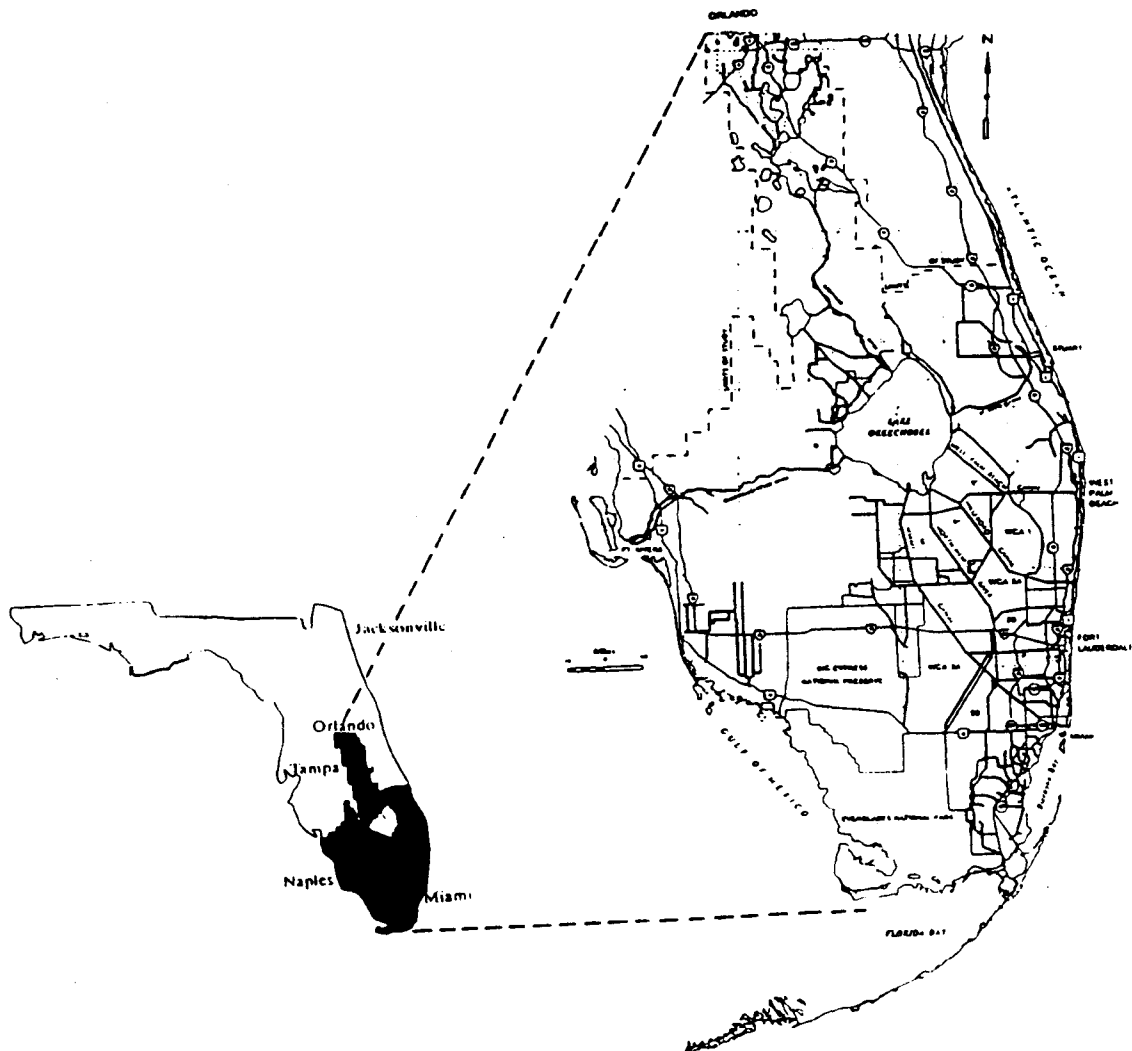


CENTRAL AND SOUTHERN FLORIDA PROJECT

PROJECT STUDY PLAN

DRAFT VERSION 1.3

COMPREHENSIVE REVIEW STUDY including WATER PRESERVE AREAS



MAY 1995



US Army Corps
of Engineers
Jacksonville District



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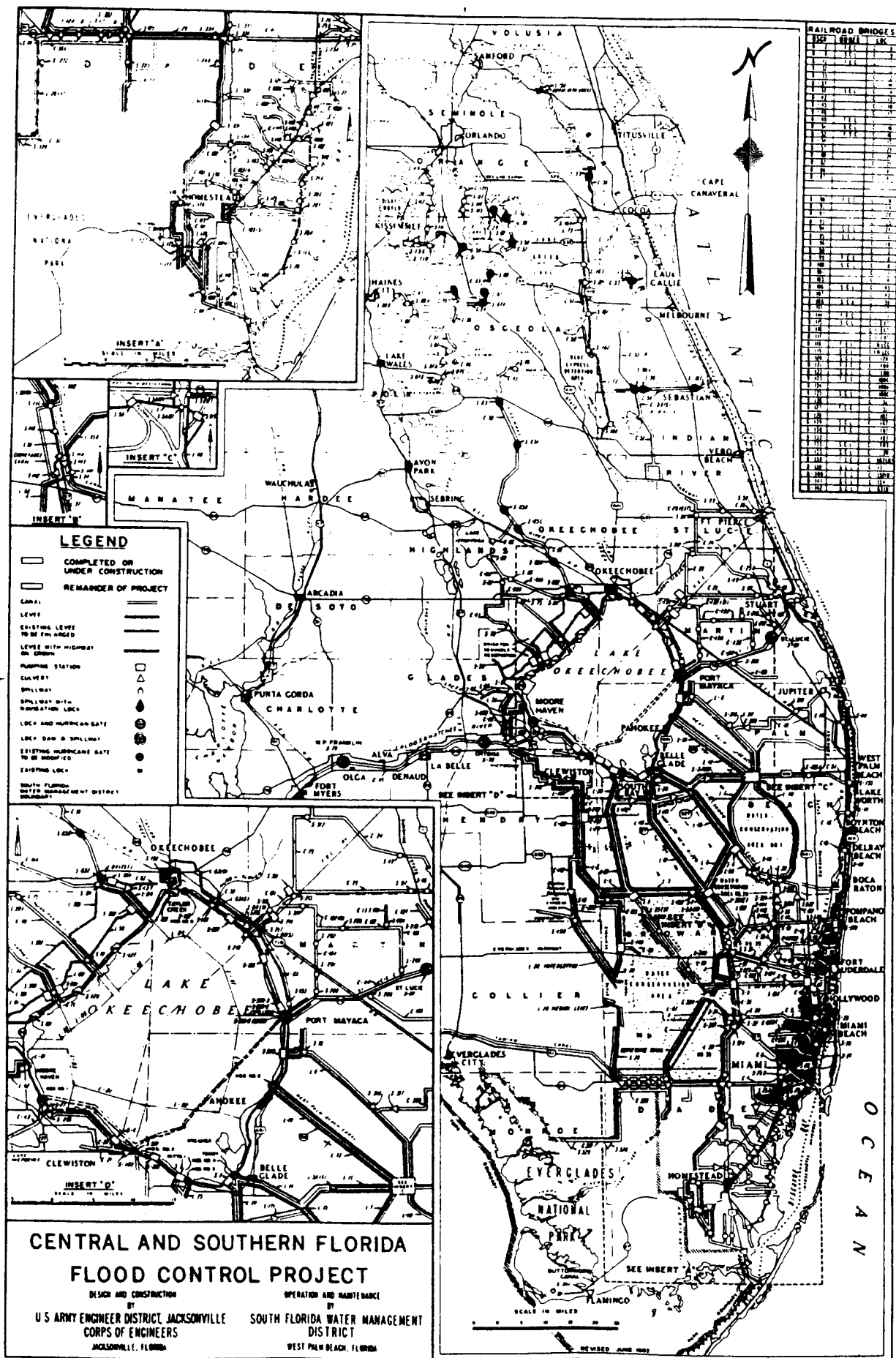


FIGURE 1

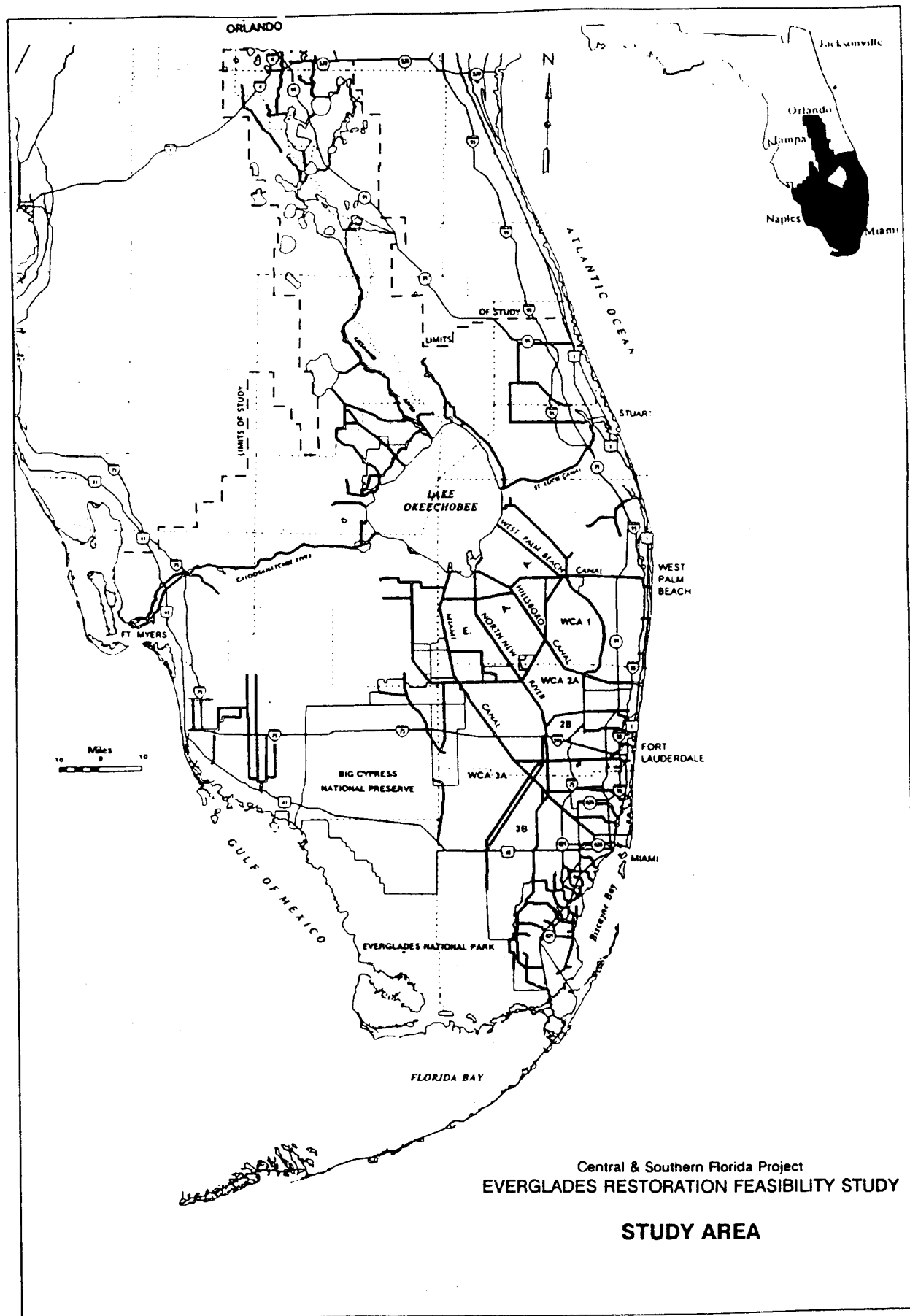


FIGURE 2

Although the implementation strategy presented in the *Reconnaissance Report* identified Everglades Restoration and Water Preserve Areas as separable projects, the studies have been combined to tie the Water Preserve Areas into the development of the comprehensive Everglades restoration plan. The detailed design and operation studies necessary for the Water Preserve Areas are included in this study scope.

Therefore, the purpose of this study is two-fold: first, the study will develop an overall C&SF Project comprehensive plan with particular attention to features specific to Lake Okeechobee, Everglades Agricultural Area, Water Conservation Areas, Everglades National Park, Big Cypress National Preserve, and Native American tribal lands and the tools necessary to evaluate the effects of this plan; and second, the study will investigate with greater detail the Water Preserve Area feature to determine the feasibility of implementing this portion of the project as the first phase of Everglades restoration. Further, this feasibility study will provide a critical link to measuring system-wide effects of the other separable elements to be evaluated in future feasibility studies.

DECISION/STUDY MANAGEMENT APPROACH

Because of the public, political and media interest in the restoration of the south Florida ecosystem, the process to be used to accomplish this study was considered carefully. At the inception of this study, it was recognized that a "not business as usual" approach is needed to successfully manage and accomplish a system-wide study that addresses all of the water resource opportunities.

STUDY TEAM

Accomplishment of the this feasibility study will be primarily the responsibility of the Corps, Jacksonville District, and the non-Federal cost sharing partner, the South Florida Water Management District (SFWMD). The study team will consist of an inter-disciplinary/inter-agency professional staff drawn from the technical disciplines necessary to accomplish the study.

As in the reconnaissance phase, a multi-agency approach will be used to staff the study team due to the complexity of the problems to be considered and the continued desire to utilize the skills of specialists in other agencies. Multi-agency staffing will be essential to facilitate the flow of needed information among agencies, and, more importantly, to achieve approval and ownership by the key public agency stakeholders. This multi-agency approach also fits into the cooperative spirit fostered by the Federal Interagency Task Force discussed in the following paragraphs. The study team will include personnel from other Federal agencies such as the National Park Service (NPS), the Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the United States Geologic Survey (USGS), and the Environmental Protection Agency (EPA). State agency participation will include the Florida Game and Fresh Water Fish Commission (FGFWFC) and the Florida Department of Environmental Protection (DEP). Team members from these agencies will be invited to act as full-time participants in the feasibility study effort.

At the regional level, the Corps' South Atlantic Division will involve the regional level Federal offices of the Fish and Wildlife Service, the National Park Service, the National Marine Fisheries Service, the Environmental Protection Agency, the Department of Transportation, and the Natural Resources Conservation Service (formerly the Soil Conservation Service). The state of Florida will also be a part of this regional level group. The regional group will focus on coordinating resources, facilitating staff coordination, expediting regional review of study products, and resolving priority competition. Study

progress will be reported to the regional level management group on a regular basis throughout the study period by the Jacksonville District and the SFWMD.

COORDINATION AND PUBLIC INVOLVEMENT

The complexity, scope, and widespread agency and public interest in this study requires an approach that will provide all interests including the Corps' higher authority and the SFWMD's Governing Board, with opportunities to provide oversight and input at the local, regional, and national levels. To facilitate consistent and effective communication between the Corps and SFWMD, an Executive Committee will be formed as required by the Feasibility Cost Sharing Agreement (FCSA). This Committee will make recommendations to include suggestions to avoid potential sources of dispute. In addition to the local and regional interests represented by the SFWMD, the study's progress and decisions will be coordinated with local, state and other Federal interests. This will be accomplished through coordination with the Interagency South Florida Ecosystem Restoration Task Force and associated Working Groups and Sub-groups; the Governor's Commission for a Sustainable South Florida; and a proposed C&SF Project Advisory Committee chartered in accordance with the Federal Advisory Committee Act; as well as all other interested parties.

Federal Task Force

The Washington-level Interagency Task Force, known as the Interagency South Florida Ecosystem Restoration Task Force, was established with the signing of a Memorandum of Agreement (MOA) by the Department of the Interior, Department of Commerce, Department of Justice, Department of Agriculture, Department of the Army, and the Environmental Protection Agency on September 23, 1993. The Agreement established the Task Force to:

"coordinate the development of consistent policies, strategies, plans, programs, and priorities for addressing the environmental concerns of the South Florida Ecosystem".

The Task Force established a field-level Interagency Management and Coordination Working Group (known as the South Florida Working Group or the Interagency Working Group), consisting of Florida-based representatives of the same six Federal agencies. Their purpose is:

"to coordinate policies and programs which affect the South Florida Ecosystem and to further effective implementation of coordinated policies, strategies, programs, and initiatives."

Study progress and decisions will be coordinated with local, state and other Federal interests as well as all other interested parties through the Interagency Working Group. The Sub-Groups of the Working Group will be utilized throughout the study process to define restoration criteria and peer review certain products produced by the study team.

Governor's Commission for a Sustainable South Florida

In March 1994, Governor Lawton Chiles established the Governor's Commission for a Sustainable South Florida to recommend strategies for ensuring the long-term compatibility of a strong south Florida economy and a healthy Everglades ecosystem, and to improve the coordination of both public and private sector activities. This forty member commission consists of business, agriculture, government, public interest, and environmental organization representatives. A number of Federal agencies are represented on the Commission as non-voting members. The study's progress and decisions will be coordinated with the Commission.

Proposed Advisory Committee

An Advisory Committee for Technical Considerations Associated with Resolution and Management of the Central and Southern Florida Project chartered in accordance with Federal Advisory Committee Act is presently being proposed by the Corps. The Federal advisory committee is needed to bring all interested parties to the table as the Corps proceeds with the modification of the C&SF Project. The advisory committee will assist the Corps in carrying out a variety of congressional mandates with regard to the Central and Southern Florida Project. This committee and appropriate subcommittees will engage in a collaborative process to suggest consensus recommendations on technical considerations to be taken into account during the study.

General Public

Involving the general public is a critical component of the study effort. Public involvement will require extensive coordination with the public, elected officials, local political jurisdictions, special interests, and other agencies to obtain their input for the study. Three goals for public involvement have been identified:

- (1) gather input from the diverse groups outside of the study team to assist in problem definition and identification of opportunities and potential solutions;

(2) develop relationships critical to the success of the study and the implementation of the recommendations of the study;

(3) manage expectations within a dynamic and charged atmosphere with widespread public interest about the ecological health of the Everglades and Florida Bay, which is complicated because of a lack of awareness about the Corps study process and the requirements for the study to meet Federal standards, such as including the public in the process, formulating alternative plans, assessing impacts, and estimating costs.

STUDY SCOPE

This feasibility study is the first of many to be conducted as part of the C&SF Project Comprehensive Review Study. The purpose of this study will be to develop an initial comprehensive plan for the overall C&SF system, and the tools necessary to evaluate separable and incremental portions of the project. Additionally, this study will focus on the first increment (phase) of the Everglades restoration portion of the Comprehensive Review Study. The end-product of this feasibility study will be an interim feasibility report with an integrated Environmental Impact Statement (EIS) that will serve as the basis for obtaining Congressional authorization of the first phase of a comprehensive Everglades restoration plan. The schedule to complete this feasibility study is 6 years.

This study will include additional hydrologic modeling, environmental modeling, water quality analyses, and water supply studies to refine the *Reconnaissance Report's* plan formulation and evaluation to identify an initial comprehensive plan C&SF Project and a more specific plan for the first phase of Everglades restoration. The study effort will identify the most plausible beneficial alternative plan components for Everglades restoration, as well as how the components should be phased for maximum benefit consistent with a cost effective incremental analysis. The report will identify potential cost effective increments that will be optimized so that when the last increment can not be justified, the project is complete. The feasibility report will identify a comprehensive plan for the C&SF Project and an adaptive Everglades restoration implementation strategy based on monitoring, evaluation and modeling. Because the level of detail for the comprehensive plan will not be sufficient to proceed directly with detailed engineering design, it is assumed that more refined plan formulation will be conducted during multiple, sequential studies to follow for specific features based on the optimization of incremental elements. A scope-of-work in Code-of-Account format is presented in Appendix A.

ALTERNATIVE PLANS

The *Reconnaissance Report* identified the important components to achieve restoration throughout the system. However, the best combination of components, and subsequent optimization, was not completed as part of the reconnaissance study. Further, water supply and water quality planning objectives were not fully evaluated during the reconnaissance phase.

Therefore, additional studies are needed to define these problems and develop alternative plans that better incorporate solutions to these planning objectives.

The major components to be carried forward from the reconnaissance phase include: alternatives for conveying water through the Everglades Agricultural Area such as flowways, canal enlargements, and modified ground water levels to control soil subsidence; water storage in the Everglades headwaters to include Lake Okeechobee, the Everglades Agricultural Area, the Water Conservation Areas, and Water Preserve Areas; alternatives to reduce community fragmentation within natural areas; and alternative operational schedules for Lake Okeechobee and Water Conservation Areas. Additional alternatives will be investigated to address the planning objectives identified during the reconnaissance phase to include water supply, water quality, and improved freshwater flows to Florida Bay.

The reconnaissance phase of the C&SF Project Review Study identified the need to return historic runoff to the Everglades hydrologic system. Concepts were investigated to capture and store excess surface waters by backpumping surface water that is normally released to tide via the C&SF Project canal system to "Water Preserve Areas". These water preserve areas may serve a number of objectives to include increased short hydroperiod wetlands and improved water supply. The reconnaissance phase of the C&SF Project Review Study clearly demonstrated that this component would be part of any Everglades ecosystem restoration plan.

The existing C&SF Project was designed to provide regional water supply for the study area. Consequently, alternatives developed for this feasibility study should include water supply features to help meet identified needs. The SFWMD Lower East Coast Regional Water Supply Study team has developed a list of 79 options or potential features to be evaluated in their study effort. The list includes items such as modifying water deliveries and regulation schedules for the Water Conservation Areas, Everglades National Park, and Lake Okeechobee, various aquifer storage and recovery applications, canal conveyance improvements, a variety of east coast buffer strip alternatives, water conservation measures, and some other concepts including seepage barriers or curtain walls. Features related to the C&SF Project that are consistent with restoration objectives will be further evaluated as part of the plan formulation process during this feasibility study.

STUDY PROCESS

The feasibility study process consists of a series of steps that identifies and responds to problems and opportunities associated with the study

objectives and specific Federal, state and local concerns, and culminates in the selection of a recommended plan. This process involves an orderly and systematic approach to making determinations and decisions at each step so that the interested public and decision makers are fully aware of the basic assumptions employed, the data and information analyzed, the areas of risk and uncertainty, the reasons and rationales used and the significant implications of each alternative plan. Table 1 summarizes the study process and general activities to be accomplished in this feasibility study.

Table 1
Study Process and General Activities

STEP 1 PROBLEM IDENTIFICATION	PLAN FORMULATION		STEP 4 DETAILED ENGINEERING DESIGN
	STEP 2 INITIAL SCREENING	STEP 3 IDENTIFY COMPREHENSIVE PLAN	
Scoping Objectives/Constraints Inventory/Forecasting Initial Plan Formulation Develop Criteria for Project Features Monitoring Plan Data Collection Model Development Public Workshops	Optimize Separable Features Real Estate Requirements Project Costs Screen Alternatives Select Final Alternatives Continue Model Development Public Workshops	Engineering Design Real Estate Requirements Project Costs Alternative Evaluation Environmental Outputs Flood Control Water Supply Water Quality Incremental Analysis Select Comprehensive Plan Public Workshops	Implementation Strategy Scope Further Studies Detailed Engineering Design for WPAs Detailed Cost Estimate Cost Allocation Financial Analysis Report Preparation Project Management Plan Report Review Public Workshops

Step 1 - Problem Identification

Initial study efforts will involve problem identification and the identification of planning objectives and constraints. This effort will essentially refine the problem identification effort performed for the reconnaissance study. As part of this effort, public concerns are identified, technical analysis are conducted to investigate the public and scientific concerns and the planning objectives and constraints are developed. Using the planning objectives and constraints as a guide, a range of alternatives will be developed to the solve problems that have been identified. Plan formulation is a dynamic process with various steps that can be iterated one or more times. The alternative plans will become more refined through additional development and through subsequent iterations. The iteration process that occurs in following phases of the study will sharpen the planning focus and will provide an opportunity to identify additional alternative plans.

This step also includes an inventory, forecast and analysis of conditions within the study area relevant to the identified problems and opportunities. Also included in this effort is the identification of data needs, data collection and the development of models to be used in the subsequent analysis of plan alternatives.

Step 2 - Initial Screening of Alternatives

Initial alternative plan screening efforts in the feasibility study will evaluate the plan components, and alternate combinations of these components, identify a system-wide C&SF Project comprehensive plan and to optimize the Everglades restoration components of the plan. Individual features, or combinations of features, will be evaluated as increments to segregate the effects of the features and to optimize their effectiveness for providing system needs. The features will then be combined to form comprehensive restoration plans for system-wide evaluation.

The object oriented modeling approach developed during the reconnaissance study to measure hydrologic responses to alternative plans will be improved and used as a screening tool for this purpose. The modifications to the object oriented models to improve their usefulness, such as the connection to the Everglades Landscape Model (ELM) or Everglades National Park Management Model (1X1), will be developed. Modifications to the River of Grass Environmental Methodology (ROGEM), to improve its usefulness to measure environmental responses for alternative restoration plans will also be developed during the feasibility study. The initial screening process will include assigning social values to the plans using technical information gathered for comparison of plan alternatives. Through this analysis and public workshops, the plans will be screened to identify the most viable components for more detailed study.

Step 3 - Identify Comprehensive Plan

Following completion of the initial screening, the array of alternatives will be narrowed and considered in more detail as the study progresses. Based on the initial screening, the most plausible beneficial alternative plan components will be grouped for maximum benefit. Computer modeling at a greater level of accuracy than the initial screening will be used for more detailed design and environmental output evaluation purposes. Additional hydrologic model development, environmental model development, water quality analyses, and water supply analyses will be required to refine plan formulation and evaluation in identification of a comprehensive Everglades restoration plan. Cost effectiveness and incremental cost analysis will be used to compare different outputs resulting from the various levels of expenditures.

This effort will identify the plan which provides the maximum benefits and results in a recommended comprehensive plan for Everglades restoration.

Step 4 - Detailed Engineering Design and Report Preparation

The study will develop an adaptive implementation strategy for implementation of the comprehensive C&SF Project plan. This strategy will recognize that after restoration measures are implemented and monitored, feedback based on new insights gained on the response of the ecosystem will require that sequential adjustments be made to the project and future elements. Then, scopes for additional studies will be developed for other features of the comprehensive plan.

This step in the study will also include detailed engineering design of the Water Preserve Area features at a level of detail sufficient to obtain Congressional authorization for construction.

The results of this feasibility study will be documented in an interim feasibility report with an integrated EIS. The report will identify a comprehensive plan and an incremental process for its implementation. The report will clearly identify potential cost effective increments that will be optimized so that when the last increment can not be justified, the project is complete. Because the level of detail will not be sufficient to proceed directly with detailed engineering design of features other than the Water Preserve Areas, it is assumed that more refined plan formulation will be conducted during multiple, sequential studies will follow based on the optimization of incremental elements.

During this step, the a draft report and associated draft Environmental Impact Statement (EIS), will be released for official public, state and other agency comment. The final feasibility report will incorporate any changes necessary to respond to comments received during the review period. Finally, the feasibility report review process involves the submittal, assessment, and processing of the report to Congress. Non-Federal representatives on the study team and the study Executive Committee continue to participate in the decision-making process during the review process.

