secretary of Health, Education, and Welfare, and the Chairman of the Federal Power Commission; the Chairman of the Council to be selected by the President.

The President is also authorized to declare the establishment of a river basin commission following specified requests. In accordance with the provisions of the act, there has been created a Great Lakes Basin Commission.

The Grand River Basin Study, being one of sixteen Type II--Comprehensive Water Resources Planning Studies authorized throughout the nation in 1962, is one of the Federal programs to be processed through the Commission and

the Council, and to the President for his review and transmittal to the Congress with his recommendations in regard to authorization of Federal projects.

Comprehensive planning for the Grand River Basin embraces investigations of all matters associated with water and related land resources use, conservation, and development. Specific water-related activities to be studied included navigation, flood control, major drainage, water supply, water quality control, hydro-electric power, fish and wildlife habitat enhancement, recreation, waste disposal, flood warning schemes, agricultural needs, and others as they become known.

Institutional Structure For Planning

Completion of the study required cooperative efforts of the Federal agencies, State of Michigan, and local governments. To accomplish this program, the Grand River Basin Coordinating Committee was created, comprised of delegated representatives from the Departments of Agriculture; Army; Commerce; Health, Education and Welfare; Interior; the Federal Power Commission; and the State of Michigan. Representatives from the Michigan Grand River Watershed Council were permitted to sit with the State representatives in behalf of the local governmental units throughout the basin.

The Coordinating Committee created the Basin Plan Formulation Subcommittee to assimilate the various reports and prepare a Suggested Plan for the Report. Upon completion of the Suggested Plan, and following public hearings in the basin, the Coordinating Committee prepared the Main Report for transmittal to the Great Lakes Basin Commission and the National Water Resources Council. Following the reviews by the Great Lakes Basin Commission and the National Water Resources Council, the Grand River Basin Report is presented to the President and Congress.

Preparing for the Suggested Plan

The Basin Plan Formulation Subcommittee was the basic planning unit to develop the Suggested Plan. The first step toward the goal was the preparation of the Plan of Investigation. This Plan established the scope of the study and detailed the process to be followed to complete the report. As determined in the Plan of Investigation, the following reports in Table I would become the Grand River Comprehensive Basin Study.

The single purpose agency reports contained investigations of the needs of a specific functional water use, and the kind of management programs that would be needed to satisfy the problem. Each investigation was conducted without regard to the other functional uses of water or land resources.

TABLE I.--Reports in the Grand River Basin Study.

Volume	Item	Subject
I	Main Report	Summary, Plan & Recommendations
	Appendices	
II	A	History of Investigation
	B	General Basin Description
III	C	Climate
	D	Surface Water Hydrology & Hydraulics & Fluvial Sediment
IV	E	Ground Water and Geology
	F	Mineral Resources
V	*G	Water Use and Stream Quality Health Guidelines
VI	*H	Flood Control
	*I	Navigation
VII	*J	Recreation
	*K	Fish and Wildlife
	*L	Power
VIII	*M	Agriculture
IX	N	Water Laws
X	O	Economic Base Study
XI	P	Basin Plan Formulation Criteria
	Q	Suggested Plan

*Single Purpose agency reports.

Preparatory to conducting the various investigations for the single purpose reports, an inventory of the water and land resources was developed by the State of Michigan, Soil Conservation Service and the Corps of Engineers. An Economic Base Study was also completed to identify various trends and long range projections. A significant factor involved in this procedure was the advantage of having each agency study the Basin independently, without being influenced by other water interests.

Preparation of the single purpose reports and documentation of the natural and social resource data were the planning tools used by the Basin Plan Formulation Sub-committee to incorporate the following elements in the development of the Suggested Plan:

1. Prepare an inventory of the water and land resources.
2. Project the immediate and long range needs of the people.
3. Identify the water and land problems in the basin.
4. Identify various water and land management programs that might be used to satisfy the projected demands.

The Suggested Plan is considered to be a technical report, prepared by the planners of the various participating agencies. Local involvement in the planning process was accomplished through informational meetings for public officials and the general public. "Feed back" from these meetings assisted in the comprehensiveness of the report.

Each of the federal and state agencies had an equal role in the development of the Suggested Plan. The Corps of Engineers representative was the planning chairman. However, he served only as a convenor to permit equal participation by all members.

The Suggested Plan

Appendix Q is the Suggested Plan to lay the basis for the Grand River Basin Coordinating Committee to prepare the Main Report, which is sometimes called the Summary Report.

The Suggested Plan is not a single scheme for managing the natural resources, but rather, is a multitude of water and land related resource management programs that can be used in various combinations to fulfill the long range needs of the people. Implementation of each of these programs will require active participation by the benefiting local governmental units. Local interests and value judgements by the local people will have an important role in the determination of when, where and how the respective programs will be implemented.

> The Plan was developed with the overriding objective to develop the plan as being the best use of the water resource and related land resources, and meeting the objectives of Senate Document No. 97, 87th Congress, 2nd Session entitled:
>
> 'Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Land Resources.'
>
> In the Plan, projects are discussed in broad categories as being either structural or nonstructural and are further defined as being single-purpose or multiple-purpose.

Preparation of the Plan was accomplished according to the established principles in Appendix P--Basin Plan Formulation Criteria. The Plan was also formulated within the legal framework of the federal, state and local governments. "Drainage laws, riparian doctrine, court injunctions, and other institutional controls peculiar to the state of Michigan will be fully considered in the recommended plan."[3]

This section, The Suggested Plan, is designed to identify the structural and nonstructural elements of the plan. The next section, "Implementation of the Suggested Plan," will provide guidelines for their implementation. Appendix T is a schematic map of the structural programs identified in the Suggested Plan.

Structural Programs

Reservoirs--An inventory of potential reservoir sites was developed from data collected by the Michigan Department

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[3] Plan of Investigation, op. cit.

of Natural Resources, the Soil Conservation Service and the Corps of Engineers. Over 200 sites were listed that may have capabilities to provide water supply, flood control, power, fish and wildlife, recreation, water quality or irrigation. Through an intensive screening process by the participating agencies, 21 sites were chosen that had the best capability for providing multi-purpose benefits. These sites are listed in Table II.

TABLE II.--Potential Multipurpose Reservoir Sites.

Name	Location (Counties)	Benefits
Upper Grand River Reservoir System	Jackson, Ingham, Livingston	Flood Control, Water Quality, Recreation, Fish and Wildlife
Sleepy Hollow	Clinton	Flood Control, Fish and Wildlife, Recreation
Columbia Creek	Ingham	Recreation
Portage River	Jackson, Ingham	Fish and Wildlife
Prairie Creek	Ionia	Recreation, Fish and Wildlife, Flood Control
Portland	Ionia, Clinton	Flood Control, Fish and Wildlife, Recreation, Water Quality
Sand Creek	Ottawa	Recreation, Fish and Wildlife
Bear Creek	Shiawassee	Recreation, Flood Control, Fish and Wildlife

TABLE II.--Continued.

Name	Location (Counties)	Benefits
No Name Creek	Eaton	Recreation, Fish and Wildlife
Ravenna	Muskegon	Recreation, Fish and Wildlife, Irrigation
Labarge	Kent, Barry	Flood Control, Fish and Wildlife
Duck Creek	Ionia	Recreation, Fish and Wildlife
Fish Creek	Ionia, Montcalm	Recreation, Fish and Wildlife
Grub Creek	Shiawassee	Recreation, Fish and Wildlife
Looking Glass River	Shiawassee	Recreation, Fish and Wildlife
Rogue	Kent	Recreation, Fish and Wildlife

Each of these sites would serve a benefit area for a distance of approximately 40 miles in radius. Reservoirs with Flood Control and Water Quality benefits would improve the stream condition all the way to Lake Michigan. The other sites inventoried are included in the report and may be considered for development by the local areas.

Watershed Projects--Watershed Development Projects are programs that are designed to primarily provide local flood control and agricultural drainage benefits on upstream

watershed areas. Additional benefits that can be included are water supply, waste disposal and recreation.

The Soil Conservation Service investigated the flooding and drainage problem areas throughout the basin and determined there were certain areas that should be considered for watershed planning before 1985. Table III identifies these areas.

TABLE III.--Suggested Watershed Development Areas.

Name	Location (Counties)
Twin Lakes Drain	Jackson
Freeman Marsh Drain	Jackson
Huntoon Lake	Jackson, Ingham
Perry Lake	Jackson, Ingham
Bly Lake	Eaton
Eaton Rapids	Eaton
Upper Columbia Creek	Ingham
Portage River	Jackson, Ingham
Prairie Creek	Ionia, Montcalm
Libhart Creek	Ionia
Upper Maple River	Clinton, Gratiot, Shiawassee
Hayworth Creek	Clinton
Stony Creek	Ionia, Clinton
Rogue River	Kent, Newaygo

Other areas may be initiated by action of local sponsors. Areas that are being considered by local interests are, Plaster Creek, Buck Creek, Mud Creek, Cedar River, and the Upper Grand.

Waste Treatment Plant Construction--The immediate goal in the treatment of municipal wastes is the provision of biological (secondary) treatment or its equivalent at each waste treatment plant. Such treatment is the minimum considered adequate in terms of present technology. This need is especially important in those areas where consideration is being given to low flow augmentation, to assist in maintaining water quality standards. Augmentation cannot be considered as a substitute for secondary treatment.

Navigation--Improving the navigational aspects of the Grand River from its mouth to the City of Grand Rapids is one of the construction programs suggested in the plan.

One part of the proposal is to improve the commercial navigation benefits the first 14 1/2 miles up to Bass River. The second part proposes to improve the remainder of the stream up to Grand Rapids for recreational navigation.

Flood Control Levee at Grandville--Because of the large amount of uncontrolled drainage area between the potential flood control reservoir sites and the City of Grandville, the reservoir plan would not reduce the flood problem at Grandville sufficiently to preclude the need for a local protection project. The construction of a levee

system with interceptors and pumping facilities for interior drainage has been found to be the most practicable and justifiable method for effectively controlling flood problems and enhancing land values at the City of Grandville.

Nonstructural Programs

Water and land resource programs that do not involve construction are nonstructural programs. They may be in the form of state or local regulations, research, education and information, warning systems or various types of investigations.

Water Quality Standards--Standards are needed to protect the quality of water for all anticipated needs. State standards are now being applied to all surface waters to protect water supply, recreation, fish, wildlife, aquatic life and agricultural needs.

Valley Preserves--A valley preserve is a nonstructural device for managing water resources through the preservation of flood plain land as a green belt. Designation of specific areas to be included within the valley preserves would be guided by the attempt to achieve the following principal objectives: (1) the preservation of ecologically significant areas worthy of preservation in their natural state; (2) the management of areas capable of satisfying personal leisure-time needs for outdoor activities such as hunting, fishing, camping and picnicking; and (3) the protection of areas within the flood plain to preclude unwise construction of buildings,

subject to flood damage. Appendix T is a schematic map of the structural programs identified in the Suggested Plan. Also noted on this map are suggested locations for designating valley preserves on the Grand River and its tributaries.

Land Treatment--Accelerated land treatment programs will need to be incorporated with watershed development projects and multipurpose reservoir projects to provide maximum productive use of the lands and to protect the waterways.

Environmental Enhancement of Urban Areas--A program for urban areas is needed in order to protect soil and water resources, and to provide an opportunity for man to live in harmony with his natural environment. These goals may be achieved through proper land use planning designed to reduce soil erosion, help maintain water quality, reduce flood damages, improve vegetative cover, provide recreation, fish and wildlife, and enhance natural cover.

Soil Erosion Control Regulations--State and local legislation is essential to protect the Basin's soil resources and watercourses. Soil transport to lakes and streams becomes a more critical problem each year due to intensive farming practices, inadequate land conservation practices, and uncontrolled runoff from rapidly urbanizing areas.

Flood Plain Land Use Regulations--Development of the flood plain has been minimal due to the availability of other lands for urbanizing. Rapid growth in the Basin will place greater premium on lands adjoining the water courses.

Regulatory controls through zoning, building and health codes, and subdivision control regulations is the key to the proper utilization of the flood plain areas.

Water Supply Improvement--Ground and surface water development provide possible alternatives to reservoir storage development for the creation and maintenance of municipal or industrial water supplies.

Stream Channel Clearance--In order to preserve the streams and to develop them for maximum effectiveness, local governmental units should adopt and enforce waterway regulations requiring that obstructions detrimental to the public health, safety and welfare be designated as a public nuisance and be eliminated.

Stream Flow Forecasting and Flood Warning--Weather surveillance and warning programs are important elements of a comprehensive nonstructural program for a river basin. Data collection and reporting of hydrologic and climatologic conditions at the local level are important functions that would improve existing systems.

Horizontal and Vertical Geodetic Control.--The greater part of the Grand River Basin is without horizontal geodetic control; however, the Basin is covered by a general network of vertical geodetic control. Plans should be made and funds provided to cover the Basin with a network of horizontal control. A complete network of horizontal and

vertical geodetic control would be valuable in planning construction, actual construction, road relocations, and acquisition and land use within the Basin.

Topographic Mapping.--Approximately 550 square miles of the Grand River Basin are without topographic maps. The other 5,000 square miles is mapped with 15-minute and some 7 1/2-minute quadrangles. Complete conversion to 7 1/2-minute quadrangles with 5-foot contour intervals would greatly aid in the planning and development of resources within the Basin.

Soil Surveys.--Approximately one-half of the counties in the Basin have been surveyed and supplied with a documented soil classification report. Such surveys are planning tools used to guide land use and management decisions on farms and urbanizing areas. The soil survey describes soil limitations for building sites, on-site sewage disposal, road construction, recreation development, and other uses.

Information-Education Programs.--An informed public is the key element for establishing regional objectives and goals. Public programs result from the support of an informed public that has a concept of the needs of the region, and how these needs can be satisfied. An informed public is better equipped to share its concern and is better able to recognize the value in resolving regional issues on a cooperative basis.

Development of Goals and Objectives

The Suggested Plan was developed by the consensus of the participants representing the federal and state agencies. Attention was given to the few constructive criticisms and comments which contributed to the development of the plan.

Effective involvement in the planning process by local public officials and the "grass roots" of the basin was not possible because of the limitation of time to complete the study and prepare the report. A great deal of time was lost in meetings and special programs in defense of the planning concepts because of the lack of knowledge by the public on the long range needs and the alternative methods available to meet the projected demands.

Acceptance of the report on the Grand River Basin Study must be based on the recognition of the following facts:

1. The Comprehensive Water Resources Planning Study for the Grand River Basin is a report that; identifies trends, needs and inventories; and suggests various types of programs that can be developed to the advantage of the people in the basin.

2. The report is not a formal step by either of the various levels of government to implement any phase of the report.

3. Every structural program identified in the report that might be constructed will require financial support from the State and/or local units of government. Appropriation of these funds will require action through the normal democratic process which would rest on the political and social acceptance of the program.

4. The report contains a documentation of resource information available to public officials and the general public for their use in making resource management decisions.

Completion of the Grand River Basin Study places a new responsibility on the public officials representing over 250 governmental units in the Basin. Future decisions in community resource development can no longer be made without regarding the impact they may have on neighboring communities. The Study has identified the regional needs in the Basin. Satisfaction of these needs will require the cooperative and coordinated efforts of the multiude of communities in the Basin.

The Michigan Grand River Watershed Council is a regional governmental entity created to assist local governmental units throughout the Basin in the planning and carrying out water management programs. In the fulfillment of its function, the Watershed Council will need to provide a leadership role in assisting the governmental units to meet together for the purpose of evaluating the findings in the Grand River Basin Study, and then to assist them in establishing goals for the Basin and its subareas. Development of a workable plan will then need to be formulated in order to resolve priorities leading to the fulfillment of the established goals.

The Grand River Basin Report was developed by a wide range of technical and professional people actively involved in water and land resource management. Establishment of goals and development of workable plans will require the involvement of other disciplines including, political, social, ecological, environmental, economic, civic and the community "grass roots."

Goal setting and plan development should be accomplished by the Watershed Council through the local and regional planning commissions. The Basin could be divided into sub-basins for representatives of all disciplines to address themselved to the regional needs in the Basin. Representatives from the sub-basins should also serve on a basin committee to correlate the regional plan with a basin plan. Representatives from the state agencies should also be involved with the basin committee to further correlate all plans with state programs.

An important function of the basin committee would be the formulation of goals for land use, water supply, recreation, population density, economic development, public facilities and cultural development. The sub-basin groups should then establish local goals compatable with the basin goals preliminary to the development of workable plans. The key to the development and implementation of a workable plan for the basin, sub-basin area, and the local community, is the selection of alternative measures to arrive at the designated goals.

The Grand River Basin Report has identified a multiude of water and land related resource management programs that can be adopted by local governmental units to meet the short and long range needs of the people in the basin. The management programs have been classified into two basic categories as structural and nonstructural, and may be considered as alternative measures to problem solving, depending on the values to be applied in the decision making process.

Regional management of the natural resources is becoming more critical as conflicting demands increase, and the decision making role becomes more complex. A basic factor of regional management is regional planning. The next step is the implementation of recommended programs. The Grand River Basin Report has provided the basic planning tool by evaluating the trends occurring in the basin, projecting the long range needs based on these trends, and suggesting alternative measures that can be applied to the natural resources by the various levels of government.

Implementation of regional management programs requires the cooperative efforts of the public entities responsible to the general public. Many institutional programs are available in the State of Michigan that will enable local people to resolve problems and develop programs on a regional basis. The next chapter speaks directly to the matter of "implementation" in order to show public officials

opportunities available to them in planning, regulation and the development of their natural resources. Local, State and Federal laws are regulatory measures that assure proper use of the resources. Construction programs to stabilize stream flow or to create multiple purpose facilities are structural methods for resource management. Public acquisition of areas for the preservation of habitat areas, historical sites, or unique environmental areas is another method for managing the resources. The chapter will identify the alternative institutional arrangements for resource management and it will also suggest guidelines to public officials to assist them in making decisions leading to effective management of their natural resources.

CHAPTER III

IMPLEMENTATION OF THE SUGGESTED PLAN

The Suggested Plan was developed to fulfill most of the projected needs of the people for the next 50 years, utilizing the known available resources. Many elements of the plan can be accomplished on an incremental basis by individual units of government while other programs, serving a regional need will require the services and resources of all levels of government.

This section is designed to provide information on the institutional arrangements needed to implement each of the structural and nonstructural elements of the plan, and to suggest management tools for the effective use of the water and land related resources.

Structural Programs

Structural programs are capital improvement projects requiring major expenditures of public funds. Water supply, waste water treatment, flood control structures, navigational facilities and recreational development programs are typical structural programs. These projects may be financed separately or in combination with local and state governments,

and they may also be cost shared with funds appropriated from the federal government.

Reservoirs

Each of the suggested reservoirs will provide regional benefits for either flood control, recreation, fish and wildlife, water quality and irrigation, or a combination of any two or more benefits.

A regional planning group should be organized, comprised of representatives from the appropriate state and federal agencies, organized citizens groups, academic institutions, service organizations, news media and other groups organized to give attention to the wise use of the water and land resources.

The regional planning group should evaluate the projected needs outlined in the Grand River Basin Study. A thorough investigation should then be conducted to determine the various alternative programs available and select the most appropriate to satisfy the confirmed needs.

When it is determined a reservoir can serve a public need and can be classified as a public necessity, a recommendation should be initiated by an appropriate planning agency and endorsed by an eligible sponsor. The sponsor must then submit its request to the local Congressman for subsequent action at the federal level. Appendix L is an outline of procedures to be followed in order for the local governmental units to receive federal cost sharing on the project.

Upon determination that a reservoir is feasible and can justify public expenditure of funds as a public necessity, the local governmental units are permitted through proper enabling legislation, to proceed toward the development of the project. The following Public Acts should be reviewed to determine the most appropriate course of action to take to achieve the desired goals. It is not the purpose of the thesis to critique the anabling legislation on their effectiveness for implementation.

The Drain Code of 1956, Chapter 22-Water Management.--Reservoirs that will provide flood control as a major benefit can be implemented under this act. A petition must be filed by three or more counties that are contiguous and will benefit by the proposed project. The benefits which result from the drainage and control of water, shall include such factors as: elimination of flood damage; elimination of water conditions which jeopardize the public health or safety; increase of the value or use of lands and property arising from improved drainage and elimination of floods; and the advantageous use to which water may be directed as a result of the project, and incidental thereto, for agricultural, conservation and recreational purposes.

Surplus Waters Act of 1964.--Following a feasible finding by the Water Resources Commission to control surplus waters through the use of an impoundment, the Commission

may authorize one or more affected governmental units to implement an approved plan. The boards may charge users of surplus water for waste assimilation or consumptive use, except those making an incidental, noncommercial or recreational use, a reasonable fee or rate for the quantity of water or for the benefits they receive. According to the terms of the act, all increased flowage resulting from operation of a plan shall be available for nonconsumptive use to all riparians.

Local River Management Act of 1964.--Two or more local governments may petition to the Water Resources Commission to establish a river management district. River management in the act means the control of river flow by the operation of dams, reservoirs, conduits and other man-made devices in order to improve and expand the uses of the river for those who depend upon it for a variety of private and public benefits.

Navigation

Navigational Improvements.--The existing and future utilization of the Grand River in the interest of recreational and commercial navigation is being investigated. Studies include an analysis of existing navigation projects and their relationship to present and prospective commerce and vessel traffic, and investigations to determine the desirability of modifying existing projects or providing additional improvements for both commercial and recreational navigation. It is

concluded, based on the limited information available, that further improvement of Grand Haven Harbor and the lower reach of the Grand River to the Bass River for commercial navigation and improvement of the Grand River up to Grand Rapids for recreational navigation appear to have some economic justification and be worthy of further detailed study. Detailed study of the commercial improvement is presently underway in accordance with a study authorized by a House Public Works Committee Resolution adopted 1 March 1950. There is also another study authorized by a House Public Works Committee Resolution adopted 9 April 1957 which will cover the recreational boating aspect of navigation on the Grand River. These two authorized studies are expected to adequately provide the further detailed study recommended by this appendix. In summary, the following improvements appear at this time, subject to further study, to exhibit economic feasibility:

(a) Improving Grand Haven Harbor in the interest of commercial navigation by deepening the existing channel to provide a controlling depth of 25 feet and enlarging the turning basin.

(b) Improving the Grand River channel from Grand Haven to the Bass River in the interest of commercial navigation by widening the existing project channel to 125 feet in the straight reaches and 150 feet at the bends, and possibly increasing the project depth.

(c) Improving the Grand River in the interest of recreational navigation from the Bass River to Grand Rapids, a distance of about 23 miles, by providing a channel 5 feet deep and 100 feet wide. Improvements for recreational boating upstream of Grand Rapids were investigated, but were determined to be not economically feasible at this time. However, this does not preclude further study of these improvements should the need arise at some future date.

Appendix K outlines the procedures the Corp of Engineers will follow in the development of small navigational projects. Appendix R is a listing of enabling legislation for local governmental units to develop navigational programs.

