CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL F/G 13/2
APPRAISAL OF SELECTED CORPS PREAUTHORIZATION REPORTS FOR ENVIRO--ETC(U)
SEP 81 E STAKHIV, J FITTIPALDI, M VINCENT IAO-CWP-P-80-4
UNCLASSIFIED CERL-TR-N-118-PT-1
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<td>APPRAISAL OF SELECTED CORPS PREAUTHORIZATION REPORTS FOR ENVIRONMENTAL QUALITY PLANNING AND EVALUATION, PART I: EXECUTIVE SUMMARY.</td>
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<th>7. AUTHOR(S)</th>
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<tr>
<td>Eugene/Stakhiv Steven/Light John/Fittipaldi Robert/Lacey Mary/Vincent Charles Simpkins</td>
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Environmental management
Army Corps of Engineers

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents an appraisal of the status of the Corps' Environmental Quality (EQ) planning as concluded by a detailed review and analysis of a select number of Corps preauthorization reports. The appraisal of EQ planning was first linked to the problems encountered in conforming to the Corps' own multiple-objective planning guidance in the ER 1105-2-200 series of planning regulations. This was done to identify potential impediments to implementing...
the new Environmental Quality Evaluation Procedures (EQEP). An implicit emphasis is placed on more quantitative, analytical approaches to measurement, impact assessment, and forecasting which provides the basis for evaluation. The linkage of forecasting techniques to evaluation methods requires the greatest methodological development in future OCE guidance. The EQEP emphasis on a more analytical and quantitative approach to forecasting and evaluation is aimed at improving the quantitative tradeoff analysis and net effects assessment steps.

The EQEP are valuable procedural guidelines which create an internally consistent planning evaluation framework. The increased rigor inherent in the specification of problems and opportunities and the identification of resources and measurement techniques forces a more traceable and ultimately rational EQ planning philosophy. The EQEP, however, must be more clearly linked to the overall planning process to show the relationship of EQ effects assessment to plan formulation, evaluation, and EQ plan designation. On balance, it was found that many reports were poorly organized, thereby hampering decision traceability. Much of the information required by the EQEP, however, was developed in many reports for essentially similar requirements of the ER 1105-2-200 series. The information was simply not used effectively nor was it documented and displayed in reports to enhance tradeoff analysis, net effects assessment, or EQ and NED plan designation. Therefore, it is concluded that the EQEP are not expected to impose a significantly increased burden for data collection.

Both the parent Principles and Standards (P&S) and the EQEP are stated in a rhetorical level of abstraction which may easily confuse the field planners without transformation into illustrative examples based on Corps mission areas and functional responsibilities. The EQEP thus appears to be complex. However, as a rational framework for evaluation, which brings the level of analysis to a comparable basis with NED procedures, the EQEP emphasizes a higher degree of methodological accountability and decision traceability. The increased evaluation rigor will result in plans which are more responsive and will withstand changes in public values.
FOREWORD

This research was performed for the Office of the Chief of Engineers (OCE) by the U.S. Army Construction Engineering Research Laboratory (CERL), Champaign, IL, and the Institute for Water Resources (IWR), Fort Belvoir, VA. The work was performed under IAO, CWP-P-80-4, dated 29 August 1980 and CIAO 81-22, dated 2 December 1980. CERL's portion of the research was conducted by the Environmental Division (EN), and IWR's portion of the research was conducted by the Policy Studies Division. The OCE Technical Monitors were Dr. John Belshe and Mr. Alex Otto.

Dr. R. K. Jain is Chief of CERL-EN. Mr. K. Schilling is Chief of the IWR Policy Studies Division. COL Louis J. Circeo is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director. Mr. J. R. Hanchey is Director of IWR.
APPRAISAL OF
SELECTED CORPS PREAUTHORIZATION REPORTS
FOR
ENVIRONMENTAL QUALITY PLANNING AND EVALUATION

PART I: EXECUTIVE SUMMARY

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PART II: CASE HISTORY STUDIES

The case history studies, which contain 14 preauthorization-report
detailed reviews, are not included with this report. Limited copies of this
document are not for distribution.
SECTION A
INTRODUCTION

Purpose

The Office of the Chief of Engineers, Planning Division, tasked the Engineer Institute for Water Resources (IWR) and the Construction Engineering Research Laboratory (CERL) to assess the status of environmental planning and evaluation in survey reports passed by BERH since 1976. More than 140 feasibility reports which had passed through the Board since 1976 were screened for compliance with the ER 1105-2-200 series of planning regulations, issued in 1975. Subsequently, 14 reports were selected for detailed analysis, with emphasis on impediments to, and opportunities for, Environmental Quality (EQ) planning and evaluation. The basic report evaluation perspective was to note the degree of conformance to the existing "200 series" of planning regulations and identify the obvious shortcomings (i.e., those that hampered fundamental planning functions or decisions). The requirements of the new Environmental Quality Evaluation Procedures (EQEP) (18 CFR 714) were compared to those of the "200 series" to determine if they unnecessarily made the planning process longer or more complex. Finally, the EQ planning problems derived from the analysis were matched with the potential of the EQEP to help resolve them.

Scope

The case study approach was selected to learn about difficulties encountered in implementing the relatively new and perhaps abstract planning philosophy embodied in the Corps' planning regulations. The selected survey reports encompassed six Corps mission areas (navigation, flood control, water supply, hydropower, beach erosion and hurricane protection, and urban studies) and covered at least one project in each Corps Division and in each mission area.

The focus of case study review and appraisal was on seven primary issues related to EQ evaluation emphasized in the EQEP:

1. Identify and define the significance of the EQ resources and their attributes.
2. Classify measures for resource management.
3. Record indicators and units used to describe resource attributes.
4. Evaluate techniques used to measure EQ attributes.
5. Compare documentation and information display with those required and/or suggested by the EQEP.
6. Critique the rationale for EQ justification.
7. Characterize subsequent OCE and BERH review actions.
Section B addresses each of these primary evaluation issues and provides a summarized tabular form of the key observations and findings derived from each case study. Section C covers the planning process, which is invariably linked to evaluation, and has been covered as a natural byproduct of the primary analysis.

Procedure

The first step in selecting a manageable set of case studies was to develop a few basic preselection criteria. The analysis had to cover the range of Corps responsibilities represented by the seven mission or functional areas of navigation, hydropower, urban studies, flood control, beach erosion and hurricane protection, water supply, and multi-purpose projects. The selected case studies had to represent diverse geographic (Corps Division) and physiographic environments. In addition, they had to possess some unique EQ-related problems or opportunities or EQ-oriented solutions. These qualitative criteria were derived from several interviews with OCE and BERH staff. Fourteen case study reports were selected from a list of about twenty-five. Unfortunately, a multi-purpose project report which met these simple criteria had not passed through BERH during the requisite time period. Table A-1 lists the final set of survey reports selected for analysis.

The next step was to organize a uniform framework for analysis, so that each of the six individuals reviewing the assigned reports would be able to systematically and consistently develop the requisite information. Table A-2 shows the outline used to structure the case study inquiry. Each survey report is summarized and documented according to this format. The 14 case studies make up Part II of this appraisal.

The last step in the appraisal process was summarizing the case study information into a series of tables. The tables array the synthesized, highlighted information for all 14 studies to enable rapid, comparative appraisal.

Documentation

The tables discussed above abstract much of the relevant background material from the detailed case study appraisals. These tables provide a convenient format for comparative analysis and support the basis of the findings and conclusions for each topic. The material provided in Section C, which relates to EQ planning, was derived from a more qualitative appraisal of associated planning factors which might directly affect the conduct of EQ evaluation. Section C was based, to a large degree, on each case study analysis of EQ planning performance objectives (understandable, traceable, significant, analytical, etc.).

The tables were constructed to reflect and summarize information requirements within the new EQEP; however, much of the information in most reports was simply not organized in a conveniently traceable format or sequence. A great deal of effort was expended by the study team to cull out the relevant information from a variety of sources other than the main report. In addition, a substantial amount of information was inferred, deduced, or imputed.
Table A-1
Selected Case Studies Reviewed
Distribution by Purpose

<table>
<thead>
<tr>
<th>BERH Reports (Favorable Action)</th>
<th>Reviewer</th>
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<tbody>
<tr>
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<td>Wilmington Harbor</td>
<td>IWR</td>
</tr>
<tr>
<td>Grays Harbor</td>
<td>IWR</td>
</tr>
<tr>
<td>Tampa Harbor</td>
<td>CERL</td>
</tr>
<tr>
<td>Lake Ponchartrain, N. Shore, LA</td>
<td>CERL</td>
</tr>
<tr>
<td>Mobile Harbor</td>
<td>IWR</td>
</tr>
<tr>
<td>Norfolk Harbor</td>
<td>IWR</td>
</tr>
<tr>
<td><strong>2. FLOOD CONTROL</strong></td>
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<tr>
<td>Fourche Bayou, AR</td>
<td>IWR</td>
</tr>
<tr>
<td>Cache Creek, CA</td>
<td>IWR</td>
</tr>
<tr>
<td>Central Ohio Survey, Hocking Creek, OH</td>
<td>IWR</td>
</tr>
<tr>
<td>Burnett-Crystal &amp; Scott Bays, Baytown, TX</td>
<td>IWR</td>
</tr>
<tr>
<td><strong>3. HYDROPOWER</strong></td>
<td></td>
</tr>
<tr>
<td>Lucky Peak, ID</td>
<td>CERL</td>
</tr>
<tr>
<td><strong>4. WATER SUPPLY</strong></td>
<td></td>
</tr>
<tr>
<td>Hudson River Project</td>
<td>IWR</td>
</tr>
<tr>
<td><strong>5. BEACH EROSION/HURRICANE PROTECTION</strong></td>
<td></td>
</tr>
<tr>
<td>Folly Beach</td>
<td>IWR</td>
</tr>
<tr>
<td><strong>6. URBAN STUDIES</strong></td>
<td></td>
</tr>
<tr>
<td>Kansas City Metro Area</td>
<td>CERL</td>
</tr>
</tbody>
</table>
1. Study Authorization
   Description of authorized study components
   History of study
   Map(s) of study area
   Recommended plan (map)
   (measures for management in recommended plan)

2. Inventory of EQ Resources
   Identify EQ resources, attributes, indicators, units, guidelines, and measurement techniques
   Inventory and forecast "baseline," "with," and "without" conditions

3. Plan Formulation
   EQ planning objectives, stages 1, 2, 3
   Management measures, separable plans, components
   Designated EQ plans
   Discussion on table of alternative plans

4. Effects Assessments
   Assess effects of each plan (stages 1, 2, 3) and/or separable components/measures
   Identify, describe, determine significance
   Net effects
   Assessment techniques

5. Rationale for Recommended Plan, EQ Justification
   Display plans
   Compare effects
   Designate EQ, NED
   Select plan

6. Summary of Report Compliance to EQ Procedures

7. EQ Planning Performance Objectives Discussion
   Understandable
   Traceable
   Significant issues
   Analytical
   Comparable and uniform level of detail
   Valid, acceptable precepts
   Problem rather than goal/solution orientation
   Complete, timely input into overall decision-making

8. BERH Summary Analysis
The overriding factor, however, is that despite the overall lack of report organization and generally weak decision traceability, much of the requisite information was encountered somewhere in the report documents. Therefore, it can be concluded that the EQEP should not impose a substantial additional burden of data collection. Rather, it provides a clearer and more rigorous framework for evaluation, documentation, and display.
SECTION B

APPRAISAL OF EQ EVALUATION

This section appraises the viability of certain EQEP requirements and the anticipated degree of conformance and potential difficulties which Corps planners may be expected to encounter under the revised planning and evaluation structure. The seven primary areas of concern are:

1. EQ resource-significance identification.
2. EQ resource management measures.
3. Indicators to describe EQ resource attributes.
4. Techniques to measure EQ resource impacts.
5. Documentation required and suggested by the Principles and Standards (P&S) (18 CFR 711) and EQEP.
6. Rationale for EQ justification.
7. Corps review process.

Each requirement is an interdependent element of both the planning process and the EQ evaluation phases. Each phase and activity has several prerequisites which must be fulfilled in order to conduct succeeding activities in a consistent and traceable manner. The structure of the current planning and evaluation process specifically places greater emphasis on early scoping, coordination, and specification of problems and opportunities (planning objectives). The forecasting activities which are central to the development of “with-plan” and “without-plan” futures and derivative impacts rely heavily on early agreement of an evaluation framework.

Each of the seven topics listed above has been addressed in the detailed case studies (PART II) and is backed by tables which summarize or abstract the key elements related to the seven topics for each of the 14 case studies.

EQ Resources Significance Identification

Background

The Principles and Standards require that the Inventory and Forecast step of the planning process include an "inventory to be made to determine the quantity and quality of water and related land resources of the planning area and to identify opportunities for protection and enhancement of those resources. The inventory is to include data appropriate to the identified problems and opportunities, as determined by scoping, and the potential for formulating and evaluating alternative plans" (18 CFR 711.40). The EQEP evaluation phase which requires defining the resources is divided into two activities: identification of resources and development of evaluation
framework. "In the first activity, EQ resources and attributes to be evaluated are identified on the basis of their significance and their likelihood of being affected by an alternative plan. In the second activity, an evaluation framework is developed for measuring or otherwise describing the condition of identified EQ resources..." (18 CFR 714.410).

The basis for identifying EQ resources and attributes is: (1) significance based on institutional, public, or technical recognition, and (2) likelihood of being affected by one or more of the alternative plans. Development of an evaluation framework places a great deal of emphasis on correctly selecting appropriate indicators for measuring or otherwise describing existing and future conditions and the effects of alternative plans.

Thus, we see that identification of significant EQ resources presents several important criteria and feedback loops:

1. Must be related to problems and opportunities.
2. Must possess significant institutional, public, or technical recognition.
3. Must state the likelihood of being affected (impacts) by an alternative plan.
4. Should possess some descriptive parameter or indicator(s) for representing the attributes of the resource for forecasting.
5. Should be explicitly linked to opportunities for enhancement, protection, restoration, or preservation.