LEVEL OF DETAIL

The purpose of the feasibility phase is to ensure the timely and economical completion of a quality feasibility report that is expected to recommend the first phase of an implementable solution to the water resources problems of south Florida and particularly the Everglades. The report will be

a complete decision making document that will: 1) present study results and findings; 2) indicate compliance with applicable statutes, executive orders and policies; and 3) provide a sound and documented basis for decision makers at all levels to judge the recommended solutions.

Due to the geographic extent of the study area and the need to complete this study in a timely fashion, the level of detail will not be sufficient to proceed directly into detailed engineering design for the entire comprehensive plan. However, the comprehensive plan will be of sufficient detail for decision makers to understand the connection of the Water Preserve Area in relation to rest of the project. The studies conducted will support a reasonable baseline cost estimate for the Water Preserve Areas that can be presented to Congress for authorization. Other components or features of the comprehensive plan will require further study and additional evaluation before proceeding into the plans and specifications phase of project development. Further, some work items, particularly computer modeling efforts will be initiated during the feasibility phase in support of the later preconstruction engineering and design phase.

The focus of the work to be conducted during the feasibility phase is in support of the plan formulation process to establish project features, and a methodology for implementing these features. The technical effort (i.e., environmental, engineering, real estate, etc.) will typically include: assessing available data; collecting necessary new data; developing assumptions; conducting preliminary analysis and conveying data in support of other technical elements; refining the analysis; and preparing documentation in support of recommended plan(s). Based on this approach, the technical aspects of the feasibility studies will be developed to the level necessary to produce a reasonable baseline cost estimate within which the Water Preserve Areas can be designed and constructed.

STUDY COST AND SCHEDULE

The schedule to complete this feasibility study is 6 years. The feasibility study starts with the execution of the Feasibility Cost Sharing Agreement (FCSA) and concludes with the issuance of the U.S. Army Corps of Engineers, Division Commander's Public Notice. This public notice announces completion of the feasibility report and provides for a 30-day comment period on the report.

STUDY COST ACCOUNTING

All study tasks, including in-kind services provided by the SFWMD, will be organized in a "Code of Accounts" format as required by Corps' *ER 1105-2-100* and described in *EC 1110-2-538*. The use of the standardized code of accounts is required for accounting and administrative purposes. Cost Code 22 is the section of the code of accounts dedicated to feasibility studies. This cost code has been broken down into a series of sub-accounts for project activities to be accomplished during the feasibility study phase. In general, the sub-accounts relate to activities performed by a specific technical or administrative work element for each account code.

LOCAL SPONSORSHIP

The South Florida Water Management District (SFWMD) has agreed to cost share in this study with the U.S. Army Corps of Engineers and will provide both cash and in-kind services as described in this document. The value of in-kind services described in this document will be fixed fee amounts. This value and resulting credit against the study cost was determined during the negotiations of this scope of work based on a cost estimate prepared by the Corps and the SFWMD proposal. The in-kind services will be performed in accordance with the schedules and narrative descriptions included in the Project Study Plan (PSP). Acceptance of the in-kind service products will be the responsibility of the Corps of Engineers, Jacksonville District. In accordance with *CESAJ SOP 1105-1-1, Establishing Work-In-Kind Prices in Feasibility Cost Sharing Agreements*, dated 25 January 1995, the amount credited will be established at the fixed fee price negotiated for each work item.

STUDY COST ESTIMATE

The total estimated cost of this study is \$18.4 million, in 1995 price levels. This estimate is the "baseline" estimate, and does not account for future price escalation. However, price escalation may occur during the feasibility study. A full funded estimate, reflecting anticipated price escalation based on standardized future escalation factors from the Office of Management and Budget, also has been developed to identify projected study costs. Both the baseline cost estimate and the full funded estimate are summarized in Table 2 and presented in greater detail in Appendix C.

STUDY SCHEDULE

The study schedule and related milestones are developed to provide study managers, project managers, and the Executive Committee a means of assessing study progress. The schedule was developed by entering a multitude of individual, yet interconnected activities, information about the activities, and logical relationships between the activities into a project management software package. This information was then processed to create the scheduled start and finish dates for the activities. Appendix D contains a Gantt-style chart summarizing activities for the study. Table 3 displays major milestones and the associated scheduled completion date.

SCHEDULE AND COST CHANGES

Throughout the study process, the schedule developed for the Project Study Plan (PSP) will likely require adjustments to ensure the project stays on schedule and within budget. While the project will be managed, insofar as possible, to comply with the schedule developed for the PSP and within the currently estimated cost, it is inevitable that changes will be necessary.

Schedule Change Authority

The Corps project manager in collaboration with the SFWMD project manager is authorized to revise project schedules that do not impact the major milestones outlined above. Changes which extend major milestone activities require approval of the Corps' South Atlantic Division Project Review Board (PRB). Any changes which would extend the completion dates of the feasibility phase completion beyond the completion dates of the current approved estimate must be submitted to the South Atlantic Division office with a Schedule and Cost Change Request (SACCR).

Table 2
Study Cost Estimate
(\$1,000)

COST CODE	DESCRIPTION	TOTAL COST	FISCAL YEARS							
			FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02
22A	Public Involvement	819.6	50.7	115.3	137.6	125.1	108.5	109.1	128.8	44.5
22B	Institutional Studies	13.1	0.0	0.0	0.0	0.0	0.0	7.8	5.3	0.0
22C	Social Studies	113.0	0.0	0.0	9.0	38.9	57.6	7.5	0.0	0.0
22D	Cultural Resource Studies	96.6	0.0	2.0	8.7	12.6	54.3	15.4	3.6	0.0
22E	Environmental Studies	3,373.6	96.1	694.0	799.4	659.4	783.6	196.2	128.9	16.0
22F	Fish and Wildlife Studies	252.6	0.0	6.1	28.9	59.3	43.5	43.4	71.4	0.0
22G	Economic Studies	602.2	6.6	86.4	182.3	144.2	149.9	32.8	0.0	0.0
22H	Real Estate Analyses	563.4	10.2	84.2	278.7	41.7	100.9	38.9	8.8	0.0
22J	Hydrology and Hydraulic Studies	5,557.7	189.1	1,353.1	1,616.4	1,134.5	806.1	329.1	129.4	0.0
22K	Geotechnical Studies	994.2	5.3	51.7	15.8	24.9	16.3	745.2	135.0	0.0
22L	HTRW Assessments	76.0	0.0	10.3	25.1	12.2	19.9	6.2	2.3	0.0
22M	Monitoring	814.8	3.9	37.0	110.7	145.9	274.2	231.8	7.8	3.5
22N	Surveys and Mapping	2,677.2	26.0	2,064.3	197.9	197.9	124.5	54.4	12.2	0.0
22P	Design/Project Cost Estimates	1,159.7	0.0	0.0	284.6	11.7	260.4	145.0	458.0	0.0
22Q	Planning Technical Management	504.3	5.3	65.4	71.6	83.7	71.7	71.8	88.9	45.9
22R	Plan Formulation and Evaluation	283.5	0.0	156.0	0.0	53.0	1.8	51.0	21.7	0.0
22S	Feasibility Report Preparation	145.0	0.0	0.0	0.0	0.0	0.0	0.0	109.5	35.5
22T	Programs and Project Management	372.5	0.0	48.9	53.6	53.6	53.6	63.8	66.0	33.0
22Y	Washington Level Review	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
TOTALS - BASELINE		18,469.0	393.2	4,774.7	3,820.3	2,798.6	2,926.8	2,149.4	1,377.6	228.4
OMB INFLATION FACTORS		—	1.0	1.03	1.031	1.063	1.096	1.13	1.165	1.201
FULLY FUNDED ESTIMATE		19,740.3	393.2	4,917.9	3,938.7	2,974.9	3,207.8	2,428.8	1,604.9	274.3
SPONSOR IN-KIND SERVICE		5,440.1	172.0	1,075.5	1,095.4	1,154.0	1,173.2	484.7	185.0	100.3
SPONSOR CASH SHARE		4,430.3	24.6	1,383.5	874.0	333.5	430.7	729.7	617.5	36.9
FEDERAL BUDGET (Federal Appropriations plus Sponsor Cash)		14,300.7	221.2	3,842.5	2,843.4	1,821.0	2,034.6	1,944.1	1,420.0	174.1

**Table 3
Milestones**

ACTIVITY	SCHEDULED COMPLETION DATE
Initiate Feasibility Study	7/95
Problem Identification Complete	5/96
Initial Screening Complete	12/97
Final Screening and Comprehensive Plan Selected	4/00
South Atlantic Division Commander Releases Public Notice	12/01

Cost Change Authority

Any cost modification which increases a study work item by 15% or less may be approved by the Corps project manager in collaboration with the SFWMD Project Manager. Study cost modifications which increase a study work item by more than 15% must be approved by the Executive Committee specified in the Feasibility Cost Sharing Agreement (FCSA). Any increase in the total study cost will require an amendment to the FCSA.

APPENDIX A
DETAILED SCOPE OF WORK

DRAFT May 2, 1995

22A - PUBLIC INVOLVEMENT

Due to the high public, political and media interest in the restoration of the south Florida ecosystem, public involvement is a critical component of the study effort. For the *Everglades Restoration Feasibility Study*, three goals for public involvement have been identified:

- (1) gather input from the diverse groups outside of the Corps of Engineers (Corps) to assist the study team in the problem definition and identifying opportunities and potential solutions;
- (2) develop relationships critical to the success of the study and the implementation of study recommendations;
- (3) manage expectations within a dynamic and charged atmosphere with widespread public interest about the ecological health of the Everglades and Florida Bay, which is complicated because of a lack of awareness about the Corps study process and the requirements for the study to meet Federal standards, such as including the public in the process, formulating alternative plans, assessing impacts, and estimating costs.

Public Involvement Plan - Develop an overall plan for public involvement to include all elements available to focus on communication efforts provide information to and solicit information from the public and to provide feedback to the public on how the information was used. The framework for the public involvement strategy must include:

- Public Input/Information
- Internal Audiences
- Media
- Outreach
- Partnering

These activities will culminate in a feasibility report which successfully reflects public concerns and ideas in the problem identification, plan formulation, and recommendations. The design for public involvement should be based on identified issues, agencies, groups, and individuals critical to the success of the study. The recommended activities should address three general purposes of the public involvement program: to gather information, maintain relationships and manage expectations. The design of the strategy will integrate the

traditional public affairs activities and audiences into an overall public involvement effort.

The framework for the strategy will be developed from input and assistance from a Public Involvement Technical Input Group made up of representatives from various agencies who work on a day-to-day basis with many other agencies, interest groups, the media and individuals in the south Florida area. The effort may undergo a formal peer review by other professionals in the public involvement field, as well as ongoing evaluation by those involved in the process.

PUBLIC INPUT/INFORMATION

This activity is the traditional heart of the Corps public involvement process in which information is gathered from and given to the public.

Public Workshops

This activity will consist of four rounds (of six meetings each) of workshops to gather information as well as to provide feedback to the public. The workshops should be scheduled such that they occur approximately once a year to foster interest in the study.

Public Workshop #1 - The first public workshop will be conducted at the beginning of the feasibility study. The purpose of this workshop will be to present the conclusions of the reconnaissance phase, to present the purpose and scope of the feasibility phase, and to solicit input for the purpose of scoping as required by *National Environmental Policy Act (NEPA)* to identify important resources, problems, and opportunities.

Public Workshop #2 - The second public workshop will be conducted at the end of the first year of the feasibility study. The workshop will present the initial array of alternative plans to be evaluated. The workshop could also include economic development opportunities connected with ecosystem restoration and water supply.

Public Workshop #3 - The third public workshop will be conducted to educate the public on technical aspects of the study. The workshop will provide an opportunity for the public to comment on technical issues. This workshop will be held during the initial alternative screening phase of the study.

Public Workshop #4 - The fourth public workshop will be conducted as part of the initial screening process and will present a summary of the

initial evaluation of alternative plans and the potential array of plans that will receive further evaluation at a greater level of accuracy.

Public Workshop #5 - The fifth public workshop will also be conducted to educate the public on technical aspects of the study. The workshop will provide an opportunity for the public to comment on technical issues. This workshop will be held during the final alternative analysis phase of the study.

Public Workshop #6 - The sixth public workshop will be conducted upon completion of the final alternatives analysis and will present a summary of the final alternative evaluation. The workshop will also present the design and operational alternatives to be evaluated in detail for the Water Preserve Areas.

Public Workshop #7 - The last workshop will take place in conjunction with release of the draft feasibility report and will include preliminary study conclusions.

Community Meetings

Throughout the duration of the study, ample opportunities will be developed for the public to get information outside of formal public workshops. Civic associations, neighborhood associations, universities and environmental groups located in areas that may be impacted by plan alternatives will provide venues for the study team to provide information to the public and enhance community awareness and community support. Public affairs staff will be assigned with the preparation of presentations to be used for these purposes. Staff assigned to this task will be kept abreast of study progress and issues and make revisions to the presentations as necessary. It is expected that these presentations will be modified annually, however, when study progress or issues dictate, all tools developed for these presentations will be reviewed and revised as necessary.

Publications

At opportune times throughout the study, newsletters and other information pieces will be developed to provide feedback to the public.

Review Study News - Approximately five issues of the *Review Study News* will be published using a format similar to the newsletters published during the reconnaissance phase (30-40 pages of text, tables, figures, and maps). The Review Study News and other publications will be

incorporated into the INTERNET system to facilitate greater public access to brief informative documents. The *Review Study News* will also be published at a greater frequency under the purview of other C&SF feasibility studies.

Publications - Other publications will include public notices identifying purpose and location of the workshops, fact sheets describing study progress, and public information brochures. In addition, regular submissions to the South Florida Water Management District's monthly publications will be developed. Once special articles have been written, they can be placed in the newsletters and newspapers of local environmental groups and civic associations when appropriate.

To estimate costs of printing and mailing, it is assumed the general mailing list will not exceed 7,500.

Internal Audiences

Much public opinion is shaped by the interested public talking to a local "expert", for example, an employee from the Corps, South Florida Water Management District (SFWMD), or another agency. This activity of the public involvement plan relies on and supplements the public affairs internal information activities. These employees are valuable sources of information who can serve as community experts to discuss ongoing study progress.

C&SF Feasibility Study Update - The *C&SF Feasibility Study Update*, a monthly publication produced by the study team, will provide management staff in various functional areas information on the progress of the study. The *Study Update* will list activities from the past month and upcoming scheduled events.

Quarterly C&SF Study Update Briefings - The study team will host study update briefings for others in the Corps' Jacksonville office and SFWMD offices.

Media

The overall public involvement strategy must include a media plan for the study. The media not only offers a valuable resource for providing information to the public, but is a resource for providing information to the planning process.

News Releases - News releases will be issued at the beginning of the study and prior to the various workshops to provide an opportunity to hold discussions with interested media representatives and explain the purpose and strategy for addressing the study objectives. It is assumed that the study will receive significant media coverage, both in local and national media.

Media Opportunities - The media will be invited to meet with the study team to discuss various aspects of the study in-depth. Media tours will also be arranged prior to any significant actions as a source of educating the media on the complexities of the system. Ample opportunities will be available to the media to be briefed in their own area with an emphasis on concerns and issues relative to their audience. When appropriate to the study process, special in-depth programs with local radio and television stations will be developed to ensure ample media opportunities and accurate coverage of the study. Due to the emphasis on local environmental issues, relationships with public radio and television stations in the South Florida market should be developed early in the study. The development of a broadcast quality video to examine the project in lay person's terms and addressing the questions and concerns of the general public could be produced and broadcast on public television. Once the program has aired, duplicates will be distributed to schools, and an edited version could be used at community meetings and distributed to schools and interested community groups.

Visits to editorial boards, appearances on major public affairs programming as well as the development of guest editorials will be part of the campaign to reach the public through media outlets. As necessary, the District Engineer will participate in Editorial Boards. This will provide an opportunity to further develop the public's understanding of the Corps process.

Outreach

The outreach activity will target specific groups of the public to promote long-term relationships and understanding of the results of the feasibility report. This activity involves coordination and preparation of meetings, workshops, and written correspondence with interests outside the Corps and SFWMD.

Federal Task Force Meetings - Federal agencies involved in the south Florida ecosystem are represented on the South Florida Ecosystem Restoration Task Force. These Federal agencies included the

Departments of Interior, Commerce, Army, Justice, and Agriculture, and the Environmental Protection Agency. The Task Force established a local-level "Working Group" consisting of Florida-based representatives of the same six Federal agencies. The study team will continue participating in monthly workshops conducted by the Working Group to ensure effective implementation of Federal policies, strategies, programs, and initiatives.

Governor's Commission for a Sustainable South Florida Meetings - This Commission was established to recommend strategies for long-term compatibility of a strong economy and a healthy ecosystem. It consists of 40 members from business, agriculture, government, public interests, and environmental organization representatives. The C&SF review study will play a major role in recommendations from this commission and, therefore, study team participation in future meetings and workshops is critical. It is assumed that the monthly meetings will continue throughout the study effort.

Federal Advisory Committee Meetings - This activity also includes development of a Federal Advisory Committee (FAC) that could be organized under the Federal Advisory Committee Act to solicit participation of key stakeholders. The development of this committee and associated activities necessary to prepare, conduct and document workshops and meetings is included in this activity.

Partnering

Partnering is a process of frank and open discussion on expectations and requirements which will shape the coordination, participation and decision-making process.

Partnering Workshop - A workshop will be held after study team members have been identified by the Corps, SFWMD, and other state and Federal agencies that have decision-making responsibility for implementing a recommended plan. This workshop will lay the foundation for better working relations on the staff level to include better dispute resolution. This team building workshop will help foster an atmosphere of trust and candor in communications and promote achievement of mutually beneficial goals.

Extended Partnering Meetings - Due to the extensive number of stakeholders involved in this study, some partnering beyond the immediate study team is necessary. Within the Corps, the study team

will meet with counterparts in Division and Headquarters periodically and invite participation in various workshops and discussions on issues. The study team will also meet and exchange information with various representatives of the SFWMD including members of the Governing Board, senior staff, and the Lower East Coast Water Supply Study Team. The study team will brief the SFWMD's Governing Board, in session, several times during the course of the study. Senior staff from other Federal Agencies such as the National Park Service and the U. S. Fish and Wildlife Service will receive on-going briefings on the study's progress.

22B - INSTITUTIONAL STUDIES

The purpose of this activity is to establish the South Florida Water Management District's (SFWMD) capability to finance their portion of the project costs. This activity will begin after the Corps of Engineers (Corps) has completed cost allocations and a funding schedule by fiscal year for Preconstruction Engineering and Design (PED) and construction phases of the project. Based on the funding schedule, the sponsor will develop a financing plan that reflects how they intend to meet their financial commitment.

Preliminary Financing Plan - The SFWMD will prepare a preliminary financing plan for the non-federal share of the project costs and a statement of financial capability in accordance with *ER 1105-2-100*. The statement of financial capability must be a clear and convincing description of the sponsor's capability to meet its financial obligations for the project in accordance with the project funding schedule.

Assessment of Capability - The Corps will evaluate the SFWMD's financial capability for project construction and capabilities for post-construction obligations relating to operation and maintenance, major repairs, and replacement to any project features. The Corps will be further required to evaluate the SFWMD's financing plan for construction of the project, which includes Government outlays, sponsor cash and credit contributions, and contributions for lands, easements, right-of-ways, relocations, and disposal areas (LERRD).

Identify Potential Impacts - The work will mostly be to estimate the social impact dimensions of alternative plans to be evaluated, especially for alternatives that involve land acquisition (i.e., displacement of people, business, and firms), although the social impacts of other benefit and cost effects may also be addressed.

22D - CULTURAL RESOURCES STUDIES

Cultural resource studies will include an evaluation of the impacts of the alternative plans upon historical, architectural, and archaeological resources. It is anticipated that various historic resources are present within the large study area, including National Register of Historic Places (National Register) sites, middens, and possibly burial sites. Extensive coordination with the Florida State Historic Preservation Office (SHPO) has occurred during previous studies within the study area. All studies will be coordinated with the SHPO in accordance with the *National Historic Preservation Act, as amended (PL 89-665)*, and the *Archeolgical and Historic Preservation Act, as amended (PL93-291)*. Cultural resources studies will begin with an intense literature survey of both resources and previous coordination of these studies with the SHPO. Such sites will be avoided whenever possible. If that is not possible a mitigation plan will be developed in consultation with the SHPO. Documentation will be submitted for review to the SHPO. An assessment of the impacts of the proposed project upon cultural resources will be prepared as part of the *National Environmental Policy Act (NEPA)* analysis. Costs attributable to work under this account include the effort required to prepare input for the preliminary draft, draft, and final reports, as well as participation in each of the required review conferences and resolution of comments as a result of the conferences.

Initial Assessment - Initial archaeological assessment, including cultural resources background literature and records check. During this activity a records check will be conducted to determine the extent of present knowledge of cultural resources in the project areas. Project areas will be visited to determine field conditions. This initial assessment will be completed prior to the Technical Review Conference (TRC).

Scope of Work - Prepare scope of work for Phase I archaeological reconnaissance. It is assumed for purposes of preparing this cost estimate that the Phase I report will be done by a separate contract.

Phase I Investigation - This work activity allows for a Phase I reconnaissance of those areas which the assessment identifies as requiring this level of investigation. This effort will be performed by contract.

Archaeological initial write-up - The results of the initial archaeological assessment will be documented for inclusion in the preliminary draft feasibility report.

This sub-account will be completed in accordance with the *National Environmental Policy Act (NEPA)* of 1969, as amended (91-190) and the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500 - 1508). The NEPA document will follow the format described in *ER 105 - 2 - 100, Chapter 7*.

Formal coordination with the State will occur at several points during the study to insure consistency with State programs, including the *State Coastal Zone Management Act (CZMA)*. It is anticipated that coordination will be accomplished by scoping and follow-up letters and subsequent meetings to insure state participation in the study process, plan development, and evaluation. Coordination with the State under the *Clean Water Act* will be required if material is placed within a wetland or waters of the United States. The *Clean Water Act* requires two actions, a 404(b)(1) evaluation and state water quality certification. The 404(b)(1) evaluation is a determination of the impacts of a proposed action on water quality and is typically included as an appendix to the EIS. The feasibility report will meet the requirements of *Section 404(r) of the Clean Water Act (Public Law 92-500, as amended)*; however, a tiered approach will be taken by a.) requesting a water quality certificate for work in the water preserve areas (for which detailed engineering and environmental studies will be available) and b.) requesting for other areas a State water quality certificate during later phases of the comprehensive project when detailed information is available. This tiered approach is necessary because application to the state for water quality certification requires detailed information which will not be available until more detailed engineering level designs are available.

The following activities are required to conduct an impact assessment as required by the *National Environmental Policy Act (NEPA)*:

Initiate Scoping - Initiate the necessary coordination with Federal, state, and local agencies and the public, including coordination needed for compliance with the NEPA.

Scoping Workshops - Meet with project partners regarding the scope of the environmental studies. Provide initial opportunities for the public and interested agencies to recommend environmental studies and issues to be addressed in the study efforts.

Modify Scope of Work - Add/delete/modify environmental study efforts following comments from previous activity.

Biological and Field Investigations - A literature search of environmental resources of the area will be conducted. Field

investigations of each project site will include inventory of habitats and species occurrence to determine existing conditions. All work will be accomplished in cooperation with the USFWS and FGFWFC and will be done in conjunction with field work to be performed by the FWS for the *Fish and Wildlife Coordination Act (FWCA)*.

Select Environmental Models (Review of ATLSS, etc.) - Select procedure(s) or models for use in quantifying beneficial environmental features. A modeling system called "Across-Trophic-Level System Simulation" (ATLSS) is being developed by the National Biological Service and several research institutions for application to South Florida restoration issues. Use of ATLSS models will be considered. ATLSS is under development for the freshwater areas of the Everglades and Big Cypress Swamp. The purpose of ATLSS is to analyze trophic dynamics of biotic components of the Everglades/Big Cypress Swamp region of south Florida in relation to landscape features and hydrology. The models will compare the future effects of alternate hydrologic conditions on the biotic components of the system. Due to varying scales at which trophic interactions occur, and the role of population structure and individual behavior for population prediction in higher trophic level animals, more than one model is under development. ATLSS, when complete, will consist of an integration of three types of models: (1) process models for lower trophic levels, including benthic insects, periphyton and zooplankton; (2) structured population models for five functional groups of fish and macroinvertebrates; and (3) individual-based models for large consumers, including wood storks, great blue herons, white ibis, American alligators, white-tailed deer, and the Florida panther. ATLSS models may be used to evaluate biotic responses to restoration alternatives.

Identify Impact Assessment Method - Meet with local sponsor, FWS, and FGFWFC to determine impact assessment method to be used to evaluate environmental responses to project alternatives in the Fish and Wildlife Coordination Act Report (CAR). Use of ATLSS models will be considered.

Initial Assessment - Evaluate project sites according to impact assessment method. All work will be done cooperatively with the USFWS and FGFWFC.

Input for Screening Alternatives - Conduct analysis to reduce project impacts with USFWS and FGFWFC and feed back into project design.

Biological Assessment - This work will include a review of information on species listed as threatened or endangered that may occur in the study area. A Biological Assessment (BA) will be prepared to address potential impacts to threatened and endangered species. Based on the information provided in the BA a determination will be made as to whether the proposed action may effect any listed species. If any listed species may be effected, then consultation with the FWS will be initiated and a Biological Opinion will be requested of the FWS. No funds are provided to the FWS for completion of a Biological Opinion.

Coastal Zone Management (CZM) Evaluation - Obtain technical information from engineering needed and complete Coastal Zone Management Act evaluation, including a determination of consistency in the EIS.

Water Quality Certification Permit Application - The application for water quality certification will be completed and submitted to the FDEP. This will be done pursuant to the *Florida Administrative Code 62-302 and Clean Water Act Section 401*.

404(b) Evaluation - Obtain excavation and fill volumes from engineering designs. Complete 404(b) evaluation and include in the EIS.

Aesthetic and Recreation Resource Analysis - An aesthetic and recreation resource analysis will be completed and will include a discussion of existing conditions, a comparative resources analysis of impacts of study alternatives and the selected plan, and a delineation of any mitigative design measures if needed.

Prepare for Technical Review Conference (TRC) - Prepare for and attend Technical Review Conference (TRC). Request USFWS and FGFWFC attendance.

Modify Studies Accordingly - Develop additional environmental studies to reflect TRC review comments.

Additional Environmental Sampling - Conduct additional environmental sampling following the Technical Review Conference and incorporate into impact assessment analysis.

Input for Final Alternatives - Identify additional beneficial environmental features and include in the final project design.

Preliminary Draft Environmental Impact Statement (EIS) - Complete preliminary Draft EIS (integrated with preliminary draft feasibility report) and forward to Corps South Atlantic Division (SAD) for review prior to the Feasibility Review Conference (FRC).

Prepare for Feasibility Review Conference - Environmental attendance of FRC. Request other Federal and state agencies to attend.

Respond to South Atlantic Division (SAD) Comments - Incorporate comments from South Atlantic Division review of preliminary draft report and Feasibility Review Conference into Draft EIS that accompanies the draft feasibility report.

