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## I. INTRODUCTION

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September, 1990 marks the beginning of the second year of work by the Galveston Bay National Estuary Program toward creation of a Comprehensive Conservation and Management Plan for the estuary. Planning and program establishment activities are now complete, and work efforts are now directed toward creating a factual foundation for future Bay management.

The factual foundation for management, or "Characterization," involves research and data analyses directed at the Bay's recognized problems. Efforts in the coming two years will be directed at determining the status, and trends over time, for critical aspects of Galveston Bay. These aspects include water quality, living resources, habitat, and physical conditions. The work will determine probable causes for the Bay's problems, from an ecosystem perspective. Parallel efforts will be directed at assessment of existing management activities. Finally, under the CCMP in year five, enhanced management efforts will be directed at well-defined environmental problems.

Throughout Characterization, work is guided not only by scientists and environmental managers; anyone with an interest in Galveston Bay can be part of the program. Industry, shipping, business, development, fishing, environmental, and community interests are already participating, and greater involvement is sought in the coming year. This involvement in large part determines what the program does. Comments, questions and suggestions about this work are welcomed at the Program Office at any time.

### **Review of Fiscal Year 1990**

The EPA/State Management Conference Agreement (Publication GBNEP-1, available from the Program Office) outlines the five years of work leading to creation of a CCMP in 1994. The commitments made in that agreement prior to the first year of the program were structured to provide a long-term flexible planning framework for individual annual work plans like this one. This Annual Work Plan therefore strives to be consistent with the Management Conference Agreement, while at the same recognizing new and better approaches.

Where proposed work deviates from the Management Conference Agreement, reasons for the changes are discussed.

## **Identification and Ranking of Priority Problems**

The Management Conference Agreement called for creation of a Priority Problems List by April, 1990. The List was to be based on consensus concerning the identity and relative importance of problems effecting the estuary, and was to become a guide for expenditure of time, effort, and money throughout the program. The components of this effort were to include: drafting of the List with GBNEP committee review; revisions based on public comments and ranking based on an explicit set of listed criteria; final approval and distribution of the List; and periodic re-evaluation of the List as better information becomes available.

Creation of the Priority Problems List was accomplished ahead of schedule and in accordance with the Management Conference Agreement. The final List was approved November, 1989, by the Policy Committee, with provision for annual review. The Priority Problems List and documentation of the steps leading to its creation are given in Appendix A.

The Priority Problems List has been extremely useful to the GBNEP. Drafting the list was the first exercise in consensus-building within the Management Conference. In substance, the list has fulfilled its intended purpose of guiding program efforts, particularly in creating and contracting projects. Although numerous diverse projects have been proposed, some could not be justified in light of the Priority Problems. Agreement on and ranking of Galveston Bay's problems has helped program actions to be focused rather than diffuse.

## **Program Inventory**

In the Management Conference Agreement, the Program Inventory had a two-fold purpose. First, the Inventory was to include descriptions of existing agency data sets related to Galveston Bay. This would determine the potential usefulness of existing information for a Data and Information Management System (DIMS). The data would have central importance in characterizing estuarine Priority Problems, in effect determining "what" should be managed.

Second, the Inventory was to include a compilation of existing management jurisdictions and activities by governmental agencies. This would be the first step in integrating--under the CCMP--the currently diverse components of environmental management. That is, the regulatory information would be the first step in determining "how" management would proceed under the CCMP.

In addressing this program element, the GBNEP determined that the work could not be accomplished by any single project. Therefore several projects were designed to address different aspects of the problem.

For data-- "what" will be managed--the **Data Base Inventory** will compile complete descriptions and specifications for existing bay-related data sets. The result will be an electronic-searchable data base of data set descriptions, including access information. The data set descriptions will then be available for contractors to acquire data for individual characterization studies. The Data Base Inventory will also become a valuable tool for resource agencies in early management implementation.

For Management-- "how" the work will be accomplished--two projects have been designed, both on a pilot scale associated with creation of Christmas Bay and Armand Bayou Coastal Preserves. The **Coastal Preserves Regulatory Survey** and the **Coastal Preserves Regulatory Evaluation** will identify, describe, and evaluate all management jurisdictions and activities within the Christmas Bay and Armand Bayou Coastal Preserves. This will help define work on an expanded scale encompassing the entire estuary.

In Texas, changing the existing mosaic of management authority is seen as a highly sensitive and critical part of drafting the CCMP. Management Assessments have therefore been structured to increase the likelihood for ultimate success. Management Assessments are to be conducted on a pilot scale prior to the entire estuary, in order to determine the most effective approach. Evaluations of agency management are to be linked to the simple base program descriptions specified by the Management Conference Agreement for this element, and state and local entities are to be included in addition to the federal programs required by EPA guidance. Whereas the Management Conference Agreement called for a Program Inventory Report by June, 1990, the projects undertaken under this element will produce several reports, none of which will be available this early. The Data Base Inventory and Coastal Preserves Regulatory Survey will produce results by Fall, 1990, while the Coastal Preserves Regulatory Evaluation will report by December, 1990.

## **Base Programs and "Action Now" Implementation**

The Management Conference Agreement specifies an evaluation of existing agency management activities. This evaluation was then to be the basis for improvements recommended in a "Base Programs Action Plan" in July of 1991 prior to the CCMP. The current approach accomplishes these objectives within the framework of the approach summarized above.

