

federad register

MONDAY, SEPTEMBER 10, 1973
WASHINGTON, D.C.

Volume 38 ■ Number 174

PART III



WATER RESOURCES COUNCIL



WATER AND RELATED LAND RESOURCES

Establishment of Principles
and Standards for Planning

**WATER RESOURCES COUNCIL
PRINCIPLES AND STANDARDS FOR PLAN-
NING WATER AND RELATED LAND
RESOURCES**

Notice of Establishment

1. Notice is hereby given by the Water Resources Council that Principles and Standards for Planning Water and Related Land Resources have been established pursuant to sec. 103 of the Water Resources Planning Act (P.L. 89-80).

2. The full texts of the Principles and Standards are published as a part of this notice.

3. These Principles and Standards are based on several years of effort by the Water Resources Council. After extensive study, review, field testing and public hearings, the Council published on December 21, 1971, "Proposed Principles and Standards for Planning Water and Related Land Resources" (36 FR 24144) along with a draft environmental statement, and invited public comment on the proposal. Extensive views and comments were received through oral statements at the public hearings held on the pro-

posal and through written submission to the Council during the period allowed for comment.

4. After careful consideration of the public response to its proposal, consultation with all concerned Federal agencies, including the Office of Management and Budget, the Council on Environmental Quality, and the Environmental Protection Agency, the Council made its decisions on the proposal and forwarded its recommendations to the President.

5. Indicated below are the areas, listed by subject, where the Council has made revisions in the Principles and Standards.

- (1) Planning objectives.
- (2) Discount rate.
- (3) Retroactive application, "Grandfather Clause".
- (4) Cost allocation.
- (5) Public participation.
- (6) Water quality evaluation.
- (7) Use of economic (OBERS) projections.
- (8) Unemployed and underemployed resources.
- (9) Application of benefit/cost ratio.
- (10) Feasible project alternatives.

(11) Impact of benefits on income distribution.

6. Revisions in the Principles and Standards are reflected as appropriate in the final environmental statement which is printed as a part of this notice. The final statement also indicates the availability of a summary of the comments received on the draft environmental statement and the availability of the original transcripts of the testimony composing the public record. The draft and final environmental statements illustrate how the Principles and Standards, by providing for explicit consideration of the environmental quality objective in plan formulation, augment the National Environmental Policy Act in fostering a full disclosure of environmental consequences.

7. Pursuant to sec. 103 of the Water Resources Planning Act (P.L. 89-80) the President approved the Principles and Standards as they appear herein.

8. The Principles and Standards are effective October 25, 1973.

ROGERS C. B. MORTON,
Chairman.

The United States Water Resources Council, an independent Executive Agency of the U. S. Government, is composed of the Secretaries of Interior; Agriculture; Army; Health, Education, and Welfare; Transportation; Chairman, Federal Power Commission; with participation by the Secretaries of Commerce; Housing and Urban Development; Administrator, Environmental Protection Agency; Attorney General, Department of Justice; Director, Office of Management and Budget; Chairman, Council on Environmental Quality; and the Chairmen, River Basin Commissions. Council activities encourage the conservation, development and utilization of water and related land resources on a comprehensive and coordinated basis by Federal, State, local government and private enterprise.

WATER RESOURCES COUNCIL

MEMBERS

Rogers C. B. Morton, Chairman,
Secretary of the Interior.

Earl L. Butz,
Secretary of Agriculture.

Howard H. Callaway,
Secretary of the Army.

Caspar W. Weinberger,
Secretary of Health, Education,
and Welfare.

Claude S. Brinegar,
Secretary of Transportation.

John N. Nassikas,
Chairman, Federal Power
Commission.

ALTERNATES

Jack O. Horton,
Assistant Secretary.

Robert W. Long,
Assistant Secretary.

Charles R. Ford,
Acting Special Assistant.

Merlin K. DuVal,
Assistant Secretary.

Chester R. Bender,
Commandant, U. S. Coast
Guard.

George G. Adkins,
Chief, Division of River
Basins.

ASSOCIATE MEMBERS

Frederick B. Dent,
Secretary of Commerce.

James T. Lynn,
Secretary of Housing and
Urban Development.

John R. Quarles, Jr.,
Deputy Administrator,
Environmental Pro-
tection Agency.

ALTERNATES

Robert M. White,
Administrator, National
Oceanic and Atmos-
pheric Administration.

Clifford W. Graves,
Deputy Assistant Secretary.

OBSERVERS

Roy L. Ash,
Director, Office of Manage-
ment and Budget.

Elliot L. Richardson,
Attorney General, Department
of Justice.

Russell E. Train,
Chairman, Council on Environ-
mental Quality.

Donel J. Lane,
Chairman, Pacific Northwest River Basins Commission.

R. Frank Gregg,
Chairman, New England River Basins Commission.

Frederick O. Rouse,
Chairman, Great Lakes Basin Commission.

Fred E. Morr,
Chairman, Ohio River Basin Commission.

ALTERNATES

John C. Sawhill,
Associate Director.

Wallace H. Johnson,
Assistant Attorney General.

Stephen F. Sloan,
Staff Member.

OBSERVERS (cont'd)

John W. Neuberger,
Chairman, Missouri River Basin Commission.

George W. Griebenow,
Chairman, Upper Mississippi River Basin Commission

REPRESENTATIVES OF THE MEMBERS

Water Resources Council. Reuben J. Johnson,
Acting Director.

Department of Agriculture William B. Davey.
Eugene C. Buie.

Department of the Army B. Joseph Tofani.
Kenneth H. Murdock.

Department of Health,
Education, and Welfare Jesse L. Steinfeld.
Richard S. Green.

Department of the Interior Lance Marston.
Jack C. Jorgensen.

Department of Transportation William R. Riedel.
William D. Derr.

Federal Power Commission George G. Adkins.

Department of Commerce Donald R. Baker.
K. L. Kollar.

Department of Housing and
Urban Development James F. Miller,
Truman Goins.

Environmental Protection Mark A. Pisano.
Agency Joseph A. Krivak.

Office of Management and Thomas W. Barry.
Budget Donald G. Waldon.

REPRESENTATIVES OF THE MEMBERS (cont'd)

Department of Justice Walter Keichel, Jr.

Council on Environmental Quality. Stephen F. Sloan.

PRINCIPLES, STANDARDS, AND PROCEDURES
FOR WATER AND RELATED LAND RESOURCES PLANNING

The Principles provide the broad policy framework for planning activities and include the conceptual basis for planning.

The Standards provide for uniformity and consistency in comparing, measuring, and judging beneficial and adverse effects of alternative plans.

The Procedures provide more detailed methods for carrying out the various levels of planning activities, including the selection of objectives, the measurement of beneficial and adverse effects, and the comparison of alternative plans for action. Procedures are developed within the framework of Principles and the uniformity of Standards but will vary with the level of planning, the type of program, and the state-of-the-art of planning.

As indicated by these definitions, the concepts of Principles, Standards, and Procedures will evolve and change. Principles, reflecting major public policy and basic public investment theory, will change and evolve slowly. Standards, representing the best available techniques for the application of Principles, will change more frequently than Principles, as progress in the development of planning and evaluation techniques takes place. Procedures, detailed methods for the application of the Principles and Standards, will be subject to even more frequent revisions as experience, research, and planning conditions require such revision.

**PRINCIPLES FOR PLANNING WATER
AND RELATED LAND RESOURCES**

- I. Purpose and scope.
- II. Objectives.
- III. Other beneficial and adverse effects.
- IV. General evaluation principles.
- V. Plan formulation.
- VI. System of accounts.
- VII. Cost allocation, reimbursement, and cost sharing.
- VIII. National program for Federal and federally assisted activities.
- IX. Implementation of principles.
- X. Application and effect.

I. PURPOSE AND SCOPE

These Principles are established for planning the use of the water and related land (hereinafter referred to as water and land) resources of the United States to achieve objectives, determined cooperatively, through the coordinated actions of the Federal, State, and local governments; private enterprise and organizations; and individuals.

These Principles provide the basis for Federal participation with river basin commissions, States, and others in the preparation, formulation, evaluation, review, revision, and transmittal to the Congress of plans for States, regions, and river basins; and for planning of Federal and federally assisted water and land resources programs and projects and Federal licensing activities as listed in the Standards.

Plans for the use of the Nation's water and land resources will be directed to improvement in the quality of life through contributions to the objectives of national economic development and environmental quality. The beneficial and adverse effects on each of these objectives will be displayed in separate accounts with other accounts for the beneficial and adverse effects on regional development and social well-being. Planning for the use of water and land resources in terms of these objectives will aid in identifying alternative courses of action and will provide the type of information needed to improve the public decisionmaking process.

II. OBJECTIVES

Existing or projected needs and problems expressed by the people through their local, State, regional, or national institutions have created a need for water and land resource management and use. These needs and problems are of such a multigovernmental nature that their resolution requires cooperation and coordination by many levels of government and private interests.

The overall purpose of water and land resource planning is to promote the quality of life, by reflecting society's preferences for attainment of the objectives defined below:

A. to enhance national economic development by increasing the value of the Nation's output of goods and services and improving national economic efficiency.

B. To enhance the quality of the environment by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

For each alternative plan there will be a complete display or accounting of relevant beneficial and adverse effects on these two objectives.

Beneficial and adverse effects are measured in monetary or nonmonetary terms. Estimating these beneficial and adverse effects is undertaken in order to measure and display in appropriate accounts the net changes, with respect to the two objectives, that are generated by alternative plans.

The priorities and preferences of the various individuals affected will vary and, accordingly, there will likely not be full agreement among all affected on whether certain effects are beneficial or adverse or on the relative trade offs between objectives. However, when any plan is recommended from among alternative plans, there is an implicit expression of what is considered to be the affected group's priorities and preferences.

Effects on some components of the two objectives are generally regarded as favorable. These include, for example, gains in national output. For other components, however, preferences will differ. This will certainly be true of some of the components making up the environmental quality objective. For such instances, planning provides information which should facilitate planning decisions and reduce conflict over such decisions.

Thus, there are beneficial and adverse effects for national economic development and environmental quality. These are measured in quantitative units or qualitative terms appropriate to a particular effect. The accounts are not mutually exclusive with respect to beneficial or adverse effects, and final decisions as to the selection of the recommended plan will be made by considering the differences among alternative plans as to all their effects.

A. Beneficial Effects on National Economic Development

Beneficial effects to be displayed in the national economic development account are increases in the value of the output of goods and services and improvements in national economic efficiency resulting from a plan. These include:

- a. The value to users of increased outputs of goods and services;
- and
- b. The value of output resulting from external economies.

B. Adverse Effects on National Economic Development

Adverse effects of a plan to be displayed in the national economic development account include:

- a. The value of resources required for or displaced by a plan;
- and
- b. Losses in output resulting from external diseconomies.

C. Beneficial and Adverse Effects on Environmental Quality

The beneficial and adverse effects of alternative plans on the environmental characteristics of the area under study or elsewhere in the Nation will be evaluated. Environmental effects will be displayed in terms of relevant physical and ecological criteria or dimensions, including the appropriate qualitative aspects. Such an evaluation would be displayed in the environmental quality account and include the effects of the proposed plan on:

- a. Open and green space, wild and scenic rivers, lakes, beaches, shores, mountains and wilderness areas, estuaries, and other areas of natural beauty;
- b. Archeological, historical, biological, and geological resources and selected ecological systems;
- c. The quality of water, land, and air resources; and
- d. Irreversible commitments of resources to future uses.

III. OTHER BENEFICIAL AND ADVERSE EFFECTS

For each alternative plan, the beneficial and adverse effects on regional development and social well-being will be displayed where appropriate.

A. Beneficial and Adverse Effects on Regional Development

The following beneficial or adverse effects of the proposed plan on a system of relevant planning regions (States, river basins, or communities) will be displayed where appropriate.

a. Income effects

(1) Beneficial.

(a) The value of increased outputs of goods and services resulting from a plan accruing within relevant regions; and

(b) The value of output resulting from external economies accruing within relevant regions.

(2) Adverse.

(a) The value of resources within relevant regions required for or displaced by a plan.

(b) Losses in output resulting from external diseconomies within the relevant regions.

b. Beneficial and adverse effects on other components of regional development.

(1) The number and types of jobs resulting from a plan in the region under consideration;

(2) Effects of the plan on population distribution within the region under consideration and among regions in the Nation;

(3) The effect of the plan on the economic base and economic stability of the region under consideration;

(4) The effect of the plan on the environment in the region under consideration; and

(5) The effect of the plan on other specified components of regional development.

B. Beneficial and Adverse Effects on Social Well-Being

The beneficial and adverse effects of a plan to be displayed where appropriate in the social well-being account include:

a. Real income distribution. The effects of a plan on the real income of classes or groups that are relevant to the evaluation of a plan will be displayed. All effects, both monetary and income in kind, will be included in this display.

b. Life, health, and safety. Plan effects on life, health, and safety other than those evaluated monetarily for the national economic development

objective will be included here. Measurement techniques will vary but would largely be in terms of physical units.

c. Educational, cultural, and recreational. The effect of the plan on educational, cultural, and recreational opportunities.

d. Emergency preparedness. The effects of the plan on reserve capacities and flexibilities in water resource systems and protection against interruption of the flow of essential goods and services at times of national disaster or critical need will be displayed.

e. Other. Other effects on social well-being may be identified and displayed as relevant to alternative plans.

IV. GENERAL EVALUATION PRINCIPLES

A. General Setting

Full employment will be assumed except where local areas of chronic unemployment, underemployment, or other conditions indicate otherwise. Plan formulation and evaluation will be based on national and regional projections of employment output, and population and the amounts of goods and services that are likely to be demanded. Actual or projected needs for water and land resources will be related to these projections. Alternative plans will take into account established standards and goals for the quality of the environment and other factors.

B. Measurement of Beneficial and Adverse Effects

Beneficial and adverse effects of each alternative plan will be determined by comparing the conditions expected with the plan to the conditions expected without the plan. Since substantial changes may be expected even in the absence of the plan, care should be taken that this fact is properly reflected in plan formulation and evaluation.

C. Price Relationships

When prices are used in evaluation they should reflect the real exchange values expected to prevail over the period of analysis. For this purpose, relative price relationships and the general level of

prices prevailing during the planning study will be assumed to hold generally for the future, except where specific studies and considerations indicate otherwise.

D. The Discount or Interest Rate

The discount rate will be established in accordance with the concept that the Government's investment decisions are related to the cost of Federal borrowing.

E. Consideration and Comparison of Alternatives

A range of possible alternatives capable of application by various levels of government and by nongovernmental interests, should be studied. These alternatives should be evaluated or judged as to their contributions to the objectives.

Plans, or increments thereto, will not be recommended for Federal development that, although they have beneficial effects on the objectives, would physically or economically preclude alternative non-Federal plans which would likely be undertaken in the absence of the Federal plan and which would more effectively contribute to the objectives when comparably evaluated according to these principles.

F. Period of Analysis

The period of analysis will be the lesser of (1) the period of time over which the plan can reasonably be expected to serve a useful purpose considering probable technological trends affecting various alternatives, or (2) the period of time when further discounting of beneficial and adverse effects will have no appreciable effects on design. Appropriate consideration will be given to long-term environmental and social well-being effects which may extend beyond periods significant for analysis of national economic development or regional development beneficial and adverse effects.

G. Scheduling

Plans should be scheduled for implementation in relation to needs so that desired beneficial effects are achieved efficiently. Beneficial and adverse effects occurring according to different patterns in time are affected differently by the discount process when plans are scheduled for implementation at alternative future times. Therefore,

plan formulation should analyze the alternative schedules of implementation to identify the schedule that would result in the most desirable mix of contributions to the objectives when the beneficial and adverse effects of a plan are appropriately discounted.

H. Risk and Uncertainty

Risk is characterized by a distribution of events occurring according to reasonably well-known probabilities, even though their sequence and time of occurrence cannot be determined. Frequency analysis in hydrology, where long records are available or can be mathematically simulated, is an example of predictable risk. In such situations, it may be necessary to choose between planning for average or probable conditions and planning for extreme events. When this is done, the nature of the choice and its relationship to the objectives will be clearly stated. Predictable risk, based upon past experience, should not be divorced from predictable or foreseeable trends which would alter probabilities based solely upon previous experience.

Uncertainty is characterized by the absence of any known probability distribution of events. This is often the situation in water resources planning. The nature of uncertainty associated with the planning study, strategies proposed to deal with uncertainty, and their impact on the objectives should be reported. In addition, sensitivity analysis may be employed to analyze uncertain situations.

I. Sensitivity Analysis

Plans should be examined to determine their sensitivity to data availability and to alternative assumptions as to future economic, demographic, environmental, and technologic trends. Selected projections and assumptions of alternative futures that are reasonably probable and that, if realized, would appreciably affect plan design or scheduling should be analyzed.

J. Updating Plans

Because of rapid change in social economic, environmental, technologic, physical, and other factors, a plan that is not implemented within a reasonable time after completion should be reviewed as provided in the standards to ascertain whether it continues to be the best alternative to achieve the objectives.

V. PLAN FORMULATION

Plans will be directed to the improvement in the quality of life by meeting current and projected needs and problems as identified by the desires of people in such a manner that improved contributions are made to society's preferences for national economic development and environmental quality. These plans should be formulated to reflect national, regional, State, and local needs or problems consistent with the above two objectives.

Planning of water and land resources is a part of broader public and private planning to meet regional and local needs and to alleviate problems. Therefore, planning for water and land resources should be carefully related to other regional or local planning activities and should include active participation of all interests.

Plans for water and land resources will focus upon the specified components of the objectives desired for the designated region, river basin, State, or local planning setting. These are expressed in terms of projected needs and problems identified in each planning setting.

The planning process includes the following major steps:

- (1) Specify components of the objectives relevant to the planning setting;
- (2) Evaluate resource capabilities and expected conditions without any plan;
- (3) Formulate alternative plans to achieve varying levels of contributions to the specified components of the objectives;
- (4) Analyze the differences among alternative plans which reflect different emphasis among the specified components of the objectives;
- (5) Review and reconsider, if necessary, the specified components for the planning setting and formulate additional alternative plans as appropriate; and

(6) Select a recommended plan from among the alternative plans based upon an evaluation of the trade offs between the objectives of national economic development and environmental quality and considering, where appropriate, the effects of the plans on regional development and social well-being.

A. Specification of Components of the Objectives

At the outset and throughout the planning process, the responsible planning organization will consult appropriate Federal, regional, State, and local groups to ascertain the components of the objectives that are significantly related to the use and management of the resources in the planning setting. These will be expressed in terms of needs and problems.

The components selected for use in formulating alternative plans should be of concern to the Nation, and the components should be those that can reasonably be expected to be substantially influenced through the management and development alternatives available to the planner. The components of objectives for which plans are formulated can be expected to change over time and between areas of the Nation as preferences and possibilities change and differ. These changes will be reflected in the Water Resources Council's Standards.

The objectives for which plans are formulated can also be expected to change over time as preferences and possibilities change. Changes in objectives will be accommodated only through revision of these principles.

The specified components will be defined so that meaningful alternative levels of achievement are identified. This will facilitate the formulation of alternative plans in cases where there may be technical, legislative, or administrative constraints to full achievement of objectives.

B. Evaluation of Conditions Without a Plan

The identification of the specified components of objectives will necessarily involve an appraisal of future economic and environmental conditions expected without the plan as compared with those desired by people for the planning area. In addition, a sufficient inventory and appraisal of the water and land resource base of the planning area will be necessary.

C. Formulation of Alternative Plans

The planning process involves an evaluation of alternative means, including both structural and nonstructural measures, to achieve desired effects.

Based upon identified needs and problems, alternative plans will be prepared and evaluated in the context of their contributions to the objectives. This involves comparisons between objectives, and it will be necessary to formulate alternative plans that reflect different relative emphasis between the objectives for the planning setting.

The number of alternative plans to be developed for each planning effort will depend upon complementarities or conflicts among specified components of the objectives, resource capabilities, technical possibilities, and the extent to which the design of additional alternative plans can be expected to contribute significantly to the choice of a recommended plan. Because planning staffs are limited, emphasis should be placed on examination of those alternative waters and land-use plans which may have appreciable effects on objectives.

With respect to the number of alternative plans there will be a continuing dialog among the Water Resources Council, river basin commissions, and other planning groups, emphasizing on the one hand the need for national guidelines and overview of objectives for which alternative plans are formulated, and on the other the special insights into local planning situations that field level teams may develop.

Appropriate methods and techniques for estimating beneficial and adverse effects will be used to provide reliable estimates of the consequences and feasibility of each alternative plan.

One alternative plan will be formulated in which optimum contributions are made to the national economic development objective. Additionally, during the planning process at least one alternative plan will be formulated which emphasizes the contributions to the environmental quality objective. Other alternative plans reflecting significant physical, technological, legal or public policy constraints or reflecting significant trade-offs between the national economic development and environmental quality objectives may be formulated so as not to overlook a best overall plan.

Major increments proposed for addition to a plan intended to serve a single component of an objective will be included only if the beneficial effects on that component of the addition outweigh the adverse effects. For example, an increment to an alternative plan proposed for the national economic development objective would be added only if the additional beneficial effects exceeded the additional adverse effects, and similarly for the environmental quality objective. For plans emphasizing some combination of objectives, the incremental rule applies to the combination of objectives that is relevant.

D. Analysis of Alternative Plans

The display of beneficial and adverse effects for each alternative plan will be prepared so that the differences among alternatives can be clearly shown and accurately analyzed. The analysis will provide the rationale for the selection of a recommended plan and the underlying evaluation of the various alternative plans. This analysis will provide the information on which the planning organization and others can base judgments as to the most desirable mix of beneficial effects as compared with the adverse effects.

The trade offs among alternative plans should be displayed as fully as possible for the components of all objectives and where appropriate for effects on regional development and social well-being to facilitate administrative and legislative review and decision.

E. Reconsideration of Specified Components of the Objectives

As planning proceeds, the specified components will be reviewed and reconsidered as appropriate. This reconsideration may result from new information, revised projections, changes in policy, or technological innovations. Reconsideration of components may result in modifying alternatives or developing additional alternative plans.

F. Plan Selection

From its analysis of alternative plans, the planning organization will select a recommended plan. The plan selected will reflect the relative importance attached to different objectives and the extent to which the two objectives can be achieved by carrying out the plan.

The recommended plan should be formulated so that beneficial and adverse effects toward objectives reflect, to the best of current understanding and knowledge, the priorities and preferences expressed by the public at all levels to be affected by the plan. A recommended plan must have net national economic development benefits unless the deficiency in net benefits for the national economic development objective is the result of benefits foregone or additional costs incurred to serve the environmental quality objective. In such cases, a plan with a less than unity benefit-cost balance may be recommended as long as the net deficit does not exceed the benefits foregone and the additional costs incurred for the environmental quality objective. A Departmental Secretary or head of an independent agency may make an exception to the net benefits rule if he determines that circumstances unique to the plan formulation process warrant such exception.

In addition to the recommended plan with supporting analysis, other significant alternative plans embodying different priorities between the objectives will be presented in the planning report. Included with the presentation of alternative plans will be an analysis of the trade offs among them. The trade offs will be set forth in explicit terms, including the basis for choosing the recommended plan from among the alternative plans.

VI. SYSTEM OF ACCOUNTS

A system of public information accounts will be established that displays beneficial and adverse effects of each plan to the objectives and beneficial and adverse effects on regional development and social well-being and provides a basis for comparing alternative plans. The display of beneficial and adverse effects will be prepared in such manner that the different levels of achievement in each account can be readily discerned and compared, indicating the trade offs among alternative plans.

For purposes of accounting, the distribution of beneficial and adverse effects will be shown to whomsoever they accrue. This will include display of the distribution of effects to regions, income classes, and interest groups relevant to the particular plan and will reflect the cost information specified in Section VII below. The system of accounts will display the beneficial and adverse effects in relevant regions in relation to the rest of the Nation. The Water Resources

Council will establish a procedure for relating regional accounts to the rest of the Nation. The use of such reporting regions will not, however, rule out the use of other regions whose delineations are important in measuring beneficial or adverse effects on regional development.

VII. COST ALLOCATION, REIMBURSEMENT, AND COST SHARING

A. Cost Allocation

On the basis of the identification provided for in the system of accounts for beneficial and adverse effects, an allocation of appropriate costs shall be made when an allocation of costs is required for purposes of establishing reimbursement levels, pricing policies, or cost sharing between the Federal Government and non-Federal public and private interests. Each objective and each component of the objectives shall be treated comparably in cost allocation and each is generally entitled to its fair share of the mutual advantages resulting from a plan.

B. Reimbursement and Cost Sharing

Reimbursement and cost-sharing policies shall be directed generally to the end that identifiable beneficiaries bear an equitable share of cost commensurate with beneficial effects received in full cognizance of the planning objectives. Since existing cost-sharing policies are not entirely consistent with this approach to planning water and land resources, these policies are being thoroughly reviewed after which changes will be recommended.

VIII. NATIONAL PROGRAM FOR FEDERAL AND FEDERALLY ASSISTED ACTIVITIES

The principles set forth in this document are concerned with alternative plans for individual projects, States, regions, or river basins. The evaluation, systematic display, and comparison of alternative plans for a project, State, region, or river basin provide the basis for selecting a recommended plan.

The formulation of national programs for Federal and federally assisted water and land resource activities requires that priorities be established among recommended plans for projects, States, regions, and river basins. The system of accounts, together with other criteria, such as available budget resources, national policy toward the environment and public and private investment alternatives, will provide a basis for formulating national programs.

IX. IMPLEMENTATION OF PRINCIPLES

The Water Resources Council will implement these Principles by establishing Standards for planning water and land resources in accordance with the Water Resources Planning Act.

The Water Resources Council will establish Procedures as necessary to carry out the established Principles and Standards.

Included in the Water Resources Council's Standards and Procedures will be provision for coordination, among Federal and State agencies and among public and private interests affected by water and land resource plans.

The Council will also specify appropriate Procedures for the review and transmission of planning reports to States, Federal agencies, the Office of Management and Budget, the Council on Environmental Quality, and the Congress. The Council may also provide for review of individual project studies to determine their relationships to regional and river basin plans and their conformance with the Council's evaluation Standards. The Council will consider any unresolved coordination problem.

The Water Resources Council will foster needed training and development of manpower, improvements in mathematical and other planning tools, and research to increase the efficiency of planning efforts. The Principles, Standards, and Procedures should be based at any given time on the best available interpretation of conceptual and empirical bases for planning water and land resources. The Council will encourage and support needed improvements in the application of the conceptual and theoretical planning and decisionmaking framework upon which these Principles are based. The Council will also encourage and support improvement in the conceptual and theoretical framework.

The Council in its Standards and Procedures will make adjustments for deviations from the Principles that may be required by law or Executive order.

The Water Resources Council will review these Principles from time to time and after consultation with others will recommend improvements for consideration of the President.

X. APPLICATION AND EFFECT

These Principles for Planning Water and Land Resources shall be implemented by the Water Resources Council and shall be applied by river basin commissions, other Federal-State organizations, and each of the Federal departments and agencies. The Office of Management and Budget, the Council on Environmental Quality, and other organizations in the Executive Office of the President will use these Principles in their review of proposed project, basin, or regional plans.

The Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources, approved by the President, May 15, 1962, printed as Senate Document No. 97, 87th Congress, 2d Session, together with Supplement No. 1 thereto, June 4, 1964, "Evaluation Standards for Primary Outdoor Recreation Benefits," and the amendment of December 24, 1968, 18 CFR § 704.39, "Discount Rate," are revoked.

These Principles, the Standards promulgated in connection therewith, and the above revocation shall take effect 45 days following the date of their publication by the Chairman of the Water Resources Council in the Federal Register.

Approved: September 5, 1973

Richard Nixon

STANDARDS FOR PLANNING WATER
AND RELATED LAND RESOURCES

Table of Contents

- I. Purpose and scope.
- II. Objectives.
- III. Other beneficial and adverse effects.
- IV. General evaluation standards.
- V. Plan formulation.
- VI. System of accounts.
- VII. Cost allocation, reimbursement, and cost sharing.
- VIII. National program for Federal and Federally assisted activities.
- IX. Coordination and review of planning studies.

Appendix A. Water Resources Planning Act of 1965, as amended.

I. PURPOSE AND SCOPE

A. Authority

These planning standards implement the Principles for Planning Water and Related Land Resources.

These standards shall apply, as appropriate, to the activities referred to in subsection B of this section except for adjustments required by law or Executive order. Adjustments required for special situations where the application of these standards is not practical may be made and will be developed by the concerned agency or entity in consultation with the Water Resources Council.

Although these standards are not binding upon State and local bodies participating in water and land resources planning, it is intended that the standards be broad and flexible enough to accommodate the goals and objectives of such entities. The standards apply to Federal participation in Federal-State cooperative planning and should also provide a useful guide to State and local planning.

The Water Resources Planning Act of 1965, as amended, is found in Appendix A.

B. Activities Covered

1. Comprehensive planning. These standards apply to Federal participation in comprehensive framework studies and assessments and regional or river basin planning of water and land resources whether carried out--

(a) By river basin commissions established under the Water Resources Planning Act;

(b) By entities performing the functions of a river basin commission, including, but not limited to, such entities as:

- (1) Federal-interstate compact commissions;
- (2) Federal-State interagency committees;
- (3) Federal-State coordinating committees;

(4) Federal-State development commissions;

(5) Lead Federal agency with special authorization for comprehensive planning;

(6) Other entities designated by the Council engaged in comprehensive water and land resource planning with coordinated Federal technical or financial assistance.

In formulating plans to meet the objectives all alternative means shall be considered, including, but not limited to, water and land programs to be carried out directly by the Federal Government, Federal financial and technical participation in water and land programs to be carried out by State or other non-Federal entities, and Federal licensing activities that affect the development, conservation, and utilization of water and land resources.

2. Federal and federally assisted programs and projects. These standards apply to the planning and evaluation of the effects of the following water and land programs, projects, and activities carried out directly by the Federal Government and by State or other entities with Federal financial or technical assistance;

(a) Corps of Engineers civil functions;

(b) Bureau of Reclamation projects;

(c) Federally constructed watershed and water and land programs;

(d) National parks and recreation areas;

(e) Wild, scenic, recreational rivers and wilderness areas;

(f) Wetland and estuary projects and coastal zones;

(g) Federal waterfowl refuges;

(h) Tennessee Valley Authority;

(i) Federal assistance to State and local government sponsored watershed and water and land resource programs (Watershed Protection and Flood Prevention Projects and Resource Conservation and Development Projects).