River channels can also be protected and improved through land use regulations and development control programs. Appendix H suggest various regulations that may be adopted along waterfronts and Appendix O is a typical zoning regulation for controlling the development of marinas on a stream.

Flood Control Levee at Grandville

Based on an "Interim Survey Report on Flood Control at Grandville," dated 1962, an approved Federal flood control protection scheme for Grandville has been authorized by Congress for construction.[1]

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[1] House Document No. 15, 88th Congress, 1st Session, September 19, 1963.

Some of the important project features are:

1. The design water surface elevation of the level is 608 feet.

2. The average height of the levee embankment is 12 feet.

3. The levee top width is 10 feet, and the sideslopes are vertical on 2 1/2 or 3 horizontal.

4. The freeboard allowances range from 2 to 4 feet.

5. Closure structures are necessary at street crossings.

6. The gravity outlet and pumping station structure is located along Buck Creek between the C & O Railway and Highway I-196.

Procedures for obtaining federal funds for construction are outlined in Appendix L.

Watershed Projects

The Watershed projects identified in the Suggested Plan are those areas that have flooding and drainage problems that may be resolved through a multi-purpose watershed program of the U. S. Department of Agriculture.

Under the provisions of the Watershed Protection and Flood Prevention Act (Public Law 566), the federal government will cost share with local areas to develop flood prevention and agricultural drainage programs. Municipal and industrial water supply, recreation, and fish and wildlife development are additional benefits that can be derived from this program.

A 14 step program has been developed in Michigan to describe the sequence of events for the implementation and development of small watershed projects. (Appendix Q).

Small watershed projects have come to mean protecting, managing, improving, and developing the water and related land resources of a watershed up to 250,000 acres in size through a project-type undertaking.

A project is planned and carried out jointly by local, State, and Federal agencies with the full understanding and support of a large majority of the community.

The State is involved only when recreation, fish and wildlife benefits are included in the program.

Development of a small watershed project is based on (1) local initiation and endorsement of local responsibility, (2) State review and approval of local proposals, (3) and Federal assistance through technical services, cost-sharing, and credit assistance. It is a combination of soil and water conservation measures on farm and ranch land, other rural land, and public land (land treatment) and structural measures (dams, levees, channels). It bridges the resource-development gap between the soil and water conservation work of individual landowners, and the large Federal and State public works projects for water resource development in major river valleys.

The U. S. Department of Agriculture's Soil Conservation Service (SCS) has the primary responsibility for carrying out the small watershed program. Appendix M is an explanation of the procedural steps followed by the Soil Conservation Service in the development of watershed programs. Appendix R identifies enabling legislation available to local governmental units for serving as program sponsors. Appendix T graphically identifies local areas that have flooding and agricultural drainage problems.

Waste Water Treatment Plant Construction

Protection of the streams through improved municipal and industrial waste treatment is one of the most important elements of a water quality protection program. Plant operation surveillance, treatment plant operator's certification, operator training courses and updating of plant facilities are essential management tools to maintain the water quality goals. Table IV identifies the municipal facilities being required to meet state standards.

TABLE IV.--Municipal Waste Treatment Needs.

Municipality	County	Type of Pollution Control Facility Required
Delta Township	Eaton	Expansion Interceptor
Delhi Township	Ingham	Secondary
East Lansing	Ingham	Expansion-Phosphate removal
Eaton Rapids	Eaton	Secondary
Fowler	Clinton	Expansion-Phosphate removal

TABLE IV.--Continued.

Municipality	County	Type of Pollution Control Facility Required
Grand Haven	Ottawa	Secondary
Grand Ledge	Eaton	Secondary
Grand Rapids	Kent	Phosphate removal
Greenville	Montcalm	Secondary
Hastings	Barry	Secondary
Hubbardston	Ionia	Lagoon
Ionia	Ionia	Secondary
Jackson	Jackson	Tertiary
Kentwood	Kent	Interceptor
Lansing	Ingham	Phosphate removal
Leslie	Ingham	Secondary
Lowell	Kent	Lagoon
Mason	Ingham	Expansion
Nashville	Barry	Secondary
Ovid	Clinton	Lagoon
Pewamo	Ionia	Lagoon
Portland	Ionia	Secondary
St. Johns	Clinton	Phosphate removal
Summit Township	Jackson	Interceptor
Walker	Kent	
Williamston	Ingham	Secondary
Wyoming	Kent	Phosphate removal
Ashley	Gratiot	Lagoon
Ravenna	Muskegon	Lagoon
Montcalm C.C.	Montcalm	Secondary
Gaines Township	Kent	Secondary
DeWitt	Clinton	Secondary
Grandville	Kent	Interceptor
Dimondale	Eaton	Lagoon
Vermontville	Eaton	Lagoon
Wright Township	Ottawa	Lagoon
Lake Odessa	Ionia	Expansion
Hudsonville and Georgetown Twp.	Ottawa	Interceptor
Perry	Shiawassee	Lagoon
Mulliken	Eaton	Lagoon
Maple Rapids	Clinton	Lagoon
Sparta	Kent	Expansion
Westphalia	Clinton	Lagoon
Carson City	Montcalm	Lagoon
Laingsburg	Shiawassee	Lagoon
Caledonia	Kent	Lagoon
Casnovia	Muskegon	Lagoon
Dansville	Ingham	Lagoon

TABLE IV.--Continued.

Municipality	County	Type of Pollution Control Facility Required
Parma	Jackson	Lagoon
Grass Lake	Jackson	Lagoon
Middleville	Barry	Lagoon
Blackman Township	Jackson	Interceptor
Cascade Twp. and Grand Rapids Twp.	Kent	Interceptor
Leoni Township	Jackson	Interceptor

Appendix R identifies the enabling legislation permitting local governmental units to construct and maintain sewage disposal systems.

Nonstructural Programs

Management of the water and land resources through the adoption and enforcement of regulations, codes and ordinances is typified as nonstructural programs. Research, educational programs and informational services also come under this category.

Water Quality Standards

The State of Michigan adopted interstate water quality standards after four public hearings were held in 1967 at Muskegon, Marquette, Saginaw and Detroit. The categories of water use are as follows:

Water Supply
- Domestic
- Industrial

Recreation
   Total body contact
   Partial body contact

Fish, wildlife and other aquatic life

Agricultural

Commercial and other uses

Each of these use classifications were assigned water quality standards for each of the following parameters:

Coliform Groups
Dissolved Oxygen
Suspended, Colloidal & Settleable Materials
Toxic and Deleterious Substances
Total Dissolved Solids
Nutrients
Taste & Odor Producing Substances
Temperature
Hydrogen Ion
Radioactive Materials

Water Quality Standards for Intrastate waters were adopted September 27, 1967. In 1968, five additional public hearings were held at Ann Arbor, Saginaw, Kalamazoo, Marquette, and Traverse City. The purpose of these hearings was to determine the desired use designation for all intrastate surface waters. The Water Resource Commission adopted use designations for all surface waters at its regular meeting March 20, 1969.

Regulations to control waste discharges can be adopted by local governmental units, providing they have the technical capability for enforcement. The City of Grand Rapids has

made a significant advance toward protection of the water quality through the adoption of waste discharge regulations."[11] The Ordinance comprehensively covers definitions, management, regulations, uses of sewers, interceptors and treatment systems and the administration for enforcement. The following specific standards on waste discharges have been incorporated:

Use of Sanitary and Combined Sewers.--Except as hereinafter provided, no person shall discharge or cause to be discharged any of the following described matter, material or wastes into a sanitary or combined sewer:

(1) Any liquid or vapor having a temperature higher than 140 degrees F.

(2) Any water or wastes which may contain more than 50 mg/l of animal or vegetable fat, oil or grease.

(3) Any gasoline, benzene, naptha, fuel oil or other inflammable or explosive liquid, solid or gas.

(4) Any grease, oil or other substance that will become solid or viscous at temperature between 32 degrees and 140 degrees F.

(5) Any garbage that has not been properly shredded.

(6) Any mineral oil or grease, ashes, cinders, sand, mud, plastics, wood, paunch manure, straw, shavings, metal, glass, rags, feathers, asphalt, tar, manure or any other solid or viscous substance capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewage works.

(7) Any waters or wastes having pH lower than 6.0 or higher than 10.0 or having any other corrosive properties capable of causing damage or hazard to structures, equipment and personnel of the Treatment Works.

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[2]Waste Water Control, Ordinance No. 68-66. City of Grand Rapids, Michigan, 1969.

(8) (a) Any waste flow or batch discharge in excess of:

6 mg/l of Zinc as Zn.
2 mg/l of total Chromium as Cr.
1.5 mg/l of Cadmium as Cd.
1 mg/l of Copper as Cu.
1 mg/l of Cyanide as CN.
1.5 mg/l of Nickel as Ni.
.02 mg/l of Phenol.

(b) Any discharge of phosphorous, ammonia, nitrates, sugars or other nutrients or waste waters containing them shall be limited to the extent necessary to prevent adverse effects on treatment processes or the stimulation of growths of algae, weeds and slimes which are or may become injurious to water supply, recreational use of water, fish, wildlife, and other aquatic life.

(9) Any paints, oils, lacquers, thinners or solvents including any waste containing a toxic or deleterious substance in sufficient quantity to impair the Sewage Treatment process or constitute a hazard to employees working in the Sewer System and Treatment Plant.

(10) Any noxious or malodorous gas or substance capable of creating a public nuisance.

(11) Any waters or wastes containing suspended solids of such character and quantity that unusual attention or expense is required to handle such materials at the Sewage Treatment Plant, or by the Sewer Maintenance Division.

(12) Any excessive discoloration (such as, but not limited to, dye wastes and vegetable tanning solutions), or any unusual chemical oxygen demand, chlorides, sulfates or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works.

(13) Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by applicable State or Federal regulations.

(14) Waste from any individual sewage disposal system except at the Sewage Treatment Plant as provided in Section 2.82; Provided, that wastes from any individual sewage disposal system may be disposed of directly into a sanitary sewer upon entering into an agreement with the City, which agreement shall specify the site of disposal, sewage disposal charge and such other conditions as may be required to satisfy the sanitation and health requirements of the City. For the purpose of this subsection 'individual sewage disposal system' is defined to include every means of disposing of industrial, commercial, household, domestic or other water-carried sanitary waste or sewage other than a public sanitary sewer.

(15) Any sludge, precipitate or congealed substance resulting from an industrial or commercial process, or resulting from the pre-treatment of the person's waste water or air pollutants.

Municipalities may adopt similar regulations providing they are not less restrictive than the State's Water Quality Standards. Enabling legislation for local enforcement of water quality standards is listed in Appendix R.

Protection of the water quality can also be provided through various enforcement programs. Local units may; adopt littering regulations similar to the State Act (Appendix A); regulate filling, grading and drodging (Appendix D); and adopt nuisance regulations (Appendix N).

Flood Plain Land Use Regulations

Management of the flood plain implies orderly planning and use of the area subject to inundation. The two general methods used in a management program are corrective measures

and preventive measures. Corrective measures are accomplished by constructing facilities that control the flood waters or by physically changing the affected area:

Construction of Flood Control Facilities	Other Protective Measures
Dams and Reservoirs	Evacuation
Levees or Walls	Flood Proofing
Channel Improvements	Urban Redeveloping
Watershed Treatment	

Preventive measures result from planning, leading to the development of flood plain regulations or implementation of other indirect measures:

Flood Plain Regulations	Indirect Measures
Zoning Ordinances	Development Policies
Subdivision Regulations	Open Spaces
Building Codes	Tax Adjustments
Health Regulations	Warning Signs
	Flood Insurance

Implementation and effective enforcement of flood plain regulations is contingent on sufficient technical data to identify the potential flood hazards of an area and the limits of the flood plain. The following documents may be considered as models for developing local regulations:

1. General Criteria for Flood Plain Regulations
2. Model Flood Plain Zoning Ordiance
3. Flood Plain Ordinance--City of Lansing

The material is prepared to serve as a guideline to communities for preparing local regulations. Careful

consideration should be given to correlating the flood plain ordinance with other ordinances of record in the community.

Public policies proclaimed through the adoption of ordinances and regulations should be undergirded with well defined purposes and objectives. The following outline is submitted as a guide for policy determination:[3]

A. Purposes and Objectives

The purpose of these criteria is to provide a uniform basis for the preparation and implementation of sound flood plain regulations for Michigan rivers and streams in order to:

1. Protect human life and health.
2. Minimize expenditures of public monies for costly flood control projects.
3. Minimize rescue and relief efforts, generally undertaken at the expense of the general public.
4. Minimize business interruptions. Closing of factories and businesses, disruption of transportation routes, and interference with utility services result in loss of wages, sales and production.
5. Minimize damage to public facilities on the flood plain such as water mains, sewer lines, streets and bridges. These facilities are repaired at the expense of the general public.
6. Help maintain a stable tax base by the preservation or enhancement of property values for future flood plain developments. In addition, development of future flood blight areas on flood plains will be minimized and property values and the tax base adjacent to the flood plains will be preserved.

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[3]Adapted from Wisconsin's Flood Plain Management Program.

7. To discourage the victimization of unwary land and home buyers.

To accomplish the foregoing objectives, provisions in flood plain zoning and other flood plain management practices and the administration and enforcement thereof shall, among other things:

1. Reduce the hazard of floods to life and property through:
   a. Prohibiting certain uses which are dangerous to life or property in time of flood.
   b. Restricting uses which would be hazardous to the public health in time of flood.
   c. Restricting uses which are particularly susceptible to flood damage, so as to alleviate hardship and reduce demands for public funds for relief and protection.
   d. Requiring permitted flood plain uses, including public facilities which serve these uses to be protected against floods, thereby providing flood protection at the time of initial construction.
2. Protect the storage capacity of flood plains, and assure retention of sufficient floodway area to convey flood flows which reasonably can be expected to occur, through:
   a. Regulating filling, dumping, dredging and alteration of channels by deepening, widening or relocating.
   b. Prohibiting unnecessary encroachments in floodways.
   c. Encouraging open space uses such as agricultural and recreational.

An essential tool needed to properly identify the flood plain area of a community is a hydrologic study. Intensity of flooding, frequency of floods and designation of flood

hazard areas is needed to properly plan the land use of the urbanizing areas.

Following the last glacial period ending about 10,000 years ago, the Basin has been exposed to an average of about 31 inches of precipitation each year. There have been extremely wet years and drought years. Many steam beds dry up during low rainfall periods and may flood the area after a moderate rain. Other streams may be less eratic but over long periods of time may be subject to severe flooding due to extreme climatic conditions.

New factors have been introduced, due to the influence of man, that have affected the flow characteristics of our streams. Urbanization has placed a premium on the land adjoining the waterways that have led to the development of areas that were once used by nature to store water during heavy rainfall periods. Encroachment on the stream channels have also limited the capability of the stream to discharge water. Community growth requires the development of thousands of acres of streets, parking lots, commercial buildings, industrial buildings and residential buildings that shed water instead of allowing it to infiltrate into the soil. The additional runoff adversely influences the quality and flow characteristics of the streams and rivers.

Hydrologic studies of streams are conducted to determine the stream flow characteristics with relation to the

climate, and to identify the potential hazards that can be reasonably predicted if there are not water management programs.

Stream flow characteristics are determined according to recorded data from previous rainfall and flood occurrences. Other meteorological factors are also used to help project the frequency and intensity of future floods. The technical data can then be used to develop soil and water management controls, and can also serve to qualify the need for controls to protect the health, safety and welfare of the community.

The Flood Plain Information Study on the Red Cedar River[4] is a typical hydrologic study of a stream. Such a study identifies the general conditions, natural and manmade, of the study area, and analyzes the hydrologic records of the stream. Technical data is then developed to show the intensity of stream flow on any given occasion, and to predict the frequency of critical flood conditions.

Completion of a Flood Plain Information Study will enable a community to develop water management controls to protect the public and direct the proper utilization of the natural resources. These controls may be zoning laws, subdivision control ordinances, building codes, shoreline protection controls, water quality regulations, open use land regulations or stream use controls.

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[4]Flood Plain Information, Red Cedar River, Ingham County, Michigan, Corps of Engineers, U. S. Army, Detroit District, March, 1968.

An example of a flood plain control regulation is the Flood Plain Control Ordinance of Lansing, Michigan adopted July 1, 1968. Appendix C is the full text of the ordinance. Appendix J is a listing of references on flood plain management programs. Appendix R is another listing of enabling legislation for establishing local regulatory programs on the flood plain. Protetection of the flood plain may also be accomplished through the enforcement of the Natural River Act by the State of Michigan (Appendix G), and Act 167 PA 1968 administrated by the Michigan Water Resources Commission (Appendix S).

Valley Preserves

Preservation of water and land related areas for direct and indirect public benefit is suggested as a valley preserve measure in the Grand River Basin Study. Valley preserves could be a program implemented by all levels of government within their respective enabling powers. Potter Park of Lansing on the Red Cedar River is typical of how a community can acquire marginal land and develop it for public use.

The State of Wisconsin has adopted a Shoreland Protection Ordinance to

> further the maintenance of safe and healthful conditions; prevent and control water pollution; protect spawning grounds, fish and aquatic life; control building sites, placement of structure and land uses and reserve shore cover and natural beauty.[5]

[5]Wisconsin's Shoreland Protection Ordinance, Department of Natural Resources, Division of Resource Development, University of Wisconsin, Madison, Wisconsin, 1967.

Under the provisions of this act, the counties are responsible for the adoption of acceptable controls, and if this is not accomplished, "the Division of Resource Development shall adopt such a resolution."

The State of Michigan adopted the "natural river act of 1970" to

> authorize the establishment of a system of designated wild, scenic and recreational rivers; to prescribe the powers and duties of the natural resources commission with respect thereto; to fund necessary study and comprehensive planning for the establishment of the system; to provide for planning, zoning and cooperation with local units of government; to authorize the protection of designated river frontage by acquisition, lease, easement or other means; to authorize local units of government and the commission to establish zoning districts in which certain uses of rivers and related lands may be encouraged, regulated or prohibited; to provide for limitations on uses of land and their natural resources, and on the platting of land; and to provide that assessing officers shall take cognizance of the effect of zoning on true cash value.

Through the provisions of this act the Natural Resources Commission may designate a river or portion thereof, as a natural river area for the purpose of preserving and enhancing its values for water conservation, its free flowing condition and its fish, wildlife, boating, scenic, aesthetic, flood plain, ecologic, historic and recreational values and uses. In the interest of protecting the "home rule" philosophy, local communities should initiate local programs to maintain local control rather than relinquish this right to the State.

Crawford County, Michigan has adopted a Green Belt Zoning Ordinance which provides such controls as; use regulations; height regulations; area regulations; minimum floor areas; native protection strips for the stream, flood areas and grade level; and regulations for sanitary waste systems, Appendix B.

Communities throughout the Grand River Basin could designate a Valley Preserve District in their comprehensive plans and zoning ordinances to identify areas that will be needed to satisfy long range public demands for all water and land related areas.

The use designation in the Valley Preserve District could be one or more of the following uses, or similar uses:

(a) Forestry

(b) Utilities such as, but not restricted to, telephone, telegraph and power transmission lines;

(c) Hunting, fishing, and wildlife preserves

(d) Preservation of scenic, historic and scientific areas

(e) Non-residential buildings used solely in conjunction with the raising of waterfowl, minnows, and other similar lowland animals, fowl, or fish;

(f) Hiking trails, bridle paths, scenic sites and lookouts;

(g) Public and private parks, picnic areas, golf courses, swimming beaches, camping sites, boating and similar uses;

(h) Structures for flood control, drainage, navigation, fish ladders, irrigation, water supply and water quality facilities;

(i) Green belt areas, buffer zones and protection strips along streams, highways and other development areas;

Establishing the Valley Preserve District in the Comprehensive Plan and the Zoning Ordinance of the community is an attempt to preserve the land for its desired use. Change of private ownership may place the community or other governmental agency in a position to require acquisition in order to assure preserving the integrity of the plan. Should the original property owner realize a property value loss due to the zoning, he may find recourse with the courts for damages.

Designation of the Valley Preserve District in the Comprehensive Plan permits the community or other governmental agency, first option within a reasonable time, to acquire the land. Failure to acquire the land by the community, or the governmental agency, would result in a forfeiture of the privilege to retain the land for its designated use.

Land acquisition will not be required to implement all phases of the Grand River Basin Plan. Preservation of some aspects of the plan such as flood plain areas, preservation of natural habitat areas, diking and ingress-egress, and limited use privileges could be attained with easements, leaving all other land rights to the property owner providing these rights do not interfere with the Basin Plan.

Implementation of regional water management programs can be accomplished through the development of structural facilities, such as, dams, dikes, pumping stations, stream channeling, park development, fish ladders, and land development programs.

Non-structural programs can also be used either as an alternate to a structural program, or as a supplement to the structural programs. Examples of non-structural programs include such methods as, flood plain zoning, governmental acquisition of land, land use controls, establish and maintain water quality standards, soil erosion controls, or secure easements from private property owners to permit specific public use of lands.

Designation of water courses and tracts of land as Valley Preserve Districts is a non-structural means of preserving land and water areas for immediate or future development and use by the public. The success of this method for satisfying the regional needs of the basin can only be measured by the coordinated planning effort by the governmental units to incorporate the Valley Preserve District in their comprehensive plans and their zoning ordinances. Through coordinated planning, common needs are determined, values are identified, goals are established, and the means to reach those goals are developed. Coordinated planning further assures strength in our democracy through programs that are socially acceptable,

economically feasible and politically sound. Appendix R identifies enabling legislation for governmental units to develop park systems.

Land Treatment of Rural and Urban Areas

The Grand River Basin Study reports land treatment measures for watershed protection will be needed on 1,471,000 acres of crop, pasture, forest and miscellaneous land in the Basin by 1985. The Study also emphasizes the need to protect soil and water resources, and to provide an opportunity for man to live in harmony with his natural environment.

In order to more fully meet total 1985 needs, and to provide adequate protection for proposed structural measures, a 10 year accelerated land treatment program is recommended. This program will apply the necessary treatment on an estimated 481,200 acres, or 33 percent of the total Basin needs.

The other phase of the accelerated land treatment program will be applied within the drainage area of the proposed multi-purpose structures. This program, to be implemented through Soil Conservation Service and Cooperative Federal-State Forestry programs, will provide adequate treatment for 332,600 acres at an estimated cost of $18,572,000. It will provide for 66 percent of the remaining 1985 needs behind the proposed structure sites.

Conservation treatment measures will include (1) water control measures such as terraces, waterways, and field diversions; (2) measures to protect the soil from erosion and increase infiltration rates such as strip cropping, contouring, cover cropping, minimum tillage, and crop residue management; (3) farm drainage systems; (4) farm ponds; (5) gully control measures; and (6) improved forest land management.