Therefore, the new EQEP requires a more explicit, better-documented inventory of resources which will be used in the forecasting core of the planning process. Most of the studies reviewed as part of this project loosely met the current (ER 1105-2-220) guidance requiring a description of "resource management problems" and a "description of the base condition" which includes the resource base. The connection between resources and planning objectives (problems and opportunities) was implied, however. Even more tenuous was the necessary linkage between the resource base and the derived indicators to be used in forecasting future conditions. Thus, a substantial degree of improvement shall be required from the field planners because of the emphasis on developing an evaluative framework early. This change would improve the present "ad hoc" system without adding substantially to the overall planning effort.

Findings/Conclusions (Refer to Table B-1)

- Resources most often identified explicitly were those anticipated to be directly affected by the proposed alteration, thereby revealing a relatively narrow view of the planning area.
o There is much ambiguity between the relationships of resources and the definition of the planning area, both under the old and potentially under the new planning guidance.

o Most studies did not expressly identify significant impacts/resources. However, based on public comment contained primarily in the EIS, it appeared that most impacts/resources discussed within the document appeared to be significant.

o Most studies did not cite why certain impacts/resources were significant, partly because of their reluctance to cite guidelines and techniques.

o Resources were not consistently defined or inventoried; there was little regard for their ultimate link to forecasting and evaluation.

o Resources were perceived differently in each study and possibly among members within the same team. Reports often consider the entire study area as a resource. Some studies identified resources without adequate justification.

o The P&S, EQEP, and NEPA implementation guidelines more than adequately define the planning area, study area, project areas, and affected area and their relationship to resource identification and tests of significance.

o The identification of EQ resources is a vital prerequisite to formulating EQ plans which are linked to fulfilling EQ-oriented problems and opportunities. It is important to understand that an EQ resource must not necessarily be pristine or highly valued. There are many opportunities for restoring degraded resources.

o The EQEP tables of resource documentation serve two vital purposes and should therefore be adopted: (1) they provide the field planner with a framework to view resources consistently and from a positive EQ orientation; and (2) they require documentation of the source of relevant information, thereby enhancing traceability and providing a rationale for the EQ evaluation framework.
<table>
<thead>
<tr>
<th>STUDY</th>
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<td>Ecosystem function (E)</td>
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(E) = explicit
(I) = implicit
### Table 8-1: Continued

**IDENTIFICATION OF RESOURCES AND INDICATION OF SIGNIFICANCE**

**BASIS FOR PRIMARY SIGNIFICANCE RECOGNITION**

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<td>Terrestrial and Marine Ecological Functions</td>
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<td>All Natural Resource (I)</td>
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<tr>
<td>Vegetation</td>
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<td></td>
<td>Known food web contributions (E)</td>
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<td>Benthic Organisms</td>
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</tr>
<tr>
<td>Fish</td>
<td>Commercial interest (E)</td>
<td>Wash Dept of Fisheries (E)</td>
<td>U.S. FWS (E)</td>
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<td>U.S. FWS (E)</td>
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<tr>
<td>Mammalian Fauna</td>
<td>(esp. Harbor Seals)</td>
<td>U.S. FWS (E)</td>
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</tr>
<tr>
<td><strong>CACHE CREEK</strong></td>
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<tr>
<td>Sedimentation and Erosion</td>
<td>Alluded to in study authorization from Congress (I)</td>
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<tr>
<td>Water Quality</td>
<td>Perceived as problem by residents in Yolo and Lake Counties (E)</td>
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<td>Fish &amp; Wildlife</td>
<td>Enhancement of wildlife habitat in study area were specific objectives of State of California (I)</td>
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<td>Hydrologic</td>
<td>Stated in study authorization (E)</td>
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<td>Archeological</td>
<td>Archeological and Historic Preservation Act (I)</td>
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(E) = implicit
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<th>Institutional Support</th>
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<td>Norfolk Harbor</td>
<td>Archeological and Historical Presentation (1)</td>
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<td>Commercial Fisheries</td>
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<td></td>
<td>First Acreage</td>
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<td></td>
<td>Tidal Influences on James River</td>
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<td></td>
<td>Dismal Swamp</td>
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<td></td>
<td>Soils</td>
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<td></td>
<td>Vegetative Communities</td>
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<td></td>
<td>Wildlife Habitat</td>
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</tbody>
</table>

| Bayside | Water Quality | | | |
| Terrestrial Habitat of 90 Acre Marsh | | | |
| Aquatic Habitat of Study Area | | | |
| Historical/Archeological Terrestrial Habitat of Coastal | | | |
| | | | |
| | | | |

| Tampa Bay | Aquatic Habitat | | | |
| | Archeological Sites | | | |
| | Fauna | | | |
| | Flora | | | |
| | Water Quality | | | |
| | Public Support | | | |

| | | | |
| | | | |
| | | | |

(E) = explicit
(I) = implicit
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<thead>
<tr>
<th>STUDY RESOURCE</th>
<th>PUBLIC SUPPORT</th>
<th>INSTITUTIONAL SUPPORT</th>
<th>TECHNICAL SUPPORT</th>
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<tr>
<td>KANSAS CITY Aquatic Habitat of Stream</td>
<td>Public Support (E)</td>
<td>State and Local Laws (E)</td>
<td>National Interest (I)</td>
</tr>
<tr>
<td>Riparian Forest Public Support (E)</td>
<td>State Inventories</td>
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<tr>
<td>Agricultural Production Public Support (E)</td>
<td>Regional Interest (E)</td>
<td>---</td>
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<tr>
<td>Population Distribution Public Support (E)</td>
<td>Regional Interest (E)</td>
<td>---</td>
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<tr>
<td>Recreation Public Support (E)</td>
<td>State Inventories (E) and Program</td>
<td>---</td>
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</tr>
<tr>
<td>Esthetic Public Support (I)</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Archeological Public Support (E)</td>
<td>State and Federal Inventories</td>
<td>National Interest (I)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LAKE PONTCHARTRAIN Archeological Sites</th>
<th>Louisiana Archeological Survey &amp; Antiquities Commission (E)</th>
<th>On-the-Ground Survey by a professional consultant (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fontainbleau State Park</td>
<td>Louisiana State Parks and Recreation Commission-State Comprehensive Outdoor Recreation Program (E)</td>
<td>National Register of Historic Places (E)</td>
</tr>
<tr>
<td>Historic Sites</td>
<td>State Art, Historical and Cultural Preservation Agency (E)</td>
<td>On-the-Ground Survey by a professional consultant (E)</td>
</tr>
<tr>
<td>Lake Pontchartrain Habitat</td>
<td></td>
<td>National Register of Historic Places (E)</td>
</tr>
<tr>
<td>Lake Minor Public</td>
<td>U.S. Environmental</td>
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(E) = explicit  
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<tr>
<th>Study</th>
<th>Resource</th>
<th>Public Concern</th>
<th>Institutional Protection Agency</th>
<th>Technical</th>
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<tr>
<td>Pontchartrain</td>
<td>Sediments</td>
<td>Concern (I)</td>
<td>Protection Agency (E)</td>
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<td>Lake</td>
<td>Pontchartrain</td>
<td>Minor Public</td>
<td>U.S. Environmental</td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td></td>
<td>Concern (I)</td>
<td>Protection Agency (E)</td>
<td>Louisiana Stream Control Commission (E)</td>
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<td>Lowland Marshes</td>
<td>and Swamps</td>
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<td></td>
<td>Bibliographical</td>
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<td>Shoreline</td>
<td>Public Interest</td>
<td>Louisiana State</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Support Thru</td>
<td>Parks &amp; Recreation</td>
<td></td>
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<tr>
<td></td>
<td>Public</td>
<td>Commission (E)</td>
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<td></td>
<td>Meetings (E)</td>
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<tr>
<td>Streams</td>
<td>Public Interest</td>
<td>Louisiana Stream</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>and Support Thru</td>
<td>Control Commission (I)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Public</td>
<td>Concern (I)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meetings (E)</td>
<td></td>
<td></td>
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<tr>
<td>Lucky Peak</td>
<td>Boise River</td>
<td>Officials of the City of Boise (E)</td>
<td>U.S. Fish and Wildlife Service (E)</td>
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<td></td>
<td></td>
<td>Public</td>
<td>U.S. Environmental Protection Agency (I)</td>
<td>Idaho Department of Health and Welfare (I)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concern (I)</td>
<td>Idaho Department of Health and Welfare (I)</td>
<td>Ada/Canyon Wastewater Treatment Management Committee (I)</td>
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<td>Historical</td>
<td>Archeological</td>
<td>Idaho State Historical Society (I)</td>
<td></td>
<td></td>
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<tr>
<td>Site</td>
<td>Sites</td>
<td>National Register of Historic Places (E)</td>
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</tr>
<tr>
<td>Irrigation</td>
<td>Area</td>
<td>Public Concern</td>
<td>Idaho Department of Water Resources (E)</td>
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</tr>
<tr>
<td>Lucky Peak</td>
<td>Lake</td>
<td>Public Interest</td>
<td>U.S. Bureau of Reclamation (E)</td>
<td>U.S. Bureau of Reclamation (E)</td>
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<tr>
<td></td>
<td></td>
<td>Concern (I)</td>
<td>Boise River Board of Control (E)</td>
<td>Boise River Board of Control (E)</td>
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<tr>
<td>Lucky Peak</td>
<td>Dam Site</td>
<td>Public Concern</td>
<td>Idaho Department of Recreation-State Comprehensive Outdoor Recreation Program (E)</td>
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<tr>
<td>Recreational</td>
<td>Development</td>
<td>Public Concern</td>
<td>Idaho Department of Recreation-State Comprehensive Outdoor Recreation Program (E)</td>
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</tr>
<tr>
<td>Wildlife Area</td>
<td>Around the Lake</td>
<td>Idaho Fish and Game Department (I)</td>
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(E) = explicit
(I) = implicit
### Table B-1 -- Continued

**IDENTIFICATION OF RESOURCES AND INDICATION OF SIGNIFICANCE**

**Basis for Primary Significance Recognition**

<table>
<thead>
<tr>
<th>STUDY</th>
<th>RESOURCE</th>
<th>PUBLIC</th>
<th>INSTITUTIONAL</th>
<th>TECHNICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUDSON RIVER</td>
<td>Hudson River Estuary</td>
<td>Environmental groups, fishermen's associ.,</td>
<td>New York</td>
<td>A number of extensive scientific studies,</td>
</tr>
<tr>
<td>PROJECT</td>
<td></td>
<td>recreational, academic organizations, counties, municipalities withdrawing water from Hudson River.</td>
<td>State. Dept. Env. Cons. Tri-State Commission, organizations, counties, municipalities withdrawing water from Hudson River, counties along river</td>
<td>ongoing surveys.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public meetings, workshops</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Water Quantity</td>
<td>Fishermen's associations, environmental groups, municipalities withdrawing water from Hudson River.</td>
<td>New York City Board of Water Supply</td>
<td>U.S.G.S. low-flow studies, NYS Monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public meetings, workshops</td>
<td>Tri-State Commission</td>
<td>NYC Monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Workshops</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water Quality</td>
<td>(Same as above)</td>
<td></td>
<td>U.S.G.S., New York State Dept. Env. Cons. Tri-State Commission New York City Board of Water Supply Municipalities, industry, counties along river</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial Sites</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(a) Habitat</td>
<td>Public meetings, affinity counties workshops</td>
<td></td>
<td>Available literature, land use maps, soils maps.</td>
<td></td>
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<tr>
<td>(b) Air quality</td>
<td>-----</td>
<td>-----</td>
<td>NYS, EPA standards</td>
<td></td>
</tr>
<tr>
<td>(d) Noise</td>
<td>-----</td>
<td>-----</td>
<td>NYS, OSHA standards</td>
<td></td>
</tr>
<tr>
<td>Urban Landscape</td>
<td>Public meetings, NYC Dept. Env. Cons. workshops NYC Board Water Supply studies</td>
<td></td>
<td>Drought emergency studies</td>
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</tr>
<tr>
<td></td>
<td>Groundwater</td>
<td>Public meetings, NYC, NYC Board Water Supply workshops</td>
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<td></td>
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</tbody>
</table>

**MOBILE HARBOR**

<table>
<thead>
<tr>
<th>STUDY</th>
<th>RESOURCE</th>
<th>PUBLIC</th>
<th>INSTITUTIONAL</th>
<th>TECHNICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mobile Bay Estuarine Ecosystem</td>
<td>Commercial Fishermen</td>
<td>Federal agencies during EIS review</td>
<td>Corps DMRP Studies Alabama Geol. Survey</td>
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<tr>
<td></td>
<td>(b) Estuarine benthos</td>
<td>Commercial Fishermen</td>
<td>Mobile City</td>
<td>Corps DMRP Studies Data, Literature</td>
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<tr>
<td></td>
<td>(c) Water Quality</td>
<td>-----</td>
<td>Alabama, Federal Agencies</td>
<td>Corps DMRP Studies</td>
</tr>
<tr>
<td></td>
<td>(d) Wetlands</td>
<td>-----</td>
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</tr>
<tr>
<td></td>
<td>(e) Shoreline</td>
<td>Property owners Mobile, Corps Erosion Studies</td>
<td>National register</td>
<td>Maps, navigation charts</td>
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<tr>
<td></td>
<td>(f) Cultural Sites</td>
<td>National register</td>
<td></td>
<td></td>
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<td></td>
<td>Barrier Islands</td>
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<td></td>
<td>(b) Dauphin Is.</td>
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<tr>
<td></td>
<td>Gulf of Mexico</td>
<td>EPA</td>
<td>EPA</td>
<td>DMRP Studies</td>
</tr>
<tr>
<td></td>
<td>(a) Water Column</td>
<td>EPA</td>
<td>EPA</td>
<td>DMRP Studies</td>
</tr>
<tr>
<td></td>
<td>(b) Benthos</td>
<td>EPA</td>
<td>EPA</td>
<td>DMRP Studies</td>
</tr>
</tbody>
</table>

(E) = explicit
(I) = implicit
EQ Resource Management Measures

Background

The P&S are fairly explicit in discussing management measures as part of the treatment of alternative plans (18 CFR 711.50). Projects are no longer discussed singularly. Instead, the P&S address "...possibilities for management, development, preservation, and other opportunities for action" (18 CFR 711.41). Furthermore, "by proper selection of these development or management possibilities, alternatives may be formulated for each problem or opportunity associated with NED and/or EQ objectives." The emphasis is clearly on alternative plans which consist of "...a system of structural and/or nonstructural measures, strategies, or programs formulated to alleviate specific problems or take advantage of specific opportunities associated with water and related land resources in the planning area."

