

# **federal register**

**MONDAY, NOVEMBER 10, 1975**



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**PART II:**

## **DEPARTMENT OF THE ARMY**

**Corps of Engineers**



### **WATER AND RELATED LAND RESOURCES; FEASIBILITY STUDIES**

**Policies and Procedures**

**Title 33—Navigation and Navigable Waters**  
**CHAPTER II—CORPS OF ENGINEERS,**  
**DEPARTMENT OF THE ARMY**  
**WATER AND RELATED LAND**  
**RESOURCES; FEASIBILITY STUDIES**

**Policies and Procedures**

The Secretary of the Army, acting through the Chief of Engineers, hereby gives notice of the adoption of a series of regulations establishing guidance for conducting Corps of Engineers feasibility studies for water and related land resources, consistent with the planning requirements of the U.S. Water Resources Council Principles and Standards and related policies.

The Water Resources Council promulgated and published in the FEDERAL REGISTER, 10 September 1973, interagency guidelines for the planning of water and related land resources. These guidelines became effective 25 October 1973. Since that time, the Chief of Engineers has been developing a comprehensive series of regulations to implement those guidelines and other legislative authorities enacted by Congress during the last several years. These other authorities include, but are not limited to, the National Environmental Policy Act of 1969 (Pub. L. 91-190), the River and Harbor Act of 1970 (Pub. L. 91-611), the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500), and the Water Resources Development Act of 1974 (Pub. L. 93-251).

Under procedures established by the Water Resources Council, the regulations adopted below were reviewed by the Council. In a letter dated 8 August 1975 to the Honorable Victor V. Veysey, Assistant Secretary of the Army (Civil Works), Mr. Warren D. Fairchild, Director, Water Resources Council, stated that the Council found the regulations to be generally consistent with the "Principles and Standards." Specific suggestions on various aspects of the regulations were also provided by the Council; these were incorporated into the final regulations as determined appropriate.

The Council also noted that the "Net Benefit Rule" (§ 290.11(c)(1)), adopted by the Secretary of the Army as a decision criterion for the Corps of Engineers to recommend Federal (Corps) participation in proposed water and related land resources plans, is under consideration by the Council of Members (Alternates) as part of the study of the "Principles and Standards" authorized by Section 80(c), Pub. L. 93-251. The outcome of this study may affect this criterion.

The Water Resources Council provided member agencies a transition period during which reports substantially completed prior to 25 October 1973 could be forwarded to Congress with an addendum addressing the primary requirements of the "Principles and Standards." Studies initiated or completed by the Corps of Engineers since 25 October 1973, with funds appropriated by Congress, must comply fully with the Water Resources Council "Principles and Standards." Many of these studies are now

nearing important decision points which require firm guidance from the Secretary of the Army on the implementation of the "Principles and Standards" and related legislative authorities. In view of these factors, and the favorable consistency review conducted by the Water Resources Council, the Secretary of the Army has decided to adopt the regulations in final form but to provide a one-year period for public comment and Corps of Engineers planning experience. After the one year period, the Chief of Engineers will review comments from the public and experience gained by Corps planners and recommend such adjustments as deemed necessary.

Comments and suggestions on the seven regulations adopted below are invited from interested parties and organizations and should be sent to the following address no later than 10 November 1976:

Chief of Engineers, ATTN: DAEN-CWP-A,  
 Department of the Army, Washington, D.C.  
 20314

Single copies of a reprint of the seven regulations may be obtained from the above address. Meetings will be scheduled on these regulations as necessary, based on public response to this notice.

Effective Date: These regulations are effective 10 November 1975.

Dated: October 20, 1975.

RUSSELL J. LAMP,  
 Colonel,  
 Corps of Engineers Executive.

**PART 290—PLANNING PROCESS: MULTI-OBJECTIVE PLANNING FRAMEWORK**  
**[ER 1105-2-200]**

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290.1	Purpose.
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290.9	Functional planning tasks.
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290.11	Plan selection and recommendation.
290.12	Effective date and applicability to planning programs.

AUTHORITY: Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778-24869, 10 September 1973.

**§ 290.1 Purpose.**

This regulation establishes guidance for conducting feasibility studies for water and related land resources, consistent with the planning requirements of the WRC Principles and Standards (P&S) and related policies. It establishes a process under which alternative plans are formulated and evaluated.

**§ 290.2 Applicability.**

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

**§ 290.3 References.**

(a) Title I, Public Law 91-190, (83 Stat. 852), *National Environmental Policy Act*, 1 January 1970.

(b) Section 122, Public Law 91-611 (84 Stat. 1818), *River and Harbor and Flood Control Act of 1970*, 31 December 1970.

(c) Sections 201, 208, 209, and 303, Public Law 92-500 (86 Stat. 81), *Federal Water Pollution Control Act Amendments of 1972*, 18 November 1972.

(d) Section 73, Public Law 93-251 (88 Stat. 12), *Water Resources Development Act of 1974*, 7 March 1974.

(e) Water Resources Council *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778-24869, 10 September 1973.

(f) ER 1105-2-14, Framework and River Basin Study Programs (33 CFR 252).

(g) ER 1105-2-50, Continuing Authorities Program (33 CFR 263).

(h) ER 1105-2-210, Plan Development Stages (33 CFR 291).

(i) ER 1105-2-220, Problem Identification (33 CFR 292).

(j) ER 1105-2-230, Formulation of Alternatives (33 CFR 293).

(k) ER 1105-2-240, Impact Assessment (33 CFR 294).

(l) ER 1105-2-250, Evaluation (33 CFR 295).

(m) ER 1105-2-800, Public Involvement: General Policies (33 CFR 380).

(n) ER 1105-2-921, System of Accounts (33 CFR 393).

**§ 290.4 Definitions.**

(a) "Alternative Plans" are different ways for managing water and related land resources employing structural and/or non-structural measures.

(b) "Base Condition" is the existing economic, social, and environmental characteristics of the area under study.

(c) "Detailed Plans" are highly developed approaches for addressing different mixes of planning objectives, recognizing that additional efforts will be necessary to provide more detailed engineering design once a plan is selected for implementation.

(d) "Evaluation" is the process of analyzing plans against the "without condition" and against each other to determine and compare their beneficial and adverse contributions.

(e) "Impacts" (effects) are the economic, social, and environmental consequences expected to result from alternative plans.

(f) "Implementable Plans" are plans which can be transformed from concept to reality. This requires consideration of institutional and technological feasibility.

(g) "Most Probable Future" is the projection of basic demographic, economic, and social parameters, which is used as the basis for defining the "without condition" and the planning objectives for a particular study.

(h) "Measure" is any structural or non-structural means of resource management, and may be part of a plan or the entire plan.

(i) "Planning Objectives" are the national, state, and local water and related land resource management needs (opportunities and problems) specific to a

given study area that can be addressed to enhance National Economic Development or Environmental Quality.

(j) "Planning Process" is a systematic approach to analyzing needs and problems, establishing planning objectives, and developing and evaluating alternative resource management plans.

(k) "Plan of Study" is a document prepared during the initial stage of planning containing a preliminary description of what the study will address and how it will be conducted.

(l) "Resource Management" involves the development, conservation, enhancement, preservation, or maintenance of water and related land resources to achieve the goals of society expressed nationally and locally.

(m) "Without Condition" is the detailed specification of the conditions which will prevail over the planning period in the absence of implementation of a plan to alter the management of water and related land resources. The description of the without condition covers all categories of impacts which are significant to the evaluation of alternative plans.

**§ 290.5 Objective of the planning process.**

The objective of the multiobjective planning framework is to guide planning for the conservation, development, and management of water and related land resources. The framework requires the systematic preparation and evaluation of alternative ways of addressing problems, needs, concerns, and opportunities under the P&S objectives of National Economic Development (NED) and Environmental Quality (EQ). This results in information necessary to make effective choices regarding resource management under existing and projected conditions. Alternative plans are to be formulated without bias to structural or non-structural measures. The appendices and references, particularly reference § 290.3(e), must be utilized for a full understanding of the multiobjective planning framework.

**§ 290.6 Basic policies.**

Corps policy on multiobjective planning is largely derived from several legislative and executive authorities, referenced in § 290.3. In major part, these authorities establish and define the national objectives for water resource planning, specify the range of impacts that must be assessed, and set forth the conditions and criteria which must be applied when evaluating plans.

(a) The P&S require that Federal and Federally-assisted water and related land planning be directed to achieve National Economic Development (NED) and Environmental Quality (EQ) as equal national objectives. NED is to be achieved by increasing the value of the nation's output of goods and services and improving national economic efficiency; EQ is to be achieved by the management,

conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

(b) The term "planning objectives" refers to water and related land resource management needs that are specific to each study. They are derived from analysis of the needs (opportunities and problems) of the study area that can be addressed to enhance the national objectives of P&S.

(c) The EQ objective in P&S should be interpreted as being the same as the definition of environmental quality contained in the National Environmental Policy Act of 1969 (NEPA). Thus, planning to achieve the EQ objective should address the broadest scope of concerns pertaining to the natural and cultural environment. EQ plans shall include only those measures which are concerned with management of water and related land resources. EQ plans shall address traditional water resources needs. Satisfaction of these needs to the degree accomplished by the NED plan is not necessary but the decision to forego satisfaction of these needs must be deliberate. For example a decision to continue to incur flood damages may be warranted in order to serve some conflicting planning objectives. If it becomes apparent in the course of a study that an economically justified plan to satisfy traditional water resource needs cannot be formulated, continued formulation of an EQ plan or other alternative plans is not warranted.

(d) P&S also requires that the impacts of a proposed action be measured and the results displayed or accounted for in terms of contributions to four accounts: National Economic Development (NED), Environmental Quality (EQ), Regional Development (RD), and Social Well-Being (SWB).

(1) Contributions to the NED and EQ accounts are the overall beneficial and adverse impacts of the proposed action on the components of the national objectives of P&S.

(2) Contributions to the RD account are determined by establishing a proposal's effects on a region's income, employment, population, economic base, environment, and social development.

(3) Contributions to the SWB account are determined by establishing a proposal's effects on real income, security of life, health and safety, education, cultural and recreational opportunities, emergency preparedness, and other factors.

(e) In addition to P&S, the River and Harbor and Flood Control Act of 1970 and the National Environmental Policy Act of 1969 require assessment of plan impacts. Section 122 of the 1970 Act specifies those impacts that, as a minimum, must be assessed for any proposed action, while Section 102(2)(c), of NEPA requires that the environmental impacts of any proposed action be fully assessed.

(f) The Federal Water Pollution Control Act Amendments of 1972 links water

quality concerns to the more traditional aspects of resource management planning. Among other things, the Act, in Sections 201, 208, 209, and 303, places substantial emphasis on planning problems and complementarities falling within the broad scope of P&S.

**§ 290.7 Planning process.**

A representation of the planning process is provided as Figure 1.

a. Achievement of the planning process objective defined in § 290.5 requires the application of several essential planning considerations which are discussed more fully in § 290.8.

b. The four functional planning tasks of problem identification, formulation of alternatives, impact assessment, and evaluation, will be performed throughout a study. These planning tasks are explained in § 290.9 and other regulations in the 1105-2-200 series.

c. Plans will be developed in three separate stages: development of a Plan of Study (POS); development of intermediate plans; and development of detailed plans. These stages are explained in § 290.10 and Part 291 of this chapter.

**§ 290.8 Essential planning considerations.**

A number of essential considerations are requisite to successful planning: the interdisciplinary character of the planning team, planning flexibility, implementability of the final alternative plans, institutional analysis, and public involvement. Public involvement is discussed in Part 380 of this chapter; the others are discussed below:

(a) *Interdisciplinary Planning.* The requirements of the P&S, NEPA, and Section 122, among others, necessitate an interdisciplinary planning approach to identify and define planning objectives, develop creative alternative plans, and analyze a broad range of complex issues, including the likely economic, social, and environmental consequences of plan implementation. This is best accomplished by a planning team which employs a diversity of professional skills.

(1) The interdisciplinary team approach will be utilized throughout a study with all participants having equal opportunity to be involved. This requirement does not mean that all participants must be involved in each activity, task, or stage, only that they must be involved when their skills could have a material effect on study progress and output.

(2) The role of the study managers is pivotal to the successful accomplishment of interdisciplinary planning since they are responsible for coordinating and synthesizing the efforts of all involved.

(3) To the extent appropriate, consultants, members of citizen groups, representatives of other government agencies, and other segments of the public should also be included as a part of the planning team to draw from a wider variety of sources and provide different perspectives on the study and its direction.

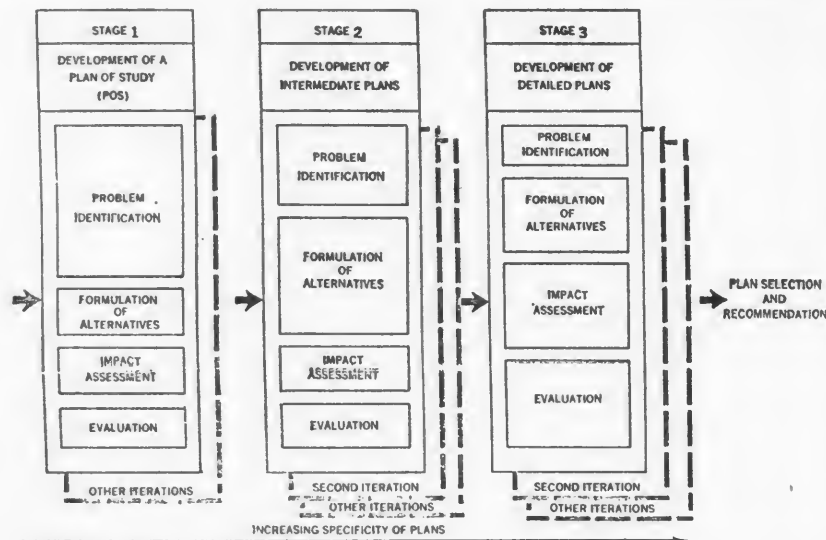


Figure 1: General Relationship of Plan Development Stages and Functional Planning Tasks

(b) **Flexibility.** Flexibility is obtained when each stage of the planning process, embracing problem identification, formulation of alternatives, impact assessment, and evaluation is repeated one or more times as necessary. In this manner, additional or increasingly precise information is introduced to guide the formulation and evaluation of alternative plans. Where conditions change significantly during the course of a study, subsequent iterations of the planning tasks can be altered to reflect and accommodate such change. Thus, the planner is provided a systematic, highly flexible means for taking the preliminary assumptions and data identified in Stage 1 and translating them into the more precise and detailed plans displayed at the completion of Stage 3. Figure 1 outlines the general relationships among the three plan development stages and the four functional planning tasks and suggests how the emphasis on the various tasks is likely to change as a study progresses.

(c) **Implementability.** The detailed plans presented at the conclusion of the planning process are to be management actions capable of being implemented based on their institutional and technological feasibility. Public involvement and institutional analysis shall be conducted throughout the study to aid in developing implementable plans. The alternatives presented at the end of Stage 3 must be fully developed with their appropriate management measures specified. Resource requirements, size and location, and resultant outputs of each detailed plan should be specified. Public and private sector expenditures or actions necessary to carry out each plan should also be identified.

(d) **Institutional Analysis.** An institution is an organization or political/social process that is generally structured, systematized, and stable. It may be a formal or informal body, group, or agency as well as one or a set of formalized practices, procedures, customs, or traditions. Political and social institutions play an essential role in the planning process,

in that they can be critical determinants regarding implementability. Institutions are diverse and widening. State governments, bi-state agencies, local planning agencies, established tax structures, and general attitudes toward financial obligation are examples.

(1) **Analysis.** Analysis of institutions is one means of assuring the feasibility of alternative plans. As plans increasingly responsive to the planning objectives are developed, a parallel, yet critically related effort must be carried out to assure plan implementability. Analysis is made to determine the institutional requirements imposed by alternative plans and the capability of existing institutions to meet those requirements. This analysis starts with a preliminary survey of existing institutions relevant to the problems addressed by the study. This requires becoming acquainted with the political character of the area and identifying any widespread attitudes or local customs regarding the management or use of resources. As the study progresses, institutional base information is refined and expanded. Financing capabilities, legal authorities, programs, and policies are described with increasing precision. Simultaneously, the views and desires of potential project sponsors must be fully considered and integrated into the planning process. The result should be a clear picture of how various alternatives could be implemented and by whom, indicating both the capabilities of different institutions with respect to a total plan or components thereof, as well as possible constraints or impediments, existing or potential, to implementation.

(2) **Relation to Public Involvement.** An early and active program of public involvement and interagency coordination is essential to successful institutional analysis and, ultimately, to plan implementation. Appropriate organizations and agencies and other publics should be active participants in the planning process early in Stage 1 rather than viewed as outsiders who must subsequently be convinced of the worth of a plan and its

implementation. Early participation and coordination may preclude or minimize later conflict or confrontation that could negate the validity of a plan that is otherwise economically, socially, and environmentally acceptable.