C. Levels of Planning

These standards apply to all levels of planning as defined by the Water Resources Council.

Framework studies and assessments are the evaluation or appraisal on a broad basis of the needs and desires of people for the conservation, development, and utilization of water and land resources and will identify regions or basins with complex problems which require more detailed investigations and analysis, and may recommend specific implementation plans and programs in areas not requiring further study. They will consider Federal, State, and local means and will consider both national economic development and environmental quality objectives.

Regional or river basin plans are reconnaissance-level evaluation of water and land resources for a selected area. They are prepared to resolve complex long-range problems identified by framework studies and assessments and will vary widely in scope and detail; will involve Federal, State, and local interests in plan formulation; and will identify and recommend action plans and programs to be pursued by individual Federal, State, and local entities. They will consider both national economic development and environmental quality objectives.

Implementation studies are program or project feasibility studies generally undertaken by a single Federal, State, or local entity for the purpose of authorization or development of plan implementation. These studies are conducted to implement findings, conclusions, and recommendations of framework studies and assessments and regional or river basin studies which are found to be needed in the next 10 to 15 years. As with framework studies and regional or river basin plans, they will consider both national economic development and environmental quality objectives.

D. Responsibility for Applying Standards

The Federal chairman and the representatives of the Federal agencies participating in a river basin commission established under the Water Resources Planning Act are responsible for applying these standards.

The study director provided or designated by the Water Resources Council or by river basin commissions (in their areas) and Federal members of coordinating bodies established or designated by the Council to carry out framework studies and assessments and regional or river basin planning studies are responsible for applying these standards.

The administrator of each Federal program or federally assisted program covered under this section is responsible for applying these standards to his program. Each Federal administrator shall follow these standards in establishing agency procedures for evaluation of programs and projects for conservation, development, and utilization of water and land resources.

The Board of Directors of the Tennessee Valley Authority, responsible for framework studies and assessments, regional and river basin planning studies and implementation studies for the Tennessee River Basin, and the Federal representatives of other entities performing the functions of a river basin commission shall apply these standards except for any adjustments required by law or Executive order or for special situations where the application of these standards is not practical.

Proposed Federal agency procedures, and revisions thereto, to implement these standards will be referred to the Water Resources Council for review for consistency with these standards.

E. Schedule for Applying Standards

The principles and standards will apply to all levels of planning studies. For authorized but unfunded projects the principles and standards will be applied on a selective basis to be determined by the head of the agency, with opportunity for suggestions from the Water Resources Council, and other governmental entities. Authorized plans or projects that are substantially reformulated as a result of application of these principles and standards will be submitted to Congress for reauthorization. Separable and independent elements of a project or a system also would be subject to review prior to funding for construction.

II. OBJECTIVES

A. Introduction

The Principles for Planning Water and Land Resources define the objectives of national economic development and environmental quality. These objectives provide the basis for the formulation of State, region, and river basin plans for the use of water and land resources to meet foreseeable short- and long-term needs and have been explicitly stated or implied in numerous congressional enactments and Executive actions. The most notable of these actions in water and related areas are summarized below.

In the Flood Control Act of 1936, the Congress declared that benefits to whomsoever they may accrue of Federal projects should exceed costs. Interpretation of this statute has resulted in development of various analytical procedures to evaluate the benefits and costs of proposed projects. These procedures have centered around a national economic efficiency analysis and were first published as "Proposed Practices for Economic Analysis of River Basin Projects" in May 1950 and revised in May 1958. Budget Bureau Circular No. A-47 was issued on December 31, 1952, informing the agencies of considerations which would guide the Bureau of the Budget in its evaluations of projects and requiring uniform data that would permit comparisons among projects.

On October 6, 1961, the President requested the Secretaries of Interior, Agriculture, Army, and Health, Education, and Welfare to review existing evaluation standards and to recommend improvements. Their report, "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources," was approved by the President on May 15, 1962, and published as Senate Document No. 97, 87th Congress, 2d Session. This document replaced Budget Bureau Circular No. A-47 and in turn has been superseded by the "Principles for Planning Water and Land Resources," upon their approval by the President, and by these "Standards for Planning Water and Land Resources."

By enacting laws and taking actions enumerated below and others, the Congress and the President have broadened the objectives to be considered in water and land resources planning.

The two objectives as defined in the principles and set forth in more detail in these standards provide a flexible planning framework that is responsive to and can accommodate changing national needs and priorities.

The statement of the objectives and specification of their components in these standards is without implication concerning priorities to be given to them in the process of plan formulation and evaluation. These standards, nonetheless, do recognize and make provision for a systematic approach by which the general public and decisionmakers can assess the relative merits of achieving alternative levels of satisfaction to the two objectives where there may be conflict, competition, or complementarity between them. This will provide the type of information needed to improve the public decisionmaking process.

B. Major Congressional Directives

Many laws that give new or more definitive directions to Federal participation in planning for water and land resources have been passed in recent years. Some major enactments are:

The Federal Water Project Recreation Act of 1965 (Public Law 89-72), provides for full consideration of opportunities for recreation and fish and wildlife enhancement in Federal projects under specified cost allocation and cost-sharing provisions.

The Water Resources Planning Act of 1965 (Public Law 89-80), establishes a comprehensive planning approach to the conservation, development and use of water and related land resources. The Act emphasizes joint Federal-State cooperation in planning and consideration of the views of all public and private interests. Section 103 of the Act provides that "The Council shall establish, after such consultation with other interested entities, both Federal and non-Federal, as the Council may find appropriate, and with the approval of the President, principles, standards, and procedures for Federal participants in the preparation of comprehensive regional or river basin plans and for the formulation and evaluation of Federal water and related land resources projects."

The Act further provides in section 102(b) that "The Council shall . . . maintain a continuing study of the relation of regional or river basin plans and programs to the requirements of larger regions of the Nation and of the adequacy of administrative and statutory means for the coordination of the water and related land resources policies and programs of the several Federal agencies; it shall appraise the adequacy of existing and proposed policies and programs to meet such requirements; and it shall make recommendations to the President with respect to Federal policies and programs."

The Act also provides in section 301(b) that "The Council, with the approval of the President, shall prescribe such rules, establish such procedures, and make such arrangements and provisions relating to the performance of its functions under this title, and the use of funds available therefor, as may be necessary in order to assure (1) coordination of the program authorized by this title with related Federal planning assistance programs, including the program authorized under section 701 of the Housing Act of 1954 and (2) appropriate utilization of other Federal agencies administering programs which may contribute to achieving the purpose of this Act."

The Water Resources Planning Act, as amended, is attached as Appendix A.

The Public Works and Economic Development Act of 1965 (Public Law 89-136) establishes national policy to use Federal assistance in planning and constructing public works to create new employment opportunities in areas suffering substantial and persistent unemployment and underemployment. The Act provides for establishing Federal-State regional commissions for regions that have lagged behind the Nation in economic development.

The Water Quality Act of 1965 (Public Law 89-234) and subsequent amendments provides for establishing water quality standards for interstate waters. These water quality standards provide requirements and goals that must be incorporated into planning procedures.

In authorizing the Northeastern Water Supply Study in 1965 (Public Law 89-298), Congress recognized that assuring adequate supplies of water for the great metropolitan centers of the United States has become a problem of such magnitude that the welfare and prosperity of this country require the Federal Government to assist in solution of water supply problems.

The Clean Water Restoration Act of 1966 (Public Law 89-753) provides assistance for developing comprehensive water quality control and abatement plans for river basins.

The Department of Transportation Act of 1966 (Public Law 89-670) provides standards for evaluating navigation projects and provides for the Secretary of Transportation to be a member of the Water Resources Council.

The Wild and Scenic Rivers Act of 1968 (Public Law 90-542) provides that in planning for the use and development of water and related land resources consideration shall be given to potential wild, scenic, and recreational river areas in river basin and project plan reports, and comparisons are to be made with development alternatives which would be precluded by preserving these areas.

The National Flood Insurance Act of 1968 (title XIII, Public Law 90-448) provides that States, to remain eligible for flood insurance, must adopt acceptable arrangements for land use regulation in flood-prone areas. This provision, together with Executive Order 11296, August 10, 1966, places increased emphasis on land use regulations and administrative policies as means of reducing flood damages. Planning policies must include adequate provision for these new enactments and directives in an integrated program of flood-plain management.

The Estuary Protection Act of 1968 (Public Law 90-454) outlines a policy of reasonable balance between the conservation of the natural resources and natural beauty of the Nation's estuarine areas and the need to develop such areas to further the growth and development of the Nation.

The National Environmental Policy Act of 1969 (Public Law 91-190) authorizes and directs Federal agencies in the decision-making process to give appropriate consideration to environmental amenities and values, along with technical considerations. The results of this analysis are to be included in proposals for Federal action.

The Environmental Quality Improvement Act of 1970 (title II of Public Law 91-224) further emphasizes congressional interest in improving the environment and the major responsibility that State and local governments have for implementing this policy.

The Flood Control Act of 1970 (Public Law 91-611) requires in Section 122 promulgation of guidelines designed to assure that possible adverse economic, social and environmental effects relating to any proposed project have been fully considered in developing such project, and that the final decisions on the project are made in the best overall public interest, taking into consideration the need for flood control, navigation and associated purposes, and the cost of eliminating or minimizing such adverse effects and the following:

- (1) air, noise, and water pollution;

- (2) destruction or disruption of man-made and natural resources esthetic values, community cohesion and the availability of public facilities and services;

- (3) adverse employment effects and tax and property value losses;

- (4) injurious displacement of people, businesses, and farms; and

- (5) disruption of desirable community and regional growth.

The same Act also includes in Section 209 the following statement: "It is the intent of Congress that the objectives of enhancing regional economic development, the quality of the total environment, including its protection and improvement, the well-being of the people of the United States and the national economic development are the objectives to be included in federally financed water resource projects, and in the evaluation of benefits and costs attributable thereto, giving due consideration to the most feasible alternative means of accomplishing these objectives."

The Rural Development Act of 1972, Public Law 92-419, provides for improving the economic and living conditions of rural America by broadening and strengthening ongoing programs of financial and technical assistance to farmers and rural communities. It provides for the management of agricultural wastes, storage of water for rural needs, recharge of groundwater, fire protection, long term contract program for land treatment, acquisition of land rights with other Federal funds, farm research, and a land inventory and monitoring program.

The Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, establishes the goals that:

- (1) the discharge of pollutants into navigable waters be eliminated by 1985;

- (2) an interim goal of water quality be provided for the protection of fish, shellfish and wildlife, and for recreation by July 1, 1983;

- (3) the discharge of toxic pollutants in toxic amounts be prohibited;

- (4) Federal financial assistance be provided to construct publicly owned waste treatment plants;

- (5) water quality and areawide waste treatment management planning include multiobjective water resources and land use planning;

(6) Regional or river basin (Level B) plans be completed by the Water Resources Council for all river basins in the United States by 1980 (Section 209); and that

(7) a major research and demonstration effort be made to develop technology to eliminate the discharge of pollutants.

The Coastal Zone Management Act of 1972, Public Law 92-583, provides for a comprehensive, long range, and coordinated national program in marine science, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering and Resources; and for annual grants to any coastal State for the purpose of assisting in the development of a management program for the land and water resources of its coastal zone, and for annual grants to any coastal State for not more than 66 2/3 per centum of the costs of administering the State's management program.

C. Relationships of Program Measures to Objectives

Formulating courses of action that effectively contribute to the attainment of the national economic development and environmental quality objectives is the paramount task of water and land resources planning. These actions are only the means by which objectives can be attained. For instance, providing flood control or preserving a scenic river is meaningful only to the extent that such actions contribute to specific needs that can be related to the objectives. Thus, plans are to be formulated in terms of their beneficial or adverse effects on the objectives.

These standards relate primarily to the planning of water and land resource programs that contribute to specified components of the objectives. It is recognized that other programs may also contribute to these objectives. In some instances, water and land programs are the only means or are the most effective means to achieve the objectives. In the usual case, however, it is likely that a combination of water and land programs and other programs will be the most effective means to achieve the desired objectives. In the formulation of plans, therefore, these standards provide for the consideration of the full range of alternatives relevant to the needs for water and land resources.

A given plan formulated for one or several components of the objectives may affect the components of other objectives in a beneficial or adverse manner. This joint effect relationship is a common occurrence

in plan formulation. Its presence necessitates that the full range of effects of plans be shown in terms of specified components of objectives regardless of the size of the effect or the component for which an alternative plan has been formulated.

D. Objectives

1. National economic development. The national economic development objective is enhanced by increasing the value of the nation's output of goods and services and improving national economic efficiency.

National economic development reflects increases in the Nation's productive output, an output which is partly reflected in a national product and income accounting framework designed to measure the continuing flows of goods and services into direct consumption or investment.

In addition, national economic development is affected by beneficial and adverse externalities stemming from normal economic production and consumption, imperfect market conditions, and changes in productivity of resource inputs due to investment. National economic development is also affected by the availability of public goods which are not accounted for in the national product and income accounting framework. Thus, the concept of national economic development is broader than that of national income and is used to measure the impact of governmental investment on the total national output. The gross national product and national income accounts do not give a complete accounting of the value of the output of final goods and services resulting from governmental investments because only government expenditures are included. This is especially true in those situations where governmental investment is required to overcome imperfections in the private market. Therefore, national economic development as defined in these standards is only partially reflected in the gross national product and national income accounting framework.

A similar situation prevails where a private investment results in the production of final public goods or externalities that are not exchanged in the market.

Components of the national economic development objective include:

a. The value of increased outputs of goods and services resulting from a plan. Developments of water and land resources result in increased production of goods and services which can be measured in

terms of their value to the user. Increases in crop yields, expanding recreational use, and peaking capacity for power systems are examples of direct increases in the Nation's output which result from water and related land resources developments. Moreover, such developments often result in a change in the productivity of natural resources and the productivity of labor and capital used with these resources. Increased earnings from changes in land use, reduced disruption of economic activity due to droughts, floods and fluctuating water supplies, and removal of constraints on production through increased water supplies are examples of direct increases in productivity from water and land development that contribute to national output. Development of water and land resources may result in increased production from the employment of otherwise unemployed or underemployed resources, as well as contributions to increased output due to cost savings resulting in the release of resources for employment elsewhere.

b. The value of output resulting from external economies. In addition to the value of goods and services derived by users of outputs of a plan, there may be external gains to other individuals or groups.

2. Environmental quality. The environmental objective is enhanced by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems in the area under study and elsewhere in the Nation. This objective reflects society's concern and emphasis for the natural environment and its maintenance and enhancement as a source of present enjoyment and a heritage for future generations.

Explicit recognition should be given to the desirability of diverting a portion of the Nation's resources from production of more conventional market-oriented goods and services in order to accomplish environmental objectives. As incomes and living levels increase, society appears less willing to accept environmental deterioration in exchange for additional goods and services in the market place.

Responsive to the varied spiritual, psychological, recreational, and material needs, the environmental objective reflects man's abiding concern with the quality of the natural physical-biological system in which all life is sustained.

Components of the environmental objective include the following:

a. Management, protection, enhancement, or creation of areas of natural beauty and human enjoyment such as open and green space, wild and scenic rivers, lakes, beaches, shores, mountain and

wilderness areas, and estuaries;

b. Management, preservation, or enhancement of especially valuable or outstanding archeological, historical, biological (including fish and wildlife habitat), and geological resources and ecological systems;

c. Enhancement of quality aspects of water, land, and air by control of pollution or prevention of erosion and restoration of eroded areas embracing the need to harmonize land use objectives in terms of productivity for economic use and development with conservation of the resource;

d. Avoiding irreversible commitments of resources to future uses: While all forms of development and use affect and sometimes change the tenuous balance of fragile aquatic and terrestrial ecosystems, the implication of all possible effects and changes on such systems is imperfectly understood at the present time. In the absence of absolute measures or standards for reliably predicting ecological change, these planning standards emphasize the need for a cautionary approach in meeting development and use objectives in order to minimize or preclude the possibility of undesirable and possible irreversible changes in the natural environment;

e. Others. Given its broad and pervasive nature, it is not practical to specifically identify in these standards all possible components of the environmental quality objective. If other components are recognized, they should be explicitly identified and accommodated in the planning process.

E. Effects on Objectives

For each alternative plan there will be a complete display or accounting of relevant beneficial and adverse effects on the national economic development and environmental quality objectives. Alternative plans will be formulated to optimize their contributions to the two objectives.

Beneficial and adverse effects are measured in both monetary and nonmonetary terms. Estimating these beneficial and adverse effects is undertaken in order to measure and display in appropriate accounts the net changes with respect to particular objectives that are generated by alternative plans.

The priorities and preferences of the various individuals affected will vary and, accordingly, there will likely not be full agreement among all affected on whether certain effects are beneficial or adverse or on the relative trade offs between objectives. However, when any plan is recommended from among alternative plans, there is an implicit expression of what is considered to be the affected group's priorities and preferences.

Effects on some components of the objectives are generally regarded as favorable. These include, for example, gains in national output. For other objectives and components, however, preferences will differ. This will certainly be true of some of the components making up the environmental quality objective. For such instances, planning provides information which should facilitate planning decisions and reduce conflict over such decisions.

1. Relationship of beneficial and adverse effects to objectives. Beneficial and adverse effects will be identified for national economic development and environmental quality objectives and will be displayed. Also, since beneficial and adverse effects may be of a monetary or nonmonetary nature, they may be measured in dollars or in physical, biological, or other quantitative units or qualitative terms as appropriate.

The objectives are not mutually exclusive with respect to beneficial and adverse effects. Comparisons and evaluations of plans require measurement or quantification of similar effects in terms of common standards. The selected standards may be in terms of dollars, acres of land, acre-feet or cubic-feet-per-second of water, miles of trails or

streams, number of people, and so on. The nonmonetary measures must include appropriate qualitative dimensions.

2. Incidence of beneficial and adverse effects. The distribution among groups and time of beneficial and adverse effects is an important consideration in the evaluation of plans. Those groups who are affected by a plan should be identified. Those who are benefited or adversely affected by a plan may be located within the planning area or region, or they may be in an area or region immediately adjacent, or they may be in distant regions which are noncontiguous with the planning area. The beneficial and adverse effects may also occur immediately or in the future in any of the areas or regions. These are discussed in detail in section III.

3. With and without analysis. In planning water and land resources, beneficial and adverse effects of a proposed plan should be measured by comparing the estimated conditions with the plan with the conditions expected without the plan. Thus, in addition to projecting the beneficial and adverse effects expected with the plan in operation, it is necessary to project the conditions likely to occur in the absence of a plan. Economic, social, and environmental conditions are not static, and changes will occur even without a plan. Only the new or additional changes that can be anticipated as a result of a proposed plan should be attributed as beneficial and adverse effects of the plan.

4. Monetary beneficial effects. For many goods and services the conventional market mechanism or simulation thereof provides a valid measure of exchange values, expressed in monetary terms. The values determined by the market may need adjustment to account for imperfect market conditions. Contributions to national economic development and the income component of regional development are of the monetary type of beneficial effects. In addition, certain components of the environmental quality objective can be analyzed in terms of monetary values.

5. Monetary adverse effects. Adverse effects result, just as beneficial effects do, from the implementation of a particular plan. Values for some adverse effects can be based on or derived from actual or simulated market prices. For example, the costs of goods and services used in constructing and operating a project or payment for damages even though no goods or services are being acquired can be derived from actual market prices. The prices determined by the market may need adjustment to account for imperfect market conditions. Some adverse effects are not represented by actual cash expenditures; but

market prices can be used to estimate or derive the appropriate monetary values by use of a simulated market price or by observing market prices for similar goods and services.

6. Nonmonetary beneficial effects. There are many effects which cannot or should not be expressed in monetary values. This is true of many contributions to environmental quality objective.

When effects cannot or should not be expressed in monetary terms, they will be set forth, insofar as is reasonably possible, in appropriate quantitative and qualitative physical, biological, or other measures reflecting the enhancement or improvement of the characteristics relevant to the type of effects under consideration.

When specified minimum technical or institutional standards related to the environmental quality objective will be met or otherwise exceeded, they will be explicitly identified.

If particular nonmonetary beneficial effects or services are not amenable to quantitative measurement they should be described as fully as possible in appropriate qualitative terms.

7. Nonmonetary adverse effects. There are adverse effects that cannot be valued by market prices and direct compensation for these adverse effects may not be possible. Nevertheless, they should be accounted for by use of appropriate nonmonetary values or described as carefully as possible. The nonmonetary values may be expressed in terms of a physical, biological, or other quantitative units or qualitative terms.

The adverse effects of a nonmonetary nature will generally be related to environmental quality.

F. BENEFICIAL EFFECTS ON NATIONAL ECONOMIC DEVELOPMENT

Beneficial effects in the national economic development account are the increases of the value of the output of goods and services and improvements in national economic efficiency.

1. General measurement concepts. There are two basic sources of increased output of goods and services that contribute toward enhancing national economic development. First, additional resources may be employed using normal production techniques, as, for example, in the application of irrigation water and other associated resources to land for the production of agricultural commodities or in the use of electric power and other associated resources for the production of aluminum. Second, resource productivity changes may be induced by the plan, resulting in more efficient production techniques to be used to achieve a higher level of output from the same resources or the same level of a specific output with fewer resources or the employment of otherwise unemployed or underemployed resources than would be achieved without the plan. In the latter case, the release of productive resources which can be employed elsewhere in the economy for the production of other goods and services ultimately results in an increase in national output as a consequence of a plan. These two sources of increased output may apply to situations in which the plan results in the production of final consumer goods or intermediate producer goods utilized by direct users; and they may also apply in situations in which firms are indirectly affected through economic interdependence with firms which utilize the intermediate producer goods from the plan.

For convenience of measurement and analysis, beneficial effects on national economic development are classified as follows:

- a. The value of increased outputs of goods and services from a plan;
- b. The value of output resulting from external economies caused by a plan.

In each case, with and without analysis must be applied to ascertain that with a plan there is a net increase in the production of goods and services, regardless of source, over those that would be obtained in the absence of the plan.

The general measurement standard for increases in the national output of goods and services will be the total value of the increase, where total value is defined as the willingness of users to pay for each increment of output from a plan. Such a value would be obtained

if the "seller" of the output was able to apply a flexible unit price and charge each user (consumer) an individual price to capture the full value of the output to the user. This concept is illustrated in figure 1.

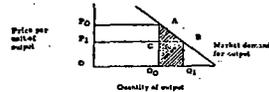


FIGURE 1.—Total value or willingness to pay for increased output.

Assuming the normal demand-output relationship, additional plan output will be taken by users as the unit price of output falls. If, as a result of the plan, output is increased by an amount $Q_1 - Q_0$, the total value of this additional output to the users is measured by the entire shaded area on the chart. This is a larger amount than would be reflected by the market value. It is the sum of market price times increased quantity (represented by the rectangle CBQ_1Q_0) plus the consumer surplus for that increase (represented by the triangle ABC).

Since, in most instances, it is not possible for the planner to measure the actual demand situation, three alternative techniques can be used to obtain an estimate of the total value of the output of the plan--willingness to pay, change in net income, and the most likely alternative.

If the additional output from a plan is not expected to have a significant effect on price, actual or simulated market prices will closely approximate the total value of the output. This is true because there would be no consumer's surplus. If the additional output is expected to significantly influence market price (as in figure 1), a price midway between that expected with and without the plan may be used to estimate the total value. This would approximate the willingness to pay, including consumer surpluses, in most cases.

When outputs of a plan are intermediate goods or services, the net income of the (producer) user may be increased. Where changes in net income of each individual user can be estimated, a close approximation of the total value of the output of the plan (including consumer surpluses) will be obtained.

The cost of the most likely alternative means of obtaining the desired output can be used to approximate total value when the willingness to pay or change in net income methods cannot be used.

The cost of the most likely alternative means will generally misstate the total value of the output of a plan. This is because it merely indicates what society must pay by the next most likely alternative to secure the output, rather than estimating the real value of the output of a plan to the users. This assumes, of course, that society would in fact undertake the alternative means. Because the planner may not be able to determine whether alternative means would be undertaken in the absence of the project, this procedure for benefit estimation must be used cautiously.

Application of these general measurement standards will necessarily vary, depending upon the source by which output is increased (that is, via direct increases in production or through subsequent employment of released resources), upon the type of good or service produced (whether the output is an intermediate or final good), and upon the type and nature of available alternatives. General measurement methods for each type of situation as well as an indication of the water and land resource plan outputs to which these standards are applicable are presented below.

a. Direct output increases. Direct outputs of water and land resource plans may be in the form of either final consumer goods or intermediate goods. An effective direct or derived demand must exist for the final and intermediate goods, respectively, to include the increased output as a contribution to national economic development.

Certain consumer goods and services may result directly from water projects and be used with no additional production resulting therefrom. Recreation, municipal water, and electric power for residential use are examples of this type of good or service. Most goods and services produced by water projects are not directly consumed, however, but are intermediate products that serve as inputs for producers of final goods or producers of other intermediate goods. The development of irrigation water for use in producing food and fiber or supplying electric power and water for industry are examples.

The values of increased output resulting directly from plans that produce final consumer goods or services is properly measured as the willingness to pay by final users for such output. When a competitive market price is not directly available, and the increased output will not be large enough to affect prices, total value of output may be estimated by simulated market prices or the use of the cost of the most likely alternative means of producing such final output. Examples

of types of outputs to which this method may be applied include:

- a. Community and residential water supply;
- b. Electric power provided for community and residential use; and
- c. Recreation enhancement.

The value of increased output of intermediate goods and services is measured by their total value as inputs to producers of final consumer products. The intermediate product from the plan may enable the producers to increase production of final consumer goods, or reduce costs of production which in effect releases resources for use elsewhere in the economy. In either case, the total value of the intermediate goods or services to the producer is properly measured as the increase in net income received by the producers with a plan as compared with the net income received in the absence of a plan. Net income is defined as the market value of producers' outputs less the market value of producers' inputs exclusive of the cost of the intermediate goods or services resulting from a plan. Examples of types of plan outputs to which this method may be applied include:

- a. Agricultural water supply; and
- b. Agricultural flood damage alleviation, land stabilization, drainage, and related activities.

Where net income changes cannot be directly determined, however, the value of the intermediate goods and services to producers will be measured either in terms of competitive market values, when competitive conditions exist, or approximated by the cost of the likely alternative that the producers would utilize in the absence of a plan to achieve the same level of output. Examples of types of plan outputs to which this method may be applied include:

- a. Industrial and commercial water supply;
- b. Urban flood damage alleviation;
- c. Electric power provided for industrial, commercial, and agricultural uses;

d. Transportation; and

e. Commercial fishery enhancement.

b. Increases in output resulting from external economies. Increased output of individual firms or industries directly affected by the plan may create situations in which related firms or industries are able to take advantage of more efficient production techniques; or consumers may be indirectly affected by a project (such as through favorable environmental changes). Such productivity changes or technological external economies can be attributed as a benefit to a plan. For example higher levels of output by directly affected firms may enable subsequent processing firms to use more efficient processing techniques and thereby release resources for use in producing other goods and services or permit the higher level of output to be processed with no additional resources.

Present techniques are not well developed for measuring the beneficial effects accruing from external economies. However, in situations where it is thought that the increased output of final consumer goods or intermediate goods used by direct users can be expected to increase the productivity or output of related firms, an attempt should be made to measure the net income change resulting from such externalities. When this is done the methodology should be carefully documented in the report.

2. Measurement of the value to users of increased outputs.

a. Water supply. Plans for the provision of water supply are generally designed to satisfy requirements for water as a final good to domestic and municipal users and as an intermediate good to agricultural and industrial users. Provision of water supply to satisfy requirements in these uses generally requires, either separately or in combination, an increase in water quantity, an improvement in water quality, and an improvement in the reliability of both quantity and quality.

Where it is necessary to use alternative costs for approximation of total value for water supply, as provided herein, the alternative selected must be a likely and realistic alternative directly responsive to achievement of this particular category, namely the additional output of water as an input to industrial, agricultural, and municipal uses or as a final good for community and individual uses. Moreover, the

alternative must be a viable one in terms of engineering and financing and must be institutionally acceptable. It must be more than a hypothetical project. It must be a real alternative that could and would likely be undertaken in the absence of the proposed program, for instance, the reuse or recycling of existing water supplies or the use of available groundwater, including the improvement of its quality, if necessary.

Although water supply can often be considered as a final good, there usually does not exist a market value in terms of price that directly expresses users' valuation of water supply for community and individual use. When this is the case, the total value of the water may be derived using the cost of the alternative that would provide essentially a comparable water supply service, in both quantity and quality, that would in fact be utilized in the absence of the water supply provided by the plan. Where such an alternative source is not available or would not be economically feasible, a market value for the water may be derived on the basis of the price paid by other like users or the average cost of a comparable water service from municipal water supply projects planned or recently constructed in the general region.

The total value of water to the producers using increased supplies is reflected in the change in their net income with a plan for the provision of water supply compared with their net incomes without the plan. It is recognized that for many planning studies it is not possible to either specifically identify net income changes accruing to firms using water supply for productive purposes or always possible to determine what part of a municipal supply is used for productive pursuits or for general community or individual uses as set forth below. In these cases, total value to the users can be approximated by use of the cost of the alternative that would be employed to achieve the same production that would be utilized in the absence of the water supply provided by a plan.

Water supply for irrigation is an input to the production of food and fiber. This may result in a net increase in production of specified products, the reduction in production cost, or a combination of both. Beneficial effects from the application of irrigation water supplies will be based upon total value to agricultural producers and will be measured as the increase in net farm income with and without a plan for providing irrigation water. This may be measured directly as the sum of net incomes of farm enterprises benefiting from a plan for irrigation.

Gross farm income comprises total annual receipts from the sale of crops, livestock, livestock products, and the value of perquisites, such as the rental value of the farm dwelling and the value of farm products consumed by the farm family.

Farm expenses are the costs necessary to produce and market farm products and maintain and replace all depreciable items.