Several requirements for creating alternative plans directly affect the development of the range of EQ management measures:

1. Plans are to be significantly differentiated from each other in terms of their effects on the NED and EQ objectives.

2. Plans are not to be limited to those which could only be implemented under Federal authorities.

3. Water conservation is to be fully integrated into plan formulation as a means of achieving NED and EQ objectives and consists of actions that will:
   a. Reduce the demand for water;
   b. Improve efficiency in use and reduce losses and waste;
   c. Improve land management practices to conserve water.

4. Nonstructural measures are to be considered for all problems and opportunities.

5. Mitigation of the adverse effects of each alternative plan must be considered.

6. Other existing plans, such as state water resources plans, are to be considered as alternative plans, if they are within the scope of the planning effort.

7. Various implementation schedules for the alternative plans are to be considered.

While the terminology has changed, the intent of the new P&S is similar to the Corps' current guidance (ER 1105-2-230) to "identify management measures"; to classify "measures that address more than one planning objective"; to combine "compatible measures which address only one planning objective"; and finally to "combine different measures into resource management systems."
Specification of EQ-oriented management measures is determined partly by the requirements to consider conservation measures, nonstructural measures, and mitigation, partly by resource-related or constrained problems and opportunities, and partly by available technologies.

Findings/Conclusions (Refer to Table B-2)

- Most of the studies did not meet the requirements of the current guidance (ER 1105-2-230) to identify and classify management measures according to their contributions to EQ and NED objectives.

- Authorizing legislation is often interpreted as preventing consideration of a broader range of management measures, thereby narrowly circumscribing the problems and potential opportunities as well as the planning area.

- The nature of some resource problems leads to a narrowed focus on specific solutions based on certain resource limitations; this makes a broad, comprehensive planning effort difficult.

- Local support and perception of EQ resource management opportunities are often lacking, contributing to a dearth of imaginative management measures.

- Management measures are closely tied to a perception of the planning area, which is often narrowly defined as the project impact area.

- EQ management measures are generally not linked to any of the four elements of EQ (enhancement, preservation, restoration, protection). In reality, neither EQ management measures nor EQ elements are well understood. Mitigation is often emphasized as the relevant EQ measure.

- EQ management measures are generally not linked to specific planning objectives (problems and opportunities) or to compatible planning objectives.

- EQ management measures which are currently considered to be sound environmental engineering practice or design are not differentiated from less environmentally sensitive standard engineering practices; this eliminates the possibility of a structurally based EQ plan with net positive EQ effects.

- Most studies did not display unique EQ-oriented or other non-traditional, management measures, but rather were often iterations of past engineering solutions.

- The field planners often fail to take credit for accepted environmental engineering practices ("environmentally-oriented design features") which may be considered separate EQ management measures. These environmental design features are often integrated into the structural components of the project, but may be compared to more mundane standard engineering designs.
The general failure to directly link problems and opportunities (planning objectives) with compatible management measures hinders plan formulation and skews the tradeoff analysis phase of plan selection.

The failure to recognize structurally based EQ management measures stems from an uncertainty of what an EQ plan represents and what opportunities the EQ elements provide for separate management measures.

Often, there is no local sponsorship or support for EQ management measures, since EQ is viewed primarily as a Federal interest.
### Table B-2

**CLASSIFICATION OF MANAGEMENT MEASURES**

<table>
<thead>
<tr>
<th>STUDY</th>
<th>ALT MANAGEMENT MEASURES</th>
<th>EQ MANAGEMENT MEASURE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOLLY BEACH</td>
<td>Relocate structures, Evacuation planning, Flood insurance, Zoning and building code modification, Flood plain regulation, Floodproof structures, No growth, Grass existing beach, No action, Beach restoration and nourishment, Beach revetment, Seawall, Offshore breakwater, Sand dune development and stabilization, Dynamite hole closure, Beach access biological observation park</td>
<td>Yes</td>
<td>Weakly related to plan objectives.</td>
</tr>
<tr>
<td>FOURCHE BAYOU</td>
<td>Channel improvement: Clearing &amp; alteration, Land buffer (grass strip), Bank protection, Bridge and pipeline alterations, Reservoirs, Flood plain regulations, Relocation or raising of structures, Acquisition of bottomland, Establishment of a Natural Area, Recreation trails, Tree planting beautification along enlarged channels, Use of gabions instead of riprap along some channels</td>
<td>Yes</td>
<td>EQ Plan</td>
</tr>
<tr>
<td>WILMINGTON HARBOUR</td>
<td>Conservation zoning, Corps permit authority, State Coastal Area Management Act, Transferable Development Projects, Preferential Tax Assessment, Federal Acquisition Scenic Easement, Acquisition as estuarine sanctuary, Federal acquisition in fee simple, Navigation improvements (channel modification)</td>
<td>Yes</td>
<td>EQ Plan</td>
</tr>
<tr>
<td>HOCKING RIVER</td>
<td>Reservoirs, Floodwalls/Levees, Floodway Channel Modification, In-stream Deep Pools, Artificial Riffles, In-stream Rock Piles, Landscaping-Ravetation, Acoustical Mounds, Trail, Riprap, Scenic Corridor Acquisition, Stream Cleanout, Zoning</td>
<td>Yes</td>
<td>These are all intended for wetland protection but not all were both effective and implementable.</td>
</tr>
</tbody>
</table>

*EOO = Environmentally oriented design feature*
<table>
<thead>
<tr>
<th>Measure</th>
<th>EU Management Measure</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Flood Insurance</td>
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<td>Building Code Regulations</td>
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<td>Temporary Evacuation</td>
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<td>Permanent Evacuation</td>
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<td>Flood Proofing</td>
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<td>Tax Reform</td>
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<tr>
<td>Watershed Land Management</td>
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<td>Divert shipping to other ports.</td>
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<td>Pipeline</td>
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<tr>
<td>Grays Harbor channel deepening and widening with deep ocean dredge</td>
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<tr>
<td>disposal</td>
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<td></td>
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<tr>
<td>Grays Harbor channel deepening and widening with side lands disposal</td>
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<tr>
<td>Waterfront renewal</td>
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<tr>
<td>Flood Forecasting</td>
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<tr>
<td>Evacuation of the Flood Plain</td>
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<tr>
<td>Flood Proof Existing Facilities</td>
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<tr>
<td>Modify Operation of Clear Lake for Flood Control</td>
<td></td>
<td>EU benefits of water quality and groundwater replenishment were not explored in report.</td>
</tr>
<tr>
<td>Reservoir Storage on Tributaries</td>
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<tr>
<td>Clear Lake Outlet Channel Enlargement</td>
<td>Yes</td>
<td>EU design feature; Bypass would follow meandering alignment designed to enhance fish habitat. Part of EC plan.</td>
</tr>
<tr>
<td>Clear Lake Outlet Channel Enlargement and Modified Bypass</td>
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<td>Raise Settling Basin Levels</td>
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<td></td>
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<tr>
<td>Raise Settling Basin Levels with Wildlife Refuge</td>
<td>Yes</td>
<td>Part of EC plan. Consideration of present farmland in settling basin to 3000 A as refuge.</td>
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<tr>
<td>Periodic Evacuation of Existing Settling Basin</td>
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<td>New North Settling Basin</td>
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<tr>
<td>New South Settling Basin</td>
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<tr>
<td>Kellner Jetty System</td>
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<td></td>
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<td>Sediment Reservoir Disposal Sites</td>
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<td>N-age. c.</td>
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<tr>
<td>TREATING EXISTING LEVEES AT CRANEY IS.</td>
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<tr>
<td>WESTWARD EXTENSION OF CRANEY IS.</td>
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</tr>
<tr>
<td>WESTWARD EXTENSION RAISEE WILLOUGHBY BAY</td>
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<td></td>
</tr>
<tr>
<td>OCEAN VIEW AREA</td>
<td></td>
<td></td>
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<tr>
<td>HAMPTON FLATLS</td>
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<td></td>
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<tr>
<td>HORSESHOE AREA OFF JACOBE BEACH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAGGED ISLAND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHESAPEAKE BAY</td>
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<td></td>
</tr>
<tr>
<td>VAFTFOLK SITE</td>
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<tr>
<td>Disposal at sea by lug &amp; crew</td>
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<tr>
<td>Hardening to sea from Craney Is.</td>
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Table II - Continued

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<tr>
<th>Measure</th>
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<td>DISPOSAL SITES</td>
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<td>TREATING EXISTING LEVEES AT CRANEY IS.</td>
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<td>WESTWARD EXTENSION OF CRANEY IS.</td>
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<tr>
<td>WESTWARD EXTENSION RAISEE WILLOUGHBY BAY</td>
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<td>OCEAN VIEW AREA</td>
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<tr>
<td>HAMPTON FLATLS</td>
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<td>HORSESHOE AREA OFF JACOBE BEACH</td>
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<td>NAGGED ISLAND</td>
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<td>CHESAPEAKE BAY</td>
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<td>VAFTFOLK SITE</td>
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<td>Disposal at sea by lug &amp; crew</td>
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<td>Hardening to sea from Craney Is.</td>
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**Table 8-2 -- Continued**

