

COMPREHENSIVE RIVER BASIN PLANNING IN THE PASCAGOULA

by

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INTRODUCTION

The development or improvement of our Nation's water resources to satisfy existing and future needs antedates our present Federal Government. In 1784, the Commonwealth of Virginia and the State of Maryland appointed commissioners to develop a plan for opening and improving navigation of the Potomac River and opening a proper road between the waters of the Potomac and the most convenient western waters in the Ohio Basin. This bi-state commission was chaired by George Washington and a report submitted on January 22, 1785.

On February 6, 1965, President Johnson directed the Secretary of Interior to prepare a program on the Potomac River Basin to serve as a model of conservation. A Federal Interdepartmental Task Force was created to develop approaches to accomplish the President's objectives.

Comprehensive River Basin Surveys are now underway in every one of the 48 states and cover about 75 percent of the land area. Forty-three separate surveys are in progress.

TYPES OF SURVEYS

The Soil Conservation Service participates in four types of river basin investigations under the provisions of Public Law 566.

All Federal water resource agencies and the concerned states cooperate in making Type I and Type II Surveys and which are now carried out under the auspices of the Water Resources Council.

Type III Surveys are specific project investigations such as a PL-566 watershed project or a Corps of Engineers' reservoir.

Incidentally, a Type III project (PL-566 watershed or Corps of Engineers' reservoir) may be planned and authorized for operations during a Type II River Basin Survey. It must be a harmonious and integral part of the over-all plan and fill an immediate need in the Basin.

A Type IV Survey is made as a cooperative effort between the Department of Agriculture and a state or other Federal agency.

GENERAL PURPOSES AND OBJECTIVES

The main objective of the participating agencies in Type II Comprehensive Basin Surveys is to identify the immediate and long-range problems and needs and to identify specific projects which should be started in the next 15 years to meet identified needs for water related goods and services.

Specifically, USDA participation is to facilitate the coordinated and orderly conservation, development, utilization and management of water and related land resources. USDA will use information developed to coordinate its project-type water and related land resource conservation and development programs with those of other Federal, state and local agencies.

The Congress has declared as a matter of policy that the economic development of the nation and regions is essential to national strength and the satisfactory levels of living and that the development of our water and land resources is necessary to achieve economic development through concurrent provisions for:

- 2 Adequate supplies of quality surface and ground waters for domestic, municipal, industrial and agricultural uses;

Waters for navigation and power;

Flood control or prevention measures to protect people, property and productive lands;

Land stabilization measures;

Drainage measures, including salinity control;

Watershed protection and management measures; and

Outdoor recreation and fish and wildlife opportunities where they can be enhanced by development works.

ROLE OF FEDERAL, STATE AND LOCAL AGENCIES

The Secretaries of the Army, the Interior, Agriculture and Health, Education and Welfare compose the Water Resources Council at the Washington level. Coordination at the Washington level is

through an interdepartmental staff committee. At the field level a coordinating committee chaired by the Corps of Engineers provides a feasible means for the guidance and conduct of the studies and to provide for complete participation and continuous coordination of the activities of the concerned agencies in the planning effort.

The Corps of Engineers determines the magnitude of present and future requirements for, and values of, flood control measures and improved navigation facilities and collaborates with other participating agencies in the determination of needs and values for water supply, water quality control, water oriented recreation, fish and wildlife conservation and other purposes of water resource use and development. In the case of detailed comprehensive studies such as the Pascagoula, it formulates plans for specific single and multiple-purpose projects. In so doing it coordinates with other agencies so as to consider all needs and to avoid duplication.

The Department of Agriculture analyzes and develops projections on the agricultural, forestry and related economies, their use of land and water resources and their relationship to the total economy of the Basin or region. The water problems analyzed include flood-water and sediment damage to rural lands and properties, impaired drainage of agricultural lands, agricultural drought problems and irrigation requirements, water needs for livestock and rural domestic use, recreation, fish and wildlife, and forest-based industries. The Department participates in the formulation of coordinated comprehensive plans for, or approaches to, water and related land resource development, including appraisals of the economic impact of the agricultural aspects of improvements considered for inclusion in them. This work is carried out through the Soil Conservation Service, Forest Service and Economic Research Service in coordination with other agencies to avoid duplication.