(3) **Implementation Arrangements.** The analysis will specify how, when, and by whom each plan may be implemented. The most socially and politically acceptable means available for the implementation of each final plan, including proposals for new organizations or financing methods or new roles for existing institutions of limited capability, will be specified. This could include broadening the Corps' responsibility. The Corps or a number of other Federal, state, regional, or local entities may implement a plan. However, lack of an existing capability for carrying out a plan, or component thereof, will not preclude the development of that plan or component provided that a realistic recommendation for a new implementing mechanism can be made. Finally, the rationale used to achieve the recommended implementation arrangements should be clearly and concisely incorporated in the report.

#### § 290.9 Functional planning tasks.

Four functional planning tasks, each composed of specific activities, are to be carried out during each stage of the planning process. While emphasis may be on a particular activity at a given point in the process, successful accomplishment of each task, as well as the planning process in general, requires continuous integration of all activities. Each activity should reflect the result of previous activities and should complement the other activities required to carry out the study. The four planning tasks and their associated activities are described below and are discussed more fully in other regulations (reference Parts 292, 293, 294 and 295 of this chapter)

(a) **Problem Identification—Task 1.** Problem identification is the determination of the range of water and related land resource problems a study will address. It provides for establishing planning objectives which give direction to subsequent planning tasks. It is carried out by identifying resource management problems and public concerns, analyzing them to determine the physical area to be studied, surveying existing and projected resource conditions in the area, and synthesizing this information into specific planning objectives. Activities to be carried out in problem identification are as follows:

(1) **Identify public concerns.** This activity identifies the range of economic, social and environmental concerns that form the basis for detailing specific water and related land resource management problems to be addressed in the study. The general public, interest groups, and government agencies will be consulted to obtain their views regarding what the study should address.

(2) **Analyze resource management problems.** Based on requirements contained in national policies and the study authority, public concerns should be analyzed to more specifically determine the

range of water and related land resource management problems to be addressed. The full complement of issues, concerns, needs, constraints, opportunities, and desires expressed by the public in relation to the resources of the study are to be reflected. One element of this activity involves analyzing previously established water "needs" and priorities to confirm their relevance to the study situation. Conduct of this activity requires extensive professional analysis of available information, including that generated during previous and on-going studies, to validate current and likely future resource management problems.

(3) *Define the study area.* The range of identified resource management problems should be examined as a basis for defining the geographic area to be studied. Depending upon the character and range of resource management problems to be studied, the study area may or may not have the same boundaries as the area described in the study authority. Properly defining the study area is extremely important since it significantly influences the types of problems, needs, and opportunities to be considered in greater detail.

(4) *Describe the base condition.* The study area should be described in terms of its existing water and land uses, as well as its economic, social, and environmental characteristics. The description should summarize existing conditions in the study area and verify actual and potential resource management problems.

(5) *Project future conditions.* Drawing on the public concerns regarding existing and future problems and opportunities in the study area, including a thorough analysis of the base condition, a number of reasonable alternative future conditions should be projected. A range of these conditions which reflect alternative assumptions about the future will be presented to the public. From this range of alternative futures, the one that best reflects the public's desires and aspirations, consistent with the constraints imposed by the economic, environmental, social, and political systems, will serve as the basis for projecting future conditions and will represent the "most probable future".

(6) *Establish planning objectives.* Initially, establishing planning objectives involves analyzing the range of public and professional concerns expressed about the use of water and related land resources in the study area to translate them into specific objectives for the study. These needs must be net of outputs which will be obtained without any change in existing resource management plans or programs; i.e., the "without condition". These differences will be analyzed as a basis for translating needs, opportunities, concerns, and constraints into the planning objectives of the study. These objectives will be set forth and described as specifically as possible so as to provide a meaningful guide and focus for subsequent formulation activities.

(b) *Formulation of Alternatives—Task 2.* Formulation of alternatives is

the development of different resource management plans to address planning objectives. The plans which are initially formulated will be assessed and evaluated. Plans which best address NED, EQ and a mix of the two will be identified. Candidates for NED plans are those which are likely to maximize net economic benefits and candidates for EQ plans are those likely to make significant contributions to preserving, maintaining, restoring, or enhancing cultural and natural resources. During subsequent iterations, candidate plans will be reformulated to insure that the best NED, EQ, and mixed plans are included in the final array of alternatives. Designation and reformulation of candidate plans requires substantial professional analysis and judgement and should reflect public preferences and desires. The NED and EQ plans are not intended to establish a polar condition, since plans which optimize NED and those which emphasize EQ must still meet a range of specific evaluation criteria and, therefore, could be similar or even the same plan. Where NED and EQ plans are significantly different, other alternatives reflecting significant trade-offs between them will be formulated so as not to overlook the best overall plan. If possible, an essentially "non-structural plan" should be carried through the planning process. Where relevant to addressing public concerns, "no development" plans may also be formulated. Activities to be carried out in formulation of alternatives are as follows:

(1) *Identify measures.* A broad range of technical and institutional measures, structural and non-structural, for potentially satisfying the planning objectives will be set forth. The identification and consideration of measures proposed or suggested by different interest groups is essential. The result is a preliminary identification and description of all the different management measures that might be applicable to a given study.

(2) *Categorize applicable management measures.* The range of measures should be analyzed in relation to the planning objectives to identify those which could address a number of the objectives and those which could address only one. Each applicable measure should then be compared to every other related measure to determine whether it is competitive or complementary thereto.

(3) *Develop plans.* Linking or combining the different applicable measures into alternative plans initially involves choosing a measure which addresses a number of objectives. To this, complementary measures which more fully address the objectives are added incrementally. This process will be repeated, adding complementary measures, until a number of management systems are developed. Plans will be developed by analyzing the complementary and competitive interactions among measures, to identify and minimize conflicts, to obtain consistency, and to insure completeness to the extent possible. Subsequent impact assessment and evaluation will narrow the range of alternatives and establish a basis for effective choice among plans.

(4) *Consider plans of others.* Other plans, proposed by governmental or non-governmental interests, will be identified and included in the planning process. These will include appropriate "non-Federal" plans that would likely be undertaken in the absence of the Corps plan. Such plans will be assessed and evaluated along with the alternative plans developed by the Corps.

(c) *Impact Assessment—Task 3.* Impact assessment is the identification, description, and, if possible, measurement of the effects of the different alternative plans on the base year condition. Consistent with the requirements of the P&S, Section 102(2)(c) of NEPA, and Section 122 of the River and Harbor and Flood Control of 1970, impact assessment provides for analyzing the significant effects of each alternative. These are the economic, social, or environmental consequences of an alternative which would be likely to have a material bearing on the decision-making process. Impact assessment requires forecasting where and when significant primary, and higher order effects could result from implementing a given alternative. This determination requires analyzing and displaying monetary and non-monetary changes in an objective manner based on professional and technical assessment of the resources. The absence of change or no net change from the base condition could also be a significant impact in certain instances and care must be taken to surface such information during this task. Describing impacts does not reflect societal preferences; these preferences are determined through subsequent evaluation. Activities to be carried out in impact assessment are as follows:

(1) *Determine sources of impacts.* The aspects of each alternative that could cause significant impacts will be identified and specified. This requires analyzing the inputs, measures, and outputs associated with the alternatives to determine causative factors that could impact on elements of the base condition.

(2) *Identify and trace impacts.* The causative factors related to each alternative should be compared to the elements of the base condition for the purpose of identifying impacts. Identifying impacts requires forecasting whether these factors could cause significant changes from the base. Accomplishing this requires cause and effect analysis to identify and trace through those impacts which are significant.

(3) *Specify incidence of impacts.* The geographical location of each impact should be identified. In addition, it will be necessary to establish when impacts are expected and their duration.

(4) *Measure impacts.* As precisely as possible, the magnitude of each impact should be determined. The impacts should be quantified using appropriate monetary or non-monetary units or concisely characterized in a written description.

(d) *Evaluation—Task 4.* Evaluation is the analysis of each plan's impacts against the "without condition" and against the other plans. Whereas impacts are identified through an objec-

tive undertaking largely on professional analysis, evaluation determines the subjective value of these changes. This is accomplished by conducting "with and without" analysis of the alternative plans and ascribing values to the impacts based on the public's perceptions of them. The process begins by establishing the contributions of each alternative in relation to the planning objectives and the NED, EQ, RD, and SWB accounts of the P&S. Then the response of the alternatives to specified evaluation criteria will be determined. From this information, judgments will be made concerning the beneficial and adverse nature of the contributions of an alternative to establish its overall desirability. After this has been done for each alternative, plans that do not result in an improvement over the without condition will be eliminated from further consideration. The first three activities listed below provide more explicit information on performing this aspect of evaluation. The relative merits of each remaining alternative in comparison with the other remaining alternatives will then be established. By so doing, evaluation will surface information which will be incorporated in succeeding iterations so as to more fully achieve beneficial contributions while reducing adverse contributions. Activities to be carried out in evaluation are as follows:

(1) *Appraise planning objective fulfillment.* The degree to which the alternative plans contribute to the planning objectives will be determined. This involves relating the significant impacts of each alternative to the planning objectives and determining if and how well the different alternatives contribute to the objectives.

(2) *Appraise System of Accounts contributions.* Each plan is valued in terms of its beneficial and adverse consequences on the four accounts. This involves analysis of each significant impact to determine the positive or negative contributions a plan will make in regard to NED, EQ, RD, and SWB. A fuller explanation regarding the content and use of the System of Accounts is contained in Part 393 of this chapter.

(3) *Apply specified evaluation criteria.* Other criteria which will be applied to provide a basis for choosing among alternative plans are acceptability, completeness, effectiveness, and efficiency, which are explicitly stated in the P&S, and certainty, geographical scope, NED benefit-cost ratio, reversibility, and stability which are derived from the first four. These criteria and their application are discussed more fully in Part 295 of this chapter. Determining certainty, stability, and reversibility requires the use of sensitivity analysis, alternative futures, and risk and uncertainty analysis as specified in the P&S.

(4) *Perform trade-off analysis.* Trade-off analysis is the actual comparison of plans, based upon perceptions of affected groups and the results of applying all the appropriate evaluation criteria. Its purpose is to identify plans which serve a wide range of interest, including the

Federal Interest. Alternative plans must be compared in such a manner that impacts measured in dissimilar units may be traded-off in such a way that the public and decision-makers are provided a basis for effective choice.

(5) *Designate NED and EQ plans.* Based on the criteria specified in the P&S and discussed above, designate the alternative or alternatives which are the most likely NED and EQ plans.

(e) *Determine if Repeating the Planning Tasks is Necessary.* At the completion of evaluation, the results of carrying out the four planning tasks will be analyzed to establish the necessity for, or direction of, the next iteration. If reiteration is necessary, the planning tasks will be repeated to develop more precise and detailed plans that more fully address the planning objectives while minimizing adverse economic, social and environmental impacts. To aid in this, specific criteria listed in Part 295 of this chapter, will be applied for reformulating the plans designated as candidate NED plans, for those designated as candidate EQ plans, and for those candidates which provide a mix of NED and EQ contributions. When a satisfactory set of detailed, implementable plans result from an iteration, the plan selection and recommendation criteria described in para 11 will be applied.

#### § 290.10 Plan development stages.

Developing plans in three stages provides for improving and increasing the level of detail and reliability of data and analyses, and for incrementally developing more precise alternative plans throughout a study. The three plan development stages are described below and are discussed more fully in Part 291 of this chapter.

(a) *Stage 1—Development of Plan of Study (POS).* During the initial stage, the four planning tasks are performed at a preliminary level of detail to define the scope and character of the study as a guide to subsequent planning. During this stage, principal emphasis will be on identification of the range of issues related to resource management in the study area. Because of the introductory nature of the planning tasks at this stage, the effort will generally involve analyzing a wide range of available data, which may be more qualitative than quantitative. The general purpose of this stage is to make an initial analysis of water and related land resource management problems and how they could be solved. The product will be a Plan of Study (POS) document describing the scope of the study and the broad management actions necessary to carry it out.

(b) *Stage 2—Development of Intermediate Plans.* The intermediate stage emphasizes identifying and analyzing the range of alternative ways for addressing the planning objectives. Considerable emphasis must be placed on more specifically defining these objectives. Based on a more definitive analysis of the objectives, alternatives will be outlined and refined without concentrating on detailed engineering or design considerations.

Data should be sufficient to set forth and analyze alternative concepts of resource management. The potential impacts of these alternative plans are to be assessed, concentrating on their significant consequences. Preliminary evaluation will be then conducted. A high level of detail is not appropriate at this stage. The alternatives developed should provide initial choices as to the different viable resource management options available in the study area.

(c) *Stage 3—Development of Detailed Plans.* During the final stage, emphasis is on modifying and reducing in number the intermediate alternatives to produce detailed, implementable plans. Design, assessment, and evaluation at this stage require data that is specific and well defined. The alternative plans produced at its completion must be at a comparable level of detail so that an effective choice can be made among them and, if appropriate, a recommendation can be implemented. This stage should produce an array of alternative plans which specify the type and location of the measures involved, their significant impacts, and the beneficial and adverse contributions of each plan.

#### § 290.11 Plan selection and recommendation.

The planning process described in §§ 290.07–290.10 forms the basis for selecting one of the detailed plans and, if appropriate, recommending it for authorization. Generally, only one plan should be selected for implementation regardless of whether or not it is within the existing general authority of the Corps. If the selected plan falls under the Corps authority, then it can be recommended by the District Engineer. If the selected plan is not within existing Corps authority, the reporting document should describe how it could be implemented.

(a) *General.* Plan selection is the designation of that alternative considered to be the most desirable, based on the results of the study. Plan recommendation is the act of proposing Corps participation in implementing the selected plan. Plan selection and recommendation occur after the last iteration of the planning process, at which point a range of detailed plans, any of which could be selected, will be displayed in the System of Accounts (Part 393 of this Chapter).

(b) *Plan Selection.* This District Engineer will select the plan in the best public interest. This selection will be based upon the public response to the detailed plans carried through the final stage. This response will include the views of those who participated in the study and will be obtained by formal and/or informal means. The product of evaluation will be clearly presented as a basis for public inputs to plan selection. The crucial considerations in the District Engineer's choice will be presented in the Statement of Findings.

(c) *Plan Recommendation.* There are two basic criteria for plan recommendation: the net benefits rule and Corps authority to implement. When both cri-

teria are met, the District Engineer will follow established procedures for recommending Federal (Corps) participation in implementation.

(1) *Net Benefits Rule.* A recommended plan when considered individually on the basis of "with" vs. "without" comparison must be justified in the sense that total beneficial contributions (monetary and non-monetary) exceed total adverse contributions (monetary and non-monetary). Further, the recommended plan must have net NED benefits unless the deficiency is the result of NED benefits foregone or costs incurred to obtain positive EQ (non-monetary) contributions. This means that a recommended plan which has no net economic benefits must make positive contributions to the environment when evaluated against the without condition. Exceptions to the net benefit rule will be extremely rare and will be based upon prior approval by the Secretary of the Army; coordination will be through DAEN-CWP. Exceptions might include unique and overriding social considerations, such as extreme loss of life.

(2) *Corps Authority.* The Corps Civil Works authority has been established by various Acts of Congress since 1824. In the event a plan selected for implementation is not clearly within Corps authority, the following provisions apply:

(a) If the selected plan or a portion thereof is not within existing Corps implementation authority, but is responsive to the planning objectives established for the study, the reporting officer may recommend Federal (Corps) participation. The basis for and extent of such participation will be specified, including the precedent setting aspects of the recommendation. Such recommendations shall be fully coordinated through DAEN-CWP before any commitments are made to States or local interests.

(b) If the selected plan falls entirely within the authority of another Federal agency, no recommendation for Federal (non-Corps) implementation will be made. The other agency will be informed of the Corps' finding by the Chief of Engineers.

**§ 290.12 Effective date and applicability to planning programs.**

This regulation is effective November 10, 1975 as published in the FEDERAL REGISTER on that date and codified as 33 CFR 290.

(a) Applicability of this regulation to Water Resources Council Level A and B studies is determined on a case by case basis, in accordance with guidance provided by the Water Resources Council and dependent on the Corps role in the study (see Part 252 of this Chapter)

(b) This regulation is fully applicable to all level C preauthorization studies conducted after the effective date, including those initiated prior to the effective date.

(c) Applicability of this regulation to Phase I GDM studies is dependent on the date the project was authorized by Congress and the extent of changes recommended to the authorized project. The emphasis of the tasks and stages during

a Phase I study will be different depending upon whether the survey scope study was conducted employing this regulation.

(d) This regulation is applicable to continuing authority studies, as discussed in Part 263 of this chapter.

(e) This regulation is generally applicable to other special or comprehensive planning studies funded under the Corps General Investigations appropriations title. Exceptions may be granted on a case-by-case basis by the Chief of Engineers.