<table>
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<th>STUDY</th>
<th>ALT MANAGEMENT MEASURES</th>
<th>EQ MANAGEMENT MEASURE</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td></td>
<td>Disposal at Sea by Pipeline</td>
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<td></td>
<td>Disposal at Sea by Special Dredge and by Tug</td>
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<td>Disposal by Truck Haul to Abandoned Mine</td>
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<td>CHANNEL IMPROVEMENTS</td>
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<td>EXISTING 45 FT CHANNELS</td>
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<td>An Offshore Terminal</td>
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<td></td>
<td>Use of Coal Slurry</td>
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<td>Change in Trade Patterns</td>
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<td>Alternative Sources of Energy</td>
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<td>New Location of Coal Resources</td>
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<td>EXISTING 35 &amp; 40 FT CHANNELS IN ELIZABETH RIVER</td>
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<td>Considered LED &amp; NED Plan</td>
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<td>Channel Deepening</td>
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<td>Offshore Terminal</td>
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<td>BAYSTOWN</td>
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<td>Earthen Levees</td>
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<td>Concrete Flood Walls</td>
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<td>Flood Proofing</td>
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<td></td>
<td>Zoning</td>
<td></td>
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<tr>
<td></td>
<td>Improved Flood Forecasting &amp; Temporary Evacuation</td>
<td></td>
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<td></td>
<td>Permanent Evacuation and Relocation</td>
<td></td>
<td>Considered EQ &amp; NED Plan</td>
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<td></td>
<td>TAMPA BAY</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Maintain entire East Bay Area.</td>
<td>No</td>
<td>The study never looked at separate, distinct actions which could, in turn, develop into separate plans. Further, no &quot;measure&quot; has any net positive effect.</td>
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<tr>
<td></td>
<td>Dredged material placed on northern disposal island on the Tampa Harbor Report.</td>
<td>No</td>
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<tr>
<td></td>
<td>Maintain 400-foot channel and turning basin in the East Bay. Dredged material placed on the northern disposal island of the Tampa Bay project.</td>
<td>No</td>
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<tr>
<td></td>
<td>KANSAS CITY (Walnut Creek)</td>
<td></td>
<td>Throughout study EQ measures were considered; however, there were no plans which emphasized EQ.</td>
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<tr>
<td></td>
<td>Regulatory measures</td>
<td>Yes</td>
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<td></td>
<td>Floodproofing</td>
<td>No</td>
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<tr>
<td></td>
<td>Relocation</td>
<td>Yes</td>
<td></td>
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<td></td>
<td>Detention Structure</td>
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<td></td>
<td>Channel Maintenance</td>
<td>No</td>
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<td>Channel Modification</td>
<td>No</td>
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<tr>
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<td>Bridge Modification</td>
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<td>--------------------------</td>
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<tr>
<td>(Line Creek)</td>
<td>Regulatory Measures</td>
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<td>Acquisition for Parks</td>
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<td>Channel Maintenance</td>
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<td>Bridge Modification</td>
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<td></td>
<td>Detention Structures</td>
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<tr>
<td>(Newman Bottoms)</td>
<td>Regulatory Measures</td>
<td>Yes</td>
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<td></td>
<td>New Levee</td>
<td>No</td>
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<td>(Rock Creek and Hillside Ditch)</td>
<td>Regulatory Measures</td>
<td>Yes</td>
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<td>Detention Structures</td>
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<td>Channel Maintenance</td>
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<td>Channel Modification</td>
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<td>Bridge Modification</td>
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<td>Modification to Existing Structures</td>
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<td>(Courtney Bottoms)</td>
<td>Regulatory Measures</td>
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<td>New Levee</td>
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<td>(Kansas River Area)</td>
<td>Regulatory Measures</td>
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<tr>
<td></td>
<td>Acquisition for Parks</td>
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<td></td>
<td>Floodproofing</td>
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<td></td>
<td>Levees</td>
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<tr>
<td>LAKE (Lower Tchefuncte River Area)</td>
<td>Revetment works</td>
<td>Yes</td>
<td>Flood protection provided by concurrent authorized project; economically unjustified for erosion control only</td>
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<tr>
<td></td>
<td>Seawall</td>
<td>Yes</td>
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<td>Levee with riprap</td>
<td>Yes</td>
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<td>National Flood Insurance Program</td>
<td>No</td>
<td>Responsibility of the City of Madisonville</td>
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<td>(Mandeville Area)</td>
<td>Restoration of existing seawall</td>
<td>Yes</td>
<td>To be provided by concurrent authorized project</td>
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<td></td>
<td>Replacement and extension of seawall</td>
<td>Yes</td>
<td>Economically unjustified due to authorized improvements</td>
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<td>Construction of sand beach in front of seawall</td>
<td>Yes</td>
<td>Opposed by local interests</td>
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<td>Hurricane protection levee</td>
<td>No</td>
<td>Economically unjustified due to authorized project</td>
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<td>National Flood Insurance Program</td>
<td>No</td>
<td>Responsibility of the City of Mandeville</td>
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<td>(Howze Beach Area)</td>
<td>Improve and enlarge levee</td>
<td>No</td>
<td>No local support</td>
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<td>Restore and maintain pumping stations</td>
<td>No</td>
<td>No local support</td>
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<td>(Slidell Area)</td>
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<td>50-year storm levee</td>
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<td>Governmental decision.</td>
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<td>100-year storm levee</td>
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<td>Governmental decision.</td>
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<td>Standard project hurricane levee</td>
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<td>Governmental decision.</td>
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<td>National Flood Insurance Program</td>
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<td>Responsibility of the City of Slidell</td>
<td>Governmental decision.</td>
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<td>(Apple Pie Ridge Area)</td>
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<td>Ring levee</td>
<td>No</td>
<td>Economically unjustified</td>
<td>Governmental decision.</td>
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<td>Improve highway embankment</td>
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<td>To be provided by concurrent authorized project</td>
<td>Governmental decision.</td>
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<td>to act as levee</td>
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<td>(Bayou Castine Area)</td>
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<td>Federal assumption of</td>
<td>No</td>
<td>NED-EQ Plan</td>
<td>Environmental versus economic considerations.</td>
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<td>maintenance-hydraulic dredging</td>
<td>No</td>
<td>Environmentally unacceptable due to turbidity</td>
<td>Environmental versus economic considerations.</td>
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<td>Federal assumption of</td>
<td>No</td>
<td>Environmentally</td>
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<td>maintenance-bucket dredging</td>
<td>No</td>
<td>unacceptable due to</td>
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<td>Place of dredge material</td>
<td>No</td>
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<td>Environmental versus economic</td>
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<td>in diked areas</td>
<td>No</td>
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<td>considerations.</td>
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<td>Placement of dredge material</td>
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<td>at Fontainebleau State Park</td>
<td>Yes</td>
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<td>(Fontainebleau State Park Area)</td>
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<td>Environmental versus economic</td>
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<td>(pavail)</td>
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<td>Beach revegetation</td>
<td>Yes</td>
<td>Economically unjustified</td>
<td>Environmental versus economic</td>
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<td></td>
<td>considerations.</td>
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<tr>
<td>Riprap along entire shoreline</td>
<td>Yes</td>
<td>Economically unjustified</td>
<td>Contrary to local interests and</td>
</tr>
<tr>
<td>100-feet wide nonrecreational beach with construction and nourishment material from local sand pits</td>
<td>Yes</td>
<td>Contrary to local interests and economically unjustified</td>
<td>Contrary to local interests and economically unjustified</td>
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<tr>
<td>100-feet wide nonrecreational beach with construction and nourishment material from local sand pits</td>
<td>Yes</td>
<td>Contrary to local interests and economically unjustified</td>
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<td>250-feet wide recreational beach with construction and nourishment material from dredging</td>
<td>Yes</td>
<td>NED Plan</td>
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<td>250-feet wide recreational beach with construction and nourishment from local sand pits</td>
<td>Yes</td>
<td>NED Plan</td>
<td>Economically unjustified</td>
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<tr>
<td>250-feet wide recreational beach with construction and nourishment material from dredging</td>
<td>Yes</td>
<td>NED Plan</td>
<td>Economically unjustified</td>
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<tr>
<td>Lucky Peak</td>
<td>Reduce power demand</td>
<td>No</td>
<td>Considered to be beyond the scope of the report</td>
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<tr>
<td>Unconventional power sources (solar, wind, geothermal)</td>
<td>No</td>
<td>Limited output and technology not advanced</td>
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<td>Fossil fuel thermal generation plant</td>
<td>No</td>
<td>Opposed by local interests</td>
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<tr>
<td>Nuclear fueled thermal generation plant</td>
<td>No</td>
<td>Indicated as being a likely alternative and used for cost comparison - actual construction beyond the scope of the report</td>
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<tr>
<td>Hydropower production at Lucky Peak but constructed and operated by a non-Federal interest</td>
<td>No</td>
<td>This measure was briefly identified in the FEIS as a viable alternative but it was also stated that no extensive investigations were made concerning this alternative</td>
<td></td>
</tr>
<tr>
<td>Hydropower production at Lucky Peak, constructed and operated by the Corps</td>
<td>No</td>
<td>Not included in FE plan - 30</td>
<td></td>
</tr>
<tr>
<td>Store water in irrigation channels</td>
<td>Yes</td>
<td>Only limited storage could be obtained</td>
<td></td>
</tr>
<tr>
<td>Store Boise effluent in ponds or inflatable tanks</td>
<td>Yes</td>
<td>Substantially greater cost than additional treatment</td>
<td></td>
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<tr>
<td>Divert side streams for storage of runoff</td>
<td>Yes</td>
<td>Additional storage would not be sufficient</td>
<td></td>
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<tr>
<td>Build independent areas in Lucky Peak</td>
<td>Yes</td>
<td>Very little storage without large investment</td>
<td></td>
</tr>
<tr>
<td>Raise New York Canal Division Dam</td>
<td>Yes</td>
<td>Insufficient storage without large investment and environmental damage</td>
<td></td>
</tr>
<tr>
<td>Land treatment of effluent</td>
<td>Yes</td>
<td>Ecologically unjustified</td>
<td></td>
</tr>
<tr>
<td>Pump water from wells</td>
<td>Yes</td>
<td>Consistently feasible but dropped from consideration with no real reason identified</td>
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<tr>
<td>Provide necessary treatment at the Boise treatment plant</td>
<td>Yes</td>
<td>Considered feasible but the responsibility of the City of Boise</td>
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<tr>
<td>Local interests obtain state water rights to uncontracted storage in Lucky Peak</td>
<td>Yes</td>
<td>Storage not sufficient to guarantee flow and against current state policy</td>
<td></td>
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<tr>
<td>Raise Lucky Peak Dam greater than 12 feet</td>
<td>Yes</td>
<td>Economically unjustified</td>
<td></td>
</tr>
<tr>
<td>Raise Lucky Peak Dam less than 12 feet</td>
<td>Yes</td>
<td>Must be combined with use of uncontracted storage and environmentally unacceptable</td>
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</table>

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### Table B-2 -- Continued

#### CLASSIFICATION OF MANAGEMENT MEASURES

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<th>EO MANAGEMENT MEASURE</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>HUDSON RIVER</td>
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<tr>
<td></td>
<td>Reservoirs</td>
<td>Partially</td>
<td>Low-flow regulation, low energy</td>
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<td></td>
<td></td>
<td></td>
<td>High water quality</td>
</tr>
<tr>
<td></td>
<td>River diversion/storage</td>
<td>Partially</td>
<td>Manages during high (&quot;excess&quot;) flow periods</td>
</tr>
<tr>
<td></td>
<td>inter-basin transfer</td>
<td></td>
<td>High energy requirements</td>
</tr>
<tr>
<td></td>
<td>Groundwater</td>
<td>Mostly</td>
<td>Energy demands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water quality problems</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Management</td>
<td></td>
<td>Conservation has a number of social, economic</td>
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<td></td>
<td></td>
<td></td>
<td>consequences and varying success</td>
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<td>Metering</td>
<td>Yes</td>
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<td></td>
<td>Leakage Control</td>
<td>Yes</td>
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<td>Recycling</td>
<td>Yes</td>
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<td></td>
<td>Contingency Measures</td>
<td>Partially</td>
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<td></td>
<td>Education</td>
<td>Yes</td>
<td>Groundwater mining, recharge</td>
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<td>Emergency pumping station</td>
<td>Partial</td>
<td>Poor water quality</td>
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<td>Distribution</td>
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<td>Expensive, energy intensive</td>
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<td>Water treatment plant</td>
<td>Partial</td>
<td>Gravity transportation</td>
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<td>Tunnels</td>
<td>Mostly</td>
<td>Increase system resiliency, dependability</td>
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<td>Interconnections</td>
<td>Mostly</td>
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<td>Provide turning basin</td>
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<td>Construct islands for fill adjacent to</td>
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<td>Upland disposal sites</td>
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<td>Groundwater contamination potential</td>
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<td>Upland disposal sites</td>
<td>Partially</td>
<td>Groundwater contamination potential</td>
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<td>Open-water disposal (Mobile Bay)</td>
<td>Partially</td>
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<td>Recycle material off existing disposal</td>
<td>Mostly</td>
<td>Expensive</td>
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<td>circulation</td>
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<td>Full depressions in Bay to reduce</td>
<td>Partially</td>
<td></td>
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<td></td>
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<td></td>
<td>Improve areas adjacent to causeway</td>
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28
Indicators To Describe EQ Resource Attributes

Background

Indicators are parametric or descriptive representations of resource attributes. The purpose of abstracting an attribute characteristic or the inherent quality (property) of a resource is to include it in a forecasting and evaluation framework. "The evaluation framework specifies the ways in which changes in significant EQ resources and attributes will be measured or otherwise described. The framework consists of indicators, units, guidelines, and techniques. The framework guides the collection of information about the existing, without-plan, and with-plan conditions of significant EQ resources and attributes" (18 CFR 711.62 (c)).

Indicators are used to describe effects of actions on EQ resources by comparing the changes in indicator quantity or quality for with- and without-plan conditions. Ideally, indicators should be selected to describe effects in terms of duration, frequency, location, magnitude, reversibility, retrievability, etc., so that net effects assessment and tradeoffs can be grounded more firmly. Indicators should be supported by guidelines, criteria, or standards related both to the indicator and to the selected measurement technique.

The current planning regulations (ER 1105-2-220) do not explicitly require developing an evaluation framework which reflects resource attributes. However, there is an implicit link in the requirement to project "basic demographic, economic, environmental and social parameters" as part of alternative futures forecasting. The EQEP emphasizes the development of indicators and requires that the selected indicators be used to forecast "with- and without-project future" conditions. The construction of an evaluation framework, definition of resources, and selection of appropriate indicators are critical to forecasting with- and without-plan futures. This, together with the apparent difficulty of the field planner to deal with forecasting without-plan futures, especially for EQ resources, is expected to be the most difficult part of the planning process, considering the central role that forecasting plays in plan formulation and evaluation.

Findings/Conclusions (Refer to Table B-3)

- In all but a few studies (Wilmington Harbor, Kansas City Urban Study, Hudson River Project), a basic approach to EQ evaluation is not specified; environmental indicators were developed sparingly or without real purpose.

- Parameters and variables, which were ultimately used in the bases for analysis and forecasting, were most often related to demographic and economic data which was available. There apparently was no clear view of using existing data as indicators which could be carried through the assessment and evaluation states.
EQEP requires that those indicators specified to describe resources in the evaluation framework must be the same ones used to forecast future "with" and "without" conditions. This places a substantial burden on planners for proper early selection; it also assumes a great deal of knowledge about cause-effect relations and interactions of future trends on project outputs.

Only indicators having an adequate data base or knowledge factor should be used. The development of the train of information specifying the resource, and embodied in Tables 1 and 2 of App A from EQEP (18 CFR 714) is a valuable documentation exercise having other benefits (see discussion of the planning process).
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<thead>
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<th>Study</th>
<th>Resource</th>
<th>Attribute</th>
<th>Indicator</th>
<th>Unit</th>
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<th>Techniques</th>
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<td>Beach</td>
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<td>Ocean View Presence/ Absence</td>
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<td>User Occasions</td>
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<td>No. Parking Spaces Easy access</td>
<td>1/4 mile</td>
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<td></td>
<td></td>
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<td>Land Value No. building Value/ft of</td>
<td>No. landmark of new Shoreline Value of building divided by frontage ft.</td>
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<td>front</td>
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<tr>
<td></td>
<td></td>
<td>Ecological</td>
<td>Shoreline Stability Ft/yr eroded</td>
<td>Critical - 5 ft/yr</td>
<td>Historical photography and maps rates for estimating future shoreline.</td>
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<td>State/Federal lists</td>
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<td>Indian Life Presence/ Absence Age</td>
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Table B-3 -- continued
DEVELOPMENT OF EQ EVALUATION FRAMEWORK

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<th>UNIT</th>
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<td>H, M, L, or D</td>
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Table B-3 -- continued
### Table B-3 -- continued

#### DEVELOPMENT OF EQ EVALUATION FRAMEWORK

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<td>Develop noise thresholds for each site; for construction equipment compare with standards; pop. density, etc. future &quot;without project&quot; forecasts during a drought scenario</td>
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<td>mgd</td>
<td>Water needed for basic city functions; lawn watering, public parks; street cleaning, firefighting, recreation</td>
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<td>&quot;ruining&quot; of deep aquifers</td>
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Table B-3 -- continued

DEVELOPMENT OF EQ EVALUATION FRAMEWORK
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<td>Sediment samples, elutriate tests, bioassays</td>
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Techniques To Measure EQ Resource Impacts

Background

Like indicators, measurement techniques are important to forecasting -- the focus of the P&S planning process. Ideally, indicators should be selected according to several pragmatic criteria; the most important criterion is that the indicator can be measured and forecast with reasonable acceptability (Figure B-1). Indicators may also be used for the very important forecasting evaluation tests of risk and uncertainty. The EQEP (18 CFR 714.422) states that "general forecasting approaches that may be considered are:

1. Adoption of available forecasts developed by other sources.
2. Use of scenarios to estimate hypothetical futures and the likely sequences of events that might lead to those futures.
3. Use of expert group judgment approaches, such as Delphi and nominal group, in which views of relevant professionals about future conditions are systematically elicited and analyzed.
4. Use of extrapolation approaches, such as trend analysis and simple modeling, which rely on historic trend information to estimate the future.
5. Use of analogy and comparative analyses, in which the effects of actions similar to those expected in the without-plans condition, on the specified indicators, in similar environmental settings are used to estimate future conditions.