The **Coastal Preserve Regulatory Evaluations** lead to **Coastal Preserves Management Plans** by Fall, 1991, that specify changes in regulatory activities to better protect and enhance these two subsystems of Galveston Bay. The Management Plans will be approved prior to a CCMP as an early model to be used in similar efforts for the entire estuary under the **Galveston Bay Regulatory Survey and Evaluation**. The two-stage approach to the problem of regulatory change has been adopted to realistically address the problem of fragmented jurisdictions in Texas.

The act of designating the two Coastal Preserves is already generating regulatory changes in several agencies. For the first time in Texas, the Texas Parks and Wildlife Department has set a minimum stream flow requirement for an entire body of water, based on need to maintain living resources. This occurred for Armand Bayou as a result of Coastal Preserve designation, with similar requirements being imposed for at least one other area outside the Preserve. The Texas Water Commission has confirmed this flow requirement in a decision limiting water rights withdrawals from Armand Bayou for irrigation of a golf course that lies within the watershed but outside the Armand Bayou Coastal Preserve.

Meanwhile, the GBNEP is implementing other "Action Now" efforts prior to completion of regulatory evaluations. The **Shoreline Survey for Point Sources** involves identification of currently unregulated or illegal influences on the Bay. Illegal point sources of wastewater will be brought under enforcement by appropriate agencies and any unregulated influences on the Bay will be evaluated for necessary regulatory changes.

### **Data and Information Management System (DIMS)**

Although a DIMS was not specifically required by OMEP guidance, such a system was deemed necessary by the Management Conference and was therefore included in the Management Conference Agreement. Commitments were made for identification of DIMS requirements, a feasibility study and report, and choice and implementation of the best DIMS alternative.

DIMS requirements were determined by a user poll. This poll and the DIMS feasibility study were accomplished by a subcommittee of the Scientific/Technical Advisory Committee. Rather than a feasibility report, a full conference DIMS workshop was held to review findings and consider alternatives. At this stage, valuable lessons were learned from other estuary programs. Subsequently the Data and Information Management Strategy (Appendix B) was adopted by consensus in January, 1990. The Strategy will be fully tested as results from characterization studies accumulate. The Strategy is flexible, with an annual review and changes as necessary.

The DIMS strategy emphasizes information as much as data, and deliberately avoids creation of a centralized computer/data processing capability and hardware system. Historical and new data sets will be compiled and analyzed by outside contractors, with data being stored in a common format and accessible storage location. Components of the Strategy begun in FY 1990 are summarized below.

Creation of a **Galveston Bay Information Center** establishes a permanent facility at Jack K. Williams Library on the Galveston Texas A&M Campus. In FY 1990, the project involves compilation of a Galveston Bay Bibliography based on the Literature Survey (below), and

initial planning for a special resource collection. The collection is to include published and unpublished agency reports, journal articles, maps, films, videos, slide programs, and aerial photos.

The Center will also house COMPAS (Coastal Ocean Management, Planning, and Assessment system), a user-friendly microcomputer-based information system currently under development by the National Oceanic and Atmospheric Administration (NOAA) and the State of Texas. Public comments indicate the Galveston Bay Information Center is highly valued by the Galveston Bay community. **CURRENT STATUS:** work plan was approved; creation of the Bibliography is well underway with entry of 2500 Galveston Bay citations completed so far; acquisitions and electronic retrieval system planning has begun; major donations of documents not available in any agency have been received; COMPAS development is proceeding outside this project via an interagency task force coordinated by the Texas Water Commission, and additional COMPAS development will proceed as part of this project as the Information Center develops. **SPECIFICS:** 135K FY 1990 contract to Texas A&M University at Galveston; 111.3K additional cost share; effective date 12/1/89; expected future funding through 1994.

A **Galveston Bay Literature Survey** was undertaken because the literature concerning Galveston Bay is scattered and not indexed, and because the "grey literature" consisting of unpublished agency reports is not likely to be utilized unless special efforts are made to index and acquire copies. This effort is currently being completed as part of the Information Center summarized above, and will result in both a written bibliography and an electronic searchable computer file by Fall, 1990.

Completion of a **Galveston Bay Data Base Inventory** will identify and comprehensively described currently existing Galveston Bay data. The final result will be an electronic searchable data base of data set descriptions, with sufficient information for program participants and project contractors to acquire relevant data from appropriate agencies. This result will be available by Fall, 1990. **CURRENT STATUS:** work plan was approved, including software for electronic retrieval; data sets currently being indexed. **SPECIFICS:** 57.5K FY 1990 contract to University of Texas at Austin; effective 12/1/89; no expected future funding.

Other components of the DIMS Strategy not yet initiated include use of EPA's Ocean Data Evaluation System (ODES) for data formatting and archiving, possible use of the Texas Natural Resource Information Center as a data storage and distribution facility, and an Inventory of and/or Purchase of remote imagery of Galveston Bay. The GBNEP has committed to an annual review of the DIMS Strategy to assure changing data and information needs are addressed by the Program. The Galveston Bay Data and Information Management Strategy is included as Appendix B of this Document.

## **Characterization of Historical Trends, Current Status, and Human Impacts on Galveston Bay**

The Management Conference Agreement specifies that characterization projects be tied to Priority Problems, that they address management needs, that they utilize existing data, and where gaps exist, that new data be gathered for specific purposes. These criteria were explicitly used for selection of the characterization studies summarized in this Annual Plan, and language in each project contract further emphasizes these requirements.