Increased net income is measured as the difference between the increase in gross farm income minus the increase in farm expenses analyzed with and without a plan. Changes in net farm income may be estimated by analyzing changes in gross farm income and expenses for each separate enterprise or by the use of representative farm budgets.

b. Flood control, land stabilization, drainage, and related activities. A number of activities, such as flood control and prevention, flood-plain management, drainage, prevention of sedimentation, land stabilization, and erosion control, contribute to the objectives through improving the productivity, use, and attractiveness of the Nation's land resources. From the viewpoint of their contribution to national economic development, the effect of these activities on the output of goods and services is manifested by increasing the productivity of land or by reducing the costs of using the land resources, thereby releasing resources for production of goods and services elsewhere. These activities affect land resources in the following manner:

- (1) Prevention or reduction of inundation arising from stream overflow, overland waterflow, high lake stages, and high tides, and prevention of damage from inadequate drainage;
- (2) Prevention or reduction of soil erosion, including sheet erosion, gullying, flood-plain scouring, streambank cutting, shore or beach erosion, and prevention of sedimentation; and
- (3) Prevention or limitation of the uses to which specified land resources will be put.

There are essentially three types of effects on use that may occur as a benefit from including these activities in a plan. The first is an increase in the productivity of land without a change in land use. The second is a shift of land resources to a more intensive use than would occur in the absence of a plan. The third is a shift of land resources

to less intensive use than would occur in the absence of a plan. In each case, the general method of calculating benefits is applicable. The distinction is made only to facilitate the application of the general method in different settings and as a means of providing criteria for the use of alternative techniques for estimating net income changes for the three classes of land utilization under the with and without analysis.

The general method to be applied in measuring effects for these and any other activities that result in a change in net productivity or a reduction in the cost of using land resources involves the measurement of the difference in net income accruing to users of land resources benefiting from such activities compared with what these users would earn in the absence of such a plan. This generally defines and establishes the limit of the willingness of users to pay for a plan that results in a change in productivity or reduction in the cost of using land resources.

Willingness to pay of the users, which is the basis for approximating the value of output from these activities, whether it be in the form of increased production of intermediate or final goods or release of resources, may be obtained by the following approaches.

(a) Productivity increase. In this situation, analysis with and without the plan indicates that the current and future enterprises employing given land resources are essentially the same with the plan as they would be without the plan. Further, it is more profitable for the given enterprise to continue to use the given land resource even without the beneficial effect of the plan than to locate at the next most efficient location. Net income change can then be measured as the difference in net income accruing to the enterprise on the specified land resource without the plan compared with what that enterprise would receive as net income with the plan on the same land resource.

(b) Changes in land use. Two situations are covered by changes in land use. These are:

(i) The situation in which the land owner benefiting from the change in land use would only utilize the land resource affected by such activity once the plan has become operative. In other words, it would not be as profitable for the benefiting landowner to utilize the affected land resource unless improved through one of the activities in this category as compared with the next most efficient location. Without such a plan the improved enterprise would occur at an alternative location. Net income change to the landowner will be measured as the difference in net income from the enterprise at an alternative location that would be utilized without the plan compared with the net income received from the

enterprise at a new location which is improved or enhanced as a result of the plan.

(ii) The situation in which enterprises that would otherwise employ a given land resource would be precluded from using the given land resources with implementation of the plan. Other enterprises less prone to incur flood damages or other adverse consequences would be allowed to use the given land resources.

Beneficial effects to the enterprises from activities in this category would be evaluated by measuring the net income change for the enterprise precluded from using the given land resources with the plan as compared with the without situation, plus the net income change for the enterprise that would be allowed to use the given land resource with the plan as compared with the without situation.

(c) Estimates of damage prevention and other measures. In the above cases, where it is not possible to directly employ net income changes to derive benefits, the estimate of actual or prospective damages to the physical properties of the enterprises involved can be employed as an approximation of net income change.

In the case of productivity change, where development will be the same with and without the plan, benefits attributable will equal total damages reduced. For the intensive land use cases, where development or use of land will be different with and without the plan, benefits can be approximated as equal to the damages these enterprises could sustain in the absence of protection if located on the affected land.

As a check on benefits derived in the form of net income change or damages prevented, observations of changes in land values for all lands may be employed.

c. Power. With respect to the computation of beneficial and adverse effects of increases in output of electric power it is emphasized that where appropriate, these should be viewed and evaluated as increments to planned or existing systems. Power supplied for general community and residential use can be considered as a final consumer good. Its value as a final good is generally reflected by the satisfaction

of individual residents or in terms of improved community services and facilities. Electric power provided to industrial, commercial, and agricultural uses is viewed as an energy input to the production of goods and services from these activities resulting in an increase in the output, reduction in the cost of production, or a combination thereof. The total value of electric power to the producers using such power is reflected in their willingness to pay. Where the identification and measurement of willingness to pay and satisfactions accruing to activities using electric power for industrial, municipal, and residential purposes are not possible, total value to the users will be approximated by taking account of the cost of power from the most likely alternative source and using this as the measure of the value of the power creditable to the plan. The alternative selected must be a viable one in terms of engineering, and the financing should be that most likely to the constructing entity. The costs should include any required provisions for protection of the environment. However, since the addition of a hydroelectric project to an electric system in lieu of an alternative power source usually will either increase or decrease the unit cost of producing power by existing generating facilities of the system, this cost differential must be taken into account in determining the power value of the hydroelectric project.

Normally, electric power is evaluated in terms of two components-- capacity and energy. The capacity value is derived from a determination of the fixed costs of the selected alternative source of supply. The energy value is determined from those costs of the alternative which relate to and vary with the energy output of the alternative plan. These capacity and energy components of power value are usually expressed in terms of dollars per kilowatt per year of dependable capacity and mills per kilowatt-hour of average annual energy.

d. Transportation (navigation). Plans for the provision of transportation through inland waterways and harbors are established to complement or extend the overall national transportation system within and among regions to achieve an improved movement of goods from the producer to the consumer.

(1) Movement of intermediate or final goods. Transportation as applied to industrial, commercial, and agricultural activities is viewed as an essential service input resulting in savings and creation of utilities in the distribution of intermediate and final goods and services.

The beneficial effects from the movement of traffic are related to the improvements in the transportation services provided

enabling the widespread distribution of goods and services, and are measured as:

(a) The savings in the movement of commodities on the waterway when compared with movement via existing alternative modes; and

(b) The expressed willingness to pay by the shippers (producers) of commodity or traffic flow newly induced by a navigation improvement as reflected in the change in their net income.

(2) Where traffic will move in the absence of the waterway improvement. In this situation, navigation studies would include an estimate of the savings to shippers via the considered navigation improvement, measured as the product of the estimated traffic and the estimated unit savings to shippers from the movement of that traffic via the proposed navigation improvement. The unit savings would be measured as the difference between the charges shippers actually incur for transportation at the time of the study and the charges they would likely incur for transportation via the improvement.

The traffic that is estimated to move via the proposed waterway will be based on a thorough analysis of the existing traffic movements in the tributary area. The potential traffic will be carefully screened to eliminate those movements that are not, for a variety of reasons, susceptible to movement on the waterway. The traffic available for water movement after the screening process is completed will be subject to an analysis of savings as discussed immediately below, and, based on the magnitude of the indicated savings, a decision will be made as to whether or not the movement would be directed to the waterway. Only traffic for which the differences in savings is judged sufficiently large to divert the traffic to the waterway will be included in the estimated waterway traffic. Moreover, as a practical matter, it will be deemed realistic to assume a sharing of the total traffic movement among alternative modes rather than to assume complete diversion to the lower cost mode.

The estimate of savings will ordinarily be developed by comparing the full charges for movement from origin to destination via the prevailing mode of transportation with the charges via the waterway being studied where these charges encompass all applicable handling, switching assessorial charges, and net differences in inventory, storage, or other charges due to the change in transportation mode. The alternative modes of transportation to be used in estimating savings to shippers

are those actually in use at the time of the study for moving the traffic in question, or, where there are no existing movements, those modes that would most likely be used for such movements. In the latter case, the alternative mode will be chosen on the basis that the shipper would take advantage of the mode affording him the lowest total charges. The competitive, or complementary, effects of existing and authorized waterways not yet constructed, including joint land-waterway routes, should also be taken into account.

(3) Where additional flow of traffic is induced by the plan.

By making new sources of supply, or by increasing the net demand for a commodity, the navigation improvement may induce more traffic movement than would be the case in the absence of such improvement. Beneficial effects creditable to the plan for such new traffic are the differences between the cost of transportation by the waterway and the value to shippers, that is, the maximum cost they would be willing to pay for moving the various units of traffic involved.

Where data are available for estimating the value at which various increments of the new traffic could be moved economically, the difference between such values and the charges for transportation by the waterway provides a measure of the estimated beneficial effects attributable to the plan.

In the absence of such data, the probable average charge that could be borne by the induced traffic may be assumed to be half way between the highest and the lowest charges at which any part of it would move. On this basis, the difference between this average and the cost by the waterway applied to the volume of new traffic is the beneficial effect of the plan.

(4) Basis for evaluation. Congress has provided the standard for computing the beneficial effects of navigation in section 7(a) of the Department of Transportation Act of 1966, as follows:

* * * the primary direct navigation benefits of a water resource project are defined as the product of the savings to shippers using the waterway and the estimated traffic that would use the waterway; where the savings to shippers shall be construed to mean the difference between (a) the freight rate or charges prevailing at the time of the study for the movement by the alternative means

and (b) those which would be charged on the proposed waterway; and where the estimate of traffic that would use the waterway will be based on such freight rates, taking into account projections of the economic growth of the area.

Consistent with the approach above outlined, these criteria are the basis on which beneficial effects for waterway plans will be evaluated.

(e) Recreation. As national living standards continue to rise, the average person, with basic needs provided for, uses an increasing percentage of rising real income to satisfy a demand for leisure time and outdoor recreational activities such as swimming, picnicking, boating, hunting, and fishing. With general ownership of automobiles and improvement in highways, travel to distant public recreational areas has become commonplace. Consequently, a large and increasing portion of recreational demand, especially that portion which is water-oriented, is accommodated by development of Federal lands and multi-purpose reservoirs which include specific provision for enhancing recreation activities. This is consistent with the requirements of the Federal Water Projects Recreation Act of 1965 (Public Law 89-72), providing for recreation and fish and wildlife as full and equal partners with all other purposes in Federal water projects.

For the most part, outdoor recreation is produced publicly and distributed in the absence of a viable market mechanism. While the private provision of recreation opportunities has been increasing in recent years, analysis of recreation needs is conducted in the absence of any substantial amount of feedback from effectively functioning markets to guide the evaluation of publicly produced recreation goods and services. Under these conditions--and based on a with and without analysis--the increase in recreation provided by a plan, since it represents a direct consumption good, may be measured or valued on the basis of simulated willingness to pay. In computing the projected recreation demand, however, the analysis should take explicit account of competition from recreation opportunities within the area of influence of the proposed plan.

There are in existence a number of methods, or approaches, to approximating demand and what people are willing

to pay for outdoor recreation. A generalized methodology encompassing the travel-distance approach is set forth below.

(1) An analytical approach relating travel cost to distance. Using marginal travel costs (i. e., variable costs of automobile operation directly related to the number of miles driven) taken as a measure of what people are willing to pay for water-oriented recreation and how price affects use, the relationship between price and per capita attendance can be established for recreation sites and market areas. This relationship, the conventional demand curve having a negative slope, sums up the response of users' demand to alternative prices of the recreational product (or experience). Separate demand curves are constructed to reflect each kind of recreation use, whether day-use travel, camping-use travel, or other. If there is no entrance charge at the project, per capita rates for each distance or travel cost would be consistent with the constructed demand curves.

If a fee is charged, however, the cost to the recreationist would then be equal to the fee plus his travel cost, thus diminishing the per capita use rate. Applying a range of reasonable entrance fee charges to the constructed demand schedules, additional separate day-use and camping-use demand curves for sites are constructed to determine respective attendance which may be expected under such conditions. Following this, initial project year day-use and camping-use values are computed by measuring the area under their respective demand curves. These values can be compared with market projections and existing capacities to determine if actual site demand will materialize. The initial year values are then projected throughout the life of the project consistent with the calculated recreational use predictions. The resultant figures, total values for day-use and camping-use over the life of the project, are separately discounted at the prevailing discount rate established by these standards to obtain average annual equivalent values.

(2) Other approaches. A variety of other approaches may be taken toward the evaluation of recreation goods and services. In general, however, no one method is completely satisfactory to the exclusion of all others. The applicable rule to follow, taking cognizance of the unique circumstances of a particular setting, including the availability of actual market data and experience, is to use that procedure which appears to provide the best measure or expression of willingness to pay by the actual consumer of the recreation good or service provided by the plan.

In the interim, while recreation evaluation methodology is being further developed, the following schedule of monetary unit values may be used in the preparation of plans.

(3) Simulated prices per recreation day. A single unit value will be assigned per recreation day regardless of whether the user engages in one activity or several. The unit value, however, may reflect both the quality of activity and the degree to which opportunities to engage in a number of activities are provided.

<u>Type of Outdoor Recreation Day</u>	<u>Range of Unit Day Values</u>
General.....	\$0.75-\$2.25
(A recreation day involving primarily those activities attractive to the majority of outdoor recreationists and which generally require the development and maintenance of convenient access and adequate facilities.)	
Specialized.....	3.00- 9.00
(A recreation day involving primarily those activities for which opportunities, in general, are limited, intensity of use is low, and often may involve a large personal expense by the user.)	

Two classes of outdoor recreation days, general and specialized, are differentiated for evaluation purposes. Estimates of total recreation days of use for both categories, when applicable, will be developed.

The general class, constituting the great majority of all recreation activities associated with water projects, embraces the more usual activities, such as swimming, picnicking, boating, and most warm water fishing.

In view of the fewer alternatives available and the likelihood that higher total costs are generally incurred by those engaged in hunting and fishing activities compared with those engaged in other types of outdoor recreation, it may be anticipated that the monetary unit values applicable to fish and wildlife recreation will ordinarily be larger than those applied to other types of recreation.

The special class includes activities less often associated with water projects, such as big game hunting and salmon fishing.

A separate range of values is provided for each class in order that informed judgment may be employed in determining the applicable unit values for each individual project under consideration. Where considered appropriate, departure from the range of values provided is permissible if a full explanation is given.

(f) Commercial fishing and trapping. Water and land resource plans may include specific measures designed for the purpose of enhancing the fish and wildlife resources and associated opportunities for the direct harvesting of fish and game as a commercial product. Beneficial effects to commercial fishing, hunting, and trapping consist of the value of an increase in the volume or quality of the products expected to be marketed. This increase is determined by comparing values of future production with and without the plan.

The beneficial effects from the increase in output of fish and wildlife products resulting from a plan is measured as the total value to the final users of the output reflected by the applicable market price, minus the expenditures incurred to obtain the fish or game.

(g) Other program outputs. In addition to the more common outputs which have been dealt with in the preceding sections, plans may produce other goods and services which contribute to national economic development. Proper application of the measurement standards to these additional outputs should be guided by analogy to the outputs which have been discussed. Care must be exercised in defining types of outputs to assure that overlapping categories are not used which lead to duplication in the estimates of beneficial effects.

(3) Measurement of increases in output resulting from external economies. Technological external economies are the beneficial effects on individuals, groups, or industries that may or may not benefit from the direct output of the project. They result from a plan if an increase in the output of final consumer goods or intermediate goods takes place beyond that which would be obtained in the absence of the plan and over and above direct outputs of the plan. This increased output may result from firms which are economically related to the plan taking advantage of more efficient production techniques and thereby releasing resources for use in producing other goods and services.

The change in net income of the economically related firms will be used as an indicator of the value of this type of national economic development effect. Changes in the total value of consumer goods due to externalities because of a plan can be accounted for by using measurement techniques like those described above.

If society would obtain the project output of final consumer goods or the output of firms that utilize the intermediate goods of the project from some other source in the absence of the project, then the net income position of the related firms would be unaffected by the plan.

Some examples of potential situations for the occurrence of external economies associated with final consumer goods and intermediate produced goods are presented below.

(a) Final consumer goods. Provision of additional recreation opportunities and fish and wildlife enhancement for the direct enjoyment of individuals may enable merchants of sporting goods and other suppliers of recreation equipment and services to increase their sales and net income. However, to the extent that the increased expenditures for outdoor sporting equipment and other outdoor recreation services substitute for some other consumer expenditures, there is no real gain in the Nation's output.

The provision of either water supply or electric power for community and residential use will not generally stimulate external economies to enhance national economic development. It is usually assumed that the necessary quantities of these outputs will be provided by some alternative means in the absence of the plan. As a consequence, firms that are economically related to consumers through the consumption of these products will experience the same economic conditions and have the same net income without the plan as compared with the plan.

(b) Intermediate producer goods. The utilization of intermediate goods and services from the plan by direct users may enable them to expand their output. Increased levels of output by direct users of the output of a plan may, in turn, enable economically related firms to improve the efficiency of their operation and/or expand their output and, as a result, increase their net income. Measurement of the change in the net income position of related firms should be made, if it can definitely be established that a change in output by the direct users will generate a corresponding income change for the related firms.

An evaluation should be made of the output levels that will be achieved by the direct users with the plan and without the plan. If the direct users would obtain the same good or service from some other source in the absence of the plan, no external economies occur and the net income position of the related firms would be unaffected by the plan. Some examples of types of plan outputs to which this standard may be applied are presented below.

In situations where water supply is an intermediate good, its utilization by direct users may stimulate more inputs to be acquired from supplying firms, and if there is an increased output from the enterprise of the direct user additional output will be processed by related processing firms. Except for irrigation water supplies and a few industries with high water requirements, water represents a relatively small consideration in the management decision of firms. If firms or industries with relatively small water requirements would obtain their necessary water from some other source in the absence of the plan, no external economies should be included in the calculation of water supply benefits.

The provision of flood control, land stabilization, drainage, and related programs may affect the productivity of and resources resulting in increased levels of output by firms directly affected by the plan. Net income changes may also occur in economically related firms. Measurement of the net income change of the related firms should be made if it can be definitely established that a change in output by the direct users will generate a corresponding income change for the related firms. However, if the plan merely enables economic activities to shift to new locations resulting in more efficient production but no change in total output, then no external economies occur and no attempt should be made to measure net income changes of related input supply or output processing firms.

Electric power provided for industrial, commercial, and agricultural uses will frequently result in higher levels of output from these economic sectors. However, if alternative electric power or alternative energy sources would be utilized in the absence of the plan, the level of output would be unaffected and no external economies would accrue as a benefit to the plan.

To the extent that navigational facilities provide alternative transportation services that would otherwise be provided in the absence of the project, no external economies occur. In situations where the navigational facility provides a unique service, such as providing movement of bulky raw materials that would not otherwise be made available, external economies may occur to the firms economically related to the shippers.

4. Special beneficial effects from use of unemployed or underemployed labor resources. The effects of the use of unemployed or underemployed resources conceptually should be treated as an adjustment to the adverse effects of a plan on national economic development. Since this approach leads to difficulties in cost allocation and cost sharing calculations, the effects from the use of such resources should be treated as an addition to the benefits resulting from a plan.

Beneficial effects from the utilization of unemployed or underemployed labor resources may occur as a result of the plan through employment in the construction or installation of the plan.

The Council, considering data from its economic projections and the economic and rural development programs, will designate planning regions in which unemployed or underemployed labor resources exist.

Where the planning region has been designated as having unemployed or underemployed labor resources and it can be shown that these labor resources will in fact be employed or more effectively employed in construction or installation of the plan, the net additional payments to the unemployed or underemployed labor resources should be measured as a benefit.

G. Adverse Effects on National Economic Development

Achievement of beneficial effects on national economic development, and or environmental quality, requires resources to be diverted from alternative uses. The adverse effects on national economic development are the economic value that these resources would have in their alternative uses. Generally, market prices provide a valid measure of the values of goods and services foregone in alternative uses. Both public and private costs associated with the plan will be measured to indicate the total adverse effect on national economic development incurred to realize the desired objectives.

1. Sources of adverse effects. Water and land resource plans result in adverse effects to national economic development in two ways.

a. Resources required or displaced to produce final or intermediate goods and services. In situations where a physical structure is necessary to obtain the desired objective, the adverse effects on national economic development include all explicit cash expenditures for goods and services necessary to construct and operate a project throughout a given period of analysis. They consist of actual expenditures for construction; transfers from other projects, such as costs for reservoir storage; development costs; and interest during construction. If the output of the plan is an intermediate good or service, the associated costs incurred by the intermediate product user in converting it into a marketable form will be measured. These associated costs are borne by the user of the plan output but nevertheless, represent resource requirements necessary to convert the project output into a product demanded by society. Examples are production costs incurred by users of plan outputs, and costs to other producers or to processors that arise in conjunction with the physical flow of the output of the plan. Associated costs should be deducted from the value of gross outputs to obtain net beneficial effects to be compared with the national economic development adverse effects of a plan. These adverse effects occur as a result of certain resources being released and subsequently unemployed as a result of the implementation of the plan.

In situations where nonstructural measures are used to obtain the desired objective, the adverse effects on national economic development will include payments to purchase easements or rights-of-way and costs incurred for management arrangements or to implement and enforce necessary zoning. In some cases, actual cash expenditures will not be involved as when local communities are required to furnish lands, easements, and rights-of-way.

b. Decreases in output resulting from external diseconomies. External diseconomies are adverse economic effects of a plan that are not reflected in

market prices of project inputs. They result when provision of goods and services for one group necessarily results in an undesirable effect or disservice for another group. For example, the return flow from an irrigation project may create a salinity condition for downstream water users, forcing them to adopt higher cost water treatment practices. These adverse effects (external diseconomies) are not compensated, yet they should be taken into account when deciding on the desirability of a plan.

Another type of external diseconomy may occur if the plan has the direct effect of reducing the output of some firms in the project area, and this reduction causes firms that are linked to the directly affected firms to become less efficient in their operation. For example, the reduction in output by a group of firms which have their output processed by another firm may result in an inefficient operation by the processing firm.

A third type of external diseconomy may occur if the plan has an adverse direct effect on the consumption by individual consumers. For example, if a plan is instrumental in increasing congestion or pollution which results in increased costs to the consumers, this effect should be taken into account in plan evaluation.

c. Cost adjustments. A special case of benefits from cost adjustments arise when a plan creates an opportunity to use resources that would be unemployed or underemployed in the absence of the plan. These resources can include labor, fixed capital, or natural resources. Utilization of such unemployed or underemployed resources may come about (a) as a result of implementing a plan, including construction, operation, maintenance, or replacement; (b) as a result of the use of intermediate goods and services resulting from the plan; or (c) as a result of expansion of output by firms who are indirectly affected by the installation of the project or indirectly affected by consumers and firms who use final and intermediate goods, respectively. The latter two effects--(b) and (c) above--occur when use of the output of a plan results in the employment of unemployed or more effective employment of underemployed resources. Increased national output results in this situation, since with a plan otherwise unemployed or underemployed resources are in effect substituted for resources that would have been drawn from productive activities elsewhere. The market value of the increase of such production will be measured as the difference in the earnings accruing to otherwise unemployed or underemployed resources with a plan as compared with their earnings without a plan. Because of measurement problems, only benefits arising from the use of otherwise unemployed or underemployed labor resources in construction or installation of the plan, will be estimated for the national economic development account.

2. Measurement of adverse effects.

a. Resources required for or displaced by the plan. Resource requirements of the plan are the sum of the market values of the goods and services used for installations; interest during construction; operation, maintenance, and replacement; and induced costs as defined below.

Installation costs are the market values of goods and services necessary to implement a plan and place it in operation, including management and organizational arrangements, technical services, land, easements, rights-of-way, and water rights; initial and deferred construction; capital outlays to relocate facilities or to prevent or mitigate damages; transfers of installation costs from other projects; and all other expenditures for investigating, surveying, planning, designing, and installing a plan after its authorization.

Operation, maintenance, and replacement costs are the market values of goods and services needed to operate an installed plan and to make repairs and replacements necessary to maintain the physical features in sound operating condition during their economic life.

b. Decreases in output resulting from external diseconomies. While external diseconomies are difficult to measure and the effects are incidental to the project, they are nevertheless recognized adverse effects.

Induced costs are all significant adverse effects caused by the construction and operation of a plan expressed in terms of market prices and whether or not compensation is involved. Compensation for some induced costs is neither required nor possible. Induced costs include estimated net increases in the cost of government services directly resulting from the project and net adverse effects on the economy, such as increased transportation costs.

H. Beneficial and Adverse Effects on Environmental Quality

A water and land use plan may have a variety of effects--beneficial and adverse--on environmental quality. While effects on environmental quality are characterized by their nonmarket, nonmonetary nature, they provide important evidence for judging the value of proposed plans.

Beneficial effects on the environmental quality account are contributions resulting from the management, preservation, or restoration of one or more of the environmental characteristics of an area under study or elsewhere in the Nation. Such contributions generally enhance the quality of life.

Adverse environmental effects--generally the obverse of beneficial environmental effects--are consequences of the proposed plan that result in the deterioration of relevant environmental characteristics of an area under study or elsewhere in the Nation, for example, acres of open and green space, wilderness areas, estuaries, or wildlife habitat inundated or altered, or of

lands experiencing increased erosion. Such adverse effects generally detract from or diminish the quality of life.

Often, however, an environmental impact of a plan cannot be easily labeled as being beneficial or adverse, since that decision will vary with the perceptions of the individual concerned. In any case, the effect itself should be quantified and displayed for purposes of decisionmaking.

1. Measurement methods. Whether subjectively perceived or objectively measured, the criteria used to describe or evaluate the beneficial or adverse effects of a plan will vary--consistent with the relevant components of environmental quality under consideration. To the extent possible, however, beneficial or adverse effects will be displayed in terms of relevant physical and ecological criteria or dimensions, including the appropriate qualitative dimensions. For example, where the effects of a plan will be visibly evident, quantitative, and qualitative descriptions may be made in terms of established or accepted water and land classification or ecological criteria and related measures.

Where significant physical effects are less easily perceived, it may be necessary to determine their extent through instrumentation or symptomatically by the presence or absence of commonly expected characteristics. As an example, eutrophication of fresh water lakes exemplifies a less easily perceived process that is reflected symptomatically, and which is subject to measurement by instrumentation with statistical analysis of data collected over time. Therefore, its rate of change is measured by reference to previous dates or periods, with projected rates of future change based on probability analysis. As explicit an account as possible of these effects and supporting analysis should be provided.

Notwithstanding the physical or ecological criteria terms available, certain environmental effects can be presented most effectively by reference to their qualitative dimensions. For instance, it may be necessary to use this approach to show the importance of a reduction in use or availability for use of areas of natural beauty, archeological, or historical significance. Consequently, the analysis should be supported by an appropriate descriptive-qualitative interpretation and evaluation of the effects of the plan on the relevant components of environmental quality.

2. With and without analysis Existing environmental conditions will be described and presented in terms that best characterize the planning perceptions and ecology of the affected area as conditions would exist without any plan. Similar descriptions will be prepared for the time sequence of the conditions to be expected with and without the plan throughout the period of analysis. The conditions before planning is initiated will provide the data from which

to evaluate environmental effects--or prediction of change--under alternative proposals, including the consequence of failure to adopt a plan for development and use of resources in the area under study. It should be clear that environmental conditions will not remain static but will, in fact, tend to change over time regardless of whether a plan is adopted.

3. Limitations. It is not presently possible to anticipate or identify, much less measure, all environmental effects or change. Nor are there in existence evaluation standards that permit full and direct quantitative comparisons and ranking of the conditions of identifiable environmental effects that might be expected to result from a plan. Consequently, reasoned judgments by multidisciplinary teams will be required in many situations. When this is necessary, a frank expression of the state of knowledge and the limitations thereof, as well as the limitations of the analysis in each instance, is essential.

4. Classes of environmental effects. Environmental effects of plans toward the complex of conditions encompassed by the environmental quality objective are best understood and their significance interpreted by evaluating them as separable components. While these are stated in terms of beneficial effects, adverse effects should be read as the converse of each statement. Beneficial effects (and adverse effects) of plans as related to components of the environmental objective are classified and evaluated relevant to:

A. Beneficial effects resulting from the protection, enhancement, or creation of open and green space, wild and scenic rivers, lakes, beaches, shores, mountain and wilderness areas, estuaries, or other areas of natural beauty.

With regard to these kinds of resources, beneficial effects on this component of the environmental quality objective are evaluated on the basis of data such as follows, though these are not all inclusive:

1. Open and green space. These are essentially undeveloped, visually attractive natural areas strategically located where most needed to ameliorate intensifying urbanization patterns.

a. Size and measure:

- (1) Total acreage (woods, fields, meadows, etc.);
- (2) Pattern and distribution;
- (3) Juxtaposition to community and urban areas (effect on urban sprawl).

b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected open and green space.

c. Improvements:

- (1) Accessibility (mileage of public roads or trails provided; easements);
- (2) Public amenities (provision for limited facilities, if any);
- (3) Other (specify or describe).

d. Protection and preservation:

- (1) Physical (fire, bioenvironmental, etc.);
- (2) Legal (dedication, easements, institutional, etc.);
- (3) Special.

2. Wild and scenic rivers. These are free-flowing streams, with shorelines or watershed essentially or largely undeveloped, which possess outstandingly remarkable scenic, recreational, geological, fish and wildlife, historic, cultural, and other features.

a. Size and measure, including characterization of adjacent primitive or near natural setting:

- (1) Total mileage;
- (2) White water mileage;
- (3) Water quality;
- (4) Character and extent or acreage of streamside land;
- (5) Juxtaposition to community.

b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected wild or scenic river.

c. Improvements:

- (1) Accessibility (trails, infrequent roads, or other minimum public access provided; easements);
- (2) Public amenities (provision for limited facilities, as boat launching, picnic areas, if any);
- (3) Other (specify or describe).

d. Protection and preservation:

- (1) Physical (bioenvironmental);
- (2) Legal (dedication or withdrawal, institutional, water quality standards, etc.);
- (3) Special.

3. Lakes. Where their clarity, color, scenic setting, or other characteristics are of special interest, aesthetically pleasing lakes contribute to the quality of human experience:

a. Size and measure:

- (1) Surface acreage;
- (2) Shoreline mileage;
- (3) Depths;
- (4) Water quality.

b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected lake or lakes.

c. Improvements:

- (1) Accessibility (public roads and trails; easements);
- (2) Drainage;
- (3) Cleaning;
- (4) Shoreline management, including public amenities;
- (5) Other (specify or describe).

d. Protection and preservation:

- (1) Physical (bioenvironmental);
- (2) Legal (institutional, pollution standards, etc.);
- (3) Special.