Paragraph 714.422(e) states that ultimately and rationally, "forecasting approaches should be compatible with the measurement and description techniques specified in the evaluation framework." Therefore, the implication is that measurement techniques should not only describe an attribute's quantity and quality characteristics (duration, frequency, location, magnitude, reversibility, etc.), but that there must be a continuity and rationale imposed on the entire stream of actions starting with the selection of an indicator, and progressing through measurement, forecasting, effects appraisal, and tradeoffs analysis.

The existing Corps planning regulations (ER 1105-2-240) require that impacts be measured, i.e., describing the magnitude, location, timing, and duration of each significant impact. Again, the regulations do not specify analytical quantification, but rather only quantification to the extent that the impacts are compared to "projected parameters" in the "without project" cases. The EQEP also seems to imply an empirical treatment of existing information rather than a deterministic, predictive forecasting approach. Based on a review of the studies, the difficulty imposed on the field by an early development of a total evaluation framework is considerable. However, several of the case studies reviewed have shown that this type of analysis can be conducted more rigorously, and ultimately produce a more rational, traceable, and lasting decision.
Findings/Conclusions (Refer to Table B-4)

- In most studies, specific EQ measurement techniques were applied sporadically or spuriously; that is, the measurement had no material bearing on a decision, but instead simply reflected the availability of data.

- EQ measurement techniques were not systematically tied to a consistent evaluative framework linking resources to impacts.

- EQ measurement techniques which were more fully developed were generally applied in the EIS phase, thereby diluting their utility in the early stages of plan formulation.

- Most feasibility studies deferred detailed environmental analyses to the Phase I, GDM studies, considering them to be the implied appropriate level of inquiry.

- The baseline with/without projections is considered in many of the studies, but not adequately developed; furthermore, its potential is not fully realized.

- The EQEP provides ample, but relatively abstract, guidance on the nature of forecasting and the level of quantification. EQEP implies a distinction among the various empirically based forecasting techniques for survey scope studies (Level C); it also possibly implies more quantitative, predictive, numerical modeling and physical hydraulic models which may be appropriate for Phase I, GDM studies.
EVALUATION FRAMEWORK

Figure B-1
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<th>APPLIED APPROPRIATE (VALID)</th>
<th>AFFECT DECISION</th>
<th>TIMELY</th>
<th>REMARKS ON TECHNIQUES</th>
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### Table 8-4 -- continued

**EVALUATION OF RESOURCE MEASUREMENT/DESCRIPTION TECHNIQUES**

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46
### Table B-4 -- continued

#### EVALUATION OF RESOURCE MEASUREMENT/DESCRIPTION TECHNIQUES

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47
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<th>APPROPRIATE (VALID)</th>
<th>AFFECT DECISION</th>
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<td>View of Dam Site</td>
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Table B-4 -- continued

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<td>Noise</td>
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<td>Comparative empirical, graphical analysis. Model results Numerous indicators, parameters</td>
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Considered Significant but no technique to evaluate true impact was identified. There should have been more discussion of winter range as a resource and potential effects on it.

Indicator species represent complexity of estuarine ecosystem and interactions.

Models helpful in quantifying entrainment impacts.

Aided the proper selection of flow criteria for alternative plan objectives.

Large numbers of technical studies conducted for power plants.

Empirical analysis

Empirical analysis

Numerous studies consolidated for scenario building

Existing water quality model (NYS) salinity, OL

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Documentation Required and Suggested by P&S/EQEP

Background

The P&S explicitly address displays (18 CFR 711.70) and their format and content (18 CFR 711.71). "Displays are graphs, tables, drawings, photographs, summary statements, and other graphics in a format that facilitates the analysis and comparison of alternative plans. Concise, understandable displays are needed during the planning process and to provide documentation in compliance with NEPA." Displays are required, but their format is not specified, for the following areas:

1. Existing and forecasted resource conditions related to problems and opportunities within the planning setting.

2. Candidate plans.
   a. Measures.
   b. Effects in NED, EQ, RED, and OSE accounts.
   c. Recommended plan (format specified in 18 CFR 711.71(c)(1)).

The EQEP addresses documentation of EQ evaluation under a discussion of "Performance Objectives" (18 CFR 714.340). EQ evaluation and its documentation are to be:

a. Understandable to the public.

b. Accessible to the public.

c. Traceable analytical and decision processes.

d. Focus on analysis of significant issues.

e. Analytic rather than encyclopedic.

f. Comparable level of detail to NED analysis.

g. Scientifically valid.

h. Objective.

i. Complete and timely.

In reality, the "200 series" planning regulations explicitly require only one display table -- the P&S System of Accounts. However, the regulation pertaining to organization and content of feasibility reports (ER 1105-2-920) specifies that the main report should be brief, implying that tabular and graphical material be used to synthesize a great deal of information. Report appendices are required to "contain detailed and technical descriptions," consisting of "data, charts, tables, and exhibits for existing conditions, alternative future conditions, without project conditions, and problems and needs."
The appendix on formulation, assessment, and evaluation of detailed plans should contain the information necessary to support the decision process and trade-off analysis consisting of "detailed analytical material related to impact assessment and evaluation (impact trees, matrix analyses, sensitivity analysis, etc.)."

The explicit requirements in ER 1105-2-920 match the general EQEP requirements, with the exception that the EQEP provides a useful series of developed, sequential display tables which supplement the documentation requirements of a compatible evaluation framework. The EQEP tables are presented only as samples and are not required. However, EQEP adds one more table which is explicitly required in addition to the three required by the P&S. This table (18 CFR 714.442, Table 714.441) documents the assessment and judgment process involved in determining the net EQ effect of each alternative plan.

Findings/Conclusions (Refer to Table B-5)

- The general requirements of current Corps guidance match the more explicitly stated EQEP requirements, with the exception that EQEP provides a sample series of developed, potentially helpful display tables.

- Display of EQ information in the reports analyzed is not treated at a level of detail comparable to economic and technical analysis. Furthermore, the basis of decisions was not generally apparent or obvious to the reviewer.

- Most deficiencies of the reviewed reports centered on a failure to document or explain decisions or assumptions and to synthesize the culmination of plan formulation or impact assessment into clear, concise informative displays or tabulations.

- Plan evolution and decision traceability was severely hampered by failure to adhere to even the outline for the main report presented by ER 1105-2-920.

- Project reports often do not even adhere to the minimal requirements and structure of impact evaluation categories of Section 122 in constructing displays.

- The use of graphics (tabular, thematic maps, pictorial, etc.) will provide a generally understandable and traceable document to the reviewer and the interested public.

- Graphic characterization of the steps and decision points in the planning process would lead to greater/enhanced traceability to EQ evaluation.

- The EQEP information display tables are good models for systematic, sequential displays.

- Information display tables should be coordinated to provide a consistent hierarchy of information which ultimately can be traced to the System of Accounts, especially the EQ Account.
### Table B-5

**DIFFERENCES BETWEEN REPORT DOCUMENTATION/PERFORMANCE AND NEW EQEP REQUIREMENTS**

**EXTENT TO WHICH NEW EQEP REQUIREMENTS APPROXIMATED**

<table>
<thead>
<tr>
<th>STUDY</th>
<th>REQUIREMENT</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTIALLY DEVELOPED</th>
<th>MEETS EQEP</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>REPORT DOCUMENTATION (EXCLUDING EQEP)</th>
</tr>
</thead>
</table>
| FUTURE REMAIN | Identify Resources | X | | | | | Non-
| | Develop Framework for Evaluation | X | | | | | 
| | Specify Past Trends and Existing Conditions for Indicators | X | | | | | 
| | Forecast Without-Plan Futures for Indicators | X | | | | | 
| | Forecast With-Plan Futures for Indicators | X | | | | | 
| | Identify Effects (w/o diff) on Indicators (yes-no) | X | | | | | 
| | Describe Effects on Indicators | X | | | | | 
| | Determine Significance of Effects on Indicators | X | | | | | 
| | Appraise (beneficial-adverse) Effects on Indicators | X | | | | | 
| | Appraise (describe) Effects on Attributes | X | | | | | 

<table>
<thead>
<tr>
<th>STUDY</th>
<th>REQUIREMENT</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTIALLY DEVELOPED</th>
<th>MEETS EQEP</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>REPORT DOCUMENTATION (EXCLUDING EQEP)</th>
</tr>
</thead>
</table>
| FUTURE REMAIN | Identify Resources | X | | | | | No discussion of appropriate evaluation account. Considerations of significance and likely effects not fully developed. 
| | Develop Framework for Evaluation | X | | | | | Guidelines and techniques not evident for all indicators. 
| | Specify Past Trends and Existing Conditions for Indicators | X | | | | | Historical information lacking. Information on social-economic characteristics presented but of no apparent use. Could have been useful in developing future scenarios but was not. 
| | Forecast Without-Plan Futures for Indicators | X | | | | | Assumptions for future without not clear. Indicators inconsistently projected or not at all. 
| | Forecast With-Plan Futures for Indicators | X | | | | | Extensive amount of data on resources under existing conditions that was extremely not referred to or of no apparent relevance to study. 
| | Identify Effects (w/o diff) on Indicators (yes-no) | X | | | | | 
| | Describe Effects on Indicators | X | | | | | Effects duration and location very generalized. 
| | Determine Significance of Effects on Indicators | X | | | | | 

* Parallels Table found in case histories which indicate report compliance to EQEP.*

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52
<table>
<thead>
<tr>
<th>STUDY</th>
<th>REQUIREMENT</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTLY DEVELOPED</th>
<th>MEETS EQEP</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>REPORT DOCUMENTATION/PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WILMINGTON MARINA</td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast Without Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast With Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w/w/o diff) on Indicators (yes-no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appraise (beneficial-adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appraise (describe) Effects on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEADVILLE RIVER</td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ex facto scoping by process of coordination with natural resource agencies.</td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nothing approximating the conceptual system for EQEP was developed, nor seem to function implicitly in the process of evaluation.</td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Some narrative on history of degradation of River due to industrial encroachment, from drainage. Some annual data on water quality. Dated curves for most phenomena.</td>
</tr>
<tr>
<td></td>
<td>Forecast Without Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Forecast largely consists of prediction that zoning (presumably in compliance with FCA) will result in return of floodplain to green space.</td>
</tr>
<tr>
<td></td>
<td>Forecast With Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Impacts on a selected set of &quot;specific parameters&quot; are quantified: disturbance, by acres of stream length of stream, acres of land. These are forecast for three final array plans at each town.</td>
</tr>
</tbody>
</table>

* Parallels Table found in case histories which indicate report compliance to EQEP.

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Table B-5 -- continued

DIFFERENCES BETWEEN REPORT DOCUMENTATION/PERFORMANCE AND NEW EQEP REQUIREMENTS*

<table>
<thead>
<tr>
<th>STUDY DESCRIPTION</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTLY DEVELOPED</th>
<th>MEETS EQEP</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>REPORT DOCUMENTATION EXCEEDING EQEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify Effects (w/wo diff) on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No procedure of systematically projecting: (1) a &quot;without plan&quot; future, (2) &quot;with plan&quot; future for each plan, then (3) subtracting w/o from with for a net effect.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effects are the &quot;with-plan&quot; futures on specific parameters noted in remarks section. They represent change from present condition, not difference between two futures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significance of effects on indicators is dispersed throughout report in acknowledging concerns of other agencies. No deliberate system of classification and display.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraise (beneficial, adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate satisfaction of new requirement is due to earlier requirement to display system of PAS accounts. Adequacy of resource/indicators is frequent question.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraise (describe) Effects on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No general appraisal of resource categories net effects (as distinct from indicators) was made. However, summary judgment for selected plans was made stating that net effects were small, if any.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

GRAY'S HARBOR

Identify Resources | X            |                    |                 |            |                               |                                   |
| Criteria for identification of resources not articulated but estuary is approached as system. Conventional encyclopedic list of published species also used. Estuarine functions and commercial fisheries help orient. |

Develop Framework for Evaluation | X            |                    |                 |            |                               |                                   |
| Use of Estuarine Functions perspective and the food web concept gave some coherence or logic, but served what to discuss, not how to go about assessment measuring evaluation. |

Specify Past Trends and Existing Conditions for Indicators | X            |                    |                 |            |                               |                                   |
| Some of literature on this major U.S. estuary drawn upon in description but no past constructed for critical indicators. |

Forecast Without-Plan Futures for Indicators | X            |                    |                 |            |                               |                                   |
| Cannot construct future values for indicators of resources from the report of EIS texts. |

* Parallels Table found in case histories which indicate report compliance to EQEP.
Table B-5 -- continued

DIFFERENCES BETWEEN REPORT DOCUMENTATION/PERFORMANCE AND NEW EQP REQUIREMENT:* 

<table>
<thead>
<tr>
<th>STUDY</th>
<th>REQUIREMENT</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTLY DEVELOPED</th>
<th>MEETS</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>REMARKS ON IMPLEMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forecast with Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w-/w/o diff) on Indicators (yes-no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appraise (beneficial-adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appraise (describe) Effects on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOTSPOT</td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast without Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast with Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w-/w/o diff.) on Indicators (yes-no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Parallels Table found in case histories which indicate report compliance to EQP.
### Table B-5 -- continued