The Department of Health, Education and Welfare and what is now the Federal Water Pollution Control Administration participates in River Basin Surveys and coordinates their work with other participating agencies in determining the present and projected needs for municipal and industrial water and the measures required to obtain acceptable water quality levels.

Several agencies of the Department of Interior are involved in comprehensive basin planning. The Bureau of Outdoor Recreation, which makes estimates of the demand for and supply of outdoor recreation, evaluation of potentials, and coordination of recreation plans of the participating agencies. The Bureau of Sport Fisheries and Wildlife estimates future requirements of fish and wildlife and study fish and wildlife population, distribution, habitat and man-days of fishing and hunting.

The Geological Survey carries out investigations relative to the occurrence and movement of surface and ground waters and quality of these waters.

The Bureau of Mines, Bureau of Indian Affairs, and the Southeastern Power Administration participate in Basin surveys where justification shows the need for their participation.

The Pat Harrison Waterway District, an agency of the State Government, is composed of 15 counties in Southeast Mississippi. They have agreed to share with each local sponsoring organization in the development of the watershed work plan and to encourage the maximum development and use of multiple-purpose structures commensurate with the needs of the people in each watershed.

DESCRIPTION OF THE BASIN

Location and Size

The Pascagoula River Basin is located in Southeast Mississippi and Southwest Alabama. The river is made up of two dominant tributary streams, the Leaf and the Chickasawhay. The Pascagoula River flows in a southerly direction to the Gulf of Mexico near Pascagoula, Mississippi. The drainage area is approximately 180 miles long and about 90 miles in width at the widest place. The total drainage area is approximately 9700 square miles. The valleys vary in width from one-half mile in the upper tributary streams to five miles in the lower portion of the Basin. The land subject to overflow comprises about 16 percent of the total land area.

The major land use is forests which comprises almost 79 percent of the total land area. Cropland comprises about 10 percent of the total land area while pasture and miscellaneous uses account for the remaining.

The average annual rainfall varies from 54 inches in the northern part of the Basin to 62 inches in the southern part.

The Basin is richly endowed with surface water and ground water sources capable of yielding large supplies of water that require a minimum of treatment for most uses. In 1965 over 536,000 people lived in the Basin. This is an increase of nearly 100,000 population in 1950 while the projected increase for 1980 is expected to approach 675,000. Over one-half the urban population was concentrated in the four-county coastal area. From 1940 to 1960 population in the urban areas increased three times as fast as population in the rural areas. This trend is expected to continue in the future.

The per capita income in 1965 was \$1582, an increase of 50 percent from the 1950 figure. The per capita income is expected to be in excess of \$2200 in 1980.

The number of farms in 1954 decreased from 30,000 to 21,300 in 1959; at the same time the size of farms increased during this same period from 100 acres to 121 acres in size. By 1980 the number of farms is expected to number about 12,000 while the size is expected to increase to over 200 acres.

WATER AND RELATED LAND RESOURCE PROBLEMS AND NEEDS

The problems of the land are many and real. They began many years ago and were accelerated when the early settlers migrated into the Basin. Thousands of acres of the Basin's forest were cleared and the land planted to cotton, corn, and other row crops. In the late 1800's and early 1900's timbermen logged the entire Basin. Problems of erosion, flooding, uncontrolled grazing, wild fires, and other related problems were accelerated.

Erosion is still a serious problem but less intensive now than in the past. Changes in the agricultural economy in recent years have resulted in shifts of land from crops to pastures and woodland. Over 850,000 acres of land are slight to severely eroded. There are over 28,000 acres of forest land and 55,000 acres of open land that need critical area measures to stop erosion. Erosion is active on over 8500 miles of roadbanks and has caused moderate deposition in road ditches, culverts and channels.

There are over 765,000 acres of land subject to overflow in upstream watersheds. The total direct annual damages from flooding in upstream watersheds is over \$2,000,000. Of this amount, \$1,167,000 are damages to crops and pastures, over \$180,000 are damages to minor fixed improvements, and \$670,000 are damages to public roads, bridges and urban-industrial areas. Investigations have shown that extensive damage occurs in those watersheds in the upper reaches of the Pascagoula stream system. All or parts of 17 watersheds have land and water problems that materially affect the use, management and production of crops and pastures. The remaining 46 watersheds in the Basin are affected to a lesser extent and the problems are not considered of such magnitude as to constitute a serious community or land area problem.