Environmental Enhancement of Urban Areas through Soil, Forest, and Water Conservation

A technical assistance program for urban areas is needed in order to protect soil and water resources, and to provide an opportunity for man to live in harmony with his natural environment. These goals may be achieved through proper land use planning designed to reduce soil erosion, help maintain water quality, reduce flood damages, improve vegetative cover, and enhance natural beauty. This program would provide assistance to planning boards community leaders, and developers in formulating and implementing effective land use plans.

Vegetative cover, including trees, shrubs, and grasses, established, retained, or improved in the metropolitan areas would provide natural beauty, recreation opportunities, and environmental enhancement. This program would furnish technical assistance for the development and maintenance of forests, nature areas, parks, open spaces, buffer zones, and greenbelt areas.

Soil Erosion Control Regulations

A sediment control program in the rural and urbanizing areas should involve the following basic principals:

A. Sediment Control in the urbanizing area should become a stated policy of the county government and all concerned public agencies operating in or having jurisdiction in the county. All departments and divisions should cooperate in implementing the program.

B. Sediment control provisions should be incorporated in the planning stage for most effective application in the construction stage of development.

C. Competent technical personnel, workable procedures and regulations, and enforcement are essential for successful sediment control.

D. Practical combinations of the following technical principals will provide effective sediment control when skillfully planned and applied:

1. The smallest practical area of land should be exposed at any one time during development.

2. When land is exposed during development, the exposure should be kept to the shortest practical period of time.

3. Temporary vegetation and/or mulching should be used to protect critical areas exposed during development.

4. Sediment basins (debris basins, desilting basins, or silt traps) should be installed and maintained to remove sediment from run-off waters from land undergoing development.

5. Provisions should be made to effectively accommodate the increased run-off caused by changed soil and surface conditions during and after development.

6. The permanent final vegetation and structures should be installed as soon as practical in the development.

7. The development plan should be fitted to the topography and soils so as to create the least erosion potential.

8. Wherever feasible, natural vegetation should be retained and protected.

E. A public information and education program on sediment control is necessary to obtain public and industry support.

F. Research, evaluation studies, and observations should be conducted to provide needed information for improvement of the program.[6]

The Township of Oakland, Oakland County, Michigan has adopted one of the first subdivision control ordinances that incorporates a grading section to control erosion.

ARTICLE V-GRADING

SECTION 500.SUBMITTAL PROCEDURE:

For Township approval of the grading plan for erosion and sediment control, the applicant shall furnish a detailed estimate and three sets of the subdivision and/or site grading plans. The Township Engineer shall review the estimate and plans for conformity to the principles set forth herein, after which they will return one of the three sets with appropriate comments. The applicant, after making any changed requests on the set of plans returned to him shall then sumbit four sets of revised plans to the Township for final approval. The Township Engineer shall then review these revised plans for conformity to the comments mentioned heretofore, and if they have been properly made, will retain three copies for the Township's records, and return one approved copy to the applicant.

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[6] Soil Erosion and Sedimentation Control Program, Michigan Grand River Watershed Council, Lansing, Michigan.

SECTION 501.DESIGN PRINCIPLES:

1. In order to provide effective erosion and sediment control, practical combinations of the following technical principles shall be applied to the erosion control aspects of the grading plan.

   a. The smallest practical area of land should be exposed at any one time during development.

   b. When land is exposed during development, the exposure should be kept to the shortest practical period of time.

   c. Temporary vegetation and/or mulching should be used to protect critical areas exposed during development.

   d. Sediment basins (debris basins, or silt traps) should be installed and maintained to remove sediment from run-off waters from land undergoing development.

   e. Provisions should be made to effectively accommodate the increased run-off caused by changed soil and surface conditions during and after development.

   f. The permanent final vegetation and structures should be installed as soon as practicable in the development.

   g. The development plan should be fitted to the topography and soil so as to create the least erosion potential.

   h. Wherever feasible, natural vegetation should be retained and protected.

The ordinance also provides for a fine and/or imprisonment upon conviction. It also declares each day that a violation is permitted to exist shall constitute a separate violation.

Many aids are available to public officials to assist them in the development, adoption and enforcement of soil erosion control. Appendix I lists valuable printed materials that may be used as guidelines and reference documents. Also listed are organizations and agencies that will provide technical and professional assistance.

The State of Maryland is recognized as the first state to embark on a formal soil erosion and sediment control program. Agencies at the local level of government were considered to be in the best position to approve subdivision development, land grading and flood plain development, and were likewise in the best position to effect a sediment control program. However, it was determined the Water Resources Commission of the State "must assume some responsibility in regard to sediment pollution".[7] The Department was authorized to develop sediment control regulations to apply to all public agencies as well as private industry and individuals.

Sedimentation has been classed as a pollutant in Michigan waters by the Water Resources Commission. Protection of the health and safety of the citizens, and enhancement of the natural environment requires a unified effort by all levels of government to control erosion and sedimentation. Appendix F is language for a legislative act prescribing the powers and duties of state agencies and local governments to provide for the necessary remedies. Appendix R identifies specific legislation for governmental entities to develop soil erosion control programs. A model soil erosion control ordinance can also be used as a basis for developing local control regulations (Appendix E).

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[7] Sediment Control Program for the State of Maryland, Water Resources Commission.

Soil Surveys

Soil surveys have been used to guide land use and management decisions on farms and in forested areas for many years. These same principles of managing soil and water can be applied to urban development problems. The soil survey describes soil limitations for building sites, on-site sewage disposal, road construction, recreation development, and other uses. It may also be used to locate potential sediment source areas, and as a tool for flood plain delineation.

A typical soil survey recently completed in the Grand River Basin is the Soil Survey of Ionia County.[8] This report identifies 83 different soil series, and describes their characteristics. Each of these soils have limited capabilities and relate various conditions that exist in the terrain. Soil information is important to the planner who is responsible for guiding the growth of a community, and utilize the maximum potential from the natural resources. Modern Soil Survey Maps will identify those areas that can be used for intensive building development on one end of the spectrum, to preserving submarginal land on the other end, for water and water related uses.

The 83 soil series in the Ionia County Soil Survey includes 12 soils, known as alluvial soils, that have been deposited from floods. Presence of these soils clearly identify those areas of the county that have been subject to frequent

[8]Soil Survey, Ionia County, Michigan, U. S. Department of Agriculture, Soil Conservation Service, East Lansing, Michigan, 1967.

inundation. There are difficulties encountered in analyzing alluvial soils. The frequencies of the various flood stages are not easily identifiable and the alluvial plains are generally smaller than the flood plain areas.

The importance of the Soil Survey is to provide analytical data to substantiate the evidence of flood conditions, and to determine proper development and usage of the soils by the municipal planner.

In addition to an analytical appraisal of the soils, the Soil Survey Report also contains 96 maps for a 575 square mile area graphically designating the location of all the soils. The municipal planner is better equipped to propose proper community development with relation to the ecology of the terrain, and realize the maximum benefit from the natural resources.

The Soil Conservation Service is authorized to contract with local governmental units for preparing a Soil Survey Report. Arrangements can be made with the District Conservationist at the District Office in the county, or by contacting the State Soil Scientist, Soil Conservation Service, 1405 South Harrison, East Lansing, Michigan.

Streamflow Forecasting and Flood Warning

The Weather Bureau within the Environmental Science Services Administration provides a public river flood forecast and warning service for the Grand River Basin through

its offices at Lansing and Grand Rapids. Future plans of basin development should consider the role of the river and flood forecast service as a means of flood control through reduction in damage to moveable property made possible by advance warnings. Also available are river forecast services by the state and federal geological services to cover daily and long range forecasts of streamflow for water supply, pollution abatement, recreation, and other water resources requirements.

Timely and accurate predictions of impending floods, when used in connection with an established flood plain management plan, provide substantial reductions in the loss of property. This method is especially effective in areas where the benefit/cost ratio does not justify a public investment in flood control structures. It is also effective where only partial protection is provided and it is necessary to make decisions as to emergency measures to be taken or evacuation ordered. There may be numerous cases where a relatively low-cost flood forecasting and warning service, when coupled with local plans for occasional evacuation and protection measures, will be more acceptable to the community than little used flood control structures which are expensive to operate and maintain.

Stream Channel Clearance

Stream channel clearance pertains to the removal of any obstruction in the stream channel that is deterimental to the public health, safety, or welfare, and impairs drainage. Pilings and other abandoned structures are known to exist in the Grand River and the Thornapple River. Dislocated trees are scattered along the stream beds, and pile up at bridge abutments and dams. Minor streams are sometimes completely bridged by obstructions.

In order to preserve the streams and to develop them for maximum effectiveness, local governmental units should adopt and enforce waterway regulations requiring that obstructions detrimental to the public health, safety, or welfare be designated as public nuisances and be eliminated. Whenever possible, responsibility for the prevention or elimination of a public nuisance should be assigned, with appropriate penalties against failure to act, but each local governmental unit should be prepared to eliminate the nuisance if it is not possible to identify the responsible party.

Stream and Lake Monitoring

Water management is a regional concern and should extend throughout the basin of the river. Systematic monitoring of the water quality conditions is a planning tool to assist all governmental units in the basin to determine what

steps are needed to assure the preservation of our water resources. Rapid urbanization, technological advancements and increasing demands on the water resources are factors that are always changing, and are factors that cause changing conditions in our streams and lakes. Water conditions are always subject to change due to these factors. The need to observe these changes becomes increasingly critical to assist governmental units in determining water pollution problems and developing water management programs.

Purpose.--Monitoring the water resources is an action program involving a systematic surveillance of the water characteristics to observe conditions and detect changes. The program should be continuous and each phase of the program should be conducted in a consistant manner in order to develop valid conclusions.

Procedures.--Standard procedures are essential to effective monitoring. Location, frequency and methods of sampling are key elements to a monitoring program. Documentation of the sampling site, and the water quality data is important. When the documentation is accomplished through the computerized program sponsored by the Environmental Protection Agency, convenient and effecient retrieval is possible for review and analysis.

The data collected has value only if it is used. Following the retrieval, review and analysis, periodic reports to the governmental units and the general public are necessary to assure them that the water quality is consistent with the standards that have been adopted. If the standards are not being satisfied, each governmental unit will need to determine what type of water and/or land management programs are needed to upgrade the quality of the water.

Water Supply Improvement

The ground-water resources are utilized by many communities, industries, and by most farmers and rural residents as a source of water supply. The ground-water reservoirs, although extensively utilized at the present, have considerable potential for additional development.

Potential overdevelopment of ground water in Lansing and Jackson, and increased use of Lake Michigan water by Grand Rapids were major factors recognized by the basin planners in considering the development of future water supplies. Since the trend is away from ground water stream water supply, municipal supplies from the great lakes appear to be the most acceptable source.

Enabling Legislation

The Michigan Legislature has adopted numerous acts for the management of water and related resources. Through the authority of enabling legislation, local governmental

entities are empowered to adopt local resource management programs. Appendix P is the index to the publication Laws Relating to Water that was prepared by the Joint Committee of the Michigan Legislature on Water Resources Planning. Legislation directly related to water management programs in the Grand River Basin Study have been collected in Appendix R according to functional planning approaches for the management of the natural resources.

Information-Education Programs

Information-Education programs should be directed toward local public officials and the general public. Programs can be implemented through the organized efforts of Federal, State and local planning agencies, which should utilize all educational media including; classes, radio, newspapers, books, pamphlets, seminars, forums and television. Civic and service organizations should be encouraged to promote and sponsor programs. All academic and professional disciplines should be involved to assist the public in endorsing sound value systems through the legislative process.

Planning Resource Management Programs

Regional planning for the proper use of local resources must be the basis for establishing resource management programs in the Grand River Basin. The time is passing when a local governmental unit can resolve its own community development

problems without considering the impact their decisions will have on their neighbors, or the affect decisions by others will have on them.

The Grand River Basin is an extremely viable area covering over 5500 square miles. Within the area there are three Standard Metropolitan Statistical Areas and it is occupied by over one million people. The area is rich with lakes, minerals, agricultural lands, natural environmental spaces, and is located in the region of the State that will experience a continuing urbanization growth. The social and economic growth of the basin is expected to surpass the rate of growth of the nation over the next 50 year period.

Proper management of the natural resources is essential to assure that present and future generations will be able to use these resources without jeopardizing the rights and privileges of others. Pragmatic and cultural values should be resolved coextensively in the decision making process for regulating the human and natural resources of the environment. Programs that are economically justified, technically sound and politically endorsed should also be socially acceptable using religion, philosophy, art, ethics, health and ecology as cultural value elements of the decision making process.

The planning process for implementing regional benefit facilities should include all levels of government having a responsible role in natural resource management, and the process should involve participants representing the private sector.

Appendix U is a critique of the planning process on the Grand River Basin Study. Many of the procedures and techniques used in this study could be followed in the development of a regional facility.

CHAPTER IV

SUMMARY

The need for regional management of the water and land related resources was clearly identified in the report by the Select Senate Committee of Congress in 1961. Creation of the Federal Water Resources Council, authority for Basin Commissions, and authorization for sixteen Type II-Comprehensive Water Resources Planning Studies on river basins in the nation are current programs that have emanated from the Committee's recommendations.

Designation of the Grand River Basin for a comprehensive study was a very timely action for the communities in the region. Agricultural development and rapid urbanization are creating conflicting demands on the natural resources. Within the basin 276 counties, cities, villages and townships are attempting to plan and manage their resources to serve over a million people. The realization for intergovernmental cooperation is becoming more apparent because of the need to satisfy community needs on a regional basis rather than by independent action. Flood plain management, recreation development, agricultural drainage, water supply, water quality control and land use management have become programs requiring long

range, regional decisions. The web of community development requires that these decisions be made between the various governmental units rather than by autonomous action of the separate units.

The Grand River Basin Study is designed to prepare a report that will be a planning tool for local communities and other levels of government. The report will include documentation of several technical reports, single purpose agency reports, suggested plans for managing the natural resources and recommendations in a Main Report suggesting priority programs for implementation. Table I is a listing of the 18 documents resulting from this study.

Local communities will benefit from four significant elements of the planning study. A comprehensive inventory has been completed of the natural resources to identify those resources that are available for public and private development. An evaluation of trends and projected changes has been conducted to determine the potential demands and needs that may be placed on these resources.

Water and land problems have been identified and projections of future problems have been cited to help establish the need for wise planning and development of the natural resources. The culmination of the report is the preparation of suggested water and land management programs that can be developed to effectively satisfy the long range needs of the people.

Many resource management measures are discussed in the report that could be developed by local communities, combinations of local communities with, or without State participation, and programs that could be developed through the participation of all levels of government.

The management programs are divided into two basic types, structural and nonstructural. The structural programs include, reservoirs, navigational facilities, flood control facilities, watershed development projects and construction of water treatment plants. Nonstructural programs may be, laws and regulations, studies, surveillance programs, information and education, or preservation programs through acquisition or contractural agreements.

The purpose of the thesis is to review each of the suggested resource management programs and determine how a local community is able to implement that program as a local program, or in conjunction with other communities, State and/or Federal government. The appendix of the thesis contains planning aids to public officials to assist them in determining institutional arrangements available for program implementation. It contains outlines and procedures for initiating programs that may be cost shared by the Federal government, and it contains typical regulatory programs that have been implemented by other local governmental units.

The Grand River Basin Study was designed to provide a comprehensive review of the numerous management programs that could be developed to properly utilize the water and land related resources. Many of these programs are an expansion of existing activities in the basin such as development of recreation areas, water quality management, soil erosion control and watershed development projects. Other programs are relatively new such as development of valley preserve areas, flood plain zoning, basin wide stream monitoring, development of multipurpose reservoirs and emphasis on eudcation-information programs.

The Michigan Grand River Watershed Council has accepted a leadership role on behalf of the governmental units to assist them in planning and carrying out water management programs in accordance with the Local River Management Act, Act 253, P. A. 164. The Council has developed a systematic stream monitoring program through the cooperation of local governmental units, Michigan Department of Natural Resources, and the Environmental Protection Agency, Department of Interior. Approximately 100 stations are tested for water quality each month, and the data is stored in a storet computer for convenient retrieval and analysis.

The Watershed Council has also provided significant leadership to the urbanizing communities by developing soil erosion control guidelines for local adoption. Pollution from sedimentation is considered to be one of the most critical

water quality management problems in the basin. Effective control of erosion will also reduce construction costs. Local communities are endorsing the soil erosion control program and are beginning to follow the standards and specifications being developed by the Soil Conservation Districts.

Flood plain management through zoning regulations has been adopted by the City of Lansing and other governmental units in the area. Following completion of hydrologic studies by the Corps of Engineers and the Soil Conservation Service, communities in the Kent County area will develop similar regulatory measures.

The Watershed Protection and Flood Prevention Act of 1954 is a Federal program leading to the development of several watershed projects in the basin. The Upper Maple Watershed Project is the largest program in the basin that has been approved for federal funding. This project also includes the Sleepy Hollow State Park. The State Park is developed around a multipurpose impoundment that will provide flood control benefits in the agricultural areas of the watershed. Other watershed programs are also being planned in Newaygo, Kent, Livingston, Ingham, Clinton, and Jackson counties.

An important aspect of every management program is the support of the public. Education and concern are basic elements essential for public acceptance of community development programs. It is the role of the Watershed Council to

serve in an advisory capacity to the general public, private organizations and public entities in order that they may actively and effectively participate in planning and programming at the local and regional level.

An essential element of program implementation is effective planning utilizing local public involvement in the development of objectives and goals. Local involvement is equally important when regional facilities are developed through the participation of State and Federal agencies. Projects initiated by the State should also include local involvement to help assure the democratic concept and programs developed for the people should also be developed by the people.

The comprehensive study of the Grand River Basin was a sound investment by the Federal government. The final report will contain a wealth of information that can be extremely valuable to public officials, in all levels of government and the general public. Some programs in the report will have greater support by the public than other programs, and the different communities across the basin will have variable attitudes on all the programs. Development of community and regional value judgements will be the most difficult task for determining the wise use of the natural resources. Pragmatic decisions are usually based on

economic feasibility, technically sound and politically acceptable. Social and cultural values including religion, philosophy, art, ethics, health and ecology will also need to be recognized in the decision making process.

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REFERENCES

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APPENDICES

APPENDIX A

STATE OF MICHIGAN LITTER ACT

ACT 106, 1963

STATE OF MICHIGAN LITTER ACT

Act 106, 1963

An act to define, control and prohibit the littering of public and private property and waters; to prescribe penalties for violation of this act; and to repeal certain acts and parts of acts.

THE PEOPLE OF THE STATE OF MICHIGAN enact:

752.901 Litter; prohibition; construction of terms; removal of wrecked vehicle from highway.(M.S.A.28.603(1))

Sec. 1. It is unlawful for any person knowingly, without the consent of the public authority having supervision of public property or the owner of private property, to dump, deposit, place, throw or leave, or cause or permit the dumping, depositing, placing, throwing or leaving of litter on any public or private property or waters other than property designated and set aside for such purposes. The phrase "public or private property or waters" includes, but is not limited to, the right of way of any road or highway, any body of water or watercourse, or the shores or beaches thereof and including the ice above such waters; any park, playground, building, refuge or conservation or recreation area; and any residential or farm properties or timberlands. It is unlawful for a person who removes a vehicle, wrecked or damaged in an accident on a highway, road or street, to fail to remove all glass and other injurious substances dropped on the highway, road or street as a result of the accident.

HISTORY: Am. 1966, p.199, Act 177, Eff. 90 days after adjournment.

752.902 Same;definition. (M.S.A. 28.603 (2))

Sec. 2. The term "litter" as used herein means all rubbish, refuse, waste material, garbage, offal, paper, glass, cans, bottles, trash, debris or other foreign substances of every kind and description.

752.903 Penalty; sentence. (M.S.A. 28.603 (3))

Sec. 3. Any person violating any provision of this act shall be guilty of a misdemeanor. The court, in lieu of any other sentence imposed, may direct a substitution of litter-gathering labor, including, but not limited to, the litter connected with the particular violation, under the supervision of the court.

752.904 Publication of act; receptacles for litter. (M.S.A. 28.603 (4))

Sec. 4. All public authorities having supervision of public property of this state or any political subdivision thereof may post notice signs and otherwise to publicize the requirements of this act. All public authorities having supervision of public property in this state may establish and maintain receptacles for the deposit of litter on the property and publicize the location thereof.

752.905 Repeal. (M.S.A. 28.603 (5))

Sec. 5. Section 681 of Act No. 300 of the Public Acts of 1949, being section 257.681 of the Compiled Laws of 1948; section 1 of Act No. 350 of the Public Acts of 1865, as amended, being section 307.21 of the Compiled Laws of 1948; and section 9 of Chapter 10 of Act No. 283 of the Public Acts of 1909, as amended, being section 230.9 of the Compiled Laws of 1948, are repealed.

752.906 Municipal ordinances. (M.S.A. 28.603 (6))

Sec. 6. This act shall not affect or in any way limit the powers of cities, villages and townships to enact and enforce ordinances for the control and elimination of liter.

APPENDIX B

CRAWFORD COUNTY INTERIM ZONING ORDINANCE

(Excerpts)

CRAWFORD COUNTY INTERIM ZONING ORDINANCE

(EXCERPTS)

Effective Date - February 1, 1969

ARTICLE I - PURPOSE

Section 1.01 Purpose - The fundamental purpose of this Ordinance shall be to promote and protect the public health, safety, morals and general welfare; to encourage the use of lands and natural resources of the county in orderly and wholesome development of the county and reduce the disorder and dangers that often adhere in unguided community developments; to lessen congestion on the public roads and provide for safety in traffic and vehicular parking; to facilitate the development of an adequate water system and other public requirements; to provide, in the interest of health and safety, the minimum standards under which certain buildings and structures may hereinafter be erected and used; to conserve life, property and natural resources, and the expenditure of funds for public improvements and services to conform with the most advantageous uses of land, resources and properties.

ARTICLE II - DEFINITIONS

Section 2.08 Building Inspector - The administrative officer of this ordinance, appointed by the County Board of Supervisors.

ARTICLE III - GENERAL PROVISIONS

Section 3.05 Grading - There shall be no excessive filling in or removal of ground on a building lot which would seriously affect the grade at the adjacent neighbor's lot line unless mutually agreed to by the respective owners of the property affected by such change. Said agreement shall be in writing.

Section 3.06 Soil Removal - Where soil or gravel is removed for any purpose, it shall be done in such a manner as to leave the area from which it was removed reasonably level. No holes may be left to fill or partly fill with stagnant water. No soil shall be removed that will cause erosion.

No soil or gravel shall be removed below street or highway grade level any closer than 175 feet to any public street or highway right of way.

ARTICLE IV - ZONING DISTRICTS

Section 4.07 Green Belt - Grayling township - The green belt zone is four hundred (400) feet from the river's edge on both sides of the AuSable River and all tributaries and lakes in Grayling township.

Section 4.06 Green Belt - Crawford County - The green belt, Crawford county shall be all waterfront property in Crawford county, except Grayling and Frederic townships. The width of the zone shall be the depth of the first tier of lots along said river, stream, tributary and lake conforming to the minimum lot width of 100 feet at the front building line and minimum area of 30,000 square feet.