Draft EIS - A draft EIS (integrated with the draft feasibility report) will be submitted by South Atlantic Division to Council on Environmental Quality (CEQ).

Comment Period for EIS - Respond to questions from agencies/public during review, respond to questions/inquiries from Corps Headquarters, and attend public meeting.

Respond to Comments - Revise the EIS based on comments received at the public meeting and during the comment period.

Final EIS - Transmit the Final EIS (integrated with final feasibility report) to South Atlantic Division.

ROD - Record of Decision is prepared and signed by Assistant Secretary of the Army for Civil Works.

ENVIRONMENTAL EVALUATION METHODOLOGY AND MODELS

The following activities are required for formulation and evaluation of alternative plans. Activities include development of environmental models that will be used to measure outputs of various alternative plans. Some activities in support of this evaluation, including baseline monitoring and identification of an adaptive management process, are cross-referenced but not included in this account.

The *Reconnaissance Report* identified important components to achieve restoration throughout the south Florida ecosystem. The feasibility study will consist of formulation, evaluation, and optimization of these and additional components identified during the study to result in a comprehensive system-

wide restoration plan for the south Florida ecosystem and a specific plan for water preserve areas. Known components that will be included are:

- alternatives for conveying water through the Everglades Agricultural Area (EAA) such as flowways, canal enlargements, and modified ground water levels to control soil subsidence;
- water storage in the Everglades headwaters to include Lake Okeechobee, the EAA, Water Conservation Areas (WCAs), and Water Preserve Areas;
- alternatives to reduce community fragmentation within the WCAs;
- alternative operational schedules for Lake Okeechobee and WCAs; and
- alternative water supply features;
- water quality features.

An evaluation methodology will be needed to predict and compare the environmental responses to alternative plans and conditions. The evaluation methodology will not be used for impact assessment or for analyzing the impacts of projects on threatened and endangered species. Other models such as Across Trophic Level System Simulation (ATLSS), or for endangered species, Biological Assessments (required by the *Endangered Species Act* to determine impacts on threatened or endangered species), would be used to analyze project impacts on specific natural resources within the study area. The models developed will be used to numerically describe optimum habitat quality and provide a basis to predicted changes in comparison to that optimum habitat quality.

The evaluation methodology must allow a means for system-wide environmental responses to be addressed. During the *Reconnaissance Report* a survey of available methodologies was conducted and none were found that met the requirements for the study. However, other types of models such as the Everglades Landscape Model (ELM) and Across Trophic Level System Simulation (ATLSS) Model are currently under development that apply to certain geographic areas and resources within the study area. Although these models are not designed to evaluate the overall effects of restoration alternatives on the entire study area ecosystem, the output from these models will be used for the ROGEM models or for impact assessments if they are available. The following description allows for the use of other models and presents a process which can be followed to modify ROGEM for use in the feasibility study.

Identification of Goals

The process of identifying "measurements of success" was initiated in the reconnaissance phase of the C&SF Review Study. The *Reconnaissance Report*, through intense public involvement, interagency/multi-disciplinary coordination, and input from the Science Sub-Group, developed a conceptual definition of what "success" would be in the south Florida ecosystem. The *Reconnaissance Report* also developed techniques by which restoration alternatives could be measured and compared to each other. Hydrologic computer models were used to provide input into habitat models. Restoration was conceptually described as a return to pre-drainage hydrologic conditions. Numeric output from these models indicates the degree of restoration achieved by each plan. This process and methodology will continue during the feasibility study, however, a series of workshops will be required early in the study process to identify long-term and intermediate restoration goals, anticipated ecological and hydrologic responses to restoration alternatives, and criteria to be used to evaluate the success of restoration plans.

A comprehensive hydrologic description with a historical perspective of South Florida is provided by output from the Natural System Model (NSM). The NSM model includes pre-drainage topographic and geographical estimates, and uses relatively recent hydro-meteorologic data to predict how water would move through an unmodified South Florida hydrologic system. NSM outputs represent the best hydrologic description of pre-drainage conditions available for the study area. The outputs from NSM will be used to develop initial hydrologic restoration targets. However, a key issue to be resolved will be how to apply NSM estimates of hydrologic conditions to present conditions and thus define hydrologic goals. For example, should NSM values be duplicated grid for grid (which is generally acknowledged as being undesirable)? Should NSM values be proportionally reduced to match the current spatial extent ("xerox reduction")? Or should some percentage of NSM values be the target? Also, as discussed in the following paragraph, findings of the *Reconnaissance Report* indicate that water management may be required to achieve a restored ecosystem - even though management is undesirable to some groups. These issues should be discussed and resolved early in the feasibility study process.

Plans evaluated in the *Reconnaissance Report* which included decompartmentalization of the WCAs indicated un-anticipated negative impacts on these areas (especially to the Loxahatchee National Wildlife Refuge). Due to changes in topography and spatial extent, the flow of water through the WCAs may require some degree of management to avoid overdrainage of the upper portions of the WCAs and accumulation of too much water in the lower portions of the WCAs. Results produced by the hydrologic and environmental models indicated that at least partial management of the system may be

required. Even if more detailed hydrologic studies continue to produce these results, use of structures to allow management of these areas in order to achieve restoration will likely remain a controversial issue.

Workshop to Identify Overall Restoration Goals - An important task will be to reach consensus among the agencies, resource organizations, and other interested parties on a clearly stated restoration goal(s). For example, the reconnaissance study goal was to identify alternatives that would "restore" plant and animal population abundances within the south Florida ecosystem. A workshop will be required to reach a consensus on restoration goals and application of these goals to this study.

Workshop to Define Desirable Ecological Responses and Hydrologic Goals - An assumption of the *Reconnaissance Report* was that hydrologic restoration (i.e. achievement of NSM values) of historic wetland areas would result in habitat with the potential of supporting historic levels of native plant and animal populations. An interagency, multi-disciplinary workshop will be held to define for the feasibility study the desirable hydrologic goals and ecological responses.

Development of Models for Initial and Final Screening

Peer Review of ROGEM by SSG - ROGEM was reviewed throughout its development by the resource agencies and organizations. However, an official peer review of ROGEM was never completed. The Science Subgroup of the Interagency Task Force has offered to facilitate a peer review ROGEM.

Review of Other Models (ATLSS, ELM, others) - A review of existing models and other models under development will be conducted to determine their applicability and availability for the feasibility study. If models are not suitable for a system-wide analysis then their appropriateness for other more specific resource or geographic analyses (such as the impact assessment that will be required for the Environmental Impact Statement (EIS)) will be evaluated. The ATLSS models were described in preceding paragraphs on the NEPA document.

Develop Estuary Models - Three estuaries need modeling evaluation for the study: Biscayne Bay, St. Lucie Estuary, and Caloosahatchee Estuary. Models of St. Lucie and Caloosahatchee estuaries are currently under

development by the SFWMD. The Biscayne estuary model not only require development but may require extensive data collection; a study is underway by the Corps to determine modeling feasibility. The models or empirical relationships developed under this activity will at a minimum characterize beneficial and detrimental salinity and freshwater flows for fish and wildlife resources utilizing these areas relative to modifications of the C&SF Project. Input for these models or empirical relationships must be compatible with other models being developed to evaluate alternative plans. Where appropriate, the output of the models or empirical relationships must be structured such that they are compatible with ROGEM. It is assumed that considerable coordination to ensure these compatibilities will be required throughout model development. During development of these tools, preliminary input should be provided to support development of ROGEM for initial screening of alternatives.

Develop Mangrove Zone Model - The importance of this area for fish and wildlife resources has been generally described in the literature but the relationship between hydrodynamics and biota is not been described or modeled. A model or empirical relationship(s) is needed to support plan formulation and evaluation of alternative plans. If it appears unlikely that a model can be fully developed for use in the feasibility study, then at a minimum, an empirical relationship between freshwater flows (and possibly salinities) and hydropatterns within this area extending to Florida Bay will be developed to support the environmental evaluation of alternative plans. Input for these models or empirical relationships must be compatible with other models being developed to evaluate alternative plans. The output of the models or empirical relationships must be structured such that they are compatible with ROGEM. Further, the Mangrove Zone Model will be developed as a component of ELM. Because of the importance of this zone to the health of the fish and wildlife, this model is highly desirable. Even if it is unlikely the model can be fully developed for use in the feasibility study, the data collection and model development should begin. Effort spent in development and data collection will still be critical in the feasibility evaluations. It is assumed that considerable coordination to ensure these compatibilities will be required throughout model development. During development of these tools, preliminary input should be provided to support development of ROGEM for initial screening of alternatives.

Develop Lake Okeechobee Model - Develop models or empirical relationship for Lake Okeechobee to include water quality and ecological parameters. The SFWMD has a research team dedicated to the study

of Lake Okeechobee. The findings of this group will be coordinated with this study to provide input for the ROGEM model for Lake Okeechobee. Input or empirical relationships must be compatible with other hydrologic and biological models being developed to evaluate alternative plans. The output of the models or empirical relationships will be structured such that they are compatible with ROGEM. Preliminary input will be provided by the SFWMD to support development of a ROGEM model(s) for (a) initial screening and (b) final development and analysis of alternatives.

Develop Exotic Species Empirical Relationships - Develop empirical relationships for exotic and/or nuisance species will be developed. Exotic and other nuisance species (such as *Typha*) are creating problems throughout the study area. ROGEM models developed for the Reconnaissance Study did not include variables for exotic species - an acknowledged limitation of the ROGEM models. Input for the models for the different communities located throughout the study area will be required for this Feasibility Study.

Develop Everglades Landscape Model - The Everglades Landscape Model (ELM) is being developed by the SWFMD. ELM is an object-oriented model which will be used to describe the flow characteristics within the WCAs, BCNP and Everglades National Park in support of environmental evaluation of alternative plans. It is a spatially explicit, biomass-based, integrated vegetation and hydrologic model that incorporates soil and nutrients. The model simulates organic soil deposition and subsidence, marl soil deposition, vegetative community changes and water depth. The vegetation, soil, and water components of the model are interdependent. The uncalibrated version of ELM is needed during the initial screening phase as an application of the Object-oriented Screening Model (OSM), and water quality and vegetation changes for application in an improved ROGEM. For final evaluation of alternative plans, ELM will be recalibrated and will provide greater sensitivity (spatially articulate) for areas of specific interest. It will also include additional parameters such as sedimentation/erosion rates, and a better defined mangrove zone component.

Application of Environmental Models

Apply ELM Screening - Outputs from the object-oriented model will provide water budgets as well as average value hydrologic information concerning depth and hydroperiods within each budget area or "pot" (e.g.

lake or WCAs). To evaluate conditions within the pots of natural areas, the ELM will be applied in lieu of the Geographic Information System (GIS) technique developed in the reconnaissance study. ELM will be used for improvements in the appropriate ROGEM models.

Apply Estuary Models - During the final screening phase, the estuary models will be applied for each alternative plan using output from the hydrologic models to determine benefit and impacts to the estuaries. Output from the model or empirical relationship will be used in the appropriate ROGEM models.

Apply Mangrove Model - During the final evaluation phase, the mangrove model will be applied for each alternative plan using output from the hydrologic models to determine the benefit and impacts to the mangrove communities. Output from the model or empirical relationship will be used in the appropriate ROGEM models.

Apply Exotic Species Model - During the final evaluation phase, the exotic species model will be applied for each alternative plan using output from the hydrologic models to determine effects to the exotic species. Output from the model or empirical relationship will be used in the appropriate ROGEM models.

Apply Lake Okeechobee Model - During the final evaluation phase, the model will be applied for each alternative plan using output from lake model (if it is completed) in order to determine effects on Lake Okeechobee. Output from the model or empirical relationship will be used in the ROGEM model.

Apply ELM Final Alternatives - It is anticipated that two models may be available for use in addressing existing water quality conditions. The first completed version of the ELM model will include capabilities for nutrient transport and cycling in addition to landscape parameters. The second version will address additional parameters including sedimentation and soil erosion.

Environmental Evaluations

The environmental models described above will provide output for each of the areas (communities or landscapes) included within the study area so that an overall or comprehensive assessment can be made for each of the plans evaluated. It is anticipated that if the models are not available that empirical relationships will be developed for use in ROGEM.

Initial Modifications to ROGEM - It is anticipated that at least 2 more versions of ROGEM will need to be developed. ROGEM version 2.0 will be used to screen the initial alternative plans and eliminate some of the less favorable alternatives. Version 2.0 will have variables for salinity (where appropriate), water quality, and exotics. During development of the models and empirical relationships described above, the SFWMD will develop methodologies to measure output from hydrologic changes in the system as a result of alternative plans. The output from the SFWMD will be used to make improvements to all of the ROGEM models.

Apply ROGEM Initial Screening - Output from the modeling effort will be used as input for the ROGEM model to define the "with project" environmental responses to plan features, and various combinations of plan features. Model output for alternative plans will be compared to each other, and to the future without-project model outputs environmental impacts associated with each alternative. This effort will provide a means by which to screen for plan components, or combination of plan components, that warrant further study.

Further Modifications to ROGEM - ROGEM Version 2.0 will be further improved for the formulation and evaluation of the final array of alternatives. This version (ROGEM version 3.0) will incorporate variables consistent with improved hydrologic, water quality, and to the extent possible ecological modeling (such as ATLSS) that will also be underway.

Apply ROGEM Final Alternatives - Evaluation of the final alternative plans will be accomplished using more refined environmental models. A final version will be used to further refine and evaluate a selected plan. Output from the various models will be used as input for ROGEM Version 4.0. Results will then be used to evaluate alternative plans to future without project conditions.

Incremental Analysis - An incremental cost analysis will be conducted. Output from habitat-based environmental models will be used in support of this analysis.

Report Preparation

TRC Presentation - Prepare for and participate in the TRC. Preparation should include activities necessary to be responsive to anticipated TRC questions/comments. Respond to comments resulting from TRC.

Environmental Evaluation Draft Appendix Write-up - This activity includes preparation of the narrative report which documents environmental evaluation tasks performed for the feasibility study. Results of the models evaluations and will be compiled and incorporated into the draft feasibility report in an appendix. This activity will include the effort necessary to compile the data, write the report, and prepare all plates necessary to document development of models, model outputs, and evaluation.

Finalize Write-up - This activity includes the effort required to address all comments generated at the FRC. This activity also includes the effort required to finalize the environmental evaluation documentation for the final feasibility report.

22F - FISH AND WILDLIFE STUDIES

This account includes work to be conducted by the U.S. Fish and Wildlife Service (USFWS) as required by the *Fish and Wildlife Coordination Act* of 1958, as amended (PL 85-624). Work will include cooperative environmental data collection and evaluation of the environmental character of the study area and alternative project sites. The work required includes reviewing the project assessment provided in the earlier reconnaissance stage *Planning Aid Letter (PAL)* and providing an updated PAL establishing baseline and future without project biological resources. A *Draft Fish and Wildlife Coordination Act Report* describing future "without project" biological resources and endangered species impacts will be required prior to the Feasibility Review Conference (FRC). A *Final Fish and Wildlife Coordination Act Report* will be required for inclusion in the *Final Feasibility Report*. USFWS will also provide a Biological Opinion pursuant to the *Endangered Species Act*, if needed.

Initiate FWS Coordination and Scope of Work - A scope of work with funding levels will be prepared. The FWS will review pertinent literature and perform any field studies cooperatively with the Corps needed to evaluate the impacts of considered actions on fish and wildlife resources in order to assist the Corps in assessing project impacts on the environment. Coordination will be initiated by attending scoping meeting(s), reviewing the previous PAL, and preparing an updated feasibility stage PAL. The PAL, which establishes baseline and future "without project" biological resources, will be required from the USFWS prior to the Technical Review Conference (TRC).

Field Studies - Cooperatively assist in field studies to establish habitat conditions.

Selection of Environmental Models - Cooperatively assist in the selection of models for analysis.

Evaluation of Alternative Plans - Assist in the analysis and evaluation of projected environmental responses.

Draft FWCAR - Complete the *Draft Fish and Wildlife Coordination Act Report* for inclusion into the *Preliminary Draft EIS* sent to the Corps' South Atlantic Division (SAD) prior to the Feasibility Review Conference. The *Draft Fish and Wildlife Coordination Act Report* will describe future "with project" biological resources and endangered species impacts.

Biological Opinion - Complete the *Endangered Species Biological Opinion*, if needed, prior to the FRC.

Revise FWCAR - Modify the *Draft Fish and Wildlife Coordination Act Report and Endangered Species Biological Opinion*, if needed, following the FRC. Send the revised versions for inclusion to the *Draft Environment Impact Statement (EIS) and Draft Feasibility Report*.

Final FWCAR - Revise Review comments and make revisions following public and agency review, as needed. Provide the *Final Fish and Wildlife Coordination Act Report and Endangered Species Biological Opinion*, if needed, for inclusion with the final feasibility report.

22G - ECONOMIC STUDIES

Economic studies will focus on benefits and costs in the National Economic Development (NED) and Regional Economic Development (RED) accounts. In this feasibility study the primary project outputs will be environmental and will not be expressed monetarily. Economic studies will be concerned mainly with effects other than these non-monetized environmental outputs. An important issue to be addressed is uncertainty, expected mainly to take the form of sensitivity of economic effects to alternative scenarios (e.g., the future of the sugar price support/import quota program, potential effects of soil subsidence on agriculture in the Everglades Agricultural Area (EAA), etc.).

Required input will be engineering cost estimates, real estate cost estimates, and hydraulics and hydrology (H&H) information for the various alternatives. Documentation will include text, tables, charts, graphs, and maps.

Initial Screening

As a part of plan formulation activities, initial screening of alternatives will require economic evaluation input. This effort will be less detailed than in the final screening of alternatives

Initial Screening Economic Evaluation - This effort will involve the preliminary evaluation of a broad array of alternatives. Analysis will be of a more cursory nature than to be done in the final screening. The effort will attempt to address each of the impact categories, to include costs, flood damage, water supply, navigation, commercial fishing, recreation, and regional effects.

NED Costs of Alternatives

A key role of NED economic evaluation will consist of properly expressing costs of alternative plans under consideration.

Analyze Construction/Implementation and Land Acquisition Costs - This data will be developed in separate individual efforts, but after it is developed, it will need to be translated into proper units for comparison, paying careful attention to the issues of price levels, present worth calculations, and the differences between financial and economic costs.

Analyze OMRR&R Costs - Most alternatives are expected to have different OMRR&R costs with than without a project. Such differences are part of the economic costs of the project.

Analyze Monitoring Costs - Most alternatives are likely to require explicitly designed monitoring programs to acquire knowledge of project effectiveness. Such information would then be used to make needed adjustments and changes for follow-on work. The costs of such programs are part of the costs of alternatives and must be accounted for.

Other NED Costs and Benefits

This work falls into the two main categories of benefits foregone, and potential additional benefits. It involves identifying and estimating opportunity costs of lost project services, potential flood damage reduction benefits for Native American Tribal Lands and other areas, economic effects on agricultural and non-agricultural sectors of changes in water supply availability, potential commercial fishing benefits, recreation, navigation and other costs and benefits.

Most of these effects are expected to take the form of impacts incidental to projects whose primary purpose is the achievement of environmental outputs.

Flood Damage Studies - Estimating the difference in flood damages with versus without an alternative will be based on stage-damage-frequency relationships for affected areas. This will be accomplished by combining stage-frequency information, available once H&H data for relevant areas are identified, with stage-damage relationships for those areas. Besides incidental effects, flood damage reduction may be specifically incorporated into the formulation of some alternatives (e.g., Native American Tribal Lands). Estimates of structure values (replacement cost less depreciation), location, first floor elevations, and average stage-damage relationships will be estimated. Agricultural land use by crop type/pasture type, and stage-duration-damage relationships will be estimated. These relationships will provide the basis for estimating the effect of the differences in H&H between without-project conditions and with each of the alternatives to be evaluated. Such analysis will necessarily be of an iterative nature, with the level of detail to be determined by the nature and extent of H&H effects as they become known, and the level of detail available based on H&H analysis results.

Water Supply Studies - Each alternative will potentially have a different level of effective water availability (quantity, timing) than in the without-project condition. The economic effects of these differentials

will be estimated for the agricultural sector, and for the M&I (municipal and industrial) sectors. Analysis will involve assessment of the costs of developing alternative supplies, and the costs of lost productivity (e.g., agricultural crop yield versus available water, manufacturing output cutbacks, etc.) in the case of shortages, and increases in productivity (or reduction in alternative costs) in the case of surpluses. Analysis will include identification of existing water use in the study area, as well as future water use projections. Projections will be based on the IWR-MAIN demand forecasting model for M&I requirements, as well as a review of projections in the Lower East Coast Water Supply Plan (LECWSP). For agricultural sector requirements, projections will be based on a review of projections by others to include the LECWSP, as well as sources such as County Extension Agents, University of Florida Institute of Food and Agricultural Sciences, etc.. Agricultural water supply shortage impacts will incorporate consideration of both technical efficiency (physical relationship between water availability and crop yield), and economic efficiency (relationship between water availability and choices made by farmers based on relevant prices and costs).

Navigation Studies - Each alternative could potentially affect navigation in Lake Okeechobee and elsewhere. A profile of existing navigation traffic (costs, trips and drafts of vessels, seasonality, etc.) through interviews, field investigation, and researching published sources (e.g., *Waterborne Commerce Statistics*, etc.) will be estimated. The effects on navigability caused by alternative Lake Okeechobee regulation schedules will be translated into economic effects in terms of delay costs, impacts of trips not made, and, if applicable, costs of less than optimum vessel drafts. Navigation effects will similarly be addressed elsewhere, such as for example, in the St. Lucie and Caloosahatchee Estuaries.

Commercial Fishing Studies - Declines in commercial fish catch have been observed in Florida Bay-based fisheries, primarily in Monroe County, and are believed to have been causally linked, at least to some extent to declines in environmental conditions in the bay. Such environmental degradation could be reversed by south Florida ecosystem restoration resulting from project implementation. Some restoration of the lost commercial fish catch, as measured against the without-project condition, could result. A range of the potential economic benefit associated with such change will be estimated based on quantities and economic values involved. This will involve consultation with the National Marine Fisheries Service, analysis of historical data, and market analysis of affected fisheries. Other potential effects on commercial fishing (e.g., Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries) will also be addressed.

Recreation Studies - The alternative plans to be evaluated during the feasibility phase have a potential to impact recreational opportunities. These impacts include fishing, boating, Florida Bay-based activities (tourism, fishing, snorkeling, diving, etc.); and potential "eco-tourism" which could be associated with an ecosystem restoration alternative (e.g., increased visitation to visitor centers, etc.). The recreational studies will consist of the identification of recreation resources within the study area, delineating those for which changes in the operation of the C&SF Project to achieve ecosystem restoration goals could have an impact. This will include an identification of all public Federal, State, county, local, and private sites, both existing and likely to be in place during the period of analysis. The quality and quantity of recreation experiences expected to occur at these sites and the extent to which such activity is likely to be impacted by implementation of ecosystem restoration alternatives will be addressed. Input from H&H analyses and environmental assessment will be required to evaluate recreation impacts. To the extent possible, existing sources such as the State Comprehensive Outdoor Recreation Plan (SCORP) will be used. Evaluation of demand and value will adhere to Federal water resource policy as set forth in *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (U.S. Water Resources Council, March, 1983), and related policy guidance.

Regional Impacts

The role of RED economic evaluation will consist of assessing the regional impact dimensions of key economic benefit and cost effect categories. RED effects to be estimated include changes in output (sales), earnings, and employment associated with alternatives under consideration. Important aspects of RED analysis will include identification of the relevant region(s), as well as the timing, duration, and absolute and relative magnitude of the impacts. The main focus of RED analysis is expected to be concerned with lost agricultural productivity associated with land potentially to be taken out of production (to be used for project purposes) and the resulting negative impacts on sales, earnings, and employment. Other RED effects to be identified and estimated include the positive impacts associated with project implementation expenditures, as well as regional impacts associated with other NED costs and benefits.

Identify Evaluation Methodology - Different evaluation methodologies will be reviewed to determine a best approach to use for the feasibility study. RIMS II multipliers will most likely be used to estimate the

regional impacts (sales, output, and earnings) associated with each benefit and cost effect, although the relative merits of other approaches will be considered.

Select Relevant Regions - For each impact category, one or more relevant regions will be selected. These will most likely consist of the immediate area (probably the county/counties where the initial impact occurs), a larger multi-county economic region, and the State of Florida. The regional impact will be estimated for each of these regions. In the case of agricultural impacts, significance of impacts on national agricultural markets will be addressed.

Evaluation of Regional Impacts - The effect of each alternative on regional output (sales), earnings, and employment will be addressed. Each of the relevant regions will be included, probably to consist of the immediate county, a multi-county region, and the State of Florida. Such effects will be addressed for each of the NED cost and benefit effects estimated.

Timing and Compensating Factors Studies - Regional impact will attempt to include the effects of reemployment, migration, and temporary income maintenance compensation, for displaced workers and lost business productivity. Also included will be the impacts associated with project implementation spending. Timing of these and other effects are important considerations which must be included.

Local Government Impacts Studies - Estimates of local government fiscal stress will be estimated, to the extent possible. This evaluation will address negative effects on the local tax base which could be caused by some alternatives, versus the change in government services.

Identify Economic Impact Amelioration Strategies - The potential for assistance programs for workers, businesses, and local governments which could be impacted negatively by some alternatives will be addressed. In particular, the experience of the Community Economic Revitalization Team (CERT), instituted pursuant to the Pacific Northwest Economic Adjustment Initiative for Oregon, Washington, and Northern California, will be reviewed and examined for possible application of its principles and experience to south Florida ecosystem alternatives. This CERT activity has operated since 1993 as a clearing house function for different Federal amelioration activities for communities economically impacted by decisions to curtail timber harvesting in some areas for purposes of ecosystem protection/preservation.

22H - REAL ESTATE ANALYSES

The Real Estate Analyses will include an appraisal of the costs of lands and damages, and preparation of a plan for acquisition of these lands. Other tasks include an analysis of physical takings, attorney's opinion of compensability, obtaining rights for entry for various field collection activities, and providing input to the Project Cooperation Agreement (PCA) and Project Management Plan (PMP). This activity includes all written memoranda, opinions, reports and other documents provided by Real Estate personnel as required in support of feasibility phase planning efforts.

Obtain Rights of Entry - Upon notification of request for rights for entry by section, township, range parameters, the South Florida Water Management District (SFWMD) will obtain permission from landowners to temporarily use his/her land for a specified time and purpose. These will be obtained for purposes of environmental investigations, cultural assessments, core sampling, surveys, explorations, etc.

Ownership Information - Upon notification of alternative component feature description and location by section, township, range parameters, the SFWMD will provide the following data for areas under consideration for project features:

- Tax maps and public right-of-way maps;
- List of property owners;
- Tax rolls including value, structure, type, etc.;
- Zoning information;
- Last search of records for each parcel;
- Anticipated mineral extraction and determine if such activity is permitted by law;
- Identify all structures potentially impacted that are occupied that may be removed due to project implementation;
- Identify all known public utilities located within the proposed project area that may require relocation;
- Identify sponsor acquisition costs and real estate administrative costs associated with implementation of each alternative plan; and
- Provide location maps (city or county) of proposed construction areas including material disposal areas.

