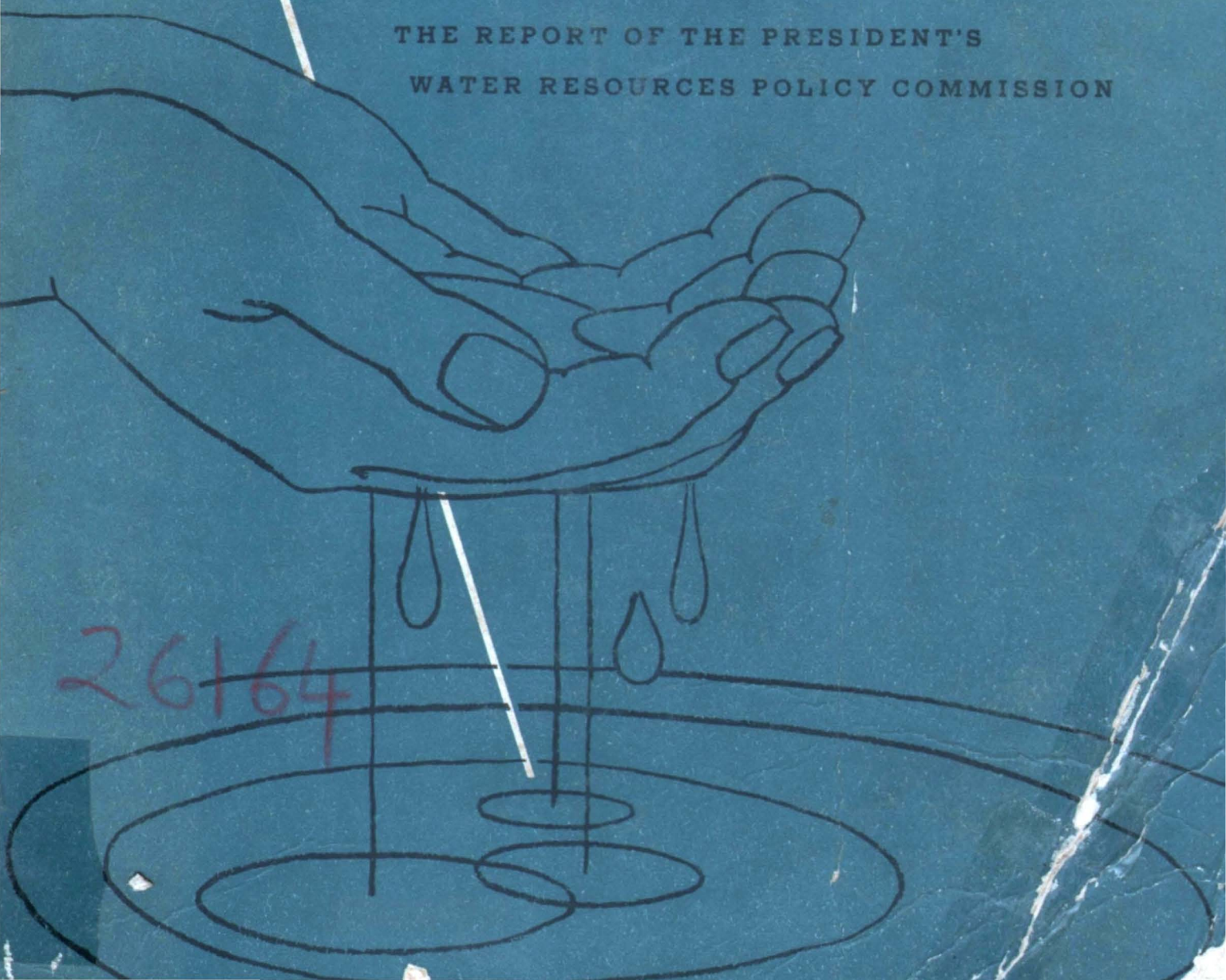
VOLUME 2

Ten Rivers in America's Future

THE REPORT OF THE PRESIDENT'S WATER RESOURCES POLICY COMMISSION




RIVER BASINS
OF THE UNITED STATES
selected for study in this volume
Scale:
0 100 200 300 400 Miles
plateaus
hills
mountains
mesas
cuestas
folded mountains
basin ranges
volcano and lava
sand
sinks
moraines
drumlins
CHECKED
2-03-04
Erwin Raisz 1950
CANADA
GULF OF MEXICO
MEXICO
PACIFIC OCEAN
ATLANTIC OCEAN
COLUMBIA
COLORADO
MISSOURI
OHIO
TENNESSEE
ARKANSAS
RIO GRANDE
ALABAMA-TOMBIGBEE
GREAT BASIN
CENTRAL VALLEY
SAND HILLS
HIGH PLAINS
OZARK PLATEAU
YAZOO BASIN
EASTERN TIMBERS
PINE FLATS
BLUE GRASS
WESTERN COAL FIELDS
ROLLING PLAINS
STAKED PLAINS
L. Superior
L. Michigan
L. Huron
L. Erie
L. Ontario
L. of the Woods
L. Itasca
Gulf of California

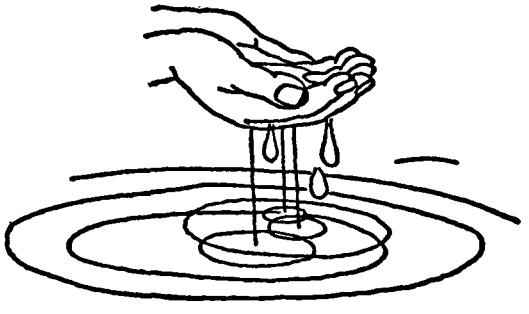
Ten Rivers in America's Future

THE REPORT OF THE

PRESIDENT'S WATER RESOURCES

POLICY COMMISSION

VOLUME 2 ★ 1950



IN THREE VOLUMES

Volume 1: A Water Policy for the American People (General Report)

Volume 2: Ten Rivers in America's Future

Volume 3: Water Resources Law

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1950

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

TELEPHONE: EXECUTIVE 3300

THE PRESIDENT'S
WATER RESOURCES POLICY COMMISSION
718 EIGHTEENTH STREET NW.
WASHINGTON 25, D. C.

COMMISSIONERS
MORRIS L. COOKE
CHAIRMAN
GILBERT F. WHITE
VICE CHAIRMAN
PAUL S. BURGESS
LEWIS WEBSTER JONES
SAMUEL B. MORRIS
LELAND OLDS
ROLAND R. RENNE

February 19, 1951

The President
The White House

Dear Mr. President:

We take pleasure in submitting herewith Volume 2 of the report of The President's Water Resources Policy Commission. This volume is entitled "Ten Rivers in America's Future". It consists of ten basin studies prepared as background data to assist the Commission in working out the policy recommendations contained in Volume 1 of its report.

The ten river basins are the Columbia, Central Valley of California, Missouri, Colorado, Rio Grande, Connecticut, Alabama-Coosa, Potomac, Ohio, and Tennessee. The studies are not designed to present final plans for the development of these basins. Rather they provide practical examples of the problems for which a national water policy must furnish workable answers.

The studies were prepared by the Commission's Committee on River Program Analysis, headed by a member of the Commission's staff and composed of experts assigned by Federal agencies responsible for the several aspects of the government's water and land resources program. The studies are based on reports and data contributed by these agencies and critically reviewed in the give and take of committee discussion. Although the material contained in the studies has been available to assist the members of the Commission in their work, this volume of the report has not been reviewed in detail by all of the Commissioners.

We take this opportunity to tell you of the wholehearted response of all executive departments and agencies to your request that they assist the Commission in its work. They made notable contributions to the basin studies contained in this volume.