A further commitment was to publish issue papers and an annual "State of the Bay" report concerning study findings and critical problems and management questions. These were to be distributed to participants and the public to augment any technical publications. The GBNEP approach to this commitment is publication of a quarterly newsletter, "Bayline," in which these issues are given a wide audience. Increasingly, Bayline will include summaries of research findings and management issues as characterization proceeds. The annual "State of the Bay" report has not been utilized since full review of each report would take 8-10 months.

Finally, a "Characterization Report" was to summarize and synthesize project findings as a basis for the CCMP. The approach of the GBNEP to this effort is detailed in Figure 2, listing both a characterization report with extensive review, and a prior major symposium contributing findings to the report. Individual scientific/technical projects contributing to this effort are summarized below.

**A Shoreline Survey for Point Source Discharges** was initiated on selected, representative portions of the Galveston Bay shoreline (159 miles), to identify and document point source influences on water quality. The survey focuses on illegal discharges, with referral to appropriate regulatory agencies, and determines feasibility and need for extending the survey to some or all of the entire bay/tributary shoreline (2,491 miles). This project is an early "Action Now" effort designed to address specific problems prior to a CCMP. A shoreline survey report with recommendations will be produced by fall, 1990. This report will help determine need for the CCMP to address undocumented shoreline impacts in the estuary. **CURRENT STATUS:** work plan was approved and field work will be conducted summer, 1990. **SPECIFICS:** 30K FY 1990 contract to Texas A&M University Geochemical and Environmental Research Group; 12.3K additional cost sharing; effective 4/2/90; additional funding not currently planned.

A study entitled **Status and Trends for Wetland and Aquatic Habitats** was initiated to map shoreline and submerged aquatic vegetation habitats based on aerial photo interpretation and field verification. The work includes digitizing of maps for a computer geographic information system. Comparisons are made with previous maps from 1956 and 1979 to determine trends; further investigations determine causes for major trends/losses of critical habitat types. Results of this work include digital geographical habitat data set overlays compatible with state resource agency geographic information systems, maps, and a report

summarizing findings, causes for noted habitat trends, and recommendations. **CURRENT STATUS:** project is just beginning; work in FY 1990 will yield historical habitat data in digital geographic form; work in FY 1991 will yield digitized, field-verified data sets for recent photos; work in FY 1992 will identify habitat losses and probable causes, and final report and maps will be produced. **SPECIFICS:** 40K FY 1990 contract to Bureau of Economic Geology in cooperation with the U.S. Fish and Wildlife Service; effective 5/1/90; expected future funding through FY 1992.

Work was initiated to assess **Toxic Contamination in Aquatic Organisms**. This project involves collection of five commercial fish and shellfish species from each of four locations in Galveston Bay, for analyses for 126 specific contaminants in edible tissue. State-of-the-art analytical procedures are utilized to determine contaminant concentrations, for use in subsequent risk analysis. Tissue concentrations and risk assessments are summarized in a report to be produced by Fall, 1990. **CURRENT STATUS:** field sampling work plan was approved and sampling has begun; laboratory work plan is under review for analyses to be conducted summer, 1990. **SPECIFICS:** 140K FY 1990 contract to Texas A&M University Geochemical and Environmental Research Group; effective 4/13/1990; additional funding not currently planned.

A project was begun to determine **Status and Trends for Oysters**. Oysters are at the heart of estuarine management issues. Oysters are a commercial species, are sensitive to salinity and bacterial contamination, and create shell reef habitat, the only significant hard substrate habitat in the estuary. The project surveys and maps oyster reefs, concentrating on previously unsurveyed portions of the estuary. Other sources of data (for example commercial fisherman, catch statistics, and use of certain sites for population indices) can help determine status and trends, with emphasis on possible causes of identified trends. Findings will be summarized in a report produced in FY 1991. **CURRENT STATUS:** work scope in final review; contract award expected May, 1990. **SPECIFICS:** 80K FY 1990 funds to be awarded for work to begin summer, 1990; no additional funding expected.

## **Public Participation**

In FY 1990, Public Participation activities were undertaken through Program Office projects and outside contracts. Projects described below were conceived to meet three overall objectives: determination of citizen concerns and perceptions related to Galveston Bay; public education and awareness concerning the function and importance of the estuary; and direct involvement of citizens in determining estuarine management. In addition to the projects summarized, the Galveston Bay Information Center (above) is seen as a benefit.

A **Public Perception Survey** of bay area citizens is planned to assess attitudes concerning the Bay and associated environmental issues. Results are to be used both to better target and more effectively design all other public participation activities leading to drafting of the CCMP. In addition the results will provide the Management Conference with a baseline

description of public attitudes and concerns. A report will be produced by Fall, 1990, summarizing survey findings. **CURRENT STATUS:** survey questions being reviewed for survey to be conducted Summer, 1990. **SPECIFICS:** 18K FY 1989 contract to University of Houston-Clear Lake; 4K additional cost sharing; effective 3/15/90; no additional funding expected.

**A Texas Coastal Preserves Video Production** was initiated, targeting Christmas Bay and Armand Bayou as two critical and environmentally significant portions of the estuary. The video will be produced by Fall, 1990 for use as a school and general public educational resource, and to increase public involvement. **CURRENT STATUS:** script outline being drafted for approval for work to be conducted Summer, 1990. **SPECIFICS:** 10K FY 1989 contract to Texas A&M Seagrass Program; effective 2/6/90; no additional funding expected.