**DIFFERENCES BETWEEN REPORT DOCUMENTATION/PERFORMANCE AND NEW EQEP REQUIREMENTS**

<table>
<thead>
<tr>
<th>STUDY</th>
<th>REQUIREMENT</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTLY DEVELOPED</th>
<th>MEETS EQEP</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>Rprt Documntation Extends EQEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraise (Beneficial/Adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The report mentioned that there would be a net positive effect on EQ resources.</td>
</tr>
<tr>
<td>Appraise (Describe) Effects on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Recommended plan would enhance recreational potential in the area.</td>
</tr>
<tr>
<td>NORFOLK HARBOR</td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Identification of resources was presumed; treatment of resources was perfunctory.</td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The rudiments of a framework were discussed for Dismal Swamp but even that was incomplete.</td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Only conducted for NED oriented indicators.</td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w/wo diff) on Indicators (yes/no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Simply was not done.</td>
</tr>
<tr>
<td></td>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Briefly mentioned in summary of accounts in perfunctory manner.</td>
</tr>
<tr>
<td></td>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Done in very perfunctory manner.</td>
</tr>
<tr>
<td></td>
<td>Appraise (Beneficial/Adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Significance not discussed in any depth.</td>
</tr>
<tr>
<td></td>
<td>Appraise (Describe) Effects on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Included in perfunctory manner in system of accounts.</td>
</tr>
<tr>
<td>CACHICHE CREEK</td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Habitat evaluation procedures were used which systematically evaluated some of the resources, attributes and indicators. Final evaluation not presented in summary form.</td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Past trends not established very well. Present conditions discussed satisfactorily.</td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not done for each alternative.</td>
</tr>
<tr>
<td></td>
<td>Forecast Without-Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Done for recommended plan only.</td>
</tr>
<tr>
<td></td>
<td>Forecast with-Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Done for recommended plan only.</td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w/wo diff) on Indicators (yes/no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Assume habitat evaluation procedures take care of this requirement.</td>
</tr>
</tbody>
</table>

* Parallels Table found in case histories which indicate report compliance to EQEP.*

---

56
### Differences Between Report Documentation/Performance and New EQEP Requirements *

<table>
<thead>
<tr>
<th>Study</th>
<th>Requirement</th>
<th>Not Included</th>
<th>Minimally Included</th>
<th>Partly Developed</th>
<th>Meets EQEP</th>
<th>Remarks on Partial Development</th>
<th>Report Documentation Exceeding EQEP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIFFERENCES BETWEEN REPORT DOCUMENTATION/PERFORMANCE AND NEW EQEP REQUIREMENTS</strong></td>
<td><strong>EXTENT TO WHICH NEW EQEP REQUIREMENTS APPROXIMATED</strong></td>
<td><strong>REMARKS ON PARTIAL DEVELOPMENT</strong></td>
<td><strong>REPORT DOCUMENTATION EXCEEDING EQEP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TAMPA</strong></td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RAY</strong></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast Without Plans Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast With Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w-w/o diff) on Indicators (yes-no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appraise (beneficial)-adverse Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Effects (describe) on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>KANSAS CITY</strong></td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast Without Plans Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast With Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w-w/o diff) on Indicators (yes-no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Parallels Table found in case histories which indicate report compliance to EQEP.

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### Table 8-5 -- continued

<table>
<thead>
<tr>
<th>Study Description</th>
<th>Requirement Not Included</th>
<th>Minimally Included</th>
<th>Partly Developed</th>
<th>Meets EQEP</th>
<th>Remarks on Partial Development</th>
<th>Report Documentation Exceeding EQEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraise (beneficial-adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraise Effects (describe) on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAKE Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pontchartrain Develop framework for evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecast without plans futures for indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecast with Plans Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify Effects (w-w/o diff) on Indicators (yes-no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe effects on indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Description of effects could have been improved for most indicators except for shoreline changes, shoaling and recreational opportunities.</td>
<td></td>
</tr>
<tr>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Statements of significance of effects were not provided. However, most effects that were described in detail and are well documented are those that were determined to be significant based on public and institutional recognition.</td>
<td></td>
</tr>
<tr>
<td>Appraise (beneficial-adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>The feasibility study itself only provided brief identification of beneficial and adverse effects on indicators. No discussion of Net EQ effects was provided. Discussion of beneficial and adverse effects in the EIS was excellent and felt to be in almost complete compliance with EQEP.</td>
<td></td>
</tr>
<tr>
<td>Appraise Effects (describe) on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Appraisal of effects on ecological attributes was weak except in terms of shoreline erosion. Appraisal of effects on cultural and aesthetic attributes was generally adequate.</td>
<td></td>
</tr>
</tbody>
</table>

*Parallels Table found in case histories which indicate report compliance to EQEP.*
**Table B-5 -- continued**

**DIFFERENCES BETWEEN REPORT DOCUMENTATION/PERFORMANCE AND NEW EQEP REQUIREMENT**

**EXTENT TO WHICH NEW EQEP REQUIREMENTS APPROXIMATED**

<table>
<thead>
<tr>
<th>STUDY REQUIREMENT</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTLY DEVELOPED</th>
<th>MEETS EQEP</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>EFFORT SOLICITATION EXCEEDING EQEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Identification of most resources involved in and around the project was adequate, too much relative information to them may have been provided. There was very little resource information specific to the proposed powerhouse site.</td>
<td></td>
</tr>
<tr>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>A specific framework was not displayed. However, most resource indicators and units could be identified. There was a significant lack of identified guidelines and techniques.</td>
<td></td>
</tr>
<tr>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>The study did not provide much information relative to historical or trend conditions with the exception of information on flow velocities. This data was somewhat confusing. Discussion of baseline conditions was not fully developed or documented.</td>
<td></td>
</tr>
<tr>
<td>Forecast without Plans Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Forecast of without plan conditions for EQ resources was not provided. Forecast of with plan conditions for EQ resources was not provided. There was quite a lot of information relative to forecast of power needs, and demand needs.</td>
<td></td>
</tr>
<tr>
<td>Forecast with Plans Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Discussion of with plan conditions was very limited and then generally provided only qualitative rather than quantitative information.</td>
<td></td>
</tr>
<tr>
<td>Identify Effects (w/o diff) on Indicators (yes-no)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Developed as a difference between alternative plans but not as a difference between with and without plans.</td>
<td></td>
</tr>
<tr>
<td>Describe Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Fairly adequate for those indicators measured in units that are easy to identify and project. Only qualitative for other indicators.</td>
<td></td>
</tr>
<tr>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Statements of significance of effects were not provided. However, most effects that were described were significant. Detailed discussion of the significance of minimum flows was provided, but not adequately addressed in alternative plans discussion.</td>
<td></td>
</tr>
<tr>
<td>Appraise (beneficial-adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>The only places where effects were described as beneficial or adverse were in the Summary Comparison and System of Accounts tables. These descriptions were minimal. There was no identification of net EQ effects.</td>
<td></td>
</tr>
<tr>
<td>Appraise Effects (describe) on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>The only true appraisal of effect related to EQ attributes concerned loss of recreational areas. This might be identified as cultural. Appraisal of effects on ecological attributes was almost totally ignored.</td>
<td></td>
</tr>
</tbody>
</table>

*Parallels Table found in case histories which indicate report compliance to EQEP.*
<table>
<thead>
<tr>
<th>STUDY</th>
<th>REQUIREMENT</th>
<th>NOT INCLUDED</th>
<th>MINIMALLY INCLUDED</th>
<th>PARTLY DEVELOPED</th>
<th>MEETS EQEP</th>
<th>REMARKS ON PARTIAL DEVELOPMENT</th>
<th>REPORT DOCUMENTATION EXCEEDING EQEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUDSON RIVER</td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not explicitly conducted according to &quot;200&quot; regs or EQEP</td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Separate reports establishing basis for forecasts, evaluation linking indicators to impacts.</td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Part of framework development</td>
</tr>
<tr>
<td></td>
<td>Forecast without-Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Done very well for socio-economic related indicators; less data for ecological indicators. (Same as above)</td>
</tr>
<tr>
<td></td>
<td>Forecast with-Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Emphasis on quantitative description where possible.</td>
</tr>
<tr>
<td></td>
<td>Identify effects (w/o diff)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Significance measured against quantitative standards, criteria, change increments, natural environment.</td>
</tr>
<tr>
<td></td>
<td>Describe effects on indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appraise (beneficial - adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appraise (describe) Effects on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>New System of Attributes not congruent with previous EQ development</td>
</tr>
<tr>
<td>MOBILE HARBOR</td>
<td>Identify Resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not conducted explicitly</td>
</tr>
<tr>
<td></td>
<td>Develop Framework for Evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Most explicit evaluation conducted through physical sampling of benthic sediments and hydraulic model.</td>
</tr>
<tr>
<td></td>
<td>Specify Past Trends and Existing Conditions for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Only for physical estuarine indicators (sediments, salinity, flows)</td>
</tr>
<tr>
<td></td>
<td>Forecast without-Plan Futures for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No direct correlation of physical changes to ecology (Same as above)</td>
</tr>
<tr>
<td></td>
<td>Forecast with-Plan Future for Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Effects (w/o diff)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Incomplete development; concentration on salinity, turbidity.</td>
</tr>
<tr>
<td></td>
<td>Describe effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No continuous development of data and impacts.</td>
</tr>
<tr>
<td></td>
<td>Determine Significance of Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Given selected few indicators, significance well established</td>
</tr>
<tr>
<td></td>
<td>Appraise (beneficial - adverse) Effects on Indicators</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not explicitly stated in report but fairly well in EIS</td>
</tr>
<tr>
<td></td>
<td>Appraise (describe) Effects on Attributes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Marginal in system of accounts</td>
</tr>
</tbody>
</table>

* Parallels Table found in case histories which indicate report compliance to EQEP.
EQ Plan Justification

Background

Both the P&S and EQEP are vague about selecting and justifying an EQ plan, although quite specific about the recommended plan. The P&S state (18 CFR 711.53(b)) that the EQ plan is a "...plan that is judged to reasonably maximize net contributions to the EQ objective..." and to "...alleviate the specific problems and take advantage of the specific opportunities that reflect the EQ objective for the relevant planning area." Other than the national EQ objective of enhancement, preservation, protection, restoration, or improvement of EQ attributes, the requirements for EQ plan selection appear to center on whether the plan:

1. Possesses net beneficial EQ effects.
2. Specifically addresses stated EQ problems and opportunities.

These two requirements should be further traced to their components in order to understand the hidden ambiguities. First, net EQ effects determination is fairly complex. Figure B-2 schematically shows the steps and highlights a hidden dilemma in selecting an EQ plan and the recommended plan. It is clear that during plan formulation, the alternative plans which progress to become candidate plans must demonstrate the four criteria of completeness, effectiveness, efficiency, and acceptability (18 CFR 711.51). A further implication is that the recommended plans have passed these tests; therefore, if the net beneficial NED and EQ effects are optimal, even though the net NED benefits do not outweigh net NED adverse effects, the plan may be recommended as the selected plan.

The existing Corps planning regulations are much more explicit in laying out the requisite components of an EQ plan (ER 1105-2-230) and the requirements for plan evaluation and selection (ER 1105-2-250). The requirements are:

1. Appraise the plan's fulfillment of planning objectives (problems and opportunities).
2. Appraise contributions of the plan to System of Accounts (NED, EW, SWB, RD).
3. Apply evaluation criteria:
   a. Acceptability.
   b. Completeness.
   c. Effectiveness.
   d. Efficiency.
   e. Certainty.
UNDER NEW PBS ECEP

(a) NO PLANS SHOULD BE DEVELOPED IN QUADRANT III
(b) QUADRANT I REPRESENTS THE FOCUS OF PBS PLANNING (i.e., positive NED and EQ)
(c) P5 MAY BECOME EQ PLAN - GREATEST NET BENEFICIAL EQ EFFECTS
(d) THE FOLLOWING MAY BECOME CANDIDATE PLANS SINCE P5 = 6 NED + 2 EQ
   P5 = 6 NED + 2 EQ
   P5 = 6 NED - 4 EQ

(w) IF THERE WAS AN OPTIMAL PLAN SUCH AS P3, IT WOULD HAVE TO LIE ON THE OPTIMAL BENEFITS CURVE.

Figure B-2
f. Geographic scope.
g. NED B/C ratio.
h. Reversibility.
i. Stability.

4. Trade-off analysis (net effects: NED + EQ).
5. Designate NED, EQ plan.

The major difference appears to be the fact that under the new EQEP guidelines, an EQ plan merely addresses EQ problems and opportunities and maximizes net EQ benefits without apparent concern for NED benefits. Under the current regulations, such disregard for other planning objectives (problems and opportunities) is not allowed. Each plan must minimally pass nine tests, and the plan which has the largest net EQ benefits is designated the EQ plan. Of course, it is often difficult to construct an EQ plan which meets all nine criteria. However, the regulations allow designation of a "least environmentally damaging" plan, and this plan has been used in the majority of survey reports reviewed.