**PART 291—PLAN DEVELOPMENT STAGES [ER 1105-2-210]**

- Sec.
- 291.1 Purpose.
- 291.2 Applicability.
- 291.3 Reference.
- 291.4 General.
- 291.5 Stage 1—Development of plan of study.
- 291.6 Stage 2—Development of intermediate plans.
- 291.7 Stage 3—Development of detailed plans.
- 291.8 Effective date.

**AUTHORITY:** Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778-24869, 10 September 1973.

**§ 291.1 Purpose.**

This regulation describes the nature and scope of the three plan development stages to be used in multiobjective planning, consistent with the WRC Principles and Standards (P&S) and related policies.

**§ 291.2 Applicability.**

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

**§ 291.3 Reference.**

ER 1105-2-200, Multiobjective Planning Framework (33 CFR 290).

**§ 291.4 General.**

Conducting a study in three stages facilitates overall management of the effort. The distinct, but related, stages allow for progressively narrowing assumptions and more precisely developing concepts of resource management into definitive plans presented for public choice at the conclusion of a study.

**§ 291.5 Stage 1—Development of plan of study.**

This stage has a twofold purpose. First, it provides for initial iterations of the four functional planning tasks to obtain a preliminary view of what the overall study will involve. Second, it is to determine how the study will be managed. It culminates in the preparation of a Plan of Study document (POS).

(a) This stage emphasizes problem identification. Every effort will be made to obtain a clear, initial definition of the planning objectives, realizing that they will be refined and modified during subsequent stages. The remaining tasks in this stage should be performed to indicate the kinds of alternative resource management programs that could potentially be undertaken in the study area.

Dependence on detail data is not appropriate. However, information should be sufficient to develop a general statement of the broad range of planning objectives relevant to the study.

(b) Existing information specific to the study area will serve as the foundation for subsequent planning. However, this stage should also provide for appraising the adequacy of existing information and data and specify subsequent steps necessary to overcome any deficiencies.

(c) During this stage, a systematic program for conducting the study will be established. The management of the overall study effort will be specified, study participants identified, necessary coordination determined, and professional skills to carry out the study identified. Major work items will be outlined on a preliminary basis, and study costs estimated.

(d) Finally, a Plan of Study document will be prepared. The POS will set forth the justification for the study, document findings of the tasks undertaken to date, and establish a program for managing the study. As the study progresses, the POS is the basis for review and approval of completed and future study efforts by higher authority.

**§ 291.6 Stage 2—Development of intermediate plans.**

This stage explores the broad range of potential courses of action for managing resources in the study area. This will be accomplished by performing a minimum of one additional iteration of the planning tasks. Initially, planning during this stage involves analysis of highly conceptual information. As the tasks are repeated, alternatives not appropriate to the study will be screened out and a number of likely, feasible plans will be designated for further consideration.

(a) The emphasis in this stage is to formulate alternatives for searching out an array of realistic ways of managing the resources of the study area. To accomplish this, more detailed problem identification must be conducted to more precisely specify the planning objectives. In addition, steps should be taken to correct deficiencies in the data base. As these are accomplished, more specific technical and institutional measures for addressing the objectives can be more precisely set forth. This should not unduly constrain the breadth of the measures considered. Overdependence on design detail is not appropriate. Developing alternative plans which incorporate non-structural measures should receive considerable attention during this stage.

(b) Impact assessment should be sufficient to identify major changes from the base condition. This is accomplished by developing a detailed information base and comparing it with the alternative plans. The level of detail will increase as this stage progresses and the ongoing assessment and evaluation screen out inappropriate alternatives, identifying those which appear to be feasible. This allows more precise focus in succeeding iterations.

**RULES AND REGULATIONS**

(c) The alternatives to be carried into the final stage should be developed to a comparable level of detail, consistent with the character, scope, and progress of the study to date. The level of detail should be sufficient for the public and higher authority to review and understand the rationale used in developing and screening the alternatives.

(d) If the study has established that it would be desirable to pursue positive Regional Development (RD) and/or Social Well-Being (SWB) contributions, an exception from existing policy should be sought at the conclusion of this stage. The Secretary of the Army must approve any exceptions prior to the initiation of the final stage.

**§ 291.7 Stage 3—Development of detailed plans.**

During the final stage, alternatives are further refined and reduced in number to obtain a reasonable array of fully implementable plans. At least one iteration of the planning tasks will be carried out emphasizing detailed design of the remaining alternatives.

(a) Principal attention will be given to the formulation, assessment, and evaluation tasks to derive implementable plans. The conceptual alternatives considered earlier will be developed into precise management programs composed of complete technical systems and institutional arrangements. These programs will be defined and detailed. The resources necessary to carry out each management action and the results produced will also be detailed. Assessment will identify all significant economic, social, and environmental impacts, including the location and expected time of occurrence; evaluation will provide for further screening of alternatives. The resultant plans must be complete in every respect, which means that while all planning objectives do not have to be fully satisfied, every aspect of the plans needed to make them work will be specified.

(b) As a general guide, the alternatives carried through this stage should possess the following characteristics:

(1) Each detailed plan should be the most efficient and effective means for addressing its planning objectives.

(2) Detailed plans should be significantly different from each other; that is, each alternative plan should make unique contributions to the planning objectives not made by any of the other alternatives.

(3) Each detailed plan must be "justified" in the sense that its total beneficial contributions (monetary and non-monetary) are equal to or exceed its total adverse contributions (monetary and non-monetary).

(c) Final alternative plans presented to the public at the late stage public meeting will be at a comparable level of detail. Reactions of the public and other agencies throughout the planning process

provide the means for determining which alternative will be selected for implementation. Recommendation for implementation by the Corps will be based upon the Corps authority to carry out the plan.

**§ 291.8 Effective date.**

This regulation is effective 10 November 1975, as published in the **FEDERAL REGISTER** on that date and codified as 33 CFR 291. The provisions of § 290.12 of this chapter are applicable to this regulation.

**PART 292—PROBLEM IDENTIFICATION [ER 1105-2-220]**

<p>Sec. 292.1 292.2 292.3 292.4 292.5 292.6 292.7 292.8 292.9 292.10 292.11</p>	<p>Purpose. Applicability. References. General. Identify public concerns. Analyze resource management problems. Define the study area. Describe the base condition. Project future conditions. Establish planning objectives. Effective date.</p>
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**AUTHORITY:** Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778-24869, 10 September 1973.

**§ 292.1 Purpose.**

This regulation provides guidance for carrying out the problem identification task of multiobjective planning, consistent with the WRC Principles and Standards and related policies.

**§ 292.2 Applicability.**

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

**§ 292.3 References.**

- (a) ER 1105-2-200, Multiobjective Planning Framework (33 CFR 290).
- (b) ER 1105-2-291, System of Accounts (33 CFR 393).

**§ 292.4 General.**

This task is undertaken to define the physical area and the nature of water and related land resource management problems that the study will address. As outlined in Figure 1, the task of problem identification culminates in delineation of the planning objectives which guide the formulation of alternative plans. The following paragraphs discuss the activities included in problem identification.

**§ 292.5 Identify public concerns.**

Initially, problem identification involves eliciting information from the public about the range of needs (opportunities and problems) which the study could address. Properly accomplished, this directs subsequent activities to respond to public, rather than agency, perceptions. As such, from the start of a study, there should be a general attempt to distinguish between professional analysis and views about water and land resource management and publicly held goals and desires.

(a) The types of problems, concerns, and opportunities to be addressed are limited to issues related to water and related land resource management. Issues regarding regional population growth, economic development, and transportation policies; attitudes about ownership and use of land, community aesthetics, and significant environmental phenomena; and other similar concerns are also to be considered where relevant to the management of water and related land resources.

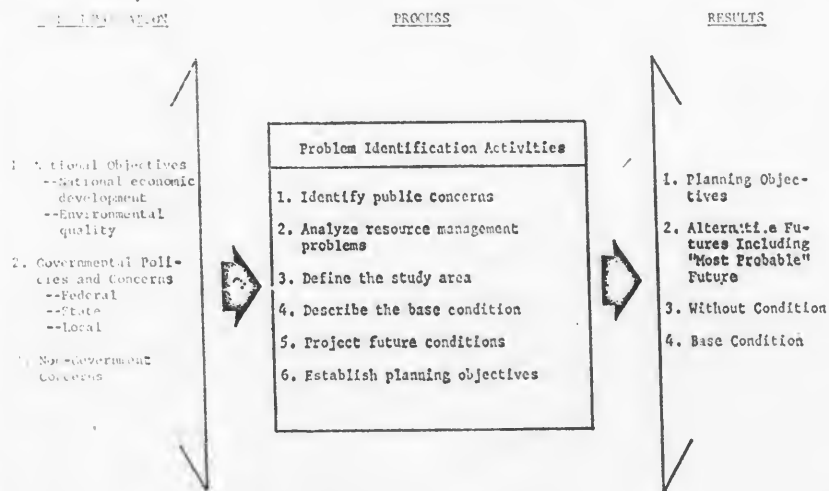


Figure 1: Problem Identification



(b) Concerns should be elicited through a public involvement program in which public officials, interest groups, governmental bodies and other segments of the public participate in a meaningful way. Figure 2 displays a representative list of information sources which should be consulted to identify public concerns. Planners knowledge unique to local and regional situations will result in the identification of additional sources. Meetings, news media presentations, brochures, citizen assistance committees, and the like are all useful tools that should be employed in obtaining this information. Public involvement, while necessary, is not sufficient to a successful outcome from the planning process. The planner is responsible for exercising the necessary professional judgment and analysis to insure that all issues, concerns, needs, opportunities, desires, and constraints related to the study effort are identified.

**§ 292.6 Analyze resource management problems.**

While many of the public's concerns will be directly related to problems or issues that can be achieved through water and related land resources management, others will not. Careful professional analysis will be necessary to determine whether a link exists in the latter case. Considerable attention must be given to examining the relationship of the traditional water resources "needs" categories to the overall study effort. This is mandatory to update or confirm the authenticity of the needs in light of differing

public perceptions and interim actions that may have been undertaken. For this reason, preestablished levels of resource development output should not constrain the analysis of the range of problems that could be addressed during the study. Public feedback should be sought when a tentative listing of problems have been identified to ascertain the relevance and completeness of the problems. Further refinement and clarification of perceived problems should be accomplished through extensive analysis and interaction with the public. This activity is critical to the planning process because it establishes the range of problems to be addressed and their validity from both public and professional viewpoints.

**§ 292.7 Define the study area.**

Determination and specification of the study area aids in establishing the scope and character of planning. To specify the area of the study, the previously identified resource management problems will be analyzed to identify their geographic distribution. This requires tracing out the problems and concerns to their ultimate physical location. Careful attention must be given to this activity to insure that the study area is appropriately defined based on the range of problems the study will address. In most instances, the concerns and problems will correspond geographically to the area specified in the study authority. However, in some cases, the study area that is defined may be different than that contained in the study authority.

range of resource management problems. In the former case, it is the responsibility of the reporting officer to insure that the solution for the smaller area is consistent with broader concerns and that no solution has been overlooked due to the limited geographic scope of the study. In the latter case, the single purpose solutions should not overlook synergistic possibilities nor possible conflicts that could arise.

**§ 292.8 Describe the base condition.**

The base condition is a composite of existing economic, social, and environmental characteristics of the area under study. Describing the base condition of the study area should begin with an analysis of available local regional, and state-wide planning data. These planning data may be in a variety of forms, including land use plans, urbanization or industrialization data or projections, and completed transportation or public utility studies. Active involvement by non-Corps elements should be sought to assist in identification of the base condition of the study area. The type of base data gathered initially will be rather general. As the study progresses and alternatives are better detailed and locations more defined, more specific information on all aspects of the base condition will be required. The base condition should be described in terms of the existing land, air, and water use as well as economic, social, and environmental characteristics of the study area perceived to be important. The base condition of the study area related to water and related land resource management should include the following information identified and described according to geographical location, quantity, and quality as appropriate.

(a) A description of its resource base, including a brief and relevant summary of the climate, geology, and topography; human and natural resources, both physical and biological; demographic, cultural, and aesthetic characteristics; land use, particularly emphasizing uses within the flood plain as contrasted to uses outside the flood plain; transportation network; financial resources; and economic activity including manufacturing, trade, and agriculture.

(b) The description of significant environmental elements in the study area will locate and identify those characteristics deemed to be aesthetically, ecologically or culturally important. To identify significant environmental elements, factors should be analyzed such as soils, water, air, cities, plants and animals (including people and their culture); forces such as wind, tides, gravity, and human activities; conditions such as light, temperature, pollution, and humidity; and processes such as photosynthesis, mineral cycling, and decomposition. This involves inputs from the scientific/professional community as well as the public at large. The description must reflect that environmental elements are important to society in a present as well as future context. As part of this description, elements should

<u>Governmental Sources</u>		<u>Non-Government Sources</u>
<p><b>A. Federal Government</b></p> <p><b>I. Legislation</b></p> <p>a. Specifically Related to Water Resources</p> <p>R&amp;R Acts</p> <p>PL 92-500</p> <p>Wild &amp; Scenic Rivers Bill</p> <p>b. Not Specifically Related to Water Resources</p> <p>NEPA</p> <p>Transportation Acts</p> <p>Wilderness Bill</p> <p><b>II. National Policies and Related Actions</b></p> <p>a. Specifically Related to Water Resources</p> <p>F&amp;S</p> <p>Exec. Order 11296</p> <p>b. Not Specifically Related to Water Resources</p> <p>National Goals</p> <p>Energy Conservation Requirements</p> <p><b>III. Agency Policy and Related Actions</b></p> <p>a. Within the Corps</p> <p>ER's, EC's, &amp; Multiple Letters</p> <p>Environmental Inventories</p> <p>Previous Study Reports</p> <p>INR Reports</p> <p>b. Outside the Corps</p> <p>MRC Studies and Requirements</p> <p>Other Agency Requirements and Studies</p>	<p><b>B. Non-Federal Government</b></p> <p><b>I. State</b></p> <p>a. Governor's Office</p> <p>b. Legislature</p> <p>Existing Legislation</p> <p>Pending Legislation</p> <p>c. Policies &amp; Administrative Agencies</p> <p>Planning</p> <p>Fish &amp; Wildlife</p> <p>Health</p> <p>Water Supply</p> <p>Water Quality</p> <p>Recreation</p> <p>Land Use</p> <p>Transportation</p> <p>Agriculture</p> <p>Commerce</p> <p>Natural Resources</p> <p><b>II. Local</b></p> <p>a. Counties</p> <p>b. Cities</p> <p>Land Use Plans</p> <p>Transportation Plans</p> <p>Recreation Plans</p> <p>Public Service Plans</p> <p>Education</p> <p><b>III. Regional</b></p> <p>a. Councils of Government</p> <p>b. Interstate Agencies</p> <p>c. Basin Commissions</p>	<p><b>I. Scientific/Professional/ Business Organizations</b></p> <p>a. Universities</p> <p>b. Clubs</p> <p>c. Fraternal Orders</p> <p>d. Chambers of Commerce</p> <p><b>II. Private Industry</b></p> <p><b>III. News Media</b></p> <p><b>IV. Citizens Groups</b></p> <p>a. Environmental</p> <p>b. Civic</p> <p>c. PTA's</p> <p>d. Consumer Groups</p> <p>e. Political Clubs</p> <p>f. Social Action</p> <p>g. Religions</p> <p>h. Home Owners Associations</p>

FIGURE 2 - Representative Information Sources

(a) For instance, the publicly expressed needs might not be capable of being addressed by resource management activities that could be undertaken in the study area. In addition, it might be determined that resource management activities in the study area could have a significant effect on areas outside that specified in the study authority and that they should also be included in the study. If

analysis shows that the study area should be different than the area specified in the study authority, the desirability of seeking a new authority should be referred to HQDA (ATTN: DAEN-CWP) Washington, D.C. 20314.

(b) Another possibility that could occur is when a study will address only a small portion of the area designated in the authority or will consider a limited

be explicitly identified which are critical in terms of their scarcity, fragility, or lack of resiliency, or which would otherwise be sensitive to change.

(c) The description of existing public and private programs for planning and managing resources in the study area will include a delineation of management systems and facilities in operation as well as those under construction, funded for construction, or approved for construction.

(d) The institutions dealing both directly and indirectly with resource management in the study area will also be identified. This should provide necessary information on existing jurisdictional, functional, and financial arrangements in the study region.

(e) Careful analysis must be made of information collected about the base condition to establish its adequacy for use throughout the study. If adequate information is not available for the purpose of the study, early efforts must be undertaken to correct the deficiencies. A sound, reasoned determination of needed data must be made early in the process to assure timely acquisition at reasonable cost.

#### § 292.9 Project future conditions.

There are major uncertainties associated with projections of future conditions. The P&S require that alternative plans be examined to determine their sensitivity to data availability and to alternative assumptions as to future economic, demographic, environmental, and technological trends. In addition, the P&S requires that selected projections and assumptions of alternative futures that are reasonably probable and that, if realized, would appreciably affect plan design or scheduling be analyzed. To accommodate this requirement, it is necessary to examine expressed opinions and assumptions about the future of the study area and to designate what is considered to be the "most probable future". Derivation of planning objectives will reflect this "most probable future." Sensitivity analysis will be conducted during the evaluation task to establish the relationship of the alternative plans to all the different significant assumptions about the future conditions of the study area.