A video public service announcement (PSA) series was initiated for **Citizen Prevention of Non-point Source Pollution**. This series will be distributed to local media representatives for airing in the greater Houston area. The objective is to target homeowner and small business activities that have a negative influence on the Bay via urban runoff. **CURRENT STATUS:** project was awarded March, 1990 for work to be conducted Summer, 1990. **SPECIFICS:** 7.5K FY 1990 expenditures approved for Texas Water Commission in-house production; effective March, 1990; no additional funding expected.

**A Galveston Bay User Conflict Video Production** was initiated to document functional conflicts among the various segments of the Galveston Bay community. Competing uses of the estuary will be highlighted, emphasizing the environmental and economic significance of the Bay, and the critical need for wise management. The production will be complete by August, 1990. **CURRENT STATUS:** project was awarded February, 1990; script to be reviewed and production to take place Summer, 1990. **SPECIFICS:** 12.7K FY1990 contract to University of Houston; effective 4/23/90; 7.4K additional cost sharing; no additional funding expected.

**An Oyster Resource Video Production** was initiated concerning oyster use and conservation. Oysters are highlighted as an example of a species at the heart of estuarine management controversies. Topics include economics, biological requirements of oysters, and sensitivity of oysters to effects from human activities. The production will be complete by August, 1990. **CURRENT STATUS:** script under review for shooting to begin June, 1990. **SPECIFICS:** 13K FY 1990 contract to University of Houston; effective 2/8/90; no additional funding expected.

**A Poster Contest** was held for third grade students. School District Superintendents were encouraged to allow their students to participate. Winning entries will be published in a calendar to be distributed in Fall, 1990. **CURRENT STATUS:** seven school districts have participating students; artwork being received for judging to take place May, 1990; calendar to be printed Summer, 1990. **SPECIFICS:** 3K FY 1990 expenditure approved for Program Office in-house project; no additional funding expected.

**Student Book Covers** were developed to promote GBNEP name identification and educational involvement with Galveston Bay Issues. **CURRENT STATUS:** eight participating school districts; cover being designed for distribution of 87,000 Fall, 1990. **SPECIFICS:** 7K FY 1990 expenditure approved for Program Office; no additional funding expected.

The Program initiated a **Publication Series**. The concept was to make all Program documents available to participants and the public in a standard readable style and pleasing format. Topics for FY 1990 included the EPA/State Management Conference Agreement (GBNEP-1), the Fiscal Year 1990 Work Plan (GBNEP-2), and the Member Directory (GBNEP-3). **CURRENT STATUS:** publications will be produced for project final reports in Fall, 1990 and planning documents including a revised Member Directory and this document to be printed late Summer, 1990. **SPECIFICS:** expenditures by Program Office as necessary from publication series budget; project to be funded throughout FY 1994.

The **Bayline Newsletter** is a quarterly publication that addresses conference actions and key issues relevant to the Galveston Bay System. These are distributed free of charge to those requesting to be placed on the program mail list. In addition, copies are distributed at public meetings and other functions. **CURRENT STATUS:** ongoing quarterly publication with distribution of 5,000. **SPECIFICS:** 9K expenditure from publication series budget by Program Office; project to be fully funded through FY 1994.

The Program developed two **Brochures**. The first emphasized historic estuary values, current conflicting uses, and the need for wise management, inviting readers to join the Galveston Bay Public Forum. The second highlighted the theme of Galveston Bay as a home, containing basic information about the bay from an economic, environmental, and recreational view. **CURRENT STATUS:** brochures being distributed from inventory at Program Office. **SPECIFICS:** 8.5K FY 1990 expenditure by Program Office from publication series budget; future expenditures as necessary to revise brochures.

A **Bay Handbook** project was initiated to highlight varied bay uses and actions that local citizens can take to protect the Bay. Issues included proper use of fertilizer and proper disposal of household wastes. Other information in the Handbook gives it a "Bay Almanac" flavor-locations of boat ramps; fishing information for popular species, etc. The book is for distribution at a variety of GBNEP events, including public meetings and through mailings. **CURRENT STATUS:** first draft is under revision for printing Summer, 1990. **SPECIFICS:** approximately 14K expenditures by Program Office as necessary from publication series budget; response to Handbook may lead to additional future expenditures and possible outside sponsorship.

Several **Special Events** were held. A Program Signing Ceremony officially kicked off the GBNEP, and a Coastal Preserve Designation Ceremony officially established two new critical estuarine preserves. Senator Phil Gramm and Senator Lloyd Bentsen were the keynote speakers at the events, respectively. The GBNEP also attended various expositions, including

eight locations for Earth Day. **CURRENT STATUS:** events completed; other events will be planned as opportunities arise. **SPECIFICS:** 5K expenditure by Program Office; future expenditures as opportunities arise.

A **Speaker's Bureau** was organized to coordinate speaking presentations to interested groups. Conference members and staff act as speakers. A slide presentation and standardized script were created. Over 400 announcements were sent to registered groups in five counties. **CURRENT STATUS:** about one program per week is being presented; the slide presentation and script are being revised and personal contacts are being made to increase the number of presentations. **SPECIFICS:** approximately 2K FY 1990 expenditure by Program Office as necessary with presentations by staff and GBNEP committee members; program maintenance funding anticipated through FY 1994.