Yours very sincerely,

Paul S. Burgess
Paul S. Burgess

Leland Olds
Leland Olds

Lewis Webster Jones
Lewis Webster Jones

Roland R. Renne
Roland R. Renne

Samuel B. Morris
Samuel B. Morris

Gilbert F. White
Gilbert F. White

Morris L. Cooke
Morris L. Cooke, Chairman

TELEPHONE: EXECUTIVE 3300

THE PRESIDENT'S
WATER RESOURCES POLICY COMMISSION
718 EIGHTEENTH STREET NW.
WASHINGTON 25, D. C.

COMMISSIONERS
MORRIS L. COOKE
CHAIRMAN
GILBERT F. WHITE
VICE CHAIRMAN
PAUL S. BURGESS
LEWIS WEBSTER JONES
SAMUEL B. MORRIS
LELAND OLDS
ROLAND R. RENNE

December 1, 1950

Mr. Morris L. Cooke
Chairman, The President's Water
Resources Policy Commission
Washington 25, D. C.

Dear Mr. Chairman:

I am transmitting herewith a survey entitled "Ten Rivers in America's Future." It consists of studies of the Alabama-Coosa, Central Valley of California, Colorado, Columbia, Connecticut, Missouri, Ohio, Potomac, Rio Grande, and Tennessee River Basins, prepared by the two Committees on River Program Analysis and members of the Commission staff. These studies were based on extensive data, many of which were compiled especially for this purpose by Federal departments and agencies responsible for water and land resources activities.

Each of the ten basins analyzed has been studied as a whole in terms of its problems and potentialities. The resulting survey may be considered a progress report for the Commission and the public on water development in the major regions of America. While this survey does not represent a complete examination of all details of the water resources programs of these basins, the important policy problems have been carefully analyzed in terms of the particular characteristics of each basin.

The analyses would not have been possible without the devoted and fair-minded participation of committee members assigned to the Commission by the Federal agencies having responsibilities in the field of water resources development. As committee chairman, I owe them a debt of gratitude, both for the wise counsel and the extensive time and effort which they gave. I also wish to express appreciation to the Commission staff for their equally fine work. Their contribution in research, compilation, and editing has been invaluable.

Sincerely yours,

Edward A. Ackerman

Edward A. Ackerman
Geographer-in-Charge

Contents

Part I. BASINS OF THE WEST

No. 1. THE COLUMBIA

No. 2. THE CENTRAL VALLEY OF CALIFORNIA

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

No. 3. THE MISSOURI

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

No. 4. THE RIO GRANDE

No. 5. THE COLORADO

911610—51——2

Part II. BASINS OF THE EAST

No. 6. THE CONNECTICUT

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

No. 7. THE ALABAMA-COOSA

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

No. 8. THE POTOMAC

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

No. 9. THE OHIO

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

No. 10. THE TENNESSEE

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

Chapter 7

ILLUSTRATIONS

No. 1. The Columbia

No. 2. The Central Valley of California

No. 3. The Missouri

No. 4. The Rio Grande

TABLES

No. 1. The Columbia

No. 2. The Central Valley of California

No. 3. The Missouri

No. 4. The Rio Grande

No. 5. The Colorado

No. 6. The Connecticut

No. 7. The Alabama-Coosa

No. 8. The Potomac

No. 9. The Ohio

No. 10. The Tennessee

Appendix 1

Request for Analyses of River Basin Program

The Commission, early in its study, sought the cooperation of various agencies of government having expert knowledge of various phases of water-resources problems in their relation to basin development. This was done by means of the following letter, sent to the head of each of the agencies.

The response of the Federal agencies furnished much of the basic material from which the 10 river basin studies were prepared.

MARCH 20, 1950.

Hon. NELSON LEE SMITH,[1]
Chairman, Federal Power Commission,
Washington, 25, D. C.