(a) The views of various segments of the public concerning their desires for the future of the study area as well as the views of the professional planner should form the basis for projecting future conditions. The process of seeking public expressions concerning the future and developing composites that reflect their views should continue until a workable projection for establishing planning objectives can be developed.

(b) Specification of future conditions should reflect projections currently used by Federal, state, and local planning agencies. OBERS Series E projections will be used as a basis for most studies. In certain instances, because of conditions unique to the study area or the limited size of the study area, OBERS may not be totally satisfactory.

Deviation from OBERS is acceptable if adequately justified and explained. When the study area is very small in size, other projections will be needed to provide sufficiently detailed projections of those conditions which affect the definitions of planning objectives over time. Such projections may be prepared by a State or other non-Federal entity, other Federal entity, or independently by the Corps. The projections used must be adequate under the criteria of EM 1120-2-118, Economic Base Studies.

(c) The planner must exercise considerable judgment and guard against simply projecting current trends. Careful empirical work can define reasonable relationships between demands for the outputs of water resource plans and key economic parameters such as population, income, and production. Where appropriate, demand should be related to those variables contained in the OBERS projections. This analysis permits the planner to focus on the relationship between price and quantity demanded.

(d) One necessary component of projecting alternative futures is to describe what would most likely happen without changing existing programs for resource management. This "without condition" should be based upon sound professional analysis reflective of public expressions and historical trends. The without condition will be employed as one element in determining the planning objectives for the study and will also play a significant role in subsequent evaluation.

#### § 292.10 Establish planning objectives.

Planning objectives are the national, state, and local water and related land resource management needs (opportunities and problems) specific to a given study area that can be addressed to enhance NED or EQ. However, planning objectives are not to be characterized as being specific to either national objective or related to any of the four P&S accounts (NED, EQ, RD, and SWB). Planning objectives should be stated in terms of resource management needs (problems and opportunities) and not as specific levels of resource management outputs that could be provided to satisfy the needs. Subsequent formulation will be carried out to establish if and how well the outputs of the plans address the objectives. Therefore, "increase open space in X county", "reduce urban flood damages along Y creek", and "maintain white-water boating on Z river" are appropriate statements of planning objectives. However, "provide 200 acres of open space in X county", "provide SPF protection on Y creek", and "provide 3,000 visitors days of white-water boating on Z river" are not appropriate planning objective statements because they predetermine the levels of outputs to be produced. Output levels are variable due to the nature and sizing of management measures and, as such, are a product of formulation and not a factor to be considered when establishing planning objectives.

(a) The components of the NED objective include:

(1) The value of increased outputs of goods and services resulting from a plan.

(2) The value of output resulting from external economies associated with a plan.

(b) The components of the EQ objective include:

(1) Management, protection, enhancement, or creation of areas of natural beauty and human enjoyment.

(2) Management, preservation, or enhancement of especially valuable or outstanding archeological, historical, biological, and geological resources and ecological systems.

(3) Enhancement of quality aspects of water, land, and air by control of pollution or prevention of erosion and restoration of eroded areas.

(4) Avoiding irreversible commitment of resources to future uses.

(5) Others not listed in paragraphs (b) (1)-(b) (4) of this section.

(c) Initially, establishing planning objectives involves analyzing the range of public and professional concerns expressed about the use of water and related land resources in the study area to translate them into specific objectives for the study. In addition, establishing the planning objectives involves determining those water resource needs (opportunities and problems) which must be addressed in relation to the "most probable" alternative future.

(d) Establishing planning objectives may reflect that given concerns, not necessarily directly related to either NED or EQ, could be so important as to impose absolute constraints on the planning process. These constraints may be of a legal, public policy nature or social, economic, or environmental factors of such importance that to violate them would compromise the validity of the entire planning effort. Where such constraints exist, they should be incorporated in the planning objectives. However, in specific cases, an existing legal constraint may be consciously overlooked if the study firmly proposes to recommend a change to modify it. Unless prior approval is obtained from HQDA (ATTN: DAEN-CWP) Wash., D.C. 20314, planning cannot be undertaken to provide positive distributional effects. This means that transfers to a region or social class will not be planned for; however, such effects may be displayed in the System of Accounts, Part 393 of this chapter.

(e) Early in the planning process, planning objectives are likely to be relatively large in number and general in nature. While the study authority may direct attention to specific concerns, the authority should not be interpreted as limiting consideration of any appropriate planning objective. In addition, planning objectives should not be eliminated from consideration early in the process merely because they do not relate directly to traditional outputs of water and related land resources management.

(f) As planning progresses, the planning objectives must be continuously re-analyzed in order that a manageable and

well defined set is specified prior to developing the detailed plans. The final array of planning objectives must be defined narrowly enough to insure that all alternative means of meeting them have been examined in the study.

(g) The planning objectives should be specified to that level of detail sufficient to provide a precise description of each, including where and when it is to be achieved. Specific objectives may be in conflict, but the full range should be set forth as a basis for formulation. Subsequent planning tasks will establish whether the conflicts can be fully or partially accommodated by a resource management program or, if not, what trade-offs must be made.

§ 292.11 Effective date.

The regulation is effective November 10, 1975, as published in the FEDERAL REGISTER on that date and codified as 33 CFR 292. The provisions of § 290.12 of this chapter are applicable to this regulation.

**PART 293—FORMULATION OF ALTERNATIVES [ER 1105-2-230]**

- Sec.
- 293.1 Purpose.
- 293.2 Applicability.
- 293.3 Reference.
- 293.4 General.
- 293.5 Identify management measures.
- 293.6 Categorize applicable management measures.
- 293.7 Develop plans.
- 293.8 Consider plans of others.
- 293.9 Effective date.

**AUTHORITY:** Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778-24869, September 10, 1973.

§ 293.1 Purpose.

This regulation provides guidance on the formulation of alternative plans in multiobjective planning, consistent with the WRC Principles and Standards (P&S) and related policies.

§ 293.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 293.3 Reference.

ER 1105-2-200, Multiobjective Planning Framework (33 CFR 290).

§ 293.4 General.

This task provides for developing alternative resource management systems that address planning objectives. To help insure that the best overall plan is developed, a range of alternative plans will be developed based on different sets of formulation and reformulation criteria. A plan to optimize national economic development and at least one plan which emphasizes environmental quality will be developed along with other plans which address mixes of NED and EQ. In practical terms, these will represent the "best" NED and EQ plans. It is required that all the plans presented at the conclusion of the study will be fully implementable and could be selected. The types of plans which are either required or

should be considered are described in paragraph 7 below. Figure 1 outlines activities necessary in the formulation of alternatives. The following paragraphs discuss the activities included in formulation of alternatives.

§ 293.5 Identify management measures.

A wide variety of technical and institutional means exists for managing resources. As the basis for formulating alternative plans, a broad range of these means should be examined to identify those which can address one or more of the planning objectives. All appropriate

measures should be identified without bias, including those proposed or suggested by different interest groups. Both structural and non-structural means will be given equal consideration. In addition, the range of management measures should not be constrained by considering only those traditionally used by the Corps. This activity should receive considerable attention during the initial iterations of the planning process. During the final iterations, this activity will be less critical because the range of measures applicable to the study will be reduced and more precise.

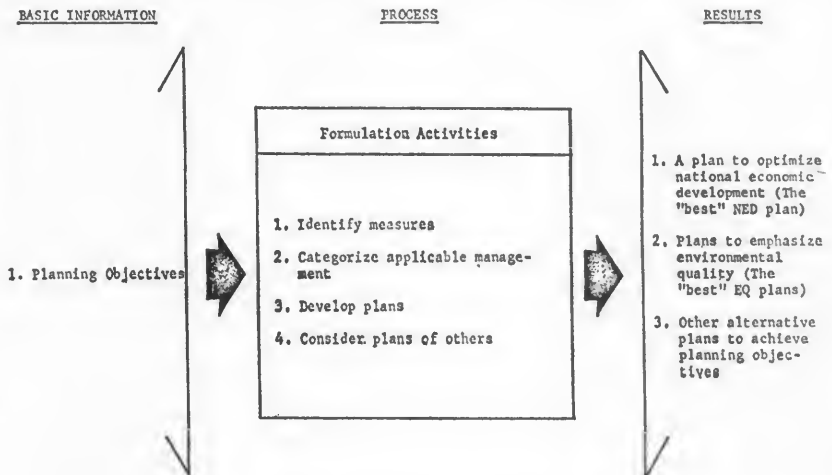


Figure 1: Formulation of Alternatives

§ 293.6 Categorize applicable management measures.

The range of measures will be analyzed to establish those which specifically could address the planning objectives. The term addressing is used in this context to connote that, while it may not be possible to completely satisfy one or all objectives, it may be possible that a measure would make a partial contribution to objective fulfillment. For this reason, different plans will make different contributions to each of the planning objectives. This is also due to the fact that the NED and EQ plans and the plans which address a mix of NED and EQ will be formulated according to different criteria which are discussed below. To accomplish the categorization, each measure should be examined to determine the objective or objectives to which it contributes. One aspect of this activity is to identify conflicts or complementarities that exist between the different measures.

§ 293.7 Develop plans.

This activity is crucial to each iteration since it is through combining different measures into resource management systems that alternatives are formulated to address the planning objectives. The "most probable future" employed to form the basis for establishing the planning objectives should be kept

in mind during this process to aid in developing plans to complement it as well as serving as one basis for subsequently evaluating the alternative plans developed. During the initial iteration of planning, combining different measures will result in a preliminary range of alternatives for managing resources. During all subsequent iterations, more definitive systems made up by linking or combining a number of measures will be developed by applying the reformulation criteria discussed in this section:

(a) Combining the appropriate measures into alternative management systems should generally be sequenced as follows:

(1) Initially, measures that address more than one planning objective should be specified. This requires selecting a particular measure and determining the objectives it does and does not address. Care must be taken to identify conflicts between these measures and to enhance their compatibility to the extent possible. If irreconcilable conflicts between measures are apparent, the more desirable measure based on subsequent impact assessment and evaluation should be retained. After combining compatible measures that address a number of planning objectives, analysis should be conducted to establish those objectives that have not been fully or partially addressed and those for which additional measures should be considered.

(2) The second level of developing plans involves adding compatible measures which address only one planning objective. As a check, planning objectives which have not yet been fully or partially addressed will be identified.

(3) If appropriate, the third step involves reanalyzing the applicable measures to select and add ones that would be appropriate for more fully addressing the planning objectives.

(4) The purpose of this activity is to set forth a number of different resource management systems. The systems are to be composed of structural and non-structural measures that, if implemented, would fully or partially satisfy the planning objectives.

(5) A major element in this development process is the necessity to modify, add, or delete measures in relation to addressing the planning objectives. The interactions among measures must be analyzed in relation to the criteria discussed in the evaluation task. As stated previously, the activity of developing plans must reflect the other activities involved in formulation of alternatives, as well as the inputs and outputs associated with problem identification, impact assessment, and evaluation. In addition, the formulation task must reflect the specific criteria established below for reformulating alternatives to develop the required NED and EQ plans as well as other plans which address a mix of NED and EQ. This means that while developing plans can be expressed as a single activity, it must be integrated with the other activities that together comprise the planning tasks.

(b) All of the alternative plans developed should attempt to address a broad range of planning objectives without bias as to the economic or environmental nature of the output. Traditional project outputs such as flood control, fish and wildlife, water supply, and recreation related to addressing the planning objectives.

(c) As a practical guide, the range of alternative plans should reflect a broad spectrum of publicly held concerns. Therefore, formulation should involve developing a broad mix of plans reflecting the full range of planning objectives rather than focusing on justifying a single alternative for recommendation. These alternative plans are to be guided by the criteria outlined in paragraphs d., e., and f., below, which describe the NED plan, the EQ plan, and plans which address a mix of objectives. It should be recognized that all alternative plans are to be subjected to the evaluation criteria specified in § 295.7 of this chapter, which may result in further modification of plans in the interest of meeting the criteria. For example, mitigation of the adverse effects of either an NED or EQ plan to meet the evaluation criteria may be greater than that which would be provided if incremental NED or EQ benefits alone are required to exceed incremental costs.

(d) The P&S require that a plan to optimize NED and at least one plan em-

phasizing EQ will emerge during the evaluation task as prescribed in Part 295 of this chapter. Since the outputs of alternative plans may have varying economic consequences, it may be necessary to consider a number of alternatives as possible candidates for the detailed plan to be called the NED plan. Because environmental consequences are not measured in a single standardized unit, it will be necessary to carry a number of plans emphasizing different environmental consequences through the planning process.

(1) An NED plan addresses the planning objectives in the way which maximizes net economic benefits. Net economic benefits are maximized when plan scale is optimized and the plan is efficient. Scale is optimized when the benefits of the last increment of output for each measure in the plan equals the economic costs of that increment. A plan is efficient when the outputs of the plan are achieved in a least cost manner. The P&S require that an NED plan have net economic benefits. Alternative measures considered in the formulation of an NED plan are to be evaluated according to economic criteria. However, the design of physical structures is to be done according to engineering criteria. As is true for all alternatives, sound design based upon the interdisciplinary inputs of the planning team is required for an NED plan. Because an NED plan includes all measures to address planning objectives whose incremental dollar benefits exceed dollar costs, mitigation, preservation, or enhancement measures should be included when they are economically justified. Examples of this would be buying additional land to mitigate for wildlife habitat inundated by a reservoir or replacement of a highway when the dollar benefits from the purchase or replacement exceed its dollar costs.

(2) Recognizing that environmental quality has both natural and human manifestations, an EQ plan addresses the planning objectives in the way which emphasizes aesthetic, ecological, and cultural contributions. Beneficial EQ contributions are made by preserving, maintaining, restoring or enhancing the significant cultural and natural environmental attributes of the study area. Determination of EQ benefits involves subjective analysis, underscoring the need for interdisciplinary planning with extensive public input, to place values on the environmental contributions of plans. Designating EQ plans involves measuring the environmental changes related to different plans and selecting those which, based on public input, contributes to or are most harmonious with environmental objectives. This means that EQ plans are those which make the "best" contributions to one or more of the components of the EQ account.

(3) Because the general criteria used in formulating NED and EQ plans are different, the measures contained in the plans will generally differ. There are cases, however, when the two plans will be similar if not identical. This may occur when the measures contained in an

NED plan have little or no adverse environmental impact or, alternatively, they make important contributions to components of the EQ objective. Like an NED plan, an EQ plan may contain environmental preservation or enhancement measures which utilize the potential created by other measures to serve other component needs. Unlike an NED plan, however, such measures may be justified in terms of environmental benefits not measurable in dollar terms compared to their costs. The acquisition of an area for habitat mitigation, cited under the NED plan discussion, is also an appropriate example here. The justification for inclusion of such a measure in an EQ plan may be based upon benefits not measurable in dollars. An EQ plan is often thought of as being synonymous with a non-structural plan but, based on the discussion in paragraph (2) of this section, this need not be the case. Paragraph (g) below describes the role of plans developed primarily of non-structural measures. Also an EQ plan is not necessarily a "do nothing" plan or a plan to maintain existing conditions. Such a plan may be an EQ plan when all applicable measures have serious net detrimental effects on environmental quality and contributions to components of the EQ objective cannot be made at reasonable cost. Specific provisions are made for deriving "no development" plan below.

(e) In addition to the NED and EQ plans described above, additional plans which serve significantly different mixes of NED and EQ should be formulated so as to not overlook the best plan. When considering alternative plans which reflect major trade-offs between NED and EQ, the addition of complementary measures to serve other planning objectives may considerably enhance the plan. An example is adding measures which contribute to EQ without reducing the economic effectiveness of the plan, such as beautification of channel works through design modification and landscaping. These measures have often been found essential to make a structural solution to a problem acceptable to local interests. A basic question in formulating plans which address mixes of NED and EQ is the extent to which the planner should trade off economic benefits and incur additional economic costs to avoid adverse impacts on environmental quality or to provide environmental quality benefits. This is a difficult problem because environmental quality values are subjective and cannot be valued in explicit monetary terms. Yet when dollar costs or benefits are traded off for environmental considerations, an implicit evaluation is made that the net benefits are worth the dollar cost to obtain them. There will be uncertainty as to what the public consensus may be regarding trade-offs and, indeed, decisions cannot be reached until the range of trade-offs is shown to the public. Therefore, a variety of alternative plans should be initially developed which appear to represent the preferences of the various publics. During subsequent iterations, the alterna-

tives can be refined and those which lack significant public support can be eliminated. The number of alternatives which address a mix of NED and EQ to be carried through to the end of the planning process is a function of both the diversity of public and professional expressions and the characteristics of the outputs possible for the measures available to address the planning objectives.

(f) It should be noted that the P&S also permit formulation of alternative plans "reflecting significant physical, technological, legal, or public policy constraints." This permits developing an alternative plan which provides a level of flood control protection greater than that which maximizes net benefits.