A **Galveston Bay Media Tour** was arranged for members of the media. This tour highlighted important aspects of the bay to raise media awareness of Program activities. **CURRENT STATUS:** tour scheduled for June, 1990; press to be escorted throughout Bay in boats provided by Texas Water Commission, Texas Parks and Wildlife Department, and Texas Department of Health. **SPECIFICS:** up to 3K expenditures as necessary by Program Office.

A **Portable Informational Display** was created for trade and special interest shows. This display highlights Galveston Bay and provides a back-drop for distributing literature at shows. **CURRENT STATUS:** display has been received from vendor; final photographic elements are being created; plans are underway for circulating display in libraries and other prominent locations. **SPECIFICS:** 1.7K FY 1990 capital expenditure; 1.4K FY 1990 expenditures for display elements; display created and managed by Program Office.

A **Consensus-building survey and training** of committee members represented in the GBNEP was initiated to relate current progress to stated goals of the program. The project was designed to help establish effective working relationships among individuals and among committees in the Conference. **CURRENT STATUS:** in-depth personal interviews were held by contractor with 18 management conference members and staff; survey results were presented at a Management Conference Workshop held April, 1990; survey identified a strong sense of commitment to managing Galveston Bay Well, and highlighted cross-committee communications as a concern; contractor made recommendations now under review by Conference to increase effectiveness of program efforts. **SPECIFICS:** 5.4K FY 1990 contract to University of Houston-Clear Lake Center for Conflict Analysis and Management; effective 2/6/90; no future expenditures anticipated.

During 1990, the GBNEP, in conjunction with the Galveston Bay Foundation, started organizing a **Bay Day** to bring people to the bay for activities which increase the awareness of the bay and increase the involvement of citizens in determining the future role of management in guiding multiple uses. This event is seen as an annual activity to progressively increase in importance, and to outlive the five years now designated for this

program. **CURRENT STATUS:** a special independent committee for Bay Day is to be funded through a special account in the Galveston Bay Foundation; work scope was approved for "seed money" efforts this year; tentative time and location for the first annual event has been set as Memorial Day, 1991, at Sylvan Beach, LaPorte, Texas. **SPECIFICS:** 4.5K FY 1990 contract to Bay Day organization anticipated summer, 1990; additional increased funding anticipated in FY 1991.

The Galveston Bay Public Forum is organizing a series of **Public Meetings** during FY 1990. A series was held in September to seek citizen involvement in recognizing and ranking Priority Problems. A series was held in May concerning this work plan and seeking involvement in the Coastal Preserves management effort planned for FY 1991. A series is planned for August to begin Management Plans for the Coastal Preserves. Each of the meeting series consisted of at least evening meetings in each of three counties. Publicity for meetings is placed in both print and broadcast media, as well as through environmental and civic organization "networking." **CURRENT STATUS:** meetings have been very successful in gathering citizen comments, even though audience size is usually less than 30 per location. **SPECIFICS:** 8.5K FY 1990 expenditure by Program Office.

The GBNEP has undertaken work toward a **Citizen's Monitoring Plan** for Galveston Bay. Under this Plan, a Citizen Monitoring volunteer organization will work in coordination with the Texas Water Commission to design and undertake estuary monitoring activities. The Plan will outline parameters, develop training materials, provide a quality assurance/quality control plan, and coordinate with the GBNEP. This effort will both significantly improve the extent of the monitoring data available per dollar spent, and will involve citizens directly in the welfare of the Bay. **CURRENT STATUS:** work scope was approved and a coordinator designated; pilot scale monitoring to begin on Armand Bayou Summer, 1990. **SPECIFICS:** 25K FY 1990 expenditure approved 3/21/90 for Texas Water Commission to coordinate project; expanded efforts for entire estuary expected next year at a similar funding level.

As part of Program efforts to build consensus and encourage teamwork for the management of the Bay, the CASC recommended and convened a **GBNEP Conference Workshop**. This working conference featured Charles (Bud) Ehler, Director of Oceanography and Marine Assessments, National Oceanic and Atmospheric Administration, and Robert H. Wayland III, Deputy Assistant Administrator, Office of Water, U.S. EPA. In addition to creating a national perspective for Galveston Bay work, the Workshop provided an opportunity for all committee members to interact on a personal basis. **CURRENT STATUS:** workshop was held April 27-28, 1990 with good attendance by all committees including Policy Committee members; verbal comments indicate workshop was extremely successful; Policy Committee unanimously approved letter of commendation to staff and key volunteers. **SPECIFICS:** 3.8K FY 1989 expenditure by Program Office; private sector contributions: 2K Exxon; 2K Mayfield, Inc. .5K Mitchell Energy; .5K Turner, Collie, Braden.

## Administration

Following the establishment of the Program Office in the Bay Area in June, 1989, and hiring of personnel during the summer, FY 1990 began with nearly a complete complement of personnel and program resources. In FY 1990, Hiring of a Research Administrator brought the Program Office to full staffing. Program Office procedures were established for: project contracting via interagency/interlocal agreements between the TWC and project contractors; automation of a mailing list; establishment of program element staff responsibilities and administrative support; and coordination and scheduling of committee meetings and activities. All activities are both coordinated with and reported to EPA Region 6 under the terms of annual cooperative agreements. Overall, the GBNEP is on schedule and making substantial progress toward the overriding goal of creation of an estuary-wide management plan, the CCMP. Below are summaries of planning activities undertaken.