4. Beaches and shores. The juxtaposition of attractive beaches, distinctive scenic shorelines, and adjacent areas of clean offshore water provides positive public aesthetic values and recreational enjoyment.

a. Size and measure:

- (1) Mileage;
- (2) Acreage;
- (3) Marshland acreage;
- (4) Embayments.

b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on designated or affected beaches and shores.

c. Improvements:

- (1) Accessibility (public roads and trails; easements);
- (2) Public amenities;
- (3) Nourishment;
- (4) Other (specify or describe).

d. Protection and preservation:

- (1) Physical (jettys, bulkheads, etc.);
- (2) Legal (dedication, institutional, etc.);
- (3) Special.

5. Mountains and wilderness areas. Generally occurring at higher altitudes, these pristine areas of natural splendor and scientific interest embrace

a very special category of land use. Such areas are designated for the purpose of preserving primeval conditions, as nearly as possible, for aesthetic enjoyment and for limited forms of recreation and other scientific uses.

- a. Size and measure:
 - (1) Acreage;
 - (2) Biological diversity;
 - (3) Pattern and distribution;
- b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected mountain and wilderness area.
- c. Improvements:
 - (1) Accessibility (limited public roads and trails);
 - (2) Public amenities (limited facilities provided, if any);
 - (3) Other (specify or describe).
- d. Protection and preservation:
 - (1) Physical (fire, bioenvironmental, etc.);
 - (2) Legal (dedication, institutional, etc.);
 - (3) Special.

6. Estuaries. Beyond their critical importance in man's harvest of economically useful living marine resources, many estuaries, coves, and bays merit special consideration as visually attractive settings that support diverse life forms of aesthetic value and as marine ecosystems of special interest.

- a. Size or measure:
 - (1) Surface acreage;
 - (2) Shoreline mileage;
 - (3) Marshland acreage and shoreline mileage;
 - (4) Water quality.

- b. Biological significance as a nursery, breeding, and feeding ground (name species involved);
- c. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected estuary.
- d. Improvements:
 - (1) Accessibility;
 - (2) Public amenities (facilities provided, if any);
 - (3) Other (specify or describe).
- e. Protection and preservation:
 - (1) Physical;
 - (2) Legal;
 - (3) Special.

7. Other areas of natural beauty: These include any other examples of nature's visual magnificence and scenic grandeur, not accommodated in the above-specified classes, which have special appeal to the aesthetic faculties of man.

- a. Size or measure:
 - (1) Acreage;
 - (2) Mileage.
- b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on designated or affected areas of natural beauty.
- c. Improvements:
 - (1) Accessibility (public roads and trails; easements);
 - (2) Screening;
 - (3) Plantings (seedlings, grassed cover, etc.);
 - (4) Public amenities (scenic overlooks, if any);

(5) Other (specify or describe).

d. Protection and preservation:

- (1) Physical (fire, bioenvironmental, etc.);
- (2) Legal;
- (3) Special.

Conversely, and in a generally parallel manner, adverse effects of a plan result from the inundation, adverse alteration, or decreases in the availability, use, and aesthetic quality of these resources.

B. Beneficial effects resulting from the preservation or enhancement of especially valuable archeological, historical, biological, and geological resources and selected ecological systems.

Excluding ecological systems which are separately evaluated below, beneficial effects on this component of the environmental objective are evaluated on the basis of data such as follows, though these are not all inclusive:

1. Archeological resources. Preservation of these resources provides a continuing opportunity for studying the development of human settlements and understanding man's cultural heritage.

a. Size or measure:

- (1) Acreage;
- (2) Square footage;
- (3) Height or depth from ground level.

b. A descriptive-qualitative interpretation including an evaluation of the effects of a plan on the designated or affected archeological resource areas.

c. Educational:

- (1) General education;
- (2) Special and scientific.

d. Improvements:

(1) Accessibility (public roads and trails; easements);

(2) Interpretation and monumentation;

(3) Other (specify or describe).

e. Protection and preservation:

(1) Physical;

(2) Legal (dedication, other);

(3) Special.

2. Historical resources. Preservation of these resources provides for the study, understanding, and appreciation of the Nation's origins and the evolution of its institutions as well as its scientific and technical progress.

a. Size and measure:

(1) Acreage;

(2) Number of units (of whatever kind).

b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected historical resource area.

c. Educational values:

(1) General education;

(2) Specialist.

d. Improvements:

(1) Accessibility (public roads and trails; easements);

(2) Availability (as appropriate to particular site or materials preserved);

(3) Interpretation and monumentation;

(4) Other (specify or describe).

e. Protection and preservation:

- (1) Physical;
- (2) Legal (dedication, other);
- (3) Special.

3. Biological resources. The opportunity to observe and study biological resources--terrestrial and aquatic--leads to an enlarged understanding and appreciation of the natural world as the habitat of man.

- a. Size and measure (wide variation depending on characteristics of particular animal or plant):
 - (1) Total land and surface acreage and shoreline mileage;
 - (a) Land acreage (forest, woodland, grassland, etc.);
 - (b) Water surface acreage and shoreline mileage;
 - (c) Marshland acreage and shoreline mileage.
 - (2) Population estimates and characteristics of fish and wildlife to include as nearly as possible:
 - (a) Age and size classes;
 - (b) Sex ratios;
 - (c) Distribution (density).
- b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected biological resource or resources.
- c. Educational:
 - (1) General;
 - (2) Special and scientific.
- d. Improvements:
 - (1) Accessibility (public roads and trails; easements);
 - (2) Habitat enhancement or site improvement:

- (a) Sanitation;
- (b) Stabilization;
- (c) Increasing edges;
- (d) Harvesting (to maintain balance with environmental food supply);
- (e) Cover planting (species, including number or acreage);
- (f) Stocking:
 - (i) Wildlife (species and number);
 - (ii) Fish (species and number);
- (3) Other (specify or describe):
- e. Protection and preservation:
 - (1) Physical;
 - (2) Legal (dedication, other);
 - (3) Special.

4. Geological resources. When of outstanding geologic or geomorphologic significance, preservation of these resources contributes to man's knowledge and appreciation of his physical environment.

- a. Size and measure:
 - (1) Surface acreage;
 - (2) Subsurface acreage (estimated);
 - (3) Quantity (estimated in appropriate units).
- b. A descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the designated or affected geological resources.
- c. Educational:

- (1) General education;
 - (2) Special and scientific.
- d. Improvements:
- (1) Accessibility (public roads and trails; easements);
 - (2) Interpretation and monumentation;
 - (3) Other (specify and describe);
- e. Protection and preservation:
- (1) Physical;
 - (2) Legal (dedication, other);
 - (3) Special.

Conversely, and in a generally parallel manner, adverse effects result from the inundation, deterioration, or disruption of like kinds of resources.

5. Ecological systems. Apart from the contributions which use of the natural resource base makes to man's basic needs for food, shelter, clothing, and employment opportunities, covered elsewhere, the environmental objective embraces the concept and appreciation of the values inherent in preservation of ecological systems per se.

Each natural area, such as a watershed, a vegetation and soil type, a tidal salt marsh, a swamp, a lake, or a stream complex, represents an ecosystem, an interdependent physical and biotic environment that functions as a continuing dynamic unit, possessing not only intrinsic values but also contributing to the enrichment of the general quality of life in a variety of subtle ways. Conversely, when such natural areas are lost or otherwise diminished in size or quality, there are corresponding adverse environmental effects borne by society.

Beneficial effects resulting from preservation of ecological systems include:

- a. The maintenance of a natural environment in a state of equilibrium as an intrinsic value to society;
- b. The provision of the purest form of aesthetic contact with nature;

- c. Contributions to the development, appreciation, and integration of a "land ethic" or environmental conscience as a part of man's culture; and
- d. Scientific understanding derived from the preservation and study of natural ecological systems which contributes to the conservation of natural resources in general, the most important practical application of ecology.

Conversely, adverse effects are the reduction or loss of opportunity to society as a result of a plan.

C. Beneficial effects resulting from the enhancement of selected quality aspects of water, land, and air by control of pollution.

1. Water quality. The beneficial effects of water quality improvements will be reflected in increased value to water users and will be recorded under the national economic development or regional development objective. For example, increases in the value of the Nation's output of goods and services from improvements in water quality will be accommodated under the national economic development objective. A great deal of improvement is needed in the methods of measuring these values.

There will be other water quality beneficial effects, however, that cannot be measured in monetary terms but are nonetheless of value to the Nation. Examples of such benefits are usually in the aesthetic and ecological areas so important to mankind. Beneficial effects from these kinds of improvements are contributions to the environmental quality account and are identified, measured, and described in nonmonetary terms.

Beneficial effects to the environmental quality account from water quality control may be defined in relation to the State standards or goals established under the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500). Reservoir storage and flow regulation for water quality may be utilized where it is the least-cost way of meeting these standards or goals.

Consistent with water quality standards or goals established for the affected planning area, water quality control beneficial effects are identified, measured, and described by methods and terms such as:

- a. Physical and chemical tests including but not limited to:
 - (1) Dissolved oxygen;
 - (2) Dissolved solids;
 - (3) Temperature;

- (4) Acidity/alkalinity;
- (5) Nutrients.
- b. Biological indicators including but not limited to:
 - (1) Coliform;
 - (2) Macro and micro organisms;
 - (3) Algae.
- c. Description: By a descriptive-qualitative interpretation, including an evaluation of the effects of a plan on the aquatic community as a whole.

Conversely, adverse effects will be reflected as departures from the established water quality standards, including related damages, as a result of a plan.

2. Air quality. Air pollution is primarily a regional problem stemming principally from urban centers containing concentrations of people, industry, and transportation. In addition to its diverse social impacts, air pollution causes direct injury to natural environments, including ground cover, trees, and wildlife. In its purely physical dimensions, air pollution is accommodated within the environmental objective.

Beneficial effects to the environmental objective from air quality control may be defined in relation to regional air quality standards established under the Clean Air Act of 1970.

Consistent with air quality standards established for the affected planning area, air quality control beneficial effects are identified, measured, and described by:

- a. The amount and use of open space between sources of air pollution and concentrations of people to assist in the process of atmospheric dispersion and dilution.
- b. Reductions in the use of fossil fuels.
- c. Reductions in damages to:
 - (1) Wildlife:

- (a) Species;
- (b) Number or density;
- (c) Distribution;
- (d) A descriptive-qualitative interpretation and evaluation of effects as appropriate.
- (2) Ground cover:
 - (a) Species;
 - (b) Acreage and density;
 - (c) Distribution;
 - (d) A descriptive-qualitative interpretation and evaluation of effects as appropriate.
- (3) Forests:
 - (a) Species or types;
 - (b) Acreage;
 - (c) Growth rates;
 - (d) Distribution;
 - (e) A descriptive-qualitative interpretation and evaluation of effects as appropriate.
- d. Enhancement of possibilities for visual enjoyment and aesthetic appeal of natural settings and scenic landscapes.

Conversely, adverse effects will be reflected as departures from established air quality standards, including related damages, as a result of a plan.

3. Land quality. Where erosion is prevalent or spreading--largely because of inadequate land use planning and management--it, among other things, seriously detracts from the general use, appreciation, and enjoyment of terrestrial and aquatic environments.

As encompassed in the environmental quality objective soil is valued as a basic national resource rather than for its more traditional role as a primary production factor contributing to increases in national output.

Beneficial erosion control effects improving the visual attractiveness of the natural landscape include:

- a. Reductions in sediment on beaches and public recreation areas;
- b. Reductions in turbidity and sediment pollution of water in rivers, streams and lakes;
- c. Restoration of cull banks from strip mines and other eroded sites;
- d. Bank stabilization on mainline and secondary roads.

Conversely, adverse effects will reflect any increases in sedimentation, bank sloughing, or other kinds of erosion resulting from a plan.

D. Beneficial effects resulting from the preservation of freedom of choice to future resource users by actions that minimize or avoid irreversible or irretrievable effects or, conversely, the adverse effects resulting from failure to take such actions.

While the previous discussion and outline of effects of the various components has been organized essentially in terms of programs or actions affecting environmental conditions, it may also be useful to view environmental effects of a plan in broad categories emphasizing the predominant considerations of each, whether aesthetic, ecological, or cultural. Following such a classification, aesthetic values in the environment generally encompass lakes, estuaries, beaches, shores, open and green space, wild and scenic rivers, wilderness areas, and other areas of natural beauty; ecological values in the environment generally embrace the physical quality of water, air, and land (erosion), biological resources, and interrelated ecological systems; and cultural values in the environment are generally accommodated by historical, archeological, and geological resources. As this system of classification is not mutually exclusive, however, it is possible for multiple public values to be reflected within each of the components.

III. OTHER BENEFICIAL AND ADVERSE EFFECTS

For each alternative plan the beneficial and adverse effects on regional development and social well-being will be displayed where appropriate in the system of public information accounts.

A. Beneficial and Adverse Effects on Regional Development

Through its effects--both beneficial and adverse--on a region's income, employment, population, economic base, environment, social development, and other factors, a plan may exert a significant influence on the course and direction of regional development.

The regional development account embraces several types of beneficial effects, such as (a) increased regional income; (b) increased regional employment; (c) population distribution; (d) diversification of the regional economic base; and (e) enhancement of environmental conditions of special regional concern. There are major difficulties in estimating some components of the regional development account, such as the location effects as well as estimating the effects of a plan on regional employment, population distribution, and economic base and stability. For this reason a complete display of beneficial and adverse effects for all components in the regional development account will not be made for a plan unless directed by a Department Secretary or head of an independent agency.

The evaluation of various classes of beneficial and adverse effects on the regional development account is discussed below.

1. Regional income

a. Beneficial effects. An increase in regional income is attained to the extent that water resource investment, together with other complementary investments, increases output and provides additional regional income flows than would otherwise occur in the absence of the plan. Increases in regional output and related income are evaluated in a manner paralleling computation of net income to the various purposes (water supply, power, etc.) and the externalities discussed under the national economic development objective.

Where the regional development effects relate to increases in regional income, two classes of beneficial effects occur. These are:

- (1) The value of increased outputs of goods and services

accruing within relevant regions resulting from a plan, including, in addition to the value of outputs to users of the plan:

(a) The value to the relevant regions resulting from the use in construction or installation of the plan of labor resources otherwise unemployed or underemployed.

(b) Additional net income accruing to relevant regions from the construction or implementation of a plan and from other economic activities induced by operations of a plan.

(2) The value of output resulting from external economies accruing within relevant regions.

b. Adverse effects. The adverse effects of a plan upon a particular region include the adverse effects on a region's income; employment; population distribution; economic base; or environmental quality.

Adverse effects on regional income include:

(1) The value of resources within relevant regions required or displaced to achieve the outputs of a plan. This includes, in addition to the value of resources contributed from within the relevant regions:

(a) Payment through taxes, assessments or reimbursement by the relevant regions for resources contributed to the plan from outside the region.

(b) Loss of assistance payments from sources outside the region to otherwise unemployed or underemployed resources and displaced resources within the region.

(c) Losses in output in the relevant regions resulting from resources displaced and subsequently unemployed.

(d) Loss of net income in the relevant regions from other economic activities displaced by construction or operation of a plan.

(2) Losses in output resulting from external diseconomies within the relevant regions.

c. Regional incidence of national economic development. Measurement of the beneficial and adverse effects of national economic development follows the same methods outlined under subsection II F and II G above and is a matter of determining the geographic incidence of such beneficial and adverse effects in the regions under consideration and the rest of the Nation.

d. Location effects. Location or transfer effects of a plan can be beneficial or adverse, depending on the region being considered. In any case, these effects are real and important to a region even though from the national view they sum to zero across all regions in the Nation. For this reason (as well as others), regional evaluations should proceed within the framework of a system of regional accounts.

Location effects are generally estimated as a multiplier factor of the more direct project outputs on the region being considered. Several alternative means of calculating such a multiplier value are available. They include input-output studies, economic base studies, and the application of Keynesian multiplier concepts to regions. Recent studies have indicated that all three approaches provide comparable values for the same region. The Water Resources Council will provide information on the appropriate multiplier values to use for specific planning studies.

2. Regional employment. Elimination or substantial reduction of high rates of unemployment--and related underemployment--in particular geographical areas and among particular segments of the population has long been a national concern, and a concern of affected regions. Water and land resource plans undertaken in designated areas characterized by significant economic and employment problems generally result in increased regional employment. When this is the case--and under with and without analysis--beneficial effects are identified and measured as the increase in the number and types of jobs resulting from the plan.

To the extent possible, planning reports will provide reasonable estimates indicating the composition of the increased employment by the relevant service, trade, and industrial sectors, including a separate estimate for agriculture. The nature of the employment increase to each sector will be classified with regard to the level of skills required--unskilled, semiskilled, and highly skilled.

Where practicable, the estimates within each of the sectors will be further classified by other pertinent attributes of the projected employment mix, such as age classes, sex, average wages, and labor force participation rates.

Adverse effects on regional employment are any decrease in the numbers and types of jobs resulting from the development.

3. Population distribution. Contributions toward achieving specified goals for population dispersal and urban-rural balance through improved distribution of population and employment opportunities are included as beneficial effects.

Although the historic movement of the Nation toward urbanization has resulted in much social, cultural, technical, and economic progress, the evidence of recent years suggests--at least for some areas--that the increasing social and economic costs attendant on attainment of high population densities in cities and suburbs are becoming unduly burdensome. The Nation is thus confronted with the task of channeling economic growth in new directions, while significantly reducing social and economic costs.

Maintaining the rural population base while drawing some people back into outlying areas with more opportunities for employment, recreation, more and better living space, and an amenable social environment represents a responsive approach toward redirecting geographic distribution of the population while providing for economic growth and development.

Public investment programs, especially those embracing plans for water and land development and use, contribute toward regional development by providing the water and land supplies--in both quantity and quality--which are an essential prerequisite to creating new settlement opportunities or expanding upon existing rural developments and by assisting in the provision of better social services and improved cultural opportunities at reduced community costs.

These beneficial effects will occur when populations of affected planning areas are stabilized or otherwise increased through immigrations resulting from implementation of a plan.

Beneficial effects can be measured as the improvement or increase in population and related employment toward attainment of specified distributional goals.

Conversely, adverse effects are identified and measured as increases in the concentration of population and employment contrary to specified objectives.

4. Regional economic base and stability. The economic base of a region consists of those activities which provide the basic employment and income on which the rest of the regional economy depends.

For some regions the mix of the existing economic base may be too narrow and specialized, thus restricting the region's development potential. Over an extended period such a region is likely to be subject to extensive cyclical instability with attendant adverse economic and social consequences. When a region wishes to offset the likelihood of such cyclical instability over the long run, diversification of the economic base may be a beneficial effect.

Water and land resource plans contribute needed inputs--particularly water supply, power, and transportation--that contribute to or assist in creating the essential conditions that enable an improvement in the industrial mix over time leading to a broader production base by which the region can provide a larger portion of the Nation's outputs of goods and services.

When the region under study has too great a concentration or specialization in its economic base and the water and land resource plan being evaluated would have a significant effect in promoting greater diversity, the following information should be shown in planning reports: (1) A statistical description of the area's current economic base, highlighting the employment concentrations which are of concern; (2) projections of future employment both with and without the plan; and (3) the percentage reduction in the area's expected dependence on its specialized type of employment, with as compared to without the water plan. The latter statistic will be shown in tabular displays of plan benefits.

Beneficial effects include contributions to (1) balanced local and regional economies; (2) regularizing market activity and employment fluctuations; (3) offsetting effects of climatic vagaries and accompanying uncertainty; and (4) reversal in decline of community growth.

These beneficial effects may be measured or described in a variety of ways, with primary emphasis on comparative indices relating to fluctuations in output, employment, and prices.

Conversely, adverse effects are identified and measured or described as negative effects on economic stability.

5. Environmental conditions of special regional concern. Where their impact is likely to have special reference to a region's perception of its future development needs, the special concern of a region toward particular elements of the overall environmental quality objective may be given expression through specific incorporation in the regional development effects.

As discussed above, beneficial effects toward improving, preserving, or achieving one or more of the diverse and varied components of the environmental quality objective are identified and measured in a variety of physical dimensions, or otherwise qualitatively described. When such benefits are applicable to regional development, they will be measured and evaluated in a manner consistent with that followed in the above referenced section.

B. Beneficial and Adverse Effects on Social Well-Being

In addition to the effects described above, most water and land resource plans have beneficial and adverse effects on social well-being. These effects reflect a highly complex set of relationships and interactions between inputs and outputs of a plan and the social and cultural setting in which these are received and acted upon. These effects will be reported as appropriate in the system of accounts for each alternative plan.

With emphasis on their incidence or occurrence, beneficial effects on social well-being are contributions to the equitable distribution of real income and employment and to other social opportunities. Since they are integrally related to the basic values and goals of society, these effects are usually not subject to monetary evaluation. The normal market exchange process, however, produces monetary values which can be utilized to aid in measuring the distributional impacts of plans on real income.

Adverse effects of a plan on social well-being have detrimental impacts on the equitable distribution of real income and employment or otherwise diminish or detract from the attainment of other social opportunities. Additionally, such adverse effects include not only those incurred in the designated planning area, but also include adverse consequences elsewhere in the Nation resulting from implementation of the plan.

1. Measurement standards. Criteria used to evaluate or describe the beneficial or adverse effects of a plan will vary with the relevant social effects under consideration. Where appraisal of such diverse social and economic characteristics as income distribution, health and safety conditions, and so forth, is relevant to a proper evaluation of a plan, the measurement standards to be applied must necessarily be broad and variable. Measures used to describe effects on social well-being may be expressed in dollars, other quantitative units, and qualitative terms.

2. With and without analysis. Existing conditions encompassed by the relevant social factors will be described and presented in terms that best characterize the planning perceptions and social setting of the affected area in the situation without the plan. Planners will also prepare similar descriptions for future social conditions to be expected with and without the plan throughout the period of analysis. The situation existing before the initiation of planning will provide the data from which to evaluate significant social effects under alternative plans.

3. Limitations. In evaluating well-being effects the obtaining of detailed breakdowns and analytically useful correlations relating to various indicators, index numbers, and similar comparative statistical indicators, as well as dollar values where possible, presents many complex definitional, data, and measurement problems. Consequently, planning studies should explicitly recognize the limitations of present methods and explore innovative approaches to the identification and measurement of the social well-being effects. Such procedures should be carefully documented in the report.

4. Classes of social well-being effects. Effects of a plan on social well-being are more clearly understood and their significance interpreted by evaluating them as separable classes of social effects. While these are stated in terms of beneficial effects, adverse effects should be read as the converse of each statement. Beneficial effects (and adverse effects) of a plan include:

a. Effects on real incomes. Beneficial effects occur when designated persons or groups receive income generated as a result of the plan.

The income distribution effect can be measured as the net amount of total and per capita income accruing to designated persons or groups.

Current guidelines or yardsticks defining the family poverty line may be used as the data from which to measure and portray the estimated absolute and percentage increase toward meeting or exceeding this standard for specific geographic planning areas.

Conversely, adverse effects are identified and measured as the reduced real income of such persons or groups due to taxes, reimbursement costs, and other adverse economic effects.

b. Effects on security of life, health, and safety. Beneficial effects include contributions to (1) reducing risk of flood, drought, or

other disaster affecting the security of life, health, and safety; (2) reducing the number of disease-carrying insects and related pathological factors; (3) reducing the concentration and exposure to water and air pollution; and (4) providing a year-round consumer choice of foods that contribute to the improvement of national nutrition.

In those limited situations where historical experience is sufficiently documented to provide confidence in projecting likely future hazards, an estimate of the number of lives saved or the number of persons affected may be provided. In most instances, however, a descriptive-qualitative interpretation and evaluation of the improvement and expected results will be applicable.

Conversely, adverse effects are identified and measured or described as increases in hazards to life, health, and safety.

c. Educational, cultural, and recreational opportunities. Beneficial effects to this component include contributions to (1) improved opportunities for community services such as utilities, transportation, schools, and hospitals; and (2) more cultural and recreational opportunities such as historic and scientific sites, lakes and reservoirs, and recreation areas.

Beneficial effects to improved community services may be described in appropriate quantitative terms, while increased cultural and recreational opportunities will be set forth as the numerical increase in the relevant facilities, otherwise accounting for size, use potential, and quality.

Conversely, adverse effects are identified and measured or described as detrimental effects on education, cultural, and recreational opportunities.

d. Effects on emergency preparedness. Beneficial effects include contributions to (1) extending, maintaining, and protecting major components of the national water transportation system; (2) provision of flexible reserves of water supplies; (3) provision of critical power supplies (ample, stable, quickly responsive); (4) provision of reserve food production potential; (5) provision for the conservation of scarce fuels; (6) provision for dispersal of population and industry; and (7) supplying international treaty requirements.

While these beneficial effects will be measured in appropriate quantitative units where readily practicable, they will be largely

characterized in descriptive-qualitative terms.

Conversely, adverse effects are identified and measured or described as overloading capacities of water resource systems and increasing the risk of interruption in the flow of essential goods and services needed for special requirements of national security.

e. Other. Other effects on social well-being may be identified and displayed as relevant to alternative plans.

VI. GENERAL EVALUATION STANDARDS

To assure consistency in the application of planning principles, uniform evaluation guides are necessary. The following general evaluation standards are to be used, to the extent applicable, in planning of water and land resources. Deviation in the application of these evaluation standards and the reasons therefor should be fully reported.

A. General Setting.

Plan formulation and evaluation shall be based upon national and regional projections of employment, output, and population and the amounts of goods and services that are likely to be demanded. The Water Resources Council has arranged for preparation and periodic revision of a set of national, regional and area economic projections as a guide to project, State, regional, and river basin planning. These projections are used by the Council as a base for its current views as to probable rates of growth in population, the gross national product, employment, productivity, and other factors. The projections also include expected rates of regional growth in relation to the level of projected national growth. The following table shows the selected national projections published by the Council and reflect the expected rates of national growth under certain assumptions. An alternative set of projections using a lower set of population growth projections and other assumptions are being prepared. The Council may change these national projections by amending these standards to include alternative futures significant to planning water and land resources.

The projections presented here and as elaborated in separate Council publications also serve as a convenient basis for preparing projections of alternative futures.

WATER RESOURCES COUNCIL
NATIONAL PROJECTIONS: SELECTED HISTORICAL AND PROJECTED DATA

Year	(1) Population (thousands)	(2) Working age population (thousands)	(3) Total labor force participation rate (percent)	(4) Total labor force (thousands)	(5) Armed forces (thousands)	(6) Civilian labor force (thousands)	(7) Unemploy- ment rate (percent)	(8) Civilian employ- ment	(9) Government civilian employ- ment (percent of civilian government)	(10) Government civilian employ- ment (thousands)
1950	152,271	114,438	57.1	64,749	1,650	63,099	05.3	59,746	09.7	5,792
1955	165,931	119,440	57.7	69,896	3,049	66,847	04.4	62,942	11.0	6,505
1960	180,684	127,335	57.4	73,126	2,514	70,612	05.6	66,581	11.9	7,543
1965	194,592	138,289	56.7	78,358	2,723	75,635	04.6	72,179	13.3	7,923
1966	196,920	140,565	57.0	80,164	3,123	77,041	03.9	74,065	14.0	10,316
1967	199,118	142,961	57.5	82,170	3,446	78,724	04.0	75,608	14.8	11,183
1968	201,166	145,405	57.6	83,691	3,595	80,096	03.7	77,210	15.1	11,627
Rate of increase 1950-1968	1.6%	1.4%	—	1.4%	4.3%	1.3%	—	1.4%	—	3.9%
1980	235,212	174,234	58.4	101,753	3,000	98,753	04.0	94,803	16.4	15,514
2000	307,803	227,470	59.2	134,662	3,000	131,662	04.0	126,396	18.6	23,466
2020	400,053	294,956	59.8	176,427	3,000	173,427	04.0	166,490	20.8	34,572
Rate of increase 1968-2020	1.3%	1.4%	—	1.4%	-0.3%	1.5%	—	1.5%	—	2.1%
Source of historical data	Census	Census	Implicit	BLS	BLS	BLS	BLS	BLS	BLS	BLS
Method of projection	Census to 2015 (P. 25 No. 391) BEA to 2020	Census to 2015 (P. 25 No. 391) BEA to 2020	Based on BLS modified by experi- ence of 1966-68	Col. 2 X Col. 3	Assumed average level of 3,000,000	Col. 4 - Col. 5	Assumed 4%	Col. 6 - Col. 7 X Col. 6	Trend projection	Col. 8 X Col. 9
Year	(11) Private civilian employment	(12) Private economy hours worked per year per man	(13) Private economy gross product per hour (1958 dollars)	(14) Private economy gross product (millions of 1958 dollars)	(15) Government gross product (millions of 1958 dollars)	(16) Gross national product (millions of 1958 dollars)	(17) Personal Income (percent of gross national product)	(18) Personal Income (millions of 1958 dollars)	(19) Earnings (percent of personal income)	(20) Earnings (millions of 1958 dollars)
1950	53,954	2,127	2.78	319,410	35,878	355,878	77.3	274,571	82.6	226,835
1955	56,137	2,091	3.34	392,007	49,956	437,963	76.5	336,010	83.7	280,475
1960	58,738	2,027	3.68	438,523	49,159	487,682	79.9	389,653	82.1	319,781
1965	62,556	2,020	4.43	559,808	57,991	617,799	80.2	495,306	80.7	399,706
1966	63,719	2,018	4.64	596,296	61,795	658,091	80.0	526,651	81.1	427,362
1967	64,425	1,996	4.74	609,100	65,568	674,628	81.6	550,196	80.6	443,581
1968	65,583	1,977	49.3	638,998	68,610	707,608	82.0	580,030	80.4	466,191
Rate of increase 1950-1968	1.1%	-0.4%	3.2%	3.9%	3.7%	3.9%	—	4.2%	—	4.1%
1980	79,289	1,919	7.03	1,985,036	84,777	1,153,873	84.9	979,439	79.1	774,654
2000	102,930	1,855	12.69	2,385,782	121,112	2,506,894	89.0	2,230,156	77.6	1,750,173
2020	131,918	1,736	22.92	5,248,901	174,234	5,423,135	—	4,987,314	76.5	3,813,710
Rate of increase 1968-2020	1.4%	-0.25%	3.0%	4.1%	1.8%	4.0%	—	4.2%	—	4.1%
Source of historical data	BLS	BLS	Implicit	BEA	BEA	BEA	BEA	BEA	BEA	BEA
Method of projection	Col. 8 - Col. 10	Trend projec- tion	Trend projec- tion	Col. 11 X Col. 12 X Col. 13	Col. 5 + Col. 9 (salary rate in 1958 dollars)	Col. 14 + Col. 15	Exponential trend projection	Col. 16 X Col. 17	Exponential trend projection	Col. 18 X Col. 19

While a relatively high rate of employment has been assumed in national projections, it is recognized that chronic unemployment and underemployment are problems in many regions. The assumption of a high rate of employment nationally does not preclude consideration of the occurrence of short-run or cyclical fluctuations in the national economy or special analyses of regions with relatively low economic activity and high rates of unemployment.