DEAR MR. CHAIRMAN: In order to provide a basis for testing proposed policy conclusions against a wide range of conditions the Commission needs to obtain as soon as possible separate analyses of present plans looking to the comprehensive development of the water resources of certain of the country's important river basins. Those selected for analysis include (1) the Columbia, (2) the Central Valley of California, (3) the Colorado, (4) the Missouri, (5) the Arkansas-White, (6) the Ohio, (7) the Connecticut, (8) the Delaware, (9) the Potomac, (10) the Tennessee, (11) the Alabama-Coosa, and (12) the Rio Grande.[2]

As a basis for such analyses we will appreciate it if you will prepare for us reports on the present plans of the Federal Power Commission for development of the water resources, including related land uses, of each of the above-named rivers to the extent that their development and use in any part comes within the jurisdiction of your agency. In order to meet the requirements of our work as at present outlined, we would like to have the report for each river basin in approximately the following form.

Part I.—The essential physical and economic facts about the Commission's program in the particular basin, including constructed projects, projects under construction, projects authorized, projects not yet authorized but for which definite plans are approaching completion, and other projects in contemplation. This should afford an integrated picture approximating your agency's part in the full development of the water resources of each basin. It should include not only what is presently planned, but also, as far as possible, what should be planned in the picture to complete the program for each basin.

This part should also include, to the extent available, a summary of the important economic data for each project including cost to construct, annual cost, annual benefits broken down to reflect the several purposes on which the project was justified, annual revenue, actual or anticipated, from different groups of beneficiaries, and peculiar need for the project in the region. It should include any facts as to the relation of these projects to each other and to the programs of any other Federal agencies authorized to participate in the development of the water or land resources of the basin.

Part II.—Brief statement of principles and practices in the particular basin with regard to the estimating of project benefits and costs. This should include the principles and standards used in (1) identification of the benefits and basis for such identification; (2) determination of the amount of benefit for each type of benefit; (3) identification of beneficiaries (individuals, groups, or levels of government) and allocation of benefits among such beneficiaries; (4) measurement of costs; (5) allocation of costs; (6) determination as to which of the beneficiaries should make repayments and the formula for repayment in each case; and (7) general project formulation.

[1] Letters similar to this were sent to the Secretaries of the Interior, Commerce, Army, and Agriculture, the Surgeon General of the United States Public Health Service, and the Chairman of the Tennessee Valley Authority.

[2] In the course of the study, the Delaware and the Arkansas-White river basins were omitted from the list.

This part of the report should also contain an analysis of how these principles and practices are working out in the particular basin.

Part III.—More extensive discussion of specific policy problems which are of particular significance in the basin covered by the report. The discussion in this part of the report should be under the general captions of the problems themselves and should set forth all the facts in the particular basin necessary to understand, and to work out a solution of the problem so far as the basin is concerned, and to test tentative policy conclusions in terms of their effect on the development of its water resources. The Commission staff is available for consultation on the matter of problem selection.

Some of the problems which we would like to have covered in this part of the report, to the extent that they are significant in the subject basin, are:

(1) Application of the principle of acreage limitation for lands benefited by Federal expenditure, as in the Central Valley, Calif., Columbia and Missouri Basins;

(2) Application of principles for determination of economic feasibility in cases where project costs appear very high in terms of that portion of the benefits which can be readily expressed in monetary terms, as in the Colorado and Columbia Basins;

(3) Use of basin account and interest component to assist in establishing economic justification for specific program objectives which separate feasibility determination do not show to be self-supporting, as in the Columbia Basin;

(4) Resolution of apparent conflicts between upstream and downstream interests in the use of the water resources of the basin;

(5) Resolution of the conflict between plans for conservation storage reservoirs and regional or local interests in preventing land inundation, as in the Missouri, Connecticut, and White River Basins;

(6) Resolution of conflicts between multiple-purpose planning and advocates of single-purpose projects, as in the Arkansas Basin;