In Frederic township the green belt - Crawford County shall be as follows:

1. All of the land between Manistee road and the West Crawford County line and the W½ of SW¼ of section 31.

2. All of the land indicated on the Crawford county zoning maps, all of the boundaries being on ¼ or ½ full section lines or roads as indicated.

ARTICLE X - GREEN BELT ZONE

Section 10.01 Description and Purpose: A zone for providing the most desirable residential, summer home and cottage area that may complement such use of the zone, so as to preserve the high quality of the natural lakes and streams of Crawford County and prevent further deterioration thereof.

The green belt zone is four hundred (400) feet from the water's edge on both sides of all rivers and streams and around all lakes in Grayling Township.

Section 10.02 Use Regulation: Land and/or buildings in the Green Belt Zone may be used for the following purposes:

(a) One single family dwelling on each lot.
(b) Parks and playgrounds.
(c) plats
(d) Guest houses will be permitted only as follows:

(1) On lots containing 90,000 square feet with 150 feet frontage, with a minimum first floor area of 480 square feet and must be constructed to the rear of principal building.
(2) On lots containing 90,000 square feet with 300 feet frontage, with the guest house fronting on the river the regulations of sections 10.04 and 10.05 set forth below must be met.

(e) A detached accessory building not more than 12 feet in height subject to the following conditions:

(1) Said accessory building shall not be located closer to a side or back line than that allowed for a principal building.
(2) A detached accessory building, any portion of which is located on the side of the main building, shall not be less than 6 feet from such principal building and not nearer to the side lot line than the width of the side required on the lot for the main building and shall maintain a front set back equal to or greater than that of the main building.
(3) A detached accessory building, any portion of which is located to the rear of the main building shall be located not nearer than 10 feet to such building.
(4) A detached accessory building may not serve as living area.

(f) Clubs, upon application and permit from the County Zoning Commission.
(g) Pump houses will be permitted if no more than 9 square feet and more than three (3) feet in height.
(h) Docks may be constructed not to exceed 8 feet in width nor more than 20 feet in length with no more than 5 feet of the dock extending over the water.

Section 10.03 Height Regulation: No building shall exceed thirty-five (35) feet or 2½ stories in height, whichever is lesser.

Section 10.04 Area Regulations: No building or structure nor the enlargement of any building or structure shall hereafter be erected unless the following yards, lot area and building coverage requirement are provided and maintained in connection with such building, structure, or enlargement.

(a) The minimum lot size shall contain 60,000 square feet. The minimum frontage width shall be 150 feet.
(b) Front yard. No building shall be contructed closer than fifty (50) feet from the water's edge, except for every foot of ground elevation above the minimum grade level, (four (4) feet above high ground water level) five (5) feet may be subtracted from the minimum set back, however, no structure shall be closer than 30 feet from the river's edge. Front yard shall be considered as that part of any lot nearer the river.
(c) Side yard. Side yards shall be of at least thirty (30) feet.
(d) Rear yard. Rear yards shall be of at least five (5) feet.

Section 10.05 Minimum Floor Area: Each dwelling unit in this zone shall have a minimum first floor area of 720 square feet, except guest houses.

Section 10.06 Native Protection Strip: A strip twenty five (25) feet wide bordering each bank of the river in this zone shall be maintained in trees and shrubs or its natural state. Trees and shrubs in a space fifty (50) feet in width may be trimmed and pruned for a view of the river and a dock.

Section 10.07 Flood Areas and Grade Level: No dwelling shall be constructed on lands which are subject to flooding or on land where a minimum of four (4) feet between finished grade level and high ground water cannot be met. Land may be filled to meet the minimum requirement of four (4) feet between finished grade level and high ground water only under the following conditions:

(a) The 25 foot native protection strip is maintained.
(b) No material is allowed to enter the stream either by erosion or mechanical means.
(c) Fill material is of a pervious material such as gravel or sand.

Section 10.08 Sanitary Waste Systems: Disposal fields and septic tanks shall be no closer than 100 feet to the river's edge. The disposal field title shall be at least three and one-half (3½) feet above the high water table. Field tile trench bottoms shall be at least two (2) feet above high water table.

Section 10.09 Sub Soil Drainage Systems: No septic or disposal field shall be nearer than forty (40) feet to any sub soil drainage system (footing drains) emptying directly into the river.

ARTICLE XI - GREEN BELT - CRAWFORD COUNTY

Section 11.01 Description and Purpose: A zone for providing the most desirable residential, retirement homes, summer homes, and cottage areas, that may complement such use of the zone so as to preserve the beauty and high quality of the lakes and rivers and prevent further deterioration of the water frontage. The zone is as follows:

> All water front property in Crawford County, except Grayling Township, the depth of one lot with the minimum width of 100 feet at the front building line and minimum size of 30,000 square feet and all other waterfront property so designated on the zoning map.

Section 11.02 Use Regulation: Land and/or buildings in this zone may be used for the following purposes only:

(a) One single family dwelling on each lot.
(b) Parks and playgrounds.
(c) Plats
(d) Travel trailer parking, by permit only, up to twenty (20) days will be permitted.
(e) Guest houses will be permitted only as follows:

    (1) On lots containing 45,000 square feet with 100 feet frontage, with a minimum first floor area of 480 square feet and must be constructed to the rear of principal building.

(f) A detached accessory building not more than twelve (12) feet in height subject to the following conditions:

    (1) Said accessory building shall not be located closer to a side or back line than that allowed for a principal building.
    (2) A detached accessory building, any portion of which is located on the side of the main building, shall not be less than six (6) feet from such principal building and not nearer to the side lot line than the width of the side yard required on the lot for the main building and shall maintain a front set back equal to or greater than that of the main building.

(3) A detached accessory building, any portion of which is located to the rear of the main building shall be located not nearer than ten (10) feet to such building.
(4) A detached accessory building may not serve as living area.

(g) Clubs, upon application and permit from the County Zoning Commission.
(h) Pump houses will be permitted if no more than nine (9) square feet and not more than three (3) feet in height.
(i) Docks may be constructed not to exceed eight (8) feet in width nor more than twenty (20) feet in length with no more than five (5) feet of the dock extending over the water.

Section 11.03 Height Regulation: No building shall exceed twenty-five (25) feet or 2½ stories in height, whichever is lesser.

Section 11.04 Area Regulation: No building or structure nor the enlargement of any building or structure shall hereafter be erected unless the following yards, lot area and building coverage requirements are provided and maintained in connection with such buildings, structure, or enlargement.

(a) The minimum lot size shall be 30,000 square feet. The minimum frontage width shall be 100 feet at front of building line.
(b) Front yard. No building shall be constructed closer than fifty(50) feet from the water's edge, except for every foot of ground elevation above the minimum grade level, (four (4) feet above high ground water level) five (5) feet may be subtracted from the minimum set back, however, no structure shall be closer than thirty (30) feet from the river's edge. Front yards shall be considered as that part of any lot nearer the river.
(c) Side yard. Side yards shall be at least twenty (20) feet.
(d) Rear yard. Rear yards shall be of at least five (5) feet.

Section 11.05 Minimum Floor Area: Each dwelling unit in this zone shall have a minimum first floor area of 625 feet, except guest houses.

Section 11.06 Native Protection Strip: A strip of twenty-five (25) feet wide bordering each bank of the lakes and rivers in this zone shall be maintained in trees and shrubs or its natural state. Trees and shrubs in a space twenty-five (25) feet in width may be trimmed and pruned for a view of the river and dock.

Section 11.07 Flood Areas and Grade Level: No dwelling shall be constructed on lands which are subject to flooding or on land where a minimum of four (4) feet between finished grade level and high ground water only under the following conditions:

(a) The 25 foot native protection strip is maintained.
(b) No material is allowed to enter the stream either by erosion or mechanical means.
(c) Fill material is of a pervious material such as gravel or sand.

Section 11.08 Sanitary Waste Systems: Disposal field and septic tanks shall be no closer than one hundred (100) feet to river's edge. The disposal field tile shall be at least three and one half (3½) feet above the high water table. Field tile trench bottoms shall be at least two (2) feet above high water table.

Section 11.09 Sub Soil Drainage Systems: No septic or disposal fields shall be nearer than forty (40) feet to any sub soil drainage system (footing drains) emptying directly into the river.

ARTICLE XII - AuSABLE RIVER ZONE

Section 12.01 Description and Purpose: A zone for providing low density desirable residential areas, agricultural, recreational and other specialized rural uses requiring large tracts of land, so as to preserve the high wuality of the AuSable River. The zone is as follows:

(a) An area bounded by M-72 on the south, on the north by the North Down River Road to the NE corner of Section 3, T26N, R2W and on the east by the eastern boundary of Grayling Township and on the west by the eastern boundary of Section 8, T26N, R3W.
(b) An area bounded by I-75, M-93, Jones Lake Truck Trail, the North Down River Road and the northern boundary of Grayling Township.

Section 12.02 Use Regulation: Land and/or buildings in this zone may be used for the following purposes only:

(a) One single family dwelling on each lot.
(b) Public schools and colleges which may include on campus: dormitories, libraries, museums, art galleries and similar uses approved by the Board of Appeals when owned and operated by a governmental agency. Fifty (50) foot side yards are required if the property abutts any residentially zoned lots.
(c) Private non-profit schools and colleges subject to the conditions stipulated in (b) above, and said private schools shall not include trade schools, business colleges or private schools operated as commercial enterprises.
(d) Parks, playgrounds, community centers and facilities therein, owned and operated by a governmental agency or a non-profit neighborhood group.
(e) Churches, provided the building or structure is at least fifty (50) feet from any other residentially zoned lot.
(f) A detached accessory building not more than twelve (12) feet or one (1) story in height subject to the following conditions:

    (1) Said accessory building shall not be closer to side or back lines allowed for a principal building.
    (2) A detached accessory building, any portion of which is located on the side of the main building shall not be less than six (6) feet from such principal building and not nearer to the side lot line than the width of the side yard required on the lot for the main building and shall maintain a front setback equal to or greater than that of the main building.
    (3) A detached accessory building, any portion of which is located to the rear of the main building shall be located not nearer than ten (10) feet to such main building.

(g) Two family structures.
(h) Multiple family dwelling units (more than two) may be permitted upon application and special approval of the County Zoning Commission if it is deemed that the development will not be detrimental to the neighborhood.
(i) Farms for both general and specialized farming together with farm dwellings and buildings and other installations useful to such farms.
(j) Country clubs, golf clubs, and publicly owned athletic fields.

Section 12.03 Height Regulation: No residential building shall exceed thirty-five (35) feet or two and one half (2½) stories, in height, which ever is lesser.

Section 12.04 Area Regulations: No building or structure nor the enlargement of any building or structure shall hereafter be erected unless the following yards, lot area and building coverage requirements are provided for and maintained in connection with such building, structure or enlargement.

(a) Front yard. There shall be a front yard setback of not less than forty (40) feet from the right-of-way line of any public roadway.
(b) Side yards. For residential buildings, there shall be total side yards of seventy (70) feet provided that no side yard shall be less than thirty (30) feet. For all other buildings, there shall be a minimum side yard of sixty (60) feet.
(c) Rear yard. There shall be a rear yard of not less than one hundred (100) feet.
(d) Lot area. The minimum lot area for use in this zone shall be 108,900 square feet (2½) acres with minimum lot width of 165 feet. A registered plat shall have a minimum lot size of 60,000 square feet with a minimum lot width of 150 feet.

Section 12.05 Minimum Floor Areas: Each dwelling unit in this zone shall have a minimum of 720 square feet per unit, except multiple family dwelling units (more than two) shall have a minimum of 500 square feet of living area plus 150 square feet or each bedroom in excess of one.

APPENDIX C

FLOOD PLAIN ORDINANCE, LANSING, MICHIGAN

Flood Plain Ordinance - City of Lansing

The City of Lansing adopted the Flood Plain Control Ordinance July 1, 1968. Specific reference is given to the Lansing Flood Plain Map. Such maps and supporting data can be prepared by the Corps of Engineers or other engineers qualified to conduct hydrologic studies.

ARTICLE V, FLOOD PLAIN CONTROL

Sec. 36-59 - Purpose:

It is the purpose of the flood plain controls to apply special regulation to the use of land in those areas of the city which are subject to predictable inundations at frequent intervals. Such regulations, while permitting reasonable economic use of such properties, will help protect the public health and reduce financial burdens imposed on the community, its governmental units and its individuals by frequent and periodic floods and the overflow of lands, reserve such areas for the impoundment of water to better stablize stream flow and to better maintain the proper ecological balance. All lands included in such flood plain controls district shall be subject to the terms imposed herein, in addition to the terms imposed by any other zoning use district in which said lands should be located.

Section 36-60 Definitions:

a. Fifty (50) year Frequency Flood: That portion of flood plain of the Grand River, Red Cedar River and Sycamore Creek that would be inundated by the limits established for a hypothetical flood having a recurrence frequency of once in about fifty (50) years, as determined by the U.S. Corps of Engineers and the Michigan Water Resources Commission.

b. Flood Plain: Means the area of land adjoining the channel of a river stream, water course, lake or other similar body of water, which will be inundated by a flood which can reasonably be expected for that region.

c. Floodway: That portion of the river bed and flood plain which would be required in the development of an artificial channel to safely pass a flood discharge for a given flood frequency.

d. Reconstituted 1947 Flood: That portion of the flood plain of the Grand River that would be inundated by a flood of the magnitude of the flood of 1947, as determined by studies of the U.S.Corps of Engineers and the Michigan Water Resources Commission.

Sec. 36-61. Flood Plain Boundaries:

All land lying within the flood plain of the fifty (50) year frequency flood of the Grand and Red Cedar rivers and Sycamore Creek, is within the flood plain and subject to these regulations, in addition to the regulations otherwise established by the Zoning Ordinance of the City of Lansing. The boundaries of the flood plain are hereby established as shown on the Lansing Flood Plain Map, which accompanies this ordinance, and which map with all notation, references and other information shown thereon, shall be as much a part of this ordinance as is fully described herein. The petitioner for use of the flood plain shall supply such additional topographical data or engineering studies as are needed to define the exact limits of the flood plain, upon the subject land.

Where there is a question as to the exact boundries and limits of a flood control district, the Lansing City Engineer shall determine the limits from topographical data available to and submitted to him. Such information may be reviewed by the Michigan Water Resources Commission.

Sec. 36-62. Uses Permitted:

When the use proposed herein is allowable in a zoning district, the following uses and types of activities are permitted in the designated flood plain:

a. Crop farming and gardening, not including related buildings, except as otherwise provided for in this ordinance.

b. Open recreational uses, such as parks, playgrounds, playfields, athletic fields, golf courses, bridle trails and nature paths.

c. Public rights-of-way, private drives and parking lots.

d. Public utilities as regulated by the Zoning Ordinance, but not to allow the erection of a building to be used for storage or as a place of employment other than for periodic maintenance, or as provided for in Section 36-63 a.

e. For residential districts the flood plain may be used for computing lot area requirements and may, therefore, be used for yard and park areas.

f. Storage yards for materials and equipment not subject to removal or major damage by flood waters.

Sec. 36-63. Uses Permitted by Special Permit:

a. Any use permitted by right or by special conditions for the zoning district applicable to the land in question, as governed by Chapter 36 of the Lansing Code of Ordinances, provided, however, that the use pattern, and the structures contemplated to accomplish said use shall:

1. Be so designated as to not reduce the impoundment capacity of the flood plain or significantly reduce flow of water, by the use of stilts, cantilevering, or such other design techniques which will place the desired buildings above the ground (floodwater) level of the site in a safe manner so that said structure or building will withstand the anticipated velocity of the flood waters, and not suffer flood damage.

2. All buildings constructed under said "Special permits" shall have a minimum floor elevation of not less than three feet above the flood plain level established by this ordinance, as indicated by the topographical data previously referred to herein and as may be amended from time to time.

3. Where topographical data, engineering studies or other studies are needed to determine the effects of flooding on a structure and/or the effects of the structure on the flow of water, the applicant shall submit such data or studies. All such data shall be prepared by technically qualified persons.

b. Dumping or back filling with any material or excavation in any manner is prohibited unless:

1. Through compensating excavation and shaping of the flood plain, the flow and impounding capacity of the flood plain will be maintained or improved, and will not cause an increase in the flood hazard or damage from floods and will not allow water to collect in pools that will stagnate.

2. No significantly measurable reduction in the flow or impoundment capacity of the flood plain thereby results.

3. Where there is dumping, back filling or excavation in any manner, adequate site plans and engineering drawings shall be submitted to effectively show the final results of such action.

e. In a flood plain the construction or location of bridges, outdoor play equipment, bleachers, and similar outdoor equipment and appurtenances, storage of materials or equipment is prohibited unless such elements would not cause any significant obstruction to the flow or reduction in the impoundment capacity of the flood plain and not suffer flood damage.

Sec. 36-64. Procedure for Special Permit for Use of the Flood Plain:

Request for "Special Permits" for use of the flood plain shall be made in writing with the data required by paragraphs 36-63a3 and 36-63b3 above and filed with the City Clerk in three (3) copies. City Council shall refer such requests to the Planning Board for recommendation and to the Public Service Department for thier technical report, and the recommendations of the City Engineer, before taking action.

Sec. 36-65. Existing Uses in the Flood Plain:

It is the intent of this ordinance to permit existing uses to continue in the flood plain until they are removed, but not to encourage their survival.

It is recognized that there exists, within the flood plain as defined by this ordinance lots and structures which were lawful before this ordinance was passed or amended, which would be prohibited, regulated or restricted under terms of this ordinance or future amendments.

Such uses are declared by this ordinance to be incompatible with permitted uses in the flood plain. It is further the intent of this ordinance that illegal uses shall not be enlarged upon, expanded or extended, nor be used as grounds for adding other structures or uses prohibited in the flood plain.

Should a structure located in the flood plain, as defined by this ordinance, be destroyed by any means to an extent of more than sixty (60) per cent of its replacement cost, exclusive of the foundation at the time of destruction, it shall not be reconstructed.

Sec 36-66. City Liability:

The City of Lansing shall incur no liability whatsoever by permitting any use or building within the flood control district.

Sec 36-67 Enforcement:

Except where herein otherwise stated, the Building Commissioner shall enforce the provisions of this ordinance.

Where other provisions of the Code of The City of Lansing impose a greater restriction than those proposed for violation of this ordinance, the provisions of the more restrictive ordinance shall be effective.

APPENDIX D

FILLING, GRADING, LAGOONING AND DREDGING REGULATIONS

FILLING, GRADING, LAGOONING AND DREDGING REGULATIONS

Filling, Grading, Lagooning and Dredging

Filling, grading, lagooning or dredging which would result in substantial detriment to navigable waters by reason of erosion, sedimentation, or impairment of fish and aquatic life is prohibited.

A Special Exception Permit shall be required:

For any filling or grading of the bed of a navigable body of water. In addition, a permit shall be obtained from the Water Resources Commission, Michigan Department of Natural Resources.

For any filling or grading of any area which is within three hundred (300) feet horizontal distance of a navigable water and which has surface drainage toward the water and on which there is:

(1) Filling of more than five hundred (500) square feet of any wetland which is contiguous to the water. For purposes of this section a wetland shall be defined as any area where ground water is at or near the surface a substantial part of the year.

(2) Filling or grading on all slopes of 20 percent or more.

(3) Filling or grading of more than one thousand (1,000) square feet on slopes of 12-20 percent.

(4) Filling or grading of more than two thousand (2,000) square feet on slopes of 12 percent or less.

Restrictions do not apply to soil conservation practices such as terraces, runoff diversions and grassed waterways which are used for sediment retardation.

Lagooning or Dredging

A Special Exception Permit shall be required before constructing, dredging or commencing work on any artificial waterway, canal, ditch, lagoon, pond, lake or similar waterway which is within three hundred (300) feet of the high water mark of a navigable body of water or where the purpose is the ultimate connection with a navigable body of water. This requirement does not apply to soil conservation practices such as terraces, runoff diversions and grassed waterways which are used for sediment retardation. In addition, a permit shall be obtained from the Michigan Water Resources Commission, Michigan Department of Natural Resources.

The Board of Appeals shall evaluate each application according to the standards as set forth in this Ordinance and may request the County Soil and Water Conservation District to make available expert assistance from those state and federal agencies which are assisting said District under a memorandum of understanding.

Conditions

In granting a Special Exception Permit for filling, grading, lagooning, or dredging the Board may attach the following conditions in addition to the provisions specified in this Ordinance that:

The smallest amount of bare ground be exposed for as short a time as feasible.

Temporary ground cover such as mulch be used and permanent cover such as sod be planted.

Diversions, silting basins, terraces and other methods to trap sediment be used.

Lagooning be conducted in such a manner as to avoid creation of fish trap conditions.

Fill is stablilized according to accepted engineering standards.

Fill will not restrict a floodway or destroy the storage capacity of a flood plain.

Sides of a channel or artificial water course be stabilized to prevent slumping.

Sides of channels or artificial watercourses be constructed with side slopes of two (2) units horizontal distance to one (1) unit vertical or flatter, unless bulkheads or riprapping are provided.

APPENDIX E

MODEL FOR

DEVELOPING SOIL EROSION AND SEDIMENT

CONTROL ORDINANCE AND REGULATIONS

MODEL FOR
DEVELOPING SOIL EROSION AND SEDIMENT
CONTROL ORDINANCE AND REGULATIONS

U.S. Department of Agriculture, Soil Conservation Service

An Ordinance to establish rules and regulations for controlling soil erosion and sedimentation within all development in the County of _____.

The (Jurisdiction) _____ County, Michigan Ordains:

ARTICLE I
TITLE AND PURPOSE

A. TITLE

This Ordinance will be known as the "_____ County Soil Erosion and Sediment Control Ordinance."

B. PURPOSE

Excessive quantities of soil are eroding from areas that are undergoing development for non-agricultural uses such as housing developments, industrial sites, roads, recreation and wildlife areas. This soil erosion makes necessary costly repairs to gullys, washed out fills, roads, and embankments. The resulting sediment clogs storm sewers and road ditches, muddies streams and silts lakes, rivers and reservoirs. Sediment is expensive to remove and limits the use of water for most beneficial purposes. Sediment choked streams are unsightly and their reduced channel capacity can result in flooding and associated damages, including the threat to public health and safety.

The purpose of this ordinance is to control soil erosion and the resulting sedimentation from occuring on developing areas by requiring proper provisions for water disposal and the protection of soil surfaces during and after construction in order to promote the safety, public health, convenience and general welfare of the Community.

ARTICLE II
DEFINITIONS

A. RULES APPLYING TO TEXT

For the purpose of this Ordinance certain rules of construction apply to the text as follows:

1. Words used in the present tense include the future tense; and the singular includes the plural, unless the context clearly indicates the contrary.
2. The term "shall" is always mandatory and not discretionary the word "may" is permissive.
3. The word or term not interpreted or defined by this article shall be used with a meaning of common or standard utilization.