**Identifying Critical Program Areas.** Work in FY 1990 was originally planned utilizing six broad work elements, listed in the FY 1990 Work Plan. These directly corresponded to EPA guidance as reflected in the five-year EPA/State Management Conference Agreement. These six elements were: 1. Program and Literature Inventory; 2. Base Programs Action Plan; 3. Data and Information Management System (DIMS); 4. Characterization Studies; 5. Public Participation; and 6. Administration.

Utilizing these elements was found to be cumbersome due to the difficulty of relating them to committee roles and to specific projects initiated subsequent to planning. For example, the "Base Program/Action Now Agenda" was difficult to translate into tangible project goals so early in the program, before problems were clearly defined. Similarly the GBNEP approach to a Data and Information Management System (DIMS) could not be laid out until the DIMS Strategy was drafted.

As a result of GBNEP actions subsequent to the original FY 1990 Work Plan, a revised Plan was drafted in March, 1990. The revised plan incorporated just four broad elements which directly corresponded to committee roles. These were: 1. Management Assessments (Management Committee); 2. Scientific/Technical Assessments (Scientific/Technical Advisory Committee); 3. Public Participation (Citizen's Advisory Steering Committee); and 4. Administration (Program Office). Work of the Policy Committee, Local Governments Advisory Committee, and Management Committee is seen as encompassing all of these elements. These work elements were found to be an efficient planning framework for budgeting and for defining the specific work to be undertaken, summarized beginning with section II in this Plan.

**Scheduling.** Initial schedule planning for the EPA/State Management Conference Agreement was also carried out before the Management Conference was fully established. Scheduling was expected to change as issues were resolved by consensus. Schedule changes are accomplished by receiving Management Conference approval followed by a request to EPA Region 6.

Estuary Characterization is one program area which may require additional work beyond the currently scheduled December, 1992, completion date. This is evident in reviewing the short period available for the actual data acquisition and analyses (Figure 2). Since Characterization results serve the critical function of factual foundation for the CCMP, scheduling will be reviewed for possible extension through Fiscal Year 1993. This extension of Characterization would agree with projected five-year funding levels supplied by OMEP.

## Some Lessons Learned

Establishing the program on a basis of consensus-building opens the door to a world of new tactical problems for environmental management. These problems can be solved or endured, however, since consensus-building seems the best hope for meaningful positive results. This requires a level of effort not historically present in coastal management. Whether the results are worth the effort can only be determined later, but the potential for good appears higher now than ever before. Below are discussed some of the challenges and victories inherent in the Program, considered from a "lessons learned" perspective.

### Challenges/Problems

**Action by Consensus.** At the heart of the National Estuary Program approach to estuary management is a built-in emphasis on building agreement among diverse participants. A complex committee infrastructure is required for this approach. Committee members represent organizations with a long history of divergent stances on critical issues, and the GBNEP is in the difficult position of changing the course of this history. Yet committees are composed of individuals who are, in many respects, like-minded (e.g. managers on the Management Committee, scientists on the Scientific/Technical Advisory Committee). So, both within-committee and between-committee disagreements can be intense. The dynamic tension among individuals and among committees is vital to guide the program. In practice this approach results in the inefficiency of any democracy in action, along with the burdens of barely manageable logistics, scheduling, and information management.

**Skepticism.** Skepticism comes from several sources. Scientists sometimes believe the program is moving too fast, ahead of a sound knowledge base. Managers sometimes overlook fundamental technical problems that would bias findings. Citizens and environmental groups are sometimes jaded by ineffective problem-solving in the past. In the final analysis, scientists must be willing to take the risk of linking their efforts to management before knowledge is conclusive. Managers must yield to scientists on technical issues. Citizens must be won over by being included in the problem-solving process from the beginning.

**Turf.** Galveston Bay enhancement and protection are the bases for the Program, but participants are sometimes motivated by defence of personal or organizational positions. Motives are political, economic, bureaucratic, or personal, with examples throughout the Program. Distinguishing between legitimate and necessary divergent opinion and defense of turf is not always possible, since the question is one of motive.

**Procurement.** Initiating contracts for projects conceived by the management conference has been fraught with problems. Texas procurement laws offer four kinds of contracting procedures, but extensive legal review eliminated two of these for use by the Program.

Remaining choices involved accomplishing all work by governmental agencies (including state universities), or utilizing a low-bid procedure that could not accommodate scientific peer review nor awards based on scientific merit of proposals. Work is currently being accomplished by agencies and universities, but the process has resulted in significant delays.

## **Program Strengths**

**Action by Consensus.** The greatest challenge to the program is perhaps also its greatest strength. The bottom-up philosophy of the Program hinges upon active participation by citizens, industry, sportsmen, commercial fishermen, elected officials, and other bay users. This philosophy creates advantages over programs imposed by government. These advantages include: building a necessary common vision for success; incorporating a high level of expertise into the plan; increasing the chances for the plan to ultimately survive Texas politics, increasing the likelihood of adequate implementation funding; and creating a higher standard of "practical realism" based on involvement by those to be affected by the plan. The consensus-building approach recognizes that estuary issues will always involve clashing viewpoints, and provides a context for resolution of these conflicts. Ideally this resolution happens before management implementation, and involves a raising of everyone's expectations so that management reflects more than just a compromise.

**Texas Coastal Preserves: Christmas Bay and Armand Bayou.** As a direct result of consensus-building, and due to an innovative newly-created Texas program, two significant portions of Galveston Bay were designated as Texas Coastal Preserves. These designations, in addition to preserving irreplaceable coastal resources, will serve as a microcosm of the entire estuary for program actions. On a pilot scale, the management conference will identify problems, draft management plans, and build management cooperation that cuts across traditional jurisdictional boundaries. This cannot help but to improve efforts in the larger system.