Findings/Conclusions (Refer to Table B-6)

o Survey studies generally do not emphasize and specify EQ problems and opportunities; as a result, they cannot rationally fulfill the intended elemental requirements of EQ plan formulation, and thus negate the EQ plan designation and justification step.

o The absence of a clear distinction among EQ planning purposes and between mitigation techniques considerably hampers the field planners in organizing EQ-oriented alternatives along with a complementary rationale.

o Most studies settled on justifying a "least environmentally damaging plan," or an "EQ-oriented NED plan," or an "environmentally-oriented design plan"; this reflects an attitude that EQ plans cannot possibly contain measures which also meet the nine responsiveness criteria. That is, EQ objectives are inherently incompatible with plan responsiveness criteria.

o Survey studies demonstrate a definite weakness in the rationale applied for net effects assessment and tradeoff analysis; this ultimately hampers EQ plan designation and selection of the recommended plan.

o The evaluation rigor imposed by the P&S and EQEP would definitely produce a more rational and traceable application of judgment during the net effects appraisal step of EQ plan designation. However, a great deal of subjective, judgmental leeway exists.
### Table B-6
#### DESIGNATION AND JUSTIFICATION OF A PLAN AS THE EQ PLAN

<table>
<thead>
<tr>
<th>STUDY</th>
<th>EQ PLAN DESIGNATED</th>
<th>HOW JUSTIFIED AS AN EQ PLAN CONTAINS</th>
<th>ADDRESSES EQ OBJECTIVES</th>
<th>PROVIDES NET EQ BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOLLY BEACH</td>
<td>X</td>
<td>Improved wildlife habitat, visually enhanced beach</td>
<td>&quot;Achieves greatest percentage (90%) of EQ oriented planning objectives&quot;</td>
<td>&quot;Most efficient plan for emphasizing EQ outputs&quot;</td>
</tr>
<tr>
<td>FOURCHE BAYOU</td>
<td>X</td>
<td>Gabioned channels, Tree planting, Natural Appreciation Area</td>
<td>Protects bottom-lands</td>
<td></td>
</tr>
<tr>
<td>WILMINGTON HARBOR</td>
<td>X</td>
<td>Protects critical ecological zone</td>
<td>Nine percent increase over without condition, 10% increase over NED Plan conditions</td>
<td></td>
</tr>
<tr>
<td>MOKING RIVER</td>
<td>X</td>
<td>Watershed land mgmt, scenic corridor, stream cleanout, landscaping</td>
<td>Avoids further degradation and enhances aesthetic and natural values of river corridor, Pools, riffles, rock-piles, acoustical mounds Single-bank channelization, bypasses, revegetation</td>
<td>Yes (Not selected plan)</td>
</tr>
<tr>
<td>GRAYS HARBOR</td>
<td>X</td>
<td>Spoil Disposal sites and methods to minimize harm</td>
<td>No</td>
<td>No (&quot;EQ&quot; plan was selected)</td>
</tr>
<tr>
<td>CACHE CREEK</td>
<td>X</td>
<td>Bypass would follow a meandering alignment designed to enhance fish and wildlife</td>
<td>EQ plan would address EQ objectives of state of California and Fish and Wildlife Service</td>
<td>Habitat evaluation procedures were used to calculate net EQ benefits of recommended plan which contained some EQ feature. HEP method was not used to calculate net effects of EQ plan.</td>
</tr>
<tr>
<td>NORFOLK HARBOR</td>
<td>X</td>
<td>All plans were considered to have no net adverse effect on EQ</td>
<td>No EQ objectives stated</td>
<td>No EQ objectives</td>
</tr>
<tr>
<td>BAYSTOWN</td>
<td>X</td>
<td>Nonstructural solutions (i.e., evaluation) were considered because structural solutions were not economically feasible</td>
<td>MED and EQ plans were considered to have a net EQ benefit. Both plans employed the same measure (i.e., evacuation) only in varying degrees.</td>
<td></td>
</tr>
<tr>
<td>TAMPA BAY</td>
<td>X</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>KANSAS CITY</td>
<td>X</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

LEO = Least Environmentally damaging plan.
<table>
<thead>
<tr>
<th>Study</th>
<th>EQ Plan Designated</th>
<th>How Justified An EQ Plan Contains</th>
<th>Addresses EQ Objectives</th>
<th>Provide Net EQ Benefits</th>
</tr>
</thead>
</table>
| Lake Pontchartrain  
(Mouth of Bayou X  
Castine Study Area) | Yes | Use of hydraulic dredge instead of bucket reduced for this area. Placement of dredge material for beach construction instead of spoil is not a goal design feature. | None stated | Reduces amount of material required to be dredged for beach construction at Fontainebleau State Park. The relationship of the plans for the two areas can be considered as a whole. |
| Fontainebleau State Park  
Study Area | Yes | Protection of natural wetland and park land due to reduction in shoreline erosion. Does not require dredging. | Protection of natural wetland and park land | Net EQ benefit not stated. However, it does not require dredging but does require transportation of beach material. This will result in associated noise, dust, and road deterioration. The EQ plan was not chosen for this area. |
| Lucky Peak | X | However, from EQ of examination of correspondence it was not designated in the draft EQ. | None | No | No |
| Housten  
River | X | Tunnel, treatment plant distribution system, conjunctive use. | Minimizes land use changes. Minimizes streamflow alterations. Minimizes disruption of aquatic ecosystem. Minimizes disruption of probably be justified archeological, historical sites. Controls growth, distribution water conservation component. | Recommended plan was an "EQ oriented ND" plan. EQ benefits at that time were not well established although under current guidance plan could as Net EQ benefits. |
| Mobile Harbor | X | Yes | Total Gulf; open water disposal of dredge material. | Net EQ benefit not stated. |

LED = Least Environmentally damaging plan.
Corps Review Process

Background

The primary Washington-level Corps of Engineers review is conducted by BERH. Therefore, the essential OCE input must be factored in during the planning process through the Intensive Management Program (ER 1105-2-10). The focus for OCE participation is further narrowed to two checkpoint conferences during Stages II and III of the Corps' three-stage planning process.

Stage II Checkpoint Conference (Milestone 04)

The purpose of this conference is to discuss and evaluate study progress, preliminary study results, and detailed matters necessary to facilitate decisions on study direction and redirection. Items covered at the meeting should include, as a minimum:

- Policy.
- Economic, social, and environmental impacts.
- Coordination and public involvement.
- Plan formulation and rationale.

Stage III Working Checkpoint Conference (Milestone 07)

The purpose of this conference is to discuss plan formulation and study problems and to check key factors that will indicate to reviewers the adequacy of the investigation and analysis. The following specifically should be addressed:

- Needs identification.
- Responsiveness of selected plan to needs.
- Hydrologic and foundation investigations.
- Alternatives to selected plan.
- Effect assessments.
- Public involvement.
- Local assurances and other institutional factors affecting plan implementation.
- Cost allocation and policy problems.
- Proposed actions to complete report.
The sequence of review responsibilities implicitly places the burden of plan formulation and evaluation consistency on OCE. This encompasses the elements of the planning process detailed in the ER 1105-2-200 series of planning regulations. Associated with the general planning requirements is the more specific and, to date, troublesome EQ planning philosophy. On the other hand, BERH may be characterized as being responsible for applying a consistent perspective to policy matters (i.e., determining the Federal interest) and established technical criteria. The two review perspectives might also be classified as one of process and procedure versus one of standards and consistency.

The Board concentrates its review on the recommended plan and evaluates the plan's conformance with accepted practices, interpretations, laws, and precedents. The Board imposes a national-level degree of consistency with respect to the underlying project rationale. BERH is part of the system of checks and balances, reflecting both the time-proven criteria for project evaluation and the current administration policies regarding placing certain emphasis on interpretation. OCE, through its checkpoint meetings and responsibilities for translating laws, executive orders, policy pronouncements, and administrative changes into engineering regulations, possesses a shorter response time to changes in public policies.

The real question is, which of the two key review sectors is responsible for developing the key, consistent, supporting rationale for EQ planning and for monitoring its incorporation into the planning process? Review of the 14 feasibility studies indicates that both elements are needed and are clearly mutually reinforcing. However, several conceptual gaps and impediments must be resolved to gain a clearer understanding of OCE and BERH roles.

The Board primarily insures that conditions for project implementation are consistent on a national level. Unfortunately, implementation rationale is not always congruous with planning rationale and is at the heart of the EQ planning dilemma. The early Stage I and Stage II plan formulation process is purposely conducted at a more abstract diversified level, with various checks to assure feasibility, stability, etc. The Board reflects the pragmatic conditions and constraints of the Federal interest. One of the key pragmatic conditions relating to EQ planning is the rather rigid set of rules pertaining to cost-sharing, i.e., the division of project costs between Federal and non-Federal interests. Generally, EQ enhancement, protection, preservation, and restoration measures are viewed as non-Federal responsibilities.

Another problem stemming from the relatively new ideology of EQ planning is distinguishing between and differentiating among the terms which constitute EQ. Enhancement, protection, preservation, and restoration are not precisely defined. More importantly, real opportunities for matching measures with these nouns are not readily apparent to the field planners. Providing examples of such EQ opportunities for each major Corps function (navigation, flood control, water supply, hydropower, etc.) would greatly clarify these concepts. Among the problematic areas which became apparent during the review of reports was the question of "quid pro quo"; that is, must the EQ features be directly tied to balancing a project impact, and in this case, would it be considered mitigation? Can authorized studies which specify engineering solutions to acknowledged needs be expected to rationally propose nonstructural plans or EQ plans? Can structurally oriented plans ever be rationalized on the basis of net EQ benefits?
Findings/Conclusions (Refer to Table B-7)

- While attempting to impose a consistent economic and environmental rationale on survey reports in a milieu of changing national policies and regulations, BERH is confronted with a series of unresolved policy issues concerning the Federal interest, relationship of separable EQ features, justification of EQ plans, cost-sharing and plan feasibility, and institutional acceptability.

- Recent BERH actions related to EQ planning, enhancement, and mitigation have reduced the ambiguity inherent in policies by establishing dependable precedents.

- The EQEP's positive emphasis on restoration, enhancement, improvement, and preservation in EQ-related actions, measures, and plans may create a period of uncertainty for both OCE and BERH reviewers.

- BERH has often noted serious deficiencies in EQ considerations and recommended that corrective actions be taken, either as amendments to the feasibility document or as conditions during Phase I, GDM.

- OCE and BERH reviews have emphasized the importance of understanding the relationship of the study area to the project impact area and its role in opportunities for EQ plans. Mitigation is more clearly associated with direct, project-related impacts. EQ enhancement, restoration, and preservation opportunities may be more clearly linked to project-induced changes (e.g., navigation improvements leading to port expansion, and both direct and indirect impacts on environmental resources).

- Necessary planning adjustments are better accommodated during intensive planning management under OCE responsibility than at the terminal BERH survey report review phase.
### Table B-7
BERNH EQ REVIEW CONSIDERATIONS

<table>
<thead>
<tr>
<th>STUDY</th>
<th>EQ ISSUES OR POINTS RAISED</th>
<th>INFORMATION, REVISION, OR OTHER ACTIONS REQUIRED</th>
<th>BERNH ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOLLY BEACH</td>
<td>Board disagreed with District as to which plan should have been designated as the EQ Plan.</td>
<td>(1) Detailed scenario and assumptions for without project future. (2) Derivation of recreation values and beach carrying capacity. (3) Information per ER 1165-2-26. (4) Board recommended further wildlife studies in post-authorized planning.</td>
<td>Favorable action at first meeting. Recommended Plan approved.</td>
</tr>
<tr>
<td>FOURCHE BAYOU</td>
<td>Justification for acquisition of Fourche Bottoms (1,750 acres)</td>
<td>(1) Documentation to support proposed acquisition at cost of $8.3 million when no additional flood protection apparent. (2) Present and future conditions by reach.</td>
<td>First meeting postponed. Deferred at second meeting as Board favored WE Plan over recommended plan.</td>
</tr>
<tr>
<td>WILMINGTON HARBOR</td>
<td>Justification for acquisition of Critical Ecological Zone (2,800 acres)</td>
<td>OCE policy guidance on EQ Planning (1) how environments Quality effects were determined--provide separate values for baseline, 25 and 50 years. (2) Map of upland industrial area. (3) Documentation supporting linkage between wetland acquisition and navigation project. (4) Analytical backup for curve of cumulative wetland losses. (5) Wetland violations. (NOTE: Board review contributed to presentation of EQ analysis.)</td>
<td>Deferred at first meeting, contingent action at second meeting--EQ Plan approved.</td>
</tr>
<tr>
<td>HOCKING RIVER</td>
<td>Environmental treatment measures included in the recommended plans (wildlife habitat planting, riffles and deep pools for game fish) were defined as mitigation and additional local cost-sharing was required for them. Cost-sharing was also further required for environmental measures on separable lands for recreation access.</td>
<td>Recommended construction authorization.</td>
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</tr>
<tr>
<td>GRAYS HARBOR</td>
<td>Exceptional importance of Grays Harbor estuarine functions noted re: salmon, other large fish, birds of Pacific flyway. Objection raised to USFWS failure to provide completed F&amp;W report pursuant to Coordination Act.</td>
<td>Further identification of environmental impacts needed. Further consideration should be given to criteria of additional wetlands by use of dredged material (in accordance with Sec. 150 of 1976 W.R.D. Act) Authorization for channel deepening not recommended, further study required.</td>
<td></td>
</tr>
<tr>
<td>CACHE CREEK</td>
<td>(1) Rationale for wildlife refuge was not fully documented. (2) Induced effects of upper basin project on soil erosion downstream not addressed in enough detail.</td>
<td>Approval of plan contingent upon receipt of report detailing the potential for downstream erosion and flood damage.</td>
<td>Cache Creek Study was received 10/26/79. Favorable action was taken by Board during April, 1980 contingent upon submission of additional information requested. Final approval June 4, 1980.</td>
</tr>
<tr>
<td>STUDY</td>
<td>EQ ISSUES OR POINTS RAISED</td>
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<td>BERN ACTION</td>
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<tr>
<td>NORFOLK HARBOR</td>
<td>(1) Channel modification and anchorage facilities in the recommended plan should be implemented with disposal of all suitable material in the ocean.</td>
<td>BERN personnel developed an addendum to study EIS which brought new EQ information to bear on the project. Results of blo assays indicate that 73% (200 out of a total 275 million cubic yards over the 50 year life of the project) is presently considered suitable for ocean disposal.</td>
<td>BERN received study on 9/8/80 and the report was approved in November Board meeting. EIS addendum was filed in December, 1980. Recommended plan was changed from recommending Suffolk Disposal site to Ocean Disposal of 73% of dredge.</td>
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<td>(2) The existing Craney Island Diked Disposal Area should be utilized for dredged material from deepening project which is not suitable for ocean disposal.</td>
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<td>(3) Post authorization planning studies should be conducted concurrently with the deepening project to identify an acceptable solution for long-term disposal of dredged materials.</td>
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<tr>
<td>BAYSTOWN</td>
<td>“Wildlife Habitat would be enhanced in the project area by providing 750 acres of land for recreation and passive uses.”</td>
<td>Report was received 3 Oct 75 and passed the Board approved plan during February meeting 1976.</td>
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</tr>
<tr>
<td>TAMPA BAY</td>
<td>Board disagreed with District proposal of a 400-ft wide channel, which exceeds the normal channel width required for the design vessel. This proposed excess was designed to provide additional clearance for berth vessels and for advanced maintenance due to unstable slide slope material. The Board held that advanced maintenance provisions should be accommodated as justified at the time maintenance is performed and that a channel width of only 300 feet should be recommended for authorization. This recommendation should have proportionally less adverse environmental effect. Several specific EQ issues were raised: a. Temporary resuspension of sediments during dredging operations would create localized reductions in DO, increased turbidity and sedimentation over a 6-month period for the initial maintenance and for two months each six years thereafter. b. Loss of benthos over 80 acres of bottom. c. The need for future, undesignated disposal areas.</td>
<td>The Board held that non-Federal first costs for deepening berthing areas and access channels now estimated at $132,000 should properly be included in the economic analysis. This added cost does not affect the economic justification.</td>
<td>Except for the changes suggested previously, the Board concurs with the reporting officers at the first meeting.</td>
</tr>
<tr>
<td>STUDY</td>
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<td>INFORMATION, REVISION, OR OTHER ACTIONS REQUIRED</td>
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<tr>
<td>KANSAS CITY</td>
<td>No EQ issues raised.</td>
<td>On-going preauthorization study of Brush Creek, MO and KS will contain appropriate recommendations for that element when issued at a later date.</td>
<td>Recommended that no Federal improvements be made at this time; plans are presented for water supply and floodplain management which can be undertaken by local authorities. Recommendation approved at the first meeting.</td>
</tr>
<tr>
<td>LAKE PONCHARTRAIN</td>
<td>Board staff review of initial draft study raised several points related to EQ which were felt to require further investigation and clarification: 1. Actual amount of turbidity created by dredging? 2. Clam population lost due to dredging? 3. Value of natural wetland area? 4. Has subsidence occurred along beach? 5. Presentation of detailed information on shoreline lost? 6. Designations of NED-EQ plans.</td>
<td>Most EQ points raised were taken care of with revisions in text and through communications between staff and Division and District. Due to Board review, Division and District personnel were requested to make further analysis concerning the major issues. This was done and resulted in changes in the size of beach to be constructed at Fontainebleau State Park. Net EQ benefits gained or lost as a result of the revision are not clear.</td>
<td>Initial Board review was conducted prior to first meeting of Full Board. Subsequent to this, improvements in analysis of the benefits of recommended plans were requested. These analyses were made and beach construction plan modified. Board concurred with revised recommendations at first meeting of Full Board.</td>
</tr>
<tr>
<td>LUCKY PEAK</td>
<td>Board staff of study identified two issues related to EQ: 1. What is the real significance of decreased Dissolved Oxygen and what will be done to mitigate this effect? 2. What is the significant potential decrease in water temperature in tailrace waters and what will be done to mitigate effect?</td>
<td>The Division/District was asked to make further analysis of major issues and prepare comments. Issues were resolved by Division/District in a letter responding to comments. This letter was not attached to the study. Minor modification to text pages were made in light of review comments.</td>
<td>Based on Board staff review and recommendations the Board approved the study in first meeting.</td>
</tr>
<tr>
<td>HUDSON RIVER PROJECT</td>
<td>Reflected report recommendations for detailed monitoring studies during Phase I, GDM of following: (a) water treatment health impacts (b) entrainment impacts of withdrawals (c) saltfront excursion, control (d) critical low flow conditions (e) monitor program for ecology, water quality (f) construction related impacts (g) develop, coordinate environmental study program</td>
<td>Recommended for advanced Phase I, GDM study prior to recommendation for construction.</td>
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**Table B-7 -- Continued**