(g) Plans employing non-structural measures may be formulated, if they are economically and/or environmentally sound. While purely non-structural alternatives may not provide workable solutions, alternatives which place heavy emphasis on non-structural measures may be highly effective in meeting the planning objectives. As indicated elsewhere, non-structural measures should be considered without bias throughout the process and if a detailed plan is developed which primarily employs non-structural measures it may be labeled a "non-structural plan". Even if a "non-structural plan" is not developed, the report of the District Engineer will fully describe how non-structural measures were considered throughout the planning process and the role they played in the development and selection of the recommended plan.

(h) In formulating plans to increase beneficial contributions to the EQ account, 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, positive action normally will be required to assure that the no development concept can be realized. Environmental characteristics that the plan is designed 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.

§ 293.8 Consider plans of others.

Federal, State, regional, and local governmental agencies may have plans, or parts thereof, for addressing the planning objectives of the study area. Public and private organizations may also have proposals or fully developed alternatives that should be considered during the planning process. Such plans should be subjected to the same requirements as other alternative plans. Judgement must be exercised to determine which of these proposals are viable and if they should be carried forward in the planning process.

§ 293.9 Effective date.

This regulation is effective November 10, 1975, as published in the FEDERAL

REGISTER on that date and codified as 33 CFR 293. The provisions of § 290.12 of this chapter are applicable to this regulation.

PART 294—IMPACT ASSESSMENT  
[ER 1105-2-240]

Subpart A—General

- Sec. 294.1 Purpose.
- 294.2 Applicability.
- 294.3 References.
- 294.4 Relationship to guidelines for effect assessment pursuant to section 122, Pub. L. 91-611.
- 294.5 Relationship to preparation of an environmental impact statement (EIS).
- 294.6 General.
- 294.7 Determine sources of impacts.
- 294.8 Identify and trace impacts.
- 294.9 Specify incidence of impacts.
- 294.10 Measure impacts.
- 294.11 Effective date.

Subpart B—Guidelines for Assessment of Economic, Social and Environmental Effects of Civil Works Projects

- 294.21 Purposes.
- 294.22 References.
- 294.23 General.
- 294.24 Assemble a profile.
- 294.25 Make projects of "without project" conditions.
- 294.26 Make "with project" projections, identifying causative factors and tracing their effects for each alternative.
- 294.27 Identify significant effects.
- 294.28 Describe and display all significant effects.
- 294.29 Evaluate effects.
- 294.30 Consider project modifications where adverse effects are significant.
- 294.31 Seek assessment feedback from other sources.
- 294.32 Use effect assessment in making recommendations.
- 294.33 Prepare a Statement of Findings.
- 294.34 Use effect assessment in the Environmental Impact Statement.

Appendix A—Sample causative factors.

Appendix B—Sample project effects.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778-24869, September 10, 1973.

Subpart A—General

§ 294.1 Purpose.

This regulation provides guidance on the assessment of impacts of alternative plans in multiobjective planning, consistent with the WRC Principles and Standards (P&S) and related policies.<sup>1</sup>

§ 294.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 294.3 References.

(a) Title I, Pub. L. 91-190, National Environmental Policy Act, 1 January 1970 (83 Stat. 852).

(b) Section 122, Pub. L. 91-611, River and Harbor and Flood Control Act of 1970, 31 December 1970 (84 Stat. 1818).

(c) ER 1105-2-200, Multiobjective Planning Framework (33 CFR 290).

(d) ER 1105-2-507, Environmental Impact Statements (33 CFR 209.410).

§ 294.4 Relationship to guidelines for effect assessment pursuant to section 122, Public Law 91-611.

Guidelines developed to meet the requirements of Section 122, Pub. L. 91-611, as approved by the Secretary of the Army, were originally issued on 28 September 1972. These guidelines have been retained as Subpart B of this part and Appendixes A and B, and are applicable to all preauthorized feasibility reports, Phase I General Design Memoranda and Detailed Project Reports transmitted to the Chief of Engineers after 31 December 1972.

§ 294.5 Relationship to preparation of an environmental impact statement (EIS).

This regulation provides general guidelines which are to be utilized in conjunction with Part 209.410 of this chapter in the conduct of environmental assessments and preparation of EISs.

<sup>1</sup> This regulation supersedes ER 1105-2-105, 15 December 1972, and supersedes 33 CFR 209.400.

BASIC INFORMATION

PROCESS

RESULTS

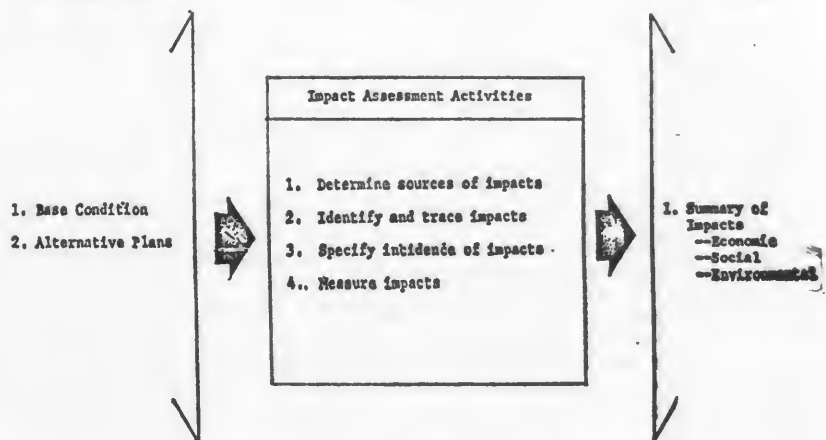


Figure 1: Impact Assessment

### § 294.6 General.

Impact assessment is an objective analysis conducted to identify and measure the likely economic, social, and environmental effects of each alternative plan. These effects, when analyzed, form the basis for evaluating the beneficial and adverse contributions of the plans. Each of the alternative plans resulting from the previous tasks as well as the impacts of the "without condition" will be analyzed in relation to the base year condition to determine expected changes. In the latter case, the assessment involved a further refinement of information gained during the Problem Identification task. For example, the "without condition" may have been described only in terms of population, economic, and employment conditions. During assessment, the land use, pollution, water supply and other economic, social, and environmental implications of the "without condition" will be analyzed. In this manner, a consistent concept of the "without condition" will be described for use during the subsequent evaluation. The assessment will be commensurate with the level of detail of the alternatives. Assessment reflects increasing precision as it is conducted during the later iterations of the planning tasks in Stage 2 and throughout Stage 3. The following paragraphs discuss the activities included in impact assessment, as depicted in Figure 1.

#### § 294.7 Determine sources of impacts.

Each alternative and its component measures should be analyzed to determine potential sources of impacts. Impacts can be caused by the inputs required to carry out a measure, by the measure itself, or by the outputs resulting from it. Inputs generally include the natural resources, energy, labor, and capital that are necessary to implement a proposed management system. Outputs are the services or products such as water supply, recreation, flood control, open space, historic preservation, and the like, delivered by the plan, specified in terms of quantity and, if appropriate, quality. During this activity, particular attention must be given to identifying and categorizing all relevant sources of impact, especially in terms of the inputs and outputs associated with the measures. The information surfaced during this activity, specified by type, location, and size, forms the basis for assessment. Appendix A provides a suggestive source list of causative factors.

#### § 294.8 Identify and trace impacts.

For each alternative plan, compare its inputs, measures, and outputs to the base condition established during the problem identification task to determine whether a change in any of the base condition elements can be forecasted as a consequence of the plan. This requires tracing each cause to determine all of its significant effects. Appendix B provides an illustrative listing of effects which could occur. In most instances the analysis will require a practicable tracing out of an

intricate network of causes and effects. Tracing out causes and effects should be tempered so that only significant effects are ultimately considered. Cause-effect analysis should surface all significant impacts of the first, second, or subsequent order.

(a) Significance is established by determining if an effect could have a material bearing on decision-making. Care must be taken to include necessary information on the one hand but to avoid overloading the process on the other. The scarcity, fragility, or resiliency of the elements of the study area must also be reflected in establishing the significance of impacts. Even though impact assessment is essentially an objective undertaking, determining whether an impact is significant or not must also reflect publicly held values.

(b) Identifying impacts should also reflect that an alternative or component measure thereof may not result in changing the base condition. If no change from the base condition is projected, its significance should also be analyzed and the lack of change should be reflected in the subsequent assessment activities. It is particularly important for the analysis to specify instances when no net change occurs, especially in cases where the combined use of two measures, such as a dam and a fish ladder, produces a different impact than that which would otherwise be expected if only one of the measures were involved.

#### § 294.9 Specify incidence of impacts.

The location, timing, and duration of each significant impact should be determined. These requirements are described below and defined in Part 393 of this chapter.

(a) Impacts should be described to establish their effect on the immediate planning area, within the rest of the study area, within a larger area affected by the plan, and on the nation as a whole, consistent with the System of Accounts tables prepared for the study.

(b) The timing of impacts should be identified to establish whether they are likely to occur prior to or during implementation of the plan, shortly after implementation, or in a longer time frame.

(c) The duration of impacts should be identified to establish whether they are reversible or irreversible and whether they are short-term or long-term.

#### § 294.10 Measure impacts.

This activity involves describing the magnitude of each change that has been identified. This is a difficult task, since many of the changes can be described only in a highly qualitative manner. This is particularly the case for environmental and social impacts. An attempt to measure all impacts, even those of a less tangible nature, will be made by appropriately trained individuals. Change should be measured from the base condition, and should be described in an appropriate unit of measure or concisely characterized in a written statement. An overdependence on numerical measure-

ment of impacts may result in misleading information which may be more appropriately and accurately related using other methods.

#### § 294.11 Effective date.

This regulation is effective November 10, 1975, as published in the FEDERAL REGISTER on that date and codified as 33 CFR 294. The provisions of § 290.12 of this chapter are applicable to this regulation.

### Subpart B—Guidelines for Assessment of Economic, Social and Environmental Effects of Civil Works Projects

#### § 294.21 Purpose.

These guidelines are designed to ensure that all significant adverse and beneficial effects of proposed projects are fully considered.

#### § 294.22 References.

Section 122, Public Law 91-611 (84 Stat. 1818).

#### § 294.23 General.

Effect (impact) assessment is an integral part of the planning process. It serves as one test of the adequacy of that process and of any positive or negative recommendations resulting therefrom. It is fully compatible with multiobjective planning.

(a) Any alternatives developed in the planning process may produce unintended effects which are not responsive to the planning objectives and which are not included in benefit-cost analysis. Such effects are the subject of these guidelines.

(b) Effect assessment is an iterative process which consists of the following steps: identification of anticipated project-caused economic, social, and environmental effects; quantitative and qualitative description and display of the effects; evaluation of the effects, whether adverse or beneficial; and consideration of measures to be taken if a proposed project would cause adverse effects.

(c) The sequence of steps in effect assessment is described in § 294.24.

#### § 294.24 Assemble a profile.

(a) Portray existing conditions in a profile describing the relevant economic, social, and environmental characteristics of the affected area. Judgment is of critical importance in determining what information will be needed.

(b) A tentative profile should be prepared early in the planning process. Subsequently, as alternatives are considered in greater detail, the profile should be made more precise and focused on identified significant effects.

(c) The boundary areas of the profile will vary depending upon whether the focus of an effect is local or regional; whether the area is defined by political jurisdiction or by hydrologic unit; and by the nature of the project effects.

(d) When completed, the profile should provide a clear understanding of the significant existing conditions, problems,

and needs of the affected area and of the rationale for any action, if proposed.

**§ 294.25 Make projections of "without project" conditions.**

(a) Extend the profile of existing conditions to portray future conditions without any project action. Projections should cover the expected life of each alternative considered over a reasonable range of probable future conditions.

(b) Utilize a range of values to compensate in part for the uncertainties of projecting the future.

(c) Projection of existing economic, social and environmental conditions should yield pertinent information about the conditions, problems, and needs of the affected area in the future and provide a basis or baseline for a comparison of the effects of alternative plans. The projection may suggest issues to be addressed in designing alternative "with project" plans.

**§ 294.26 Make "with project" projections, identifying causative factors and tracing their effects for each alternative.**

(a) Make projections of the "with project" conditions for each alternative being considered, including pre-construction, construction and operation periods through its expected life.

(b) Identify and list project-related causative factors (see Appendix A) and their likely economic, social, and environmental effects (see Appendix B) concurrently with the formulation of alternative plans.

(c) The causative factors and effect elements for each alternative should be set forth in sufficient detail to ensure that all significant interactive relationships are considered. The inter-relatedness of economic, social, and environmental aspects cannot be overlooked and must be considered regardless of the category in which any given effect is placed.

(d) Assessments initially should emphasize breadth rather than depth. Refinements should await later stages of plan formulation.

(e) Effect assessment at any stage should be carried to a degree of detail commensurate with the alternative it addresses.

**§ 294.27 Identify significant effects.**

(a) Examine causative factors and the effects they produce for each alternative. Select those effects which appear significant in view of the conditions, problems and needs of the affected area as projected for the "with" and "without" project conditions.

(b) A "significant" effect is one which would be likely to have a material bearing on the decision-making process.

(c) A determination regarding significance should be made at the earliest stage possible in the assessment process. The determination should be reconsidered at each stage, particularly in the light of public input and reaction.

(d) In the process of formulation, adjustments may be made in the alternative plans that avoid or reduce identified

adverse effects. In such cases, only residual adverse effects should be identified for further analysis in the concurrent assessment process.

**§ 294.28 Describe and display all significant effects.**

(a) Describe the effects of the various alternative plans in quantitative terms to the extent possible. Where this cannot be done, effects should at a minimum be set forth in qualitative-descriptive terms.

(b) The effects should be described objectively, and tentatively designated as adverse or beneficial.

(c) Beneficial effects that are identified should be included, to the extent possible, in the benefit evaluation section of the survey report.

(d) Beneficial effects of one kind cannot be considered to cancel out an adverse effect of another kind.

(e) Display the effects of the alternative plans in a form that is easily understood, interpreted, and evaluated, and that clearly shows the differences among them. The display is to be used in consulting with State and Federal agencies and public groups with particular expertise. The display also provides one of the bases for assessing alternative plans, selecting a recommended plan, and assisting in public participation.

**§ 294.29 Evaluate effects.**

(a) Place values on the significant adverse and beneficial effects in monetary terms where applicable, quantitatively where possible, and qualitatively in any event.

(b) The assumptions or criteria on which a judgment is based should be made explicit, since segments of the public may perceive any single effect quite differently.

(c) Significant adverse effects must be sufficiently well displayed to facilitate the weighing of need and type of project modification, if any. No single method for determining relative value is generally accepted. Public policy, community preferences, and the magnitude and degree of severity of effect are factors to be considered.

(d) The aggregate or systems interaction of combined economic, social, and environmental effects should be considered along with evaluation of individual effects. In addition, the possibility of individual effects being part of a larger cumulative process should be investigated.

(e) Effects not significant, not relevant, or that can be adequately incorporated in benefit-cost evaluation should not be accommodated in the effect evaluation.

(f) An evaluation cannot be validated without obtaining the review and reaction of other agencies and the public.

**§ 294.30 Consider project modifications where adverse effects are significant.**

(a) For each significant adverse effect, investigate the possibility of:

- (1) Eliminating the effect;
- (2) Mitigating the effect by minimizing or reducing it to an acceptable level

of intensity; or by compensating for it by including a counter-balancing positive effect.

(b) The costs of such measures, as well as any costs of reduced project performance, provide further bases for comparing alternatives and for deciding how or whether to modify them or to accept the adverse effects.

(c) If effect assessment has not proceeded in step with the formulation of alternatives, the possibility always exists that an identified adverse effect may be of such magnitude or character that it cannot be accepted in the best overall public interest, or be corrected by project modifications. In such a case, one or more new alternatives must be formulated to avoid an unacceptable adverse consequence. "No action" is always one of the alternatives to be considered.

(d) For each beneficial effect investigate the possibility of:

(1) Reflecting it in the benefit-cost analysis of the project formulation process; or

(2) Describing and displaying the effect for consideration by the public and in plan selection; or

(3) Considering it as an offset for a corresponding adverse effect.

**§ 294.31 Seek assessment feedback from other sources.**

(a) Effect assessment procedures require a variety of information sources and continuous feedback.

(b) Informal exchanges with Federal, State, and private groups and with individuals should be sought at the beginning of any investigation and maintained throughout planning. More formal discussion occurs in the course of initial, formulation and late-stage public meetings.

(c) Consultation with a wide range of interests tests the adequacy of identification of effects, validates their designation as beneficial or adverse, and provides commentary on measures considered for project modification.

(d) Response should be solicited to ensure that effects have not been overlooked or that the significance of effects has not been misjudged.

(e) Fully utilize all the public participation procedures of the planning process. For survey report investigations, effects and possible modifications will be introduced at the initial, formulation and late-stage public meetings at a level of detail commensurate with that with which the alternatives are presented.