**Data and Information Management Strategy.** Numerous pitfalls exist in the information management arena. The GBNEP carefully examined other programs, and drafted a strategy that decentralizes data processing and centralizes useful information. The temptation was strong to expend program funds on a centralized computer system and dedicated staff, and to acquire "all the data on Galveston Bay" for studies. It is now clear that this would have been a mistake. The adopted strategy makes use of only the data sets that can meaningfully address priority problems, provides for a common format and for universal data availability, and leaves resource agency data sets where they will always be maintained anyway--with the agencies. The Galveston Bay Information Center, COMPAS, and individual studies will put the useful findings in the hands of managers and the public.

**Attracting Local Supplemental Funding.** The Program has sought to supplement federal and state match funding from its inception. This began with coordination with the Texas Legislature during appropriations to highlight the importance of the Program, and continued with assuring competitive distribution of project monies to attract cost-sharing by contractors. To date the GBNEP has attracted funding of more than \$ 435,000 beyond core federal and state monies. The estimated total of state contributions combined with cost-sharing was \$ 668,826 for FY 1990, or nearly as large as the federal share of \$ 700,000.

**Program Publications.** Beginning with Bayline and program brochures, and continuing with the GBNEP publication series, the program has committed to high standards for written communications. This philosophy corresponds to the "open architecture" of the program and high profile of coastal management.

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TABLE 1

## Galveston Bay National Estuary Program

Fiscal Year 1990 Budget

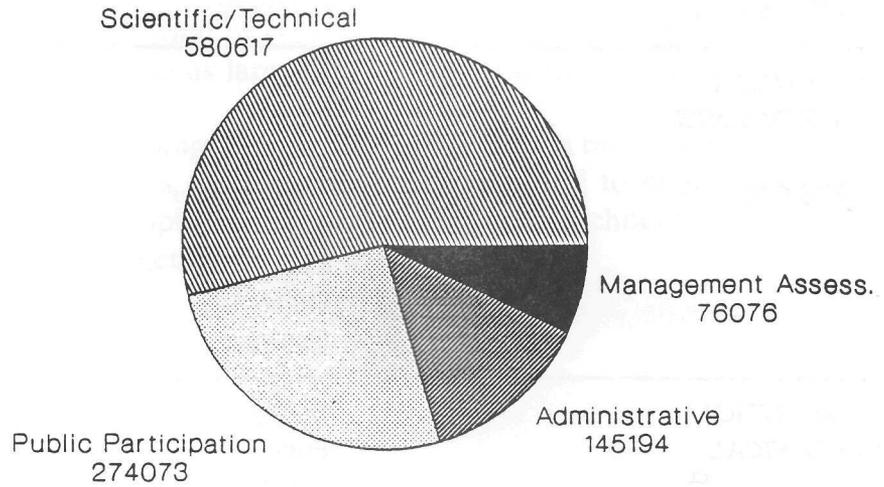
Revised March 15, 1990

Work Element	Category	Budget
<i>MANAGEMENT</i>	Salary	28,736
<i>ASSESSMENTS</i>	Fringe	15,624
	Indirect	6,770
\$76,076	Travel	2,148
	Capital	1,020
	Supplies	172
	Other	2,356
	Contracts	19,250
<i>SCIENTIFIC/ TECHNICAL</i>	Salary	34,020
	Fringe	18,497
	Indirect	8,015
\$580,617	Travel	2,354
	Capital	3,801
	Supplies	919
	Other	510
	Contracts	512,500
<i>PUBLIC PARTICIPATION</i>	Salary	55,273
	Fringe	30,052
	Indirect	13,022
\$274,073	Travel	6,260
	Capital	7,282
	Supplies	2,907
	Other	90,920
	Contracts	68,357
<i>ADMINISTRATIVE</i>	Salary	54,616
	Fringe	29,695
\$145,194	Indirect	12,868
	Travel	5,205
	Capital	7,223
	Supplies	1,422
	Other	10,166
	Contracts	24,000
<b>Program Total</b>		<b>1,075,959</b>

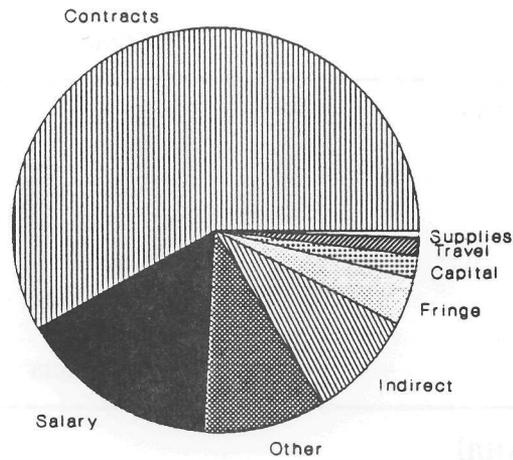
\* Other includes meeting expenses, publications and non-contract public particip

FIGURE 1

**GBNEP FY 1990 BUDGET BY WORK ELEMENT**  
Revised March 15, 1990



**GBNEP FY 1990 BUDGET BY BUDGET CATEGORY**  
Revised March 15, 1990



## Program Activities for Fiscal Year 1991

The following brief descriptions concern actions to be undertaken or considered by the program in FY 1991. Approaches to future work may be discussed at two levels. Key Concepts provide the overall ideological framework for tackling the problem of managing an estuary by consensus; Key Program Areas help determine the content of work that merits the attention of the GBNEP. The Key Program Areas are similar to those determined in the last-revised version of the FY 1990 Work Plan, and are composed of specific individual projects described in section III of this work plan.