Preliminary Real Estate Cost Estimates - Prepare LERRD preliminary cost estimates for multiple components for initial screening during plan formulation stage of the study. This will require a similar method of estimating costs performed during the reconnaissance phase.

Section Corner Survey - This survey is required to establish state plane coordinates for approximately 30 Sections and 12 Townships for real estate mapping purposes. This data should be in Transverse Mercator Projection, Florida East Zone using 1927 Datum. Use of a Global Positioning Station will be used. It is assumed that other data, provided by the State, will also be available. The survey data will be incorporated into the GIS database and used to map property boundaries and ultimately develop real estate acquisition costs for alternative plans.

Real Estate Acquisition Maps - Prepare an initial set of maps and drawings that delineate the real estate acquisition lines based on technical design drawings developed during feasibility phase. This activity is dependent upon receipt of footprint of project components/features and tax maps followed by a coordination meeting with Study Manager to assure all project features are identified including temporary construction areas, road access, borrow/disposal areas, etc. These maps will reflect the minimum real estate required for project purposes.

Physical Takings Analysis - This analysis will result in a written legal opinion as to whether flooding induced by construction, operation or maintenance of the proposed project will result in a taking of an interest in real property for which just compensation must be paid to the owner. The opinion must describe the analysis to include hydrologic data to include depth, frequency, duration, velocity and extent of such induced flooding based on economic data, as well as relevant state and Federal law, and present a conclusion on the takings issue.

Relocations Analysis - After a determination through engineering design of what facilities must be relocated including roads, railroads, pipelines, utilities, bridges, and cemeteries by engineering design, a preliminary legal opinion on whether a substitute facility is required will be documented. The opinion makes findings on whether the owner has a compensable interest, whether the owner has a legal duty to continue to maintain and operate the facility/utility, and whether that federal law requires the provision of a substitute facility rather than mere payment of market value for the property acquired. The preliminary legal opinion differs from the final legal opinion only in its acceptance as fact of the owner's statement of its interest in the property, without a search of property records. A baseline cost estimate must be developed for the relocations to include an engineering cost estimate for the performance or construction of the relocation as described in 22P, Engineering Analysis and Design/Project Cost Estimates, and the value of the land.

The *Real Estate Supplement (RES)* shall include a statement as to whether the Government, the local sponsor, or owner will be responsible for the relocation and acquisition of new rights-of-way and the costs for relocation and land to be acquired allocated to each entity.

Gross Appraisal - This activity includes activities necessary to complete a detailed, supported appraisal of the collective real estate requirements and impacts of the recommended plan as required by *ER 405-1-12, (Chapter 4 and Draft Chapter 12)*. The Gross Appraisal must be of sufficient detail to provide an accurate cost estimate sufficient for Congressional authorization. Review and approval of the *Gross Appraisal Report* is accomplished concurrently with the draft feasibility report. The Gross Appraisal will be submitted concurrently with the draft feasibility report and is dependent upon receipt of the FINAL recommended plan including real estate maps with project features, estates to be appraised, tax and ownership information, zoning and land use maps.

Real Estate Supplement (RES) - The Real Estate Supplement to the *Feasibility Report* will outline the minimum real estate requirements for a proposed restoration project as required by *ER 405-1-12, Draft Chapter 12*. It will contain a description of the area; the acreage and proposed estates, including non-standard estates, and reason therefore; a discussion of any land owned by the Federal government, the local sponsor or any public entity; a discussion of the local sponsor's ability to acquire LERRD; a discussion of mineral activity, if any, and the attitude of landowners; at least a preliminary assessment of facilities/utilities to be relocated; and any other relevant real estate information appropriate for the project.

This activity also includes development of a detailed cost estimate for the recommended plan that will be input for the M-CACES (engineering) cost estimate. This baseline cost estimate will be developed from the Gross Appraisal and will include other costs such as *Public Law 91-646* relocations, administrative costs, and contingencies.

Draft PCA and PMP Input - This activity includes development of data necessary to support other documents pertinent to the project, including, but not limited to, the PMP and the draft PCA. For these documents, a detailed schedule of land acquisition will be developed.

22J - HYDROLOGY AND HYDRAULICS STUDIES

This account includes costs for the investigative effort to collect and analyze the hydrologic and hydraulic data needed to formulate, evaluate and optimize a comprehensive system-wide Everglades restoration plan to include design of the Water Preserve Areas. The tasks will involve collecting existing hydrologic and water quality data; selection and/or development of other appropriate hydrologic and water quality models; and modeling of existing conditions, future without project conditions, and restoration alternatives.

The reconnaissance study modeling identified the important components to achieve restoration throughout the system. However, the best combination of components, and subsequent optimization, was not completed. Initial screening efforts in the feasibility study will evaluate these plan components, and alternate combinations of these components, to optimize a comprehensive system-wide Everglades restoration plan. Individual plan components, or necessary combinations of components, will be evaluated in increments to segregate the effects of the individual increments and to optimize their effectiveness for providing system needs. Optimal increments will then be combined to form comprehensive restoration plans for system-wide evaluation. The object oriented modeling approach developed during the reconnaissance study will be improved and used as a screening tool for this purpose. The modifications to the object oriented models to improve their usefulness, such as the connection to the Everglades Landscape Model (ELM) or Everglades National Park Management Model (1X1), will be developed during the feasibility study. Existing hydrologic data will be evaluated to determine the model simulation period to be used in the feasibility study modeling efforts.

The outputs from the Natural System Model (NSM) will be used as a tool to develop hydrologic restoration targets. However, a key issue to be resolved is how NSM estimates of hydrologic conditions will be applied to present conditions and thus, define hydrologic goals for the study area. Key decisions to be made include whether NSM values should be duplicated grid for grid, whether NSM values should be proportionally reduced to match the current spatial extent ("xerox reduction"), or whether a percentage of NSM values should be a target for the current spatial extent. This issue will need to be addressed early in the study process. An interagency/multi-disciplinary workshop will be required to reach consensus on this issue. This activity is described in the *22E - Environmental Studies* section.

Following completion of the initial screening, the field of alternatives will be narrowed and considered in more detail as the study progresses. Once the

general guidelines for components have been identified, modeling at a greater level of accuracy will be required for more detailed design purposes as well as distinguishing between alternatives that have similar outputs from the screening phase.

Currently available hydrologic models do not provide the areal extent to adequately evaluate restoration alternatives for the feasibility study. In order to complete a detailed hydraulic assessment for a variety of plans having a large number of component combinations, models will be required to at least have the precision of the SFWMM, have water quality parameters and greater areal extent. Ideally, the models would have the ease of use of an object oriented model.

The evaluation of existing conditions within the study area will be accomplished using both the object-oriented models during initial screening and the more refined models during the detailed alternative analysis. Output from these models for the simulation period will be compared with output from the model runs used to evaluate future without project conditions. This comparison will identify the environmental, flood control, and water supply impacts associated with implementation of project modification efforts currently underway by the Corps of Engineers.

The future "without project" condition describes what is expected to happen if none of the alternative plans evaluated in this feasibility study are implemented. The without project conditions is the same as the "no action" alternative that is required to be considered by the Federal regulations implementing the *National Environmental Policy Act of 1969 (NEPA)*. For the purpose of evaluating effects of alternative restoration plans, C&SF Project modification efforts currently underway by the Corps of Engineers are included in the "future without project" condition. The project modifications assumed to be in-place in future without project conditions include Modified Water Deliveries to Everglades National Park, Kissimmee River Restoration, Lake Okeechobee Run 25 Regulation Schedule, New Regulation Schedule for WCA 1, the Everglade Construction Project (STA's), U.S. Highway 1 Culverts and associated wetland mitigation, and the Hole-In-The-Donut Restoration project.

The future without-project hydrologic model outputs will be compared with the model outputs for existing conditions to identify the flood control, water quality and water supply impacts associated with implementation of project modification efforts currently underway by the Corps of Engineers. Similarly, comparison of environmental model output for future without project conditions and existing conditions will identify the environmental impacts associated with implementation of project modification efforts currently underway by the Corps of Engineers.

The feasibility study will support the continued development of existing hydrologic models to facilitate water quality improvements and increased areal extent. These models will be used in support of an adaptive management approach to south Florida ecosystem restoration. Adaptive management will combine the iterative use of models, research, and monitoring with project management to revise, improve and fine tune the incremental restoration projects to be identified in this feasibility study.

MODEL DEVELOPMENT

There are many computer models existing, under development, and planned that describe water movement through South Florida. However, the timeframe established for this feasibility study limits the models that are complete or nearly complete. Therefore, models were selected for the study based on likelihood of availability, accuracy requirements, timeliness of usage, and peer review support. For the first part of the study, about 20 plans need to be evaluated and reduced to about 6 plans for final consideration. The second part of the study will involve more precise hydrological outputs that must interface with other models and evaluation methodologies which will be used to assess impacts/benefits to water supply, flood control, water quality, and the environment.

In order to visualize the model applications that will satisfy the study needs, a flow-chart was developed (Figure 22J-1). Where models require development, it is assumed that enough data are available. In cases where the data will not support development and can not be gathered, an alternative track will be used. State-of-the-art model application is assured using this concept.

Develop Water Budgets for STAs, WPAs BCNP, LEC - Development of water budget information for STAs, WPAs, BCNP, and LEC will be required to support development of the object-oriented screening model.

Object-oriented Screening Model (OSM) - In order to evaluate 20 plans in a timely manner, an object-oriented water budget model will be developed and applied. Because this model will lack water quality and landscape characteristics within the sensitive areas, a co-application ELM will be done. OSM will be similar in computation to the Regional Routing Model, however it will be developed to include STA's, WPA's, BCNP, and a better definition of LEC budgets.

Everglades Landscape Model (ELM) - This is a newly developed model which is near completion -- due in mid-1995. The hydrologic solution algorithm is a function of a varying landscape with a resolution of 1 km square grids. However ELM has the ability to predict water quality and

surface elevations and flow velocities would be computed at select locations in the with and with-out project channels and storage areas. The hydraulic design of these features will be submitted for structural design and screening cost estimates.

Apply SFWMM Final Alternatives - Hydraulic design and the hydrologic evaluation of the final alternative plans will be accomplished using more refined hydrologic models. For the detailed hydrologic analysis of final alternatives, it is anticipated that the Modified SFWMM will be utilized. The Modified SFWMM model will include the Big Cypress National Preserve, Everglades National Park, Stormwater Treatment Areas, and the Water Preserve Areas. Output from this refined hydrologic modeling effort will support the more detailed economic and environmental evaluations of restoration plan alternatives. The hydraulic design for the final array of plans will be submitted for more detailed engineering design.

Apply GMS, PRM Final Alternatives - The modified SFWMM model will be utilized in conjunction with the Prescriptive Reservoir Model (PRM) to optimize regulation schedules of multi-reservoir system as well as the Groundwater Modeling System (GMS). The GMS is a modeling environment under which either MODFLOW or FEMWATER can be run. The groundwater models will need to describe the eastern ENP conditions as well as groundwater level changes in northwest WCA 3A near Tribal lands and options associated WPA designs.

Apply SFWQM Model - The existing SFWMM will be modified to include modules modified to include water quality modules for modeling key water quality parameters and transport mechanisms within the system. Output from the SFWMM model or empirical relationships will be used as input in the appropriate ROGEM models. Output from this model will also be used for the environmental impact assessment to be completed for plans that are evaluated in detail.

Hydraulic Design Final Alternatives - Hydraulic design and evaluation of the final alternative plans will also be accomplished using HEC models. More detailed hydraulic design will be accomplished for alternatives selected for final evaluation. The detailed analysis will include flood control channels with adequate protection for surfaces with high velocities or structures to dissipate energy. The hydraulic design of features required to implement final alternative plans will be submitted for structural design and cost estimates.

Stage-Damage Mitigation Studies - It is anticipated that flood damage reduction may be required to be incorporated into the formulation of alternatives which negatively impact certain areas, i.e. Native American Tribal Lands. Flood elevations versus frequency relationships for the existing flood prone areas WCA-3 will be developed. Standard Corps' programs would be used to generate hydraulic models of the existing and any proposed flood control features. Water surface elevations and flow velocities would be computed at selected locations in the pre and post-project channels and storage areas. Hydraulic models would be compiled using various floods for which historic hydraulic data is available. Estimating the difference in flood damages with versus without an alternative will be based on stage-damage relationships for affected areas. This will be accomplished by combining groundwater information from H&H investigations with stage-damage relationships for those areas where flood damage reduction may be required.

Output from these models for the simulation period will be compared with output from the model runs used to evaluate future without project conditions. This comparison will identify the flood control, water supply and water quality impacts associated with each alternative plan. The model outputs will also be used as input to the environmental evaluation models and the GIS database to evaluate the environmental responses to plan alternatives. If models under development to address the estuaries, the mangrove areas located in the downstream portions of mainland ENP, Big Cypress National Park and southern Dade County, and water quality are available, they will be use to support the environmental evaluation of final alternatives. If these models are not available, empirically based evaluation methodologies will be developed and incorporated into the ROGEM model to address the estuaries, the fringing mangrove zones and water quality in the detailed analysis of restoration alternatives.

WATER PRESERVE AREAS

Upon identification of a conceptual comprehensive Everglades Restoration Plan, detailed hydrologic and hydraulic design studies will be accomplished for the Water Preserve Areas to support a decision to authorize this increment of the comprehensive restoration plan. The aspects associated with the development of the Water Preserve Areas include the development of essential features, linking of the non-contiguous areas, regional impacts and development of operational guidelines within the South Florida region. Hydrologic and hydraulic studies, including groundwater investigations, will be required to support Water Preserve Areas development. It is anticipated that

the standard Corps programs, HEC-1, HEC-2 and UNET will be used to develop design information for the Water Preserve Areas.

Hydraulic Analysis of Existing Control Structures - This effort will involve development of accurate ratings of the control structures on existing canals discharging freshwater to the Intracoastal Waterway and Biscayne Bay in Palm Beach, Broward, and Dade Counties. Results from this study will help quantify freshwater discharges to the lower east coast and provide valuable data for calibration and verification of existing and planned hydraulic models of the Everglades and Biscayne Bay. Rating curves will be developed from field measurements of discharge and water levels to replace or refine the existing theoretical ratings. The Acoustic Doppler Current Profiler (ADCP), a new state of the art device for measuring flows, will be used to make control structure discharge measurements. The ADCP uses the doppler shift in acoustic signals to determine water velocity and compute discharge. It is ideal for measurements in slow and spatially varying velocity fields. Statistical techniques will be used to determine the best-fit ratings for the structures and error analysis of the ratings.

Rainfall-Frequency Analysis - An analysis of U.S. Department of Commerce Technical Publication #42 *Generalized Estimates of Probable Maximum Precipitation and Rainfall-frequency Data for Florida* will be performed to determine the relationships between rainfall, runoff and frequency for the study area. Design storms will be developed for frequencies from 2-year to 100-year. "Maximum Probable Rainfall" will be investigated along with areal and temporal rainfall distribution.

Apply HEC Models for WPAs - Screening - The aspects associated with the development of the Water Preserve Areas include the development of essential features, linking of the non-contiguous areas, regional impacts and development of operational guidelines within the South Florida region. Known components that will require hydrologic analysis and hydraulic design for initial screening of alternatives for the Water Preserve Areas include canals, levees, spillways, culverts, pump stations, curtain walls and Aquifer Storage and Recovery (ASR) wells. Hydrologic and hydraulic studies, including groundwater investigations, will be required to support Water Preserve Areas development. Hydrologic modeling will be required to support hydraulic design work for initial alternatives. Use of the standard Corps' HEC models would be typical.

A detailed review of hydrologic methods will be made along with an analysis and computation of the hydrologic parameters in the basin. The

relationship between rainfall, discharge and stage frequency will be determined by computer programs. The programs will be used to simulate the surface runoff response of each stream basin by representing the basin as an interconnected system of hydrologic and hydraulic components. A component is an entity such as rainfall, a stream channel or a storage reservoir and is mathematically represented in the models as hydrologic parameters. Peak flow frequency will be determined at desired locations. Verification of the model will be with the use of alternate methods and stage frequency determined by hydraulic analyses of historic events. Hydrologic analyses will be performed on both the existing and future conditions in the basin and for both with and without project conditions. It is anticipated that the standard Corps programs, HEC-1, HEC-2 and UNET will be used to evaluate alternative plans for the Water Preserve Areas.

Apply HEC Models Final Alternatives for WPAs - Hydraulic design and the hydrologic evaluation of the final alternative plans for the Water Preserve Areas will also be accomplished using HEC models. Output from these models will be used to evaluate the flood control, water supply, and water quality impacts associated with various designs and operation schemes for the Water Preserve Areas. The model outputs will also be used as input to the environmental evaluation models and the GIS database to evaluate the environmental responses to Water Preserve Areas alternatives.

The Water Preserve Areas will impact water availability to well field recharge, water sent to tide, seepage from Water Conservation Areas, and possibly local flood control. To assess these regional impacts, both surface and groundwater modeling will be required. Groundwater modeling will also be used to evaluate options such as the curtain wall. Since backpumping will be studied, a small amount of water quality modeling is likely to be required.

Hydraulic Design of WPAs - Upon selection of the comprehensive Everglades restoration plan, hydraulic design shall be performed in greater detail for canals, levees, spillways, culverts and pump stations required to implement the Water Preserve Areas. Hydraulic design of the selected plan will be finalized using additional field data and surveys collected for the final alignment of the Water Preserve Areas. Flood stages and initial overtopping due to cases where design channel and/or levees will not contain flows exceeding the design capacity will be investigated as necessary. Wind and wave set-up shall be performed where applicable to insure adequate height of levees.

PLANNING SUPPORT ACTIVITIES

H&H Participation in the TRC - Prepare for and attend TRC. Preparation should include activities necessary to be responsive to anticipated TRC questions/comments. Respond to comments resulting from TRC.

Hydrology and Hydraulics write-up for Draft Report - This activity includes preparation of the narrative report which documents all hydrology and hydraulics studies performed for the feasibility study. Results of the hydrologic model evaluations and other hydrologic investigations will be compiled and incorporated into the draft interim feasibility report in a Hydrology and Hydraulics appendix. Included in this activity is the effort necessary to compile the data, write the report, and prepare all plates necessary to document model development, output and evaluation.

H&H Participation in the FRC - Prepare for and attend FRC. Preparation should include activities necessary to be responsive to anticipated FRC questions/comments.

Finalize Hydrology and Hydraulics Write-up - This task includes the effort required to address all comments generated at the FRC. This activity also includes the effort required to finalize the hydrologic model investigations documentation for the final interim feasibility report.

Support for Development of PMP - This activity includes the effort required to provide H&H input to the development of the Project Management Plan for project modifications recommended by this feasibility study. This includes the effort required to develop the time and cost estimates to perform preconstruction engineering design (PED) studies recommended in this feasibility study.

22K - GEOTECHNICAL STUDIES

This account includes the analysis of the foundations and materials at existing C&SF Project sites for the purpose of selection and design of project features. No exploration is required for development of those comprehensive restoration plan elements located within existing project areas. However, preliminary geotechnical exploration will be needed for engineering design associated with the proposed Water Preserve Areas. Additional field exploration required for subsequent engineering and design studies will be identified.

Costs attributable to work under this account include field investigations and the effort required to prepare input for the preliminary draft, draft, and final reports, as well as participation in each of the required review conferences and resolution of comments resulting from the conferences.

Obtain Historic Core Boring Logs - Review historic core boring logs from previous subsurface investigations. All geotechnical designs for the initial screening of alternatives will be based on existing field data. A limited number of core borings will be obtained where no existing data is available.

Geotechnical Design for Initial Screening - Geotechnical parameters for canals, levees, and structures for the preliminary array of alternative plans will be based on as-built conditions of existing project features.

Geotechnical Design/Analyses for Final Array of Alternatives - A slope stability analysis will be performed to determine side slopes for levees and canals for the final array of alternative plans. In addition, the work will also include a settlement analysis, a finite-element seepage analysis, and an evaluation of structure foundation conditions, construction dewatering requirements, slope protection requirements, and potential borrow sources.

Field Investigations - Geotechnical field exploration will be needed to support engineering and design studies necessary for the Water Preserve Areas. Once the general alignments of the water preserve areas have been identified, field investigations will be initiated in order to better refine the design and define the cost of project features. Field investigation requirements were estimated based upon the conceptual design presented in the South Florida Water Management District's September 1994 Report titled, *Analysis of Water Supply Potential for*

Area B, the Everglades Buffer Strip and the Hillsboro Basin: Phase 3b East Coast Buffer Concept. Anticipated field studies would include core borings at proposed structure locations, core borings at 4000-foot intervals along all proposed levee alignments, core borings at 1000-foot intervals for all proposed canal construction alignments. This estimate also assumes exploratory drilling at two proposed Aquifer Storage and Recovery (ASR) well locations. Additional field exploration required for subsequent engineering and design studies will be identified.

Laboratory Analysis - This effort includes the costs for laboratory analysis of data collected in the field investigations. Results from this effort will support the engineering design and evaluation of project costs associated with the water preserve areas.

Groundwater modeling - Provide geotechnical data related to aquifer characteristics and groundwater movement to support the hydrologic modeling. Effort will also include output review and any other support required to complete the modeling.

Geotechnical participation in the Technical Review Conference (TRC) - Prepare for the TRC and perform necessary calculations in order to be responsive to anticipated TRC questions/comments. Respond to comments resulting from the TRC.

Prepare geotechnical plates - All geotechnical plates will be drawn on CADD and placed on sheets with proper borders and title blocks.

Geotechnical write-up for preliminary draft report - All information will be compiled and put in report format. The report will include core boring logs (both historic and new), geologic interpretation, results of all analyses, and laboratory test results.

Finalize geotechnical write-up - Finalize the geotechnical portion of the feasibility report write-up. The report will include geologic information, core boring logs, laboratory test results, and design analyses. Also included is effort needed to prepare for the Feasibility Review Conference (FRC) and to address any comments resulting from the FRC.

Provide Input to PMP - Develop the geotechnical scope of work, including time and cost estimates, for the Project Management Plan.

22L - HTRW ASSESSMENTS

The objective of this activity is to facilitate early identification and appropriate consideration of Hazardous, Toxic and Radioactive Waste (HTRW) problems. Information developed during this phase should provide the rationale for proceeding with the next phase of project implementation.

Civil Works project funds are not to be employed for HTRW-related activities except as provided in *ER 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects*, or otherwise specifically provided in law. HTRW sites will be avoided whenever practicable. This can be accomplished by early identification of potential problems before any land acquisition begins. Plan formulation and plan selection may be substantially influenced by the presence of HTRW in the project area. They may be a significant factor in project alternative design even though cost may be greater than a plan which provides for HTRW response action.

HTRW assessment will determine the type and extent of HTRW contamination, if any, and how HTRW considerations will impact on the alternative project plans. A preliminary cost estimate of required HTRW response actions will be needed for each alternative plan in order to be able to make a reasoned choice among alternative plans. Alternative plans may consider avoidance of HTRW as well as possible responses. At least one alternative plan should be formulated to avoid HTRW sites to the maximum extent possible, consistent with project objectives. These assessments, conducted during the feasibility stage, are shared with the local sponsor.

Investigation - The HTRW portion of the feasibility phase will include (1) a determination of the nature and extent of contamination and (2) a qualitative analysis of the impacts of any contamination in the absence of response action. This phase should include a preliminary identification of potential source areas, contaminant release mechanisms, exposure routes, potentially exposed populations, as well as a determination of the non-numerical risk or potential adverse health effects for the identified potential receptors. Investigation activities may include topographic setting, underlying geology, surface and groundwater flow, building and utility layouts, the conditions of all structures above and below ground, and characterization of chemical constituents of HTRW contaminants. The level of detail should be sufficient to determine the extent of HTRW contaminants in relation to alternative plan features and adjacent lands potentially impacted by these features.

Alternative Analysis - This analysis shall identify and evaluate alternatives to respond to verified HTRW problems which cannot be avoided by project design. Activities conducted may include additional sampling and analysis if needed, identification of alternative response measures, alternative screening, cost analysis of alternatives and adherence to environmental standards and criteria. The analysis of proposed response alternatives should include a comparative evaluation of

- (1) the effectiveness of the alternative or to what degree baseline risks are reduced or minimized by the response and if residuals/action comply with regulatory standards;
- (2) implementability, or technical feasibility of the response action alternative; and, finally,
- (3) cost associated with each response alternative.

The recommended response action will be selected based on a balance of evaluation criteria, developed in full coordination with the appropriate Federal and state regulatory agencies. The evaluation will be included as an appendix to the feasibility report. The plan will document criteria used in selecting the recommended response action, including degree of reduction or mitigation of potential risks to human health and the environment, compliance with regulatory requirements, long and short term effectiveness, implementability, and cost of the recommended response action.

Project Cost Estimate - Design cost estimates and response cost estimates for resolving HTRW and other regulated contaminant problems which are a part of project cost will be developed to the same level of detail as other project features. The cost of HTRW remediation will not be considered as a project cost nor in determining economic feasibility of the Civil Works project unless the project is without a local sponsor and immediate HTRW remediation without the project is not required. The cost of remediation action may, however, be an important factor for a sponsor making decision concerning the project, and thus should be estimated during the feasibility phase.

Sponsor commitment - Should there be a known HTRW problem, the letter of intent to cost share in the project shall state either that the local sponsor has accepted responsibility for required response, or that the sponsor has initiated procedures requiring the responsible parties to respond. the project authorization document and the Project

Management Plan should include language describing how response actions will be coordinated with project construction. Construction shall not be undertaken until response actions have been completed on impacted lands.

HTRW Appendix - The feasibility report will fully document the HTRW impact or potential. The report will either conclude that there is no known HTRW, or that HTRW has been identified. If HTRW is identified, the report will also describe what actions are being taken toward avoidance or response, and what non-Federal interest is responsible for the response, if applicable. Documents for innocent landowner defense will be retained.

22M - MONITORING AND POST PLANNING CONSIDERATIONS

Because of the relative newness of restoration science and uncertainty in ecosystem restoration planning, theories and tools, success can vary due to a variety of technical and site specific factors. Recognizing this uncertainty, it is prudent to allow for contingencies to address restoration problems early in the planning process. To accomplish this, a technique called "adaptive management" should be considered for inclusion in restoration projects. At the heart of adaptive management and the cornerstone for restoration success is a carefully designed monitoring program that measures effects of restoration measures, allows for feedback based on new insights, and adjustments made accordingly to the project and future separable restoration elements.

Project Implementation Plan

This study assumes that a restoration plan will be designed and implemented to allow maximum flexibility by supporting the iterative use of models, research, and monitoring in conjunction with management to revise, improve, and fine tune restoration projects. Figure 1 offers an example of how this strategy could work to plan and implement this large complex restoration project. Consensus on ultimate restoration goals must be achieved up-front. An incremental process will be followed due to the large and complex nature of the south Florida ecosystem and its problems, and because of the uncertainties regarding the ecological responses that will occur during efforts to re-establish more natural hydrological conditions.