B. DEFINITIONS

The following definitions shall apply in the interpretation and enforcement of this Ordinance, unless otherwise specifically stated:

1. Certification: A signed, written statement by the (Designated Official) that specific constructions, inspections or tests where required have been performed and that such

comply with the applicable requirements of this Ordinance or regulations adopted.

2. Cut: Portion of land surface or area from which earth has been removed or will be removed by excavation; the depth below orginal ground surface to excavated surface.

3. Debris Basin: A barrier or dam built across a waterway or at other suitable locations to retain rock, sand, gravel, or silt or other material.

4. Diversion: A channel with or without a supporting ridge on the lower side constructed across or at the bottom of a slope.

5. Embankment: A man-made deposit of soil, rock or other materials.

6. Erosion: The wearing away of the land surface by the action of wind, water or gravity.

7. Excavation: See Cut.

8. Existing Grade: The vertical location of the existing ground surface prior to cutting or filling.

9. Fill: See Embankment.

10. Finished Grade: The final grade or elevation of the ground surface conforming to the proposed design.

11. Grading: Any stripping, cutting, filling, stockpiling, or any combination thereof and shall include the land in its cut or filled condition.

12. Grading Permit: A permit issued to authorize work to be performed under this Ordinance

13. Grassed Waterway: A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from a field, diversion or other site feature.

14. Mulching: The application of plant or other suitable materials on the soil surface to conserve moisture, hold soil in place, and aid in establishing plant cover.

15. Natural Ground Surface: The ground surface in its orginal state before any grading, excavation or filling.

16. Permittee: Any person to whom a permit is issued in accordance with this Ordinance.

17. Professional Engineer: An engineer duly registered or otherwise authorized by the State of Michigan to practice in the field of civil engineering.

18. Regulated Grading: Any grading performed with the approval of and in accordance with criteria established by the (Designated Official).

19. Sediment: Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

20. Sediment Basin: See Debris Basin.

21. Sediment Pool: The reservoir space allotted to the accumulation of submerged sediment during the life of the structure.

22. Slope: Degree of deviation of a surface from the horizontal usually expressed in percent or degree.

23. Soil: All unconsolidated mineral and organic material of whatever origin that overlies bedrock which can be readily excavated.

24. Soil Engineer: A professional engineer who is qualified by education and experience to practice applied soil mechanics and foundation engineering.

25. Site: Any plot or parcel of land or combination of contiguous lots or parcels of land where grading is performed or permitted.

26. Stripping: Any activity which removes or significantly disturbs the vegetative surface cover including clearing and grubbing operations.

28. Structural Rock Fills: Fills constructed predominantly of rock materials for the purpose of supporting structures.

29. Temporary Protection: Stabilizations of erosive or sediment producing areas.

30. Vegetative Protection: Stabilization of erosive or sediment producing areas by covering the soil with:

    a. Permanent seeding, producing long-term vegetative
    b. Short-Term seeding producing temporary vegetative cover, or
    c. Sodding, producing areas covered with a turf of perennial sod-forming grass.

31. Watercourse: Any natural or artificial watercourse, stream, river, creek, ditch, channel, canal, conduit, culvert,

drain, waterway, gully, ravine or wash in which water flows in a definite direction or course, either continuously or intermittently, and which has a definite channel, bed and banks, and shall include any area adjacent thereto subject to inundation by reason of overflow or flood water.

32. County Drain Commissioner: The (_____) County Drain Commissioner.

33. County Health Department: The (_____) County Health Department.

34. County Planning Commission: The (_____) County Metropolitan Planning Commission.

35. County Plat Board: The (_____) County Plat Board.

36. County Road Commission: The (_____) County Road Commission.

37. Government Agency: Means any department, commission, independent agency, or instrumentality of the United States and of the State of Michigan, and any county, city, township, village, authority district, or other governmental unit.

ARTICLE III
APPLICATION PROCEDURE

A. INITIAL

The developer is encouraged to consult the general development plans and detailed plans of any unit of government that effect the tract to be developed and the area surrounding it before he submits a preliminary plat for review. He should also

become acquainted with the zoning ordinance, standards and requirements, this ordinance, and other ordinances which regulate the development of land in the County. He should also discuss the concepts of the proposed development with the (_____) Planning Commission and with the staff of the (_____) Metropolitan Planning Commission.

B. COMPLIANCE

No site plan or plat shall be approved unless it includes soil erosion and sediment control measures in accordance with the technical standards of the local Soil Conservation District. No approval for occupancy of any building will be granted unless all needed erosion control measures have been completed or substantially provided for in accordance with this ordinance and the standards and specifications of the local Soil Conservation District. The developer shall bear the final responsibility for the installation and construction of all required erosion control measures according to the provisions of this ordinance and to the standards and specifications of the local Soil Conservation District.

C. DATA REQUIRED

The developer must submit the following information for the entire tract of land, whether or not the tract will be developed in stages:

1. A boundary line survey of the site on which the work is to be performed.
2. Description of the features, existing and proposed, surrounding the site of importance to the proposed development.

3. Description of general topographic and general soil conditions on the site (available from the (_____) Planning Commission or the Soil Conservation District.

4. Location and description of existing and future man-made features of importance to the proposed development.

5. Plans and specifications of soil erosion and sedimentation control measures in accordance with standards and specifications of the Soil Conservation District.

6. A timing schedule indicating the anticipated starting and completion dates of the development sequence and the time of exposure of each area prior to the completion of effective erosion and sediment control measures.

D. PERMITS

1. Requirement: Except as exempted by Article V, no person shall do any grading, stripping, cutting or filling unless he has valid grading permit issued by the (Designated Official).

2. Application: A separate application shall be required for each grading permit. Plans, specifications and timing schedules shall be submitted with each application for a grading permit. The plans shall be prepared or approved and signed by a professional engineer or by an architect. The (Designated Official) may waive the preparation or approval and signature by the professional engineer or architect when the work entails no hazard to the adjacent property.

ARTICLE IV
PRINCIPLES AND STANDARDS

A. IMPLEMENTATION

Since considerable soil erosion can take place during construction, development plans shall contain proposed erosion and sediment control measures. These measures shall be incorporated into the final plat and final construction drawings. Erosion and sediment control measures shall conform to the standards and specifications established by the (_____) Soil Conservation District. The measures shall apply to all features of the construction site, including street and utility installations as well as to the protection of individual lots. Measures shall also be instituted to prevent or control erosion and sedimentation during the various stages of development.

B. GENERAL DESIGN PRINCIPLES

Practical combinations of the following general principles will provide effective sediment control when properly planned and applied:

1. The development plan shall be fitted to the topography and soils so as to create the least erosion potential.
2. Permanent vegetation and improvements such as streets, storm sewers or other features of the development, capable of carrying storm run-off in a safe manner, shall be scheduled for installation to the greatest extent possible before removing the vegetation cover from an area.

3. Wherever feasible, natural vegetation shall be retained and protected.
4. Where inadequate vegetation exists, temporary or permanent vegetation shall be established.
5. The smallest practical area of land shall be exposed at any one time during development.
6. When land is exposed during development, the exposure shall be kept to the shortest practical period of time.
7. Critical areas exposed during construction shall be protected with temporary vegetation and/or mulching.
8. Sediment basins (debris basins, desilting basins, or silt traps) shall be installed and maintained to remove sediment from run-off waters from land undergoing development.
9. Provisions shall be made to effectively accomodate the increased run-off caused by changed soil and surface conditions during and after development.
10. The permanent final vegetation and structures shall be installed as soon as practical in the development.

C. DEVELOPMENT STANDARDS

All development plans, specifications and timing schedules, including extensions of previously approved plans, shall include provisions for erosion and sediment control in accordance with the standards and specifications established by the (_____) Soil Conservation District.

1. Technical standards for the design and installation of erosion and sediment control measures are on file at the offices of the (_____) Soil Conservation District and other governmental agencies.

D. MAINTENANCE

Individuals or developers carrying out soil erosion and sediment control measures under this Ordinance, and all subsequent owners of property on which such measures have been installed, shall adequately maintain all permanent erosion control measures, devices and plantings in effective working condition.

ARTICLE V
VARIANCES AND EXCEPTIONS

The (Legislative Body of Jurisdiction) shall have the authority to interpret this Ordinance and may in specific cases grant variances and exceptions to these requirements providing such variance or exception is in harmony with the general purpose and intent of the requirements.

ARTICLE VI
INSPECTION AND ENFORCEMENT

The requirements of this Ordinance shall be enforced by the (Designated Official) who shall inspect or require adequate inspection of the work. If the (Designated Official) finds any existing conditions not as stated in any application, grading permit, or approved plan, he may refuse to approve further work.

APPENDIX F

SOIL EROSION AND SEDIMENTATION CONTROL ACT OF 1971 (DRAFT)

Soil Erosion and Sedimentation Control Act of 1971 (Draft)

*SENATE BILL*_____

*HOUSE BILL*_____

A bill to provide for the control of soil erosion and sedimentation; to prescribe the powers and duties of the Water Resources Commission, the State Department of Agriculture, the State Soil Conservation Committee, and local governmental units with respect thereto; to authorize certain guidelines, studies, and specifications; to require the development of certain local ordinances; to promulgate rules; and to provide for certain remedies for violations.

THE PEOPLE OF THE STATE OF MICHIGAN ENACT:

Sec. 1. This act shall be known and may be cited as the "Soil Erosion and Sedimentation Control Act of 1971".

STATEMENT OF POLICY

Sec. 2. The Legislature finds and declares that excessive quantities of soil are eroding from land areas that are being used for housing developments, industrial sites, roads, some agricultural practices, recreation areas, and other purposes; that soil erosion makes necessary costly repairs to gullys, washed out fills, roads and embankments; that resulting sedimentation clogs and fills storm sewers, drainage ditches, drains, streams, lakes, and reservoirs and may adversely affect fish, wildlife, and water quality; that sediment is difficult and costly to remove and limits the use of water for most beneficial purposes; and that such erosion and sedimentation must be effectively controlled to prevent future damage to the environment and promote the health and safety of the citizens of the State of Michigan.

Sec. 3. As used in this act:

(a) "Department" means the Michigan Department of Agriculture.

(b) "Commission" means the Water Resources Commission of the Department of Natural Resources.

(c) "Local Agency" means a county, township, city or village.

(d) "Soil Conservation District" means any Soil Conservation District of the State Soil Conservation Committee as created by section 5 of Act. No. 297 of the Public Acts of 1937, being section 282.5 of the Compiled Laws of 1948.

(e) "Soil Erosion" means the wearing away of the land surface by the action of wind, water, gravity, or a combination thereof.

(f) "Sediment" means solid particulate matter, both mineral and organic, that is in suspension in water, is being transported, or has been moved from its site of origin by the processes of erosion.

(g) "Earth Change" means any man-made change in the natural cover or topography of the land which may result in soil erosion and sedimentation.

(h) "Land Use" means any use of the land which may result in an earth change and which may result in or contribute to soil erosion and sedimentation, including but not limited to subdivision and other residential development, industrial and commercial development, highway and road construction, drainage ditch construction, surface mining, and some agricultural practices.

Sec. 4. (A) Within one year after the effective date of this act, the Soil Conservation Districts shall prepare a unified soil erosion and sedimentation control program. Such program shall identify land uses which shall be governed by the provisions of this act and shall include guidelines

and specifications for such soil erosion and sedimentation control for all such identified land uses.

(B) The Commission shall assist the Soil Conservation Districts in the preparation of said unified soil erosion and sedimentation control program by:

(1) making available information regarding the effect of sediments on water quality;

(2) identifying water quality standards and the location of those waters of the State which are degraded by sedimentation;

(3) setting forth requirements which shall be included in said unified soil erosion and sedimentation control program to protect water quality standards and designated uses of the waters of the State.

(C) The Department shall assist the Soil Conservation Districts in the preparation of said unified soil erosion and sedimentation control program by defining any agricultural practices which contribute to soil erosion and sedimentation and by recommending measures which shall be employed to prevent further soil erosion and sedimentation from such practices.

(D) Copies of said unified soil erosion and sedimentation control program shall be submitted to the Department and Commission by the Soil Conservation Districts for approval before said program is implemented.

Sec. 5. (A) Each local agency of jurisdiction shall develop grading and construction ordinances subject to the guidelines and recommendations of the unified soil erosion and sedimentation control program as specified by section 4 of this act. Said grading and construction ordinances shall contain provisions for the approval of development and land use plans, ero-

sion and sedimentation control, and enforcement thereof by the appropriate local agency. Said ordinances may require the issuance of a performance bond of any developer or land user as may be necessary.

(B) The Department and the Commission, if so requested by any local agency, shall provide technical assistance in the development of said grading and construction ordinances.

(C) The local agency shall file notice of any violation of its grading and construction ordinance with the Commission and the Department.

Sec. 6. (A) A local agency, before issuing a building permit or approving a plat, pursuant to sections 112, 113, and 114 of Act. No. 288 of the Public Acts of 1967, being sections 560.112, 560.113, and 560.114 of the Compiled Laws of 1948, for any development or land use which may in any way result in soil erosion and sedimentation, shall require such land user or developer to submit a plan of development. Said plan shall contain certification by the developer or land user that any land clearing, construction, development, or other modification will be accomplished pursuant to said plan and shall adhere to all requirements contained within the local agency's grading and construction ordinance.

(B) All such plans of development submitted to a local agency shall be reviewed and approved by the appropriate Soil Conservation District before said local agency shall permit construction or development. In its review of such plan of development, the Soil Conservation District shall certify that such plan meets all requirements as contained in the unified soil erosion and sedimentation control program.

Sec. 7 All developments and land uses affected by the provisions of this act which are undertaken by a local agency shall be approved by the Commission

and the Department before any earth change is made.

Sec. 8. In case of a conflict between an existing ordinance of a local agency relating to soil erosion and sedimentation control and an ordinance enacted pursuant to the provisions of section 5(A) of this act, the ordinance which is more restrictive shall control, provided said ordinance meets the requirements of the unified soil erosion and sedimentation control program as specified by this act.

Sec. 9. Any local agency which permits, allows, or suffers the continuation of soil erosion or sedimentation into the waters of the State by any of its inhabitants or persons occupying, using, or developing lands from which sedimentation or erosion originates, shall be subject to the remedies as specified in Section 7 of Act. No. 245 of the Public Acts of 1929, as amended, being section 323.7 of the Compiled Laws of 1948.

Sec. 10. The Commission and the Department, in order to carry out its duties and functions as specified by this act, may promulgate rules in accordance with and subject to the provisions of Act. No. 306 of the Public Acts of 1969, being sections 24.201 to 24.313 of the Compiled Laws of 1948.

Sec. 11. Any person who violates any provision of this act or the rules promulgated hereunder is guilty of a misdemeanor. Each day of any such violation shall be considered a separate violation.

12-29-70
Water Development Services Division
WHV

APPENDIX G

NATURAL RIVER ACT OF 1970, ACT 231

Natural River Act of 1970

Act No. 231
Public Acts of 1970
Approved by Governor
December 3, 1970

STATE OF MICHIGAN

75TH LEGISLATURE

REGULAR SESSION OF 1970

Introduced by Rep. Goemaere on behalf of the Committee on Conservation and Recreation

AN ACT to authorize the establishment of a system of designated wild, scenic and recreational rivers; to prescribe the powers and duties of the natural resources commission with respect thereto; to fund necessary study and comprehensive planning for the establishment of the system; to provide for planning, zoning and cooperation with local units of government; to authorize the protection of designated river frontage by acquisition, lease, easement or other means; to authorize local units of government and the commission to establish zoning districts in which certain uses of rivers and related lands may be encouraged, regulated or prohibited; to provide for limitations on uses of land and their natural resources, and on the platting of land; and to provide that assessing officers shall take cognisance of the effect of zoning on true cash value.

The People of the State of Michigan enact:

Sec. 1. This act shall be known and may be cited as the "natural river act of 1970".

Sec. 2. As used in this act:

(a) "Commission" means the natural resources commission.

(b) "River" means a flowing body of water or a portion or tributary thereof, including streams, creeks or impoundments and small lakes thereon.

(c) "Free flowing" means existing or flowing in natural condition without impoundment, diversion, straightening, riprapping or other modification.

(d) "Person" means an individual, partnership, firm, corporation, association or other entity.

(e) "System" means all of those rivers or portions thereof designated under this act.

(f) "Natural river" means a river which has been designated by the commission for inclusion in the wild, scenic and recreational rivers system.

Sec. 3. The commission, in the interest of the people of the state and future generations, may designate a river or portion thereof, as a natural river area for the purpose of preserving and enhancing its values for water conservation, its free flowing condition and its fish, wildlife, boating, scenic, aesthetic, flood plain, ecologic, historic and recreational values and uses. The area shall include adjoining or related lands as appropriate to the purposes of the designation. The commission shall prepare and adopt a long range comprehensive plan for a designated natural river area which shall set forth the purposes of the designation, proposed uses of lands and waters, and management measures designed to

accomplish the purposes. State land within the designated area shall be administered and managed in accordance with the plan, and state management of fisheries, streams, waters, wildlife and boating shall take cognizance of the plan. The commission shall publicize and inform private and public landowners or agencies as to the plan and its purposes, so as to encourage their cooperation in the management and use of their land in a manner consistent with the plan, and the purposes of the designation. The commission shall cooperate with federal agencies administering any federal program concerning natural river areas, and with any watershed council established under Act No. 253 of the Public Acts of 1964, being sections 323.301 to 323.320 of the Compiled Laws of 1948, when such cooperation will further the interest of the state.

Sec. 4. A river qualifying for designation as a natural river area shall possess 1 or more of the natural or outstanding existing values cited in section 3 and shall be permanently managed for the preservation or enhancement of such values. Categories of natural rivers shall be defined and established by the commission, based on the characteristics of the water and the adjoining lands and their uses, both as existing and as proposed, including such categories as wild, scenic and recreational. The categories shall be specified in the designation and the long range comprehensive plan.

Sec. 5. The commission may acquire lands or interests in lands adjacent to a designated natural river for the purpose of maintaining or improving the river and its environment in conformance with the purposes of the designation and the plan. Interests which may be acquired include, but are not limited to, easements designed to provide for preservation and to limit development, without providing public access and use. Lands or interests in lands shall be acquired under this act only with consent of the owner.

Sec. 6. (1) The commission may administer federal financial assistance programs for natural river areas.

(2) The commission may enter into a lease or agreement with any person or political subdivision to administer all or part of their lands in a natural river area.

(3) The commission may expend funds for works designed to preserve and enhance the values and uses of a natural river area and for construction, management, maintenance and administration of facilities in a natural river area conforming to the purposes of the designation, when the funds are so appropriated by the legislature.

Sec. 7. Before designating a river as a natural river area, the commission shall conduct public hearings in the county seat of any county in which a portion of the designated natural river area is located. Notices of the hearings shall be advertised at least twice, not less than 30 days before the hearing, in a newspaper having general circulation in each such county and in at least 1 newspaper having general circulation in the state and 1 newspaper published in the Upper Peninsula.

Sec. 8. After designation of a river or portion of a river as a natural river area and following the preparation of the long range comprehensive plan, the commission may determine that the uses of land along the river, except within the limits of an incorporated municipality, shall be controlled by zoning contributing to accomplishment of the purposes of this act and the natural river plan. County and township governments are encouraged to establish these zoning controls and such additional controls as may be appropriate, including but not limited to building and subdivision controls. The commission may provide advisory, planning and cooperative assistance in the drafting of ordinances to establish such controls. If the local unit does not, within 1 year after notice from the commission, have in full force and effect a zoning ordinance or interim zoning ordinance established under authority of the acts cited in section 11, the commission, on its own motion, may promulgate a zoning rule in accordance with section 13. A zoning rule may also be promulgated if the commission finds that an adopted or existing zoning ordinance fails to meet adequately guidelines consistent with this act as provided by the commission and transmitted to the local units concerned, does not take full cognizance of the purposes and objectives of this act or is not in accord with the purposes of designation of the river as established by the commission.

Sec. 9. A zoning ordinance adopted by a local unit of government or a zoning rule

promulgated by the commission shall provide for the protection of the river and its related land resources consistent with the preservation and enhancement of their values and the objectives set forth in section 3. The ordinance or rule shall protect the interest of the people of the state as a whole. It shall take cognizance of the characteristics of the land and water concerned, surrounding development and existing uses and provide for conservation of soil, water, stream bed and banks, flood plains and adjoining uplands.

Sec. 10. The ordinance or rule shall establish zoning districts within which such uses of land as for agriculture, forestry, recreation, residence, industry, commerce and additional uses may be encouraged, regulated or prohibited. It may limit or prohibit the placement of structures of any class or designate their location with relation to the water's edge, to property or subdivision lines and to flood flows and may limit the subdivision of lands for platting purposes. It may control the location and design of highways and roads and of public utility transmission and distribution lines except on lands or other interests in real property owned by the utility on January 1, 1971. It may prohibit or limit the cutting of trees or other vegetation but such limits shall not apply for a distance of more than 100 feet from the river's edge. It may specifically prohibit or limit mining and drilling for oil and gas but such limits shall not apply for a distance of more than 300 feet from the river's edge. It may contain other provisions necessary to accomplish the objectives of this act. A zoning rule promulgated by the commission shall not control lands more than 400 feet from the river's edge.

Sec. 11. A local unit of government in establishing a zoning ordinance, in addition to the authority and requirements of this act, shall conform to Act No. 184 of the Public Acts of 1943, as amended, being sections 125.271 to 125.301 of the Compiled Laws of 1948, or Act No. 183 of the Public Acts of 1943, as amended, being sections 125.201 to 125.232 of the Compiled Laws of 1948. Any conflict shall be resolved in favor of the provisions of this act. The powers herein granted shall be liberally construed in favor of the local unit or the commission exercising them, in such manner as to promote the orderly preservation or enhancement of the values of the rivers and related land resources and their use in accordance with a long range comprehensive general plan to insure the greatest benefit to the state as a whole.

Sec. 12. Upon adoption of a zoning ordinance or rule, certified copies of the maps showing districts shall be filed with the local tax assessing officer and the state tax commission. In establishing true cash value of property within the districts zoned, the assessing officer shall take cognizance of the effect of limits on use established by the ordinance or rule.

Sec. 13. (1) The commission shall prescribe such administrative procedures and rules and provide such personnel as it may deem necessary for the enforcement of a zoning ordinance or rule enacted in accordance herewith. A circuit court, upon petition and a showing by the commission that there exists a violation of a rule properly promulgated under this act, shall issue any necessary order to the defendant to correct the violation or to restrain the defendant from further violation of the rule.

(2) A zoning rule of the commission shall be promulgated in accordance with and subject to the provisions of Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.315 of the Compiled Laws of 1948. The rule shall include procedures for receiving and acting upon applications from local units of government or landowners for change of boundaries or change in permitted uses in accordance with sections 71 to 87 of Act No. 306 of the Public Acts of 1969. An aggrieved party may seek judicial review in accordance with and subject to the provisions of sections 101 to 106 of Act. No. 306 of the Public Acts of 1969.