**BERH EQ REVIEW CONSIDERATIONS**
<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>MOBILE</td>
<td>Dredged material disposal alternatives.</td>
<td>Additional information development on EQ measures during Phase 1, GDM</td>
<td>Endorsed MED plan.</td>
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<tr>
<td>HARBOR</td>
<td>Gulf open water disposal.</td>
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<td></td>
<td>Mitigation measures:</td>
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<td></td>
<td>Wetlands establishment</td>
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<td></td>
<td>Restoration of circulation</td>
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Table B.7 -- Continued
This section addresses some of the EQ-related planning issues which were not covered in the more direct analysis of factors constituting the evaluation framework. The overall conduct of the planning process, traced through the 14 survey reports reviewed, revealed a number of persistently recurring problems. It is worthwhile to list those problems since they reflect difficulties of conformance with a number of planning requirements and because they represent probable future difficulties in meeting the new EQEP requirements.

This section analyzes more closely the role and conduct of EQ planning within the overall planning context. The performance standards suggested in the EQEP for evaluating EQ planning was used in the effort as the framework for analyzing issues such as the general planning process, planning objectives, and consideration of cumulative impacts and project-related issues.

In analyzing and comparing the specific procedural requirements of the new EQEP and existing Corps regulation, frequent reference to forecasting as the focal point of the planning process has been made. OCE must expend a fairly large effort, supported by the Corps research community, to relate the abstract presentation of planning/forecasting to a well-developed, referenced set of forecasting techniques. The Corps' planning regulation preferred analytical forecasting but accepted descriptive statements. The EQEP emphasizes a number of empirically based generic approaches to forecasting. Thus, this emphasis is expected to create the greatest potential difficulty for field planners, especially in those districts where environmental planners are normally not part of the plan formulation effort.

Planning Process

Background

Environmental quality considerations are fully integrated into the overall Corps multiobjective planning (MOP) framework for planning (ER 1105-2-200); this integration is consistent with the WRC Principles and Standards. The EQ evaluation process presented in the EQEP, emphasizes Step 4 (Evaluation) in the six-step P&S water resources planning process. However, each phase (definition, inventory, assessment, appraisal) is parallel to the steps in the overall interactive planning process (see 18 CFR 714.400). Thus, while a semantic difficulty is imposed on the field planners because of a number of new terms (problems and opportunities for planning objectives, actions and management measures for project, etc.), the overall concept of an iterative planning process with evaluation phases is the same.

The EQEP is not substantively different in concept and guidance from the combined series of Corps planning regulations and report organization regulations. However, the EQEP establishes a much clearer level of accountability and decision traceability than the more flexible "200 series" planning regulations. This is bound to improve the EQ planning process as a coequal
component of NED planning. The EQEP imposes a level of rigorous analysis comparable to the NED procedures. While it will be argued that the nonquantifiable nature of many EQ resources creates an analytical incongruity, thereby imposing unnecessary difficulties, many techniques suggested in the EQEP for forecasting are empirically based numeric or quasi-numeric approaches. These are not the same as deterministic, analytical mathematical or numerical models.

Findings/Conclusions

- Plan formulation rationale was not easily traced in most of the feasibility reports reviewed.

- For most studies, a "plan of attack" or rationale for an evaluation framework providing concepts, cause-effect relationships, interactive effects, or merely a substantiation of significant trends or problems and requiring an in-depth forecasting of resource conditions, was not developed.

- NED concerns invariably dominate the plan formulation process and are reinforced at many different phases and activities within the planning process (selection of resources, planning objectives, forecasted variables, assumptions for exclusion, general level of detail).

- Field planners naturally concentrate their efforts on specifically stated resource management problems (needs) stemming from the emphasis embodied within legislative authorizations, ignoring more generally stated environmental objectives.

- There is a tendency to use certain guidance and criteria establishing minimal degrees of compliance (e.g., Section 122 impact criteria) as substitutes for the more expansive EQ opportunity initiatives possible under the new P&S and EQEP (restoration, enhancement, etc.).

- A few legislatively mandated planning and evaluation conditions (e.g., Section 122 impact topics) seem to act as EQ planning process constraints; i.e., they serve as minimal requirements which are further "trivialized" by lack of specificity and quantification.

- The EQEP, like the Principles and Standards, are written fairly clearly and concisely, but are still somewhat abstract because of the diversity of considerations. Extensive field guidance on a specific, project-related basis must be provided to transform the concepts into operational methods tied to project purposes.

- The EQEP are valuable procedural guidelines which create an internally consistent planning evaluative framework. The increased rigor inherent in the selection of measurement techniques and displays forces a more traceable and ultimately rational EQ planning philosophy.
There is a distinct tendency of field planners to put off most analytically oriented EQ planning and evaluation needs to Phase I, GDM.

There is a real question about the appropriate level of measurement and forecasting to be incorporated within survey scope planning. Evidence and logic seem to indicate that the basis for feasibility study decisions should be existing data, information, concepts, and forecasts. However, this does not imply descriptive analysis, as has been the rule, but rather an empirical development and synthesis of standard practices, concepts, and available data.

A convenient breakpoint for deciding the appropriate level of measurement techniques could be that physical hydraulic models, new mathematical-numerical models, and other specialized analytical techniques (e.g., environmental monitoring) be reserved for Phase I, AED.

Despite fairly reasonable OCE guidance on planning and the intensive management system, there are major shortcomings in many Corps planning efforts in the areas of technical credibility, creativity, and adherence to straightforward rules.

Adherence to the simple report organization requirements of ER 1105-2-920 would have resolved many of the plan formulation traceability shortcomings found in the survey reports.

Development of an EQ evaluation framework early in the planning process is a critical aspect of evaluation, affecting the selection of indicators, forecasting, "with" and "without" comparisons, net effects assessment, etc. The EQ evaluation framework also implies a good understanding of potential cause-effect relationships, interactive effects and trends, and cumulative impacts. This is perhaps the most difficult requirement of the EQEP to fulfill early in the planning process. Proper scoping must be relied on to aid this critical planning phase.

Development of integrated guidance during the planning process should begin with minimum, legislated, or required information. For example, Section 122 impact information should be explicitly linked to forecast indicators for "with" and "without" comparison; tracked-through effects assessment to plan appraisal and display in the System of Accounts; and net effects assessment along with EQ plan designation.

Planning Objectives (Problems and Opportunities)

Identification of problems and opportunities is the first step of the six-step planning process. Like so many of the other interlocking requirements of planning and evaluation, this step could determine the outcome of the planning process. Neither the new EQEP nor the Principles and Standards provide an understanding of their fundamental importance for asserting a positive connotation to EQ planning, rather than the currently pervasive "adverse impact" connotation.
Planning objectives are interwoven throughout the planning and evaluation process; therefore, determining the responsiveness of management measures, actions, and plans, as well as the distribution of effects and cost, is very important for developing an understandable, illustrative set of guidelines for the field. The current planning regulation on problem identification in the planning process (ER 1105-2-220) provides more than adequate guidance on establishing planning objectives: "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." Early scoping and coordination will invariably have to be emphasized to lay out problems and opportunities that are linked to the resource base.

Findings/Conclusions

- Specification of planning objectives in general, as well as EQ-oriented planning objectives, is one of the apparent shortcomings of field planners.
- Instead of planning objectives, the field planners often substitute criteria for evaluating plans which represent environmental constraints, e.g., "minimize degradation."
- EQ planning objectives, when posed, are often very general in scope, representing broad, philosophical goals, rather than positive enhancement, protection, restoration, and preservation purposes.
- Public involvement techniques are not used adequately early in the planning process to directly contribute to scoping and identification of the following information needs critical to plan formulation:
  1. Identify EQ resources.
  2. Identify EQ problems.
  3. Identify EQ opportunities.
  4. Identify EQ management measures.
  5. Identify constraints for the "most probable future."
- The correct specification of planning objectives is an elemental factor which influences the entire process of formulating and evaluating alternative plans.
- Planning objectives are especially critical to the fundamental orientation of EQ enhancement, preservation, protection, and restoration opportunities, thereby introducing a positive connotation to EQ planning.
o Planning objectives, however, must be preceded by a similarly positive perspective during the resource management problems and opportunities identification phase, and during the identification and inventory of resources.

o The importance of appropriate formulation of planning objectives is particularly emphasized by the requirement, during plan evaluation, to appraise how well the planning objectives have been fulfilled by each plan; such an appraisal will be a contributing factor toward designating the EQ and NED plans.

o Public involvement techniques, other than formal public meetings, must be structured to derive the appropriate planning information.

Cumulative/Induced Effects

Background

Despite substantial progress in the area of impact analysis, a number of concepts are still not addressed, despite the fact that they are important in assessing appraisal of effects and net effects. Analysis of cumulative and induced effects is explicitly required in NEPA, P&S, and EQEP. This difficult undertaking is needed to answer the questions related to reversibility, retrievability, and the relationship to long-term productivity. Furthermore, this longer-term, comprehensive element of impact analysis might help resolve such EQ purposes as enhancement, restoration, preservation and mitigation.

The requirement for cumulative impact analysis is very difficult, since the CEQ definition requires that the impacts of all actions in the past, present, and reasonably foreseeable future be taken into account, along with the project's incremental effect. While this is the basis of baseline development and future forecasting, the concept has barely been developed to the point of a good working definition of the various ancillary terms (induced, synergistic, interactive, crescive, secondary, indirect, etc.).

Findings/Conclusions

o Many studies did not identify and develop the cumulative/indirect/induced relationships of actions and effects.

o Those studies that attempted a statement of cumulative impact assessment restricted the consideration to hydrologic/water quantity changes.

o Induced effects of project-generated growth or other project outputs were rarely discussed.

o A requirement for cumulative impact assessment is problematic and must be developed at a fundamental R&D level.

o Cumulative impact assessment philosophy is probably more adaptable at the programmatic, generic, or areawide assessment stage, rather than during project-specific analysis.
Cumulative impact analysis of induced growth can only be handled by land-use modeling linked to basic input/output assumptions about economic growth and the relationship of project outputs to growth.

Project-Related Findings

Background

Invariably, there is always a set of specialized issues, concerns, or constraints which surface during a comprehensive, generic review of a diversity of problem types. In certain areas of the country, some problems are not amenable to the broad, eclectic nature of plan formulation. There are either resource-bearing constraints, or the problem is critical, or the technologies available for solution are constrained. A few of these issues have emerged from the review of survey reports.

Findings

- Some project types, such as flood control and water supply, have evolved over many years of planning and have achieved an analytical proficiency grounded in hydrologic modeling.

- Other projects (e.g., estuarine dredging, beach restoration) rely on fairly simplistic or qualitative, or even spurious techniques. This belies the availability of analytical techniques for saltfront intrusion, sediment transport studies, estuarine circulation, wave erosion, and longshore transport.

- Apparently, there is disagreement in districts between planners and the particular perspective brought in by the engineering staff about analyzing certain problem types. Creation and selection of appropriate management measures is often hampered by the incremental nature of the district's plan formulation process.

- Restoration of EQ resources, rather than enhancement, appears to be a neglected opportunity for EQ planning and management measures, especially in urbanizing environments.

- The field planners often fail to take credit for accepted environmental engineering practices ("environmentally-oriented design features") which may be considered separable EQ management measures. These environmental design features are often integrated into the project's structural components, but may be compared to more mundane standard engineering designs.