Planning will also take account of national and State environmental and social standards such as water quality standards, air quality standards, or minimum health standards.

**B. Measurement of Beneficial and
Adverse Effects**

In planning water and related land resources, beneficial and adverse effects of a proposed plan should be measured by comparing the estimated conditions with the plan with the conditions expected without the plan. Thus, in addition to projecting the beneficial and adverse effects expected with the plan in operation, it is necessary to project conditions likely to occur in the absence of the plan. Since economic, social, and environmental conditions are dynamic, changes will occur without the plan in a variety of factors, including regional economic activity, rates of unemployment or underemployment, and environmental conditions. Consequently, only new or additional beneficial and adverse effects resulting from the proposed plan should be attributed to it.

C. Price Relationships

The prices of goods and services used for evaluation should reflect the real exchange values expected to prevail over the period of analysis. For this purpose, relative price relationships and the general level of prices for outputs and inputs prevailing during or immediately preceding the period of planning generally will be used as representing the price relationships expected over the life of the plan. Exceptions to the general rule will occur when the output or input of the plan affects prices, abnormal weather or other factors have temporarily affected prices, or governmental or other institutional arrangements have temporarily affected prices.

The Water Resources Council will publish periodically data on prices of agricultural and other goods and services that can be furnished efficiently for all planning activities. Included in these publications may be special analyses of price problems and simulated

prices for recreation and other project outputs or effects for which market prices are not readily available.

D. The Discount Rate

The discount rate will be established in accordance with the concept that the Government's investment decisions are related to the cost of Federal borrowing.

(a) The interest rate to be used in plan formulation and evaluation for discounting future benefits and costs, or otherwise converting benefits and costs to a common time basis, shall be based upon the estimated average cost of Federal borrowing as determined by the Secretary of the Treasury taking into consideration the average yield during the twelve months preceding his determination on interest-bearing marketable securities of the United States with remaining periods to maturity comparable to a 50-year period of investment: Provided, however, that the rate shall be raised or lowered by no more than or less than one-half percentage point for any year.

When the average cost of Federal borrowing as determined by the Secretary of the Treasury exceeds the established discount rate by more than 0.25 percentage points, the rate shall be raised 0.5 percentage points. When the average cost is less than the established rate by more than 0.25 percentage points, the rate shall be lowered 0.5 percentage points.

(b) The Water Resources Council shall determine, as of July 1, the discount rate to be used during the fiscal year. The Director of the Water Resources Council shall annually request the Secretary of the Treasury during the month of June to advise the Water Resources Council of his determination of the average cost of Federal borrowing during the preceding twelve months.

(c) Notwithstanding the provisions of paragraphs (a) and (b) of this section, the discount rate to be used in plan formulation and evaluation during the remainder of the fiscal year 1974 shall be 6-7/8 percent.

E. Consideration and Comparison of Alternatives

A range of possible alternatives to meet needs and problems, including types of measures and alternatives capable of application by various levels of government and by nongovernmental interests, should be studied. These alternatives should be evaluated or judged as to

their contribution to the objectives and other effects.

Plans, or increments thereto, will not be recommended for Federal development that, although they have positive contributions to the objectives, would physically or economically preclude alternative non-Federal plans which would likely be undertaken in the absence of the Federal plan and which would more effectively contribute to the objectives when comparably evaluated according to the principles.

The alternative non-Federal plan that would likely be physically displaced or economically precluded with development of the Federal plan, or increments thereto, will be evaluated for purposes of this determination on a comparable basis with the proposed Federal plan with respect to their beneficial and adverse effects on the objectives, including the treatment of national economic development effects and the discount rate used in the evaluation. Taxes foregone on the proposed Federal plan and taxes paid on the non-Federal alternative will be excluded in such comparisons for the evaluation of the national economic development objective.

F. Period of Analysis

The period of analysis will be the lesser of: (1) The period of time over which the plan will serve a useful purpose considering probable technological trends affecting various alternatives; or (2) the period of time when further discounting of beneficial and adverse effects will have no appreciable result on design. Where pertinent, however, appropriate consideration will be given to long-term environmental factors which may extend beyond periods significant for analysis of effects for national or regional economic development.

Salvage value remaining at the end of the period of analysis should be taken into account for income-producing features of the plan.

For the environmental quality objective, the goal may be to achieve a level of environmental quality during or at the end of the period of analysis and to maintain this level into the indefinite future.

One hundred years will normally be considered the upper limit of the period of analysis, and shorter periods will be used whenever appropriate for any of the considerations described above.

G. Scheduling

Plans should be scheduled for implementation in relation to needs

so that desired beneficial effects are achieved effectively. Beneficial and adverse effects occurring according to different patterns in time are affected differently by the discount process when plans are scheduled for implementation at alternative future times. Therefore, plan formulation should analyze the alternative schedules of implementation to identify the schedule that would result in the most desirable mix of contributions to the objectives when the beneficial and adverse effects of a plan are appropriately discounted.

While beneficial and adverse effects toward the objectives will accrue over different time frames for the alternative implementation schedules, the discontinued equivalent of such beneficial and adverse effects to be considered in the comparison of the alternative implementation schedules should represent the present value of the beneficial and adverse effects toward the objectives for each alternative implementation schedule at a common point in time.

H. Risk and Uncertainty

Since future events cannot be predicted with certainty, beneficial and adverse effects actually realized in the future may differ from the values expected of them at the present. In some cases, the range of variation can be anticipated and the sensitivity of proposed plans or projects to future contingencies can be evaluated.

Risk may be characterized as being reasonably predictable, since bases are available to calculate the probability or frequency of losses associated with its occurrence. For example, average losses from fires, storms, pests, and diseases can be estimated with reasonable assurance. Thus, the value attached to risk may be converted into a reasonably certain annual allowance. The net returns of a project should exclude all predictable risk, either by deducting the allowance therefor from the beneficial effects or adding such allowance to the project costs. The basis for making a risk allowance in estimating the beneficial and adverse effects of a program or project should be clearly stated.

Uncertainty is characterized by the absence of a basis for predicting the probability of occurrences. Uncertainties may result in estimating beneficial and adverse effects from such factors as fluctuations in the levels of economic activity, technological changes or innovations, and unforeseeable developments. Allowances for uncertainties must be based largely upon judgment, since information is not available for calculating a value. The nature of the uncertainty thought to surround beneficial and adverse effects should be discussed in planning reports, and specific strategies, such as flexibility in project designs, recommended to cope with it. In addition, sensitivity analysis

may be employed to analyze uncertain situations.

I. Sensitivity Analysis

Planning organizations should examine the sensitivity of plans to data availability and to key items for which alternative assumptions might be appropriate. Examples of such items include prices; discount rates; and economic, demographic, and technological trends. Selected projections and assumptions of alternative futures that are likely and that, if realized, would appreciably affect plan design or scheduling should be analyzed.

J. Updating Plans

Because of rapid change in social, economic, technologic, physical, and other factors, a plan for a project prepared under these standards that is not implemented within 10 years after completion should be reviewed to ascertain whether it continues to be the best alternative to achieve the objectives.

V. PLAN FORMULATION

A. Introduction

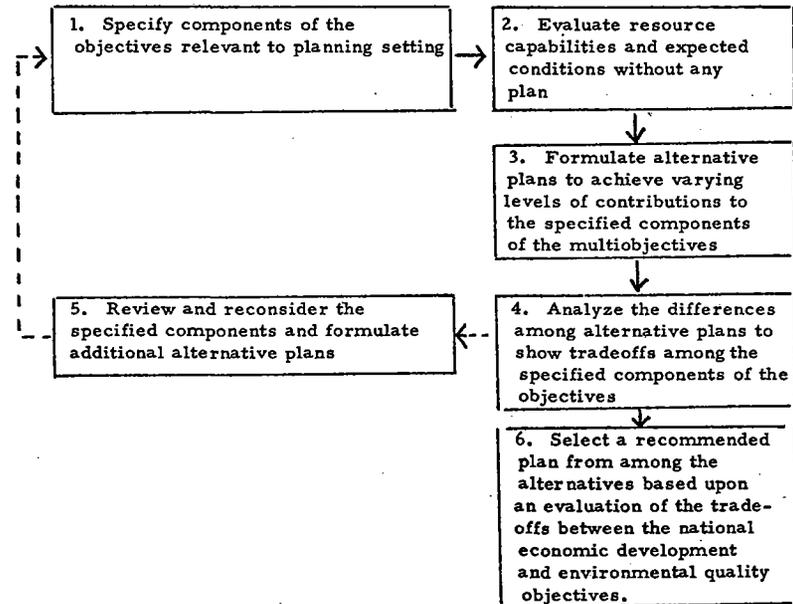
As set forth in principles, the formulation of plans will be directed to meeting current and projected needs and problems as identified by the desires of people in such a manner that improved contributions are made to society's preferences for national economic development and environmental quality.

1. Major steps in plan formulation. Plan formulation is a series of steps starting with the identification of needs and problems and culminating in a recommended plan of action. The process involves an orderly and systematic approach to making determinations and decisions at each step so that the interested public and decisionmakers in the planning organization can be fully aware of the basic assumptions employed, the data and information analyzed, the reasons and rationales used, and the full range of implications of each alternative plan of action. This process should be described in enough detail in the report of the study so that it may be replicated by others.

The plan formulation process consists of the following major steps:

1. Specify components of the objectives relevant to the planning setting;
2. Evaluate resource capabilities and expected conditions without any plan;
3. Formulate alternative plans to achieve varying levels of contributions to the specified components of the objectives;
4. Analyze the differences among alternative plans to show tradeoffs among the specified components of the objectives;
5. Review and reconsider, if necessary, the specified components for the planning setting and formulate additional alternative plans as appropriate; and
6. Select a recommended plan from among the alternatives based upon an evaluation of the tradeoffs between the objectives of national economic development and environmental quality.

In the subsequent parts of this section each of these steps is described in more detail. The major steps involved in this process are shown schematically at the end of this subsection. It should be noted that the plan formulation process described herein is not just a once-through process but may be reiterated several times, with each reiteration being somewhat more detailed than the previous one. The plan formulation process must be tailored to fit a given planning situation and the detail and depth of analysis will necessarily vary with each level of planning.



2. Levels of planning. The standards for plan formulation apply to the preparation of framework studies and assessments, regional or river basin studies, and implementing studies. The important differences in the application of these plan formulation standards to different levels of planning are the relevant component needs, the level of detail with respect to beneficial and adverse effects in the decision process, and the types of alternative courses of action that are considered.

a. Framework studies and assessments (Level A). Framework studies and assessments will evaluate or appraise on a broad basis the needs and desires of people for the conservation, development, and utilization of water and land resources; will identify regions or basins with complex problems which require more detailed investigations and analysis; and may recommend specific implementation plans and programs in areas not requiring further study. They will consider Federal, State, and local means.

Framework studies and assessments of major regions are designed to:

- (1) Determine the extent of water and land problems and needs;
- (2) indicate the general approaches that appear appropriate for their solution; and
- (3) identify specific geographic areas where regional, river basin, or implementation planning studies are needed. For framework studies and assessments, the information to be assembled should be consistent with the level of detail as outlined in guidelines for framework studies and assessments to be issued by the Water Resources Council. The framework studies and assessment should identify the complementarities and conflicts among components of the objectives. Alternative courses of action will be considered for each of the specified subbasins. Framework studies and assessments usually do not provide a basis for recommending specific action for water resource development. However, comparisons should be made between alternative courses of action to indicate potential complementarities and conflicts that may exist as relative emphasis is shifted from one objective to another. This information will provide a basis for a decision as to which areas require more detailed regional, river basin, or implementation studies.

b. Regional or river basin plans (Level B). Regional or river basin plans are reconnaissance-level evaluations of water and land resources for a selected area. They are prepared to resolve complex longrange problems identified by framework studies and assessments and will vary widely in scope and detail; will focus on middle term (15 to 25 years) needs and desires; will involve Federal, State, and local interests in plan formulation; and will identify and recommend action plans and programs to be pursued by individual Federal, State, and local entities.

Regional or river basin plans are concerned with a broad array of component needs of objectives. Alternate plans will consider effects on many components of objectives, and the analysis of tradeoffs among alternatives will be quite complex. Scheduling for implementation of the various elements of the recommended plan will be presented to indicate how each element relates to projected needs and the urgency and priority associated with meeting the needs.

Section 209(a), Public Law 92-500, Federal Water Pollution Control Act as amended, October 18, 1972, provides that Level B (regional or river basin) plans be completed by the Water Resources Council for all river basins in the United States by January 1, 1980.

The identification of the more urgent elements of the plan that require early action will guide subsequent implementation studies.

c. Implementation studies (Level C). Implementation studies are program or project feasibility studies generally undertaken by a single Federal, State, or local entity for the purpose of authorization or initiation of plans. These studies are conducted to implement findings, conclusions, and recommendations of framework studies and assessments and regional or river basin studies.

Plan formulation for implementation studies will focus on the preparation of a recommended plan of action to follow in the next 10 to 15 years. Long-range projections of the need for and use of water and land resources will be considered, however, primary attention should be directed toward the formulation of a plan to meet near-term needs and alleviate problems. Such plans will be oriented toward an identified set of specific components of the two objectives for the planning area. The complexity of the plan formulation process will depend on the extent of the needs and problems in the area and the variety of planning functions that may be employed to meet the needs. In some cases, the array of component needs to consider may be large. Other implementation studies may be oriented toward a single objective and, hence, will be concerned with only a few needs and alternatives.

B. Specification of Components

At the outset and throughout the planning process the specific components of the objectives that are significantly related to the use and management of the resources in the planning setting will be expressed in terms of needs and problems in the context of the objectives of national economic development and environmental quality.

The term "specific component of the objectives" refers to the desired achievement of types of goods, or services and environmental conditions, that are being sought as contributions to the objectives. These components can be considered and desired. The term "component needs" as used herein refers to the type, quantity, and quality of desired beneficial effects.

Reference should be made to the definition and description of objectives and benefits presented in section II as the basis to determine the full range of components of the objectives, only a few of which are presented in this section as examples to illustrate the plan formulation process.

1. National economic development. For the national economic development objective, the components will usually be expressed at two levels.

a. The first level directly relates to the objective in the sense of the specification of the actual outputs of goods and services desired. Hence, the first level of specified components of this objective will generally be depicted in terms of increased outputs of goods and services or their more efficient production such as the following:

- (1) Increased or more efficient output of food and fiber;
- (2) Increased or more efficient output of recreational services;
- (3) Increased or more efficient production of energy;
- (4) Increased or more efficient production of transportation services;
- (5) Increased productivity of land for residential, agricultural, commercial, and industrial activities;
- (6) Increased or more efficient production of necessary public services such as municipal and domestic water supply; and
- (7) Increased or more efficient industrial output.

b. The second level of specification of the components of the national economic development objective follows from the translation of the first level specification of needs for goods and services into specific needs for water and land resources. In the context of the above, the second level specification of components would be established in terms such as the following:

- (1) Water and land for irrigation;
- (2) Water and land related recreation opportunities in terms of user days;
- (3) Hydroelectric power needs;
- (4) Inland navigation or deep draft harbor needs;
- (5) Provision of flood-free land or provision of stabilized lands;
- (6) Water supplies for municipal and domestic use; and
- (7) Water supply for industrial use.

The above examples are not intended to exhaust either the wide variety of outputs of goods and services that can become specific components or the total range of specific water and land needs into which the first level of components is translated. The major point is that to determine the specific components of the national economic development objective, it will usually be necessary to approach the problem, first, at the general level of the types of national outputs of goods and services and then translate these into specific water and land needs or problems.

It should further be noted that the specification of components of the national economic development objective at either level should always be stated in terms of outputs (which are the beneficial effects of a plan), but never in terms of the inputs to a plan. This also holds true in the specification of the components of the environmental quality objective as well.

2. Environmental quality. The components of the environmental quality objective may be directly expressed as the achievement of specific environmental conditions such as the following:

- (1) Miles of scenic river of specified characteristics;
- (2) Acres of ecological areas of specified type preserved or enhanced;
- (3) Reach of river meeting specified water quality standards; and
- (4) Number of open space areas of specified type.

3. Participation. The actual derivation and identification of components require several different approaches. An initial point of departure is the national and regional economic analyses and projections provided by the Council. These will be useful in a first-cut definition of the economic parameters of the components of the objectives. More detailed definitions will require in-depth consultation with Federal, State, and local officials familiar with the planning setting. Direct input from the public involved at the local and regional level is important and will be accomplished by:

- a. Soliciting public opinion early in the planning process;
- b. Encouraging periodic expression of the public's views orally, and recording their opinions, and considering them;
- c. Holding public meetings early in the course of planning to advise the public of the nature and scope of the study, opening lines of communication, listening to the needs and views of the public and identifying interested individuals and agencies;
- d. Making available all plans, reports, data analysis, interpretations, and other information for public inspection.

Efforts to secure public participation should be pursued vigorously through appropriate means of public hearings, public meetings, information programs, citizens committees, etc.

Definition and specification of the components of the environmental quality objective will require direct consultation with groups identified with environmental concerns as well as with those groups within a planning setting whose actions have significant impacts on the environment. A broad spectrum of public groups and interests must be considered and consulted in the identification of the components.

4. Projected conditions. The components of the objectives will be drawn for both current and future conditions. Projections should be made for selected years over a specified planning period to indicate how changes in population and economic conditions are likely to impact on the components over time.

Economic and demographic projections should be consistent with the Council's national baseline projections which reflect differential regional growth patterns and probable future population and economic conditions of all regions of the Nation. Additional projections representing other views of the future may also be made. Such projections,

however, should be made on a comparable basis with the baseline projections to enable valid comparisons to be made between alternative plans based on these different projections. Because demands for commodities and services are a function of price, the future needs are also affected by price. Therefore, the assumptions relating to prices used to determine the future needs must be stated.

Environmental needs of the future should be identified in terms of specific features of the natural environment of the area that will assure a continuance of sources with limitations alleviated or a healthful, scenic, and aesthetically satisfying experience to all citizens. For instance, unique archeological, historical, and biological features of the area that are desired for preservation for future generations should be identified. Desired environmental conditions for the future should be explicitly stated. These environmental component needs should reflect not only current preferences but should attempt to reflect the preferences likely to prevail in the future.

5. Sensitivity tests. In view of the uncertainty, with respect to both economic and demographic change as well as the uncertainty of future preferences for the components of the environmental objective, it will be necessary in projecting the needs associated with these components to show alternative levels in the future as the basis for testing the sensitivity of alternative plans when evaluated against different levels of needs for a given component in the future.

6. Preferences. The specification of the components of the objectives must reflect the specific effects that are desired by groups and individuals of the planning area as well as the specific components declared to be in the national interest by the Congress or by the executive branch through the Water Resources Council. In this way the components of objectives will reflect local, State, and national preferences and priorities as well as the extent of complementarity and conflict among components.

In this regard, the identification and detailing of the components of the objectives should be viewed as the process of making explicit the range of preferences and desires of those affected by resource development in terms of reference that can form the basis for the formulation of plans. Rather than a single level of achievement being set forth for any specified component, a range of possible levels should set forth so that the relevant preferences can be seen for a given component. It should be anticipated that the initial specification of components will be modified (expanded or reduced) during subsequent steps in plan formulation to reflect the capability of alternative plans to satisfy component needs and to reflect technical, legislative, or administrative constraints.

C. Evaluation of Resource Capabilities

In very broad terms, the first step of specification of the components of objectives can be viewed as establishing the boundaries of demand (needs or problems) in the context of each objective. In the next step, evaluation of resource capabilities, the initial evaluation is made of the supply (availability) of the resources that can be employed to satisfy the current and future levels of demand.

Resources of the planning area shall be evaluated in terms of their ability to meet the current and projected demands identified for each component under two sets of conditions:

(1) Capability of resources without any planned action; and

(2) capability of water and land reproductivity enhanced through management plans. An analysis of the capability of resources to meet the projected demands without any planned action will reveal the extent and magnitude of unsatisfied component needs and indicate the requirement for some specific plan of action to assure their satisfaction. To the extent that the water and land resources without any planned action are unable to meet current and projected needs or to the extent that resource management enables the needs to be met more efficiently, there is an evident justification for formulating alternative plans.

In this formulation step, the first task is to undertake a selective inventory of the quantity and characteristics of water and land resources of the planning area and an appraisal of opportunities for further use of these resources. Problems limiting the use of resources should also be identified.

The resources inventory should include data on all physical factors appropriate to the investigation. Examples of the type of information needed include:

1. Hydrologic data such as rainfall and runoff characteristics, frequencies of high and low flows, availability of groundwater, natural lakes, marshes, and estuaries;
2. Water quality data, including dissolved oxygen temperature, turbidity, and mineralization;
3. Geology and topography of the planning area;

4. Land capability and use classifications;
5. Archeological, historical, cultural, scenic, or unique areas;
6. Biological resources; and
7. Current and planned water uses.

Based on an analysis of the inventory, the next step requires that an appraisal be made of the capability of the resources to support further use for the component needs. This would provide guidance as to the possible scope and magnitude of plans to meet the demands for each component. This appraisal would require identification of possibilities for management, development, and other opportunities for action such as:

1. Reservoir sites cataloged as to possible ranges of storage capacities;
2. Preservation of scenic streams;
3. Stream channel improvement possibilities;
4. Land treatment and enhancement measures;
5. Preservation or enhancement of fish and wildlife; and
6. Preservation or enhancement of a cultural or archeological area.

These possibilities for management, development, or other actions will indicate the resources capabilities relative to specific commodities, services, or environmental amenities desired by society. By proper selection of these development possibilities, plans may be formulated to meet the needs for each component of the objectives.

Problems likely to present impediments to the attainment of the desired levels of national or regional output of goods and services, environmental amenities, or social opportunities for the planned period should be identified. Problems may take the form of physical constraints that limit resource use, conflicts in resource use, legislation that hinders desired use or development, or other limitations.

At this point, it should be possible to generally outline the total development and resource use programs that are needed to meet current and projected needs for each component of the objectives. An examination of these potential programs may reveal conflicts and complementarities among them. In addition, other programs may also be available. These may include such alternatives as changes in production processes for increased efficiency, meeting needs by shifting demand to other areas, or encouraging more rapid rates of technological progress.

D. Formulation Of Alternative Plans

In the first two steps in the plan formulation process, the components of the objectives were specified in terms of needs and problems, the resource capability within the planning areas were evaluated, and the broad outlines of management, development, and other actions were identified. The next step is to undertake the actual design and scaling of alternative plans.

Ideally, in the presence of a situation where there are few or no constraints on planning and where the components of the objectives are essentially complementary (the satisfaction of one component need does not preclude the satisfaction of the other component needs), the formulation of a single plan would be sufficient. The only test required would be that the plan was the most efficient plan to satisfy the specified level of component needs. Although in only a few instances will this situation occur, the case does help to establish the guidelines and criteria to judge the range of alternative plans that should be formulated and the tests to be applied in formulating any given plan.

The requirement for the formulation of alternative plans derives from the basic characteristics of the approach when more than one objective is involved. First, instead of the component needs of the two objectives being complementary, it is more likely they will be in conflict--the satisfaction of one will reduce the satisfaction of others. Second, given uncertainty with respect to future economic and demographic changes and the general uncertainty with respect to future preferences for the environmental quality objective, a single specified level of achievement or need satisfaction for any given component is not likely to be acceptable through time. Other factors contributing to the necessity for formulation of alternative plans include limited resources, technical planning constraints, and legal and administrative constraints.

Suggestions as to the determination of the general nature and types of alternative plans which should be formulated and the number of alternatives which should be developed within each general type are given below.

A first requirement is to determine the general types of alternatives to be developed under alternative assumptions concerning the level and magnitude of component needs in the future. Given alternative assumptions concerning future economic and demographic trends for the planning setting and the total range of component needs related thereto, a set of alternative plans should be prepared for each major assumption concerning the future. In those planning situations where there does not exist a strong linkage between water and land development and major shifts in economic and demographic trends, the Council's baseline projections will generally be used as a single set of assumptions about the future level of component needs required. Where the linkage is sufficiently strong so that water and land development may materially alter future economic or demographic trends, this relation should be reflected in alternative assumptions. Where the planning area may be unusually susceptible to other factors that could easily change in the future, it will be appropriate to establish a basis for a different set of alternative plans based on alternative assumptions concerning future change. In this instance, a sensitivity check should be made to ascertain the extent to which component needs will vary significantly given different assumptions concerning the future. If no significant variation is found, only one set of alternative plans will have to be developed.

Within a given set of assumptions concerning future change and the component needs associated thereto, the number and types of alternative plans to be developed will be determined by applying the following:

1. On a first approximation basis array component needs that are essentially complementary--that is, the satisfaction of one of these component needs does not preclude satisfaction of the other component needs or does not result in materially adding to the cost of satisfying the other component needs in the array; and
2. From the above approximation, it should be possible to group component needs and the elements of a plan to satisfy those needs that are essentially in harmony, each set representing the nucleus for an alternative plan.

At this step, relevant alternative means of meeting each of the component needs to be included in an alternative plan should be identified. All relevant means should be considered. An analysis should be made for each alternative means, including an identification of the beneficial and adverse consequences to other component needs. The assembly of information on alternative means of meeting the component needs will provide a basis for selecting the most effective means, or combination of means, of satisfying all component needs.

The significance of this step is threefold: (1) It provides information on the effectiveness of alternative means of satisfying a component need; (2) it provides information on the extent of complementarity or conflict among component needs in relation to a particular means; and (3) it provides a basis for selecting alternative means for satisfying a component need in the formulation of an alternative plan.

At this point, it should be possible to formulate alternative plans built upon the set of complementary component needs and plan elements. These essentially are the building blocks for the formulation of alternative plans. In formulating a given alternative plan, initial consideration will be given to its orientation toward fulfilling the component needs for one of the objectives. Further additions should be made for the component needs of the other objective, provided that their addition to a given plan does not significantly diminish the contributions of the overall plan to that objective toward which the plan is oriented. An analysis of the alternative plan, in terms of beneficial and adverse effects, will reveal the extent of any shortfalls against the other objective. The process is then repeated until sufficient numbers of alternative plans have been formulated so that there is at least one plan that generally satisfies each specified component need of the objectives. This does not mean that there must be a plan for each objective that excludes plan elements that significantly contribute to the component needs of the other objective nor does it mean that a given alternative plan cannot appropriately satisfy the component needs of both objectives. Additional alternative plans may be required where there are possible conflicts among the component needs within a given objective.

A precise number of alternative plans cannot be specified in advance but will be governed by the relevancy of the objectives to a given planning setting, the extent of component needs and their complementarity, the available alternative means, and the overall resource capabilities of the area under study.

To facilitate comparisons and tradeoffs among alternative plans and comparisons of beneficial and adverse effects measured in nonmonetary terms with beneficial and adverse effects measured in monetary terms, one alternative plan should be formulated in which optimum contributions are made to the component needs of the national economic development objective. Additionally, during the planning process at least one alternative plan will be formulated which emphasizes the contribution to the environmental quality objective. Other alternative plans reflecting significant tradeoffs between the national economic development and environmental quality objectives may be formulated so as not to overlook a best overall plan.

In formulating alternative plans, tests of acceptability, effectiveness, efficiency, and completeness should be applied.

The acceptability test refers to the workability and viability of the plan in the sense of acceptance of the public and compatibility within known institutional constraints.

The effectiveness test refers to technical performance of the plan and the level of contribution to the components of the objectives.

The efficiency test requires that among all acceptable alternatives, Federal and non-Federal, water and nonwater, structural or nonstructural, the given alternative plan should be the least cost means, considering all adverse effects, of achieving specified components of the objectives when comparably evaluated according to these standards.

The completeness test requires that a given alternative plan provide and account for all necessary investments or other actions that will be needed to assure the full realization of the contributions provided by the plan to the components of the objectives specified for the planning area. This may require relating the water and land resources plan to other types of public or private plans where they are crucial to the full realization of the contributions to the objectives. The rule to follow is that beneficial and adverse effects must be treated comparably when relating water and land resource plans to other plans.

In formulating alternative plans to satisfy the component needs of the environmental quality objective, consideration may be given to an alternative which explicitly precludes any significant forms of physical construction or development. Where such a "no development" alternative is considered, it must be recognized that positive action is nonetheless required to assure that the "no development" concept can be realized and, further, that the particular environmental characteristics that it is desired to maintain or enhance through the "no development" alternative may change through time as a result of changing conditions within a planning setting. Positive actions, such as zoning or public land acquisition, may be necessary to accomplish the "no development" alternative. The test of plan completeness must be very carefully applied for this type of alternative plan.

E. Analysis of Alternative Plans

In the previous formulation step, a series of alternative plans were formulated and their beneficial and adverse effects evaluated and measured in accordance with the definitions and measurement standards set forth in section III of these standards. A display of the beneficial and adverse effects will be developed for each alternative plan in a form similar to that shown and discussed in section VI, System of Accounts.

In this formulation step, an analysis and comparison of alternative plans is outlined to make the following determinations:

1. The effectiveness of given alternative plans in meeting the component needs of the objectives;
2. The differences among alternative plans in terms of their contributions to the objectives and where appropriate and their effects on regional development and social well-being; and
3. The relative value of those beneficial and adverse effects that are essentially presented in nonmonetary terms, in terms of what is given up or traded off among plans with varying degrees of contributions to the objectives.

These determinations are essential to the subsequent step for selection from among the alternatives of a recommended plan.

The first determination involves the analysis of how well each alternative plan performs against the component needs that served as the basis for its formulation. The analysis should include an appraisal of any shortfalls against component needs for which the plan was formulated and the extent of shortfall against other component needs. For instance, if a given alternative has been formulated with emphasis on the component needs for the national economic development objective, the analysis should indicate the performance of the plan in terms of those needs and further indicate the degree to which the component needs for the environmental quality objective have been fulfilled or remain unmet. For this purpose, measures of performance should be developed that characterize how a particular plan performs against the component needs of the objectives.

The second determination involves the systematic comparison of the performance of given alternatives with each other. The purpose for these comparisons is to portray the extent of difference among alternative plans as a basis for reducing the number of alternative plans to be considered in the selection of a recommended plan. The comparisons should be carried out to display the type of information on beneficial and adverse effects shown in section VI.