(7) Resolution of apparent conflict between urban water supply and other water resource values in the basin, as in the Delaware Basin;

(8) Resolution of possible conflict between conservation storage and recreational interests, including preservation of National and State parks and monuments, as in the Columbia, Colorado and Ohio Basins;

(9) Resolution of conflicts between general river basin programs involving storage of floodwaters and development of hydroelectric power and fish and wildlife interests, as in the Columbia Basin;

(10) Resolution of conflicting theories governing the marketing of power from Federal river basin projects, as in the Colorado Basin;

(11) Sediment problems, as in the Colorado, Missouri, and Rio Grande Basins;

(12) Adaptation of projects and programs to take account of existing improvements and programs, as in Columbia, Missouri, and Alabama-Coosa Basins;

(13) Specialized problems involving project and program plans, including that of coordinating the interests of the several agencies of the Commission within the basin;

(14) Problems of securing adequate basic data for planning and programing, whether for lack of sufficient appropriations or other reasons;

(15) Problems of securing local participation;

(16) Problems of international coordination, as in Columbia and Rio Grande Basins.

Those preparing the reports should not feel limited by the above suggestions as to the problems we would like to have discussed or as to the river basins in which these problems occur. They are offered merely as illustrations. The problems suggested should be dealt with in the report on any river basin where they are significant and any other problems of similar importance in any river basin should be dealt with; for we are seeking the facts necessary to enable us to formulate policy conclusions covering the control and use of the country's water resources.

Furthermore, we are not asking that these reports propose solutions of the problems, although any observation those preparing the reports may wish to bring to our attention will be welcome. What we are looking for particularly is a complete statement of the basic facts required for an understanding of the effect of policy determinations on the plans for basin development.

In general, and without limitation, the report should take into consideration all the purposes which water resources programs can serve, including domestic and industrial water supply, livestock watering, pollution abatement, flood control, watershed management, reforestation, ground-water recharge, irrigation, navigation, hydroelectric power, fish and wildlife, and recreation. Where such purposes may best be served by a coordinated approach to portions of two or more rivers, this should be noted.

We will appreciate receiving 25 copies of each report, prepared on letter-sized paper (8 by 10½ inches). We would like the report single-spaced, with a short introductory résumé, and such maps, profiles, and pictures as may serve to illustrate the program.

Similar requests are going to other departments and agencies concerned with development of water resources. We would like to have the data prepared for the separate basins in the order in which

they are mentioned in paragraph 1 of this letter and to receive each basin analysis as soon as it is completed. In order that we may meet the schedule set by the President, we will appreciate receiving the last memorandum by May 15.

Should questions arise as to the significance of any part of the above outline I will appreciate the opportunity to provide such clarification as may be needed.

Sincerely,

LELAND OLDS,
Commissioner in Charge of Studies.


RIVER BASINS
OF THE UNITED STATES
selected for study in this volume
Scale:
0 100 200 300 400 Miles
plateaus
hills
mountains
mesas
cuestas
folded mountains
basin ranges
volcano and lava
sand
sinks
moraines
drumlins
CHECKED
2-03-04
Erwin Raisz 1950
CANADA
MEXICO
GULF OF MEXICO
Gulf of California
PACIFIC OCEAN
ATLANTIC OCEAN
COLUMBIA
COLORADO
MISSOURI
OHIO
TENNESSEE
RIO GRANDE
CENTRAL VALLEY
SAND HILLS
HIGH PLAINS
OZARK PLATEAU
APPALACHIAN MOUNTAINS
BLUE RIDGE
EASTERN TIMBER
PINE HILLS
FLATWOODS
YAZOO BASIN
TEXAS GULF PRAIRIE
COASTAL PLAINS
ROLLING PLAINS
STAKED PLAINS
GREAT PLAINS
GREAT BASIN
Lake Superior
L. Michigan
L. Huron
L. Erie
L. Ontario
Hudson Bay