There are two contrasting views on how to approach and assess the success of ecosystem restoration in south Florida. These views will influence the strategy for achieving south Florida restoration. One view is that the south Florida ecosystem will have been restored once certain population levels have been reached for wading birds, alligators, endangered species, etc. In contrast, a different view is that restoration will have been achieved when certain defining ecological conditions (functions and relationships) that characterized the pre-drainage Everglades have been recovered, without setting specific population levels as goals. It may eventually become evident that these two views are merely different ways of characterizing a recovered ecosystem, and that achieving one will achieve the other. There is, however, agreement by proponents of both perspectives that a set of measures will be required to show whether the restoration programs are carrying the Everglades in the desired direction. There is also general agreement that monitoring be conducted according to a carefully designed research protocol.

Interagency/multi-disciplinary coordination meetings and workshops will be required at several points indicated in the following paragraphs. The key to designing a restoration plan will be:

- (1) to clearly identify (and state) the study objectives and desired environmental and hydrologic responses;
- (2) achieve consensus on how to monitor ecological and hydrologic responses to project alternatives; and
- (3) develop a strategy on how to interpret and implement plans that can be responsive to monitoring/research findings.

Establish Basis for Monitoring/Research plan - The ecological and hydrologic restoration goals will provide the basis for describing what parameters will be monitored. An assumption of the *Reconnaissance Report* was that hydrologic restoration (i.e. achievement of NSM values) of historic wetland areas would result in habitat with the potential of supporting historic levels of native plant and animal populations. The purpose of the monitoring and research program will be to provide the framework for designing the sequence of implementing restoration increments, and provide information on ecosystem responses as a basis for designing subsequent increments for achieving restoration. A monitoring plan will be developed that will test the fundamental hypothesis that hydrologic changes in the direction of "pre-drainage" (as predicted by the NSM) hydrologic conditions will result conditions favorable to population changes in the direction of historic or pre-drainage levels. Research will also be required in response to the need to better understand this highly complex ecosystem and to better predict and analyze the impacts of restoration plans on the natural environment. Development of a monitoring plan is discussed in the next section of this subaccount.

Development of Restoration Strategy - The development and implementation of a monitoring and research program is essential in designing the sequencing of restoration components (increments). This program should provide information on ecosystem responses as a basis for designing and implementing subsequent increments toward achieving the restoration goal. Development of a strategy on how to interpret and adjust to monitoring/research findings will be required and accomplished through workshops. However, as a start, Figure 22M - 1 is offered as an example of strategy which could be followed. The major activities and decision points identified thus far include the following:

Restoration Implementation Strategy

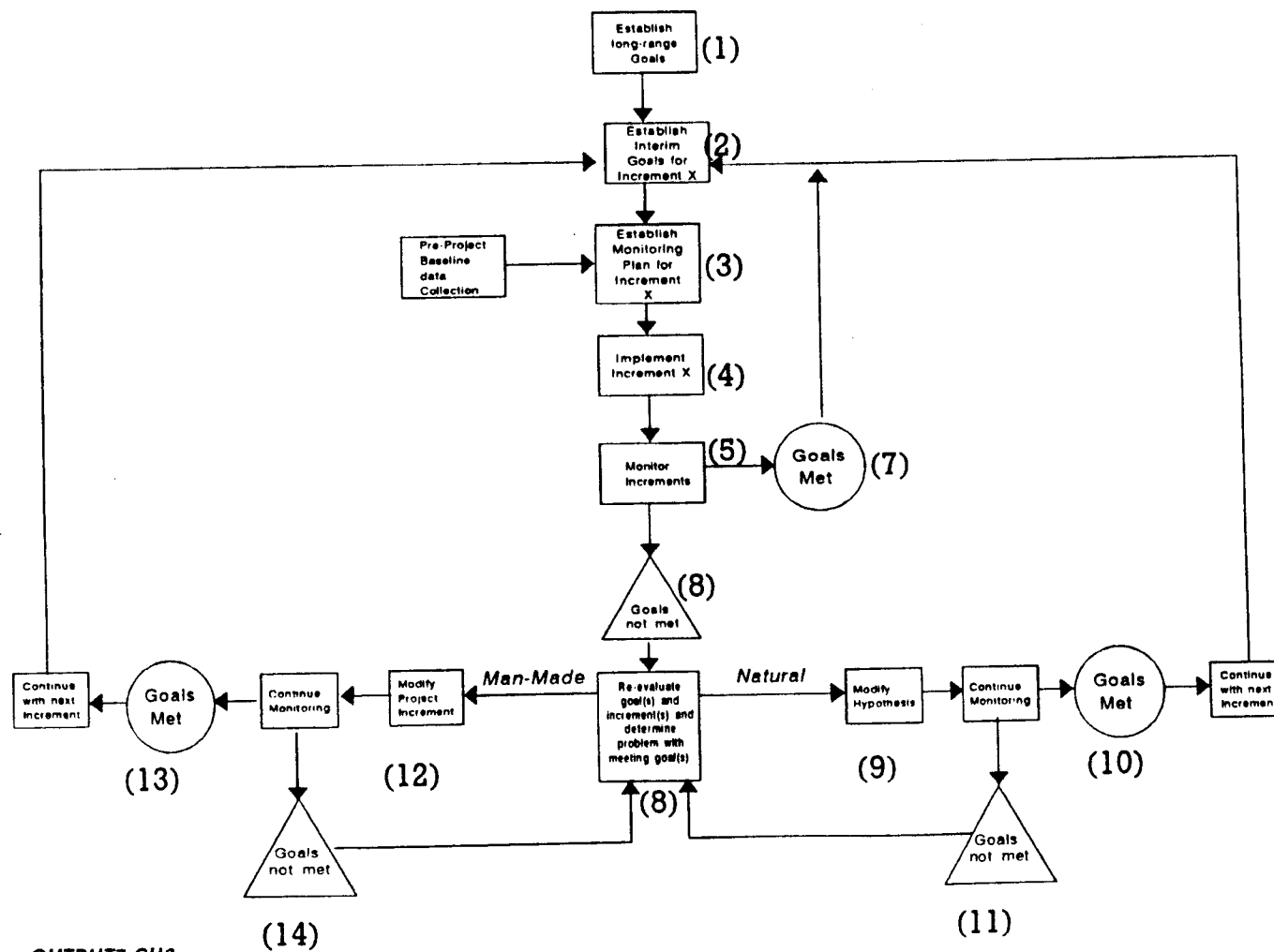


FIGURE 22M-1

22M-3

DRAFT May 3, 1995

(1) **Establish long-range restoration goals.** The need for developing clearly defined goals is discussed above. For example, long-range ecological and hydrological restoration goals could be to restore historic plant and animal population levels, and historic hydrologic conditions as predicted by the Natural Systems Model (NSM).

(2) **Establish interim goals for Plan (Increment) #1.** For example, an interim ecological goal could be wading bird population levels increase by X % over the next X years (or population levels increase X out of X number of years). An interim hydrologic goal could be improve hydropatterns X % by X years. The first interim goal could be identified during the workshop for "a" above.

(3) **Establish monitoring/research plan for Increment #1.** Hydrologic and ecological monitoring activities within the study area are currently being conducted and coordinated with others as part of the Modified Water Deliveries Project, C-111 Project, and Taylor Slough Test. Also, numerous actions concerning water quality monitoring and evaluation are on-going within the study area. All monitoring/research activities should be coordinated and analyzed to determine duplicative activities as well as to identify additional required activities. Also, exchange and use of data is critical to the decision-making process of project implementation. These activities are further discussed below in the following section and under the *Hydrology and Hydraulic Studies* subaccount. Pre-project baseline data collection would be initiated prior to project construction.

(4) **Implement Increment #1.** The first increment of the project would be implemented. Post-project monitoring activities would begin.

(5) **Monitor the results of Increment #1.**

(6) **Determine if goals are met.** Results of the monitoring plan would be evaluated to determine if the interim goals are being met.

(7) If goals are met, then **continue with Increment #2** by establishing interim goals (continue process by returning to (2)).

(8) If goals are not met, then **determine the problem** with meeting the goals. Project implementation and monitoring results should be verified and evaluated to identify why the goals were not met. It should be determined whether the problem is "unmanageable" (refer to (9) or "natural" (refer to (12))).

(9) If failure to meet the goal is "unmanageable" (i.e. cannot be met by altering the design or operation of the C&SF Project) or is due to an unanticipated natural phenomenon (for example, a 4 year drought occurs and results in the failure to meet both the hydrologic and ecological goals), then **re-evaluate and modify the hypothesis, and continue monitoring**. Determine if the goals are met (return to (6)).

(10) If goals are now met, then **continue with the next Increment** (return to (2)).

(11) If goals are not met, then return to (8) and **determine why the goals are not being met**.

(12) If failure to meet the goal is due to a design or operation problem of the C&SF Project, then **re-evaluate the goals and if necessary modify the Project Increment**. Again monitor the effects and determine if the goals are now being met.

(13) If goals are now met, then **continue with the next Increment** (return to (2)).

(14) If goals are not met, then return to (8) and **determine why the goals are not being met**.

Monitoring Plan

The role of monitoring will be to measure two levels of responses during project implementation, and to use this information to improve the design of sequential iterations (increments) of the project. The responses to be determined are: (1) if the characteristic species and communities in the southern Florida wetland systems are showing improvements in the direction of pre-drainage conditions, and (2) if the defining physical and ecological characteristics of the pre-drainage wetland systems are being recovered. Characteristic species and communities may include such keystone and endangered species as wading birds, the snail kite, the Cape Sable Seaside Sparrow, American alligator, and American crocodile; and such community components as the structure, species composition, and spatial patterns of each plant association, including periphyton mats, within each landscape feature of the remaining wetlands. The defining characteristics of the pre-drainage wetlands were the spatial scale, dynamic hydrological patterns, habitat heterogeneity, and the presence of large populations of those species of animals (wading birds, snail kites, etc.) that can only occur by operating across multi-landscape scales.

Routine, systematic analysis of the monitoring data (1) will improve our understanding of the hydrologic and ecological relationships in these wetlands by showing which of the structural and operational components of each project increment produce predicted vs. unpredicted responses, and (2) will lead to improvements in the design of each sequential increment by showing which components contribute to recovery of populations and communities of representative species and to the defining characteristics of the wetland systems. A comprehensive, regional monitoring program should be in place prior to the initiation of the restoration project increments, to establish the complete pre-project baseline condition, and should continue during and beyond the period of implementation of the project. Implementation of sequential increments of the restoration project should occur following analysis of each increment in the monitoring database.

Develop Monitoring Plan - Monitoring activities are being initiated as part of several on-going south Florida projects. An initial activity in support of developing a monitoring plan will be to evaluate the adequacy of existing monitoring protocols, both for the spatial and temporal features of each, and for the quality of the resulting databases for use in statistical treatments for trend analyses. Protocols for any new monitoring projects to be added to the comprehensive, regional program should also be developed. For example, identification and implementation of an interagency monitoring program is currently under development as part of the Modified Water Deliveries to Everglades National Park, C-111, and Taylor Slough Demonstration projects. Coordination meetings are being held to identify monitoring objectives, existing data, additional parameters to be monitored, how data will be shared, and required actions based on monitoring findings. This study assumes that joint workshops will be held to insure that a comprehensive monitoring plan will be developed that will include any existing plans developed. Development of a monitoring plan will include several efforts and accomplishments. Many of these activities will be accomplished simultaneously as a result of meetings. Exchange of data and information will be on-going throughout the process.

Existing Hydrologic Data Evaluation - Requirements of the future hydrologic modeling efforts will be evaluated to determine any necessary changes or modifications required for the existing data collection network. This will provide for identification of baseline hydrologic monitoring needs to support future restoration activities. It is assumed that no additional monitoring sites are needed to support the feasibility study modeling effort.

Ecologic Data Analysis and Evaluation - Data analysis and evaluation includes efforts needed to support model development and baseline monitoring in support of future restoration activities. As mentioned above (under *Develop Monitoring Plan*) development of a monitoring plan has been initiated as part of on-going projects within the study area. Due to the extensive data collection efforts currently underway within the study area, the cost estimate for this activity does not include funds for additional data collection. The cost estimate for this activity is for the analysis and evaluation of existing data.

Water Quality Data Collection and Evaluation - The scope of this effort will involve investigation and catalog of all available water quality data and databases in the region in support of model development, baseline monitoring to support future restoration activities, and water quality certification. The water quality data analysis effort will include a literature search, review of existing water quality data, identification of: point/non-point nutrient and contaminant sources; and on-going research studies of transport mechanisms. Additional water quality data needs and collection of essential data will be identified early in the feasibility phase. Testing may include any or all of the parameters identified in the existing South Florida Water Management Districts studies of the East Coast Buffer (Water Preserve Areas). Any testing for nutrients, heavy metals, and toxic organic chemicals will be specified and agreed upon with the SFWMD and other agencies at work in the area.

Develop Matrix of Actions Based on Monitoring Findings - The results of monitoring activities should be evaluated and assessed. The monitoring databases will be used to evaluate the affects of the structural and operational components of each restoration project on the physical and ecological components and characteristics of the South Florida wetland systems. If results are as predicted then monitoring can proceed. However, if results are unexpected and/or unexplained then the monitoring activities and hypothesis(es) should be re-evaluated and possibly modified. The monitoring program itself must be re-evaluated periodically for completeness and technical merit. The monitoring program should be designed to support the use of the monitoring results to modify or fine-tune the monitoring program as well as to determine implementation of future project increments.

22N - SURVEYS AND MAPPING

(Except for Real Estate Purposes)

The Surveys and Mapping effort will use Geographic Information Systems (GIS) as an integral tool permitting the spatial analysis of hydrologic models, environmental evaluation and cultural data. GIS allows the management of large datasets, more detailed analysis, and the exploration and evaluation of more alternatives than would be possible by the traditional methods in the same amount of time. This increase in efficiency is critical given the size of the study area and the large scale of the analysis contemplated.

Spatial data will be incorporated from other projects, obtained from other agencies, or purchased as necessary. Additional hardware and software may be purchased to augment that which is already available.

GIS Data Collection - This activity consists of researching and acquiring data in the form of ASCII, analogue, cell-based data, raw digital, scanned data, other mapping systems, GPS coordinates, high altitude aerial photography, satellite imagery and existing digital data for GIS analysis of projects as required during the feasibility study. It can be assumed that depending on the type of data and the source organization, charges may be incurred for the data. Types of data to be researched will include but are not limited to:

- EOSAT scenes for the project area
- LEC Water Supply Plan East Coast Buffer maps and/or digital data
- Historical water levels in ENP
- Updated Stormwater Treatment Area (STA) data
- Private in-holdings in ENP expansion area (8.5 mi.² area - NE Shark Slough)
- Current crop maps of EAA and Frog Pond
- Complete survey of monitoring wells, x,y coordinates, ground elevation and section ties, at each site, as well as stage data, rainfall, marine site, etc.
- Other surveys of project area, aerials, survey maps, etc.
- Maps of other agencies plans for project area.
- Data and information on site specific endangered species
- Heritage Foundation data on habitat types
- Updated or additional census tract data
- Available data bases for GAP

- Current well water level data
- Permit data from Corps Regulatory Branch
- Land use data - FLUCS - updated 1994-95
- Updated USGS topographic data from 5' to 6" contour intervals
- Orthophotoquads of all of South Florida produced from CIR photography and available on CD-Rom.
- Map created from Landsat imagery of area covering South Florida from Orlando south to the Keys
- Map products from Broward county consisting of 18 layers of data including hydrology and geology created from high altitude aerial photography
- Available data bases from Dade County planning division
- Additional and/or updated vegetation data for project area
- Available data bases from the Nature Conservancy
- Climatological data from NOAA
- Additional Data for Big Cypress National Preserve in the form of ground elevations, water control structures, ground cover, etc.
- Land cover from Landsat imagery with vegetation as well as land cover types
- Occurrences of wildlife localities as in rookeries, eagle's nests, etc.
- Strategic habitat conservation areas, high priority lands for biodiversity protection.
- Priority wetlands for listed species ranked on basis of number of species use.

Topographic Surveys - There will be a concurrent effort to analyze in greater detail, the potential sites for Water Preserve Areas (WPAs) along the eastern boundaries of the Water Conservation Areas and Everglades National Park. The topographic data will be used in hydrologic modeling and environmental evaluation geared specifically to the Water Preserve Areas. Included will be an update of site suitability for the WPA'S based on new siting suitability criteria.

Topographic surveys and aerial infrared digital orthophoto based topography at National Map Accuracy Standards with a scale of 1-inch = 600-feet with 1-foot vertical contours identified will be developed for the Water Preserve Areas. Cross-sections will be surveyed at 500-foot intervals with control monuments at 1-mile intervals to develop the contour maps. Topographic surveys and aerial photography will be accomplished and as needed will be converted to a usable format for integration into the Intergraph system for use by the Engineering Division.

Hardware and Software Procurement - This activity involves determining the increased needs for GIS efforts in relation to field data collection, software implementation, and map production. It includes researching vendor specifications as well as cost comparisons. This may include, but is not limited to procurement of the following:

- GPS equipment for rapid collection of field data as in location of habitat nesting sites, hydraulic structures, monitoring wells, etc.
- Software that aids in more efficient, rapid data collection, analysis and product generation.
- Plotting or printing equipment of a faster speed and higher quality for more immediate display of analytical results.

Quality Assurance - This activity involves all aspects of quality review of surveyed, collected, acquired data and information before any conversion including general review for data quality, and detailed review for proper attribution and classification. In addition, quality control of data bases after construction including checking validity of surveyed, collected, acquired and existing data using the software capabilities, graphic display to check for data spikes and segment crossovers and software checking for label and node errors.

Data Base Conversion and Construction - This activity involves converting the acquired data in its existing form, performing the necessary steps to create a usable format compatible with the software, including any digitalization, reformatting, and scanning of data if necessary and constructing final data bases.

GIS Analysis and Map Production - This activity includes analysis of existing or acquired data and hydrologic and/or environmental models and creating maps, tables and charts as graphic displays using either ARC/Info, ArcView, Erdas, GRASS, Image Alchemy, Terra Model, Microstation, Site Works, or Surfer or additional software packages to be purchased as needed to complete the analysis. Also, maps, charts, tables, graphics and illustrations for report preparation and public awareness and involvement.

Data Management and Metadata Standards - This activity involves the organization of geospatial data bases into the Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata as instructed by *Executive Order 12906, Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure*.

22P - ENGINEERING ANALYSIS AND DESIGN/PROJECT COST ESTIMATES

This account includes all the design and cost estimates needed to support plan formulation of restoration alternatives in addition to the design and cost estimate of the comprehensive plan and the Water Preserve Areas.

The alternative plans selected for further study will be identified after the Technical Review Conference (TRC). Preliminary design and cost estimates for these alternative restoration components will then be prepared to support plan formulation and optimization of the comprehensive Everglades restoration plan. The preliminary design and cost analysis will include estimates of construction costs, estimates of average annual operation, maintenance and replacement costs, and engineering, design, supervision and administration costs. After the TRC, when the plans are identified for further study, an M-CACES (engineering) cost estimate will be required. The evaluation will be in sufficient enough detail so the requirements of EC 1110-2-268 will be incorporated. Material from these activities will be incorporated as part of a separate engineering appendix to the feasibility report. Costs attributable to work under this account include the effort required to prepare input for the preliminary draft, draft, and final reports, as well as participation in each of the required review conferences and resolution of comments resulting from the conferences.

Engineering Design for Screening Alternatives - Preliminary civil design for formulating, scoping, and screening alternative plans will include site layout, identification of project features, typical cross sections, profiles, and location of facilities/utilities. Initially, only features identified during the reconnaissance phase will be investigated. Alternate combinations of types of construction and alignments will be screened to assure optimum plans are identified. All of the work described in this activity will be completed prior to the Technical Review Conference (TRC).

Screening Level Cost Estimates - Cost engineering will assist in the selection of the components of the plans that will be considered during the screening process. Cost information already compiled during the reconnaissance phase of study will be used to provide cost data for possible variations of the alternatives considered during the reconnaissance phase. M-CACES cost estimates will not be required during the screening of all the alternatives that to be considered.

Engineering Design Final Alternatives - After the initial screening processing is completed and during the time leading up to the selection of tentative plans for further study, planning will provide engineering design additional components as the individual project plans are refined. These designs will be provided to cost engineering to refine the cost estimates for final alternatives.

Preliminary Cost Estimates for Final Alternatives - After the initial screening processing is completed and during the time leading up to the selection of a tentative plan (or possibly two plans), modified and updated cost figures will be supplied as the individual project plans are refined in order to selectively eliminate alternatives. The cost estimates will be based on quantities which will be provided by engineering design for both construction and Operation, Maintenance, Rehabilitation, Repair and Replacement (OMRR&R) items. All of the work described in this activity will be completed prior to the Feasibility Review Conference (FRC).

Design and Cost Estimating participation in TRC. Preparation of work to date in presentation format and attendance at TRC.

Finalize Design for Comprehensive Plan and WPAs - After final alternative screening is complete, design for the comprehensive plan and recommended plan for the Water Preserve Areas, and a locally preferred plan (if different and requested), will be finalized. This effort will include developing the drawings, deriving quantities, and identifying operation and maintenance costs.

Civil design write-up for preliminary draft report - This activity includes preparation of the narrative report which documents all work leading up to submission of the preliminary draft report and input into the draft Project Management Plan (PMP).

Cost Estimating write-up - This activity includes the effort to prepare a narrative summary and the associated cost tables, documenting all the work performed leading up to submission of the preliminary draft feasibility report.

M-CACES cost estimate - Initial M-CACES cost estimate for the recommended plan and locally preferred plan, if different. A detailed M-CACES cost estimate will be prepared for the selected plan(s). The cost estimate will include detailed cost evaluations of the requirements for OMRR&R activities. The cost estimate will be accompanied by a cost

estimate summary describing major design features and important assumptions made in putting together the M-CACES cost estimate.

Design and Cost Estimating participation in the FRC - Preparation of work to date in presentation format and attendance at the Feasibility Review Conference (FRC).

Finalize M-CACES cost estimate - Provide detailed cost figures for refinement and/or changes in the final project design prior to the final report. Included will be a detailed evaluation of the requirements for OMRR&R activities. This will then be incorporated into the final M-CACES cost estimate for the selected plan. Also included is the effort required to modify the report write-up and the appropriate cost tables, if necessary, prior to submission of the final feasibility report.

Comment responses & finalize write-up - This task includes the effort required to address all comments generated at the FRC by revising drawings and the report write-up as well as documenting the comments and resolutions in the Project Guidance Memorandum (PGM).

During the plan formulation process of identifying alternative measures to be screened, and in actually performing the screening, the South Florida Water Management District (SFWMD) will be required to work closely with Corps. SFWMD will review draft designs and provide comments. SFWMD's responsibility in this area will continue throughout the study as more features are formulated and designs developed. SFWMD will provide input to the Corps regarding operation and maintenance costs for the alternatives. SFWMD will also assist in the process of locating existing utilities in the project area.

22Q - FEASIBILITY PLANNING TECHNICAL MANAGEMENT

The management of the execution of the feasibility study will be accomplished by the U.S. Army Corps of Engineers, Jacksonville District, Planning Division in conjunction with the South Florida Water Management District's (SFWMD) assigned Project Manager. Tasks will include preparation of work orders, specific work requests, overseeing the timely completion of study tasks, and monitoring schedules and funding. It includes preparation of correspondence required to initiate and conclude study coordination with Federal, state, and local agencies. Preparation and conduct of briefings, workshops, and informal meetings with Federal, state, and local officials, state agencies, and the public. Coordination and dissemination of review comments on the completed products and draft feasibility report. Management of the feasibility study team is an ongoing responsibility of the study manager, i.e., scheduling meetings, identification of the major tasks to be completed, and coordination with team members on the development of study products.

Initiation of Feasibility Study - Prepare and issue initial work orders to appropriate offices as indicated in the study network schedule. Periodically update work orders and submit additional requests.

Technical Review Conference (TRC) - Responsibility for conduct of this meeting will be handled by the study manager. The study manager will be responsible for preparation of the materials related to technical and policy issues to be covered at the meeting.

Submit Preliminary Draft Feasibility Report - Submission of the preliminary draft feasibility report and draft M-CACES (engineering) cost estimate to the Corps' higher headquarters.

Feasibility Review Conference (FRC) - Responsibility for conduct of this meeting will be handled by the Corps. The study manager will be responsible for preparation of the materials related to technical and policy issues to be covered at the meeting. A Memorandum For Record (MFR), summarizing the meeting, will be prepared.

Submit Draft Feasibility Report - The Corps will transmit the draft feasibility report with integrated draft EIS and M-CACES cost estimate to Corps' higher authority and the public.

Submit Final Feasibility Report - The Corps will transmit the final feasibility report and associated documents to the Corps' higher authority.

Study Management - This activity includes on-going study management responsibilities throughout the feasibility phase of the study. The cost associated with this activity includes the tasks described in the opening paragraph of this account description.

SFWMD will be responsible for having the appropriate personnel attend all required meetings listed in the Project Study Plan (PSP) schedule as milestones, management of the in-kind work to be provided under other accounts, and providing budgetary and schedule input for completion of the activities. On-going coordination between SFWMD and the Corps is critical, and SFWMD costs associated with this coordination is included here.

22R - PLAN FORMULATION AND EVALUATION

This account includes the evaluation of different alternatives and the general plan formulation activities by the study manager, in conjunction with the study team, which are not appropriately accounted elsewhere. The responsibility for defining the planning framework for conduct of the feasibility study, including problem identification, and identification of planning objectives and constraints, falls under the purview of the plan formulation function. A screening and selection analysis will array the costs and benefits associated with each plan. The formulation studies will require testing and evaluating alternative restoration plans, both structural and non-structural, for economic, environmental, and engineering effectiveness based on study objectives and constraints. Formulation activities specific to the Water Preserve Areas includes the selection of suitability criteria and an iterative facility siting analysis based upon the site suitability criteria. Formulation and evaluation of alternative plans specific to the Water Preserve Areas component of the comprehensive Everglades restoration plan will be of sufficient scope to recommend authorization of this component.

ALTERNATIVES

Alternatives to be developed/evaluated will be based on the components of the basic plans presented in the reconnaissance report. The reconnaissance study modeling effort identified the important components to achieve restoration throughout the system. However, the best combination of these components, and optimization of component effectiveness, was not completed as part of the reconnaissance study. The major aspects of the components to be evaluated will include:

- alternatives for conveying water through the Everglades Agricultural Area (EAA) such as flowways, canal enlargements, and modified ground water levels to control soil subsidence;
- water storage in the Everglades headwaters to include Lake Okeechobee, EAA, Water Conservation Areas (WCAs), and Water Preserve Areas;
- alternatives to reduce community fragmentation within the WCAs;
- alternative operational schedules for Lake Okeechobee and WCAs; and

- alternative water supply features;
- water quality features.

Problem Identification - Initial study efforts will involve problem identification and the identification of planning objectives and constraints. As part of this effort, public concerns will be identified through scoping and Public Workshop #1. A technical analysis will be conducted to investigate the public and scientific concerns and then planning objectives and constraints will be developed. This will include an inventory, forecast and analysis of conditions within the study area relevant to the identified problems and opportunities.

Initial Plan Formulation - This activity includes the effort to develop preliminary alternatives for initial screening. This will include a public workshop (described under 22A *Public Involvement*) in which ideas to meet the study objects will be presented. This activity also includes the development of site suitability criteria for the Water Preserve Areas and the subsequent identification of potential water preserve area sites based upon Geographic Information System (GIS) database evaluations. Completion of this activity is critical for numerous activities to begin to include hydrologic modeling, engineering design, and real estate appraisals.