These comparisons will facilitate the evaluation of the significance of the differences among alternative plans. While all alternative plans will tend to differ, the degree and extent of difference is critical in reducing the number of alternative plans to be seriously considered for recommendation.

The third determination involves a special analysis designed to provide an approximation of relative monetary values to those effects to objectives that are generally characterized and displayed in nonmonetary terms. It is not the purpose of the analysis, however, to convert such effects to monetary equivalents but to gain an insight with respect to the relative value of such effects by understanding their impact upon monetary values which, as a practical matter, is a generally understood common denominator for decisionmakers.

This analysis involves extracting information from the previous evaluation involved in comparison of plans. For the purposes of the special analysis, the alternative plan that optimizes the national economic development objective is compared with the alternative plans that emphasize the environmental quality objective. Enhancement of environmental quality, for example, can be related to beneficial effects foregone or increased adverse effects in national economic development. Likewise, an increase in national economic development can be compared with adverse effects on environmental quality. From this analysis, it should be possible to develop an array of relative values for the nonmonetary effects.

While not designed to provide a basis for conversion of nonmonetary beneficial and adverse effects to monetary terms, this analysis does provide the range of monetary tradeoffs involved for the nonmonetary effects for a particular planning setting and will serve to point out that any final evaluation of the worth of nonmonetary effects must be seen in the context of the alternative way of using a particular resource.

F. Reconsideration of Components and Alternative Plans

As indicated in the introduction to this section, plan formulation should be viewed as a continuous process that must be reiterated during the overall planning process based upon the results of the initial consideration of plan formulation described above. Further, it should be noted that the level of analysis probably should not be detailed until the results of the initial or subsequent reiterations more clearly indicate the relevancy of the components of objectives to the planning setting and the range and number of alternatives that should be considered as the basis for selecting a recommended plan. It should be stressed, with respect to alternative plans, that in the last formulation step, the selection of a recommended plan, only alternatives that could be favorably recommended for various mixes of the components of the objectives will be considered.

The basis for reiteration of the plan formulation process at this point of for modifying certain steps in that process should be based upon the following considerations:

1. Level of detail inadequate as basis for selection of a recommended plan;
2. Alternatives considered result in significant shortfalls in meeting the component needs of one or both of the objectives;
3. Resource capability and alternatives considered suggest that the initial specification of component needs was in error and requires modification;

4. Public policy changes occurring during the planning study suggest change in emphasis for the objectives; and
5. Additional information obtained on resource capabilities or the technical aspects of alternative plans.

The above considerations are only suggestive of the conditions requiring reappraisal and reiteration of the plan formulation process. As a general guide, however, in determining the extent and number of reiterations that should be undertaken, a judgment must be made as to whether or not new information, further detail, or other change in the conditions listed above are likely to result in either significant changes in the component needs or in the alternatives considered.

G. Plan Selection

The culmination of the plan formulation process is the selection of a recommended plan from among the alternative plans. Based upon the analysis of alternative plans and the results of reiterations of the plan formulation process, a set of alternative plans should be developed--each one of which, given the relevant mix of contributions to components of the objectives, could be selected on its own merits as a recommended plan or recommended course of action. It is from among these alternatives that a recommended plan will be selected.

The previous formulation steps should effectively screen the number and types of alternatives that are to be considered as candidates for a recommended plan. In general, these alternatives should possess the following characteristics:

1. For the given set of component needs, each alternative plan should be the most efficient means to achieve those needs.
2. The plans should be significantly differentiated from each other, primarily in terms of emphasis on objectives; that is, each alternative plan makes a unique contribution to one or both objectives not provided for by any of the other alternatives under consideration. Using the analysis of alternatives, those alternatives that may have been formulated with essentially similar characteristics in terms of component needs with only minor differences should be screened to select the alternative that provides the best mix of contributions to the specific set of component needs.
3. Without regard to assigning priorities or weights to the component needs of a particular alternative to differentiate such alternative in terms of the other alternatives, each alternative must be "justified" in the sense that in the judgement of the planning organization the total beneficial effects

(monetary and nonmonetary) to the objectives relevant to the alternative are equal to or exceed the total adverse effects (monetary and nonmonetary) to those objectives.

Given the above screening process, the choice of a recommended plan from among the remaining alternatives is essentially a choice governed by a reasonable and rational perception of priorities and preferences about the mix of objectives. It is not a choice predicated upon an analysis of the most justified plan, since each alternative to be considered at this step of the overall formulation process can be justified on its own merits in terms of its contributions to the given mix of component needs relevant to each alternative.

If explicit priorities or weights were assigned to the beneficial and adverse effects to each component need of the objectives, it would be possible to select a best plan to be recommended with a minimum of judgment. In most cases, however, such priorities or weights will not be available and, as set forth in Principles, selection of a recommended plan will be based upon an appraisal so that the beneficial and adverse effects to the mix of objectives, to the best of current understanding and knowledge, reflect the priorities and preferences expressed by the public at all levels to be affected by the plan.

The basis of selection will be fully reported upon indicating all considerations made in the selection process. A recommended plan must have net national economic development benefits unless the deficiency in net benefits for the national economic development objective is the result of benefits foregone or additional costs incurred to serve the environmental quality objective. In such cases, a plan with a less than unity benefit-cost balance may be recommended as long as the net deficit does not exceed the benefits foregone and the additional costs incurred for the environmental quality objective. A Departmental Secretary or head of an independent agency may make an exception to the net benefits rule if he determines that circumstances unique to the plan formulation process warrant such exception.

An explicit presentation will be shown of the comparisons and resulting tradeoffs of the recommended plan to other alternative plans considered for recommendation. This will be shown in accordance with the system of accounts in section VI.

VI. SYSTEM OF ACCOUNTS

The system of public information accounts is an information system that displays beneficial and adverse effects of each plan on the objectives and on regional development and social well-being and provides a basis for comparing alternative plans. The display of beneficial and adverse effects on the national economic development and environmental quality objectives and on regional development and social well-being will be prepared in such manner that the different levels of achievement to each objective and effects on regional development and social well-being can be readily discerned and compared, indicating the tradeoffs between alternative plans.

For purposes of accounting, the distribution of beneficial and adverse effects will be shown to whomsoever they accrue. This will include display of the distribution of national economic development, environmental quality, regional development and social well-being effects to regions, income classes, and interest groups relevant to the particular plan and will reflect the cost information specified in Section VII below. The system of accounts will display the beneficial and adverse effects in relevant regions in relation to the rest of the Nation.

The system of accounts calls attention to the important aspects of information which must be generated and displayed if the decision-making process is to be effective. The evaluation framework through the system of accounts provides for a systematic investigation of the full range and extent of effects of a plan and provides for a display of this information in a format which is clear and useful to all participants in the decision process.

Four accounts will be used for displaying beneficial and adverse effects and for showing and analyzing the tradeoffs among plans. The four accounts to be used are national economic development, environmental quality, regional development, and social well-being.

Two series of displays will be prepared. In the first, gross beneficial and gross adverse effects and net beneficial effects where appropriate will be displayed in four accounts for each alternative plan. The second series of displays will be used to provide a ready comparison of the alternative plans.

In the first series of displays, beneficial and adverse effects to be shown in each account will be in accordance with the definition and discussion of beneficial and adverse effects by components of the objectives and on regional development and social well-being contained in Sections II and III. Values for the national economic development account will be expressed in monetary units; values for the environmental quality account will be expressed in appropriate quantitative units or qualitative terms; and the regional development account and the social well-being account will include a combination of monetary units and other appropriate quantitative units or qualitative terms. Tables 1, 2, 3, 4, and 5 illustrate the nature and the content of the first series of displays.

Table 1 is a schematic diagram of the system of accounts and illustrates the basis for summarizing beneficial and adverse effects in each account. Table 1 indexes the detailed display of beneficial and adverse effects by components in tables 2, 3, 4, and 5. The components of the national economic development account appear in table 2. The components of the environmental quality account appear in table 3. The components of the regional development account appear in table 4. The components of the social well-being account appear in table 5. The tables include hypothetical data on beneficial and adverse effects as examples only. These should not be considered necessarily inclusive as to specification of components or coverage nor should they be considered mandatory. The appropriate components should be specified in each planning study.

For the purposes of accounting for regional development the standard set of economic accounting areas designated by the Water Resources Council will be used. The Council will maintain a set of economic projections for these economic accounting areas and a capacity to provide additional analysis for planning studies on request. The economic area projections will be compatible with the Council's projections of national growth.

A plan may have effects on one or more of the economic accounting areas. As many economic accounting areas as necessary will be included in order to cover the geographic area relevant to the regional development account. The effects of a plan upon the individual economic accounting areas comprising this geographic area should be identified in the planning report in order to take account of the plan in subsequent evaluations of problems and needs.

The system of accounts will also display the beneficial and adverse effects for the geographic area relevant to the evaluation of the regional development account in relation to the other parts of the Nation. The number of economic accounting areas to be used will vary, dependent on the information available and the extent of the effects of the plan. It is not proposed that the effects of a plan be identified across all of the individual economic accounting areas. The evaluation will, however, as a minimum, analyze the effects of a plan upon the geographic area relevant to the evaluation of the regional development account and the rest of the Nation. If a plan results in substantial effects upon other regions of the Nation, the regions should be identified and the effects evaluated.

The incidence of national economic development adverse and beneficial effects across the system of regional accounts must sum to the total national economic development adverse and beneficial effects evaluated for the plan. The incidence of locational effects, both beneficial and adverse, across the system of regional accounts must sum to zero for beneficial effects and must sum to zero for adverse effects. In cases when an effect category includes both national economic development effects and locational effects, the sum of the effects for that category across the system of regional accounts will equal the total national economic development effects included in the category.

The use of the standard set of economic accounting areas will not, however, rule out the use of other regions such as hydrologic regions or States whose delineations are important in measuring beneficial or adverse effects on specified components of the regional development account. However, in such cases, the evaluation should also include an analysis of the effects of a plan utilizing the standard set of economic accounting areas.

Table 4 shows information for region 1, region 2, and the rest of the Nation to illustrate that the system of regional accounts is to show the major incidence of the plan and the relation to the rest of the Nation.

The second series of displays (table 6) will be used to provide a ready comparison of alternative plans. Each of the alternative plans will be paired with the recommended plan so that the advantages and disadvantages of each can be compared. Other comparisons between alternative plans may be displayed where relevant. The information needed for this second series of displays will be taken from the first

series. The information should be summarized and condensed to make it as brief and yet as meaningful as possible. Differences between the recommended plan and alternatives should be set forth in a consistent manner so that positive and negative differences in beneficial and adverse effects are readily discernible. Table 6 illustrates the nature and content of this series of displays.

These tables illustrate the system of accounts. In some cases more or less detail may be needed. Appropriate summary tables should be used.

TABLE 1-Schematic Diagram of System of Accounts

<u>Account</u>	<u>Beneficial and adverse effects</u>
National economic development.	(See table 2 for example display of effects by component.)
Environmental quality.	(See table 3 for example display of effects by component.)
Regional development Region 1. Region 2. Rest of Nation.	(See table 4 for example display of effects by component.)
Social well-being	(See table 5 for example display of effects by component.)

TABLE 2-Beneficial and Adverse Effects for a Plan (Use Additional Tables for Each Alternative Plan)

<u>National Economic Development</u>	
<u>Components</u>	<u>Measures of effects</u>
Beneficial effects:	
A. The value of increased outputs of goods and services. Examples include:	
(1) Flood control-----	\$1,000,000
(2) Power-----	1,000,000
(3) Water supply-----	1,000,000
(4) Irrigation-----	1,000,000
(5) Recreation-----	1,000,000

(6) Use of labor resources otherwise unemployed or underemployed in construction or installation of the plan-----	1,000,000
B. The value of output resulting from external economies, Examples include:	
(1) Economies of scale in subsequent processing ----	1,000,000
(2) Reduced transportation costs as result of road relocation-----	1,000,000
Total beneficial effects---	<u>3,000,000</u>
Adverse effects:	
A. The value of resources required for a plan. Examples include:	
(1) Project construction and OM&R-----	3,000,000
(2) Project pumping power---	1,000,000
(3) Labor resources displaced and subsequently unemployed-----	500,000
B. Losses in output resulting from external diseconomies. Examples include:	
(1) Diseconomies of scale in subsequent processing for displaced activities-----	500,000
(2) Increased transportation costs as result of road relocation-----	1,000,000
Total adverse effects---	<u>6,000,000</u>
Net beneficial effects-----	<u>2,000,000</u>

**TABLE 3. -Beneficial and Adverse Effects for a Plan
(Use Additional Tables for Each Alternative Plan)**

<u>Environmental Quality</u>	
<u>Components</u>	<u>Measures of effects</u>
Beneficial and adverse effects:	Example include:
A. Open and green space, wild and scenic rivers, lakes beaches, shores, mountains and wilderness areas, estuaries, and other areas of natural beauty.	<ol style="list-style-type: none"> 1. Create lake with 3,500 surface acres, 70 miles of shoreline, and depth of 80 feet, with high quality water and excellent access. 2. Create 600 acres of open and green space along creek, 1,000 to 1,5000 feet wide, with good access and located 4 miles from city. 3. Inundate 3,500 acres of open and green space, 10 miles long and 1/2-mile wide, located along stream and near city.
B. Archeological, historical, biological, and geological resources and selected ecological systems.	Example include: <ol style="list-style-type: none"> 1. Preserve recognized historical archeological feature and enhance access to feature. 2. Enhance wildlife habitat by acquisition of 500 acres mixed forest, pastureland; construction of three small ponds with 50 surface acres expected to maintain duck and pheasant population of 5,000 and 10,000 birds, respectively. 3. Disrupt 3,000 acres of wildlife habitat due to interior access roads and adjacent picnicking and camping sites, with

possible decrease in deer, pheasant, and duck population.

C. The quality of water, land, and air resources.

Example include:

1. Meet State water quality standards over 200 miles of stream below reservoir.
2. Enhance esthetic appeal of land adjacent to reservoir by selected clearing and enhance visual enjoyment by unique design and location of access roads.
3. Prevent erosion by provision of 500 acres of grassed waterways and implementation of crop rotation practices on 5,000 acres of land.
4. Increase salt concentration over 50 miles of stream from X p. p. m. to Y p. p. m. due to salt load in return flows.
5. Increase erosion over 2,000 acres due to access road borrow pits and denuded recreation sites as a result of expected concentrated use; silt load downstream of reservoir estimated to increase X tons per year.

D. Irreversible commitments of resources to future uses.

Example include:

1. Preserve low cost reservoir site by recommending development of well field for municipal water supply at slightly greater cost to the national economic development objective.

2. Reservoir is to be located at site with some unique species of plants and wilderness qualities due to limited access but which is a very efficient reservoir site.

TABLE 4.--BENEFICIAL AND ADVERSE EFFECTS FOR A PLAN
(USE ADDITIONAL TABLES FOR EACH ALTERNATIVE PLAN)
REGIONAL DEVELOPMENT

Components	Measurement of Effects										Rest of Nation	Summary
	Region 1 (Planning Area)					Region 2 (Adjacent Area)						
	Total	Direct Users			Other	Total	Direct Users			Other		
	Farm	City	Rec.			Farm	City	Rec.				
Income:												
A. Beneficial effects:												
a. The value of increased outputs of goods and services from a plan to the users residing in the region under consideration. Examples include:												
Flood control	\$400,000	\$100,000	\$300,000	\$ 0	\$ 0	\$300,000	\$ 0	\$300,000	\$ 0	\$ 0	\$300,000	\$1,000,000
Power	500,000	100,000	400,000	0	0	500,000	100,000	400,000	0	0	0	1,000,000
Water supply	1,000,000	0	1,000,000	0	0	0	0	0	0	0	0	1,000,000
Irrigation	500,000	500,000	0	0	0	500,000	500,000	0	0	0	0	1,000,000
Recreational	400,000	0	0	400,000	0	300,000	0	0	300,000	0	300,000	1,000,000
1. The value of output in the region under consideration resulting from the use in construction or installation of the plan of labor resources otherwise unemployed or underemployed. Examples include:												
Employment for project construction	1,000,000	0	0	0	1,000,000	0	0	0	0	0	0	1,000,000
2. Additional net income accruing to the region under consideration from the construction or implementation of a plan and from other economic activities induced by operations of a plan. Examples include:												
Expenditures by imported construction workers and subsequent net regional income impacts	+1,000,000	0	0	0	1,000,000	0	0	0	0	0	-1,000,000	0
Expenditures by imported recreationists and subsequent net regional income impacts	+500,000	0	0	0	500,000	+500,000	0	0	0	500,000	-1,000,000	0
b. The value of output to the region under consideration resulting from external economies. Examples include:												
Economies of scale in subsequent processing	500,000	0	0	0	500,000	500,000	0	0	0	500,000	0	1,000,000
Reduced transportation costs as result of road relocation	1,000,000	0	0	0	1,000,000	0	0	0	0	0	0	1,000,000
Total beneficial effects	\$6,800,000	\$700,000	\$1,700,000	\$400,000	\$4,000,000	\$2,600,000	\$600,000	\$700,000	\$300,000	\$1,000,000	-\$1,400,000	\$8,000,000

116

Table 4.-- Beneficial and Adverse Effects for a Plan -- Continued

Components	Measurement of Effects											Rest of Nation	Summary
	Region 1 (Planning Area)					Region 2 (Adjacent Area)							
	Total	Direct Users			Other	Total	Direct Users			Other	State, Local Gov't.		
	Farm	City	Rec.			Farm	City	Rec.					
B. Adverse effects:													
a. The value of resources contributed from within the region under consideration to achieve the outputs of a plan. Examples include:													
Lands, assessments, rights-of-way	\$ 500,000	\$ 0	\$ 0	\$ 0	\$ 0	\$ 500,000	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 500,000	
General taxes	250,000	0	0	0	0	250,000	0	0	0	0	250,000	1,000,000	
1. Payment through taxes, assessments, or reimbursement by the region under consideration for resources contributed to the plan from outside the region. Examples include:													
Power reimbursement	250,000	250,000	0	0	0	250,000	250,000	0	0	0	0	500,000	
Water supply reimbursement	500,000	0	500,000	0	0	0	0	0	0	0	0	500,000	
Irrigation repayment	250,000	250,000	0	0	0	250,000	250,000	0	0	0	0	500,000	
Ad valorem taxes	500,000	0	0	0	0	500,000	0	0	0	0	0	500,000	
2. Loss of assistance payments from sources outside the region to otherwise unemployed or underemployed resources and displaced resources residing in the region under consideration. Examples include:													
Loss of State unemployment compensation:													
(a) Employment for project construction by O&M	+500,000	0	500,000	0	0	0	0	0	0	0	0	-500,000	
(b) Employment in activities induced by and stemming from project operation	+250,000	0	250,000	0	0	+250,000	0	250,000	0	0	0	-500,000	
(c) Induced unemployment in displaced activities	-250,000	-100,000	-150,000	0	0	-250,000	-100,000	-150,000	0	0	0	+500,000	

117

Table 4.-- Beneficial and Adverse Effects for a Plan -- Continued

Components	Measurement of Effects											Rest of Nation	Summary	
	Region 1 (Planning Area)						Region 2 (Adjacent Area)							
	Total	Direct Users			Other	State Local Gov't.	Total	Direct Users			Other			State Local Gov't.
	Farm	City	Rec.				Farm	City	Rec.					
3. Losses in output in the region under consideration resulting from labor resources displaced and subsequently unemployed. An example is: Induced unemployment in displaced activities -----	300,000	100,000	200,000	0	0	0	200,000	100,000	100,000	0	0	0	0	500,000
4. Loss of net income in the region under consideration from other economic activities displaced by construction or operation of a plan. An example is: Loss of net income in displaced activities induced by and stemming from agricultural operations inundated by project -----	+500,000	250,000	250,000	0	0	0	+500,000	250,000	250,000	0	0	0	0	0
b. Losses in output resulting from external diseconomies to users residing in the region under consideration. Examples include: Diseconomies of scale in subsequent processing for displaced activities-- Increased transportation costs as a result of road relocations -----	0	0	0	0	0	0	500,000	0	0	0	500,000	0	0	500,000
Total adverse effects -----	3,550,000	750,000	1,550,000	0	0	1,250,000	2,950,000	750,000	450,000	0	1,500,000	250,000	-500,000	6,000,000
Net beneficial effects--	\$3,250,000	\$ -50,000	\$ 150,000	\$ 400,000	\$4,000,000	\$1,250,000	\$-350,000	\$-150,000	\$ 250,000	\$ 300,000	\$-500,000	\$-250,000	\$-900,000	\$2,000,000

NOTE: Similarly, the incidence of beneficial and adverse effects for other components of the Regional Development account would be shown for appropriate groups or classes.

118

Table 4.-- Beneficial and Adverse Effects for a Plan -- Continued

Components	Measures of effects		
	Region 1 (Project area)	Region 2 (Adjacent area)	Rest of Nation
B. Employment:			
Beneficial effects:			
Increase in the number and types of jobs resulting from a plan in the region under consideration. Examples include:			
Employment for project construction-----	200 semiskilled jobs for 4 years	100 semiskilled jobs for 4 years	-200 semiskilled jobs for 4 years
Employment for project OM&R-	50 permanent semi-skilled jobs	5 permanent semi-skilled jobs	-5 permanent semi-skilled jobs
Employment in service and trade activities induced by and stemming from project operation	900 permanent semi-skilled jobs	95 permanent semi-skilled jobs	-45 permanent semi-skilled jobs
Total beneficial effects-----	200 semiskilled jobs for 4 years 950 permanent semi-skilled jobs	100 semiskilled jobs for 4 years 100 permanent semi-skilled jobs	-200 semiskilled jobs for 4 years -50 permanent semi-skilled jobs

- Continued

119

Table 4.--Beneficial and Adverse Effects for a Plan -- Continued

Components	Measure of effects		
	Region 1 (Project area)	Region 2 (Adjacent area)	Rest of Nation
Adverse effects: Decrease in the number and types of jobs resulting from a plan in the region under consideration. An example is:			
Employment in displaced activities induced by and stemming from agricultural operations inundated by project.	50 permanent semi-skilled jobs	-----	-50 permanent semiskilled jobs
Net beneficial effects-----	200 semiskilled jobs for 4 years 900 permanent semi-skilled jobs	100 semiskilled jobs for 4 years 100 permanent semi-skilled jobs	-200 semiskilled jobs for 4 years

120

- Continued

Table 4.--Beneficial and Adverse Effects for a Plan -- Continued

Components	Measure of effects		
	Region 1 (Project area)	Region 2 (Adjacent area)	Rest of Nation
C. Population distribution			
Beneficial and adverse effects: Population distribution within the region under consideration and among regions in the Nation. Examples include:			
1. Create 1,000 permanent jobs supporting a population of 3,500 people in a region which historically has had a high rate of out migration.	-----		-500 permanent jobs and population of 1,750 people
2-----		Induced traffic as result of reduced transportation costs estimated to increase production of steel by x tons, involving y employment and z population in city which is highly industrialized presently	-y permanent jobs and z population

121

- Continued

Table 4.--Beneficial and Adverse Effects for a Plan -- Continued

Components	Measure of effects		
	Region 1 (Project area)	Region 2 (Adjacent area)	Rest of Nation
D. Regional economic base and stability:			
Beneficial and adverse effects:			
Economic base and economic stability of the region under consideration. Examples include:			
1. Create 500 permanent jobs in a new industry offering high income stable year-around employment resulting in diversification of employment base	Create 100 permanent jobs in a new industry offering high income stable year-around employment resulting in diversification of employment base		-100 permanent jobs
2. Create 100 permanent jobs in concentrated industry with seasonal employment	-75 permanent jobs		-25 permanent jobs

122

- Continued

Table 4.--Beneficial and Adverse Effects for a Plan -- Continued

Components	Measure of effects		
	Region 1 (Project area)	Region 2 (Adjacent area)	Rest of Nation
E. Environmental conditions of special regional concern:			
Beneficial and adverse effects:			
The quality of water resources.			
Examples include:			
1. Meet State water quality standards over 50 miles of stream below reservoir	Meet State water quality standards over 100 miles of stream beginning 50 miles below reservoir	Meet State water quality standards over 50 miles of stream beginning 150 miles below reservoir	
2.-----	Increase in salt concentration over 25 miles of stream from point x to point y due to salt load in return flow	Increase in salt concentration over 25 miles of stream from point y to point z due to salt load in return flow	

123

Table 5.--Beneficial and Adverse Effects for a Plan
(Use Additional Tables for Each Alternative Plan)

Social Well-being																										
Components	Measures of effects																									
Beneficial and adverse effects:																										
A. Real income distribution.																										
Examples include:-----	<ol style="list-style-type: none"> 1. Create 1,000 low to medium income permanent jobs for unskilled and semiskilled workers. 2. Plan has distribution of benefits by income class over first 20 years of operation as follows: <table border="1"> <thead> <tr> <th>Income class (Dollars)</th> <th>Percentage of adjusted gross income in class</th> <th>Percentage benefits in class</th> </tr> </thead> <tbody> <tr> <td>Less than 3,000-</td> <td>11</td> <td>22</td> </tr> <tr> <td>3,000-10,000---</td> <td>62</td> <td>64</td> </tr> <tr> <td>More than 10,000</td> <td>27</td> <td>14</td> </tr> </tbody> </table> 3. Reimbursement, taxes, and lands, easements, and rights-of-way contributed by region 1 total \$2.25 million. These contributions have a distribution by income class as follows: <table border="1"> <thead> <tr> <th>Income class (Dollars)</th> <th>Percentage of adjusted gross income in class</th> <th>Percentage contributions in class</th> </tr> </thead> <tbody> <tr> <td>Less than 3,000-</td> <td>11</td> <td>25</td> </tr> <tr> <td>3,000-10,000---</td> <td>62</td> <td>60</td> </tr> <tr> <td>More than 10,000</td> <td>27</td> <td>15</td> </tr> </tbody> </table> 		Income class (Dollars)	Percentage of adjusted gross income in class	Percentage benefits in class	Less than 3,000-	11	22	3,000-10,000---	62	64	More than 10,000	27	14	Income class (Dollars)	Percentage of adjusted gross income in class	Percentage contributions in class	Less than 3,000-	11	25	3,000-10,000---	62	60	More than 10,000	27	15
Income class (Dollars)	Percentage of adjusted gross income in class	Percentage benefits in class																								
Less than 3,000-	11	22																								
3,000-10,000---	62	64																								
More than 10,000	27	14																								
Income class (Dollars)	Percentage of adjusted gross income in class	Percentage contributions in class																								
Less than 3,000-	11	25																								
3,000-10,000---	62	60																								
More than 10,000	27	15																								
B. Life, health and safety.																										
Examples include:-----	<ol style="list-style-type: none"> 1. Provision of 100-year flood protection to city. 2. Production of x tons of fresh vegetables during winter months. 3. Create 10 small pools with drawdown of reservoir with attendant increase in mosquito population. 																									

- Continued

Table 5.--Beneficial and Adverse Effects for a Plan -- Continued

Components	Measures of effects
C. Educational, cultural, and recreational opportunities: Beneficial and adverse effects: Examples include-----	<ol style="list-style-type: none"> 1. Create diversity of recreational opportunity by provision of (a) 10,000 man-days boating; (b) 5,000 man-days fishing; and (c) 20,000 man-days picnicking. Reduce excessive use of recreation facilities on peak days and thereby improving aesthetic quality of recreation experience at existing facilities. 2. Influx of 500 construction workers will place severe burden on educational facilities over 4-year construction period.
D. Emergency preparedness. Examples include:-----	<ol style="list-style-type: none"> 1. Provide 100 mw, hydroelectric power centrally located in region not dependent upon importation and movement of fuel. 2. Proposed plan for preservation of scenic river will require using optimum sustained yield of groundwater resources to serve anticipated population over next 20 years.

Table 6.--Summary Comparison of Two Alternative Plans
(Use Additional Table for Each Relevant Comparison)

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
National Economic Development:			
Beneficial effects-----	\$5,000,000	\$8,000,000	+\$3,000,000
Adverse effects-----	5,000,000	6,000,000	+ 1,000,000
Net beneficial effects-----	0	2,000,000	+ 2,000,000
Environmental Quality:			
(Use same component stubs for beneficial and adverse effects as illustrated in table 3. Examples follow.)			
Beneficial and adverse effects:			
A. Open and green space, lakes	A. Create lake with 3,000 surface acres, 60 miles of shoreline and depth of 70 feet with high quality water and excellent access.	A. Create lake with 3,500 surface acres, 70 miles of shoreline and depth of 80 feet with high quality water and excellent access.	A. Create larger lake by 500 surface acres, 10 miles of shoreline and 10 feet of depth. Either plan would have high quality water and excellent access.

126

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
Beneficial and adverse effects: (Con'd.)			
A. Open and green space, lakes - Continued		Inundate 3,500 acres of open and green space, 10 miles long and 1/2 mile wide, located along stream and near city.	Inundate 3,500 acres of open and green space, 10 miles long and 1/2 mile wide, located along stream and near city.
B. Archeological resources:	B. Inundate recognized historical archeological feature.	-----	B. Do not inundate recognized historical archeological feature.

127

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
Regional Development:			
Region 1 - Components			
A. Income:			
Beneficial effects-----	\$5,000,000	\$6,800,000	+\$1,800,000
Adverse effects-----	3,000,000	3,550,000	+550,000
Net beneficial effects---	2,000,000	3,250,000	+1,250,000
B. Employment:			
Beneficial effects:			
Project construction employment-----	1. 300 semiskilled jobs for 3 years.	1. 200 semiskilled jobs for 4 years.	1. -100 semiskilled jobs per year for 3 years, but +200 semiskilled jobs for 1 year.
Project O&M employment-----	2. 40 permanent semi-skilled jobs.	2. 50 permanent semi-skilled jobs.	2. +10 permanent semi-skilled jobs.
Employment in service and trade activities induced by and stemming from project operation---	3. 850 permanent semiskilled jobs	3. 900 permanent semiskilled jobs.	3. +50 permanent semiskilled jobs.

128

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
B. Employment - (Con'd.)			
Adverse effects:			
Employment in activities induced by and stemming from displaced agricultural operations-----	1. 15 permanent semi-skilled jobs.	1. 50 permanent semi-skilled jobs.	1. +35 permanent semi-skilled jobs.
Net beneficial effects---	1. 300 semiskilled jobs for 3 years.	1. 200 semiskilled jobs for 4 years.	1. -100 semiskilled jobs per year for 3 years, but +200 semiskilled jobs for 1 year.
	2. 875 permanent semiskilled jobs.	2. 900 permanent semiskilled jobs.	2. +25 permanent semiskilled jobs.