### Key Concepts:

Actions to increase public awareness of estuarine problems; active seeking of public participation in consensus-building.

Management based on the estuary as a holistic ecological unit; promotion of basin-wide planning to control pollution and manage living resources.

Establishment of working partnerships among federal, state, and local governments to cut across traditional jurisdictions.

Projects to transfer scientific and management information, experience, and expertise to program participants.

Utilization of a phased approach: first, identify and define priority problems; second, establish probable causes of the problems; third, devise alternative strategies to solve the problems; forth, choose and implement the most effective of these.

Identification of approaches that balance conflicting human uses of the estuary, but seek to restore or maintain its natural character.

Utilization of collaborative problem-solving, to assemble maximum expertise, to broaden the management perspective, and to secure a wide commitment.

Reliance on existing, previously under-utilized data and information, combined with critical applied research to fill in the knowledge gaps.

## Key Program Areas

Two broad activities are recognized for FY 1991. These are management activities corresponding to the EPA "Base Programs/Action Now Agenda" element; and scientific work aimed at "Characterization" of the estuary in the context of recognized problems. Both of the elements were initiated in FY 1990. In addition, commitment is present for the ongoing Public Participation and Administrative activities needed to carry the GBNEP forward. The approach for FY 1991 will therefore encompass four Key Program Areas.

**1. Management Assessments.** This element reflects primarily "Program Inventory" and "Base Programs Action Plan" items in guidance provided by the EPA Office of Marine and Estuarine Protection. The approach to this element in FY 1990 will involve continuation of a pilot regulatory evaluation project concerning the two designated State Coastal Preserves, Christmas Bay and Armand Bayou. This work will lead to initiation of a larger project beginning in the second half of FY 1991 to evaluate jurisdictions and management activities in the entire estuary. Management Assessments will ultimately determine "how" we manage the estuary; whereas the Scientific/Technical Assessments, below, will determine "what" we need to manage.

**2. Scientific/Technical Assessments.** This element reflects primarily the "Characterization" guidance item in the Management Conference Agreement. Critical existing historical data will be evaluated for environmental trends and to determine causes of Priority Problems, and new studies will be initiated where gaps exist in historical data. Study goals will target four broad categories corresponding to Priority Problems: Reduction/Alteration of Living Resources; Public Health Issues; Resource Management Issues; and Shoreline Erosion. Effective characterization of the estuary, more than any other activity, will determine the success of the GBNEP in FY 1991. In FY 1992, the results of this work describing the "State of the Bay" will be published to serve as the factual bench mark for drafting of the CCMP. A time line for these significant activities is shown in Figure 2.

**3. Public Participation.** Public participation is a key element in consensus-building. Citizen educational and involvement activities will maintain continuity with programs begun in FY 1990, listed above. Components include publication of the newsletter, convening of public meetings, slide and video presentations, and special events. A Five-year Public Participation Plan drafted in FY 1990, as well as the specific activities listed in section III of this document provide a detailed planning perspective for this program area.

**4. Program Administration.** A Program Director and support staff will continue to guide the GBNEP toward the goals of the Management Conference. Roles of the Program Office include staff support of committees, program planning, project contract procurement and coordination, interagency coordination and communication, and administrative coordination with EPA. These activities were greatly refined during initial program work in FY 1990, and will undergo continued refinement throughout FY 1991. The projected budget details an administrative component for each of the three other key program areas, above, as well as for this program-wide component.

FIGURE 2

GALVESTON BAY CHARACTERIZATION TIMELINE

ELEMENT	1990												1991												1992																				
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F							
<b>STUDIES</b>																																													
Literature Survey	-----											^ 8/31																																	
Data Base Inventory	-----											^ 8/31																																	
Shoreline Survey				-----											^ 8/31																														
Toxics/Aquatic Organisms					-----											^ 8/31																													
Oyster Trends/Status					-----											^ 8/31																													
Ecosystem Scheme					-----											-^ 10/31																													
Habitat Trends/Status												-----											^											----- ^ 2/1											
Segmentation												-----											^											----- ^ 2/1											
Point Source Loading												-----											^											----- ^ 2/1											
Non-Point Source/Land Use												-----											^											----- ^ 2/1											
Ambient Water/Sediment												-----											^											----- ^ 2/1											
Living Resources												-----											^											----- ^ 2/1											
Physical Features																							-----											----- ^ 2/1											
<b>SYNTHESIS</b>																																													
Outline Report					-----											^ 6/30																													
Draft Known Portions												-----											-----											----- ^ 11/30											
Artwork/Photos																							-----											----- ^ 7/15											
State of Bay Symposium																																		----- -^ 2/15											
Complete Report Draft																																		----- ^ 5/1											
Peer Review (MC; STAC)																							-----											----- -^ 1/31 ----- ^ 7/15											
Redraft Report																																		----- -^ 8/15											
Public Meetings																																		----- -^ 9/15											
Review; GBNEP + Public																																		----- 10/31											
Redraft Report																																		----- -^ 11/15											
Report Design																																		----- ^ 12/31											
Report Sent to Printer																																		----- ^ 12/31											