(f) For continuing authority reports and Phase I General Design Memoranda, effect assessment will be tailored to the public participation requirements of existing regulations.

(g) Sections 294.24-294.30 should be taken before each public meeting to complete a formal iteration of the effect assessment process.

**§ 294.32 Use effect assessment in making recommendations.**

(a) More detailed assessment will be applied to the alternatives, including the tentatively selected proposal, by the time they are presented in the late-stage

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public meeting. At this meeting, formal presentation of the alternatives and measures to overcome adverse effects will be made and the degree of public acceptance gaged.

(b) The reporting officer should recommend the alternative that is in the best overall public interest considering the planning objectives, the benefits and costs, and the significant economic, social, and environmental effects, including costs of treating those that are adverse.

(c) While assessment and appraisal from all sources influence the alternative recommended by the reporting officer, the burden of judgment and defense ultimately rests with him.

#### § 291.33 Prepare a Statement of Findings.

(a) Include a summary of the completed effect assessment in the report immediately before the Statement of Findings.

(b) The Statement of Findings presents the rationale of the reporting officer for his conclusions and recommendations in accordance with the "best overall public interest."

#### § 291.34 Use effect assessment in the Environmental Impact Statement.

The requirements of Section 122 supplement the requirements of PL 91-190 (NEPA). Consequently, the completed effect assessment for environmental effects should be used as input for the Environmental Impact Statement.

#### APPENDIX A

##### SAMPLE CAUSATIVE FACTORS

In order to identify and evaluate the effects of a project, describe aspects of the project in terms of factors likely to produce significant effects. Evaluation of effects should not be carried out in greater detail than the project alternative being considered. The list below is illustrative. It is not to be considered complete or limiting.

##### INPUT FACTORS

Natural Resources: Water; Land; Resources Products—Gravel, Sand, Coal, Timber, Crushed Rock; Wildlife and Fish; Aesthetics; Flora (Plant life).  
Energy Resources.  
Capital.  
Labor.

##### SYSTEMIC FACTORS

Physical Alterations: Channelization; Excavation; Dredging; Draining.  
Structures: Dam/Lake; Levee; Jetty; Channel; Barrier; Road and Utility Relocation.  
Institutional: Acquisition; Easements; Relocation.

##### OPERATION AND MAINTENANCE FACTORS

Equipment Service.  
Resource Management: Harvesting; Planting; Buffer Zone Maintenance; Grazing; Fencing.  
Maintenance: Recreational areas; Water Quality Protection; Dredging Operations; Navigation Controls; Reservoir Controls and Procedures.

##### OUTPUT FACTORS

Hydro-power.  
Flood Control.  
Navigation.  
Water Supply.  
Recreation.  
Irrigation.  
Fish and Wildlife.  
Water Quality.  
Shoreline Protection.

#### APPENDIX B

##### SAMPLE PROJECT EFFECTS

All significant effects of projects should be identified and assessed. In some cases, a causative factor may result in only one significant effect. In other cases, the significant effects of a causative factor will be numerous and may require consideration in all three effect categories. (Example: a causative factor such as dredging may result in turbidity in the water for a brief period. This should be considered a predominantly environmental effect. Yet, because of the turbid water, a textile factory downstream may have to close down for a few days. This is an economic effect, and should be considered as a result of dredging even though it is a lesser effect than the environmental one. The increased turbidity may also have the effect of reducing water recreation temporarily. This is a social effect of the dredging). Judgment must be used as to the limits of tracing out effects. Generally, the degree of detail involved in assessment should be no greater than that of the plan it addresses.

An asterisk denotes items specifically mentioned in Section 122. These must be identified and evaluated. If they are considered to be not significant, that should also be noted. Other effects should be identified and evaluated only if they are considered to be significant. The list below is an illustrative one. It is not to be considered complete or limiting.

##### SOCIAL EFFECTS

\*Noise; Population, e.g.—Mobility, Density.  
\*Displacement of people; \*Aesthetic values; Housing; Archeologic remains; Historic Structures; Transportation; Education opportunities; Leisure opportunities (recreation, active and passive); Cultural opportunities; \*Community cohesion; \*(Desirable) community growth; Institutional relationships; Health.

##### ECONOMIC EFFECTS

National Economic Development; Local government finance, e.g.—\*Tax revenues, \*Property values; Land use; \*Public facilities; \*Public services; Local/regional activity, e.g.—\*(Desirable) regional growth, Relocation; Real income distribution; \*Employment/labor force; \*Business and industrial activity; Agricultural activity—\*Displacement of farms, Food supply; National defense

##### ENVIRONMENTAL EFFECTS

\*Man-made resources; \*Natural resources; Pollution aspects: \*Air—CO, Sulphur oxides, Hydrocarbons, Particulates, Photochemicals; \*Water—Pathogenic agents, Nutrients N and P, Pesticides, herbicides, rodenticides, Organic materials, Solids, dissolved and suspended; Land—Soils; Animal and plant: Birds, Mammals, Amphibians, Fish, sport and commercial, Shellfish, Insects, Microfauna, Trees, shrubs and plants, Microflora; Ecosystems: Habitats, Food chains, Productivity, Diversity, Stability; Physical and Hydrologic aspects: Erosion,

Erosion and sedimentation effects, Compaction and subsidence, Slope stability, Groundwater regime alteration, Surface flow effects, Micrometeorological effects, Physiologic changes (e.g., wetlands destruction).

#### PART 295—EVALUATION

[ER 1105-2-250]

Sec.	
295.1	Purpose.
295.2	Applicability.
295.3	References.
295.4	General.
295.5	Period of analysis and interest rate for evaluation.
295.6	Appraise planning objective fulfillment.
295.7	Appraise system of accounts contributions.
295.8	Apply specified evaluation criteria.
295.9	Perform trade-off analysis.
295.10	Designate NED and EQ plans.
295.11	Procedures to be followed when reiterating planning tasks.
295.12	Effective date.

AUTHORITY: Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778-24869, September 10, 1973.

#### § 295.1 Purpose.

This regulation provides guidance on the evaluation of alternative plans in multiobjective planning, consistent with the Principles and Standards (P&S) and related policies.

#### § 295.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

#### § 295.3 References.

- (a) ER 1105-2-200, Multiobjective Planning Framework (33 CFR 290).  
(b) ER 1105-2-210, Plan Development Stages (33 CFR 291).  
(c) ER 1105-2-240, Impact Assessment (33 CFR 294).  
(d) ER 1105-2-921, System of Accounts (33 CFR 393).

#### § 295.4 General.

Evaluation involves determining the contributions, both beneficial and adverse, of each alternative plan. In evaluation, the impacts of each alternative and the impacts of the "without condition" are compared to determine the contributions each plan would make when compared with what would happen in the absence of carrying out any of the plans. Then the relative contributions of the alternative plans are ranked and traded-off based on professional analysis and the perceptions of the public. At the conclusion of the planning process, the results of the evaluation provide the basis for choosing the most desirable plan and, if appropriate, recommending its implementation. A system of Accounts which will be used for displaying the results of this activity throughout a study, is discussed in Part 393 of this chapter. The evaluation task is depicted in Figure 1.



The following paragraphs discuss the activities included in evaluation.

**§ 295.5 Period of analysis and interest rate for evaluation.**

(a) A 100-year period will be used for evaluation for plans associated with major reservoirs, main line agricultural levees, local flood control in urban areas, and hurricane protection. A 20-year

period will be used for cost-effective analysis of wastewater collection and treatment facilities (see Part 275 of this chapter). A 50-year period of analysis will be used in all other cases. The period of analysis used for evaluation, however, will in no case exceed the estimated useful life of the plans being evaluated.

**§ 295.7 Appraise system of accounts contributions.**

The significant impacts of each plan will also be evaluated to establish the plan's contributions to the NED, EQ, RD, and SWB accounts of the P&S. In general, the process followed in appraising planning objective fulfillment will be repeated to accomplish this activity. Identifying contributions to the four accounts involves a wide range of uncertainties which should be specified quantitatively or qualitatively, including who gains or loses, locational incidence, and time of occurrence. Because they are especially critical to the efficacy of the overall planning process, unintended contributions should also be identified. If the unintended contribution is significantly beneficial, it suggests the existence of previously unidentified concerns that reformulation could potentially address more fully. However, if the unintended contribution is significantly adverse, further reformulation is indicated.

**§ 295.8 Apply specified evaluation criteria.**

The third evaluation activity involves applying specified criteria to the alternative plans to test their responsiveness. These criteria are: acceptability, completeness, effectiveness, and efficiency, as explicitly stated in the P&S; and certainty, geographic scope, NED benefit-cost ratio, reversibility, and stability, which are derived from the first four.

(a) Acceptability of a plan is determined by analyzing its acceptance by concerned publics. A plan is acceptable if it is, or will likely be, supported by some significant segment of the public. However, during reiterations of the planning tasks, every attempt should be made to eliminate, to the extent possible, unacceptability to any significant segment of the public.

(b) The completeness of a plan is determined by analyzing whether all necessary investments or other actions necessary to assure full attainment of the plan have been incorporated.

(c) The effectiveness of a plan is determined by analyzing the technical performance of a plan and its contributions to the planning objectives and to the System of Accounts.

(d) The efficiency of a plan is determined by analyzing its ability to achieve the planning objectives and NED and EQ outputs in the least-cost way.

(e) The certainty of a plan is determined by analyzing in general terms the likelihood that if the plan is implemented the planning objectives and the contributions to the NED and EQ accounts will be attained.

(f) The geographic scope is determined by analyzing the relevancy of the geographic area encompassed by the plan; it must be large enough to encompass a full understanding of the problems and focused enough to make the proposed solutions effective.

(g) The NED benefit-cost ratio of a plan is determined by analyzing the eco-

BASIC INFORMATION

PROCESS

RESULTS

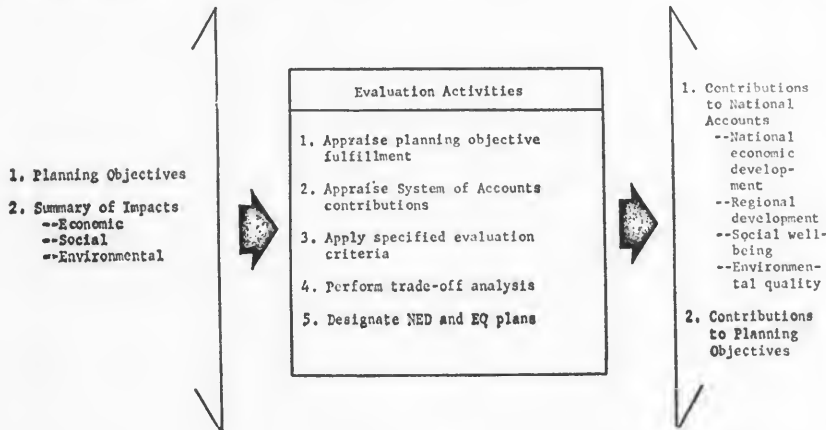


Figure 1: Evaluation

(b) Interest rates for evaluation are established annually by the Water Resources Council. Guidance on interest rates is published annually by DAEN-CWP in an Engineer Circular, following publication of the new rate in the FEDERAL REGISTER.

**§ 295.6 Appraise planning objective fulfillment.**

The first evaluation activity is to determine the relationship of the impacts of alternative plans to the planning objectives. Establishing the extent of which alternatives satisfy the objectives involves comparing the impacts of the plans and making a subjective judgment of the degree of satisfaction. Subjective judgments must reflect both professional analysis and public perceptions about how well the planning objectives are addressed. The purpose of this activity is to provide information about objective fulfillment as a basis for redirecting subsequent iterations to recast the objectives or to provide different measures to more adequately address the objectives.

(a) The appraisal of objective fulfillment initially involves comparing the significant impacts, both intended and unintended, of each alternative plan to the planning objectives. If an impact is related to an objective, then the degree of objective fulfillment should be determined. Possible methods for accomplishing this are by establishing a scale and measuring objective fulfillment in relation to it, by describing the degree of fulfillment

or by making a subjective ranking of fulfillment. Then the net effect of the alternative in relation to the objective will be established by aggregating the separate impacts and subjectively determining the extent to which a net beneficial or adverse contribution will be made by the alternative. This process will be repeated for all objectives on which the alternative plan impacts and subsequently for each plan until the net effect of each plan on all the planning objectives is established.

(b) One aspect of the appraisal is to distinguish between what could be actual or potential contributions of the alternatives. An actual contribution is one that will occur as a result of a plan either under the auspices of a governmental agency or through the normal working of the economic system. A potential contribution is one that requires additional positive action by another agency or entity.

(c) Establishing the degree of net beneficial or adverse contributions does not necessarily involve a numerical measure. When appropriate, numbers may be used in measuring contributions. However, many contributions may be expressed only in terms of ordinal differences such as "high, medium, or low" or in terms of net effects such as "beneficial or adverse". An overdependence on numerical relationships is not necessary, although discretion must be exercised when using other forms of depicting objectives fulfillment.

conomic benefits in relationship to the economic costs.

(h) The reversibility of a plan is determined by analyzing the capability, as public needs and values change or should unusual future circumstances so warrant, of restoring the partially or fully implemented plan to approximate the without condition; "non-structural plans" may rate higher in this regard.

(i) The stability of a plan is determined by analyzing the range of alternative futures, data and/or assumptions which can be meaningfully accommodated within the recommended plan or minor modifications thereof. Greater stability generally indicates a more desirable plan.

#### § 295.9 Perform trade-off analysis.

Subsequent to identifying the contributions of the alternative plans to the planning objectives and the System of Accounts and establishing their response to the specific evaluation criteria, trade-off analysis will be conducted to analyze the comparative contributions of the alternative plans. When this has been accomplished for each alternative, the resulting information should be compiled so that what is gained or foregone by choosing a given alternative over other alternatives is clearly set forth.

(a) To carry out this activity monetary units, numerical data, and qualitative information will be compared. Monetary relationships are only one part of the trade-off analysis; major aspects of the analysis will involve the consideration of qualitative information regarding the social and environmental values of each plan. Although more difficult to analyze, this information must be considered equally with the more tangible economic and engineering data.

(b) Trade-offs will involve subjective judgments and must therefore reflect public preferences. Through incorporation of public inputs, the trade-off analysis should surface the alternative or alternatives which appear to be the most acceptable to major segments of the public.

#### § 295.10 Designate NED and EQ plans.

The alternatives which appear to best meet the criteria for the NED and EQ plans (as stated in Part 293 of this chapter) should be designated as a basis for subsequent iterations. This requires analyzing the overall economic and environmental contributions of each alternative when compared to the without condition. The plans that result in the greatest net economic return will be candidates for the NED plans. The plans that result in the most desirable environmental contributions will be candidates for EQ plans. The designation of NED plans can be made largely by drawing upon analysis of the economic returns to each alternative. The designation of EQ plans is highly subjective and must reflect societal preferences for the environmental contributions of the alternative plans. Particular note should be taken that the NED plan and an EQ plan could be similar in certain instances where both sets of criteria are met optimally by the same measures.

#### § 295.11 Procedures to be followed when reiterating planning tasks.

The results of each iteration of the planning tasks will be analyzed to establish the necessity for, or direction of, the next iteration. If reiteration is to be undertaken, it will be necessary to establish which plans will be carried forward and the criteria that will be applied to their reformulation. This determination will be based on the results of the evaluation activities and the public's perceptions of the acceptability of the alternatives. Generally, reiteration will be undertaken for three reasons. Principally, reiteration will be undertaken to develop more precise and detailed plans that more fully address the planning objectives within the constraints of the study. Secondly, reiterations will be undertaken to attempt to reduce the significant adverse economic, social, and environmental impacts of the alternative plans. And thirdly, reiterations may be undertaken to increase the RD and SWB benefits of alternative plans, only in those specific cases when prior approval from the Secretary of the Army has been obtained.

(a) For all alternatives to be carried through to the next iteration, the specificity of the plans should be increased. This is accomplished by more precisely defining the planning objectives and by more fully exploring the range of means for addressing them. In addition, reiterating the planning tasks should be directed toward changing "potential" benefits into "actual" benefits, as well as reducing the uncertainties associated with the different alternatives. The following criteria will be applied to the reformulation of alternatives designated as NED and EQ plans, including those plans which address a mix of the two national objectives:

(1) For the alternatives designated as NED plans, add new measures or modify or delete those already employed to develop plans which are fully implementable and represent the best plans that can be formulated on the basis of economic criteria alone. To accomplish this, the following should be carried out in sequence during the subsequent formulation activity:

(i) Attempt to increase net NED benefits by analyzing the incremental benefits and costs of each measure and by making appropriate adjustments.

(ii) Without reducing the level of net NED benefits, attempt to increase net EQ benefits taking into consideration the full range of EQ costs.

(iii) Without reducing the level of either net NED or EQ benefits, seek the best combination of SWB and RD benefits possible.

(iv) Reduce adverse effects on RD and SWB to extent possible without incurring unreasonable losses in net NED or EQ benefits.