(3) The lawful use of any building or structure and of any land or premise as existing and lawful at the time of enactment of a zoning ordinance or rule or of an amendment thereof may be continued although such use does not conform with the provisions of the ordinance, rule or amendment. The ordinance or rule shall provide for the completion, restoration, reconstruction, extension or substitution of nonconforming uses upon such reasonable terms as may be set forth in the zoning ordinance or rule.

Sec. 14. Nothing in this act shall preclude a component of the system from becoming a part of the national wild and scenic river system under the federal wild and scenic rivers act, Public Law 90-542, approved October 2, 1968. The commission may enter into written cooperative agreements for joint federal-state administration of rivers which may be designated under Public Law 90-542.

Sec. 15. The commission shall approve preliminary and final plans for site or route location, construction or enlargement of utility transmission lines, publicly provided recreation facilities, access sites, highways, roads, bridges or other structures and for publicly developed water management projects, within a designated natural river area, except within the limits of a city or incorporated village. It may require any measure necessary to control damaging erosion or flow alteration during or in consequence of construction. Rules concerning such approvals and requirements shall be promulgated under the provisions of Act No. 306 of the Public Acts of 1969, as amended.

Sec. 16. This act may not be construed to prohibit a reasonable and lawful use of any other natural resource which will benefit the general welfare of the people of this state and which is not inconsistent with the purpose of this act.

Clerk of the House of Representatives.

Secretary of the Senate.

Approved _____

_____

Governor.

APPENDIX H

WATER FRONT DEVELOPMENT REGULATIONS

WATERFRONT DEVELOPMENT REGULATIONS

Setbacks from the Water

For lots that abut on navigable waters:

All buildings and structures, except piers, marinas, boathouses and similar uses which require a lesser setback, as determined by the Board of Appeals, shall be set back at least seventy-five (75) feet from the waterline and elevated at least two (2) feet above the experienced high water elevation unless otherwise specified by a flood plain zoning ordinance. Seepage pits and soil absorption fields shall be set back at least fifty (50) feet from the normal high water elevation.

The Zoning Administrator shall determine the normal high water elevation or line where not established.

Increased Water Setbacks

These designated bodies of water possess unique characteristics because of outstanding fish and aquatic life, shore cover, natural beauty or ecological attributes. An increased setback of ____ feet from the normal high water elevation shall be required on the following lakes, flowages, rivers and streams or designated portions thereof:

List the appropriate water bodies.

Reduced Building Setbacks

A setback less than the setback required for the appropriate class of highway may be permitted where there are at least five (5) existing main buildings within 500 feet of the proposed site that are built to less than the required setback. In such cases, the setback shall be the average of the nearest main building on each side of the proposed site or if there is no building on one side, the average of the setback for the main building on one side and the required setback. Any other setback may be permitted by the Board of Appeals in accordance with this Ordinance.

Removal of Shore Cover

Purpose.--Regulation of tree cutting along the shores of navigable waters is necessary to protect scenic beauty, control erosion and reduces effluent and nutrient flow from the shoreland. These provisions shall not apply to the removal of dead, diseased or dying trees at the discretion of the landowner, or to silvicultural thinning upon recommendation of a forester.

Tree-cutting.--Tree-cutting in a strip paralleling the shoreline and extending thirty-five (35) feet inland from all points along the normal high water mark of the shoreline shall be limited in accordance with the following provisions:

No more than 30 percent of the length of this strip (as measured along the normal high water mark) shall be clear cut to the depth of the strip.

Provided, further that cutting of this 30 percent shall not create a clear cut opening in this strip greater than thirty (30) feet wide for every one hundred (100) feet of shoreline (measured along the normal high water mark).

In the remaining 70 percent length of this strip (distance measured along the normal high water mark) cutting shall leave sufficient cover to screen cars, dwellings, accessory structures, except boathouses, as seen from the water; to preserve beauty and to control erosion.

Natural shrubbery shall be preserved as far as practicable, and where removed it shall be replaced with other vegetation that is equally effective in retarding runoff, preventing erosion and preserving natural beauty.

The removal of natural shrubbery and its replacement shall require the granting of a special exception by the Board of Appeals. Petition for such special exception shall be accompanied by a plan showing the work to be accomplished. The granting of such special exception shall be conditional upon a contract requiring the petitioner to give to the Board of Appeals, within one year after the date of grant, satisfactory evidence of compliance with such plan or pay for the cost of such compliance by the County.

Paths.--Any paths, roads or passages within the strip shall be so constructed or surfaced as to be as effective in controlling erosion.

Cutting Plan.--A special cutting plan allowing greater cutting may be permitted by the Board of Appeals by issuance of a Special Exception Permit. In applying for such a permit the Board may require the lot owner to submit a sketch of his lot including the following information: location of all structures, location of parking, gradient of the land, existing vegetation, proposed cutting and proposed replanting. The Board may grant such a permit only if it finds that such special cutting plans:

(1) Will not cause undue erosion or destruction of scenic beauty and,

(2) Will provide substantial shielding from the water of dwellings, accessory structures and parking areas. The Board may condition such a permit upon a guarantee of tree planting by the lot owner. Such an agreement shall be enforceable in court.

Commercial Forestry.--From the inland edge of the thirty-five (35) foot strip to the outer limits of the shoreland, the commercial harvesting of trees shall be allowed when accomplished under accepted forest management practices. The maintenance and improvement of water quality shall be emphasized in all timber harvesting operations. The purpose

of this order favor long-lived species adapted to the site and will prescribe slash disposal methods necessary for aesthetic value.

More Restrictive Tree Cutting Provisions

The depth of the strip within which tree cutting is restricted shall be increased _____ feet and the width of allowed openings shall be reduced to ____ feet on the following lakes, flowages, rivers and streams or designated portions thereof. These designated bodies of water possess unique characteristics because of outstanding fish and aquatic life, shore cover, natural beauty or ecological attributes.

List the appropriate water bodies.

APPENDIX I

GUIDELINES AND REFERENCE DOCUMENTS FOR SOIL EROSION CONTROL

GUIDELINES AND REFERENCE DOCUMENTS

FOR SOIL EROSION CONTROL

Handbook of Specifications for the Protection of Natural Resources, Michigan Department of Natural Resources, December, 1969.

Soil Erosion and Sedimentation Control Program, Michigan Grand River Watershed Council, Lansing, MI, 1969.

Community Action Guidebook for Soil Erosion and Sediment Control, National Association of Counties Research Foundation, Washington, D.C., 1970.

Model for Developing Soil Erosion and Sediment Control Ordinances and Regulations, Soil Conservation Service, East Lansing, Michigan, 1970.

Technical Guide Sec. III-H, Controlling Runoff and Erosion on Lands Being Developed for Non-Agricultural Uses, SCS, East Lansing, Michigan.

Technical Guide Sec. IV-G, Vegetative Protection of Developing Areas with Short Term Seeding, SCS, East Lansing, Michigan.

Technical Guide Sec. IV-G, Vegetative Protection of Developing Areas with Permanent Seeding, SCS, East Lansing, Michigan.

Technical Guide Sec. IV-G, Vegetative Protection of Developing Areas by Sodding, SCS, East Lansing, Michigan.

Technical Guide Sec. IV-G, Temporary Protection of Developing Areas Without Seeding, SCS, East Lansing, Michigan.

Technical Guide Sec. IV-G, Temporary Sediment Basin in Developing Areas, SCS, East Lansing, Michigan.

Technical Guide Sec. IV-G, Diversions in Developing Areas, SCS, East Lansing, Michigan.

Standard Specifications for Road and Bridge Construction, Michigan Department of State Highways, Lansing, Michigan.

Soil Erosion, Sedimentation Control and Land Balance Ordinance, Ann Arbor, Michigan, 1970.

APPENDIX J

FLOOD PLAIN MANAGEMENT PROGRAMS

FLOOD PLAIN MANAGEMENT PROGRAMS

Introduction to Flood Proofing, John R. Schaeffer, Center for Urban Studies, University of Chicago, 1967.

A Legal View of the Flood Plain, Edward W. Beuchert, Harvard Law School, 1961.

Flood Control Via the Police Power, Allison Dunham, University of Chicago, Law School.

Flood Plain Information Study of Red Cedar River, Ingham County, Michigan, Corps of Engineers, U. S. Army, Detroit, Michigan, March 1968.

Presidential Documents, Executive Order 11296, Federal Register Vo. 31, No. 155, August, 1966.

Let's Plan the Damages Out of Floods, Peter Farb, "National Civic Review", May 1960, National Municipal League.

Using Zoning Principles in Flood Plain Regulation, Joseph I. Perry, "Journal Hydraulics Division," Paper #957, ASCE.

Wisconsin's Shoreland Protection Ordinance, December 1967, Department of Natural Resources, Division of Resource Development, Madison, Wisconsin.

Flood Plain Zoning, Charles J. Pelletier, Connecticut Water Resources Commission, September 1960.

Floods and Flood Warnings, U. S. Department of Commerce.

The Control and Development of Flood Plain Areas, Gilbert R. White, U. of C.

Comprehensive Flood Damage Prevention, John W. Weathers, TVA, Knoxville, Tennessee.

Environment Effects of Flood Plain Regulations, Eugene W. Weber and Walter G. Sutton, U. S. Department of Army, Washington, D.C.

Model Flood Plain Zoning Ordinance, Department of Material Resources, Division of Resource Development, Madison, Wisconsin.

APPENDIX K

OUTLINE OF PROCEDURES FOR CONCEPTION, AUTHORIZATION, AND CONSTRUCTION OF SMALL NAVIGATION PROJECTS UNDER AUTHORITY OF SECTION 107 OF THE 1960 RIVER AND HARBOR ACT, AS AMENDED

OUTLINE OF PROCEDURES FOR CONCEPTION,
AUTHORIZATION, AND CONSTRUCTION OF SMALL NAVIGATION PROJECTS
UNDER AUTHORITY OF SECTION 107 OF THE
1960 RIVER AND HARBOR ACT, AS AMENDED

The procedures for conception, authorization, and construction of small navigation projects can be divided into 10 steps.

Step 1. Initiation of action by local interests. An investigation of a prospective Section 107 small project may be initiated after receipt of a formal request from a prospective sponsoring agency empowered under state law to provide all required local cooperation. This request and any further inquiries concerning a small navigation project should be made directly to the District Engineer for the concerned area.

Step 2. Reconnaissance study. As an initial step in the investigation procedure, a reconnaissance report is prepared based on a preliminary investigation made to determine a likelihood for development through further detailed studies of an economically justified, engineeringly, and environmentally feasible project under the provisions of the authorizing legislation. This report will state if further detailed studies are recommended.

Step 3. Review and assignment of further detailed studies. Upon completion of a reconnaissance report by the District Engineer, the Division Engineer having jurisdiction will review the report and transmit it to the Chief of Engineers. Approval by the Chief of Engineers is required before detailed studies leading to a detailed project report can be initiated by the District Engineer.

Step 4. Assurances of local cooperation. The District Engineer will notify responsible local interests that they will be required to furnish formal assurances that they will provide the required measures of local cooperation. A project will not be recommended unless the District Engineer is fully satisfied that the local interests understand their responsibilities and that they are legally responsible, financially capable, and willing to cooperate to the necessary degree.

Step 5. Recommended plan of improvement. The District Engineer, after carefully analyzing the data obtained from local interests and developed through field and office studies, will devise a plan of improvement best suited for problems under consideration and the area in question. A favorable recommendation by the District Engineer will depend on whether the benefits to be derived through the plan of improvement exceed the cost to be incurred. Also, the District Engineer will inform the local cooperating agency, the State Governor and other interested Federal agencies of the contemplated proposal in order to obtain their views and recommendations on the improvements discussed in the report.

Step 6. Consideration by Chief of Engineers. Upon completion of the detailed project report by the District Engineer, the Division Engineer having jurisdiction will review the report and transmit it to the Chief of Engineers. If the Chief of Engineers approves the project, the project will take its place on the backlog list of approved projects awaiting construction funds.

Step 7. Allocation of construction funds. The Secretary of the Army is authorized to allot from yearly appropriations made for commercial or recreational navigation for the construction of small projects not specifically authorized by Congress, when in the opinion of the Chief of Engineers such work is advisable. Not more than $1000,000 is to be allotted under this authority for a project at any single locality and the amount allotted shall be sufficient to complete Federal participation in the project.

Step 8. Preparation of plans. Before construction of the project can be started, detailed plans, specifications, and cost estimates will be prepared by the District Engineer, with such assistance and review by the Division Engineer and Chief of Engineers as are necessary. At this time, the formal assurances of local cooperation required by law, of which local interests were notified in Step 4, must be provided and approved by the Secretary of the Army.

Step 9. Invitation to bid. Upon completion of plans and specifications, prospective bidders will be invited to bid on constructing the proposed improvements. Upon determination of the eligible low bidder a contract will be awarded to him for construction of the project in accordance with those plans and specifications, or, if satisfactory bids are not secured, Government construction with hired labor may be undertaken as provided by law.

Step 10. Initiation of construction of project. After award of the contract, the successful bidder will mobilize his plant, equipment, and personnel, and start construction.

APPENDIX L

SURVEY INVESTIGATIONS AND REPORTS

DEPARTMENT OF THE ARMY
Office of the Chief of Engineers
Washington, D. C. 20315

EP 1120-2-1

ENGCW-PD

Pamphlet
No. 1120-2-1

1 May 1967

SURVEY INVESTIGATIONS AND REPORTS

Major Steps in the Conception, Authorization and Construction of Corps of Engineers' Projects for Water Resources Development

Purpose and Scope. This pamphlet summarizes the major steps leading to construction of civil works projects by the Corps of Engineers for navigation, beach erosion control, flood control, and related water resources developments. Small projects of limited scope which may be accomplished under general authority available to the Secretary of the Army and the Chief of Engineers are excepted from this pamphlet. The pamphlet may be used by Division and District Engineers for public distribution in explaining the planning, coordination and authorization processes involved in the civil works program.

The Federal Interest. Congress, by general and specific laws, has determined that a Federal interest exists in the comprehensive planning of water resources development for long-range needs, and in constructing and participating in the costs of projects for navigation, flood control, major drainage, irrigation, beach erosion control, and hurricane flood protection, and such related developments as hydroelectric power, water supply, water quality control, fish and wildlife preservation and enhancement, and outdoor recreation. The procedures involved in determining the justification and the extent of Federal interest in activities of this kind are described below. Corps of Engineers' reports include comprehensive studies of river basin development, and survey reports on specific projects and systems of related projects. The following steps apply generally to both types of studies, differing principally in the scope of geographic coverage. Basin studies and survey investigations by the Corps of Engineers may be authorized by Congressional Act or by resolution of the Senate or House Committee on Public Works. Subsequent Federal construction and participation in project costs are subject to specific Congressional authorization. While all relevant aspects of water resource development are considered in the investigation stage, this does not necessarily lead to Federal assumption of all responsibility, and local cooperation may be indicated depending on applicable laws and precedents.

Step No. 1. Initiation of action by local interests:

Local citizens who desire Federal assistance in improvements for navigation, beach erosion control, flood control and related water resource purposes should contact their Senators and Representatives with a request that provision of the desired facilities be considered by the Federal Government. Local interests may also request advice of representatives of the Corps of Engineers on the appropriate further procedures.

This Pamphlet rescinds Section II, EM 1120-2-101 and EP 1120-2-1, dated 17 March 1964.

Step No. 2. Consultation by Senator or Representative with Public Works Committee:

a. If previous reports on navigation, flood control, or related purposes have been made for the area in question, the Senator or Representative may request the Senate or House Committee on Public Works to adopt a resolution authorizing a review of previous reports to determine whether any modifications of the Chief of Engineers' recommendations in such reports would be advisable.

b. If no previous report has been made, the Senator or Representative may request the Committee to include authorization for a survey in either an omnibus river and harbor and flood control bill or a separate bill.

c. In the case of beach erosion control, hurricane protection and related purposes, the Senator or Representative may sponsor an act authorizing a study or may request the Committee to adopt a resolution authorizing a study in accordance with Section 110 of the River and Harbor Act approved 23 October 1962.

Step No. 3. Action by the Senate or House Public Works Committee:

If the Committee to which the request is referred is convinced of the need for a review report, an appropriate resolution calling upon the Board of Engineers for Rivers and Harbors to make the review will be adopted by the Committee and referred to the Chief of Engineers for action. In the case of a beach erosion problem, the resolution requests the Secretary of the Army to cause the survey to be made. If the previous report involves the project for the alluvial valley of the Mississippi River and tributaries, the resolution will call for a review of that report by the Chief of Engineers rather than by the Board. Where no previous study has been made, the authorization for an investigation may be included in either an omnibus river and harbor and flood control bill or a separate bill for consideration by Congress. Each Committee may request advice of the Chief of Engineers on the desirability of authorizing such study.

Step No. 4. Assignment of investigation by Chief of Engineers:

When Congress authorizes an investigation, the Chief of Engineers will assign the detailed studies to an appropriate reporting officer, usually the Division Engineer in whose territory the area is located. The Division Engineer may further assign the investigation to the proper District Engineer. However, before studies can be undertaken, funds for the purpose must be appropriated by the Congress.

Step No. 5. Public Hearings by Division or District Engineers:

The Division or District Engineer, in order to ascertain the views and desires of local people, will hold public hearings at times appropriate and at localities accessible to all concerned. Local interests will be afforded full opportunity to express their views on the character and extent of the improvement desired, on the need and advisability of its execution, and on their general willingness and ability to cooperate with the Federal Government in the

costs of projects in accordance with established policies and laws. Notices of public hearings to be held by the reporting officers are distributed directly to all parties known to be interested in the investigation.

Step No. 6. Investigation by Division or District Engineer:

The Division or District Engineer after careful analysis of engineering and economic data obtained through field and office studies, will formulate alternative plans of improvement and determine their costs and probable benefits. Consideration will also be given to other objectives defined by Congress, such as area redevelopment. In selecting the plan of improvement best suited for the problems and the area in question, consideration will be given to optimum use of all water resources of the area by providing related improvements. All stages of study are carefully coordinated with local and other Federal agencies concerned. A favorable recommendation will depend on whether the benefits to be derived through the plan of improvement exceed the costs to be incurred. If the plan is economically justified, further public hearings may be held to inform those interested in its characteristics, and to obtain general agreement by responsible officials on the specific requirements of local cooperation.

Step No. 7. Review by Division Engineer and issuance of public notice:

Upon completion of the report by the District Engineer, the Division Engineer having jurisdiction will review the report and transmit it to the Board of Engineers for Rivers and Harbors. At this time he will issue a public notice to all parties known to be interested in the investigation, setting forth the findings of the District and Division Engineers and their recommendations for improvement, and informing those concerned that they may furnish their views to the Board. The Mississippi River Commission acts instead of the Board on reports on the alluvial valley of the Mississippi River.

Step No. 8. Review and hearings by the Board of Engineers for Rivers and Harbors or the Mississippi River Commission:

The Board of Engineers for Rivers and Harbors, an independent review group with staff in Washington, D. C., is required by law to review all survey and review reports of the Corps of Engineers except those under the jurisdiction of the Mississippi River Commission. The Board or the Commission may hold public hearings before making its recommendations to the Chief of Engineers.

Step No. 9. Preparation of proposed report of the Chief of Engineers and review thereof by the affected States and Federal agencies:

When the Board or the Commission completes its review of the report and transmits its recommendations to the Chief of Engineers, the latter will prepare his proposed report and will refer it, with the Board's or Commission's report, to the Governors of the affected States and to other interested Federal agencies in order to obtain their formal views and recommendations on the improvements

discussed in the report. The Federal agencies involved may include the Departments of Agriculture, Transportation, Commerce, Interior, Labor, and Health, Education, and Welfare; the Federal Power Commission and the Appalachian Regional Commission; and interested branches of the Department of Defense. The States and the other Federal agencies normally will be expected to forward their comments on the proposed report to the Chief of Engineers within 90 days.

Step No. 10. Transmittal of report to Bureau of the Budget:

After the Chief of Engineers receives and considers the comments of the Governors of the affected States and those of other interested Federal agencies, he will complete his report and submit it to the Secretary of the Army, who will then submit a draft of his letter of transmission to Congress, with the report of the Chief of Engineers and all pertinent papers, to the Director of the Bureau of the Budget for a determination of the relationship of the report to the program of the President.

Step No. 11. Transmittal of report to Congress:

Upon receipt and consideration of the comments of the Bureau of the Budget, the Secretary of the Army will transmit the report of the Chief of Engineers, with all pertinent papers and comments, to the Congress. This step will complete the action required of the Chief of Engineers and the Department of the Army in complying with the Congressional resolution or act authorizing the investigation.

Step No. 12. Project authorization by Congress:

After the report is forwarded to Congress by the Secretary of the Army, the Committees on Public Works of the Senate and the House may hold hearings on the report with a view towards formulating a bill including authorization of projects recommended in the report. The report may be ordered to be printed by a committee as a Senate or House Document, and then is known as the project document. Authorization for construction of projects will usually be included in omnibus river and harbor and flood control bills.

Step No. 13. Assurances of local cooperation:

When scheduling of planning and construction of an authorized project is being considered, the District Engineer notifies responsible local interests that they will be required to furnish formal assurances that they will provide the authorized measures of local cooperation. (See Steps 5 and 6.) If assurances satisfactory to the Secretary of the Army are not furnished, projects generally are placed on the inactive list. In the specific case of local flood control projects, projects are deauthorized as provided by law if the assurances are not provided within 5 years after a formal request is made in writing.

Step No. 14. Request for planning and construction funds:

In order that the Corps of Engineers may construct a project authorized in an omnibus bill, funds must be requested from Congress. All requests for

planning and construction funds will be reviewed by the Bureau of the Budget, and, if found to conform with the President's budgetary policies, will be transmitted to the Congress as part of the President's Budget, and later considered by the Appropriations Committees.

Step No. 15. Appropriation of planning and construction funds:

Upon completion of hearings by the Appropriations Committees considering the Department of the Army Civil Works Appropriations, a bill will be reported out of Committee and referred to the full Congress for passage. The enactment will then go to the President for signature. Authority and funds will be thereby given to the Chief of Engineers to initiate detailed planning and construction of the projects referred to in that bill.

Step No. 16. Preparation of detailed plans:

Before construction of the project can be started, detailed plans, specifications, and cost estimates will be prepared by the District Engineer, with such assistance and review by the Division Engineer and the Chief of Engineers as are necessary. At this time, the formal assurances of local cooperation required by law, of which local interests were notified in Step 13, must be provided by local interests and approved by the Secretary of the Army.

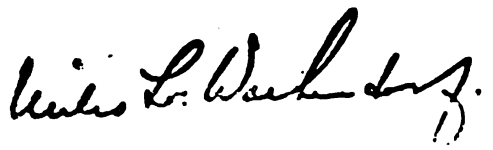
Step No. 17. Invitation to bid:

Upon completion of detailed plans and specifications, qualified contractors will be invited to bid on constructing the proposed improvements. A contract will then be awarded to the eligible low bidder for construction of the project in accordance with the plans and specifications.