129

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recom- mended plan minus Plan B)
C. Population distribution:			
D. Regional economic base and stability: Beneficial and adverse effects by component evaluated in Table 4 would be compared for the alternative plans and differences between plans noted.			
E. Environmental conditions of special regional concern:			
Region 2 - Components			
A. Income:			
Beneficial effects-----	\$2,500,000	\$2,600,000	+\$ 100,000
Adverse effects-----	2,600,000	2,950,000	+ 350,000
Net beneficial effects----	- 100,000	- 350,000	- 250,000

130

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended Plan	Difference (recom- mended plan minus Plan B)
B. Employment:			
Beneficial effects:			
Project construction employment-----	1. 100 semiskilled jobs for 3 years.	1. 100 semiskilled jobs for 4 years.	1. Same number of semiskilled jobs per year for 3 years, but + 100 semiskilled jobs for 1 year.
Project O&M employ- ment-----	2-----	2. 5 permanent semi-skilled jobs.	2. + 5 permanent semi-skilled jobs.
Employment in service and trade activities induced by and stem- ming project operation.-----	3. 80 permanent semi-skilled jobs.	3. 95 permanent semi-skilled jobs.	3. + 15 permanent semi-skilled jobs.

131

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
B. Employment - (Con'd.)			
Adverse effects:			
Employment in activities induced by and stemming from displaced agricultural operations-----	1. 5 permanent semi-skilled jobs.	-----	1. -5 permanent semi-skilled jobs.
Net beneficial effects---	1. 100 semiskilled jobs for 3 years.	1. 100 semiskilled jobs for 4 years.	1. Same number of semi-skilled jobs per year, for 3 years, but + 100 semiskilled jobs per year for 1 year.
	2. 75 permanent semiskilled jobs.	2. 100 permanent semiskilled jobs.	2. 25 permanent semiskilled jobs.

132

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
C. Population distribution:			
D. Regional economic base and stability:			
Beneficial and adverse effects by component evaluated in Table 4 would be compared for the alternative plans and differences between plans noted.			
E. Environmental conditions of special regional concern:			

133

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recom- mended plan minus Plan B)
Rest of Nation - Components			
A. Income:			
Beneficial effects-----	- \$ 500,000	- \$1,400,000	- \$ 900,000
Adverse effects-----	700,000	+ 500,000	- 1,200,000
Net beneficial effects----	- 1,200,000	- 900,000	+ 300,000
B. Employment:			
Beneficial effects:			
Project construction employment-----	1. - 300 semiskilled jobs for 3 years.	1. - 200 semiskilled jobs for 4 years.	1. + 100 semiskilled jobs for 3 years, but - 200 semiskilled jobs for 1 year.
Project O&M employ- ment-----	2-----	2. - 5 permanent semi- skilled jobs.	2. - 5 permanent semi- skilled jobs.
- Continued			

134

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recom- mended plan minus Plan B)
B. Employment - (Con'd.)			
Beneficial effects - (Con'd.)			
Employment in service and trade activities induced by and stemming from project operation----	3. - 25 permanent semiskilled jobs.	3. - 45 permanent semiskilled jobs.	3. - 20 permanent semiskilled jobs.
Adverse effects:			
Employment in activities induced by and stem- ming from displaced agricultural opera- tions-----	1. - 15 permanent semiskilled jobs.	1. - 50 permanent semiskilled jobs.	1. -35 permanent semiskilled jobs.
Net beneficial effects---	1. - 300 semiskilled jobs for 3 years.	1. - 200 semiskilled jobs for 4 years.	1. + 100 semiskilled jobs for 3 years, but - 200 semiskilled jobs for 1 year.
	2. - 10 permanent semiskilled jobs.	1. 0 permanent semiskilled jobs.	2. + 10 permanent semiskilled jobs.
- Continued			

135

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
C. Population distribution:			
D. Regional economic base and stability: Beneficial and adverse effects by component evaluated in Table 4 would be compared for the alternative plans and differences between plans noted.			
E. Environmental conditions of special regional concern:			

136

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
Social Well-being Components (Use same component stubs for beneficial and adverse effects as illustrated in Table 5. Examples follow.)			
Beneficial and Adverse effects:			
A. Real income distribution-----	A. Plan is neutral in distribution of benefits by income class over first 20 years' operation with percentage distribution of benefits by income class the same as percentage distribution of adjusted gross income in class.	A. Plan has distribution of benefits by income class over first 20 years of operation as follows: (Con'd. on next page)	A. Increase distribution of real income to low income persons.

137

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
A. Real income distribution (Con'd.)			
	Following table is reflected under "Recommended plan"		
	Income class (Dollars)	Percentage of adjusted gross income in class	Percentage benefits in class
	Less than 3,000---	11	22
	3,000-10,000----	62	64
	More than 10,000--	27	14
B. Life, health, and safety			
	B. Provide 100-year flood protection to city.	B. Provide 50-year flood protection to city.	B. Do not provide 100-year flood protection to city; provide 50-year flood protection to city.

138

- Continued

Table 6.--Summary Comparison of Two Alternative Plans -- Continued

Account	Plan B	Recommended plan	Difference (recommended plan minus Plan B)
C. Educational, cultural and recreational opportunities:			
	C. Create diversity of recreational opportunity by provision of (a) 7,500 man-days boating, (b) 4,000 man-days fishing, and (c) 20,000 man-days picnicking.	C. Create diversity of recreational opportunity by provision of (a) 10,000 man-days boating, (b) 5,000 man-days fishing, and (c) 20,000 man-days picnicking.	C. + 2,500 man-days boating and + 1,000 man-days fishing.
D. Emergency preparedness:			
	D. Plan would require using optimum sustained yield of ground water resources to serve anticipated population over next 30 years with potential for overloading capacities of water resource systems.	D. Provide x kilowatts hydroelectric power generating capacity centrally located in region requiring importation of coal for conventional thermal plants.	D. Do not require use of optimum sustained yield of ground water resources; provide x kilowatts hydroelectric power generating capacity.

139

VII. COST ALLOCATION, REIMBURSEMENT, AND COST SHARING

On the basis of the identification provided for in the system of accounts for beneficial and adverse effects, an allocation of appropriate costs shall be made when an allocation of costs is required for purposes of establishing reimbursement levels, pricing policies, or cost sharing between the Federal Government and non-Federal public and private interests. All components of the national economic development and the environmental quality objectives shall be generally treated comparably in cost allocation and are entitled to their fair share of the advantages resulting from a plan.

Reimbursement and cost-sharing policies shall be directed generally to the end that identifiable beneficiaries bear an equitable share of costs commensurate with beneficial effects received in full cognizance of the objectives. Since existing cost-sharing policies are not entirely consistent with the two objective approach to planning water and land resources, these policies will be reviewed and needed changes will be recommended.

A. Cost Allocation

1. Introduction. The existence of joint contributions toward objectives and their components requires that an allocation of appropriate costs of a plan be made for purposes of establishing reimbursement levels, pricing policies, or cost sharing between the Federal Government and non-Federal interests. Thus, when legislative or administrative policies regarding reimbursement, pricing levels, or cost sharing apply to a proposed plan an allocation of appropriate costs shall be made. If such policies do not apply, no allocation of costs is necessary unless required for other administrative reasons.

For purposes of cost allocation, only the costs included in the national economic development account will be allocated between objectives and their components. Appropriate costs comprising the allocation of national economic development costs to the objectives and their components will be identified for purposes of applying specific reimbursement and cost-sharing policies.

Objectives and their components will generally be treated comparably in the cost allocation with respect to the identification of alternatives, the evaluation of alternatives, and the determination of incremental and/or separable costs. However, the national economic development objective serves as the baseline for cost allocation since only national economic development costs are allocated.

2. Summary of the cost allocation method. The cost allocation method described herein is a modification and extension of the separable costs-remaining benefits method of cost allocation which has been used to allocate costs of a multi-purpose project to purposes served by the project.

In the two objective setting, cost allocation becomes a two-stage process involving the allocation of costs between objectives and then the further allocation of costs among components of objectives. The system of accounts showing beneficial and adverse effects for alternative plans will usually provide much of the information needed in this process. This is particularly true for incremental and separable costs which may be determined by comparing the appropriate alternatives including the alternative of no plan.

Under the first stage, the method provides for the allocation of national economic development costs between the objectives. For cases when features of a plan are included to serve the environmental quality objective and at the same time contribute incidentally to the national economic development objective, the method provides that the net incremental costs of such features be allocated to the environmental quality objective. Case 1, attached, is an example relating to this circumstance.

For cases when features of a plan are designated to serve the environmental quality objective at the loss of net beneficial effects on the components of the national economic development objective served by the plan, and for cases when the entire plan is designated to serve the environmental quality objective at the loss of net beneficial effects on national economic development, the method provides that costs equivalent to the net national economic development beneficial effects foregone be allocated to the environmental quality objective. Case 2, attached, is an example relating to the first circumstance. In the second circumstance, if the plan is unjustified in terms of the national economic development objective, and no alternative formulation can be developed that is justified in terms of this objective but the plan is recommended in view of net contributions to the environmental quality objective, then the estimation of net national economic development beneficial effects foregone should be based on the assumption that marginal benefits of alternative uses of resources required for the recommended plan are equal to the costs of those resources.

Under the second stage the method provides for the further allocation of national economic development costs allocated to the two objectives in stage 1 among the components of the objectives. In the case of the environmental quality objective, this would be done by allocating to each

component of that objective a share of the national economic development cost based on the costs, comparably evaluated, of the alternative means most likely to be undertaken in the absence of the plan of obtaining the beneficial effects attributable to each component. In the case of the national economic development objective, costs would be allocated among the components of the objective using the separable costs-remaining benefits method of cost allocation essentially as applied in the past.

3. The cost allocation method

a. Cost allocation among objectives. When features of a plan are included to serve the environmental quality objective or its components which are not economically justified, the environmental quality objective shall be allocated.

Not less than the incremental national economic development costs net of any incidental incremental national economic development beneficial effects of achieving the beneficial effects attributable to the environmental quality objective determined by identifying on a last added basis, the national economic development costs and beneficial effects of increments of scale of a plan intended primarily to serve such objectives.

When features of a plan are designated to serve the environmental quality objective or its components at the loss of net beneficial effects on the components of the national economic development objective served by the plan, or when the entire plan is designated to serve the environmental quality objective or its components at the loss of net beneficial effects on national economic development, costs equivalent to the net national economic development beneficial effects foregone shall be allocated to the environmental quality objective.

Following is an example table illustrating how the national economic development costs allocated to the two objectives may be displayed for the major alternative plans.

Table 1.--A Display of National Economic Development Costs Allocated to the Two Objectives for the Major Alternative Plans

	NED	EQ	Total Allocated
Plan A:			
Plan element:			
1-----			
2-----			
3-----			
N-----			
Plan B:			
Plan element:			
1-----			
2-----			
3-----			
N-----			
Plan C:			
Plan element:			
1-----			
2-----			
3-----			
N-----			

b. Cost allocation among components

(1) Of the national economic development objective. National economic development costs allocated to the national economic development objective under the procedures discussed above for stage 1 shall be further allocated among components of that objective in the following manner:

Each component of the national economic development objective served by a plan shall be allocated -

Not less than the separable national economic development costs of achieving the beneficial effects, attributable to each component determined under the assumption that each component is in turn omitted last from the plan, adjusted downward by an amount equivalent to the national economic development costs allocated to the environmental quality objective in the first stage of the cost allocation method in cases when a desired contribution to such objective stems directly from the provision of service to a national economic development component.

Nor more than the lesser of the beneficial effects or the costs, comparably evaluated, of the alternative means most likely to be undertaken in the absence of the plan of obtaining the beneficial effects attributable to each component.

Remaining joint national economic development costs (the total national economic development costs allocated to the national economic development objective in stage 1 less the sum of the separable national economic development costs determined for each component of that objective) shall be allocated among all components in proportion to the lesser of beneficial effects or alternative costs less any separable costs previously allocated to each component of the national economic development objective.

In the allocation of costs among components of the national economic development objective, it would be appropriate in most instances with respect to the two components for external economies and unemployed or underemployed resources, to assume that alternative national economic development costs would be equal to such benefits evaluated for these components and that separable national economic development costs for these two components would be zero.

(2) Of the environmental quality objective. When required for establishing reimbursement levels, pricing policies, or cost sharing, the costs allocated to the environmental quality objective in stage 1 will be further allocated among components of such objective in proportion to the costs, comparably evaluated, of the alternative means most likely to be undertaken in the absence of the plan of obtaining the beneficial effects attributable to each component.

Following is an example table illustrating how the national economic development costs allocated to the components of the objectives may be displayed for the major alternative plans.

Table 2.--A Display of National Economic Development Costs Allocated to the two Objectives and Their Components for the Major Alternative Plans

	Allocated to	
	NED	EQ
Plan A:		
Plan element 1-----	Water supply Flood control Recreation External economies Unemployed labor resources Et cetera	Water quality Open and green space Wild rivers Wetlands Archeological features Et cetera
	Total	Total
Plan element: 2----- 3----- N-----		
Plan B:		
Plan element: 1----- 2----- 3----- N-----		
Plan C:		
Plan element: 1----- 2----- 3----- N-----		

4. Definitions

a. Components. Components of the environmental quality objective comprise the specific beneficial contributions toward this objective in a particular planning setting. For purposes of cost allocation, components of the national economic development objective include the more traditional purposes such as power, water supply, flood control, recreation, irrigation, etc.; and two components which encompass the categories of beneficial effects for external economic and beneficial effects from the use of otherwise unemployed or underemployed labor resources.

b. Alternatives. The costs of selected alternative means of obtaining the contributions to component of an objective provide a limit on the costs to be allocated to an objective or component of an objective. The costs of selected alternative means of obtaining the contributions to one or more objectives or components are also determined to identify the incremental costs for the environmental quality objective or its components and the separable costs for the components of the national economic development objective.

A range of possible alternatives to meet needs and problems, including types of measures and alternatives capable of application by various levels of government and by nongovernmental interests, should be considered. The alternative means of obtaining the relevant contributions to the objectives to be selected for the above determinations should be those which would be physically displaced or economically precluded by the proposed plan and those which would likely be undertaken in the absence of the proposed plan.

The alternative means selected for the above determinations which would likely be physically displaced or economically precluded with implementation of the proposed plan, or increments thereto, will be evaluated on a comparable basis with the proposed plan with respect to their beneficial and adverse effects on the objectives, including the treatment of national economic development costs and the discount rate used in the evaluation.

Taxes foregone on Federal alternatives and taxes paid on non-Federal alternatives will be excluded from such evaluations for the national economic development objective.

c. Incremental costs. For purposes of cost allocation, incremental costs are defined as the national economic development costs of including features in a plan intended primarily to serve the environmental quality objective. Such incremental costs will be determined under the assumption that such objective is served in turn last. Gross incremental costs for the environmental quality objective are the total incremental costs of features included

in a plan primarily for that objective. Net incremental costs represent the gross incremental cost for the environmental quality objective less any incidental incremental national economic development beneficial effects that accrue as a result of including features in a plan for such objective.

d. Separable costs. Separable costs are defined as the difference between the national economic development costs of a plan and the national economic development costs of the plan with each component of the national economic development objective in turn omitted, adjusted downward by an amount equivalent to the national economic development costs allocated to the environmental quality objective in the first stage of the cost allocation method in cases when a desired contribution to such objective stems directly from the provisions of service to a national economic development component.

e. Remaining joint costs. Remaining joint costs are defined below as they apply to stage 2 of the cost allocation method described herein.

For allocation of costs among components of the national economic development objective, remaining joint costs are defined as the difference between the total national economic development costs allocated to the national economic development objective in the first stage of the cost allocation method and the sum of the separable costs determined for the components of the national economic development objective.

5. Application of the cost allocation method. The cost allocation method described herein shall be applied to all multiobjective reservoir projects or plans. In the case of other types of projects or plans where currently some variation of the separable costs-remaining benefits method of cost allocation is used, or another procedure to allocate project economic costs among project purposes is used, national economic development costs allocated to the national economic development objective under stage 1 of the method described herein, may continue to be allocated among components of the national economic development objective following those procedures.

6. Review of cost allocations. Cost allocations will be reviewed to the extent appropriate when new contributions are made to objectives or their contributions cease, or when there is a material change in the level of contributions made toward the objectives and their components served by a project or plan. A revised cost allocation or a modification of the existing allocation will be made if, as the result of such review, it appears that a significant inequity may result if the existing allocation is not revised or modified. Due consideration will be given, in the event of a revision or modification of an existing allocation, to the relative periods of time over which contributions are made to the various objectives and their components.

The standards followed for the existing allocation will generally be followed in the revised allocation.

In the case of minor modifications, such as the withdrawal of water for municipal water supply from existing storage space, costs may be assigned to the new component in proportion to some comparable measure of use such as storage capacity, or on the basis of the value of the contributions made. If contributions to the new component result in a reduction in the contributions made to an existing reimbursable component, the cost assigned to the new component should be no less than the loss in revenues for the existing component.

7. Case examples. Attached to this section are two case examples illustrating the use of the cost allocation method described herein.

B. Reimbursement and Cost Sharing

1. General. Current reimbursement and cost-sharing policies are being reviewed in their entirety. The basis for reimbursement and cost sharing now required, the need for adjustment of these policies, the need for new reimbursement and cost-sharing policies for the environmental quality objective and its components or entirely new approaches and appropriate repayment arrangements and interest rates for repayment are being reviewed. Until this comprehensive review is completed and approved, all current reimbursement and cost-sharing policies are considered to be in full force and effect.

ILLUSTRATION OF COST ALLOCATION METHOD

Case 1.--Incremental scale included in plan intended primarily to serve environmental quality objective.

A. Project Data

	NED Plan A	Recommended Plan B
NED Objective:		
Beneficial effects:		
FC-----	\$50	\$50
Recreation-----	20	30
Power-----	30	40
Total-----	\$100	\$120
Adverse effects:		
Project construction and OM&R-----	50	90
Net beneficial effects----	50	30
EQ objective:		
Beneficial and adverse effects-----	1-----	1. Meet State water quality standards over 100-mile stream.
	2. 3,000 acres flat water.	2. 3,500 acres flat water.
	3. Inundate 10 miles free flowing stream.	3. Inundate 11 miles free flowing stream.

B. Allocation of NED Costs Between Objectives

1. Incremental NED costs and incidental incremental NED benefits associated with incremental scale included in Plan B intended to serve the environmental quality objective (reservoir capacity for downstream low flow augmentation):

	NED Plan A	Recom- mended Plan B	Differ- ence
NED objective:			
Benefits-----	\$100	\$120	\$20
Costs-----	50	90	40
Net benefits-----	50	30	-20

Thus:

Net incremental NED costs = \$20

2. Allocation of NED costs of Plan B:

Total NED costs of Plan B-----	\$90
Less net incremental NED costs of Plan B (allocated to EQ objective)-----	-20
Allocation of NED costs of Plan B to NED objective-----	\$70

C. Allocation of NED Costs Among Components of the NED Objectives

1. Separable NED costs for NED components:

	Plan B	Plan B with FC omitted	Plan B with recrea- tion omitted	Plan B with power omitted
Total NED costs	\$90	\$80	\$85	\$65

	Separable NED costs
Flood control-----	\$10
Recreation-----	5
Power-----	25
Total-----	\$40

2. Remaining joint NED costs of NED objective:

Total NED costs allocated to NED objective-----	\$70
Less total separable NED costs for NED components-----	-40
Remaining joint NED costs of NED objective-----	\$30

3. NED cost allocation table for Plan B for NED components:

	NED components			Total
	FC	Recreation	Power	
1. Benefits-----	\$50	\$30	\$40	\$120
2. Alternative NED costs---	20	50	30	100
3. Benefits limited-----	20	30	30	80
4. Separable NED costs----	10	5	25	40
5. Remaining benefits-----	10	25	5	40
Percent distribution-----	25	63	12	100
6. Remaining joint NED costs-----	7	19	4	30
7. Total allocated NED costs-----	17	24	29	70

Case 2.--Increment of scale in plan operated to serve environmental quality objective.

A. Project Data:

	Recommended plan with service to EQ objective deleted	Recommended Plan C
NED objective:		
Beneficial effects:		
FC-----	\$50	\$50
Recreation-----	30	20
Power-----	40	30
Total-----	\$120	\$100
Adverse effects:		
Project construction and OM&R-----	90	80
Net beneficial effects-----	30	20
EQ objective:		
Beneficial and adverse effects-----	1-----	1. Meets State water quality standards over 100 miles stream.
	2. 3,500 acres flat water.	2. 3,000 acres flat water.
	3. Inundate 11 miles free flowing stream.	3. Inundate 10 miles free flowing stream.

152

B. Allocation of NED Costs Between Objectives

1. Incremental NED costs and incidental incremental NED benefits associated with feature included in recommended plan operated to serve the environmental quality objective (reservoir capacity for downstream low flow augmentation):

	Recommended plan with service to EQ objective deleted	Recommended Plan C	Difference
NED objective:			
Benefits-----	\$120	\$100	-\$20
Costs-----	90	80	-10
Net benefits-----	\$ 30	\$ 20	-\$10

NOTE: In this case example it has been assumed that in the absence of providing service to the EQ objective the power and recreation components would be scaled within the plan to maximize net NED benefits. As shown above, additional incremental NED costs for specific power and recreation facilities to maximize these net benefits is assumed to be \$10 under an alternative operating plan where no provision is made for low flow releases. Incremental NED benefits for power and recreation is assumed to be \$20 under such an alternative operating arrangement.

A further implied assumption in this case example is that it is more efficient to forego power and recreation net benefits than it would be to add additional capacity in the reservoir to make low flow releases beyond that which maximizes power and recreation net NED benefits. This may frequently be the case, i.e., to increase reservoir capacity beyond that assumed for either alternative operating arrangements would be very costly due to, for example, major road, railroad, or bridge relocations.

In this situation where the recommended plan does not represent the inclusion of increments of scale for the EQ objective to a plan which has been scaled to maximize net NED benefits, but rather because of efficiency considerations involves a tradeoff between net NED benefits and contributions to the EQ objective, the concept of net incremental costs has to be viewed in terms of net NED benefits foregone.

153

Thus:

Net incremental NED costs = \$10

2. Allocation of NED costs of Plan C:

Total NED costs of Plan C-----	\$80
Less net incremental NED costs of Plan C (allocated to EQ objective)-----	<u>-10</u>
Allocation of NED costs of Plan C to NED objective----	\$70

C. Allocation of NED Costs Among Components of NED Objective

1. Separable NED costs for NED components:

	Plan C	Plan C with FC omitted	Plan C with recreation omitted	Plan C with power omitted
Total NED costs-----	\$80	\$70	\$75	\$60

	Separable NED costs
Flood control-----	\$10
Recreation-----	5
Power-----	<u>20</u>
Total-----	\$35

2. Remaining joint NED costs of NED objective:

Total NED costs allocated to NED objective-----	\$70
Less total separable NED costs for NED components-----	<u>-35</u>
Remaining joint NED costs of NED objective-----	\$35

3. NED cost allocation table for Plan C for NED components:

	NED components			Total
	FC	Recreation	Power	
1. Benefits-----	\$50	\$20	\$30	\$100
2. Alternative NED costs--	30	40	25	95
3. Benefits limited-----	30	20	25	75
4. Separable NED costs---	10	5	20	35
5. Remaining benefits----	20	15	5	40
Percent distribution----	50	38	12	100
6. Remaining joint NED costs-----	18	13	4	35
7. Total allocated NED costs-----	28	18	24	70

VIII. NATIONAL PROGRAM FOR FEDERAL AND FEDERALLY ASSISTED ACTIVITIES

A. Introduction

With an ideally developed system of planning in which national priorities and budget constraints were integrated with local and regional priorities, the approaches in the principles and standards would result in a national program of the appropriate emphasis and size. In the ideally developed system, there would be no necessity for a second round where national priorities and budget constraints are imposed on plans developed according to other priorities.

Since we are far from the ideal system of planning, an interim approach is described below.

Up to this point, these standards have been concerned with alternative plans for projects, States, regions, or river basins. The evaluation, systematic display, and comparison of alternative plans provide an indication of the priorities given the various objectives in selecting a recommended plan whether for projects, States, regions, or river basins. Such plans include both Federal and non-Federal activities and are of concern to all levels of government.

In formulating a national program of Federal and federally assisted activities for water and land resources, national priorities must be established among recommended project, State, region, or river basin plans. The system of accounts for beneficial and adverse effects for recommended plans, together with other criteria such as available budget resources, national policy toward environmental quality, or regional development or social well-being and public and private investment alternatives, will provide information needed for formulating a national program.

The Council will develop and put into operation a national programming system to support decisions as to long-range priorities for water and land resource activities. While the elements of such a system already exist in the member departments, what is needed is a common system to bring the information together and to insure that future field planning studies are consonant with the national system.

It is essential that the planning process not only articulate the full range of choice available for meeting any given level of needs, but that it also provide information which would be a basis for determining the order in which needs are to be fulfilled. Criteria for such selections

should flow from the decisions made in regard to the priorities assigned to the objectives.

Clearly, a choice exists as to which of the objectives are to be emphasized. However, having assigned priorities to these respective objectives, these decisions must then be related to the instruments available for policy implementation-the most important being the annual budget within which national priorities are reflected for all Federal and federally assisted activities.

The appropriation of funds to implement a particular plan represents the termination of one planning cycle and the initiation of another. For this reason, priorities established in the planning process may be reinforced or altered by subsequent budgeting decisions. Different types of priority decisions are required in each level of planning. Priority decisions in formulating plans for projects are responsive to the kinds and quantities of project outputs expected. In formulating plans for regions or river basins, priorities are established among alternative courses of action. In formulating national programs, priorities may be assigned among the various river basin plans which are in competition for the same limited funds.

B. Priorities in Plan Formulation

Formulation of plans for projects can be viewed as the process of selecting specific measures for meeting identified problems and needs. Since combinations of individual measures generate different effects in a geographic area and since a multitude of such combinations is possible, formulation of plans for projects requires that priorities be established not only in regard to the objectives which are to be emphasized in each alternative formulation, but also in regard to which of the alternative formulations are to be recommended. Therefore, it should be clear that priorities are necessarily established, either explicitly or implicitly, during the process of formulating project plans.

A plan for a region or river basin is a sequence of actions or measures which upon implementation will result in meeting the problems and needs for water and land resource development. The project level of planning accords priorities and subsequently selects (assigns a priority to) that formulation which makes the most beneficial contribution to those objectives considered to be most important. However, it is not until regional or river basin level of planning is undertaken that the resulting projects are accorded a priority in terms of their time phasing or sequence of implementation.

The problems and needs for water and land resource development vary among the different regions of the Nation, a major reason for this variance being the economic, social, and environmental conditions uniquely associated with different geographic areas. It is for this reason that water and land resource plans are formulated for and apply to well-defined geographic areas, either river basins or other designated regions.

Recognizing the existence of budget constraints, a choice must be made as to whether or not each plan is to progress toward completion at the same rate or whether plans for some regions are to progress at accelerated rates. Whatever the choice, it represents a priority decision in formulating a national program.

Since plans are directed toward meeting problems and needs in designated geographic areas, choosing priorities among regional or river basin plans reflects in practical terms, the assignment of priorities to geographic areas. Therefore, in the budgetary sense, national program formulation is the allocation of a multiyear budget among geographic areas.

C. Establishing Priorities

The President and the Congress, through the authorization, budgetary, and appropriation process, are ultimately responsible for assigning priorities for implementation of Federal activities. At an earlier stage, however, the Water Resources Council has certain responsibilities with regard to priorities. These standards amplify upon those responsibilities by requiring member agencies to formulate long-range national and regional programs for water and land resource activities.

1. Project plans. To assure that adequate data are available for subsequent steps in the process of national programing for water and land resource activities, it is essential in the process of formulating plans for a project that sufficient information with respect to the contributions that alternative plans make to the objectives be clearly developed and reported.

2. Basin plans. With respect to basin or regional plans, it is necessary to establish priorities among the various activities in a plan and to present a clear statement of their most effective sequence of implementation. Many basin plans have contained early action programs which single out the projects for more immediate needs. However, the criteria for this choice generally are not related to national priorities for water and land resource activities.

Under existing procedures, priorities for Federal and federally assisted activities are usually established by agency recommendations to the President and by specification in the President's annual budget messages to the Congress. Public review of these priorities is generally limited to testimony before the various congressional subcommittees which are considering the budget requests for a particular agency.

Since the priorities set forth in the Federal budget are usually limited to actions to be undertaken within an ensuing fiscal year, State and local planning groups are forced to make highly uncertain projections in regard to the future activities of Federal water and land programs. These standards provide that river basin commissions and entities designated by the Water Resources Council to perform the functions of a river basin commission recommend long-range schedules of priorities for the collection and analysis of basic data and for the investigation, planning, and construction of projects. State members of river basin commissions have a responsibility to participate in establishing the long-range schedule of priorities. These standards require that each Federal agency that is a member of a river basin commission or entity performing the functions of a commission participate in the preparation of such a long-range schedule of priorities. Such a schedule is to reflect priorities to be accorded to previously authorized projects, as well as those recommended for authorization during each 5-year period in the schedule. The recommended schedule of priorities should accompany all requests for congressional authorization and funding. A copy of the schedule should also be forwarded to the Governors of the appropriate States for review and comment.

3. National programs. The single most perplexing problem in water and land resource programing is the integration of regional and river basin plans into a national program of Federal and federally assisted activities for the management and use of the Nation's water and land resources. In order that the Council may make a continuing study of the relation of regional or river basin plans to the requirements of larger regions of the Nation and to the Nation as a whole, these standards require that each member of the Council prepare a 5-year national program of water and land resource activities for submission through the Council to the President. The 5-year program is to include an identification of priority activities for collection and analysis of basic data and for the investigations, planning, and construction of projects which are to be initiated in each region during the period. The amount of program funds to be allocated to a particular region or basin is not to be based upon a rigid mathematical formula but, consistent with the level of funds prospectively available, upon an assessment of the relative needs for water resource activities in the respective regions. The national program

and its regional allocations is to be continually reviewed and modified periodically to reflect the changing needs for water resource activities.