Initial Screening - Initial screening efforts in the feasibility study will evaluate the plan components, and alternate combinations of the components, to optimize a comprehensive system-wide Everglades restoration plan. Individual plan components, or necessary combinations of components, will be evaluated in increments to segregate the effects of the individual increments and to optimize their effectiveness for providing system needs. Optimal increments will then be combined to form comprehensive restoration plans for system-wide evaluation. An hydrologic object-oriented system model (OSM), the River of Grass Evaluation Methodology (ROGEM), and the Everglades Landscape Model (ELM) will be used for this purpose. This effort will include initial screening of alternative design and operational plans specific to the Water Preserve Areas. Standard Corps of Engineers computer programs developed by the Hydrologic Engineering Center (HEC) will be used to evaluate alternative designs for the water preserve areas. The evaluation of effects of each alternative plan will involve the measurement or estimation of the effects of each alternative plan and determine the difference between without-plan and with-plan conditions for each of the categories of effects. The process will include assigning social values to the plans using technical information gathered for

comparison of plan alternatives. Through this analysis, the plans will be screened to identify the most viable components for more detailed study.

Select Final Array of Alternatives - Following completion of the initial screening, the field of alternatives will be narrowed (approximately 6) and considered in more detail as the study progresses.

Final Screening - Modeling at a greater level of accuracy will be required for more detailed design and environmental output evaluation purposes. Additional hydrologic model development, environmental model development, water quality analyses, and water supply analysis will be required to refine plan formulation and evaluation. The evaluation of the final set of alternative plans will consist of analyzing the effects of the plans against various sets of evaluation categories and criteria. The results of the evaluations will be arrayed and compared to identify significant differences among the plans.

Optimization of Comprehensive Plan - Cost effectiveness and incremental cost analysis will be used to compare different outputs resulting from the various levels of expenditures. This effort will include development of an implementation process that incorporates an adaptive management strategy to project implementation. This strategy will recognize that once restoration measures are implemented and monitored, feedback is provided based on new insights gained on the response of the ecosystem and sequential adjustments can be made to the project and future elements.

Optimization of Water Preserve Areas Plan - Cost effectiveness and incremental cost analysis will be used to compare different outputs resulting from the various levels of expenditures specific to the implementation of Water Preserve Areas. This effort will include development of an implementation process that incorporates an adaptive management strategy to implementation of the Water Preserve Areas. This strategy will recognize that once the Water Preserve Areas are implemented and monitored, feedback is provided based on new insights gained on the response of the ecosystem and sequential adjustments can be made to the project and future elements.

Cost Allocation and Apportionment - This task includes the effort required to evaluate the allocation and apportionment of costs based on the purpose of the proposed project features in accordance with established U.S. Army Corps of Engineer cost-sharing policies. This

effort will establish the cost-sharing apportionment for all recommended project features.

22S - REPORT PREPARATION

The *Water Preserve Areas Interim Feasibility Report with Environmental Impact Statement* shall consist of the Main Report with an integrated NEPA document and numerous Technical Appendices. This report will be prepared in compliance with Federal *ER 1105-2-100, Planning Guidance* and *ER 1110-2-1002, Maps and Drawings*. The report shall be a complete decision-making document and as such shall include a complete presentation of plan formulation. The report shall be based on all studies and investigations conducted and also from published reports applicable to the study area.

The Main Report, which summarizes the study finding(s) and recommendation(s), shall be direct, concise, and written in an user-friendly style using sufficient graphics, illustrations and photographs to convey the information. For the purpose of estimating costs, the main report is assumed to be 300 pages. The NEPA document will be integrated with the Main Report and shall conform to the regulations contained in *ER 200-2-2, Policy and Procedures for Implementation of NEPA*, dated 4 March 1988.

All technical appendices shall be written for technical reviewers. The final version of each appendix will be submitted to the Study Manager on disk in WordPerfect 5.1 or equivalent for inclusion in the final document. The estimated size of all Appendices combined is 1500 pages, including foldout maps.

The base maps used to show study features shall be the same for all versions of the report, whether Main or an Appendix. All maps and drawings will be in either CADD or GIS format, and will be developed in layers to facilitate color separation for reproduction by off-set press. All graphs, illustrations and photographs should be developed with a view toward off-set printing or photo copy. For example, while a graph with color lines "looks good", in most cases, a variety of line widths and symbols in black and white will accomplish the same purpose at a fraction of the cost. Color will be used sparingly.

Preliminary Draft Report - This activity will involve preparing a preliminary draft feasibility report and associated documents for use at the Feasibility Review Conference (FRC).

Draft Report - This activity involves preparing the draft feasibility report, including the draft *Environmental Impact Statement (EIS)*. This report will be released for public comment. Other activities will include preparing responses to Corps higher authority and incorporating the results of the FRC.

Final Report - This activity includes the tasks necessary to produce a final feasibility report. Incorporate any changes necessary to respond to comments received during the review period. Prepare a draft Chief of Engineers Report for submittal to Assistant Secretary of the Army for Civil Works.

22T - FEASIBILITY PROGRAMS AND PROJECT MANAGEMENT

The Corps' Project Manager (PM) will monitor study progress during the feasibility phase of the project. This includes attendance and participation in study team meetings, as well as public meetings, the Technical Review Conference (TRC), and the Feasibility Review Conference (FRC). In addition, a draft Project Management Plan (PMP) describing the project activities during Preconstruction Engineering and Design (PED) and construction will be prepared by the Corps as part of this work item for submittal with the preliminary draft feasibility report. Preparation of documents for compliance with Project Management regulations to include: annual budget data, fly sheets, and testimony, and monthly reporting documents for PRB will also be handled by the PM.

South Florida Water Management District's (SFWMD) responsibility for this account includes preparation of reporting documents, attendance at meetings - Executive Committee, Project Review Board, and sponsor's internal meetings - briefings, etc. required to keep higher reviews informed of study progress and findings. Includes time and effort required to assist Corps in preparation of the PMP for advanced engineering and design studies.

Prepare draft Project Management Plan (PMP) - During this activity the project manager will formulate the PMP based on study results available at that time. This task will required close coordination with the study manager, the study team, and the sponsor. In addition, the construction schedule will be coordinated with Construction Division, the local sponsor, and other appropriate elements. The draft PMP will be submitted with the preliminary draft feasibility report.

Participation in FRC - The project manager will present the draft PMP at Feasibility Review Conference (FRC).

Revise draft PMP - Based upon the review comments received at the FRC and those contained in the Project Guidance Memorandum (PGM), the draft PMP will be finalized for approval by the Corps Project Review Board (PRB).

PMP approved by District PRB - This activity consists of the project manager presenting the PMP to the Corps PRB for approval.

Project Management - This activity includes on-going project management responsibilities throughout the feasibility phase of the

Fact Sheet and Slides Submittal - The SAD Commander will submit a project Fact Sheet to HQUSACE which outlines the problems and opportunities identified in the feasibility study, the alternative plans considered, planning principals used, a description of the recommended plan, map of the project, physical data on project features, views of the State, Non-Federal interests, and other Federal Agencies, status of the EIS, and financial data on the recommended plan. The District commander will provide 35mm slides to HQUSACE within 30 days after the SAD Commander's Public Notice has been issued. The Fact Sheet and slides will be used to support testimony before authorization committees of Congress.

HQUSACE Review - HQUSACE will perform a comprehensive review of the interim feasibility report and perform the detailed review of plan formulation, economic, environmental and social aspects. The staff will also consider the views expressed by interested parties at public meetings and workshops and in written correspondence received in response to the SAD Commander's Public Notice. Upon completion of its initial review, the staff will draft an assessment summarizing its findings on the report indicating any additional information needed to address specific concerns. The assessment will be submitted to ASA(CW) to solicit any additional views and comments on the interim feasibility report. The draft assessment will also include a tentative target date for a staff field visit.

90-day State and Federal Agency Review - HQUSACE will initiate the 90-day review within a few days after receipt of the interim feasibility report if the document complies with procedural requirements of law and does not indicate significant interagency conflict. The Corps SAD Commander will be responsible for filing the NEPA document, EIS, with the Environmental Protection Agency (EPA). The SAD Commander will also be responsible for the local distribution of the EIS to parties not included on the HQUSACE mailing list for the normal 30-day review. The 30-day review occurs concurrently with the 90-day State and agency review period.

Washington Level Final Assessment - The final Washington level assessment will be a consolidation of the review comments of all Washington echelons and will identify any aspects which need to be addressed before the feasibility report is considered by decision makers.

Field Visit and Meeting - Upon receipt of the Washington level final assessment, a field visit/meeting will be scheduled. The field visit is intended to provide an opportunity for the Jacksonville District and non-

Federal sponsor to furnish information to the HQUSACE review staff to address review comments and resolve potential issues.

Documentation of Report Review - Based upon information obtained during the field visit, the HQUSACE review staff will prepare written documentation of the results of the report review. The documentation will discuss how each comment in the Washington level assessment was resolved; what back-up information is available to support the comment resolution; and indicate any revisions made to the report. The documentation will also indicate any concerns which have not been completely resolved.

Washington Level Decision-Making Process - The HQUSACE review staff will conduct a briefing for the senior representatives of HQUSACE and the ASA(CW). The purpose of the briefing is to present results of the review and to permit opportunity for participants to discuss the report. Facts pertaining to the report will be presented, including any available comments provided by the State and other Federal agencies during the 90-day review and identification of those agencies which have not responded and whose comments, if submitted, would need to be considered during later decision making. Representatives to attend the briefing include the following:

HQUSACE - major Division staff Chiefs;

ASA(CW) - Deputy for Policy, Planning, and Legislative Affairs;

Staff representatives from the Corps Jacksonville District and South Atlantic Division;

Representatives from the non-Federal sponsor, the SFWMD.

Chief of Engineers Report - Prior to transmittal of the report to Congress and signing of the Record of Decision (ROD) by the ASA(CW), the sponsor, the State, interested Federal agencies, and other parties will be advised of any modifications made to the recommendations and will be afforded an opportunity to comment further. In such circumstances, an additional 30-day review period will be provided for further comment before finalizing the recommendations in the final report of the Chief of Engineers.

APPENDIX B
ORGANIZATIONAL BREAKDOWN STRUCTURE
(OBS)

DRAFT May 2, 1995

REPORT: CODELIST

CODE FILE LISTING FOR P:CSFREVCL.COD

REPORT DATE: 5MAR95

CODE	DESCRIPTION
ALL	All Cooperating Federal and State Agencies
ASA(CW)	ASSISTANT SECRETARY OF THE ARMY FOR CIVIL WORKS
CO-S	CO-SOUTH FLORIDA AREA OFFICE
CT	CONTRACTING DIVISION
CT-C	CT-AE AND CONSTRUCTION BRANCH
DE	DISTRICT ENGINEER
DEP	FLORIDA DEPT OF ENVIRONMENTAL PROTECTION
DP	DDE FOR PROJECT MANAGEMENT
DP-B	DP-PROGRAMS MANAGEMENT BRANCH
DP-I	DP-PROJECT MANAGEMENT BRANCH
EN	ENGINEERING DIVISION
EN-C	EN-COST ENGINEERING BRANCH
EN-D	EN-DESIGN BRANCH
EN-DC	EN-DESIGN BR. SPECIFICATIONS SECTION
EN-DD	EN-DESIGN BR. DRAFTING SECTION
EN-DL	EN-DESIGN BR. LEVEE & WATERWAYS SECTION
EN-DM	EN-DESIGN BR. MECHANICAL SECTION
EN-DS	EN-DESIGN BR. STRUCTURES SECTION
EN-G	EN-GEOTECHNICAL BRANCH
EN-GG	EN-GEOTECHNICAL BR. GEOLOGY & EXPLORATION SECTION
EN-GS	EN-GEOTECHNICAL BR. SOILS SECTION
EN-H	EN-HYDROLOGY & HYDRAULICS BRANCH
EN-HH	EN-H&H BR. HYDRAULIC DATA & DESIGN SECTION
EN-HI	EN-H&H BR. HYDROLOGIC INVESTIGATION SECTION
EN-HW	EN-H&H BR. WATER MGMT & METEOROLOGY SECTION
EN-S	EN-SURVEY BRANCH
EN-SF	EN-SURVEY BR. FIELD SURVEY SECTION
EN-SL	EN-SURVEY BR. CONTRACT SURVEY SECTION
EN/RE/PD	DISTRICT REVIEW AND COORDINATION
ENP	EVERGLADES NATIONAL PARK
EPA	U.S. Environmental Protection Agency
FAC	FEDERAL ADVISORY COMMITTEE
FGFWFC	FLORIDA GAME AND FRESH WATER FISH COMMISSION
FWS	U.S. FISH AND WILDLIFE SERVICE
HQ	HEADQUARTERS OF THE U.S. ARMY CORPS OF ENGINEERS
NMFS	NATIONAL MARINE FISHERIES
OC	OFFICE OF COUNSEL
PA	PUBLIC AFFAIRS OFFICE
PD	PLANNING DIVISION
PD-D	PD-SOCIO-ECONOMICS BRANCH
PD-E	PD-ENVIRONMENTAL RESOURCES BRANCH
PD-EE	PD-ENVIR RES BR. ENVIRONMENTAL QUALITY SECTION
PD-ER	PD-ENVIR RES BR. ENVIRONMENTAL COORDINATION SECTION
PD-ES	PD-ENV RES BR. ENVIRONMENTAL STUDIES SECTION
PD-F	PLAN FORMULATION BRANCH
PD-PF	PD-PLAN FORM BR. FLOOD CONTROL & FLOOD PLAIN MGMT SECTION
PD-PN	PD-NAVIGATION SECTION OF PLAN FORMULATION BRANCH
PD-PR	PLANNING DIVISION. ECOSYSTEM RESTORATION SECTION
RE	REAL ESTATE DIVISION
RE-A	RE-AQUISITION BRANCH

OPEN PLAN

PAGE: 2

REPORT: CODELIST

CODE FILE LISTING FOR P:CSFREVC1.COD

REPORT DATE: 5MAR95

CODE	DESCRIPTION
RE-P	RE-PLANNING AND CONTROL BRANCH
RE-S	RE-APPRAISAL BRANCH
SAD	SOUTH ATLANTIC DIVISION
SAJ	ALL JACKSONVILLE DISTRICT OFFICES
SFWM	SOUTH FLORIDA WATER MGMT DISTRICT
USGS	U.S. Geological Survey
WES	WATERWAYS EXPER STATION HYDRAULICS LAB - NAV

APPENDIX C
STUDY COST ESTIMATE BY CODE OF ACCOUNTS

DRAFT May 2, 1995

C&SF- Comprehensive Review Study w/WPAs

Report File: RAM

Report Date: 2MAY95

Project File: CSF_EVER

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22A					
PUBLIC INVOLVEMENT					
PD-PR - PLANNING DIVISION, ECOSYSTEM RESTORATION SECTION					
A0010L	FACA/Extended Partnering Mtgs	2190	01AUG95	12SEP01	33,125
A1030	Review Study News #1	30	01AUG95	30AUG95	13,358
A1000S	Public Involvement Plan	60	01AUG95	30SEP95	7,750
A0060	Partnering Workshop	30	01AUG95	30AUG95	8,750
A0070S	Media Opportunity/News Release	2190	01AUG95	12SEP01	10,300
A1100L	Public Wrkshp #1	30	01OCT95	31OCT95	12,500
A0020L	Gov Commission/Fed Task Force	2190	03NOV95	13DEC01	55,000
A0040	C&SF Update & Briefings	2190	03NOV95	13DEC01	59,200
A2030	Review Study News #2	30	05MAY96	04JUN96	13,357
A2100L	Public Wrkshp #2	30	05JUN96	05JUL96	12,500
A2500	Review Study News #3	30	10AUG97	09SEP97	13,357
A2550L	Public Workshop #3	30	10SEP97	09OCT97	12,500
A3030	Review Study News #4	30	12DEC97	12JAN98	13,357
A3100L	Public Wrkshp #4	30	13JAN98	12FEB98	12,500
A3500	Review Study News #5	30	28APR99	27MAY99	13,357
A3550L	Public Workshop #5	30	28MAY99	27JUN99	12,500
A4030	Review Study News	30	22JAN00	20FEB00	13,357
A4100L	Public Wrkshp #6	30	21FEB00	21MAR00	12,500
A4200	Review Study News #7	30	03AUG01	01SEP01	13,357
A4250L	Public Workshop #7	30	02SEP01	01OCT01	12,500
Subtotal: \$					355,125
SFWM - SOUTH FLORIDA WATER MGMT DISTRICT					
A1000L	Public Involvement Plan	60	01AUG95	30SEP95	23,250
A0010S	FACA/Extended Partnering Mtgs	2190	01AUG95	12SEP01	33,125
A0070L	Media Opportunites	2190	01AUG95	12SEP01	70,300
A1100S	Public Wrkshp #1	30	01OCT95	31OCT95	12,500
A0050	Community Meetings/Publication	2190	03NOV95	13DEC01	195,250
A0020S	Gov Commission/Fed Task Force	2190	03NOV95	13DEC01	55,000
A2100S	Public Wrkshp #2	30	05JUN96	05JUL96	12,500
A2550S	Public Workshop #3	30	10SEP97	09OCT97	12,500
A3100S	Public Wrkshp #4	30	13JAN98	12FEB98	12,500
A3550S	Public Workshop #5	30	28MAY99	27JUN99	12,500
A4100S	Public Wrkshp #6	30	21FEB00	21MAR00	12,500
A4250S	Public Workshop #7	30	03AUG01	01SEP01	12,500
Subtotal: \$					464,425
TOTAL FOR THIS ACCOUNT: \$					819,550

C&SF- Comprehensive Review Study w/MPAS

Report File: RAM
Project File: CSF_EVER

Report Date: 2MAY95

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
228					
INSTITUTIONAL STUDIES					
PD-D - PD-SOCIO-ECONOMICS BRANCH					
B3100	Assessment of Capability	30	22DEC99	21JAN00	5,320
Subtotal: \$					5,320
SFWMD - SOUTH FLORIDA WATER MGMT DISTRICT					
B3000	Preliminary Financing Plan	30	21NOV99	21DEC99	7,780
Subtotal: \$					7,780
TOTAL FOR THIS ACCOUNT: \$					13,100

C&SF- Comprehensive Review Study w/MPAs

Report File: RAM
Project File: CSF_EVER

Report Date: 2MAY95

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
220					
CULTURAL RESOURCE STUDIES					
PD-ER - PD-ENVIR RES BR, ENVIRONMENTAL COORDINATION SECTION					
D1000	Archeol. Initial Assessment	365	06JUL96	15JUL97	15,000
D3000	Cultural Resources SOW	225	15FEB98	01OCT98	10,000
D3100	Phase I Cultural Invest	360	02OCT98	06OCT99	60,000
D4000	Cultural Resources Drft Rpt	30	07OCT99	06NOV99	8,000
D4100	Cultural Resources Final Rpt	30	01JUN01	30JUN01	3,600
TOTAL FOR THIS ACCOUNT: \$					96,600

C&SF- Comprehensive Review Study w/WPAs

Report File: RAM

Report Date: 2MAY95

Project File: CSF_EVER

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22E					
ENVIRONMENTAL STUDIES					
PD-ER - PD-ENVIR RES BR, ENVIRONMENTAL COORDINATION SECTION					
E1000	Initiate Scoping	2	01AUG95	02AUG95	800
E1050	Prepare for Scoping Wrkshp	20	03AUG95	22AUG95	4,000
E1100	Modify SOW	60	05MAY96	05JUL96	4,000
E1200	Field Investigations	180	06JUL96	07JAN97	27,400
E1300	Ident Impact Assess Method	30	08JAN97	07FEB97	3,000
E1350	Select Impact Models	5	08FEB97	12FEB97	4,000
E1375	Initial Assess	60	13FEB97	14APR97	19,000
E2000	Input for Initial Screen Alt	10	15APR97	24APR97	10,000
E2900	Prepare for TRC Presentation	15	25APR97	09MAY97	4,000
E3000	Modify Studies	30	10MAY97	09JUN97	5,200
E3050	Additional Env Sampling	30	10JUN97	10JUL97	9,000
E3100	Input for Final Alternatives	60	13JAN98	15MAR98	12,000
E3200	Bio Assessment	240	16MAR98	15NOV98	19,000
E3300	CZM Eval	60	16MAR98	14MAY98	4,000
E3400	404(b) Eval	60	16MAR98	14MAY98	8,000
E3500	Water Quality Cert. & Coord	365	30AUG99	02SEP00	90,000
E4000	Prelim Draft EIS	365	22JAN00	20JAN01	25,600
E3600	Aesthetic/Recreation Analysis	145	22JAN00	14JUN00	13,200
E4100	Prepare for FRC	5	21JAN01	25JAN01	2,400
E4110	Respond to FRC Comments	30	01JUN01	30JUN01	4,000
E4200	Draft EIS	30	01JUL01	30JUL01	42,000
E4300	NEPA Coord of Draft Rpt	70	03AUG01	11OCT01	0
E4310	Respond to Comments/Revise EIS	30	12OCT01	10NOV01	14,000
E4400	Final EIS	1	11NOV01	11NOV01	2,000
Subtotal: \$					326,600
PD-PR - PLANNING DIVISION, ECOSYSTEM RESTORATION SECTION					
EP100L	Wrkshp ID Rest. goals	45	01AUG95	15SEP95	7,500
EP1200	Peer Review ROGEM	180	01AUG95	03FEB96	12,000
EP1300	Review Exist Env Models	180	01AUG95	03FEB96	12,000
EP110L	Wrkshp ID Eco/Hydro Goals	60	16SEP95	16NOV95	11,500
EP140L	Initial ROGEM Mod	180	04FEB96	04AUG96	168,000
EP2000	Apply ROGEM Initial Screening	180	10APR97	09OCT97	104,000
EP220L	Additional ROGEM Mod	548	10APR97	23OCT98	145,500
EP2100	Prepare for TRC Pres	5	10OCT97	15OCT97	2,000
EP3000	Apply ROGEM Final Alternatives	360	24OCT98	28OCT99	112,000
EP3100	Incremental Analysis	180	24OCT98	27APR99	18,000
EP4000	Env Eval Draft Appendix	90	29OCT99	29JAN00	24,000
EP4100	Final Env Eval Appendix	30	01JUN01	30JUN01	18,000
Subtotal: \$					634,500

C&SF- Comprehensive Review Study w/MPAS

Report File: RAM
Project File: CSF_EVER

Report Date: 2MAY95

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
SFUND - SOUTH FLORIDA WATER MGMT DISTRICT					
EP100S	Wrkshp ID Rest. Goals	45	01AUG95	15SEP95	7,500
EP2300	Dev ELM	360	02AUG95	05AUG96	165,000
EP3800	Estuary Model Dev	540	02AUG95	08FEB97	285,000
EP3900	Mangrove Zone Model Dev	540	02AUG95	08FEB97	430,000
EP3600	Dev Lake Okeechobee Model	540	02AUG95	08FEB97	250,000
EP3500	Develop Exotic Species Model	540	02AUG95	08FEB97	120,000
EP110S	Wrkshp ID Eco/Hydro Goals	60	16SEP95	16NOV95	11,500
EP140S	Initial ROGEM Mod	180	04FEB96	04AUG96	56,000
EP2350	Apply ELM Initial Screening	360	05OCT96	09OCT97	108,000
EP220S	Additional ROGEM Mod	548	10APR97	23OCT98	48,500
EP3400	Apply ELM Final Alternatives	540	12DEC97	19JUN99	108,000
EP3850	Apply Estuary Models	490	13JUN98	28OCT99	241,000
EP3950	Apply Mangrove Model	490	13JUN98	28OCT99	282,000
EP3650	Apply Lake Okeechobee Model	490	13JUN98	28OCT99	200,000
EP3550	Apply Exotics Species Model	490	13JUN98	28OCT99	100,000

Subtotal: \$ 2,412,500

TOTAL FOR THIS ACCOUNT: \$ 3,373,600

C&SF- Comprehensive Review Study w/WPAs

Report File: RAM

Report Date: 2MAY95

Project File: CSF_EVER

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22G					
ECONOMIC STUDIES					
PD-D - PD-SOCIO-ECONOMICS BRANCH					
G2000	Economic Analysis Screen Alt	360	01AUG95	04AUG96	86,832
G3100	Flood Damage Studies	1000	05MAY96	28FEB99	54,240
G3200	Water Supply Studies	1000	05MAY96	28FEB99	222,836
G3300	Navigation Studies	1000	05MAY96	28FEB99	27,120
G3400	Commercial Fishery Study	1000	05MAY96	28FEB99	24,860
G3500	Recreation Studies	1000	05MAY96	28FEB99	54,240
G3600	Identify Eval Methods	100	05MAY96	14AUG96	4,520
G3900	Timing/Compensation Factors	700	05MAY96	24APR98	4,520
G3700	Select Relevant Regions	100	15AUG96	25NOV96	2,260
G3800	Eval Regional Impacts	600	26NOV96	04AUG98	77,800
G3910	Local Gov Impact Studies	700	26NOV96	15NOV98	13,560
G3920	ID Economic Impacts Offsets	100	16NOV98	28FEB99	13,560
G3000	Analyze Constr/Land Costs	30	21OCT99	20NOV99	13,560
G3010	Analyze OMRR&R Costs	30	21OCT99	20NOV99	1,356
G3020	Analyze Monitoring Costs	30	21OCT99	20NOV99	904
TOTAL FOR THIS ACCOUNT: \$					602,168

C&SF- Comprehensive Review Study w/MPAs

Report File: RAM
Project File: CSF_EVER

Report Date: 2MAY95

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22H REAL ESTATE ANALYSES					
EN-S - EN-SURVEY BRANCH					
H1200	Survey Section Corners	90	01AUG95	31OCT95	150,000
Subtotal: \$					150,000
RE-A - RE-ACQUISITION BRANCH					
H1000	ID Rights-of-Entry Needs	240	05MAY96	07JAN97	3,850
H1100	Obtain Ownership info	120	24FEB97	24JUN97	3,850
H3100	Physical Takings Analysis	60	19JAN99	20MAR99	18,000
H3200	Relocations Analysis	60	21MAR99	19MAY99	16,200
H4100	Draft PCA/PMP RE input	35	21NOV99	27DEC99	5,950
Subtotal: \$					47,850
RE-P - RE-PLANNING AND CONTROL BRANCH					
H3000	RE Acquisition Maps	360	13JAN98	17JAN99	26,000
H4000	Real Estate Supplement	90	21NOV99	20FEB00	19,250
Subtotal: \$					45,250
RE-S - RE-APPRAISAL BRANCH					
H2000	Prelim RE Cost Estimate	360	20AUG96	24AUG97	207,250
H3300	Gross Appraisal	180	20MAY99	20NOV99	81,500
Subtotal: \$					288,750
SFWMD - SOUTH FLORIDA WATER MGMT DISTRICT					
H1010	Obtain Rights-of-Entry	45	08JAN97	23FEB97	13,650
H1110	Acquire Ownership Info.	60	25JUN97	24AUG97	17,850
Subtotal: \$					31,500
TOTAL FOR THIS ACCOUNT: \$					563,350