Step No. 18. Construction of project:

After award of the contract, the successful bidder will mobilize his plant, equipment, and personnel, and start construction. Upon completion, a final sharing of costs is determined, and the Federal Government or local interests assume operation and maintenance of the project in accordance with authorized requirements.

FOR THE CHIEF OF ENGINEERS:



MILES L. WACHENDORF
Colonel, Corps of Engineers
Executive

APPENDIX M

LOCAL-STATE-FEDERAL WATERSHED PROJECTS

LOCAL-STATE-FEDERAL WATERSHED PROJECTS

The Application

1.

The Need.--First of all the local people must recognize that they have a water-management problem and that they can solve it only by working together. They must be willing and able to spend time and money toward solving the problem.

2.

Preparing the Application.--A local organization, which may be a soil conservation district, prepares the application. The application includes (a) size and location of the watershed, (b) description of the problem, (c) extent of damages, (d) details about the work needed, and (e) information about the organization and source of funds. Standard application forms are available.

3.

Where to Send the Application.--Send the application to the agency designated by the Governor of your State and a copy to the State office of Soil Conservation Service (SCS).

4.

Field Examination.--Technical specialists from SCS, Forest Service (FS), and other agencies examine the watershed.

5.

State Action.--If the State agency disapproves the application, the local organization is notified. If it approves, the State agency notifies the SCS State Conservationist and recommends priorities for planning within the State.

6.

Washington Review.--The State Conservationist sends the application to Washington for review by the SCS Administrator. The State Conservationist informs the local organization when the watershed is authorized for planning help.

Work Plan

7.

Preliminary Survey.--The SCS and FS make a preliminary survey of the watershed and review the survey with the local organization. The items mentioned in the application are specifically considered. The local organization decides whether to proceed with the work plan.

8.

Detailed Field Studies.--The SCS, FS, and other agencies make detailed field studies to determine what can be done, the cost, and the benefits. Benefits must exceed costs. The local organization reviews the findings and decides what measures to include in the work plan.

9.

Work Plan Preparation.--The local organization prepares a work plan with assistance from SCS and other agencies. The plan describes the proposed measures, how they will be financed, and when they will be installed. The SCS Administrator reviews the plan and makes recommendations. The plan is signed by the local organization and sent to the SCS Administrator.

10.

Work Plan Approval.--If funds are available, the Secretary of Agriculture can authorize operations to begin at once provided:

a. The Federal contribution to construction costs does not exceed $250,000; and

b. The work plan does not contain any single structure having a total capacity of more than 2,500 acre-feet.

If the Federal contribution to construction costs exceeds $250,000, or if the work plan contains a single structure having a total capacity of more than 2,500 acre-feet, the procedure is as follows:

a. Other interested Federal agencies have 30 days in which to review the plan.

b. The President transmits the plan to Congress.

c. Committees of the Senate and the House approve the plan before appropriations are made.

Financing

11.

Making Funds Available.--The SCS Administrator allocates funds for watershed projects from money appropriated each year by Congress.

12.

Cost Sharing.--The local organization shares in the cost of installing works of improvement for irrigation, drainage, and other agricultural water management. Cost-sharing is determined by the Secretary of Agriculture on the basis of direct identifiable benefits. The Federal Government pays for installing works of improvement applicable to flood prevention.

13.

Local Cost.--The local organization pays for installing works of improvement for purposes other than flood prevention and agricultural water management.

14.

Land and Easements.--The local organization obtains and pays for all land, easements, and rights-of-way needed for the project.

15.

Loans to Local Groups.--To help a local organization pay its share of the project cost, the Secretary of Agriculture may make loans or advancements to the local organization. The loans or advancements can be made for periods up to 50 years at the Federal long-term borrowing rate with a limit of $5 million for 1 project.

Operation

16.

Local Responsibility.--The local organization is responsible for installation work. Needed soil and water conservation treatment must precede or be applied during work on structures. SCS technicians and others may provide additional technical assistance to accomplish this during the time specified in the work plan.

17.

Engineering Plans.--Engineers make field surveys and prepare desings and specifications for constructing the works of improvement specified in the work plan.

18.

Employing Engineers.--When structures are for municipal or industrial water supplies, the local organization must employ non-Federal professional engineers. When projects are for flood prevention or for agricultural water management, the local organization has the option of employing non-Federal engineers or using the technical service available through the SCS. If the local organization employs engineers for this work the Federal Government reimburses it for this service. The Secretary of Agriculture may advance to the local organization up to 5 percent of the total cost of the works of improvement for this service.

19.

Bids and Contracts.--The local organization issues bids and lets contracts for construction.

20.

Construction.--Contractors start work on structures and other works of improvement.

21.

Operation and Maintenance.--When works of improvement are installed, the local organization is responsible for operation and maintenance of the project. Agreements are signed stating who will operate and maintain the project and how they will do it.

APPENDIX N

PUBLIC NUISANCE REGULATION,

DUST-ASHES-NOXIOUS MATTER

PUBLIC NUISANCE REGULATION

DUST-ASHES-NOXIOUS MATTER

No lime, ashes, coal, dry sand, hair, feathers or other substance that is liable to be blown by the wind shall be sifted or agitated or exposed where particles set in motion thereby will pass into any street, public place, watercourse or into any occupied premises.

No reasonable precaution shall be omitted by any person to prevent fragments or other substances from falling or dust and light material from flying into any street, place, watercourse, or building from any building or structure while the same is being constructed, altered, repaired or demolished.

APPENDIX O

WATERFRONT MARINA DISTRICT

W-M, WATERFRONT MARINA DISTRICT

PREAMBLE:

The intent of this Article is to provide districts suitable for recreational and commercial boating and those activities and service facilities related to harbor and waterway improvements. Such districts would encourage safe and efficient development of waterfront areas and facilitate navigation.

Section 13.01. PERMITTED USES.

a. Municipal or private development of either the berthing, protection, or servicing and storage of recreational and commercial boats, yachts, cruisers, inboards, outboards, sailboats, and other such watercraft.

b. Commissary facilities for the provision of food, beverages, and the like to be taken aboard boats.

c. Municipal or private beaches and recreation areas.

d. Retail businesses which supply commodities for persons using the facilities of the district such as: sale of boats, engines and accessories, fishing equipment and other similar items.

e. Restaurant, lounge or clubs.

f. Hotels or other such facilities to provide temporary home-port accommodations.

g. Accessory buildings, structures and uses customarily incidental to any of the above uses when located on the same property.

h. Off-street parking and loading in accordance with ARTICLE VI.

i. Other uses of similar and no more objectionable character to the above uses, and subject to the requirements set forth in ARTICLE XVI.

Section 13.02. PERMITTED USES AFTER SPECIAL APPROVAL. Under such reasonable conditions as imposed by the Zoning Board of Appeals, after public hearing, to secure harmony with the purposes of the W-M District, the following uses may be permitted:

a. Engine and hull repair shops.

b. Boat fuel stations.

Section 13.03. PROHIBITED USES. The specific uses which are prohibited in this District shall be the erection, construction, alteration, or use of buildings or premises and/or land for:

a. Dwellings.

b. Businesses as permitted in the C-1 and C-2 Districts and not specifically permitted in Section 13.02 above.

Section 13.04. DEVELOPMENT STANDARDS.

a. All dredging, construction, and/or development shall be subject to all requirements of the Township, County and State relating to harbor, channel and other waterway development, including Act 245, P. A. 1959 as amended, and the 1958 Federal Boating Act.

b. All site plans shall be reviewed by the Planning Commission prior to the issuance of any permit or action by the Zoning Board of Appeals so as to ascertain optimum development in relation to requirements of ARTICLE XVI.

Section 13.04. AREA, HEIGHT AND PLACEMENT REGULATIONS. (In accordance with the attached Schedule of Regulations, ARTICLE XVI.0

APPENDIX P

MICHIGAN LAWS RELATED TO WATER

MICHIGAN LAWS RELATING TO WATER

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APPENDIX Q

HOW A PUBLIC LAW 566 PROJECT MOVES FROM START TO FINISH

HOW A PUBLIC LAW 566 PROJECT MOVES FROM START TO FINISH

Step 1 Recognition by local people of a problem which may be eligible for assistance under Public Law 566.

Step 2 Preparation of application by eligible sponsors.

Step 3 Submission of application to the State Soil Conservation Committee.

Step 4 Field review performed by the State Committee's Watershed Review Committee.

Step 5 Education-information program.

Step 6 Public meeting with the State Committee.

Step 7 Official approval or disapproval of application by the State Committee, acting for the Governor.

Step 8 Submission of approved application to Soil Conservation Service for implementation.

Step 9 Preliminary Investigation by the Soil Conservation Service.

Step 10 Expression of interest from sponsors and local people in proceeding.

Step 11 Preparation of a work plan by the Soil Conservation Service with local assistance.

Step 12 Official acceptance of plan by sponsors and local people.

Step 13 Construction.

Step 14 Official dedication.

APPENDIX R

ENABLING LEGISLATION

ENABLING LEGISLATION

		Act	Year	Compiled Laws
Watershed Programs				
Metropolitan Areas	Metropolitan District Act	312	1929	119.1-119.15
County	Drain Improvement		1956	280.431
County	Intra County Drains		1956	280.461-280.495
County	Inter County Drains		1956	280.511-280.545
County	Water Management Districts		1956	280.551-280.583
Regional	Inland Lake Level Act	146	1961	281.61-281.86
Regional	Surplus Water Act	20	1964	281.301-281.315
	Soil Conservation Districts	297	1937	282.1-282.16
Waste Treatment Plant Construction				
Counties	Public Water and Sewage Systems	342	1939	46.171-46.186
Home Rule Cities	Sewage Disposal Systems	279	1909	117.4f
Municipal	Acquisition of waste and Sewage Systems	235	1947	123.331-123.347
		82	1955	123.351-123.356

ENABLING LEGISLATION (continued).

		Act	Year	Compiled Laws
County	Department of Public Works	185	1957	123.731-123.745
Municipal	Authorities	233	1955	124.281-124.294
County	Drain Code-Sewage Disposal		1956	280.423-280.424
Federal	Grants for Sewage Disposal Systems	222	1949	323.101-323.103
State	Grants for Sewage Disposal Systems	329	1966	323.111-323.114
	Water and Sewage Districts	211	1956	323.151-323.162
Metropolitan Areas	Metropolitan Districts	312	1929	119.1-119.15
Navigation				
Townships	Waterway Improvement	286	1923	41.481-41.482
General Villages	Harbors, Wharves	3	1895	67.35-67.39
Fourth Class Cities	Harbors, Wharves	215	1895	97.1-97.6
Fourth Class Cities	Sewers, Drains, Watercourses	215	1895	101.1-101.18
Home Rule Cities	Watercourses	279	1909	117.4h
Home Rule Cities	Docking of Watercraft	279	1909	117.4h
Port Districts	Local Ports	234	1925	120.1-120.35

ENABLING LEGISLATION (Continued).

		Act	Year	Compiled Laws
Port Districts	State Ports	251	1966	120.51-120.56
Cities	Waterfront Improvements	66	1941	123.601-123.604
State	Waterways Commission	320	1947	281.501-281.511
Municipal	Facilities	66	1952	281.541-281.543
	Inland Lakes and Streams	291	1965	281.731-281.747
Flood Control Levee at Grandville				
Home Rule City	Watercourses	279	1909	117.4h
Water Quality Standards				
Fourth Class Cities	Preservation of Water Purity	215	1895	97.4
Fourth Class Cities	Sewer Ordinances	215	1895	101.17
Counties	Houseboat Sanitation	68	1957	123.591-123.593
Counties	Public Health	306	1927	
State	Noxious Weeds	284	1917	247.51-247.52
State	Water Resources Commission	245	1929	323.1-323.12a
State	Swimmer's Itch	58	1929	323.221-323.225

ENABLING LEGISLATION (continued).

		Act	Year	Compiled Laws
Home Rule Cities	Public Health	279	1909	117.4h
Villages	Public Health	278	1909	78.24k
Townships	Public Health	247	1945	
Charter Townships	Public Health	359	1947	42.14
Flood Plain Land Use Regulations				
Municipal	Flood Control	278	1952	281.621-281.628
Municipal	Planning	285	1931	125.31-125.45
County	Planning	282	1945	125.101-125.107
City and Village	Zoning	207	1921	125.581-125.590
Home Rule Cities	Zoning	131	1957	117.4i
State	Plat Act	172	1929	560.1-
State	Flood Plain Management			
Village	Zoning	171	1958	125.311
Township Rural	Zoning	184	1943	125.271-125.301
County Rural	Zoning	183	1943	125.201-125.232
Valley Preserves				
Townships	Parks	157	1905	41.421-41.425

ENABLING LEGISLATION (continued).

		Act	Year	Compiled Laws
Counties	County & Regional Parks	261	1965	46.351-46.362
Metropolitan Areas	Metropolitan Districts	312	1929	119.1-119.15
Municipal	Recreation & Playground	156	1917	123.51-123.54
Land Treatment of Rural and Urban Areas				
Counties	Soil Conservation Districts	297	1937	282.1-282.16
Soil Erosion Control				
Municipal	Beach Erosion	278	1952	281.621-281.628
Counties	Soil Conservation Districts	297	1937	282.1-282.16

APPENDIX S

FLOOD PLAIN REGULATIONS BY STATE OF MICHIGAN

Flood Plain Regulation by State of Michigan

Act No. 167, P.A. of 1968
Approved by Governor June 17, 1968

Senate Bill No. 960

THE PEOPLE OF THE STATE OF MICHIGAN ENACT:

Section 1. The title and sections 2a, 3 and 4 of Act No. 245 of the Public Acts of 1929, section 2a as added by Act No. 117 of the Public Acts of 1949 and section 3 as amended by Act No. 405 of the Public Acts of 1965, being sections 323.2a, 323.3 and 323.4 of the Compiled Laws of 1948, are amended and 2 new sections to stand as sections 5a and 5b are added, the amended title and amended and added sections to read as follows:

TITLE

An act to create a water resources commission to protect and conserve the water resources of the state, to have control over the pollution of any waters of the state and the Great Lakes, to have control over the alteration of the watercourses and the flood plains of all rivers and streams, with powers to make rules and regulations governing the same, and to prescribe the powers and duties of such commission; to prohibit the pollution of any waters of the state and the Great Lakes, and to prohibit the obstruction of the floodways of the rivers and streams of the state; to designate the commission as the state agency to cooperate and negotiate with other governments and agencies in matters concerning the water resources of the state; and to provide penalties for the violation of this act.

Sec. 2a. The water resources commission is designated the state agency to cooperate and negotiate with other governments, governmental units and agencies thereof in matters concerning the water resources of the state, including but not limited to flood control and beach erosion control. The commission shall have control over the alterations of natural or present watercourses of all rivers and streams in the state to assure that the channels and the portions of the flood plains that are the floodways are not inhabited and are kept free and clear of interference or obstruction which will cause any undue restriction of the capacity of the floodway. The commission is further authorized to take such steps as may be necessary to take advantage of any act of congress heretofore or hereafter enacted which may be of assistance in carrying out the purposes of this act.

The commission shall report to the governor and to the legislature at least once in each year any plans or projects being carried on or considered and shall include in such report requests for any legislation needed to carry out any proposed projects or agreements made necessary thereby, together with any requests for appropriations.

Sec. 3. The commission shall be authorized to bring any appropriate action in the name of the people of the state of Michigan, either at law or in chancery as may be necessary to carry out the provisions of this act, and to enforce any and all laws relating to the pollution of the waters and the obstruction of the floodways of the rivers and streams of this state. Whenever the attorney general deems it necessary, he shall take charge of and prosecute all criminal cases arising under the provisions of this act.

Sec. 4. The commission or any agent duly appointed by it shall have the right to enter at all reasonable times in or upon any private or public property for the purpose of inspecting and investigating conditions relating to the pollution of any waters and the obstruction of the floodways of the rivers and streams of this state. The commission

shall have the right to call upon any officer, board, department, school, university, or other state institution and the officers or employees thereof for any assistance deemed necessary to the carrying out of this act.

Sec. 5a. The commission shall have the authority to make regulations and orders for the prevention of harmful interference with the discharge and stage characteristics of streams. It shall have the authority to ascertain and determine for record and in making its order the location and extent of flood plains, stream beds and channels and the discharge and stage characteristics of streams at various times and circumstances.

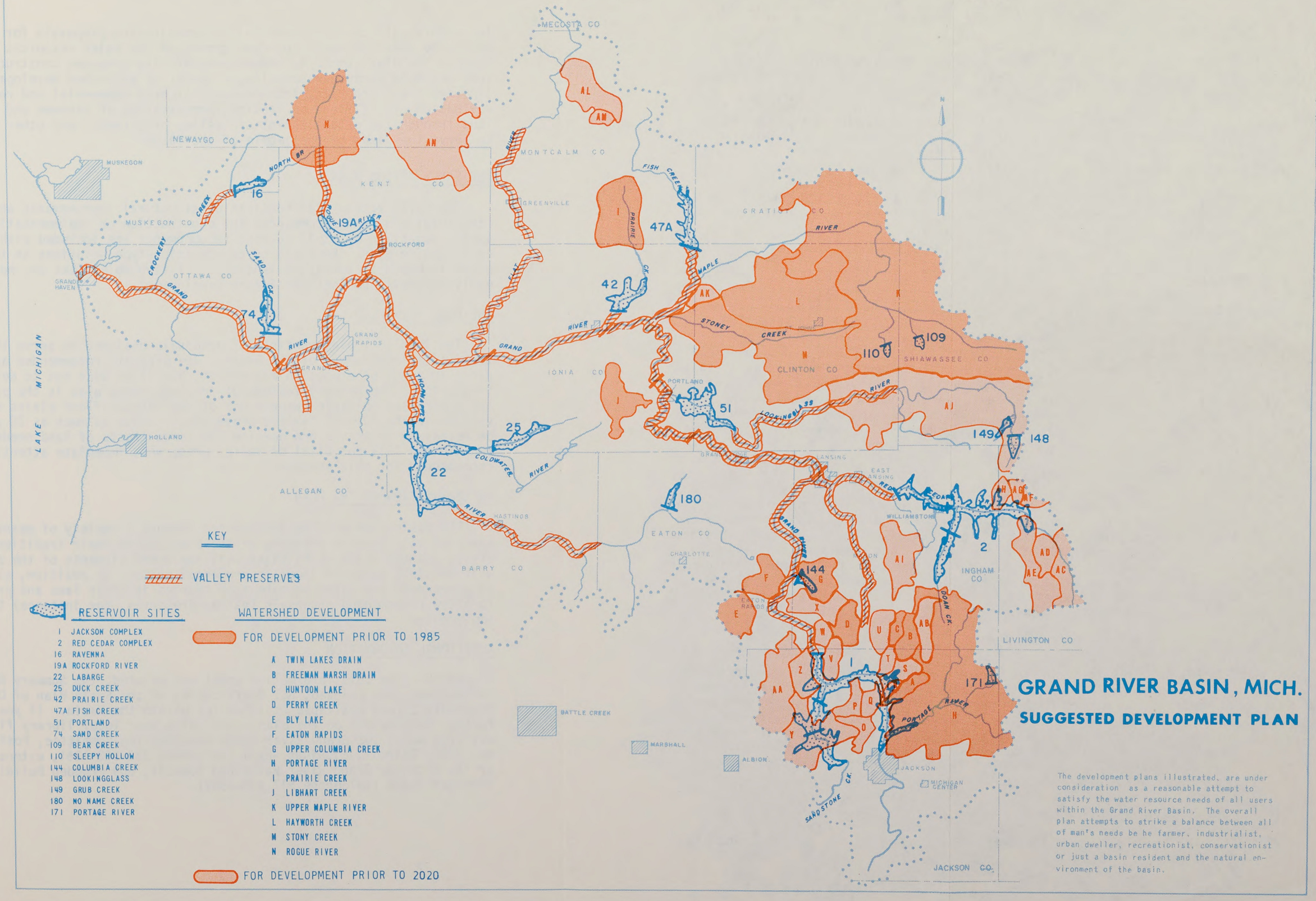
Sec 5b. It shall be unlawful for any person to occupy or permit the occupation, for residential, commercial or industrial purposes of lands or to fill or grade or permit the filling or grading for any purposes other than agricultural of lands in the flood plains, stream bed or channel or any stream, as ascertained and determined for record by the commission, or to undertake or engage in any activity on or with respect to the lands which is determined by the commission to harmfully interfere with the discharge or stage characteristics of a stream, unless the occupation, filling, grading, or other activity shall have been permitted by an order or rule of the commission, or by a valid permit issued therefor by the Department of Conservation under the provisions of law.

Reproduced by W.R.C. 5/27/68

APPENDIX T

SUGGESTED DEVELOPMENT PLAN

CORPS OF ENGINEERS — U.S. ARMY



KEY

VALLEY PRESERVES

RESERVOIR SITES

1	JACKSON COMPLEX
2	RED CEDAR COMPLEX
16	RAVENNA
19A	ROCKFORD RIVER
22	LABARGE
25	DUCK CREEK
42	PRAIRIE CREEK
47A	FISH CREEK
51	PORTLAND
74	SAND CREEK
109	BEAR CREEK
110	SLEEPY HOLLOW
144	COLUMBIA CREEK
148	LOOKINGGLASS
149	GRUB CREEK
180	NO NAME CREEK
171	PORTAGE RIVER

WATERSHED DEVELOPMENT

FOR DEVELOPMENT PRIOR TO 1985

A	TWIN LAKES DRAIN
B	FREEMAN MARSH DRAIN
C	HUNTOON LAKE
D	PERRY CREEK
E	BLY LAKE
F	EATON RAPIDS
G	UPPER COLUMBIA CREEK
H	PORTAGE RIVER
I	PRAIRIE CREEK
J	LIBHART CREEK
K	UPPER MAPLE RIVER
L	HAYWORTH CREEK
M	STONY CREEK
N	ROGUE RIVER

FOR DEVELOPMENT PRIOR TO 2020

GRAND RIVER BASIN, MICH.

SUGGESTED DEVELOPMENT PLAN

The development plans illustrated, are under consideration as a reasonable attempt to satisfy the water resource needs of all users within the Grand River Basin. The overall plan attempts to strike a balance between all of man's needs be he farmer, industrialist, urban dweller, recreationist, conservationist or just a basin resident and the natural environment of the basin.

WHY PLAN

Approximately one million people live in the Grand River Basin. The Basin contains three metropolitan areas and is spread over 5,572 square miles in west central Michigan.

By the year 2000, it is estimated that the population of the Basin will be close to two million people. The doubling of the population will place increasing demands on limited resources. Utilization of our water and land is no longer a privilege that can be taken for granted.

To provide the greatest amount of good for the greatest number of people, it is imperative that we exercise wise use of our water and related land resources.