(2) For the alternatives designated EQ plans, add new measures, or modify or delete those already employed, to develop plans which are fully implementable and represent the best plans that can be formulated on the basis of en-

vironmental criteria alone. To accomplish this, the following should be carried out in sequence during the subsequent formulation activity:

(i) Attempt to increase net EQ benefits, taking into consideration the full range of EQ costs.

(ii) Without reducing net EQ benefits or incurring additional EQ costs, attempt to increase the net NED benefits.

(iii) Without reducing either the net EQ or the level of net NED benefits, seek the best combination of SWB and RD benefits possible.

(iv) Reduce adverse effects on RD and SWB to extent possible, without incurring unreasonable losses in net NED or EQ benefits.

(3) For the remaining alternatives that address a mix of the two national objectives, add new measures, or modify or delete those already employed, to develop plans which can be fully implemented and represent a viable mix of NED and EQ. To accomplish this, the following should be carried out in sequence during the subsequent formulation activity:

(i) Attempt to increase net EQ and/or net NED benefits.

(ii) Without reducing the level of either net EQ or net NED benefits, achieve the best combination of SWB and RD benefits possible.

(iii) Reduce adverse effects on RD and SWB to extent possible without incurring unreasonable losses in net NED and EQ benefits. This means that net EQ or NED benefits may be reduced to offset adverse RD or SWB effects only when the NED or EQ cost incurred, or benefits foregone, are less than the RD or SWB adverse effects reduced.

(b) As stated above, and discussed more fully in Part 291 of this chapter, positive RD and SWB effects can only be pursued when specifically approved by higher authority.

(c) When significant adverse impacts cannot be avoided, reiteration should surface viable mitigation measures. When mitigation is necessary, planners must take the following actions.

(1) For significant water-related adverse impacts which cannot be eliminated by further planning iterations, planners are directed to consider mitigation actions based on the Corps' initiative rather than waiting to respond to technical questions or concerns raised by another public entity. This action is required by § 294.8 of this chapter.

(2) For significant non-water related adverse impacts outside the normal range of Corps planning, assistance from other Federal, State and local agencies is to be sought regarding pertinent means to address or consider the adversity in question.

#### § 295.12 Effective date.

This regulation is effective November 10, 1975, as published in the FEDERAL REGISTER on that date and codified as 33 CFR 295. The provisions of § 290.12 of this chapter are applicable to this regulation.

**PART 393—FEASIBILITY REPORTS: SYSTEM OF ACCOUNTS [ER 1105-2-921]**

- Sec.
- 393.1 Purpose.
- 393.2 Applicability.
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- 393.4 Objective of the system of accounts.
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- 393.21 Uncertainty.
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- 393.23 Actuality.
- 393.24 Section 122 requirements.
- 393.25 Display of specified evaluation criteria.
- 393.26 Implementation responsibility.
- 393.27 Uses of SA.
- 393.28 Effective date.

**AUTHORITY:** Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778-24869, 10 September 1973.

**§ 393.1 Purpose.**

This regulation provides guidelines for reporting the results of evaluating alternative plans, consistent with the requirements of the WRC Principles and Standards and related policies.

**§ 393.2 Applicability.**

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

**§ 393.3 References.**

- (a) ER 1105-2-200, Multiobjective Planning Framework (33 CFR 290).
- (b) ER 1105-2-220, Problem Identification (33 CFR 292).
- (c) ER 1105-2-240, Impact Assessment (33 CFR 294).
- (d) ER 1105-2-250, Evaluation (33 CFR 295).

**§ 393.4 Objective of the system of accounts.**

The System of Accounts (SA) is a display requirement of the P&S and is integral to the iterative planning process established by reference § 393.3. The SA is filled out with increasing refinement and detail as the study progresses. The

planning process generates information, some of which is displayed as the content of an interim SA at the end of each iteration. The interim SA will be used to help determine what must be done on the next iteration to improve planning. §§ 393.5-393.26 detail the content requirements of the final SA displays; § 393.27 indicates the uses of the interim SA during ongoing planning.

**§ 393.5 General.**

The SA can display only a limited amount of the information derived during the planning process. Therefore, the interdisciplinary planning team will be allowed considerable latitude in the format and level of detail of the SA. Most of its content results from the evaluation of significant impacts. Thus, only significant beneficial and adverse contributions will be displayed. In addition, the SA must describe each alternative carried through the final planning stage; display the planning objectives; present each plan's performance against the specified evaluation criteria; and indicate the timing, geographical incidence, uncertainty, exclusivity, and actuality associated with the evaluation of significant impacts, as discussed in Part 295 of this chapter. Because the SA does not

<i>Planning Objective</i>
Reduce flood hazard in area X.....
Address long-term irrigation needs.....
Increase riverbank preservation.....
Improve water quality of river X.....

include all information, this ER does not affect display requirements established in other regulations. However, the SA satisfies the display requirements of Section 122 guidance (Part 294 of this chapter).

**§ 393.6 Suggested tables.**

No rigid format is required. However, two suggested tables are presented. Table 1 will be very general and brief. It will present the crucial planning considerations underlying each alternative. This table will be attached to the Statement of Findings. Table 2 will be used to display the breadth and detail of the assessment and evaluation of alternative plans. It will normally be presented in the body of the main report in that section pertaining to assessment and evaluation.

**§ 393.7 Final planning objectives displayed.**

The SA will display each planning objective carried through the final iteration and the beneficial and adverse contributions thereto made by each alternative. Contributions will be indicated in essentially physical terms with considerable flexibility allowed the interdisciplinary planning team to choose an appropriate descriptive unit; e.g.

<i>Contribution</i>
Provides 100-yr. level of protection.
Provides 100,000 AF.
Preserves 2 mi. of riverbanks.
Increases water quality to a level suitable for swimming.

**§ 393.8 Potential planning objectives not displayed.**

The feasibility report will identify resource management issues surfaced during the study but not carried through as final planning objectives. Explanations

for not carrying through such issues include:

- (a) Lack of public support.
- (b) Lack of net positive contributions to the national objectives.
- (c) Lack of technologically sound measures to obtain the desired outcome.

TABLE 1.—Summary comparison of alternative plans

	Plan A	Plan B	Plan N
<i>(To be typed as required)</i>			
A. Plan description.....			
B. Significant impacts. <sup>1</sup> (The significant economic, social, and environmental effects of each plan are to be listed.)			
C. Plan evaluation:			
1. Contributions to planning objectives. (The beneficial and adverse contributions of each plan to the planning objectives are to be listed.)			
2. Relationship to 4 national accounts. (The beneficial and adverse contributions to each of the 4 P. & S. accounts are to be listed.):			
NED.....			
EQ.....			
SWB.....			
RD.....			
3. Plan response to associated evaluation criteria <sup>2</sup> .			
D. Implementation responsibility. (Federal, including both Corps and non-Corps requirements, State, local, and private actions necessary to implement each plan are to be listed.)			

<sup>1</sup> Significant impacts specified in sec. 122 of Public Law 91-611 will be noted with an \*, pt. 294 of this chapter.  
<sup>2</sup> Each plan's acceptability, completeness, effectiveness, efficiency, certainty, geographic scope, NED benefit/cost ratio, reversibility, and stability should be noted if crucial to plan selection.

TABLE 2.—System of accounts

Accounts	Plan description—location of impacts				Plan N
	Plan A		Plan B		
	Within the immediate planning area	Within the rest of the study area	Within a larger area affected by the plan	Within the rest of the Nation	

(To be typed as required)

1. National Economic Development.
  - a. Beneficial impacts (specify separate benefits and source, if possible.)
    - (1) Value of increased outputs of goods and services.
    - (2) Value of output resulting from external economies.
    - (3) Value of output from use of unemployed or underemployed resources in construction or installation.
    - (4) Total NED benefits.
  - b. Adverse impacts (specify separate costs and source, if possible.)
    - (1) Project costs.
    - (2) Losses resulting from external diseconomies.
    - (3) Total NED costs.
  - c. Net NED benefits.....
2. Environmental quality
  - a. Environmental quality enhanced (specify resources impacted and quantify as possible.)
  - b. Environmental quality degraded (specify resources impacted and quantify as possible.)
  - c. Environmental quality destroyed (specify resources impacted and quantify as possible.)
3. Social well-being.....
  - a. Beneficial impacts (specify and quantify as possible.)
    - (1) Enhancement of health, safety, and community well being.
    - (2) Educational, cultural, and recreation opportunities.
  - b. Adverse impacts (specify and quantify as possible.)
    - (1) Deterioration in quality of life, health, & safety.
    - (2) Degraded educational, cultural, & recreational opportunities.
    - (3) Injurious displacement of people & community disruption.
4. Regional development.....
  - a. Beneficial impacts (specify separate benefits & source if possible.)
    - (1) Value of increased income.....
    - (2) Quantity of increased employment.
    - (3) Desirable population distribution.
    - (4) Increased stability of regional economic growth.
  - b. Adverse impacts (specify separate costs & source.)
    - (1) Value of income lost.....
    - (2) Quantity of jobs lost.....
    - (3) Undesirable growth.....

## INDEX OF FOOTNOTES

## TIMING

1. Impact is expected to occur prior to or during implementation of the plan.
2. Impact is expected within 15 years following plan implementation.
3. Impact is expected in a longer time frame (15 or more years following implementation.)

## UNCERTAINTY

4. The uncertainty associated with the impact is 50% or more.
5. The uncertainty is between 10% and 50%.
6. The uncertainty is less than 10%.

## EXCLUSIVITY

7. Overlapping entry; fully monetized in NED account.
8. Overlapping entry; not fully monetized in NED account.

## ACTUALITY

9. Impact will occur with implementation.
10. Impact will occur only when specific additional actions are carried out during implementation.
11. Impact will not occur because necessary additional actions are lacking.

## SECTION 122

\*Items specifically required in Section 122 and Part 294 of this Chapter.

## § 393.9 Alternatives to be displayed.

While no specific number of alternatives is required for the SA, all alternatives carried through the final planning stage will be displayed in the final SA. This means that the NED plan and the EQ plan(s), as well as other plans which meet significantly different mixes of NED and EQ, will be displayed. Resource management measures associated with each alternative should be presented in the Plan Description portion of Tables 1 and 2.

## § 393.10 Reporting of alternatives not displayed.

All major alternative plans considered will be briefly described in the report. The basis for exclusion of certain alternatives from the final SA display will be stated; for instance, the alternative is similar to another alternative displayed but was found to be less acceptable or efficient. Any plan or element thereof, proposed by a significantly affected group and not carried through the final planning stage, will be appropriately noted in the presentation. However, plans will not be excluded from the final SA because of incidence of cost sharing or lack of Corps authority to implement.

## § 393.11 Display of significant impacts.

A summary of significant impacts will be presented; see, for example, Table 1 and Part 294 of this Chapter. Emphasis will be placed on describing environmental and social impacts in an appropriate manner since this task is highly qualitative. Economic changes should be quantified in dollar terms.

## § 393.12 Regions for display.

The SA will display information concerning the geographic regions in which a significant portion of any beneficial or adverse impact will occur. The P&S require, as a minimum, that at least one region and the rest of the nation be shown. The one region need not necessarily be an OBERS area. The regions suggested in Table 2 are examples of the likely geographical areas where impacts may occur. These regions are:

(a) *Within the immediate planning area.* This is the area where physical structures or land purchase are to be undertaken. This area will be specified, as appropriate, usually in terms of a county, city, or other local jurisdiction.

(b) *Within the rest of the study area.* This is the area where most of the significant physical impacts occur. This area will be specified as appropriate, usually in terms of a river basin, sub-basin, metropolitan area, coastal area, harbor area, or other water and related land system. The planning area will normally be included within the study area.

(c) *Within a Larger Area Affected by the Plan.* In some instances significant impacts may occur beyond the study area. This is apt to be the case for studies involving interbasin transfers of power, water, or water pollutants, and for many navigation plans. Significant impacts on such areas are likely to occur primarily

as a result of large scale plans either individually or as part of a system.

(d) *Within the Rest of the Nation.* This area should be used as an account balancing area. By definition, all impacts not included in previously designated regions accrue to the rest of the nation.

**§ 393.13 Regionalization of NED and EQ accounts.**

To aid in the display of beneficial and adverse impacts by regions, the following criteria should be followed:

(a) For the NED account, flood control benefits will be shown for the flood plain. Water supply, irrigation, and power benefits will be shown for the area receiving the water or power. In instances where the water or power goes into a common pool, the receiving area is that served by the common pool. Water quality benefits will be shown for the area where quality is improved. Fish and wildlife dollar benefits will be shown for the area where the improvement in habitat occurs. For recreation benefits, including lake recreation, beach erosion, and small boat harbors, the benefits will be shown for the area(s) where the recreationists reside. Navigation benefits will be shown for the origins and destinations of the commodities in transit.

(b) For the EQ account, the effect will generally be shown where the physical impact occurs.

(c) The fact that effects are assigned to a region can be misleading. Often the direct NED benefit is passed on to consumers throughout the nation. Similarly, preservation of the environment may benefit people throughout the nation. In those cases where the impact is traced to such consumers, it is acceptable to show it for the region where the ultimate beneficiary resides, rather than for the areas specified above.

**§ 393.14 Components of accounts.**

The P&S specify components of accounts which will be considered in filling out the SA. Only components to which a significant contribution occurs will be displayed; other components need not be shown. Sub-categorization of the components displayed will be used to further specify the source and nature of the contribution (see Table 2). For the EQ account it is recommended that § 393.12 form the basis for the SA display. The other two accounts need not be displayed by components if more appropriate means are established.

**§ 393.15 Content of national economic development (NED) account.**

Since this account is filled out in dollar terms, it should emphasize brevity. However, it should be complete in the sense that total dollar quantifiable benefits and costs will be displayed. Benefits and costs should be specified as average annual equivalents using the appropriate period of analysis and discount rate (Part 295 of this chapter). Price levels will be those current at the time of the study, updated periodically according to existing practice. WRC Guideline #2, *Agricultural Price Standards*, October 1974, as updated, will be used for agri-

cultural price levels. The components of benefits and costs in the NED account are discussed below:

(a) *Value of Increased Outputs of Goods and Services.* These are the benefits calculated under established Corps procedures for benefit/cost analysis. No change in existing guidelines are made in this regulation. However, recreation unit day values are increased by the P&S. It is important that the source of NED benefits be specified; e.g., "flood control"; "open space"; "fish and wildlife"; "water quality", and so forth. Note that many of the benefit sources are oriented toward environmental outputs. This is because such benefit sources are often partially quantifiable in the NED account. Undue detail as to the source of benefits is not necessary. For example, "flood control" is a sufficient designation of source; sub-designations such as "existing flood damages reduced", "reduction of fill costs", and the like are not needed for the SA.

(b) *Value of Output Resulting From External Economies.* The NED benefits resulting from external economies, sometimes referred to as "indirect" or "secondary", are to be included in the NED account only in those cases where it can be positively shown that a net gain will accrue to the nation. These benefits have not been widely used in evaluating Corps projects because of the empirical difficulty of separating national aspects of external economies from regional or local transfers. However, their validity is clear and any language to the contrary in EM 1120-2-112, *Secondary Benefits in Flood Control Evaluation*, is unintended. Even where net national secondary benefits will accrue due to the outputs of a Corps plan, such benefits are not attributable to the plan if the outputs would be obtained by an alternative means. Examples of such benefits are water supply and power.

(c) *Value of Output From Use of Unemployed or Underemployed Resources in Construction or Installation.* This is a special category of benefits which relaxes the basic assumption of a "full employment" economy. As explained in the P&S, this component is conceptually an adjustment to the cost of a project because there is no economic cost associated with the use of an otherwise unemployed resource. Due to measurement difficulties, only unemployed labor resources will be considered as a project benefit in this category. ER 1165-2-6, *Evaluation of Area Redevelopment Effects*, is applicable with the following adjustments:

(1) *Direct payments.* The NED benefit is limited to payments to unemployed and underemployed labor resources directly employed in the construction and installation of the plan. Labor earnings without the Corps plan will be deducted for underemployed resources. The number of unemployed and underemployed laborers directly employed on similar water and land resources projects in comparable areas is an acceptable empirical method of establishing such benefits. Also acceptable is experience

on plans similar to the Corps plan such as using urban mass transit system construction as a proxy for large reservoirs in urban areas. The SA will specify the range of uncertainty associated with the calculation of these benefits.

(2) *Maintenance.* The NED benefit is limited to the construction and installation phase of the plan. Maintenance related benefits and induced employment benefits may be shown in the regional account only.

(3) *Status of benefit.* The P&S elevates benefits to unemployed and underemployed labor resources to the same level as other NED benefits. This means that there will be only one NED benefit/cost ratio.

(d) *Project Costs.* These are all inputs, measured at market value, required for plan implementation. The measurement of such costs is well established. Losses in land productivity, mitigation costs, and loss of recreation opportunities at the new unit day values will be included.

(e) *Losses From External Diseconomies.* Such losses are measured in the same manner as computing the value of output resulting from external economies.