C&SF- Comprehensive Review Study w/MPAs

Report Date: 2MAY95

Report File: RAM
Project File: CSF_EVER

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22J					
HYDROLOGY AND HYDRAULIC STUDIES					
EN-NH - EN-H&H BR, HYDRAULIC DATA & DESIGN SECTION					
J1000	Initiate Model Development	1	01AUG95	01AUG95	0
J0000	Eng Tech Management	1260	02AUG95	19FEB99	264,000
J2050	Hydraulic Design (Screening)	450	05MAY96	09AUG97	450,000
J2900	H&H Prepare for TRC	25	10OCT97	04NOV97	12,500
J3050	Hydraulic Design Final Alt	270	16JUL98	19APR99	270,000
J4300	H&H Input to PMP	30	21NOV99	21DEC99	15,000
J3080	Final Hydraulic Design - WPAs	180	22JAN00	19JUL00	200,000
J4000	H&H Draft Appendix	90	20JUL00	17OCT00	90,000
J4100	H&H Prep for FRC Pres	25	18OCT00	11NOV00	12,500
J4200	Final H&H Report	30	01JUN01	30JUN01	20,000
Subtotal: \$					1,334,000
EN-HI - EN-H&H BR, HYDROLOGIC INVESTIGATION SECTION					
J1100	Dev OSM Model (Screening)	360	02AUG95	05AUG96	190,180
J3300	PRM Model Dev	240	02AUG95	05APR96	85,075
J3600	GMS Model Dev	360	02AUG95	05AUG96	160,150
J1500	Rainfall-Frequency Analysis	45	02AUG95	16SEP95	10,010
J2020	Apply HEC Models - Screening	360	06AUG96	10AUG97	617,000
J2010	Apply OSM Screening	390	05SEP96	09OCT97	160,160
J3040	Apply HEC Model Final Alts	540	10OCT97	19APR99	580,000
J3010	Apply GMS/PRM Models Final Alt	490	16MAY98	30SEP99	256,500
J3100	Stage Damage Studies	360	16MAY98	20MAY99	120,575
Subtotal: \$					2,179,650
EN-HW - EN-H&H BR, WATER MGMT & METEOROLOGY SECTION					
J1300	Historical Hydro Data Analysis	360	02AUG95	05AUG96	58,800
J3800	Operational Studies	990	02AUG95	15MAY98	285,600
Subtotal: \$					344,400
SFWMD - SOUTH FLORIDA WATER MGMT DISTRICT					
J3400	SFWMD Dev (Increase Coverage)	540	02AUG95	08FEB97	389,925
J3500	NSM Model Dev (Increase Cover)	360	02AUG95	05AUG96	135,125
J3700	Dev SFWOM	540	02AUG95	08FEB97	350,000
J1101	Dev Water Budgets WPA,WCA,LEC	180	02AUG95	04FEB96	50,050
J3020	Apply SFWMD/SFWOM Final Alt	540	10OCT97	19APR99	226,000
Subtotal: \$					1,151,100
USGS - U.S. Geological Survey					
J3510	Peer Review of NSM by USGS	360	02AUG95	05AUG96	300,000
J1400	Hydraulic Analysis Exist Str	180	02AUG95	04FEB96	248,500

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ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
					Subtotal: \$ 548,500
					TOTAL FOR THIS ACCOUNT: \$ 5,557,650

CESF- Comprehensive Review Study w/WPAs

Report File: RAM
Project File: CSF_EVER

Report Date: 2MAY95

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22K GEOTECHNICAL STUDIES					
EN-G - EN-GEOTECHNICAL BRANCH					
K1000	Obtain Hist Boring Logs	30	01AUG95	30AUG95	10,000
K1100	Geotech Input Model Dev	90	31AUG95	02DEC95	40,000
K2000	Geotech Design Initial Screen	60	05MAY96	05JUL96	20,000
K2100	Prepare/Participate in TRC	15	06JUL96	20JUL96	4,000
K3000	Geotech Design Final Alt	90	12DEC97	15MAR98	40,000
K4300	Geotech Input to PMP	7	21NOV99	28NOV99	2,000
K3200	Geotech Field Investigations	180	22JAN00	19JUL00	686,000
K3300	Geotech Lab Analysis	120	20JUL00	16NOV00	62,200
K3400	Geotech Analysis	210	20JUL00	14FEB01	58,000
K4000	Prepare Geotech Plates	90	17NOV00	14FEB01	42,000
K4100	Prepare Geotech Draft Rpt	60	15FEB01	15APR01	26,000
K4200	Finalize Geotech Write-up	30	01JUN01	30JUN01	4,000
TOTAL FOR THIS ACCOUNT: \$					994,200

CESF- Comprehensive Review Study w/WPAs

Report File: RAM
Project File: CSF_EVER

Report Date: 2MAY95

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22M					
MONITORING AND POST PLANNING CONSIDERATIONS					
EN-HW - EN-H&H BR, WATER MGMT & METEOROLOGY SECTION					
M1600	Exist Hydrologic Data Eval	1040	01AUG95	05JUL98	54,000
Subtotal: \$					54,000
PD-EE - PD-ENVIR RES BR, ENVIRONMENTAL QUALITY SECTION					
M1510	Water Quality Data Evaluation	360	24FEB98	28FEB99	67,800
Subtotal: \$					67,800
PD-PR - PLANNING DIVISION, ECOSYSTEM RESTORATION SECTION					
M1000	Est Basis for Monitoring Plan	180	01AUG95	03FEB96	12,500
M1100L	Dev Restoration Strategy	180	04FEB96	04AUG96	8,875
M1200	Dev Monitoring Plan	180	05AUG96	07FEB97	32,625
M1410	Ecological Data Evaluation	360	24FEB98	28FEB99	63,000
M4000	Dev Action Matrix - Monitoring	180	01MAR99	29AUG99	11,000
Subtotal: \$					128,000
SFWMD - SOUTH FLORIDA WATER MGMT DISTRICT					
M1100S	Dev Restoration Strategy	180	04FEB96	04AUG96	8,875
M1210	Dev Monitoring Plan	180	05AUG96	07FEB97	32,625
M1400	Ecological Data Analysis/Manag	730	08FEB97	28FEB99	91,000
M1500	Water Quality Data Analysis	730	08FEB97	28FEB99	171,500
M4010	Dev Action Matrix - Monitoring	180	01MAR99	29AUG99	11,000
M1520	Water Quality Testing	180	01MAR99	29AUG99	250,000
Subtotal: \$					565,000
TOTAL FOR THIS ACCOUNT: \$					814,800

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ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22H SURVEYS AND MAPPING					
EN-S - EN-SURVEY BRANCH					
N1400	Topographic Surveys	120	05MAY96	04SEP96	1900000
					Subtotal: \$ 1,900,000
PD-PR - PLANNING DIVISION, ECOSYSTEM RESTORATION SECTION					
N1000	GIS Data Collection	200	01AUG95	24FEB96	510,500
N1100	Hardware/Software Procurement	153	01AUG95	06JAN96	16,100
N1200	Data Quality Assurance	360	01AUG95	04AUG96	49,000
N1300	Data Base Convers/Constr	125	25FEB96	29JUN96	12,600
N2000	GIS Analysis	478	05AUG96	09DEC97	167,300
N2100	GIS Map Production	30	31AUG99	30SEP99	7,000
N2200	Data Management Metadata	60	01OCT99	02DEC99	14,700
					Subtotal: \$ 777,200
					TOTAL FOR THIS ACCOUNT: \$ 2,677,200

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ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22P					
ENGINEERING ANALYSIS AND DESIGN/PROJECT COST ESTIMATES					
EN-C - EN-COST ENGINEERING BRANCH					
P2100	Cost Est Initial Alt	60	10AUG97	09OCT97	22,600
P2210	Cost Est prepare for TRC	5	10OCT97	15OCT97	2,800
P3100	Preliminary Cost Final Alt	60	20AUG99	20OCT99	47,880
P4200	MCACES Cost Est Final Plan	60	16JAN01	16MAR01	133,560
P4300	Cost Est Write-up	30	17MAR01	15APR01	16,800
P4410	Cost Est prepare for FRC	5	16APR01	20APR01	2,800
P4510	Final Cost Est Rpt	30	01JUN01	30JUN01	8,400
Subtotal: \$					234,840
EN-D - EN-DESIGN BRANCH					
P2000	Eng Design Screening Alt	180	08FEB97	09AUG97	260,800
P2200	Eng Design Prepare for TRC	5	10OCT97	15OCT97	4,750
P3000	Eng Design Final Alt	180	20APR99	20OCT99	255,800
P4050	Final Design Comp Plan & MPAs	180	20JUL00	15JAN01	250,800
P4100	Civil Design for Drft Rpt	90	16JAN01	15APR01	94,050
P4400	Eng Design prepare for FRC	5	16APR01	20APR01	9,975
P4500	Final Design Rpt	30	01JUN01	30JUN01	28,500
Subtotal: \$					904,675
SFWMD - SOUTH FLORIDA WATER MGMT DISTRICT					
P2150	Review Initial Alt Design/Cost	60	10AUG97	09OCT97	5,320
P4250	Review MCACES	60	16JAN01	16MAR01	14,840
Subtotal: \$					20,160
TOTAL FOR THIS ACCOUNT: \$					1,159,675

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ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22R					
PLAN FORMULATION AND EVALUATION					
PD-PR - PLANNING DIVISION, ECOSYSTEM RESTORATION SECTION					
R1000	Problem ID	180	01NOV95	04MAY96	83,000
R1200	Initial Plan Alt Formulation	180	01NOV95	04MAY96	73,000
R2000	Initial Screening	60	10OCT97	11DEC97	22,000
R2100	Select Final Alt	30	12DEC97	12JAN98	9,000
R3000	Final Screening	60	21NOV99	21JAN00	8,000
R4000	Optimize Comprehensive Plan	90	22JAN00	20APR00	23,000
R4100	Optimization of WPAs Plan	90	21APR00	19JUL00	23,000
R4200	Cost Allocation/Apportionment	90	21APR00	19JUL00	12,500
Subtotal: \$					253,500
SFWD - SOUTH FLORIDA WATER MGMT DISTRICT					
R2010	Initial Screening	60	10OCT97	11DEC97	22,000
R3010	Final Screening	60	20JUN99	19AUG99	8,000
Subtotal: \$					30,000
TOTAL FOR THIS ACCOUNT: \$					283,500

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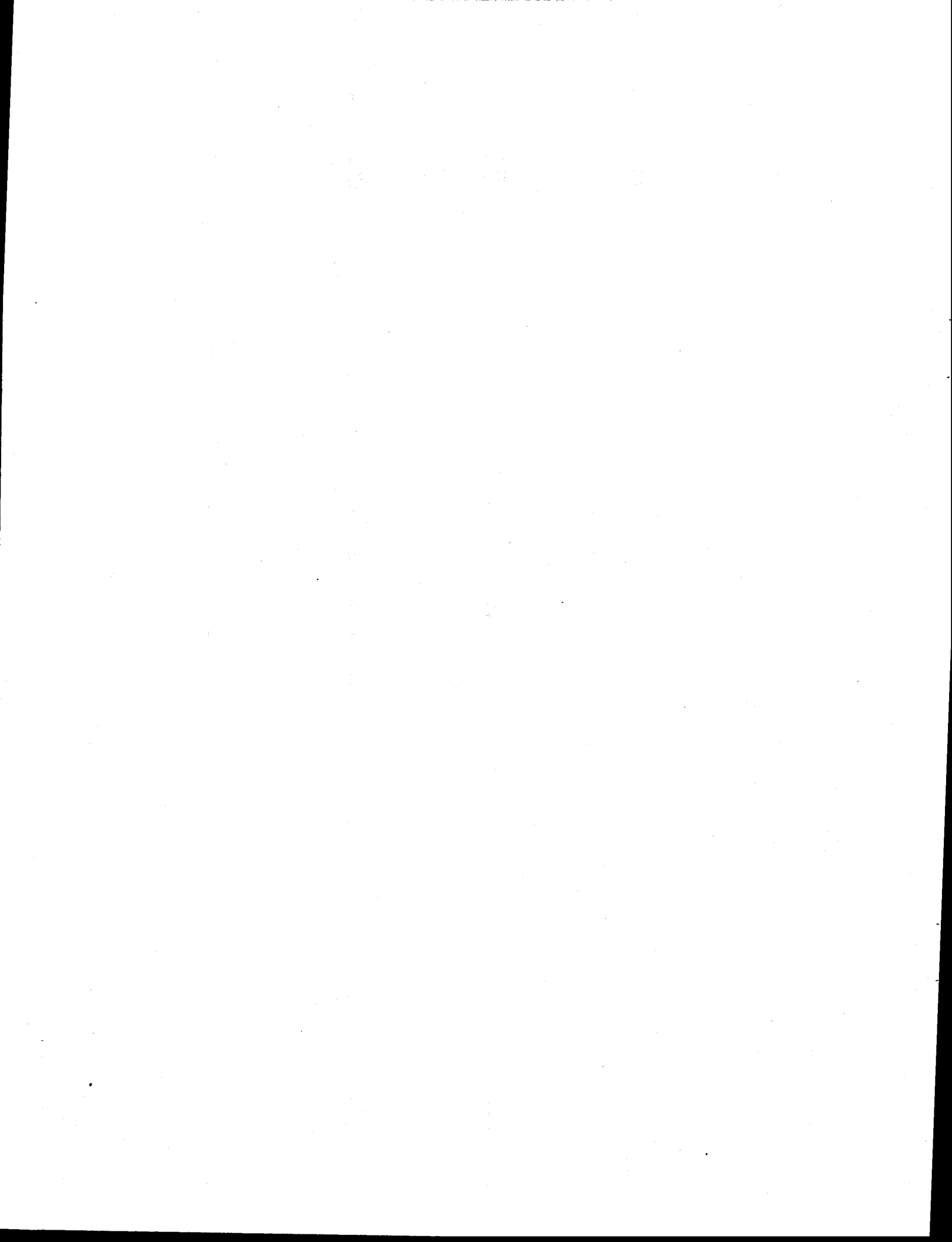
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Report Date: 2MAY95

Project File: CSF_EVER

ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
225					
REPORT PREPARATION					
PD-PR - PLANNING DIVISION, ECOSYSTEM RESTORATION SECTION					
S4000	Prelim Draft Rpt	45	02MAR01	15APR01	45,000
S4100	Draft Report	30	02JUL01	31JUL01	40,000
S4200	Final Report	30	02SEP01	01OCT01	60,000
TOTAL FOR THIS ACCOUNT: \$					145,000



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ACTIVITY LISTING BY CODE OF ACCOUNTS

ACTIVITY	DESCRIPTION	Duration	START	FINISH	COST
22T					
FEASIBILITY PROGRAMS AND PROJECT MANAGEMENT					
DP-1 - DP-PROJECT MANAGEMENT BRANCH					
T0000	Project Managment	2190	03NOV95	13DEC01	175,000
T4000	Prepare Draft PMP	60	21NOV99	21JAN00	15,000
T4100	Prepare for FRC	5	22JAN00	26JAN00	2,500
T4200	Revise Draft PMP	30	01JUN01	30JUN01	5,000
Subtotal: \$					197,500
SAJ - ALL JACKSONVILLE DISTRICT OFFICES					
T4300	PMP approved by Dist PRB	1	01JUL01	01JUL01	0
Subtotal: \$					0
SFWD - SOUTH FLORIDA WATER MGMT DISTRICT					
T0001	Project Management	2190	03NOV95	13DEC01	175,000
Subtotal: \$					175,000
TOTAL FOR THIS ACCOUNT: \$					372,500

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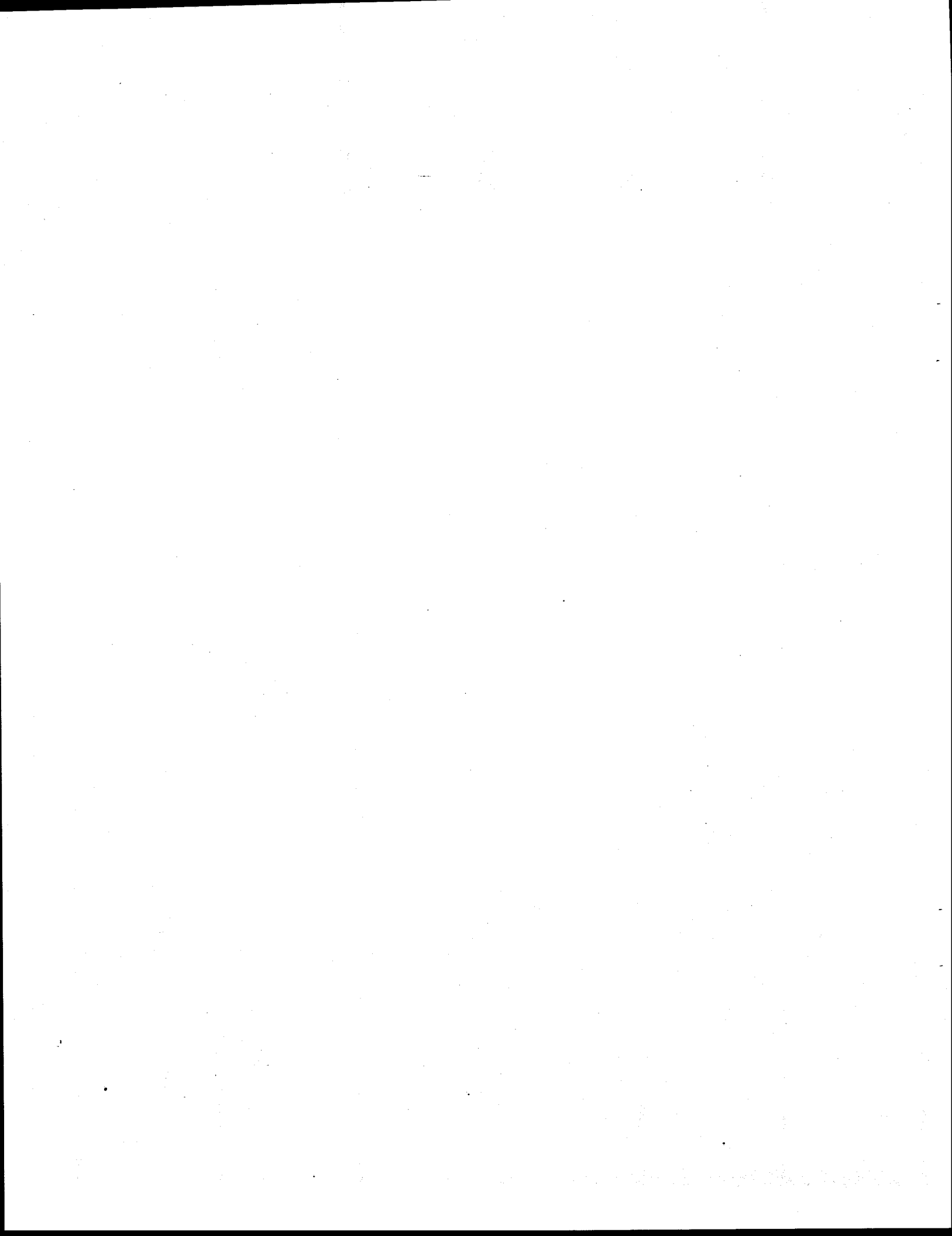
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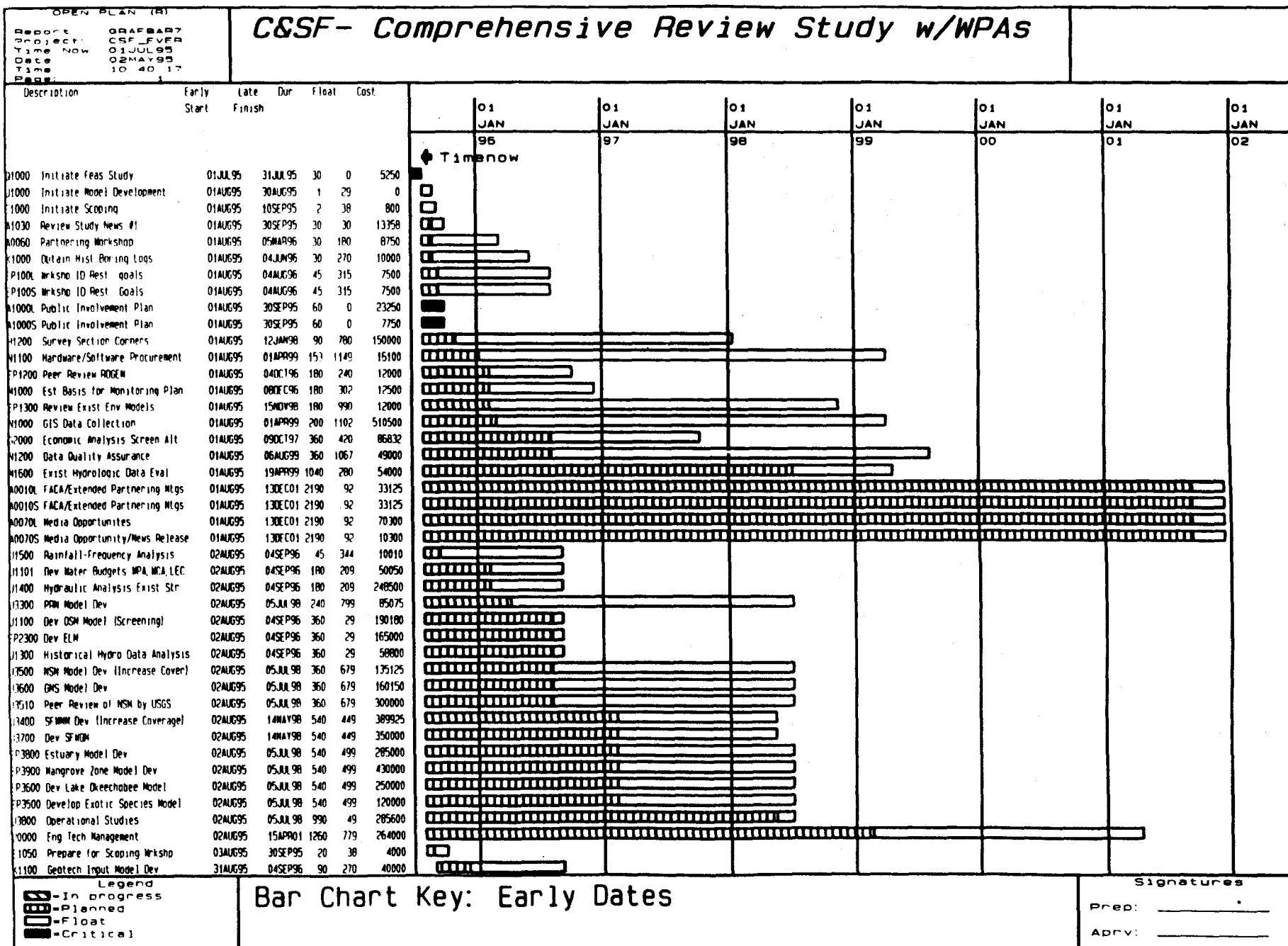
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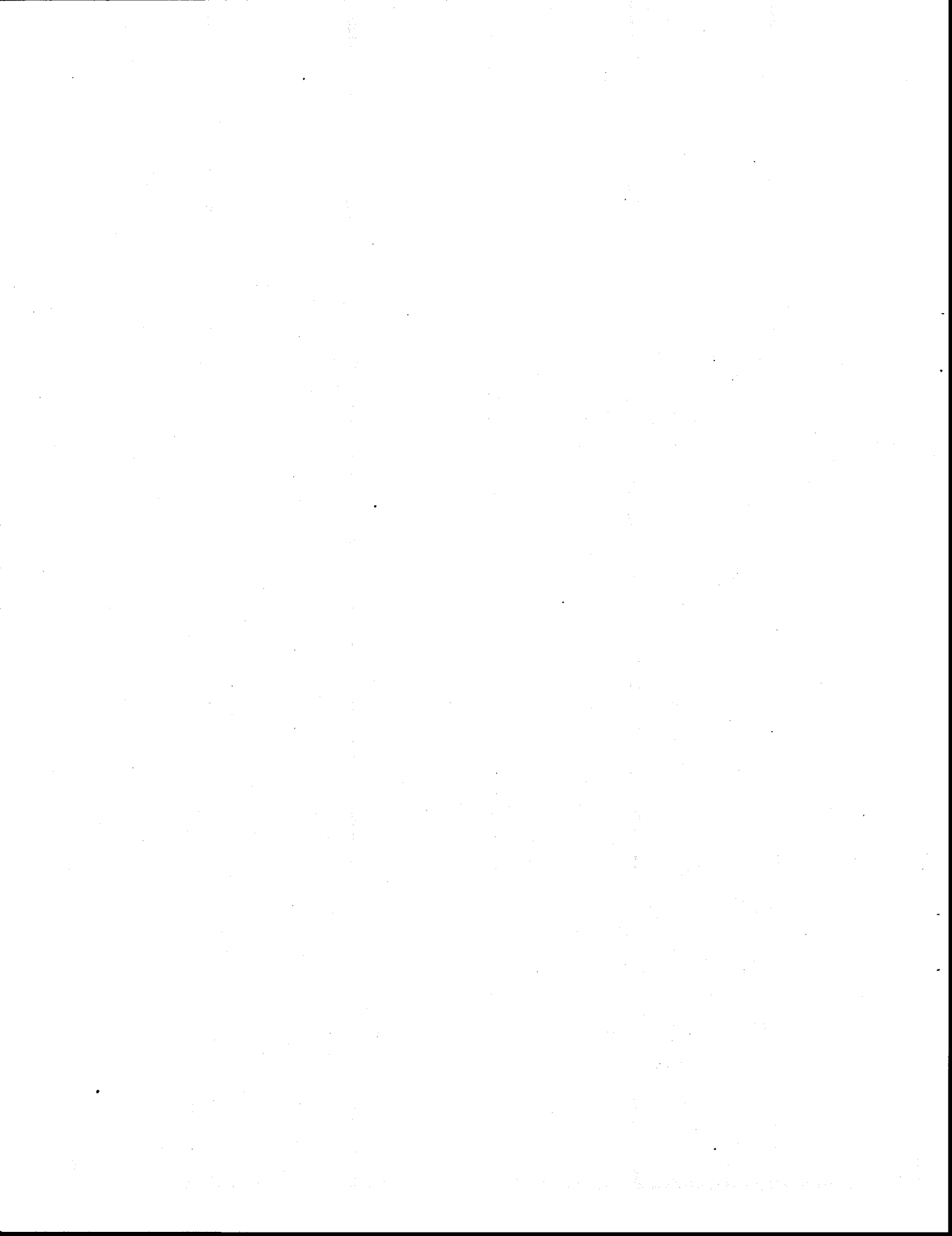
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22Y					
WASHINGTON LEVEL REVIEW					
ALL - All Cooperating Federal and State Agencies					
Y4050	Public Comment Period	30	14DEC01	12JAN02	0
Y4300	State & Agency Rev	90	27DEC01	26MAR02	0
Subtotal: \$					0
HQ - HEADQUARTERS OF THE U.S. ARMY CORPS OF ENGINEERS					
Y4200	HQ Review	30	22DEC01	20JAN02	0
Y4210	HQ Final Assess	30	21JAN02	19FEB02	0
Y4220	HQ Field Visit/Mtg	3	20FEB02	22FEB02	0
Y4230	HQ Review Report	30	23FEB02	24MAR02	0
Y4400	Senior Reps Briefing	3	27MAR02	29MAR02	0
Y4500	Chief's Report	45	30MAR02	13MAY02	0
Subtotal: \$					0
PD-PR - PLANNING DIVISION, ECOSYSTEM RESTORATION SECTION					
Y0000	Review Contingency - SAJ	0	14MAY02	13MAY02	37,500
Subtotal: \$					37,500
SAD - SOUTH ATLANTIC DIVISION					
Y3900	SAD Review Draft Rpt	30	03AUG01	01SEP01	0
Y3950	SAD Review Final Report	30	13NOV01	12DEC01	0
Y4000	DE Public Notice	1	13DEC01	13DEC01	0
Y4100	Submit Final Rpt to HQ/OASA	5	17DEC01	21DEC01	0
Y4110	Fact Sheet/Slides	1	25DEC01	25DEC01	0
Subtotal: \$					0
SFWM - SOUTH FLORIDA WATER MGMT DISTRICT					
Y0001	Review Contingency - SFWM	0	14MAY02	13MAY02	12,500
Total for this Account: \$					50,000
TOTAL STUDY COST: \$					18,468,743