Surface drainage is a serious problem in the Coastal Flatwoods Resource Area. Studies indicate that over 463,000 acres of land has a serious drainage problem; of this amount 189,000 acres is open land in crops and pastures, and 274,000 acres is in woodland. An

economic analysis of the drainage problem was made to determine the total average yearly reduction in net farm income due to inadequate drainage which occurs with present cropping patterns and farming conditions. The estimated average annual reduction in net farm income from inadequate drainage of open land is \$1,200,000. No analysis was made of drainage problems on forested land.

The lack of water or moisture for the production of crops and pastures is not considered a serious problem in the Basin; however, studies indicate that there are more than 142,000 acres of irrigable land that would benefit from the use of supplemental water on crops grown in the Basin.

In 1965 the unsatisfied demand or need for fresh water fishing amounted to 68,000 man-days. Assuming no change in the 1965 supply and capacities the estimated need in 1980 would be 249,000 man-days as related to projected population and participation rates. Fishing capacities provided for in 20 early-action reservoirs planned by the Soil Conservation Service and expansion of existing Forest Service projects will supply 102,000 man-days of fishing. The unsatisfied demand or need is thereby reduced to 147,000 man-days for the period of 1980.

There appears to be ample land area and wildlife habitat to satisfy the demand for hunting beyond 1980.

There is a serious shortage of facilities to satisfy those recreation activity occasions that are associated with water or are water oriented. In 1965 there was a need to satisfy over 5,000,000 swimming activity occasions, 2,700,000 boating activity occasions, 642,000 camping and nearly 3,000,000 picnicking occasions. The estimated supply for 1980 indicates that the need for increasing these facilities will be greater than that that occurred in 1965. In other words, the demand is progressively exceeding the supply.

A preliminary report by the Federal Water Pollution Control Administration indicates that the need of water storage for low flow augmentation in the Basin is rather limited. Low flow augmentation is required on Tallahala Creek in and below Laurel, Mississippi. Flow augmentation is needed in the Pascagoula River Estuary and Bay including the Escatawpa River near Pascagoula.

RECOMMENDATIONS FOR LAND AND WATER RESOURCE DEVELOPMENT PROJECTS

On-site field investigations were made to determine the frequency, amount and extent of floodwater damages to agricultural land and fixed improvements in each watershed in the Basin. Benefits from

land enhancement were limited to the degree of protection expected and the dominant type of agriculture projected in the floodplains in specified future years. Field biologists made on-site investigations in each feasible watershed to determine the damages, if any, to habitat from proposed project structural measures. Where damages to wildlife habitat would occur, provisions were made to mitigate these damages.

All or parts of 17 watersheds were determined as being economically feasible watershed projects. All or parts of 30 watersheds are potentially feasible watershed projects and 16 watersheds were identified as not being economically feasible in the future because of the character of the soils in the floodplain or other undesirable features in the watershed. See Fig. 1.

Multiple-purpose structures for recreation and fish and wildlife were considered for each of the economically feasible watersheds. An analysis was made of the demand, supply and need for outdoor recreation in the Basin by the Bureau of Outdoor Recreation. The preliminary location and size of all multiple-purpose reservoirs proposed by USDA, Corps of Engineers and the Pat Harrison Waterway District were studied to see if too many reservoirs were being considered in any given area of the Basin to satisfy 1980 needs. When it was determined that an imbalance would not be created, individual site studies were made for each proposed multiple-purpose reservoir. An allocation of demand for water-dependent activities and water-enhanced activities were made for each site. The value of a recreation-user day was used to determine the annual benefits for each site.

The 17 upstream watersheds that were identified as being physically and economically feasible will be recommended for early action implementation. Eight of these watersheds will be recommended for implementation by authority of the Watershed Protection and Flood Prevention Act or what is commonly known as PL-566. Nine watersheds will be recommended for implementation under special Basin-wide authority.

Land treatment measures were considered as a basic element in formulating all watershed projects and are essential if each is to function properly. These measures are to be planned and applied by individual farmers in cooperation with the respective Soil Conservation Districts in which the watersheds occur. It is expected that the land treatment measures for watershed protection will be applied in the 17 watersheds at an estimated cost of approximately \$3,000,000. Of this amount, \$516,000 will be financed by Federal funds and the remaining \$2,485,000 by Local funds. The Federal funds are for technical assistance.

Land treatment measures for land stabilization are important features in the Basin-wide program. These measures will be installed Basin-wide and on an accelerated basis to assure the life of those projects planned in the Basin and to reduce the amount of sediment entering the stream system and thus reduce the pollution problem. The total installation cost of the measures is estimated to be \$11,700,000 if installed during the next 10 to 15 years.

Within the 17 watersheds it is proposed that 133 floodwater retarding structures be built, 852 miles of channel improvement, and 20 multiple-purpose dams for flood prevention and recreation. The estimated installation cost for the floodwater retarding structures is about \$13,850,000, for the 852 miles of channel \$8,780,000, and for the 20 multiple-purpose structures including basic facilities the cost is estimated to be \$8,336,000. Total project costs including land treatment measures for watershed protection, critical area treatment, floodwater retarding structures, channel improvement, and multiple-purpose structures with basic facilities for recreation is estimated to be over \$42,000,000 (preliminary).

Early-action projects proposed by the Corps of Engineers include four multiple-purpose reservoirs in the Leaf River System and one multiple-purpose reservoir on the Escatawpa River. There will be approximately 31,000 surface acres of water behind these five structures. Water will be impounded for flood control, water supply for municipalities and industries, low flow augmentation and recreation. The total installation cost of these five structures is estimated to be \$134,000,000 (preliminary).

The Pat Harrison Waterway District proposes early-action projects on eight streams in the lower part of the Pascagoula River Basin. These eight projects will impound about 6700 surface acres of water. The largest reservoir will be on Thompson Creek and will have about 4100 surface acres of water. The estimated cost of these eight multiple-purpose projects is \$14,000,000 (preliminary). See Fig. 2.

SOME CONCLUSIONS AND RECOMMENDATIONS

Resource allocation is not now and never will be an exact science. Progress is being made in the art of planning and political decision makers are being provided information which makes it increasingly difficult to justify or disguise unwise decisions.

The concepts under which plans for land and water resource development projects were formulated in the Pascagoula River Basin is a modification of an approach used by the Corps of Engineers in

developing plans for both the Delaware and Potomac River Basins. It includes the comprehensive planning concept as outlined in Senate Document No. 97 and incorporates a move toward joint Federal and State participation in water resource planning.

Each agency or department will prepare reports outlining the results or findings of their investigations in the Basin. The two action agencies, the Corps of Engineers and the Department of Agriculture, will prepare reports that will serve as authorizing documents. In each it will be recommended that those land and water resource development projects that were found to be physically and economically feasible and justified will be recommended for implementation within the next 10 to 15 years. The Pat Harrison Waterway District has the authority to plan, construct, operate and maintain the eight projects in the central and lower part of the Basin. When these projects are completed, they will contain over 43,000 surface acres of water that may be used for various forms of recreation activities. They will provide flood control benefits to agricultural and urban areas, water supply for municipal and industrial uses, low flow augmentation or pollution abatement for those streams where pollution is a problem, and be a vital factor in improving the general economic level throughout the Basin.

PASCAGOULA RIVER BASIN

MISSISSIPPI-ALABAMA
WATERSHED MAP

SCALE
0 5 10 15 20 MI

- LEGEND
- HARD SURFACED ROADS
 - STATE HIGHWAY NUMBER
 - FEDERAL HIGHWAY NUMBER
 - RAILROADS
 - PRINCIPAL DRAINS
 - COUNTY LINE
 - STATE LINE
 - RIVER BASIN BOUNDARY
 - SUB BASIN BOUNDARY
 - WATERSHED BOUNDARY
 - NATIONAL FOREST BOUNDARY
 - MISS. WATERSHED NUMBER
 - ALA. WATERSHED NUMBER

FEASIBILITY OF WATERSHED PROJECTS

- FEASIBLE WATERSHEDS
- POTENTIAL FEASIBLE WATERSHEDS
- NON-FEASIBLE WATERSHEDS



Figure 1.

GULF OF MEXICO

PASCAGOULA RIVER BASIN

MISSISSIPPI-ALABAMA
WATERSHED MAP

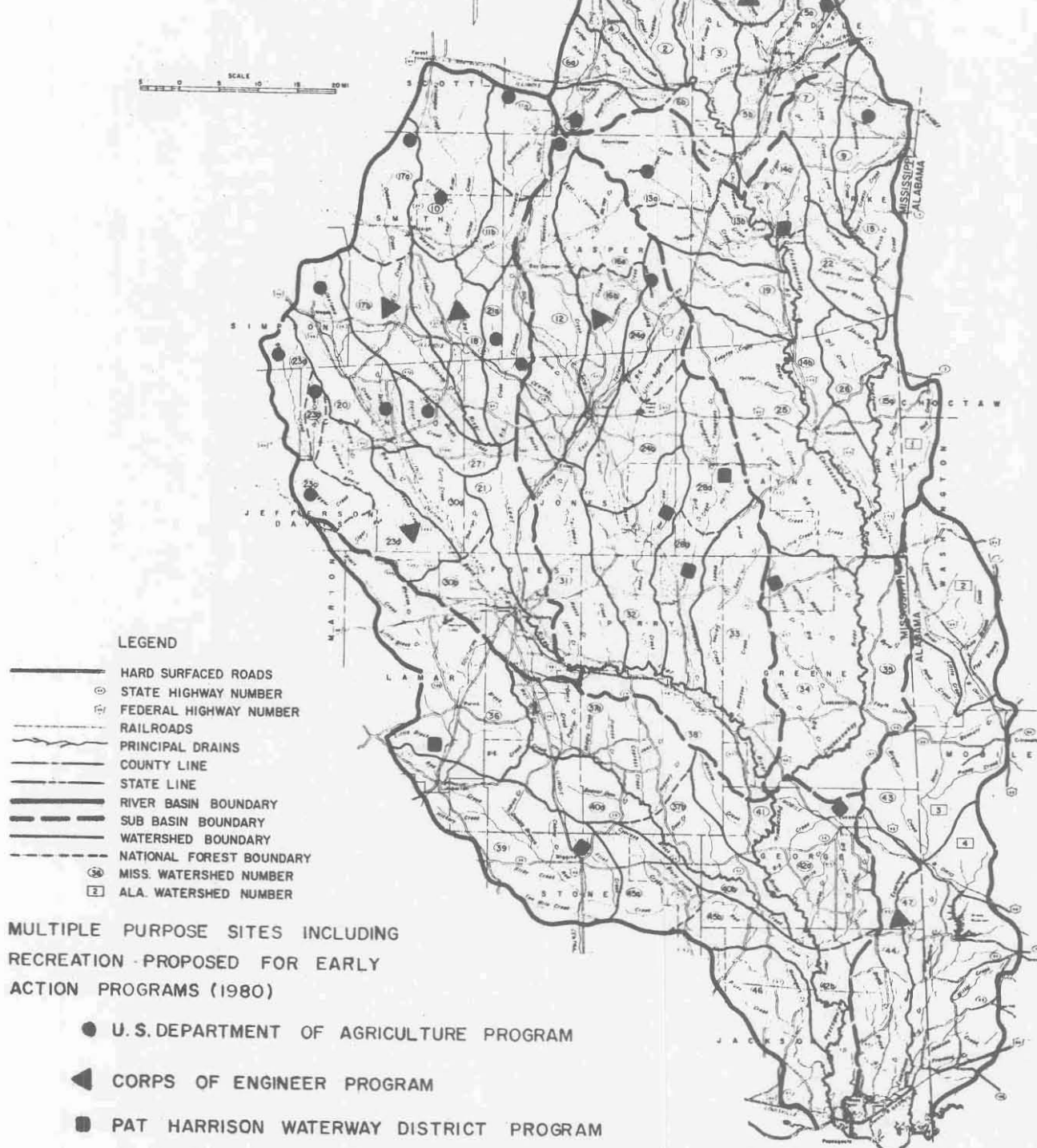


Figure 2.

GULF OF MEXICO

Preliminary