**§ 393.16 Content of environmental quality (EQ) account.**

Emphasis will be given to this account because, unlike the NED account, there is no common denominator readily available for comparing items within the EQ account. On the other hand, extensive listing of all perceived impacts may confuse rather than enlighten reviewers and the public. Hence, the challenge is one of providing an adequate, comprehensible display. One possible method is shown in Table 2, where the components of the EQ account are not the focus of the display; rather the focus is on the values of the impacts. The interdisciplinary planning team, reflecting public inputs and expert judgment, will indicate whether EQ is enhanced, degraded, or destroyed. Where there is no impact or where evaluation indicates that the impact is neutral or otherwise insignificant, no entry is made in Table 2 for the sake of brevity. However, in certain situations where there is no impact, the report will note the lack thereof (see Part 294 of this chapter). The judgment of the interdisciplinary planning team is based upon with and without analysis and the following definitions:

(1) *EQ Enhanced.* The environment is enhanced if a greater quantity or improved quality of environmental outputs is obtained with a plan than without it. Often, so called "preservation" measures are actually an enhancement because without the plan the environment would be degraded or destroyed over time. Frequently, the same plan may cause both beneficial and adverse outputs. Beneficial outputs will be displayed under EQ enhanced; adverse impacts will be displayed under EQ degraded or destroyed. However, EQ enhanced should be limited, where appropriate, by some notion of an optimum quantity of the EQ output. For example, the amount of

open space needed by a certain population size is the limit on the extent of EQ achieved by additional open space.

(2) *EQ Degraded.* The environment is degraded if a lesser quantity or reduced quality of environmental output is obtained with a plan than without it. Nevertheless, the environmental loss could be made up by actions outside the plan or by natural processes over a period of time.

(3) *EQ Destroyed.* In this case, environmental quality is reduced to the extent that it cannot be regenerated. Loss of a species of wildlife in a given area is an example. Pollution to the point where a river becomes anaerobic is another. While the line between degradation and destruction is rarely clear and precise, the distinction is important. "Irreversible commitments of resource to future uses" as specified by the P&S, will be a subcategory of the "EQ destroyed" category.

#### § 393.17 Content of social well being account.

This account includes most of the benefits traditionally termed intangible under existing practice, especially for flood plain management plans.

(a) *General.* The following are the general requirements and considerations in filling out the SWB account in the SA.

(1) *Flood Control.* Based on paragraph 6, page 15 of the WRC Principles, intangible flood control benefits will be considered in plan formulation, selection and recommendation. Such effects will be presented briefly in the SA under "Enhancement of health, safety, and community well being", or comparable designation (see Table 2).

(2) *Adverse SWB.* Avoidance of adverse social contributions is a consideration of plan formulation. Beneficial contributions are treated in a much more constrained manner (see Part 295 of this Chapter). Therefore, Table 2 divides social impacts into those which are beneficial and those which are adverse. Although social benefits are not taken into account fully at the project planning level, planners should recognize that beneficial contributions may be important at the national program planning and budgeting level. Therefore, to the extent practicable, planners are encouraged to provide estimates of social contributions, both beneficial and adverse.

(3) *Monetary SWB.* Where a social contribution can be quantified (partially or totally) in dollar terms as a national benefit, it should be included as an NED benefit or cost.

(4) *Preferable Entry.* In general, as with all intangible factors, the preferable entry is a meaningful, quantified notation of the beneficial or adverse contribution. However, lack of either study funds or data may necessitate a verbal, descriptive entry.

(b) *Specifics.* The following expands on that already specified in the P&S.

(1) *Effects on Distribution of Real Income.* The beneficiaries of plans will be specified by family incomes into upper, middle, and lower third, based on the na-

tional average. At the planner's discretion, other classes of beneficiaries may be displayed for a given study, such as "farm", "urban", and so forth.

(2) *Effects on Health, Safety, and Community Well Being.* Generalized statements are to be avoided. If an impact is significant enough to be displayed, then it is important enough to be documented. This is particularly so where the contribution is used to formulate, select, or recommend a plan.

(3) *Effects on Educational, Cultural, and Recreation Opportunities.* These impacts generally can be shown as a function of mileage/time, distance, and numbers and kinds of population affected.

(4) *Injurious Displacement of People and Community Disruption.* This category is recognized as a recurrent problem in many plans. The display should indicate the effect of measures taken to avoid such problems; for example, betterments, early sale and leaseback, town relocation, and the like.

(5) *Other.* The social category is a broad one and unique aspects may be involved in any given plan or element thereof. The "other" category is intended to insure that all social contributions of significance are included.

#### § 393.18 Content of regional development account.

General comments above, concerning the social account, are applicable to this account as well. Impacts should be quantified if possible. Avoidance of unreasonable adverse impacts is a consideration of plan formulation; thus adverse and beneficial impacts should be separately displayed. Certain "regional" contributions other than transfers may be dollar quantifiable on a national basis, particularly for external economies and diseconomies. If quantified, such contributions belong in the NED account. The following expands on that already discussed in the P&S:

(a) *Regional EQ and SWB.* These components are redundant for the type of format used in Table 2, which calls for display of EQ and SWB components by regions. Hence, there is no need for a regional EQ or SWB component.

(b) *Regional Income and Employment.* This discussion applies to location effects on regional income in the RD account. It also applies to employment associated with such income. This information will be displayed whenever the public has indicated a strong concern regarding regional income and employment effects. However, display is inappropriate where a competent, professional job cannot be done due to lack of time and funds. The following considerations should be reflected in Table 2. First, only when a complete accounting of all direct and indirect effects of a plan on regional income can be accomplished will the RD account be summed. Second, a qualitative description should be used whenever the assessment is limited, thereby avoiding misleading quantification. Third, when the accounting is incomplete, an entry similar to the following will be included in the display: "All other regional income

and employment-not evaluated." Fourth, the uncertainty associated with the effect will be noted. And fifth, nothing in the above limits the need for a full assessment and display of adverse impacts on employment, business, and industrial activity pursuant to Section 122 requirements (Part 294 of this chapter). The following categorization defines a complete accounting for a given region and explains items 4a(1) and (2) of Table 2:

(1) *NED net benefits.* These are directly derived from the NED account.

(2) *Direct expenditures.* These are the net increases in expenditures made within the region. For example, where these are recreation expenditures, they include purchases for motel accommodations, bait, repairs, and so forth which would not be made in the region in the absence of the alternative. Where these are construction force expenditures, they include the amount of wages spent in the region over and above those which would be made in the absence of the alternative. Such construction expenditures exclude wages to residents of the region.

(3) *Subsequent impacts.* This category includes expenditures made after the NED and direct expenditures. For example, a reduction in agricultural flood losses may mean that farmers have more income which can be expended on additional farm equipment or house furnishings; obviously farm equipment and furniture retailers will, in turn, have increased income to spend; and so forth. Such second and third round economic impacts are generally referred to as "multiplier" effects. Their measurement is especially difficult, particularly for small regions. These subsequent impacts will be separately shown. The Bureau of Economic Analysis (BEA), U.S. Department of Commerce, has developed some preliminary tools for the estimation of multiplier effects. Whenever a planner decides to display multiplier effects for an area in which BEA is capable of making an estimate at reasonable cost, the BEA data will be obtained; deviations will be explained. In addition, WRC, in conjunction with BEA, is developing a set of regional multipliers. When these become available, they will be used.

(4) *Induced economic activity.* Exclusive of NED benefits, benefits to induced activities are properly included in the regional account. Care must be taken to exclude those benefits already implicitly or explicitly included above.

#### § 393.19 Alternative futures.

The alternative future which reflects the without condition will be the basis for the SA display. There is no other SA display requirement associated with alternative futures. For further details on alternative futures and sensitivity analysis, see para 24 of this regulation, § 292.9 of this chapter, and § 295.8 of this chapter.

#### § 393.20 Timing.

The timing of an effect is a critical variable in plan formulation. Therefore, the SA provides for the following notations:

(a) A "1" will be used to designate impacts expected to occur prior to or during plan implementation.

(b) A "2" will be used to designate impacts expected in a short time frame. These will generally be impacts estimated to occur in 15 years or less after implementation of a plan.

(c) A "3" will be used to designate impacts expected in a long time frame. These will generally be impacts estimated to occur later than 15 years after implementation of a plan.

**§ 393.21 Uncertainty.**

The concept of uncertainty is a broad one. It encompasses two of the specified evaluation criteria, certainty and stability, discussed in § 295.8 of this chapter. A rigorous statistical analysis to establish certainty or stability is not required. As used in this guidance, the concept represents a judgmental balancing of the following factors: the sensitivity of the impact on plan recommendation; the data limitations inherent in either the assessment or evaluation of the impact; and limitations inherent in the theoretical framework or methodology. Based upon these factors, the following notations will be made recognizing that the percent designations are suggestive and are not intended to imply statistical rigor.

(a) A "4" will be used to designate that the level of uncertainty associated with an impact in the judgment of the analyst is greater than 50%. Many components of the regional account, second, and third order effects, and external economies and diseconomies will often fall into this notation.

(b) A "5" will be used to designate an uncertainty range of 10%-50%.

(c) A "6" will be used to designate an uncertainty range of 0-10%, thus suggesting that the impact is virtually certain.

**§ 393.22 Exclusivity.**

The components of accounts are not mutually exclusive. There are two major areas where such non-exclusivity may distort the display of accounts.

(a) *Regional Development.* Regional components of the NED, EQ, and SWB accounts must sum to the national totals. This will avoid double counting of effects geographically.

(b) *Double Classification of Monetary and Non-Monetary Effects.* Some contributions are dollar quantifiable but deserve special handling as non-monetary contributions as well. For example, while elimination of land scour due to flood flows can be quantified in dollars and counted as an NED benefit, it should also be included as a positive contribution to the environmental account since it improves the quality of land resources. Therefore, the SA provides for the following notations:

(1) The designation "7" will be used when the SWB, EQ, or RD contribution has been fully monetized and counted as an NED beneficial or adverse contribution.

(2) The designation "8" will be used when the SWB, EQ, or RD contribution has been partially monetized.

**§ 393.23 Actuality.**

Many of the contributions of plans depends upon the actions of others. The SA will include notations indicating the proximity of cause between a plan and an impact. The following notation will be used in Table 2.

(a) A "9" will be used to designate that the contribution will likely occur without any action by any entity other than the proposed implementing agency, normally the Corps, or the required action is extremely likely to occur through the economic or natural physical systems.

(b) A "10" will be used to designate that the achievement of the beneficial contribution requires positive governmental action, other than cost sharing, by another agency. The adverse contribution associated with this action can and likely will be prevented by government action. This situation can be specified only when coordination indicates that the necessary action will be taken.

(c) An "11" will be used when coordination indicates that the action required by other agencies will not be forthcoming.

**§ 393.24 Section 122 requirements.**

Section 122 specifies kinds of effects which must be assessed. These are discussed in Part 294 of this chapter. These effects will be identified, assessed, and evaluated. If significant, they will be displayed in the SA. When displayed, they will be asterisked.

**§ 393.25 Display of specified evaluation criteria.**

Each plan's acceptability, completeness, effectiveness, efficiency, certainty, geographical scope, NED benefit/cost ratio, reversibility, and stability will be noted on Table 1, if critical to plan selection. Except for the NED benefit/cost ratio, most of these criteria will be useful primarily in the process of filling out the interim SA as part of the functional planning tasks. Therefore, for the final display, emphasis should be on brevity; the accompanying write-up may be used to expand on the display.

(a) *Acceptability.* For purposes of display, the planner should indicate whether or not the plan is supported by any significant segment of the local, state, or regional publics. In addition, strong opposition by a significant segment of the public should be noted.

(b) *Completeness.* A brief statement will be made as to which investments or actions necessary to obtain the outputs are not part of the plan. Notations "9", "10" and "11" will already have addressed the major aspects of completeness and further information will be supplied in relation to the "implementation responsibility" section of Table 1.

(c) *Effectiveness and Efficiency.* These two related criteria center on the concept of achieving maximum net outputs, where outputs and inputs are conceived broadly to include intangible factors. Effectiveness includes, in addition, the concept of technological feasibility. All plans described in the SA should be the least costly way of achieving the outputs. It will be sufficient for display purposes to

indicate that the plan is the least costly means of obtaining the outputs of that plan, where cost includes intangible costs, and that the plan is technologically feasible.

(d) *Certainty.* A brief statement will be made as to the likelihood of the contributions in the SA being obtained. Notations "4", "5", and "6" will already have addressed the major aspects of uncertainty.

(e) *Geographical Scope.* This criteria is closely related to the choice of study area. For final display purposes, indicate those areas beyond the study area whose problems are solved by the plan, such as, by interbasin transfers of water. In addition, where a report concerns only a portion of study authority area, this fact will be noted.

(f) *NED Benefit/Cost Ratio.* This ratio will always be shown.

(g) *Reversibility.* A brief statement of the degree of reversibility will be made.

(h) *Stability.* A simple notation of high, low, or medium stability is sufficient. Since detailed analysis of each plan under each alternative future is not required, this criteria will usually involve considerable judgment. The concept of stability is also inherent in notations "4", "5", and "6". As a guide, plans which are highly sensitive to data or assumptions about which knowledgeable people might differ have low stability.

**§ 393.26 Implementation responsibility.**

Federal, including both Corps and non-Corps, state, regional, local, and private actions required to implement each plan are to be listed.

**§ 393.27 Uses of SA.**

The SA is to be used as an aid to the planning process established in Part 290 of this chapter. It is used at the end of each iteration as a check upon the thoroughness of carrying out the planning tasks. Also, the SA will assist in defining the additional work necessary for the subsequent iteration. The following paragraphs indicate suggested specific uses of the SA in conjunction with the planning process.

(a) *Problem identification.* There are four suggested uses of the SA to facilitate planning for subsequent iterations:

(1) *Planning Objectives.* The SA will assist the interdisciplinary planning team in observing when planning objectives have been overlooked, or are too numerous, general, or specific. When combined with the specified reformulation criteria, the SA provides a tool for honing or refining plans to insure that they are the best ones from an overall societal point of view.

(2) *Study Area.* Using the SA to observe the location of significant impacts, the interdisciplinary planning team can determine whether the study area has been appropriately identified. This activity is directly related to the geographical scope evaluation criteria. As with most of the specified evaluation criteria, the greatest utility is to the ongoing planning process rather than to the final SA display.

(3) *Data Gaps in Base Condition, Projections.* When the information in the SA is soft or uncertain, and the impact is crucial to reaching a decision, a data gap has been surfaced which may be remedied on subsequent iterations. Where remedying the data gap is not feasible, sensitivity analysis of alternative futures is helpful. The SA notations "4", "5", and "6" and the certainty and stability evaluation criteria are directly related to this activity. In addition, a high degree of uncertainty may imply that a plan with greater reversibility is desirable.

(4) *Alternative Futures, Sensitivity Analysis.* Analysis leading to the SA often involves assumptions, steps, techniques, or data about which knowledgeable people could differ. Hence, the SA will be used as a basis for checking the sensitivity of the analysis and data to the results. This activity is directly related to the certainty and stability evaluation criteria.

(b) *Formulation of Alternatives.* The relationship between plan outputs and plan measures lies at the heart of reformulation criteria. In filling out the SA, opportunities for increasing net outputs should become apparent. Hence, the interdisciplinary planning team should

try to increase the quantity and quality of outputs, decrease costs, or both. This is done by adding, deleting, or modifying measures and assessing and evaluating outputs to see if greater net outputs can be obtained.

(c) *Assessment and Evaluation.* The display of the results of these two tasks are the main content of the SA. There are three major areas where the SA will assist in improving assessment and evaluation on the next iteration. These are:

(1) *Public Input to Evaluation.* Many of the impacts of a plan are viewed differently by various segments of the public and Corps planners. The SA provides a focus for periodic interaction with the public as to the values placed on outputs. In many cases this may change the evaluation during subsequent iterations.

(2) *Data Gap in Assessment.* The SA will surface data gaps in the assessment task. Thus, improved assessment should be sought on the next iteration. A similar statement can be made for evaluation techniques.

(3) *Unintended Effects.* One of the most productive uses of the SA lies in surfacing unintended impacts. For example, suppose plans are designed primarily for wastewater management. However, one plan uses small detention

reservoirs, which also reduce flood problems. This impact will be noted in the SA. On reiteration, the potential of a system for joint outputs should be explored. Alternatively, significant unintended impacts may be adverse. In such cases, mitigation measures or revision of planning objectives is called for. For example, one solution to a flood problem may have adverse impacts on ground water recharge, not mentioned previously as a concern in problem identification. The interdisciplinary planning team should determine whether the lost recharge is serious, by professional analysis and public inputs. If it is serious, recharge ought to be incorporated into the planning objectives, thus directing attention toward solutions, including mitigation, which avoid loss of recharge.

#### § 393.28 Effective date.

This regulation is effective November 10, 1975, as published in the FEDERAL REGISTER on that date and codified as 33 CFR 393. The provisions of § 290.12 of this chapter are applicable to this regulation.

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