THE PLANNERS

The plan is the product of seven years of study by Federal, State, and local agencies, which functioned together under the leadership of an interagency Coordinating Committee. The Coordinating Committee included representatives from the Federal Departments of Agriculture; the Army; Commerce; Health, Education, and Welfare; the Interior; and Transportation; and from the Federal Power Commission. The State of Michigan participated in the study through its membership on the Coordinating Committee and through close coordination between Federal and State agencies. The Michigan Grand River Watershed Council participated actively in Coordinating Committee meetings in behalf of the local units of government within the Grand River Basin.

THE PLANNING PROCESS

The water-related resources of the Basin were inventoried, and existing and projected water needs of the Basin were analyzed. The portion of the public's needs which the planners were satisfied would be met by existing or on-going programs was not given further consideration. For example, the on-going water pollution enforcement program and the existing State Park system were accepted as fact. Planning proposals were developed to attempt to satisfy the remaining needs. Proposals were developed for both long and short term solutions.

PURPOSES TO BE SERVED BY THE PLAN

The purposes to be served by the plan include maintenance and improvement of water quality, provision of adequate water supplies, development of water and land resources to provide increased opportunities for outdoor recreation, improvement of fish and wildlife habitat, increased efficiencies in agriculture through land and water management, reduction in flood damages, construction of improved channels for recreational and commercial navigation near the mouth of the Grand River, and improvement of the river for aesthetic as well as utilitarian purposes.

THE REPORT AND THE PLAN

The study report will consist of a Summary Report and 17 appendices. The report will contain technical information and proposals for future action to meet the needs for development of the water resources of the Basin. The plan currently under consideration proposes construction of some multiple purpose reservoirs, a number of watershed development and land treatment programs, improvements for both commercial and recreational navigation, local flood protection, preservation of streams and related land through the establishment of "valley preserves," and other programs to serve the needs of the people of the Basin.

THE EARLY ACTION PLAN

The early action plan consists of structural improvements and non-structural programs recommended for construction or implementation by 1985. Seventeen multiple purpose impoundments are included within the early action plan. Emphasis on construction-type solutions in the early phase is based on trends in land use. If favorable sites are not acquired early they will be lost for future development.

THE LONG TERM PLAN

The long term plan consists of proposals designed to serve the long term (post-1985) needs of the Basin. The programs recommended are long range in terms of execution and effect, but it is best not to defer their initiation. The primary feature of the long range plan is the preservation and controlled multiple purpose use of the natural flood plains or river valleys in the form of "valley preserves." Since as much as 20 years may be necessary to secure and develop the large tracts of land needed to realize the full potential of valley preserves, immediate attention is recommended for this program.

IMPLEMENTATION OF THE PLAN

The basin plan will be implemented through a variety of means. Federal agencies will provide elements of the plan within their traditional work areas, and the State of Michigan will implement elements of the plan, as will the full range of local governmental units. In addition, all levels of government are asked to make some changes in their laws and programs to allow recommended proposals (valley preserves, for instance) to be implemented.

ADDITIONAL INFORMATION

At the time this information sheet was printed, the Summary Report had not yet been printed, but draft copies of the Basin Plan of Development (Appendix Q) are available at libraries within the Basin. If you wish further information on the plan, check with your local library first. You may also write the Grand River Basin Coordinating Committee, Post Office Box 1027, Detroit, Michigan 48231 (telephone 313-963-1261, extension 315), or the Michigan Grand River Watershed Council, 609 Prudden Building, Lansing, Michigan 48955 (telephone 517-489-0552).

APPENDIX U

A PLANNING CRITIQUE

OF THE

GRAND RIVER BASIN

COMPREHENSIVE WATER RESOURCES

PLANNING STUDY

A PLANNING CRITIQUE OF THE GRAND RIVER BASIN COMPREHENSIVE WATER RESOURCES PLANNING STUDY

Recommendations

This paper is a critique of the regional planning process conducted on the Grand River Basin. The six year study by planners from various federal and state agencies contained the following features to accomplish their objectives:

1. Identified the water and land problems in the basin.
2. Prepared an inventory of the water and land resources.
3. Projected the immediate and long range needs of the people.
4. Identified a multitude of water and land management programs that might be used to satisfy the projected needs.

The following recommendations indicate some of the methods that would enhance the planning process for other river basins:

1. A federal agency that is participating in the planning should not be responsible for coordinating the efforts of the other agencies. This responsibility should be the function of the Great Lakes Basin Commission.
2. Municipal planners of counties, cities, and regional entities should be directly involved throughout the planning process.
3. Physical models of development programs should be created to relate the impact of the long range needs and their potential resolution.
4. Complete information should be available to the general public before public hearings are held.
5. The planning process should incorporate a continuous program of information and education to permit and encourage public involvement. Participation of the public and private sectors would help assure the recognition for community values and goals.
6. More complete lines of communications should be developed with all forms of the news media to provide them with adequate information for release to the general public.

Other recommendations in the critique pertain to the role of the State Legislature, long range planning, jargon, emerging concerns and the resulting affect of "planning clouds" on real estate emanating from the study.

Introduction

The Grand River Basin Study is one of sixteeen Comprehensive River Basin Planning programs started in 1963 as a Federal-State program. The origin of the Study began in 1959 when a Select Senate Committee was formed to study the relation of water resources activities in the United States to the national interest, and the extent and character of water resource activities both governmental and non-govermental that will be required to take care of needs for water for all purposes now and in the future. The Select Senate Committee, commonly known as "Kerr Committee," held nation-wide hearings from 1959 thru 1961. The Committee found there were serious water problems across the nation and recommended detailed and comprehensive water resource development plans be prepared cooperatively by Federal and State agencies at the earliest practicable time.[1]

The Administration and Congress accepted the Committee's report and adopted the policy of studying and resolving water

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[1] Report of the Select Committee on National Water Resources, Report No. 29, 87th Congress, First session.

related land resource problems on a river basin basis.[2] The Grand River Basin is the only basin designated for a study in the State of Michigan.

In 1965 the United States Congress enacted the "Water Resources Planning Act" which established the Water Resources Council, and provided for the establishment of River Basin Commissions. The Chairman of the Council is appointed by the President, and the Council membership consists of the Secretary of the Interior, the Secretary of Agricultural, Secretary of the Army, Secretary of Health, Education, and Welfare and the Chairman of the Federal Power Commission. The function of the Council is to assure that the Comprehensive Basin Planning Program is accomplished in an orderly, efficient, and coordinative manner.

The purpose of this paper is to identify problem situations that developed during the planning study of the Grand River Basin. Each problem is then discussed with suggestions as to how the situation may be improved.

Institutional Aspects

Dual Role of the Corps of Engineers

The Problem.--Six Federal agency heads, including the Secretary of Interior, the Secretary of Agriculture, the Secretary of the Army, the Secretary of Health, Education and Welfare, and the Chairman of the Federal Power Commission, were designated to serve on the Grand River Basin Coordinating Committee for the purpose of completing the study.[3]

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[2] Senate Document No. 97, 87th Congress, Second Session, U. S. Government printing office, Washington, D.C., 1962.

[3] Plan of Investigation, Comprehensive Basin Planning Study of the Grand River Basin, Michigan, Corps of Engineers, Detroit, Michigan, p. 1.1.

The Corps of Engineers was assigned the additional responsibility as Chairman agency to correlate the planning process. The principle difficulty in this situation is the equal role each agency had in the planning program. Even though the Corps of Engineers had the responsibility for chairing all planning sessions, they did not have the right or responsibility to direct the procedures to be followed or the decisions to be made. Since the representative of each of the agencies respected the "equal footing" of each of the other agencies, there were many times a leadership role was not assumed by the Chairman or other representatives in order not to display unwarranted authority.

The Recommendation.--A basic principle in the field of Administration is that a person or an agency should not attempt to wear two "hats" in an administrative function because of the potential conflicts that may arise. At the time the Type-II--Comprehensive Water Resources Planning Study was started on the Grand River Basin the Grand River Basin Coordinating Committee functioned informally under an Ad Hoc Committee in Washington. The Corps of Engineers served in the chairmanship capacity for the planning process and at the same time served an equal role with the other agencies in developing technical reports. As chairman of the planning process the Corps of Engineers had an equal voice in plan formulation. Following the adoption of the Water Resources Planning Act of 1965 there was created a National Water Resources Council and also the Great Lakes Basin Commission, which were organized to administrate comprehensive planning for water and related land resources. The Great Lakes Basin Commission is comprised of representatives from federal agencies responsible for water resource management, and the various states surrounding the Great Lakes. This Commission, broadly representing the federal and state interests in water management, would be the appropriate organization to assume the chairmanship role in administrating river basin planning programs. Through this planning structure, the Great Lakes Basin Commission could more effectively interpret and administrate policies established by the National Water Resources Council. All federal and state agencies would also be more equally related in the planning process.

Involvement of Municipal Planners

The Problem.--Early in the study program an opportunity was given to public officials including the municipal planners to suggest water management needs. However, the municipal planners did not have another opportunity to participate in the planning process until basic plans were developed, later known as the Preliminary Plan for the Grand River Basin. A

meeting was held for the municipal planners approximately nine months before the report was to be completed, but even at this late date there was a great deal of resistance by Federal planners to relate specific details on the planning program.

The Recommendation.--Local involvement could have been greatly improved if there were some mechanism in which municipal planners could have officially participated in the planning process. One method could have been the creation of a task force made up of City, County, and regional planners to serve in an advisory capacity to the Basin Plan Formulation Subcommittee. A member of this task force could have been assigned as a member of the Basin Plan Formulation Subcommittee in order to maintain continuity between development of local plans and the preparation of the Grand River Basin Report. The Federal-State planners also would have had a better feedback relationship and would have been in a better position to weigh conflicting values in community development of the natural resources. The planners could also have had significant part in the informational program on the Preliminary Basin Report and also had a significant role in the public hearings conducted by the Grand River Basin Coordinating Committee.

Role of State Legislature

The Problem.--The Grand River Basin Coordinating Committee is the planning agency responsible for completing the Study and preparing the report. The Governor or his designated representative is the only person representing the State of Michigan serving on the committee. The Legislature is not involved in the planning process because there are no laws required for the completion of the study or other legislative acts for implementation since the study is designed only to prepare a report. Because of the implied impact the study will have on the Grand River Basin, many aroused citizens have contacted their legislators for information and protection. The members of the Legislature were not and could not be prepared to properly respond to the concerns of the people to the satisfaction of the constituents.

The Recommendation.--The members of the Legislature are elected officials responsible to their constituents in all matters pertaining to the affairs of the state. In view of this responsibility, the members of the Legislature in the study area need to establish their role in the planning process. This role needs to be clearly defined so that each member of the Legislature can function within acceptable limits without interfering with the planning process, but at the same time be in a position whereby he can represent the district he serves. The members of the Legislature would need to work

together in defining their role as to how they can serve their districts and how they can share their concerns and interests with the planners conducting the study.

Planning Difficulties

Development of a 50 Year Plan

The Problem.--One of the purposes of the Grand River Basin Study was to develop long range goals to satisfy projected needs of the people for the next fifty years. Not only is this study period beyond the comprehension of the average citizen, municipal planners are reluctant to project programs beyond 20 years.

The Recommendation.--Long range planning is becoming more essential because of the geometric trends in population, standard of living and demands on our natural resources. Long range goals are important in order to establish general direction for short range decisions. In order to effectively demonstrate how current trends will effect future decisions, dramatic models should be developed to demonstrate the impact projected urbanization will have in the basin. Actual models of the landscape with long range land use programs should be generated to effectively demonstrate to all age levels the need and value for long range planning. The planning process should be included in the elementary and secondary schools to equip the students who will be responsible for making decisions in the future.

Planning Personnel Turnover

The Problem.--The planning study extended over a six year period, during which time personnel changes occurred in the various agencies in the planning program. These changes may have occurred because of revised roles of the agencies, turnover of personnel, or due to limitation of planning funds.

The Recommendation.--One of the greatest set-backs in assuring a continuous planning process is when an agency is limited to one person working on a specific study. Planning programs that will have the impact on an area such as the Comprehensive Water Resources Planning Study should be conducted under the direction and surveillance of at least two people in each agency, in order to provide sufficient back up in the event one person changes employment. When a change does take place, another person should immediately be brought into the picture to provide the necessary back up for effective, continuous planning.

Pioneer Planning

The Problem.--The Type II--Comprehensive Water Resources Planning Studies authorized in 1965 were the first studies conducted on river basins to be completed under the newly organized National Water Resources Counci.[4] During the planning period, planning philosophies were being developed, criteria of values were being established and procedural steps were being refined.

The Recommendation.--A close operating relationship needs to be maintained between the Basin Plan Coordinating Committee and the National Water Resources Council, in order to cope with the changing demands of the nation, state, and local areas. Direct coordination of river basin planning through the Great Lakes Basin Commission would provide significant assurance that planning programs can remain abreast of changes that may be necessary during the planning program.

Emerging Concerns

The Problem.--The planning period for the Grand River Basin Study occurred at a time when the "ecological" movement gained momentum. During this same period of time, water quality standards were being established and new technologies were creating critical pollution products; and technologies were also developing new methods for abating pollution.

The Recommendation.--The planning program should be responsive to changing conditions that may have an effect on the study program. An example of changes that occurred during the Grand River Basin Study included: change of interest rates on bonding costs; development of spray irrigation of waste disposal; legislative reform for the protection of the environment; and increased public awareness that such changing conditions are being recognized in the planning process, and that any planning report must be subject to continuous review to accommodate new trends and resource management capabilities that have developed subsequent to the completion of the planning study.

"Property Clouds" on Real Estate

The Problem.--The Grand River Basin Study was designed to develop a report to identify the various water and land

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[4] Water Resources Planning Act, Public Law 89-80, 89th Congress S.21, July 22, 1965.

management programs that could be developed throughout the Grand River Basin. Many of these programs were structural in nature, that would require public acquisition of lands for development. Even though these programs were conceptual in nature, there was a fear by property owners they would become a reality, which in turn would affect the value of their property. It also created grave doubts by developers to proceed with the development of plans recognizing the possibility that the area may be needed for public use.

The Recommendation.--A planning report should properly reflect how the projected needs can and should be satisfied within the capability of financial feasibility, along with social and political acceptability. When such conditions have been satisfied, many fears can be abated through the development of an informed public. Areas that are designated for public use should be so designated to encourage a rational transition from private to public ownership without creating unnecessary fears or doubts. An effective informational program would make it possible to determine public attitude toward specific development programs. Orderly growth, supported by public opinion, would minimize the jeopardy that otherwise occurs when public programs are planned.

Planning Jargon

The Problem.--One of the problems in properly relating to local people is in the use of terms common to planners, but unfamiliar to the average person. Not only does this reduce the effectiveness of communication, but it is sometimes considered as a devious way to answer questions.

The Recommendation.--Every field has specialized words that can be called jargon. The following terms were frequently used in the planning process:

Alternatives
Benefit-cost ratio
Net demands
Water quality
Social acceptance
Consumptive use
Comprehensive planning
flow-through
Flood frequency
Intangible benefits
Trade-offs
Conservation pool
Single purpose plans
Intermediate regional flood
Waste assimilation
Average annual damage and benefits
Recreational demand
Local people
Land treatment
Parameters
Acre-feet

An important tool in the planning report would be the preparation of a glossary of terms for the benefit of the general public and to clarify the meaning of words between agencies.

Public Participation

Federal Planning of Local Resources

The Problem.--The Grand River Basin Study was initiated following public hearings held in the basin to explain the purpose of the study. Very little acknowledgement was given to the planning process until the Federal and State planners developed conceptual measures for managing the local resources. Local people then took strong exception to the Federal government for making plans on the use of the local resources and exception was also taken with the Federal planners for not involving local people in the planning process.

The Recommendation.--One of the first steps initiated to develop comprehensive plan for the Grand River Basin was to conduct public hearings to explain to the local people the purpose and program for conducting the river basin study. There was a lapse of over three years before the local people had another opportunity to become aware of the progress of the planning study and have any knowledge of the contents of the emerging plan. When reports were submitted on the planning process, it was apparent that a great deal of documentation was being completed without the use of local resources and participation. The results of this experience indicate the need for a continuous informational program to be conducted during the planning process to apprise the people of the steps that were being taken and also to give opportunity to provide input from the local level. If such a relationship had been developed early in the planning stages, the final report could have been better related as a Local-State-Federal report rather than a Federal-State report.

Public Hearings

The Problem.--Public hearings were held on the Grand River Basin Study to give opportunity to the general public and public officials to comment on the plan as they understood it, and to provide an additional means for public education on the planning program. Unfortunately, it was necessary to hold the public hearings before Appendix Q, The Suggested Plan, could be completed and there was not sufficient opportunity

for the general public or the public officials to have a proper concept of the plan to offer constructive criticism or comments. The use of public hearings also implies steps are being taken for project development, which is not true for the Grand River Basin Study.

The Recommendation.--The key to the effectiveness of a public hearing is the ability of the general public and the public officials to understand the program the public hearing is being held for, in order that constructive comments and criticisms can be offered leading to the completion of the final report. The following items should be completed prior to the scheduling of public hearings:

All technical reports should be printed and circulated.

All single purpose reports prepared by the various agencies should be printed and circulated.

The Suggested Plan should be printed and circulated.

An informational booklet should be printed and circulated.

A period of four to six months should be allowed to conduct informational meetings to explain the contents of all the above reports in order to fulfill the intended purpose of the public hearings. If an intensive informational program is properly conducted, and full opportunity is given to public officials and the general public to respond to the published information to give the planners proper respect for the concerns of the local people, then it may not be necessary to hold public hearings in the traditional way. Since public hearings are normally related to designated projects prior to appropriation of funds, holding public hearings for the completion of a study may not be necessary. This suggestion has merit when it is recognized a report contains various alternative measures for managing the local resources. Implementation of any one of the projects would necessitate a public hearing, at such time as it is determined necessary to proceed with the program.

Grass Roots Involvement

The Problem.--Literally no opportunity was given to local people in evaluating the needs or suggesting remedies to known and projected problems. The only act of involvement by grass roots persons occurred during the education-informational meetings after the Preliminary Plan had been documented.

The Recommendation.--Local people could have had a greater opportunity to be involved in the planning process if the planning commissions throughout the basin could have been closer related to the program through the municipal palnners. The planning commissions could have then conducted periodic seminars, public forums, and informational meetings as a service to the local communities. More effective evaluation of the alternative measures could have been accomplished in order to better identify priorities and designate objectives and long range goals. Through this process, local people would have had a better opportunity to understand various trends that are occurring in the study area and to have a better appreciation for the long range needs to realize the value of suggesting resource management programs to achieve long range goals.

Information-Education Programs

The Problem.--Information on the preliminary plan was not released to the general public until approximately six months before the report was to be completed. Very little opportunity was given to the general public to gain an in depth understanding of the findings of the study and the basis for the development of the preliminary plan.

The Recommendation.--An information-education program should not be a one-shot effort to explain the planning process and the contents of the suggested report. The general public should be participants in the planning program rather than observers. An information-education program should be a continuous effort in order to properly relate the needs, issues and potential resolutions of problems. Unless there is a complete understanding of the situation, wise decisions cannot be made to satisfy short and long range needs of the people.

Public Apathy

The Problem.--The term "public apathy" usually carries the connotation that the people don't care or have no interest in a subject matter. Public apathy is usually suggested when there is no public reaction, negative or affirmative. There was indication the general public was apathetic about the Grand River Basin Study because of their lack of interest in attending informational meetings to gain awareness of the program and become involved in the planning process.

The Recommendation.--A progressive approach toward resolving the problem of public apathy is through the development of a concerned public through an effective informational program. Unless the public has a proper appreciation for the needs and understanding as to how they can be resolved, then there will be little reaction by the public. If there is a reaction, it will be negative because of doubt generated through lack of understanding. There should be sufficient understanding by the public so that there can be self-education, rather than completely relying on the professionals to explain and promote wise resource management programs.

Role of News Media

The Problem.--The art of planning is not a subject that has major public appeal. For this reason there is a reluctance by the news media to discuss planning since it does not attract active readership. News items are usually released only when it is apparent there is public concern.

The Recommendation.--The news media have the greatest responsibility in developing an informed public. Their responsibility lies not only in disseminating the information to create awareness, but also to translate the available information so that the work by public and professional officials can be readily understood by the average public citizen. The news media need to be careful it does not ride on the wagon of emotionalism or political opinion. Sufficient information should be provided to the news media in order that this role can be performed and every means should be provided to explain the information to the news media to assure a proper translation of the needs, problems, and alternative solutions.

Public Objections

The Problem.--Some people may disagree because they do not approve of a basic principle used in the planning process, but the majority of objectors on the Grand River Basin Study has been by people who would be directly affected by a project that might be developed in accordance with the plan. Their objections may be because they may be loosing a family heritage, they don't want to move, they have their life investment in their property, or they don't agree with land being used to satisfy somebody else's problems. These attitudes were expressed during the informational meetings and the public hearings.[5]

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[5]Transcript of Public Hearings, Comprehensive Basin Planning Study of the Grand River Basin, Michigan, Corps of Engineers, Detroit, Michigan.

The Recommendation.--Public objections should be recognized as valid concerns of disagreement and responded to in an objective and rational manner. All persons, whether they be property owners, non-property owners, public officials, environmentalists, concerned citizens or members of the planning staff, should respect the opinions of others to the extent that they realize there may be an honest difference of opinion. Then, there should be a deliberate attempt to resolve the issues to the best interest of community, the State, and the nation.

Summary

The purpose of this critique has been to identify problem situations that were observed in the Grand River Basin Study and then to address these problems by suggesting solutions or alternate methods of employment. Another purpose for this analysis was to identify issues that may be an element of a planning program for developing local or regional resource systems.

The scope of this paper has been to identify the weaknesses or failures of the Grand River Basin Study. By the nature of this effort no attempt was made to highlight the advantages and successes of the study program. Some of the important factors resulting from this study include the following: documentation of economic, population and land use trends; inventory of the natural resources; projection of long range needs; suggested long range goals; inter-agency cooperation at the Federal and State levels; and documentation of data to aid decision making at the local level.

The next important step in the planning process is coordinating the efforts of the local governmental units to determine what programs are needed for orderly development of the basin. Communities will need to meet to establish what needs have to be satisfied and then consider the alternative methods to fulfill the needs. The decision making process will need to establish the engineering and economic feasibility of each program, and at the same time political and social acceptability must be attained to satisfy the cultural value systems of the society.

REFERENCES

1. Report of the Select Committee on National Water Resources, Report No. 29, 87th Congress, First session.

2. Senate Document No. 97, 87th Congress, Second Session, U. S. Government Printing Office, Washington, D.C., 1962.

3. Plan of Investigation, Comprehensive Basin Planning Study of the Grand River Basin, Michigan, Corps of Engineers, Detroit, Michigan, p. 1.1.

4. Water Resources Planning Act, Public Law 89-80, 89th Congress S.21, July 22, 1965.

5. Transcript of Public Hearings, Comprehensive Basin Planning Study of the Grand River Basin, Michigan, Corps of Engineers, Detroit, Michigan.