IX. COORDINATION AND REVIEW OF PLANNING STUDIES

A. Introduction

The success of water and related land resources planning depends on meaningful participation of interests concerned with each objective at each step in the planning process. The leaders for water and related land resource planning have the challenging responsibility of achieving such participation while managing effective planning studies and facilitating decisionmaking. This responsibility will require an aggressive program to involve all concerned interests in identifying an area's problems and needs, in planning alternative solutions, and in decisions as to action.

Federal planning and participation in planning will be carried out on a coordinated basis from the earliest consideration of planning needs and priorities through initiation of an investigation or survey and the entire process of planning and review. When warranted, joint Federal agency-State planning for regions or river basins will be arranged by the Council. Full advantage is to be taken of existing field organizations and arrangements for coordination, such as river basin commissions, other regional agencies or commissions, Federal-State interagency committees, interstate bodies, and State and local agencies. When any Federal agency initiates an investigation, it shall follow the Water Resources Council's standards for appropriate coordination and consideration of problems of mutual concern with other Federal agencies and with interested regional, State, and local public agencies and private interests.

B. National Program of Planning Studies

The Water Resources Council will prepare and keep up to date a national program of water and related land resource planning studies. This program will include a long-range schedule of priorities for:

1. Framework studies and assessments (Level A);
2. Regional or river basins plans (Level B); and
3. Implementation studies (Level C).

1. Framework studies and assessments. In accordance with section 102 of the Water Resources Planning Act, the Council will maintain a continuous study of water requirements and the adequacy of water supplies to meet them. The Council will publish periodically an assessment of the Nation's water and land resources, and will publish as needed framework studies and assessments for the major regions of the country.

The reports on framework studies and assessments will be prepared by the regional entities designated by the Council. The Council shall review such reports as to the adequacy of water supplies to meet requirements in the region; the relation of the regional programs to the larger regions of the Nation; the adequacy of administrative and statutory means for coordination among Federal agencies; the adequacy of existing policy and programs to meet such requirements; and other regional and national problems in the conservation, development, and utilization of water and land resources as the Council may determine.

Framework studies and assessments will be included in the periodic national assessment reports and as appropriate may be transmitted separately by the Council to the Congress.

2. Regional or river basin plans. As part of its comprehensive planning responsibilities, each river basin commission is directed under the Water Resources Planning Act to recommend long-range schedules of priorities for the collection and analyses of basic data and for investigation, planning, and construction of projects. Where commissions have adopted such long-range schedules, the Council and Federal departments and agencies shall use the commissions' recommendations in establishing priorities for regional or river basin plans. Planning leaders shall be provided by or designated by river basin commissions in their respective areas.

Where a river basin commission has not been established under title II of the Water Resources Planning Act, the Council may designate some other regional entity to perform the function of a river basin commission in recommending priorities for plans. Planning leaders shall be provided by or designated by the Council in these areas.

For regional or river basin plans, the Council will have prepared and will submit budgets with suitable statements of justifications for consideration in establishing the President's budget. These statements will outline a brief plan of study, including arrangements for study coordination and management.

When a budget for a regional or river basin plan has been approved, the Council will prepare terms of reference for the plan, provide or designate the planning manager, and prepare the coordination arrangements, including designation of participating Federal agencies and States. The planning manager shall submit a detailed plan prepared in accordance with the Council's Handbook for Regional or River Basin Plans for review and approval of the Council. The planning manager will be responsible for the efficient management of the plan and for organizing the study so that all concerned interests may participate in the planning process. When the components of the objectives of the regional or river basin plan have been identified, as provided in section V, Plan Formulation, the planning manager will prepare a statement of the specified components of the objectives and the probable effects of the plan on such objectives. A copy of this statement will be sent to the Water Resources Council and to the Council on Environmental Quality as a preliminary report under section 102(2)(C) of the National Environmental Policy Act of 1960.

The planning manager will submit completed reports of regional or river basin planning studies to the Water Resources Council for review. Copies shall be furnished to the Council on Environmental Quality.

The procedure for processing of reports from river basin commissions is presented below. For reports of studies in other areas, the Council will prepare its review report which may include modifications of the plan and after clearance with the Office of Management and Budget will transmit its report and the plan to the Congress for appropriate action.

a. River basin commission plan reports. These reports will be submitted to the Water Resources Council for review in accordance with the Water Resources Planning Act. Copies will be furnished to the Council on Environmental Quality. The Water Resources Council will prepare a report of its review which may include revision of plans for Federal projects included in the commission's plan.

The Council will review each plan prepared by a river basin commission with special regard to:

1. The efficacy of such plan in achieving optimum use of the water and land resources in the area involved;
2. The effect of the plan on the achievement of other programs for the development of agricultural, urban, energy, industrial, recreational, fish and wildlife, and other resources of the Nation; and

3. The contributions which such plan will make in achieving the Nation's economic and social goals.

The Council will formulate such recommendations as it deems desirable in the national interest and transmit them, together with the plan or revision of the river basin commission plan, and the views, comments, and recommendations with respect to such plan or revision submitted by any Federal agency, Governor, interstate commission, or U.S. section of an international commission, to the President for his review and transmittal to the Congress with his recommendations in regard to authorization of Federal projects.

b. Coordinated State plans. Federal agencies administering programs of Federal assistance to States and other public bodies shall report to the Council on pending applications the information required to carry out the Council's responsibility for coordination of Federal assistance programs and other Federal programs under the Water Resources Planning Act.

In carrying out its coordination function, the Council will encourage State planning agencies to submit a program for planning water and land resources which shows how Federal assistance from various sources is to be used with resources from State and other public bodies to accomplish State objectives. The Council will coordinate such State program proposals with proposed Federal planning to avoid duplication and to facilitate effective use of planning resources.

When a State program for use of Federal assistance has been approved by the Council, Federal agencies will be guided by the State program in approving applications for grants and other Federal assistance.

Copies of reports resulting from federally assisted planning shall be distributed for information by the Federal agency responsible for the program to the Water Resources Council, to the appropriate river basin commission, and to designated offices in member agencies. The Council will include a distribution list in its Handbook for Coordination of Planning Studies and Reports. These reports will be used for information in preparing the national planning program.

c. Handbook for regional and river basin plans. The Council will issue and keep up to date a Handbook for Regional or River Basin Plans. This handbook will set forth procedures for preparing work plans, establishing study management, preparing budgets, and the application of principles and standards in regional or river basin plans.

3. Implementation studies

a. Council coordination. To facilitate the coordination of water and land resources planning studies among the agencies represented on the Water Resources Council, the Federal agencies, on or before July 1 of each year, will exchange, through the Council, lists of implementation studies which are under consideration as proposed new planning starts for the fall budget submissions. The lists will include information concerning the type of study, study name, purpose, location, estimated duration, and a preliminary estimate of total cost. Information will be included on the relation of the proposed implementation study to priorities established by the Council on the basis of recommendations by river basin commissions or other regional entities and to State planning programs. On the basis of this information and the information on applications for federally assisted programs, the Council will prepare its recommendations, for "administrative use only," as to a national program of implementation studies that should be considered for initiation in the succeeding fiscal year.

Each Federal agency will (on an "administrative use only" basis) keep the Council informed of action on implementation studies included in the Council's recommended national program during the budgetary and appropriation process. When the appropriations have been approved, each Federal agency will advise the Water Resources Council which implementation studies have been funded, the assignment of study management, and any special coordination arrangements.

b. Field coordination of implementation studies. River basin commissions established under the Water Resources Planning Act serve as the principal agency for the field level coordination of Federal, State, interstate, local, and non-governmental planning efforts for the development of water and land resources in their areas of responsibility. Procedures to accomplish this will be developed by the commissions consistent with the Water Resources Planning Act and applicable rules, regulations, and guidelines of the Water Resources Council.

Where a river basin commission has not been established under title II of the Water Resources Planning Act, other entities may be requested by the Water Resources Council to coordinate planning studies.

The following are the minimum procedures for field level coordination and shall apply in those regions where a river basin commission has not been established, and may be used or adapted for use by a commission in the area where one has been established:

(1) Initiation of implementation studies. When any implementation study has been funded, the field office responsible for its initiation will inform the corresponding field offices of the other Federal departments and agencies, river basin commissions, States, and concerned local agencies of this action. This written communication will request a statement, within a specified period of time, as to what interests they may have in the proposed study, what pertinent data they may have or know about that can be made available, and what preliminary comments and suggestions on these subjects they may care to make.

(2) Coordination during studies. When the components of the objectives for an implementation study have been identified, as provided in section V. Plan Formulation, the planning organization will prepare a public statement of the specified components of the objectives and probable effects of the plan on such components. A copy of this statement will be sent to the Water Resources Council and to the Council on Environmental Quality for a preliminary report under section 102(2)(C) of the National Environmental Policy Act.

As the plan which is to be incorporated in the report is being formulated, the head of the field office responsible for the report will periodically communicate and arrange for mutually desired conferences with the corresponding field offices of Federal departments or agencies, river basin commissions, States, and concerned local agencies which have indicated an interest. The purpose of these communications and conferences are to determine what pertinent data are in existence, to arrange schedules for obtaining assistance and for obtaining additional data without duplication, to interchange information, to discuss the proposed plan and report, and to identify areas where there may be complementary or competitive effects.

(3) Field review of reports. When the report by the responsible field office has been completed, it will be submitted prior to official transmission to higher authority to the other interested field offices of Federal departments and agencies, river basin commission, States, and concerned local agencies for review and comment. Reports will be revised as may be necessary to reflect mutually acceptable changes. Suggestions on which agreement is not reached and which are not otherwise resolved will be recorded in the field office comments.

c. Review of Federal implementation study reports. The following types of final reports will be referred by the responsible agency head to the heads of other departments or agencies in Washington, D. C., and States for review and comment and to the Water Resources Council office for information; and the Council on Environmental Quality in

accordance with section 102(2)(C) of the National Environmental Policy Act:

1. Reports required to be submitted to other departments or agencies and States in accordance with existing law;
2. Reports prior to project authorization in which other agencies have participated, have an interest, or on which the originating agency desires comments or views; and
3. Reports following project authorization when, in the opinion of the head of the responsible agency, the comments or views of other departments or agencies are necessary or desirable prior to initiation of construction activities.

The Water Resources Council will review and comment on reports of implementation studies in areas covered by regional or river basin plans. The Council will also review reports that contain innovations in planning procedures or cost-sharing arrangements, or which have unresolved evaluation or coordination problems. Federally assisted studies that are submitted for Congressional approval shall be reviewed in the same manner. The Council's comments shall be included when reports on implementation studies are transmitted to the Congress.

Copies of final reports or plans not subject to headquarters review in accordance with the foregoing shall be furnished for information purposes to (a) the heads of other concerned Federal departments or agencies, (b) the Governor of the State (s) in which the project is located, (c) the Water Resources Council, and (d) the Council on Environmental Quality.

Reports of plans requiring congressional approval for project authorization shall be forwarded to the Office of Management and Budget for clearance before transmittal to the Congress. Copies of the reports will be forwarded to the Office of Management and Budget by the responsible department or agency head, together with copies of comments received from the Water Resources Council, other concerned Federal departments or agencies, and States. The responsible agency shall also determine that all statutory requirements have been met and that there is no apparent conflict with other water and land resource projects or programs.

d. Handbook for Coordination of Implementation Studies and Reports. The Water Resources Council has prepared and will keep up to date a Handbook for Coordination of Implementation Studies and Reports for the use of agencies represented on the Council and others concerned with implementation studies of water and land resources. The handbook will provide a summary of coordination policies, a description of agency areas of interest and responsibility, designation of agency offices and representatives which are to receive information regarding planning activities, and reports for review.

C. Notification of planning clearinghouse.

The designated field office of Federal departments or agencies responsible for federally assisted programs shall inform potential applicants for assistance in planning water and land resource development projects of the need for them to notify the planning and development clearinghouse of the State(s) and the region, or, if applicable, the metropolitan area clearinghouse of their intention to apply for assistance (Bureau of the Budget Circular A-95 and Intergovernmental Cooperation Act of 1968).

Applicants for project assistance are to include with their applications:

1. Comments made by or through clearinghouses, along with a statement that such comments have been considered prior to submission of the application; or
2. A statement that the procedures for informing clearinghouses of an intention to apply have been followed and that no comments have been received.

The responsible field offices of Federal departments or agencies are responsible for establishing working relations with the appropriate clearinghouses. The clearinghouses shall be notified when the agency initiates planning activities and a conference arranged to discuss coordination needs and arrangements. At such conferences, arrangements should be made to obtain available and pertinent base data, statistics, or other information from the clearinghouse. The need and arrangements for further consultation to assure coordination should also be discussed and agreed on.

Approved

Richard Nixon

FINAL ENVIRONMENTAL STATEMENT
PREPARED PURSUANT TO THE
NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

PRINCIPLES AND STANDARDS
FOR PLANNING WATER AND RELATED LAND RESOURCES

I. SUMMARY

1. Purpose. The principles and standards are established for planning the use of the water and related land resources of the United States to achieve objectives, determined cooperatively, through the coordinated actions of the Federal, State, and local government; private enterprise and organizations; and individuals.

Plans for the use of the Nation's water and land resources would be directed to improvement of the quality of life through contributions to the objectives of national economic development and environmental quality.

The beneficial and adverse effects of alternative plans on each of these objectives will be displayed in separate accounts with a third and fourth account for effects on regional development and social well-being.

2. Background. The Water Resources Council began its review of principles and standards for planning water and related land resources in 1968 to carry out one of the important Congressional mandates of Public Law 89-80, the Water Resources Planning Act.

In 1969, after a preliminary report of a Special Task Force had been prepared, the Council held 10 public hearings to solicit the views, recommendations and comments of the public on the preliminary report. The Task Force's preliminary report was also widely discussed and reviewed during late 1969 and 1970 at various meetings and seminars and by numerous organizations and individuals both within and outside of the Federal Government. In addition, the proposals contained in the preliminary report were subjected to extensive analytical testing during this period.

After careful consideration of the final recommendations of the Special Task Force submitted in August 1970, the Council published proposed "Principles and Standards for Planning Water and Related Land Resources" along with a separate draft Environmental Statement on the proposed Principles and Standards in the "Federal Register" on December 21, 1971, (36 F. R. 24144) for a period of public review and comment, commencing on December 21, 1971, and terminating March 31, 1972. Notice was also given that as part of the review, a public hearing would be held at the National Museum of History and Technology in Washington, D. C., March 20 and 21, 1972. Reaction to the notice and publication of the Council's proposals prompted the Council to announce and hold additional public hearings in San Francisco, California, March 13 and 14, 1972, and St. Louis, Missouri, March 15 and 16, 1972. These were announced in the "Federal Register," February 5, 1972, Vol. 37, No. 25.

The Council received 11,832 comments on 23 issues from 4,782 respondents during the 100-day period of public review, and prepared a 320-page "Summary/Analysis of the Public Response . . ." for distribution to the public and all respondents.

The Council considered all the issues and various alternatives raised by the public and Federal and State agencies and forwarded its recommendations to the President, July 24, 1973. On August 3, 1973, President Nixon wrote Chairman Rogers C. B. Morton approving the new principles and standards for planning water and related land resources, as recommended in Chairman Morton's letter of July 24, 1973.

The Council's "Principles and Standards" will supersede the present criteria, "Policies, Standards and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources" approved by the President May 15, 1962, printed and commonly known as Senate Document No. 97, 87th Congress, 2d session, together with Supplement No. 1, thereto, June 4, 1964, "Evaluation Standards for Primary Outdoor Recreation Benefits," and the amendment of December 24, 1968, covering the discount rate.

The public record for the period December 21, 1971, to March 31, 1972, including letters of comment and written and oral testimony, can be inspected during the hours of 8:15 a. m. to 4:15 p. m.,

Monday through Friday, excepting national holidays, at the headquarters of the Water Resources Council. Photostat or similar copies may be obtained at a cost of \$.50 per page by writing the Water Resources Council. Indicate the name of the person presenting the statement desired and page numbers as provided in Appendix II of the Council's "Summary/Analysis."

The following pertinent documents can be purchased from the National Technical Information Service, U. S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22151. Prepayment is required.

Proposed Practices for Economic Analysis of River Basin Projects, May 1958. ("Green Book"). Order # PB-209 180, \$5.25.

Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources, May 29, 1962. ("S. D. 97"), Order # PB-209 184, \$3.00.

Report to the Water Resources Council by the Special Task Force, Procedures for Evaluation of Water and Related Land Resource Projects, June 1969. ("Blue Book"). Order # PB-209 171, \$8.75.

Summary: Federal Agency Technical Comments on the Special Task Force Report Entitled "Procedures for Evaluation of Water and Related Land Resource Projects," July 1970. ("T. F. Report" - Vol. I), Order # PB-209 172, \$3.00.

Summary and Index: Public Response to the Special Task Force Report entitled "Procedures for Evaluation of Water and Related Land Resource Projects," July 1970. ("T. F. Report," Vol. II), Order # PB-209 173, \$3.00.

Report to the Water Resources Council by the Special Task Force: Findings and Recommendations, July 1970. ("T. F. Report," Vol. III), Order # PB-209 174, \$3.00.

Report to the Water Resources Council by the Special Task Force: Principles for Planning Water and Land Resources, July 1970. ("T. F. Report," Vol. IV), Order # PB-209 175, \$3.00.

Report to the Water Resources Council by the Special Task Force: Standards for Planning Water and Land Resources, July 1970. ("T. F. Report," Vol. V), Order # PB-209 176, \$3.00.

Report to the Water Resources Council by the Special Task Force: A Summary Analysis of Nineteen Tests of Proposed Evaluation Procedures on Selected Water and Land Resource Projects, July 1970. ("T. F. Report," Vol. VI), Order # PB-209 177, \$3.00.

Federal Register - Water Resources Council, Proposed Principles and Standards for Planning Water and Related Land Resources, Volume 36, Number 245, December 21, 1971. (Proposed) Order # PB-209 187, \$3.00.

3. Objectives. Planning for the use of water and land resources would be conducted to reflect society's preferences for attainment of the objectives defined below:

a. To enhance national economic development by increasing the value of the Nation's output of goods and services and improving national economic efficiency.

b. To enhance the quality of the environment by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural or cultural resources and ecological systems.

Components of these objectives refer to types of outputs and environmental conditions that are being sought as contributions to these objectives.

4. Effects on objectives. For each alternative plan there will be a complete display or accounting of relevant beneficial and adverse effects on national economic development and environmental quality objectives.

Beneficial and adverse effects are measured in monetary terms for the national economic development objective,

Other beneficial or adverse effects are measured in nonmonetary terms for components of the environmental quality objective. Estimating these beneficial and adverse effects is undertaken in order to measure the net changes with respect to particular objectives that are generated by alternative plans.

Thus, there are beneficial and adverse effects for national economic development and environmental quality objectives. These would be measured in monetary or quantitative units or qualitative terms appropriate to a particular effect. The objectives are not mutually exclusive with respect to beneficial or adverse effects, and final decisions as to the selection of the recommended plan would be made by considering the differences among alternative plans as to all their effects.

a. National economic development. Beneficial effects to the national economic development objective would include all effects on national output regardless of the reason a plan may be formulated. These beneficial effects include the value of increased outputs of goods and services, the value of output resulting from external economies. National economic development adverse effects are resources required for or displaced by a plan, and losses in output resulting from external diseconomies.

b. Environmental quality. The beneficial and adverse effects of the proposed plan on the environmental characteristics of an area under study or elsewhere in the Nation would be evaluated. Environmental effects will be displayed in terms of relevant physical and ecological criteria or dimensions, including the appropriate qualitative aspects. Such an evaluation would include the effects of the proposed plan on (a) open and green spaces, wild and scenic rivers, lakes, beaches, shores, mountains and wilderness areas, estuaries, and other areas of natural beauty; (b) archeological, historical, biological, and geological resources and selected ecological systems; (c) the quality of water, land, and air resources; and (d) irreversible commitments of resources to future uses.

Effects under the environmental quality account are expressed in various quantitative units or in qualitative terms. In some instances, the effects can be expressed in terms of meeting legally established standards.

5. Other beneficial and adverse effects. For each alternative plan the beneficial and adverse effects on regional development and social well-being will be displayed where appropriate in the system of public information accounts.

a. Regional development. The beneficial and adverse effects of a proposed plan on relevant planning regions (States, river basins, or communities) would be displayed in a regional development account, including income effects and effects on other components of regional development including (1) the number and types of jobs resulting from a plan in the region; (2) the effects of the plan on population distribution within the region and among regions; (3) the effects of the plan on the regional economic base and economic stability; and (4) the effect of the plan on environmental quality in the region under consideration.

Because of measurement problems, a complete display of beneficial and adverse effects for all components in the regional development account will not be made for a plan unless directed by a Department Secretary or a head of an independent agency.

b. Social well-being. The beneficial and adverse effects of a proposed plan on the social well-being account will be displayed, including the effects of a plan on the real income of classes or groups that are relevant to the evaluation of the plan; effects of the plan on life, health, and safety; effects of the plan on educational, cultural, and recreational opportunity; effects of the plan on reserve capacities and flexibilities in water resource systems and protection against interruption of the flow of essential goods and services at times of national disaster or critical needs; and effects of a plan on other relevant social factors.

6. System of accounts. A system of public information accounts would be established that displays beneficial and adverse effects of each plan to the objectives and beneficial and adverse effects on regional development and social well-being and provides a basis for comparing alternative plans. The display of beneficial and adverse effects would be prepared in such manner that the different levels of achievement to the components of each objective could be readily discerned and compared indicating the tradeoffs among alternative plans. The system of accounts will display the beneficial and adverse effects in the region under consideration in relation to other parts of the Nation.

7. The planning process. Plans will be directed to improvements in the quality of life by meeting current and projected needs and problems as identified by the desires of people in such a manner that improved contributions are made to society's preferences for national economic development and environmental quality. Plans for water and land resources will focus upon the specified components of the objectives desired for the designated region, river basin, State, or local planning setting.

The planning process would include the following major steps:

- (1) Specify components of the objectives relevant to the planning setting;
- (2) Evaluate resource capabilities and expected economic and environmental conditions without any plan;
- (3) Formulate alternative plans to achieve varying levels of contributions to the specified components of the objectives;
- (4) Analyze the differences among the alternative plans which reflect different emphases among the specified components of the objectives;
- (5) Review and reconsider if necessary the specified components for the planning setting and formulate additional alternative plans as appropriate; and
- (6) Select a recommended plan based upon an evaluation of the tradeoffs among the alternative plans.

Essential to this process is the formulation of alternative plans to achieve varying levels of contributions to the objectives and the active participation of all interests.

During the planning process one alternative plan will be formulated in which optimum contributions are made to the national economic development objective. Additionally, during the planning process at least one alternative plan will be formulated which emphasizes the contributions to the environmental quality objective. Other alternative plans reflecting significant physical, technological, legal or public policy constraints or reflecting significant tradeoffs between the national economic development and environmental quality objectives may be formulated.

Four tests would be applied in the formulation of any given alternative plan:

- (1) The acceptability of the alternative plan to the public and compatibility with institutional constraints;

- (2) The effectiveness of the alternative plan in meeting component needs of the objectives;

- (3) The efficiency of the plan in meeting component needs of the objectives and a demonstration that the plan represents the least-cost means of achieving such component needs; and

- (4) The completeness of the plan in accounting for all investments and other required inputs or actions.

As alternative plans are developed and subjected to these tests, the basic steps in the planning process may be reiterated as necessary with each iteration more detailed than the last.

Each alternative plan screened for final consideration should be "justified" in the sense that in the judgment of the planning organization the total beneficial effects to all objectives exceed the total adverse effects to all objectives.

From its analysis of alternative plans the planning organization will select a recommended plan. The plan selected will reflect the importance attached to different objectives and the extent to which different objectives can be achieved by carrying out the plan.

The recommended plan should be formulated so that beneficial and adverse effects toward objectives reflect, to the best of current understanding and knowledge, the priorities and preferences expressed by the public at all levels to be affected by the plan.

A recommended plan must have net national economic development benefits unless the deficiency in net benefits for the national economic development objective is the result of benefits foregone or additional costs incurred to serve the environmental objective. In such cases, a plan with a less than unity benefit-cost balance may be recommended as long as the net deficit does not exceed the benefits foregone and the additional costs incurred for the environmental objective. A Departmental Secretary or head of an independent agency may make an exception to the net benefits rule if he determines that circumstances unique to the plan formulation process warrant such exception.

In addition to the recommended plan with supporting analysis, other significant alternative plans embodying different priorities among the desired objectives would be presented in the planning report. Included with the presentation of alternative plans would be an analysis of the tradeoffs among them. The tradeoffs would be set forth in explicit terms, including the basis for choosing the recommended plan from among the alternative plans.

8. Cost allocation and reimbursement. When necessary to establish reimbursement or cost-sharing policies an allocation of appropriate costs would be made among the objectives and among components of the objectives in such a manner to insure that all objectives and components are treated comparably and receive their fair share of the advantages from an objective plan.

Reimbursement and cost-sharing policies would be directed generally to the end that identifiable beneficiaries bear an equitable share of costs commensurate with benefits received in full cognizance of the objectives. Since existing cost-sharing policies are not entirely consistent with the two objective approach to planning water and land resources, these policies will be reviewed and needed changes will be recommended.

9. The discount rate. The discount rate will be established in accordance with the concept that the Government's investment decisions are related to the cost of Federal borrowing.

The interest rate to be used in plan formulation and evaluation shall be based upon the estimated average cost of Federal borrowing as determined by the Secretary of the Treasury taking into consideration the average yield during the twelve months preceding his determination on interest-bearing marketable securities of the United States with remaining periods to maturity comparable to a 50-year period of investment. The rate shall be raised or lowered by no more than or less than one-half percentage point for any year. When the average cost of Federal borrowing as determined by the Secretary of the Treasury exceeds the established discount rate by more than 0.25 percentage points, the rate shall be raised 0.5 percentage points. When the average cost is less than the established rate by more than 0.25 percentage points, the rate shall be lowered 0.5 percentage points.

The Water Resources Council shall determine, as of July 1, the discount rate to be used during the fiscal year.

The discount rate to be used in plan formulation and evaluation during the remainder of the fiscal year 1974 shall be 6-7/8 percent.

10. National program development. The Council will formulate a national program for Federal and federally assisted water and land resource activities, including a long-range schedule of priorities among plans for projects, States, regions, and river basins.

11. Water and land planning activities covered. The principles and standards would apply to Federal participation with river basin commissions, States, and others in the preparation, formulation, evaluation, review, revision, and transmission to the Congress of plans for States, regions, and river basins; and for planning of Federal and certain federally assisted water and land resource programs and projects as listed in the standards by the Water Resources Council.

II. EVALUATION

(Environmental Impact, Unavoidable Adverse Environmental Effects, and Irreversible and Irrecoverable Commitments of Resources)

The evaluation system and system of public information accounts provide for the full and systematic display of effects, including those which are generally regarded as favorable or beneficial, those which are generally regarded as unfavorable or adverse, and those for which preferences differ and may be considered either beneficial or adverse depending upon the value judgments of those expressing the preference. The effects of an alternative plan on the environmental characteristics of an area under study or elsewhere in the Nation would be evaluated for each alternative plan formulated. Thus, environmental effects would be displayed for each alternative plan whether formulated to achieve optimum contributions to the national economic development objective, or formulated to emphasize contributions to the environmental quality objective. Environmental effects would also be displayed for alternative plans formulated to reflect various levels of

contributions to the national economic development or environmental quality objectives. The display of environmental effects and the effects on the other objectives for all alternative plans formulated would provide information which should facilitate planning decisions and reduce conflict over such decisions.

The principles and standards conform fully with the intent and the spirit of the National Environmental Policy Act of 1969 by providing for full and systematic evaluation and display of environmental effects for all alternative plans.

III. FORMULATION

(Alternatives and the Relationship Between Short-Term Uses of the Environment and Enhancement of Long-Term Productivity)

The explicit consideration of the environmental quality objective in formulating plans for the use of the Nation's water and land resources provides opportunity for consideration of significant enhancement of the quality of the environment. Rather than simply displaying environmental impacts the planning process established in the principles and standards would require that plans be directed to meeting current and projected needs and problems as identified by the desires of people in such a manner that improved contributions are made to society's preferences for national economic development or environmental quality. Impacts on regional development and social well-being are also considered where appropriate. At the outset and throughout the planning process responsible planning organizations would consult appropriate Federal, regional, State, and local groups to ascertain the components of the objectives that are significantly related to the use and management of the water and land resources in the planning setting. The identification of the specific components of objectives to be considered explicitly in plan formulation will necessarily involve an appraisal of future economic, environmental and social conditions expected without the plan as compared with those desired by people for the planning area.

The principles and standards will be applied at all levels of planning as defined by the Water Resources Council. At the broadest level of planning, that is, framework studies and assessments, specification of the components of the environmental quality objective

would be directed toward the alternative choices that should be considered and evaluated in the study responsive to the needs and aspirations of the people. These alternative choices relate to various views of the desires of people in the mix of objectives to be served in planning for the use of the Nation's water and land resources and reflect the alternative parameters and assumptions upon which the planning is based, including but not necessarily limited to alternative assumptions regarding the levels of future economic and population growth and environmental quality.

At the next more detailed level of planning defined by the Water Resources Council, that is, regional or river basin planning, specifications of the components of the environmental quality objective would generally be concerned with alternative courses of action that should be considered and evaluated in planning for the use of water and land resources of an entire region or river basin as this is the level of consideration of alternatives at which the environmental issues and tradeoffs are most likely to be relevant to decisionmaking.

At the most detailed level of planning defined by the Water Resources Council, that is, implementation studies, specification of the components of the environmental quality objective will generally be concerned with groups of interrelated or individual plan elements where environmental issues and tradeoffs are likely to be significant in the decisionmaking process.

The success of water and land resources planning will depend on meaningful participation of interests concerned with each objective at each step in the planning process. Under the principles and standards when the objectives of a framework study or assessment or regional or river basin plan have been identified the study leader responsible for the management of the study will prepare a statement of the specified components of the objectives and the probable effects of the plan on such objectives. A copy of the statement will be sent to the Water Resources Council and to the Council on Environmental Quality as a preliminary report under section 102(2)(C) of the National Environmental Policy Act of 1969. The study manager will submit completed reports of framework studies and assessments and regional or river basin planning studies to the Water Resources Council for review. Copies of such reports shall be furnished to the Council on Environmental Quality.

It is concluded that promulgation of the Principles and Standards for Planning Water and Related Land Resources will further the purposes of the National Environmental Policy Act of 1969.