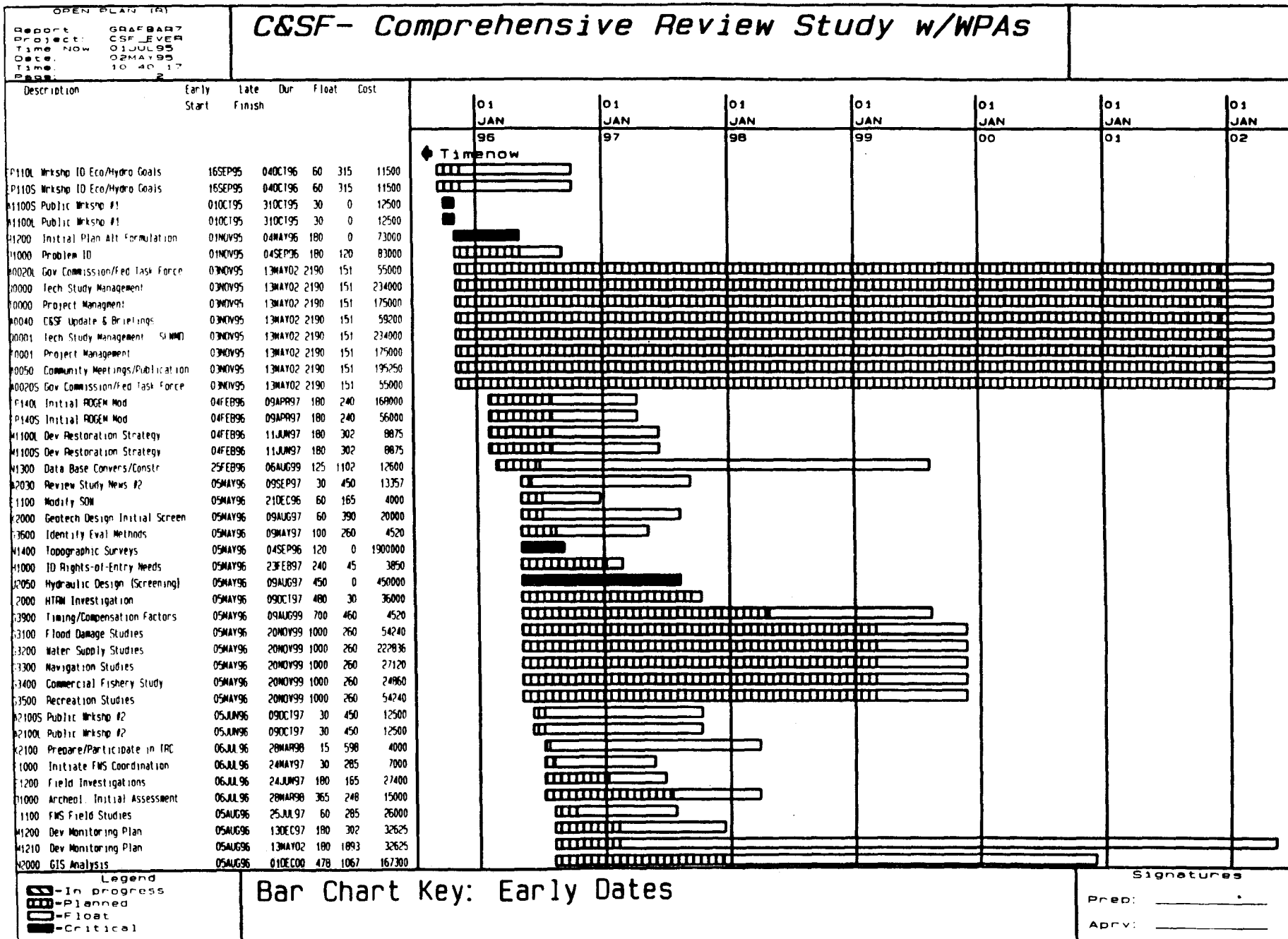
APPENDIX D
STUDY SCHEDULE

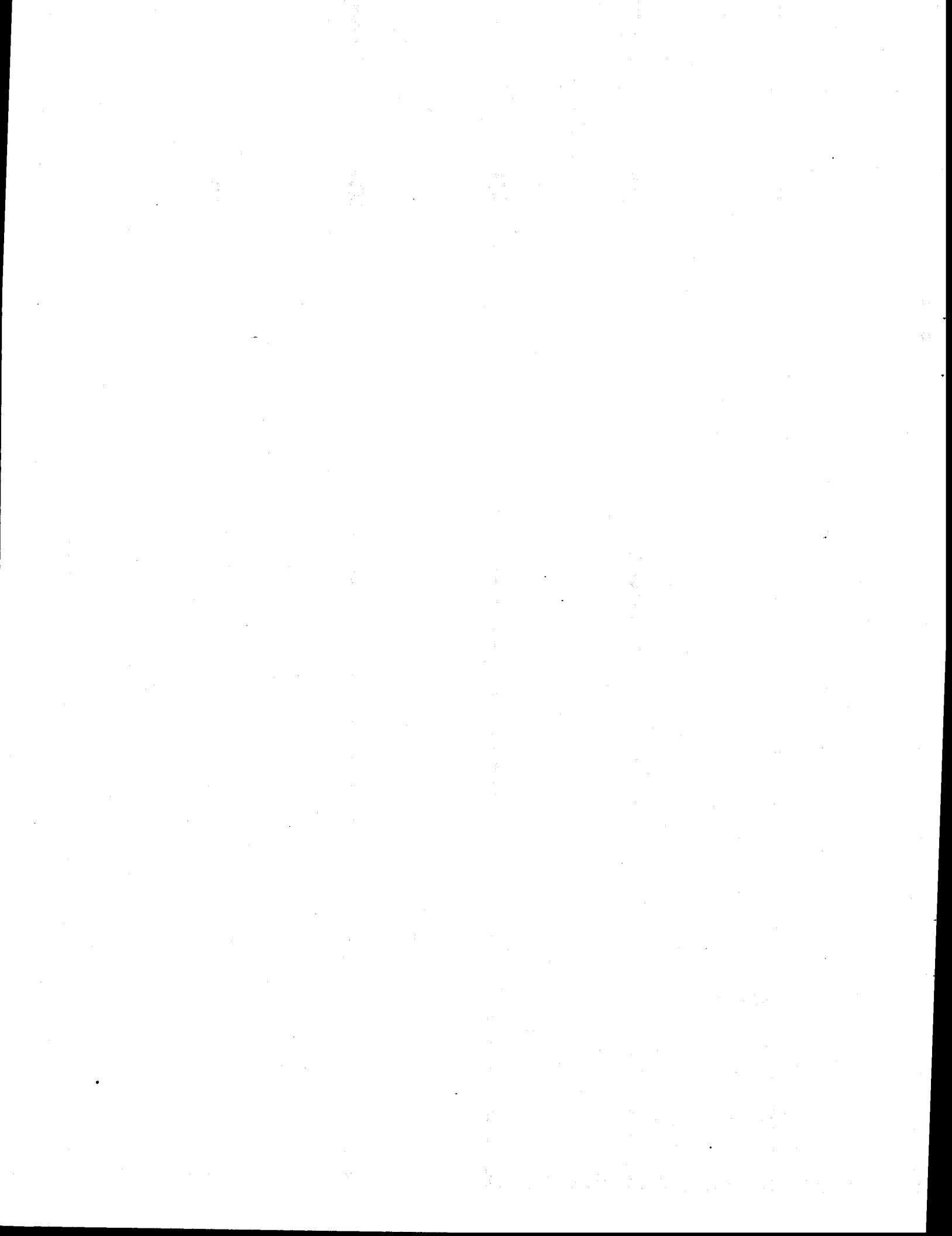
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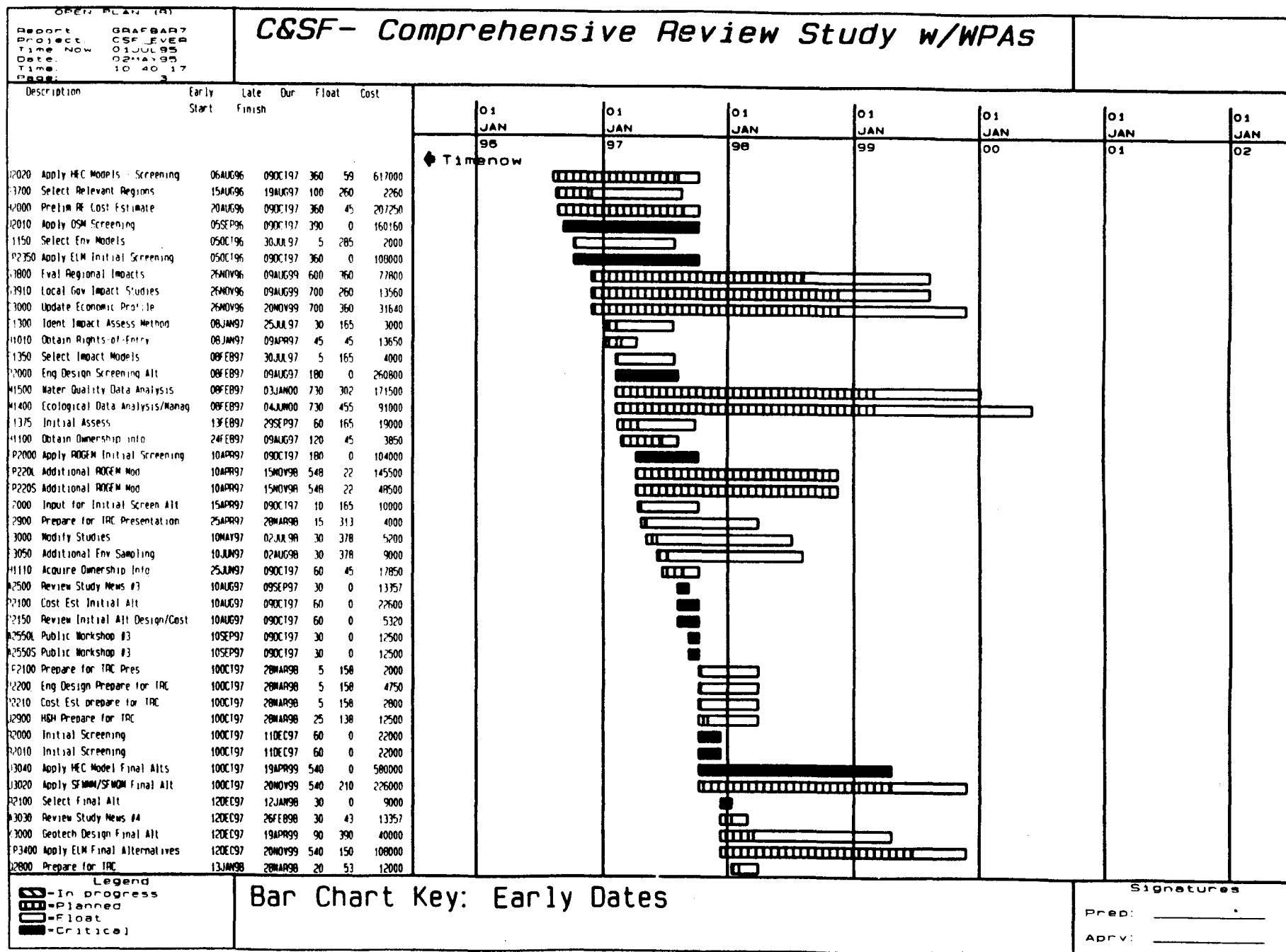


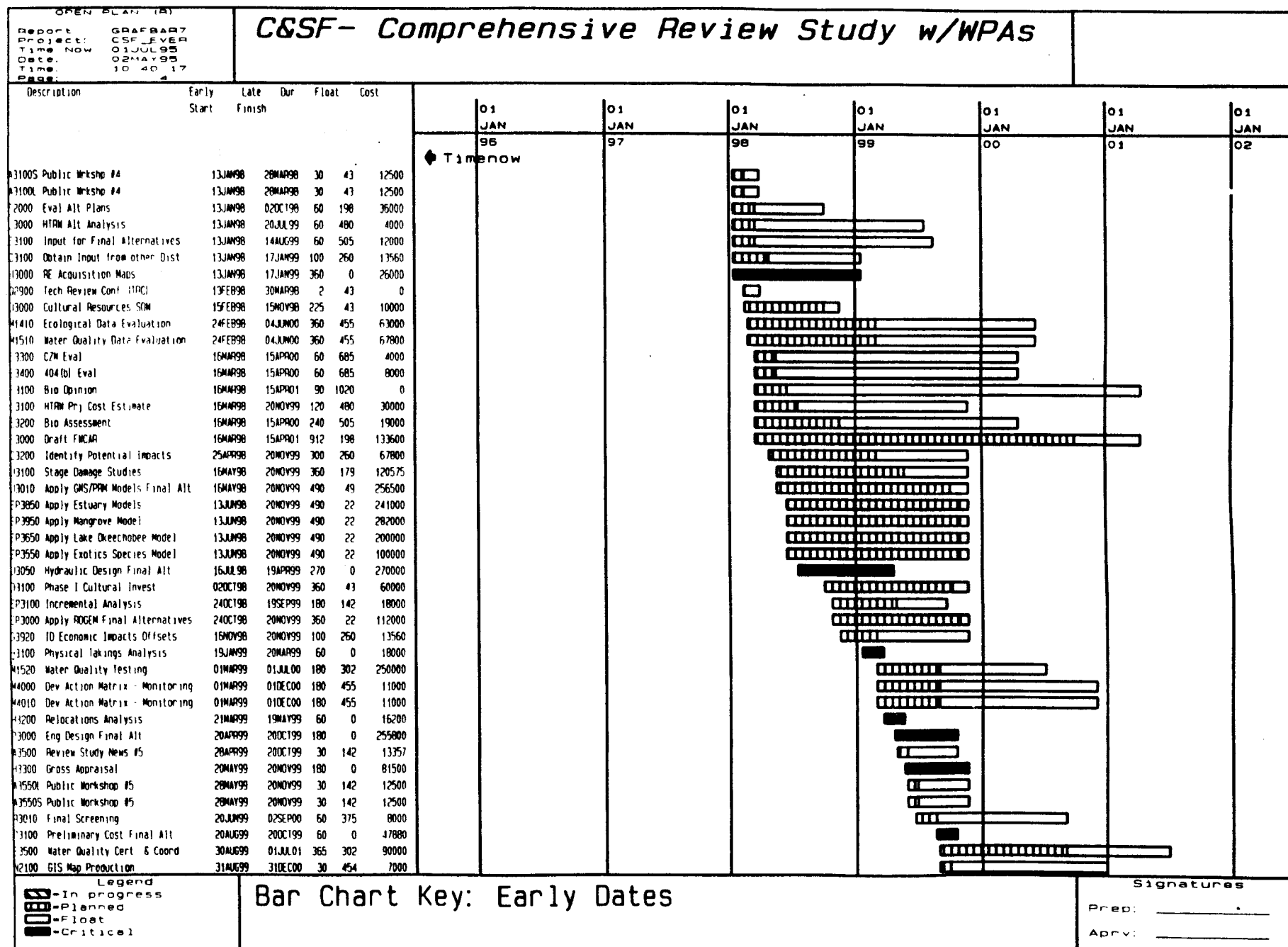













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Page:       5
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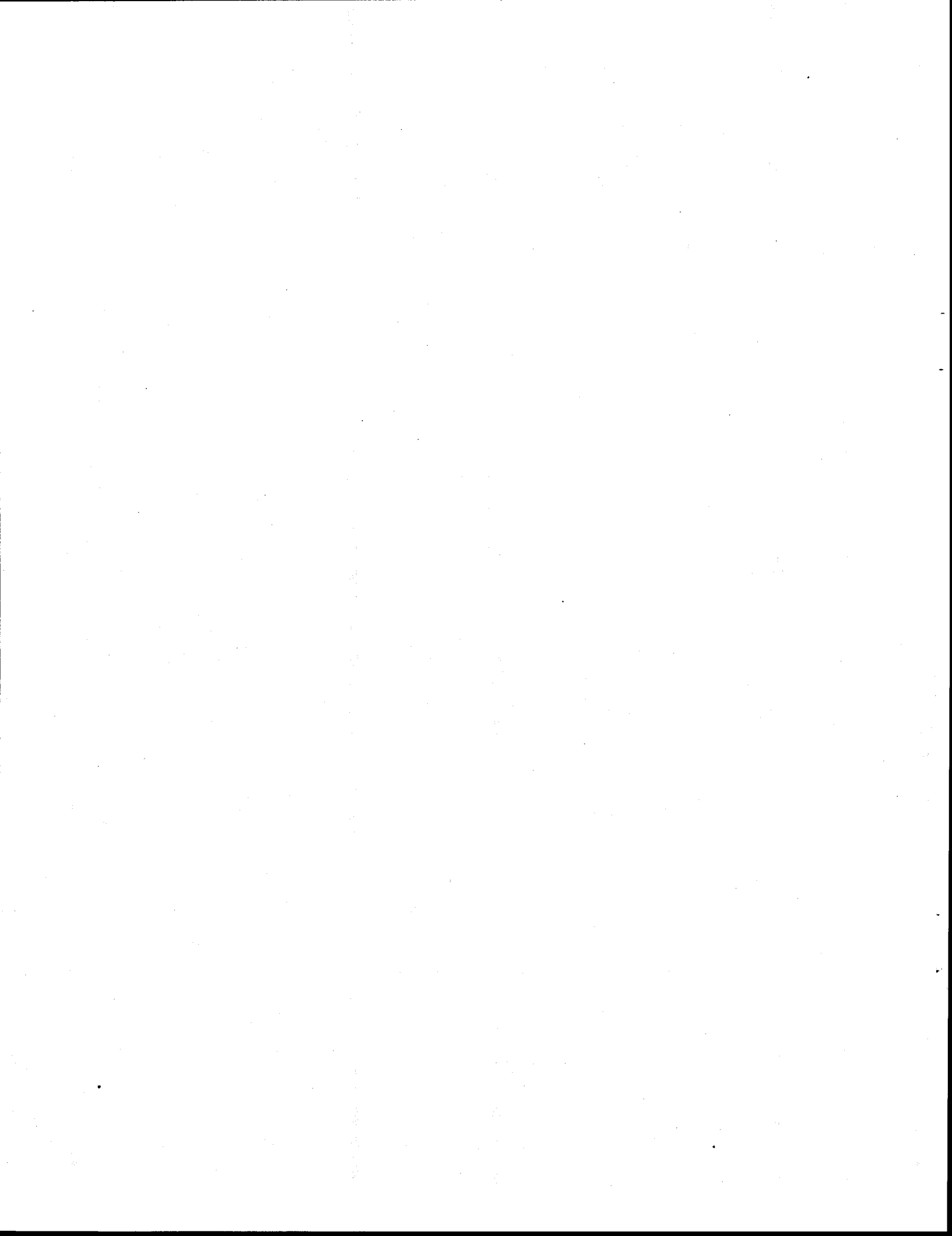
C&SF- Comprehensive Review Study w/WPAs

Description	Early	Latest	Our	Float	Cost	Timeline						
	Start	Finish				01 JAN 96	01 JAN 97	01 JAN 98	01 JAN 99	01 JAN 00	01 JAN 01	01 JAN 02
42200 Data Management Metadata	01OCT99	01MAR01	60	454	14700							
44000 Cultural Resources Drift Rpt	07OCT99	15APR00	30	158	8000							
33000 Analyze Constr/Land Costs	21OCT99	20NOV99	30	0	13560							
33010 Analyze CMR/RCR Costs	21OCT99	20NOV99	30	0	1356							
33020 Analyze Monitoring Costs	21OCT99	20NOV99	30	0	904							
04000 Env Eval Draft Appendix	29OCT99	15APR01	90	442	24000							
44300 Geotech Input to PMP	21NOV99	13MAY01	7	531	2000							
33000 Preliminary Financing Plan	21NOV99	13APR01	30	478	7780							
44300 HSH Input to PMP	21NOV99	13MAY01	30	508	15000							
44100 Draft PCA/PMP RE input	21NOV99	13MAY01	35	503	5950							
33000 Final Screening	21NOV99	21JAN00	60	0	8000							
44000 Prepare Draft PMP	21NOV99	13MAY01	60	478	15000							
44000 Real Estate Supplement	21NOV99	01MAR01	90	375	19250							
33100 Assessment of Capability	22OCT99	13MAY01	30	478	5320							
44100 Prepare for FRC	22JAN00	18MAY01	5	478	2500							
44100 HTRM Sponsor Commitment	22JAN00	01MAR01	30	375	2000							
44000 HTRM Appendix	22JAN00	01MAR01	30	375	4000							
44030 Review Study News	22JAN00	16MAR01	30	390	13357							
44000 Optimize Comprehensive Plan	22JAN00	01DEC00	90	225	23000							
33600 Aesthetic/Recreation Analysis	22JAN00	15APR01	145	305	13200							
33080 Final Hydraulic Design - MPAS	22JAN00	19JUL00	180	0	200000							
33200 Geotech Field Investigations	22JAN00	19JUL00	180	0	686000							
44000 Prelim Draft EIS	22JAN00	15APR01	365	85	25600							
44100S Public Wrkshp #6	21FEB00	15APR01	30	390	12500							
44100L Public Wrkshp #6	21FEB00	15APR01	30	390	12500							
44100 Optimization of MPAS Plan	21APR00	01MAR01	90	225	23000							
44200 Cost Allocation/Apportionment	21APR00	01MAR01	90	225	12500							
44000 HSH Draft Appendix	20JUL00	15APR01	90	180	90000							
33300 Geotech Lab Analysis	20JUL00	16NOV00	120	0	62200							
44050 Final Design Comp Plan & MPAS	20JUL00	15JAN01	180	0	250800							
43400 Geotech Analysis	20JUL00	14FEB01	210	0	58000							
44100 HSH Prep for FRC Pres	18OCT00	18MAY01	25	188	12500							
44000 Prepare Geotech Plates	17NOV00	14FEB01	90	0	42000							
44200 MCACES Cost Est Final Plan	16JAN01	16MAR01	60	0	133560							
44250 Review MCACES	16JAN01	16MAR01	60	0	14840							
44100 Civil Design for Drift Rpt	16JAN01	15APR01	90	0	94050							
44100 Prepare for FRC	21JAN01	18MAY01	5	113	2400							

-  - In progress
-  - Planned
- - Float
-  - Critical

Bar Chart Key: Early Dates

Prep: _____
Apprv: _____



APPENDIX E
TECHNICAL REFERENCES

DRAFT May 2, 1995

TECHNICAL REQUIREMENTS

The work to be performed consists of a feasibility level effort, in accordance with the schedules and budgets included herein, to develop a comprehensive Everglades restoration plan. The study will also develop an implementation process that incorporates an adaptive management approach to project implementation to include an incremental justification process based on monitoring, evaluation and modeling. This work includes preparation of a Environmental Impact Statement (EIS), environmental output evaluation, incremental cost analysis, cost effectiveness analysis, the necessary survey and geotechnical investigations, a hydraulic analysis, hydrologic investigations, design calculations and drawings, GIS database development, preparation of a detailed construction cost estimate, real estate investigations, socio-economic impact analysis, study and project management, and coordination with local, state and Federal agencies as well as other environmental/interest groups and the public. The scope of studies in terms of content and level of detail for the feasibility phase study effort are as defined and required by the following Federal documents:

ER 1105-2-100 dtd 28 Dec 1990	"Planning Guidance" Department of the Army regulation on Policy and Guidance for the conduct of civil works planning studies.
ER 5-7-1 dtd 1 Mar 1991	"Project Management" Department of the Army regulation for the overall management of civil works projects.
ER 200-2-2 dtd 4 Mar 1988	"Procedures for Implementing NEPA" Department of the Army regulation on 33 CFR 230 Environmental Quality.
EC 1165-2-201 (Draft) dtd 31 Jan 1995	"Ecosystem Restoration in the Civil Works Program" Department of the Army policy guidance for ecosystem restoration. This EC modifies PGL 24 by eliminating the "project linkage" and "modern historic condition" requirements. All other provisions of PGL 24 remain in effect.
IWR Report 94-PS-2 dtd Oct 1994	"Cost Effectiveness Analysis for Environmental Planning: Nine Easy Steps" Report developed by the Institute of Water Resources to assist field practitioners conduct cost effectiveness and incremental cost analysis in planning for environmental restoration and mitigation.
PGL No. 24 dtd 7 Mar 1991	"Restoration of Fish and Wildlife Habitat Resources" Department of the Army Policy Guidance Letter (PGL) on accomplishing fish and wildlife habitat restoration.

ER 405-1-12 dtd 28 May 1991	"Real Estate Handbook - Local Cooperation" Department of the Army regulation establishing guidelines for real estate activities for local cooperation agreements.
ER 1110-2-1150 dtd 31 Mar 1994	"Engineering and Design for Civil Works Projects" Department of the Army regulation describes engineering responsibilities during the planning, design, construction, and operations phases of civil works projects.
ER 1165-2-132 dtd 26 Jun 1992	"Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects" Department of the Army regulation provides guidance for consideration of issues and problems associated HTRW which may be located within project boundaries or may effect civil works projects.
ER 1110-1-1300 dtd 26 Mar 1993	"Cost Engineering Policy and General Requirements" Department of the Army regulation provides cost engineering policy, guidance, and procedures for civil works programs.
EC 1110-2-268	"Civil Works Construction Cost Estimating" Department of the Army circular establishing accounting standards for preparing cost estimates for civil projects.
EC 1110-2-538	"Civil Works Project Cost Estimating - Code of Accounts" Department of the Army circular establishing accounting standards for preparing cost estimates for civil works projects.
EM 1110-2-1301	"Cost Estimates - Planning and Design Stages"
U.S. Water Resources Council Publication dtd 10 March 1983	"Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies."