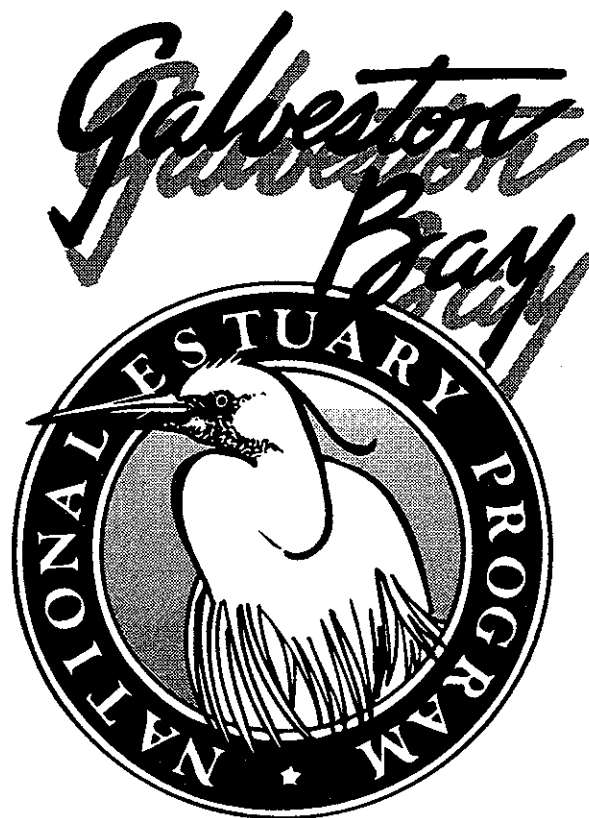


Executive Summaries



*The Galveston Bay Plan
Submission Package*

November, 1994

Endorsements

THE CONCEPT OF INITIALLY STUDYING from a scientific viewpoint the state of the bay, and using those findings to draft the current plan, lends a special credibility and weight to The Plan. The Galveston Bay Plan currently bears the imprints of both the careful science and the consensus building process from a number of involved and concerned Bay users... We think The Galveston Bay Plan, as currently drafted has the promise of creating a real difference in the environment of Galveston Bay. We strongly support its implementation.

—Mayor's Advisory Committee on the Environment (Houston), and the Texas Chemical Council

I am in support of The Plan as a mechanism to ensure that the ecological future of Galveston bay is protected. All those who contributed to The Plan did an excellent job in determining the vital environmental issues and balancing those issues with the fiscal realities that governments and business face today.

—Bob Lanier, Mayor of Houston

Philosophically The Galveston Bay Plan has the right approach by joining the issues of public welfare, economics and all aspects of the environment in considering the future of the bay. We fully support this approach... The Galveston Bay Plan's approach of combining issues represents a quantum improvement; we look forward to fruitful results of cooperation with local communities.

—Robert A. Cole, Director, Lazy Bend Association

The [Greater Houston] Partnership believes it is possible to sustain a healthy productive and useful bay while maintaining the sound economic development of the Galveston Bay area. We recognize the proposed Galveston Bay Plan to be the next step in the important ongoing process of maximizing Galveston Bay's value for all of its stakeholders. The key reasons for the support of The Galveston Bay Plan by the Greater Houston Partnership are:

- The cooperative nature of the work by the various interests in the Galveston Bay Area utilizing the National Estuary Program format/process
- The sound scientific basis of the characterization of the bay from which The Plan was developed
- The proposed creation of the Galveston Bay Council to provide the foundation for continuing communication and cooperation by all parties
- The ability to review and adjust The Plan in the future through the advisory function of the Galveston Bay Council.

—Greater Houston Partnership

On behalf of the Galveston District, Corps of Engineers, I am pleased to endorse this Draft Plan.

—Major Ray Schultz, Deputy District Engineer,
Army Corps of Engineers

Galveston Bay may be in better shape than some had presumed when GBNEP began; nevertheless, our collective concerns were not misplaced, as the studies do support an overall monitoring program to maintain a healthy and productive bay. If we are to sustain this bay as the environmental and economic resource we know it to be, we can only do so through a stewardship in which all parties appreciate the concerns of all of the bay interests. The time for that stewardship is now, before drastic measures are needed, while we can monitor and manage, rather than be forced to command and control...

We... express our appreciation for the tremendous effort that has gone into the Draft CCMP. We fully expect the result of this public participation process to be a plan for the management of Galveston Bay whose implementation is a commitment shared by all stakeholders. To that end, the Port of Houston Authority pledges its cooperation and support.

—Port of Houston Authority

I believe that the GBNEP staff, Groundwater Services personnel, and all the public and industry representatives did a fine job of pulling together timely research, disparate points of view, and a wide variety of issues, initiatives, and jurisdictional conflicts to produce The Plan. The process of bringing together divergent perspectives and trying to forge a consensus on problems, solutions, and priorities was very useful. Furthermore, The Plan itself is a fine document—far more focused, concise, and easily implemented than most planning works.

—David A. Todd, Austin

Overall, [The Galveston Bay Plan] reflects one of the most polished and substantive plans I have had the pleasure to review.

—Stephen Bugbee, EPA Permits
Washington, D.C.

...Having over 23 years experience in coastal issues, policies, and resource management, I feel qualified to provide you with our support for the Draft Galveston Bay Plan... The Texas A&M Sea Grant College Program provides its endorsement and support for the Draft Galveston Bay Plan subject to any major, substantive revisions... Thanks to you and all of your staff for the hard work and excellent job given the numerous entities, organizations, officials, agencies, trade associations, and citizens that were involved in The Plan.

—Mike Hightower, Sea Grant
Deputy Director

On Behalf of the [Texas City] City Commission, we commend your committee and you [Senator Rodney Ellis] for the efforts exhibited on behalf of our beautiful Galveston Bay.

—Charles Doyle, Mayor of Texas City

The East Harris County Manufacturer's Association appreciates the opportunity to present further comments on what, in many ways, has become a model for future National Estuary Program plans. The Plan demonstrates that sound research, combined with consensus program development, yields quality results. The Plan is a tribute to those who worked so long and hard to get to this point. On the whole, the East Harris County Manufacturer's Association supports the draft Galveston Bay Plan.

—C. L. Lancaster,
Chairman of the Board,
East Harris County Manufacturer's
Association

The Galveston Bay Plan represents a thoughtful and insightful document that addresses significant issues of habitat destruction, water and sediment quality problems, and competing uses of the fragile Galveston Bay system, as well as proposes... a number of actions that should result in habitat protection.

—Texas Historical Commission

These plans as presented represent a major step forward in the comprehension and public presentation of this bay's increasing problems which are progressively eroding its sustainability and economic value.

—David Marrack, M.D.

[The Galveston Bay Plan] was well designed and thought-out and the clear and concise actions came together logically in the Action Plans... The level of detail in the draft is quite adequate, and has been sent to other Tier II and Tier III NEPs as a good example. These assets should help pave the way for a smooth implementation of The Plan. The draft reflects strong commitment, consensus-building, and leadership within the committees in attempting to address long-term problems in such a large, complex, and dynamic ecosystem as Galveston Bay. The commitment of the Management Conference in developing this strong draft CCMP is impressive and commendable.

—EPA Office of Wetlands, Oceans, and
Watersheds
Washington, D.C.

It is apparent from reviewing the proposed Plan that a great deal of time and effort has been put into developing a program that is balanced and allows for economic growth while protecting a valuable natural resource.

—Friendswood Development Company

As a long term participant in the Galveston Bay Program, we are pleased with the progress of the program toward the goal of sound and effective stewardship of the Galveston Bay system. The Plan reflects the dedication of the program staff and the virtues of combining careful research and consensus development.

—Houston Lighting and Power

Overall, I am impressed with the results of the GBNEP effort and the resulting Galveston Bay Plan Draft. You have discovered new facts, some contrary to popular conceptions, and developed a plan that will protect the Bay from future misuse.

—Hans R. Friedli, Citizen Monitor

The [Stormwater Management Joint Task Force] believes that protection of valuable natural resources such as Galveston Bay is critical to this region. In that regard we commend the GBNEP for their effort in protecting Galveston Bay. We encourage active involvement by local governments in the development of The Galveston Bay Plan.

—Stormwater Management Joint Task
Force

The Houston-Galveston Area Council supports the concept of a comprehensive Galveston Bay Plan to coordinate the management of this important resource... We commend the GBNEP Management Conference for its efforts to base its plan on sound scientific work, and for seeking consensus among the Bay's managers and users. We also appreciate the fact that local government input was invited and that our concerns have been addressed in major revisions to The Plan's implementation and financing strategies.

—H-GAC Board of Directors

The Board of Directors of the Gulf Coast Conservation Association has unanimously voted to support and approve the Galveston Bay National Estuary Program's Comprehensive Conservation and Management Plan. We would hope that all Texans realize the importance of the Galveston Bay system to our state's economy and ecology. We endorse the Management Plan as a viable tool for its restoration, maintenance, and protection. We would hope that this Plan receives the necessary support it so deserves.

-Gulf Coast Conservation Association

The League of Women Voters of Houston applauds the efforts of the Galveston Bay National Estuary Program Management Conference. We have been especially impressed with the attention given to obtaining input from the public at regular intervals... We feel that adoption of the [Galveston Bay Plan] by state and federal agencies, local governments, environmental and citizens' groups, commercial and industrial interests and recreational users is a step in the right direction.

**-League of Women Voters
of Houston**

We recognize the significant potential to our economy in protecting the bay and the challenge of managing our water quality for our area's large population. We feel that much can be accomplished through a comprehensive, cooperative approach of local, regional, and state governments and organizations to improve storm water management, habitat protection and shoreline erosion. We must be ever mindful of realistic potential for funding and seek to prioritize recommendations to address our most serious problems.

**-Sandra Pickett, Liberty
City Councilwoman**

I commend the Galveston Bay National Estuary Program staff for aggressively soliciting advice and comments from all interested parties during the development of The Plan. The Plan is a comprehensive document that appropriately addresses opportunities and problems in Galveston Bay and contiguous areas and recommends realistic approaches for management of the estuarine resources.

-Lial F. Tischler, Tischler/Kocurek

Mitchell Energy & Development Corporation commends the Galveston Bay National Estuary Program Management Conference ... for the quality of its review of Galveston Bay, a review that demonstrated the success of many existing control programs, such as point source controls in the Ship Channel area, in protecting the environmental quality of the Bay. Much of the design of the Comprehensive Plan has benefited from the quality of the review.

**-Mitchell Energy and Development
Corporation**

The Galveston Bay Foundation enthusiastically supports the proposed Galveston Bay Plan. The Foundation supports the concept of sustainable development for the Galveston Bay area, and believes that it is possible to have a healthy productive bay and continued economic development in the surrounding area. The Foundation believes that the proposed Galveston Bay Plan is an important next step in the process of maximizing the potential of Galveston Bay for all of its users.

-Galveston Bay Foundation

The Houston Audubon Society wants to emphasize...the importance that it places on a Comprehensive Conservation and Management Plan for Galveston Bay. The wise stewardship of this estuary is long overdue, and of utmost importance economically, recreationally and environmentally. We appreciate the countless hours that dedicated and learned people have devoted to The Plan, and hope that their good ideas will be implemented fully.

-Houston Audubon Society

The Fish and Wildlife Service has been an active participant in the GBNEP since its inception. As such, we have been pleased both with the consensus-building format of the GBNEP and the results of that process. The Service strongly endorses the Draft Plan and we fully intend to be active participants in its implementation. The Plan will be most complementary to the recent Service thrust towards an ecosystem approach to fishery and wildlife conservation.

-U.S. Fish and Wildlife Service

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Galveston Bay Plan

Executive Summary

Galveston Bay ranks high among the nation's great bay systems, providing huge economic benefits to the region and state. Remarkably, the bay's natural resources are self-renewing as long as the bay remains healthy and productive. However, Galveston Bay, like many other U.S. bays, now faces significant problems related to habitat loss and species declines, conflicting human uses, and pollution. Some management actions (for example, regulation of point sources of pollution) are already working to improve the bay. Other serious problems still need to be addressed if disasters noted in other U.S. bays are to be prevented. The bay's most serious problems, such as habitat losses and non-point source pollution, occur at the ecosystem level, and will require interdisciplinary solutions involving both natural resource agencies and bay stakeholders.

The Galveston Bay Plan is a Comprehensive Conservation and Management Plan produced by the Galveston Bay National Estuary Program under Section 320 of the Water Quality Act. *The Plan* was drafted by a partnership of state and federal agencies, local governments, stakeholders, interest groups, and the public. Over a five-year period, bay problems were agreed upon, numerous scientific studies conducted, and 82 management initiatives were established to address 17 specific problems.

WHAT PROBLEMS DOES *THE PLAN* ADDRESS?

Habitat Destruction and its Effect on Fish and Wildlife Populations

Destruction of coastal wetlands and underwater seagrass meadows has been substantial, with more than 30,000 wetland acres lost during four decades. These are productive nursery areas for the bay's seafood species, which also serve valuable functions to stabilize shorelines, moderate flooding, and remove contaminants. *The Galveston Bay Plan* proposes nineteen specific actions for habitat and fish and wildlife protection. Initiatives include direct acquisition of wetlands, economic incentives (such as tax breaks) for conservation by private land-owners, and habitat creation (such as utilizing dredged sediment from navigation channels to create wetlands). Efforts aimed at fish and wildlife protection include reduction of commercial fishing by-catch (incidental catch of non-target species in shrimp trawls), catch and release programs for recreational fisheries, and controlling harmful exotic species that displace Galveston Bay's native fish and wildlife.

Competing Human Uses of the Bay: A Balance Between Needs and Available Resources

A variety of bay problems result from the way various users of the bay compete for its scarce resources. For example, diversions of freshwater for use by the expanding population alter circulation and salinity patterns in the bay, in turn affecting the

abundance and distribution of fisheries species and the condition of coastal habitats. *The Galveston Bay Plan* will help determine freshwater needs for Galveston Bay in order to sustain ecological productivity in balance with human uses. Promoting water conservation and more efficient water usage are some of the tools that can be used to achieve these goals.

Shoreline development also can produce unintended problems such as habitat alteration and destruction, pollution, and loss of fish and wildlife abundance and diversity. Nearly 650,000 people live within two miles of the bay's shoreline, with steady population growth intensifying the need for better planning. *The Galveston Bay Plan* proposes five shoreline management actions to ensure compatibility of shoreline uses. These actions include the establishment of guidelines for shoreline development for residential, commercial, and industrial uses. Local governments along the bay's shoreline will have the opportunity to voluntarily coordinate with other shoreline communities in maintaining the shoreline values that draw people to the area and contribute to local economies. Other actions include minimizing negative effects of structures and dredging on publicly-owned lands and ensuring improved access to publicly-owned shorelines.

Water and Sediment Quality Problems

Regulation of point sources of pollution has resulted in substantial improvement of water quality in the upper Houston Ship Channel—a success in the making. But despite ongoing improvements, there are still concerns over source areas—limited areas with pollution or contamination problems. Non-point sources of pollution are of particular concern, with over 50 percent of Galveston Bay permanently or conditionally closed to oyster harvest due to fecal coliform bacteria contamination. *The Galveston Bay Plan* proposes sixteen specific actions to reduce water quality problems caused by non-point runoff. These actions include the implementation of storm water management programs which focus on residential neighborhoods, septic tanks, new development and road construction, and industrial and agricultural activities. Other actions would require treatment of wastes from boating and marina activities.

Other actions address aging sewage collection systems which create bypasses to the bay's tributary waters, improved monitoring, regionalization of smaller, less effective wastewater treatment systems, and elimination of harm associated with brine discharges from petroleum extraction. Several actions are designed to refine methods used by the state to determine allowable pollutant loadings for Galveston Bay and to ensure that pollutant discharges are regulated more effectively. Together, these actions are designed to ensure balanced but protective public policy for the benefit of future generations of Texans.

WHO WILL IMPLEMENT THE GALVESTON BAY PLAN?

The Galveston Bay Plan recommends implementation under a Galveston Bay Program of the Texas Natural Resource Conservation Commission (TNRCC), with a

Galveston Bay Office of the commission to be located in the bay area. Several factors weighed in this decision:

- Most state initiatives in *The Plan* fall under the jurisdiction of the TNRCC. Initiatives estimated to cost about \$7.5 million over the first five years fall to the TNRCC, compared to some \$4.5 million for TPWD, and \$1.5 million for GLO (other state agencies were even smaller amounts).
- The National Estuary Program is a Water Quality Act program, and all other programs under the Water Quality Act are under TNRCC jurisdiction at the state level.
- The recent consolidation of natural resource management under the TNRCC by the Texas Legislature has given this agency a broad role for management of aquatic and marine ecosystems—a good fit with the comprehensive approach of *The Plan*.

A Program Director and staff of up to 15 TNRCC employees will oversee the work of implementation. The composition of the staff will reflect *The Plan's* initiatives, with expertise in wetlands and estuarine habitats, coastal resource conservation, non-point source issues, water quality, public health, and public education. Work of the staff will also include support actions provided by a regional monitoring initiative, research, and continuing public participation in bay policy.

The Galveston Bay Council

Unlike past management initiatives, *The Galveston Bay Plan* is a comprehensive plan. Diverse concerns for habitats and wildlife, competing resource uses, water quality, and human health cannot be adequately addressed without the involvement of multiple resource agencies and bay stakeholders. To achieve success, problems of a regional nature, those affecting the entire ecosystem, will require regionally coordinated actions. Therefore, *The Plan* proposes creation of a *Galveston Bay Council* to advise the TNRCC on all aspects of implementation. The Galveston Bay Council will consist of representatives of federal, state, and local natural resource agencies, the research community, local governments, citizens, and other Galveston Bay stakeholders. The Galveston Bay Council will:

- Provide a forum for technical and stakeholder review and input during *Plan* implementation
- Maintain agency commitments to implement *The Galveston Bay Plan*
- Advise TNRCC staff during preparation of progress reports, evaluations and *Plan* updates
- Authorize and make appointments to advisory committees as necessary
- Assess the success of the action plans and initiate revisions
- Address legislative issues and make recommendations to the legislature
- Set annual priorities for the implementation of the action plans

The Galveston Bay Council is a continuation of the partnership successfully utilized by the Galveston Bay National Estuary Program for the creation of *The Galveston Bay Plan*.

Consistency Review: Broader Options Under the Texas Coastal Management Program

Consistency review is an important tool for the implementation of *The Plan*. Federal consistency review under Section 320 of the Water Quality Act allows the Galveston Bay Program to review federal assistance programs and federal development projects for consistency with *The Plan*. Consistency ensures that federal agency actions which affect Galveston Bay do not work at cross-purposes to the goals of *The Plan*.

While federal consistency review under Section 320 of the Water Quality Act gives the Galveston Bay Program the ability to review certain federal actions for consistency and seek "accommodation" by a federal agency proposing an action that is inconsistent with *The Plan*, it does not give the Galveston Bay Program the authority to stop such action nor to seek mediation.

There are two other types of consistency review *The Plan* may be able to use in the future. Under the CMP, the Coastal Coordination Council has the authority to review state actions that may adversely affect coastal natural resource areas for their consistency with the CMP. Additionally, once the CMP is approved by the National Oceanic and Atmospheric Administration for participation in the federal Coastal Zone Management Program, the Coastal Coordination Council will have the authority to review federal actions (licenses and permits, development projects, direct activities, and federal assistance) to determine their consistency with the CMP.

If enforceable policies of *The Galveston Bay Plan* are adopted by the CCC for a Special Area Management Plan (SAMP), then the state and federal consistency reviews under the CMP may be used to ensure that state and federal actions are consistent with *The Plan*. The enforceable policies associated with *The Plan* will be developed in an open consensus process and will be based on existing federal and state regulations and laws. A focus group that includes industry and other stakeholder representatives will work with the Galveston Bay Council in identifying enforceable goals and policies for inclusion of *The Galveston Bay Plan* as a SAMP under the CMP.

HOW MUCH WILL THE GALVESTON BAY PLAN COST?

Costs

Total Galveston Bay Program costs are estimated at \$2.0 million per year. Approximately \$1.0 million per year will be needed for Galveston Bay Program operating expenses. These funds will be used by the TNRCC to undertake actions identified in *The Plan* as Galveston Bay Program functions. These costs include

establishing and staffing the Galveston Bay Program Office and supporting the Galveston Bay Council. An additional \$1.0 million per year will be needed as match money for grants. This "seed money" can be used to leverage outside funding, such as federal grants, to fund specific initiatives. Costs to implement actions in *The Plan* are estimated at \$36.5 million over five years, with variable annual costs averaging \$7.3 million per year. These costs include those to be incurred by federal, state, and local entities as well as the Galveston Bay Program for implementing new actions recommended by *The Plan*.

Sources of Funds

Of the \$2.0 million required annually for the Galveston Bay Program (\$1.0 million for the Program itself and \$1.0 million seed money to leverage grants and other sources), funding is to consist of \$1.5 million state funds and \$0.5 million federal funds. State funds are to be sought from the Texas Legislature as an appropriation to the TNRCC for establishment of the Galveston Bay Program to implement *The Plan*. The available funding options for implementation of new actions recommended by *The Plan* include federal, state, and private grants and assistance programs. Although funding from many of the regulatory agencies involved in the Galveston Bay Program cannot be formally committed over long time periods, there has been an informal commitment from these agencies to support the Program on a long-term basis.

Within *The Plan* individual actions have been assigned a priority rank of "High," "Medium," or "Low" based on deliberation by the Management Conference. In assigning these ranks, the Management Conference considered both the costs and probable outcomes of the actions, and made judgments about which were most significant in relation to the bay's documents problems. The assigned rankings will provide a guideline for expenditure of funds during implementation of *The Plan*.

Implementation Strategy for *The Galveston Bay Plan* Executive Summary

The Galveston Bay Plan is the result of five years of research and planning by the Galveston Bay National Estuary Program Management Conference. Participants in the Conference included representatives of federal, state, and local government agencies, scientists, environmentalists, industries, commercial fishing, shipping, and other users of Galveston Bay. The conference identified and ranked seventeen priority problems affecting Galveston Bay. The goals, objectives and management recommendations developed to address these problems form the basis for *The Plan*. This document is the Implementation Strategy for *The Galveston Bay Plan*. Along with *The Plan* itself, this report is being submitted to the United States Environmental Protection Agency (EPA), as authorized by the federal Clean Water Act.

The Galveston Bay Plan recommends 82 management actions to be carried out by 20 federal and state agencies, over 100 local governments and special purpose districts, and other bay users. This report describes how *Plan* implementation will be led by a newly created Galveston Bay Program (GBP) of the Texas Natural Resource Conservation Commission (TNRCC) and outlines the major roles of other federal, state, and local governments, "stakeholders," and the public. A summary table of agency responsibilities for each of *The Plan's* actions is also included in this document.

This report also identifies the possible enforceable policies in each of *The Plan's* actions, and cites the relevant federal and/or state statutory and regulatory basis for enforcement. Additional actions required (if any) to make the policies enforceable are also described. Based on the analysis of enforceable policies, necessary federal and state legislation, Memoranda of Understanding, and local ordinances are identified. The report concludes with a description of how implementation results will be tracked and evaluated.

This strategy is intended to provide information to support the Implementation chapter of *The Plan*. It does not necessarily include all roles, plans, statutes or rules that may need to be changed, nor does inclusion here necessarily mean that the role, plan, statute, or rule will have to be revised. Each agency must determine what changes are necessary to implement the intent of the *Plan* as it applies to the agency. The agency would then prepare proposed legislation and regulations which would include the specific changes or requests for funding and revise agency plans or rules as necessary to achieve the goals and objectives of the *Plan*.

The Galveston Bay Program of the Texas Natural Resource Conservation Commission. Several alternatives were originally considered by the GBNEP Management Conference for implementing *The Galveston Bay Plan*. Originally, three choices were considered: the Texas Natural Resources Conservation Commission (TNRCC); the General Land Office (GLO); and, the creation of a new, independent entity by the Texas Legislature. During development of the *Plan*,

creation of a new, independent entity, (first called "The Galveston Bay Authority," and later the "Galveston Bay Council") was initially identified as the preferred alternative. Subsequently, numerous focus group discussions with local elected officials revealed little support for any approach that would (1) create a totally new government structure with authority over local actions; or (2) involve funding or collection of funds by local governments (e.g. taxes or fees). As a result of the involvement by local officials and further deliberation by the GBNEP, the TNRCC was identified by the Management Conference as the preferred implementing entity for *The Galveston Bay Plan*.

To oversee implementation of *The Galveston Bay Plan*, establishment of a permanent Galveston Bay Program (GBP) of the TNRCC, with an office located in the bay-area, is recommended. Under this arrangement, the TNRCC will be advised by a *Galveston Bay Council* (GBC) composed of the agencies, stakeholders and citizens involved in *Plan* implementation. The GBC will provide a continuing focus on Galveston Bay issues and coordination among the implementing organizations.

A Program Director and staff of up to 15 TNRCC employees will oversee the work of *Plan* implementation. The GBP will have the following principal functions:

- Acquire, manage and disperse funds to implement *The Plan*
- Review federal, state and local projects in an open process for consistency with *The Plan*
- Provide for coordination with the Texas Coastal Management Program (CMP) and the Coastal Coordination Council (CCC)
- Provide for coordination and communication among state and federal resource agencies for the many cross-jurisdictional issues
- Monitor implementation of specific actions by *The Plan's* partners
- Identify and communicate bay improvements to agencies, stakeholders, and the public, and redirect *The Galveston Bay Plan* where improvements lag
- Conduct public outreach and education to increase public awareness of Galveston Bay, and to advocate conservation of the estuary
- Evaluate the impacts of proposed actions on cultural resources and areas of historical significance

The GBC will consist of representatives of federal, state, and local natural resource agencies, the research community, local governments, citizen groups including representatives from low-income and other minority communities, and other Galveston Bay stakeholders. The GBC will select its own Chair annually, meet at least quarterly and perform the following functions:

- Provide a forum for technical and stakeholder review and input during *Plan* implementation
- Maintain agency commitments to implement *The Galveston Bay Plan*
- Advise TNRCC staff during preparation of progress reports, evaluations, and *Plan* updates
- Authorize and make appointments to advisory committees as necessary
- Assess the success of the actions plans and initiate revisions

- Address legislative issues and make recommendations to the legislature
- Set annual priorities for implementation of the action plans, by advising the TNRCC.

Who Will Do What. Because of the comprehensive nature of *The Plan*, successful implementation will depend on coordinated actions by local, state, and federal agencies and other organizations responsible for implementing specific initiatives. The Galveston Bay Program (GBP) will be responsible for this coordination, utilizing the advice of the Galveston Bay Council (GBC).

Agency Responsibilities. Agencies and other entities will fulfill their commitments to *Plan* implementation in a variety of ways, including:

- earmarking funds
- allocating staff
- assisting with legislative initiatives
- passing new or revised regulations
- establishing guidelines
- entering into memoranda of understanding (MOUs)
- passing local ordinances
- adopting resolutions of support
- redirecting agency resources to achieve *Plan* objectives

Overall tracking and coordination for implementing *The Plan* will be the responsibility of the GBP. However, individual recommendations in the *Plan* will be the responsibility of numerous individual agencies.

Enforceable Policies. The Clean Water Act (CWA) amendments of 1987 established the National Estuary Program to provide a basis for coordinating federal, state and local actions, including regulatory measures. While the CWA {§ 320(f)(2)} suggests that a completed CCMP will be implemented once approved by EPA, it does not provide specific authority to enforce implementation. Hence, *The Plan* as a whole is not "enforceable." However, it will be the basis for federal and possibly state and local consistency review. The types and strength of consistency review tools available for *Plan* implementation will partially depend upon possible adoption of enforceable policies of *The Plan* as a SAMP in the TCMP and acceptance of the TCMP into the Federal Coastal Zone Management (CZM) Program. Policies for *Plan* consistency review are described in *The Federal Consistency Report for the Galveston Bay Plan*.

Since the *Plan* as a whole is not enforceable, its implementation will be, in large part, dependent on discretionary or voluntary initiatives by various agencies. However, many of the *Plan's* individual actions contain recommendations for increasing enforcement of existing regulations, creating new regulations or modifying existing ones to better meet *Plan* goals and objectives. "Enforceable policies" are any elements of the *Plan's* recommended actions which call for federal, state, and/or local agencies to exercise their regulatory authority to require or cause an action to be undertaken. For the most part, enforceable policies are mechanisms based on the issuance and enforcement of permits, rules, standards, policy

guidelines, and/or other legal means of requiring compliance with the *Plan's* recommended actions. Some actions also recommend new legislative authority be given to implementing agencies to regulate or enable certain activities. However, these policies will not preclude the use of appropriate alternative means of achieving the *Plan's* goals and objectives.

Legislative Needs. Implementation of some of the *Plan's* recommendations will require legislation at the federal and state level. Several major legislative initiatives called for in the *Plan* were identified in the process of developing the Implementation Strategy. The Galveston Bay Program will work closely with federal and state agencies to assure passage of these legislative initiatives.

Memoranda of Understanding. Several *Plan* actions will require establishment of a formal Memorandum of Understanding (MOU) between two or more agencies to coordinate regulatory or other programs. The Galveston Bay Program will help initiate the MOU negotiations, however, it will be the responsibility of the agencies involved to actually implement the MOU, provide appropriate public notice, and issue rules, if necessary.

Local Ordinances. A number of *Plan* actions will be implemented through local ordinances. Major local ordinance initiatives recommended in the *Plan* are outlined in this document, by implementation year. The Galveston Bay Program will help link local governments with appropriate technical assistance resources in developing their ordinances.

Measuring Results. Agencies which are participating in implementing *The Plan* will be asked to submit progress reports every six months to the GBP. These reports should be tied to the steps identified in the *Plan* recommendations. At the end of the biennium, each implementing entity should be required to prepare a brief wrap-up report on the status of work that had been proposed in the *Plan*. This report would go beyond the six-month progress reports by including more in-depth evaluation of implementation successes and obstacles and an opportunity for suggestions on how the overall *Plan* implementation strategy should be adjusted heading into the next cycle.

The GBP shall prepare an annual report to include:

- a summary and overall assessment of implementation efforts
- a brief status report on each recommended action in *The Plan*
- a financial report
- committee reports, noting work completed and issues addressed
- a report on implementation needs for the coming year(s)

Implementation results should be evaluated against monitored environmental parameters to ensure that *Plan* initiatives are having their desired impact. The environmental monitoring effort is described in a separate report title *Galveston Bay Regional Monitoring Program*. The environmental and programmatic evaluations should be tied to the GBP's annual budget preparation and priority-setting process, its public information function (annual report of accomplishments),

and the biennial State of the Bay symposia. It will be up to the GBC to respond to the annual assessment and evaluation and to recommend to the TNRCC any redirection of implementation efforts and funds.

Each agency, group or entity involved in *Plan* implementation is encouraged to assign a Galveston Bay liaison to coordinate with GBP staff. Even as formal reporting requirements are established, the importance of routine informal communication among staff of involved agencies should not be underestimated.

The most direct method for ensuring implementation commitments is to link continued receipt of implementation funds to performance. This method could only be employed for funds which originate with or "pass through" the TNRCC to other units of government. Any pass-through funding or contract funds under TNRCC control could be conditioned based on performance, which the GBP should evaluate periodically.

There is likely to be some "peer pressure" involved as agencies document how they have contributed to the achievement of *Plan* objectives and as they present their implementation accomplishments to the public at State of the Bay symposia and in other forums.

Federal Consistency Report for *The Galveston Bay Plan* Executive Summary

Most significant activities which occur in the Galveston Bay system will have some federal involvement (e.g., dredging, highway construction, and channelization). These activities have the potential to conflict with the goals and policies of *The Galveston Bay Plan*, a Comprehensive Conservation and Management Plan (CCMP) developed under the Water Quality Act of 1987 by the Galveston Bay National Estuary Program (GBNEP). Conversely, federal activities also have the potential to enhance beneficial bay management activities identified in *The Galveston Bay Plan*. Section 320 of the Water Quality Act provides National Estuary Programs (NEPs) with authority and responsibility to conduct "consistency" reviews of federal assistance projects and direct federal actions in Estuaries of National Significance.

The Water Quality Act's provision for consistency review is the basis for creation of an effective and efficient process to help assure that federal activities are compatible with the aims of *The Galveston Bay Plan* during its implementation. This report summarizes the consistency review activities to be undertaken during implementation of *The Galveston Bay Plan*, and is written to be a supplement for *The Plan*, as submitted to The Governor of Texas and Administrator of EPA.

In addition to the implementation of NEPs, various federal laws authorize reviews by state and local governments of federal actions for consistency with state and local plans. Consistency review under Section 320 does not grant NEPs the authority to deny a federal project, rather the federal agency involved must consider the NEP's recommendations and accommodate its concerns or explain why accommodation is not accomplished. This contrasts with federal consistency review under the Coastal Zone Management Program (CZMP), which grants consistency review authority over permits as well as federal assistance and development projects. Thus, Texas' developing Coastal Management Program (CMP) will allow for potential "veto" of certain federal actions that are not undertaken in a manner consistent with the CMP's enforceable goals and policies. Upon acceptance of Texas' CMP into the federal CZMP, consistency review for *The Galveston Bay Plan* could occur through the CZMP consistency review process. This process is to be based on future possible designation of some elements of *The Galveston Bay Plan* as "enforceable policies," an action to be deliberated upon by the Galveston Bay Council

Contained within this report are the following elements outlined in guidance provided by EPA to NEPs:

- An **inventory** of federal programs and development projects that may affect the ability to meet the goals and objectives of *The Galveston Bay Plan* (Part II; APPENDIX V). Future activities proposed under these

selected programs and projects are the activities to be reviewed for federal consistency;

- A **one-time assessment** which identifies current inconsistencies between these federal programs/development projects and the objectives of *The Galveston Bay Plan* and describes how these specific inconsistencies will be resolved (Part III); and
- A **strategy for continuing consistency review** of the activities proposed in the future under programs identified in the inventory, and for review of new federal programs and projects that are established in the future (Part IV).

In establishing a federal consistency review program, an important goal of the GBNEP was to avoid duplication of efforts with other existing and developing consistency review and certification programs. Therefore, special attention was paid to consolidating the proposed activities with these other programs.

Inventory of Federal Programs. A review was conducted of all the federal financial assistance programs listed in the Catalog of Federal Domestic Assistance, direct federal development projects, and federal license and permit programs (APPENDIX V and TABLES IA and IB). Based on this compilation, deliberation by the Management Conference narrowed the list to programs which meet the guidance requirements and which have the potential to be inconsistent with *The Galveston Bay Plan*. This activity provided a list of programs for use in making the consistency determinations themselves.

One-Time Assessment of Federal Consistency. Consistency review criteria were developed by the Management Conference which were based on the goals, objectives, and actions of *The Galveston Bay Plan*. Using these criteria, the Federal Program Inventory was reviewed to identify federal programs that may be inconsistent with *The Galveston Bay Plan's* purposes and objectives. Numerous programs and projects were identified that have the future potential to conflict with or further the goals of *The Galveston Bay Plan* (see APPENDIX V), but only several were singled out for their potential to be inconsistent at the current time.

The Management Conference has determined that the following current activities have the *potential* to be inconsistent with the goals and objectives of *The Galveston Bay Plan* depending on design/implementation methods:

- Houston/Galveston Navigation Channels, Texas Project
- Buffalo Bayou Project: Brays Bayou, Greens Bayou and Cypress Creek
- Wallisville Lake Project
- Interstate 10 at: Turtle Bayou, Wallisville, Cedar Bayou and Trinity River
- NASA Road 1 Construction from I-45 to SH 146
- Expansion of the Strategic Petroleum Reserve to One Billion Barrels
- Maintenance Dredging of the Intracoastal Waterway

Future activities associated with these programs and projects will be reviewed for consistency with *The Galveston Bay Plan* as part of the ongoing review strategy (below).

Development of an Ongoing Federal Consistency Review Strategy. The federal consistency review strategy proposed in this report has the following broad attributes:

- The Galveston Bay Program (GBP) of the Texas Natural Resource Conservation Commission (TNRCC) will have the responsibility for conducting federal consistency reviews. Review activities will include a notification process, compilation of comments, technical staff review, and preparation of formal findings. This activity will generally occur for projects within the lower watershed of Galveston Bay, encompassing parts of five counties.
- The Galveston Bay Council (an agency/stakeholder group appointed to facilitate implementation of *The Galveston Bay Plan*) will serve in an advisory capacity to the GBP in consistency review, and once convened, will formulate policies concerning how it will advise the GBP.
- Federal consistency review by the GBP, to the maximum extent practicable, will be merged with the existing Executive Order (EO) consistency review process carried on by the Texas Review and Comment System (TRACS). This will involve linking review of bay-related activities to the ongoing review activities of the H-GAC and the Texas Office of State/Federal Relations under the existing state program.
- The GBP will coordinate with other existing review and certification programs, including TNRCC programs for 401 Certification and State Non-Point Source consistency reviews, for proposed federal activities within the geographic project area. These are ongoing activities of the TNRCC and would be coordinated within the agency with *Galveston Bay Plan* activities.
- Upon adoption of the Texas Coastal Management Program (CMP) into the federal Coastal Zone Management Program (CZMP), *The Galveston Bay Plan* and related enforceable policies and advisory policies (if any) will be forwarded to the Coastal Coordination Council (CCC) possible for adoption as a Special Area Management Plan (SAMP). If adoption occurs, the stronger federal consistency review associated with the CMP can potentially be used to review the consistency of federal actions with *The Galveston Bay Plan's* enforceable policies.

Elements of the process to be utilized in carrying out on going consistency review include:

- Receipt of Project Letters. Project notification letters will be forwarded to the GBP from either the Texas Office of State and Federal Relations (SFR) or the Houston-Galveston Area Council (H-GAC) under procedures of the Texas Review and Comment System and as described in this report.
- Review Policy and Guidelines. The Galveston Bay Council may establish review policies and guidelines needed in addition to those established in *The Galveston Bay Plan*. This may include a procedure or threshold for Council consideration of projects, either by establishing some minimum threshold for project size or impact, or by circulation of staff-prepared comments to Council members for adoption in lieu of any request for full Council review by a Council member.
- Consistency determination. The GBP, acting with the advice of the Galveston Bay Council, will issue a consistency recommendation. The recommendation could be: 1) The project is **consistent** with the Galveston Bay Plan and consistency review criteria; or 2) The project is **inconsistent** with the Galveston Bay Plan and the consistency review criteria (reasons for inconsistency will be cited) or 3) The project is **consistent** with *The Galveston Bay Plan*, but could be improved in specific ways to improve its benefit to the Bay. The GBP may waive review of projects with limited or no impact on the Bay.
- Forwarding Comments to Federal Agencies. After clearing the GBP's review process, comments on projects covered by the Texas Review and Comment System will be forwarded to federal agencies through H-GAC or the Texas Office of State/Federal Relations. Comments on projects not included in that list will be forwarded directly to the federal agency.
- Resolving Inconsistencies. Under the state review and comment system the GBP may request that a federal agency "accommodate" its comments and findings. A request for accommodation should be made explicitly, and is not simply assumed whenever a finding of inconsistency is made. The request is forwarded to the Office of State/Federal Relations, which makes the request on behalf of the State. This formal process does not preclude the GBP from entering into informal discussions with the federal agency in attempts to resolve consistency issues.

Funding Strategy for The Galveston Bay Plan

I. Executive Summary

The Galveston Bay System represents a huge economic, cultural, and environmental asset to Texas and the Nation. In order to maintain this value of bay assets for the future, and to address current problems which have been scientifically documented by the Galveston Bay National Estuary Program, *The Galveston Bay Plan* proposes more than eighty specific actions to address concerns related to pollution, development, and overuse of the bay and its resources. The costs of these actions have been estimated by the Management Conference, and are summarized in *The Plan* itself and in supporting documentation. Chapter VIII in *The Plan* summarizes how proposed actions are to be implemented, including how the work will be funded.

This report is intended to provide information to support the implementation chapter in *The Galveston Bay Plan*. This report does not necessarily include all funding sources or strategy elements that may be eventually utilized by the Galveston Bay Program in the future, nor will all funding alternatives developed in this report be adopted by the program or its partner implementing agencies. Naturally, each implementing agency is subject to continually changing fiscal opportunities and limitations. Each agency must determine what specific funding opportunities are available as actions are initiated, and the Galveston Bay Program will continuously facilitate this process. The information here, developed by contractors to the program, is intended to aid in identifying alternative funding sources, the actual use of which depends upon appropriate policy decisions developed by organizations represented on the Galveston Bay Council, or (where appropriate) by individual agencies.

Action Plan Summary of Funding Opportunities

The Galveston Bay Plan is organized as a series of individual action plans, each of which contains a set of specific actions. Potential funding opportunities developed for this project are summarized below for each of the major action plans. These are given in descending order of priority (as determined by Management Conference rankings of priority problems and goals in *The Plan*), and do not correspond exactly to the order presented in *The Plan* itself.

Habitat Protection. Loss of vital habitats such as wetlands is listed as the highest priority problem in *The Galveston Bay Plan*. Actions to increase the quantity and improve the quality of wetlands and other habitats for fish and wildlife, as well as those that eliminate or mitigate the conversion of wetlands to other uses, will address the problem of loss of vital habitats. These actions are described in the

Habitat Protection Action Plan. State and local governments, universities and researchers can apply to several federal grant programs to finance habitat related research. Programs that specifically address research are described in the funding strategy for the Research Action Plan.

Federal programs and partnerships are the two most promising methods that can aid the Galveston Bay Program and the state in restoring and acquiring vital habitats, especially wetlands. To take full advantage of cost-share assistance from competitive matching grants authorized by the Breaux Bill, the Galveston Bay Program should aid the state in establishing a trust fund to acquire coastal wetlands, natural areas, and open spaces. This will enable the state to receive up to 75 percent of project costs from National Coastal Wetlands Conservation Grants. The Galveston Bay Program should assist private landowners to enroll in the USDA's Wetlands Reserve Program, which provides direct payments to agricultural landowners to restore and permanently maintain wetlands on their property. The Clinton administration has recommended increased funding for this program. The North American Wetlands Conservation Fund facilitates partnerships such as the Gulf Coast Joint Venture, a coalition of state agencies and private industrial and conservation groups which are pooling their funds and resources to acquire, protect, and restore wetlands and other priority habitat that support waterfowl. Other promising partnerships for acquisition and restoration include those between state agencies and the Nature Conservancy, as well as the Coastal America Program.

Non Point Sources of Pollution. The environmental problem ranked second in importance in *The Galveston Bay Plan* is the presence of contaminated runoff from nonpoint sources. TNRCC administers the EPA's Nonpoint Source Implementation (Section 319) Grants through its Nonpoint Source Pollution Control Program, while the Texas State Soil and Water Conservation Board undertakes actions related to agriculture. To channel a larger proportion of the state's share of Section 319 money to Galveston Bay, the Galveston Bay Program should seek to include *The Galveston Bay Plan's* nonpoint source related actions in TNRCC's 319 work plan. Political subdivisions may apply to the TWDB for low interest State Revolving Fund Loans to plan, design and construct structural nonpoint source controls that are authorized in the states 319 plan, as well as in *The Galveston Bay Plan*. Funds from the NPDES-related grants program can be used to develop and implement control strategies for stormwater discharge problems. As Texas's designated coastal management agency, the GLO will be eligible to receive money from NOAA's Coastal Zone Management Program for development of its Coastal Management Plan, which must include development of coastal urban and marina nonpoint source control initiatives. Local governments and other marina facility owners will be soon eligible to apply for Clean Vessel Act Grants from the TPWD to improve their pump-out facilities, to reduce nonpoint source pollution from marinas and boats.

Point Sources of Pollution. The third most pressing problem identified in *The Galveston Bay Plan* is the entry of sewage and industrial wastes into Galveston Bay due to design and operational problems, especially during rainfall runoff. The State Revolving Fund, administered by the TWDB, offers low interest loans to local governments for construction, repair and enhancement of publicly owned treatment

works (POTWs). TWDB offers grants for Regional Water Supply and Wastewater Planning for preparing plans to regionalize small wastewater treatment systems.

Two other priority problems identified in *The Plan* are illegal connections to storm sewers and toxic chemicals contaminating water and sediment. The potential exists for TNRCC to use EPA Water Pollution Control formula grant funding to offset local government costs of eliminating illegal connections to storm sewers. Other possible sources of funding are Water Quality Management (§205) and the State Revolving Fund.

Freshwater Inflow and Bay Circulation. The fourth priority problem ranked in *The Galveston Bay Plan* is that future demands for freshwater and alterations to circulation may seriously affect productivity and overall ecosystem health in the Galveston Bay system. Financing procedures for this action are already underway. A cooperative agreement between TWDB and USGS will finance some monitoring costs. Planning initiatives will be financed through a combination of funding sources including the Clean Rivers Program and in-kind services provided by the Corps of Engineers. TNRCC will pursue and or provide funding for a study to evaluate the effect of channels and structures on bay structures on bay circulation, habitats, and species.

Water and Sediment Quality. The fifth highest ranked priority problem in *The Galveston Bay Plan* is contaminated water and sediment. Potential federal funding sources for solution-oriented technical studies and monitoring for the recommendations in this Action Plan include NOAA's Sea Grant program, and the Department of the Interiors' USGS programs. The EPA has several programs for research and monitoring, along with planning and management assistance for implementation. Potential state programs include the Texas Water Development Board's funding for research, planning, and infrastructure through the State Revolving Fund.

Species Population Protection. The sixth priority is to reverse the declining population trend for affected species of marine organisms and birds, and maintain populations of other economically and ecologically important species. The same TPWD-administered assistance programs that have been recommended in the funding strategy for acquisition of wetland habitat can be used to further these goals. Similarly, the same partnership and foundation grant programs can also help to fund species population protection efforts.

To fund a baywide species management program, the TPWD should seek financial assistance from the USFWS Wildlife Restoration (P-R) Fund. The TPWD program to return the shells of harvested oysters to designated locations in the bay to increase oyster spawning will require an appropriation from the Texas legislature, however, funding to augment this appropriation can be sought from NOAA's SEAMAP and Unallied Management Projects.

Houston Lighting and Power (HL&P), in partnership with the Port of Houston Authority and the Galveston Bay National Estuary Program, is successfully carrying out an experimental project to create five acres of oyster reef substrate

using coal combustion by-products. TPWD can also seek funding for this program from USFWS programs such as Wildlife Restoration (P-R), the Coastal Wetlands Planning, Protection, and Restoration Funding, and from the Sport Fish Restoration Fund. Future support of this kind of work may also be available through mitigation or remediation projects which result from disturbance of natural oyster reefs (e.g. the deepening and widening of the Houston Ship Channel, if approved by Congress).

The Galveston Bay Program can seek to augment funding from NMFS for its bycatch development actions with NOAA's Sea Grant, MARFIN, SEAMAP, Unallied Management Projects, as well as the TPWD's Sport Fish Restoration Fund allocation. This fund can also be used to fund TPWD's educational programs for recreational fishermen about catch and release. To develop management plans for threatened or endangered species, USFWS and TPWD programs such as Fish and Wildlife Management Assistance can be used for technical assistance, and funds can be sought from the Wildlife Restoration and Cooperative Endangered Species Conservation Funds.

Shoreline Management. The seventh most pressing environmental problem ranked in *The Plan* is inadequate shoreline management and environmentally compatible public access to the bay. Another problem cited in the plan is shoreline erosion and loss of stabilizing vegetation due to shoreline subsidence and subsequent rising sea levels. The Harris-Galveston Coastal Subsidence District (HGCSD) manages subsidence in the area, and funds itself with Subsidence Fees. *The Galveston Bay Plan* recognizes the important contribution made by the HGCSD, but does not recommend any new actions related to subsidence requiring funding.

To assist shoreline planning and management, the Galveston Bay Program will work with the USFWS and other agencies to monitor shoreline loss due to erosion. *The Plan* also recommends that the Galveston Bay Program consider recommending that the Coastal Coordination Council designate Galveston Bay as a Special Management Area under the Coastal Management Plan. The most likely federal source of funding for this action is the Coastal Zone Management Award Program from NOAA. Funding to improve access to publicly owned shorelines may be sought from the Texas Parks and Wildlife Department from their Boat Ramp Assistance Program.

The National Parks Service Land and Water Conservation Fund provides grants to states for planning, acquisition and development of outdoor recreation facilities that could be used to improve public access to publicly owned shorelines. The Local Park Grant Assistance Program, administered by the TPWD, can also be used for these purposes. The DOT's Intermodal Surface Transportation Efficiency Act (ISTEA) program can be used for recreational area improvement and acquisition activities related to publicly owned shorelines. For instance, the Galveston Bay Foundation has been working with ISTEA funding to develop the Galveston Bay loop of the Texas Coastal Trail.

Spills and Dumping. Ranked eighth on the list of Galveston Bay priority problems is addressing impacts of spills of toxic and hazardous materials. The

Coastal Protection Fund, administered by the GLO, is the most promising source of funding for implementation of spill related actions. The GLO could share some of these funds with the Galveston Bay Program through Memoranda of Understanding. Privately funded initiatives such as the Marine Spill Response Corporation and Clean Channel Association can also aid in the implementation of spill related actions.

Should NOAA award the GLO Coastal Zone Management Program funding, the GLO may use it to finance planning and implementation of spill and dumping related actions such as an advance shoreline characterization, improvement of stormwater management, and public education on the harms of illegal dumping. As with the Coastal Protection Fund, the GLO would need to make arrangements to funnel any of this funding to the Galveston Bay Program.

The Galveston Bay Program is eligible to apply for assistance for some of the actions in this plan from EPA's TNRCC administered Water Pollution Control State and Interstate Program, the Water Quality Management Planning program, and the Nonpoint Source Implementation Grants Program. To improve trash management near the shoreline, and to publicize the harm caused by dumping, local governments, public agencies, and educational institutions may apply for TNRCC sponsored Clean Texas 2000 grants, as well as TNRCC's Solid Waste Management Public Information/Awareness Grants.

To develop educational programs to publicize environmental harm caused by illegal dumping, the Galveston Bay Program can apply to the EPA for Environmental Education Grants. Universities and other public or private organizations can apply to the TDH for Chemical Awareness Grants. Texas A&M was awarded \$60,000 in FY 1991 from this program to develop and provide public training workshops on hazard communication and chemical awareness.

Public Health Protection. Number nine on the priority problem list is the potential risks posed by the potential presence of toxic chemicals in seafood taken from the Bay. Problem twelve is that a large portion of the bay is permanently or provisionally closed to shellfish harvesting because of high fecal coliform bacterial levels. Sixteenth on the list of problems is that some tributaries and near-shore areas of Galveston Bay are not safe for contact recreational activities such as swimming, wade-fishing, and sail-boarding due to risk of bacterial infection.

To reduce the potential health risk resulting from these problems, *The Plan* recommends that the TDH seek funding through the Seafood Consumption Safety Program. For assistance with monitoring, sampling, and analysis of seafood, state appropriations should be sought. No grant programs have been identified to fund seafood testing. Funding strategies for reducing contaminant sources to the estuary have been developed and are described in this report.

NOAA's Sea Grant conducts outreach activities that can augment, but not provide funding to the TDH public education program. Funds from the TPWD-administered Sport Fish Restoration Program may also be used for these purposes, as long as the efforts are directed to recreational fishermen.

The Plan recommends that TDH should conduct more frequent water sampling in shellfish harvesting areas. This sampling can be funded by state appropriations, Water Research Grants from the TWDB, as well as NOAA's Marine Research-Regional Program. TNRCC can use funds from its EPA Water Pollution Control-State and Interstate Program Support (§106) formula grant to support state pollution prevention and abatement projects including enforcement programs.

Grants, Loans, Technical Assistance and Partnership Opportunities

Grants, loans, technical assistance, and partnership opportunities, although temporary, can augment and multiply conservation efforts already in place at the federal, state, local and private levels. Federal and state agencies provide a variety of grants and loans as well as technical assistance for locally funding programs. Public and private foundations such as the Coastal America Program, the Clean Texas 2000 Program, and other donors, provide grants and partnership opportunities to fund environmental conservation projects. In general, grants and loans should not be relied on for funding of long term administrative obligations, but should be used to fund, or to augment funding, of specific projects.

Matrix of Funding Options

FEDERAL FUNDS ADMINISTERED BY STATE AGENCIES		ACTION PLAN PRIORITIES								
FEDERAL PROGRAM	STATE PROGRAMS	1	2	3	4	5	6	7	8	9
Coastal Wetlands Planning (USFWS)	TPWD Programs	X					X			
Sport Fish Restoration Fund (USFWS)	TPWD Programs	X					X			X
Wildlife Restoration(USFWS)	TPWD Programs including Boat Ramp Assistance	X					X	X		
Cooperative Endangered Species (USFWS)	TPWD Programs	X								
Wetlands Reserve Program (USDA)	Local ASCS Office	X								
Rice Protection Stabilization (USDA)	Local ASCS Office	X								
Wetlands Protection-State Development Fund (EPA)	TNRCC and other state agencies with wetlands programs	X								
Intermodal Surface Transportation Efficiency Act (ISTEA) (DOT)	State DOT office							X		
Nonpoint Source Implementation (319) Grants (EPA)	Nonpoint Source (319) Grants (TNRCC)		X						X	
Capitalization Grants for State Revolving Funds (EPA)	State Revolving Fund (TWDB)		X	X		X				
National Pollutant Discharge Elimination System Related State Program Grants (EPA)	TNRCC Programs		X			X				
Coastal Zone Management Administration Awards (NOAA)	GLO Coastal Management Program		X			X		X	X	
Clean Vessel Act Grants (USFWS) via Sport Fish Restoration	State Boat Ramp Assistance (TPWD)		X							
Water Pollution Control - State Support (EPA)	TNRCC Programs		X	X					X	

FEDERAL FUNDS ADMINISTERED BY STATE AGENCIES		ACTION PLAN PRIORITIES								
FEDERAL PROGRAM	STATE PROGRAMS	1	2	3	4	5	6	7	8	9
Water Quality Management Planning (EPA)	Water Quality Management Planning (TNRCC)		X			X			X	
Water Pollution Control Research and Demonstration (EPA)	TWDB Programs		X			X				X
Sea Grant (NOAA)	Texas A&M Sea Grant	X	X	X	X	X	X	X	X	X
Outdoor Recreation, Acquisition, Development & Planning (Land & Water Conservation Fund) (National Park Service)	TPWD State Parks							X		
STATE ENVIRONMENTAL FEES										
	Water Quality Assessment Fees	X	X		X	X				
	TPWD User Fees	X					X			
	Coastal Protection Fees	X							X	
	Waste Treatment Inspection Fees			X		X				
OPTIONS FOR LOCAL GOVERNMENT										
	Ad valorem property taxes	X	X					X		
	Drainage Fees		X			X				
	Revenue Bonds		X	X						
	Municipal Sales & Use Taxes		X			X				

Federal agencies such as the Corps of Engineers, NOAA, USGS, USDA and the USFWS offer assistance in the form of technical expertise and "in kind" or work effort in place of financial assistance to projects. Many federal programs award grants or allocate funds to state agencies, which administer the programs for the state. Generally, the state entities eligible for federal grants have a mission and responsibilities that are compatible with the mission and responsibilities of the granting federal agency. Other federal grant programs are not "passed through" to the state, rather, proposers can apply directly to the federal agency for them.

User Fees, Taxes, and Alternative Funding Mechanisms. User fees and taxes can provide a stable source of revenue to fund ongoing programs. State agencies such as the TNRCC and the TPWD collect user fees to fund programs related to the fees charged. For example, the TNRCC administers a Waste Oil Recycling Fee. However, spending of the revenues from these user fees is usually restricted by legislation and portions may be dedicated back to general revenue. Local governments can use fees and taxes to provide a stable source of revenue to fund ongoing programs such as operation and maintenance of stormwater systems, wastewater treatment facilities, and water and sewer infrastructure.

When designing a method for financing new activities, it is generally best to use existing financing mechanisms rather than create new ones. This reduces the need for start-up funding, and new administrative infrastructure. In addition, using existing mechanisms is less likely to involve legislation or voter approval, and if either is required, the existing mechanism, if it has been successful in the past, will be more easily accepted.

Monitoring Strategy for *The Galveston Bay Plan* Executive Summary

The Galveston Bay National Estuary Program (GBNEP) was established under the Clean Water Act of 1987 to develop a Comprehensive Conservation Management Plan (CCMP) for Galveston Bay. In 1990 work began to: (1) identify specific problems facing the Bay, (2) compile bay-wide data and information to describe the status, trends, and probable causes related to the identified problems, and (3) create a comprehensive plan to enhance governance of the bay at the ecosystem level. Based on five years of intensive work by the diverse members of an appointed "Management Conference", *The Galveston Bay Plan* was created in 1994 for submission to the Governor of Texas and Administrator of EPA..

National Estuary Program guidance requires the development of a detailed Environmental Monitoring Plan, as a separate support document to be submitted as a supplement to *The Galveston Bay Plan*. The two major goals for monitoring work as defined in EPA guidance are: 1) to measure the effectiveness of the management plan's actions and objectives; and 2) to provide essential information that can be used to redirect and focus actions implemented under *The Plan* as they are actually carried out.

To accomplish this task, a Monitoring Work Group of technical experts was created to develop and recommend to the Management Conference a detailed regional monitoring implementation plan. This work group built on work of a previous Monitoring/Data and Information Task Force convened during Galveston Bay Plan development, and began work under the following goal statement:

The Regional Monitoring Program will be developed as a statistically sound, holistic monitoring effort designed to provide environmental data of known quality and confidence. It will be responsive to CCMP management goals and objectives, and will also have a larger goal of providing knowledge of bay-wide ecosystems, their variability, and societal impacts both environmental and ecological. Understanding that no agency's mandate is broad enough for this undertaking, the Regional Monitoring Program is seeking to promote a cooperative effort by all agencies, organizations, and other stakeholders who participate in bay monitoring activities. The Galveston Bay Regional Monitoring Program attempts to integrate and expand the disparate monitoring efforts currently active on the Bay into a comprehensive and unified monitoring plan. The regional monitoring program will integrate current monitoring efforts to the maximum extent possible, while acceding to the independent objectives of the groups involved. The plan will be developed with full participation of all interested agencies in order to encourage cooperation, communication and to maximize the potential for successful implementation.

Based on this approach, the Monitoring Work Group began to flesh out the broad monitoring recommendations in the draft *Galveston Bay Plan*. Based on contracted work by Tetrattech, Inc., and numerous strategy sessions, this report was drafted to meet Galveston Bay's monitoring needs and comply with the requirements for CCMP approval by EPA. As the strategy was developed, The Galveston Bay Plan itself was also revised to reflect the progress of the Monitoring Work Group.

This document is intended as a supplement to Chapter VI in *The Galveston Bay Plan*, providing a technical and practical rationale for future Galveston Bay monitoring activities. The report does not attempt to provide ultimate detail for the Monitoring Program, but serves as a framework from which a comprehensive monitoring program will be implemented. A companion document, *Protocols for Sample Collection and Analysis: Galveston Bay Regional Monitoring Program*, contains the detailed information necessary to implement the program at the field level.

The Galveston Bay Regional Monitoring Program is designed to address two types of monitoring efforts: programmatic and environmental. Programmatic monitoring provides information to address the questions: "Are the goals and objectives set forth in *The Plan* being met?" and "Are the regulatory agencies meeting their commitments to *The Plan*?" In contrast, environmental monitoring attempts to provide answers to the broader question "Is the health of the ecosystem improving?" The process and principles used in developing the monitoring program are discussed in Chapter 2: Framework for Developing the Regional Monitoring Program. Overall, regional monitoring seeks to:

- measure the status and effectiveness of *Plan* Actions,
- establish consistent performance criteria and develop effective quality assurance and quality control programs to promote comparability between data collection efforts,
- characterize the status and trends of conditions in the bay,
- integrate existing monitoring efforts to the greatest extent possible,
- make use of ecological indicators to assess status and trends in bay resources,
- be overseen and coordinated by a multi-agency committee which will advise the Galveston Bay Program of the TNRCC, and
- develop a data management strategy to ensure access to monitoring information.

The various agency partners involved in Galveston Bay monitoring each have specific mandates to meet, regardless of monitoring actions tied to *The Galveston Bay Plan*. However, in most cases, the Monitoring Work Group found that ongoing agency activities were flexible enough to serve both specific agency purposes and the broader goals of *The Plan*. In support of a commitment to utilize these ongoing monitoring efforts wherever possible, the first task was to catalogue the existing monitoring activities in the Galveston Bay System. A summary of these activities is given in Chapter 3. Subsequent chapters in this report address the monitoring program for each of four primary management topics:

Habitat/Living Resources Conservation

Chapter 4 - Habitat Condition

Chapter 5 - Species Distribution and Condition

Balanced Human Uses

Chapter 6 - Public Health

Chapter 7 - Freshwater Inflow

Chapter 8 - Spills / Dumping

Chapter 9 - Shoreline Management

Water and Sediment Quality Improvement

Chapter 10 - Water and Sediment Quality

Chapter 11 - Non-Point Sources of Pollution

Chapter 12 - Point Sources of Pollution

Data Information Management System

Chapter 13- Communicating Results: Data and Information Management

Habitat/Living Resources Conservation Chapters 4 and 5 address the monitoring requirements for providing maintenance and restoration of the critical habitats which make up the Galveston Bay Estuary ecosystem, and protection of the many species which make their home in the estuary or depend on the estuary for part of their life cycle. Chapter 4 discusses a monitoring program designed to assess the management goals and objectives for Habitat Condition. A program for assessment of the quality and quantity of vegetated wetlands is presented. Assessments of wetland status, areal extent, and distribution will be accomplished through use standardized computerized technology for classification of coastal habitats from satellite thematic mapper multi-spectral imagery. The recommended protocols are the NOAA Coast Watch Change Analysis Program. These protocols have been adopted and implemented in Texas by the Texas Parks and Wildlife Department, Resource Protection Division. Landcover inventories and change analysis information for Texas coastal areas, including Galveston Bay, will be available at 3-5 year intervals. This land cover classification data is available in GIS format and can be readily integrated into the proposed Galveston Bay Data Information System.

The second element of habitat monitoring, habitat quality, will utilize information on wetland distribution to rank wetland quality assessments. Habitat quality may be defined through the functions and values that characterize a wetland. Functions, are the ecological benefits that a habitat provides. Wetland functions include fish and wildlife habitat, nursery habitat, and food web support. Wetland values are a measure of the human benefits provided by a habitat. These include flood control, groundwater recharge, and recreational opportunities. By defining a degraded wetland habitat as one that no longer performs one or more of its function or value roles, quality assessments can be defined in terms of ability to perform these roles. For assessing wetland quality the monitoring program proposes the development of the USFWS Wetland Value Assessment technique. This technique is a community-oriented approach assessment tool which can be used to quantify

changes in habitat quality. The WVA works under the premise that optimal conditions of habitat quality can be characterized and that an index of wetland quality can be developed against that optimal condition. This approach emphasizes the concept that species protection is inextricably linked to habitat protection.

To address species management problems in the Bay, Chapter 5 develops a suite of monitoring programs directed at assessing the measurement of population trends of economically and ecologically important plant and animal species. This monitoring element relies heavily on the Coastal Fisheries sampling program conducted by the Texas Parks and Wildlife Department. Specific monitoring elements address: fish and crustacean population levels; oyster populations; and the effects of pressures such as commercial by-catch, and impingement and entrainment on fish and crustacean populations. The plan also addresses the issues of monitoring for assessing reductions in populations of nuisance species and enhancing endangered and threatened species populations.

Balanced Human Uses The second primary management topic, Balanced Human Uses, addresses many of the impacts to the Bay, direct and indirect, from the human population residing in close proximity to the Bay. This topic deals with maintaining a balance between public access to bay resources and the environmental requirements of a healthy ecosystem. Four categories of human uses of the bay were developed and are summarized in the ensuing discussions of Chapters 6-9.

Chapter 6, Public Health Protection, addresses issues impacting human consumption of Bay products such as fish and shellfish and contact recreation opportunities provided by the Bay. Monitoring in this section provides information to improve assessments of the safety of oyster harvest areas, development of a risk-based seafood consumption program, and development of a Contact Recreation Advisory Program. In response to these concerns the Texas Department of Health will seek funds to expand its monitoring program for the harvest of shellfish and will develop a routine fish and crustacean tissue sampling program. This program will be designed to allow for development of risk-based program to safeguard the quality of seafood production in the Bay. These programs will be coordinated with the Galveston Bay Regional Monitoring Program.

Chapter 7 addresses the important issue of the continued flow of high quality fresh water into the estuary. A balanced salt/fresh water mix is critical for the survival of most estuarine species and is vital to maintaining biodiversity within the system. The Texas Water Development Board with the Texas Parks and Wildlife Department is currently completing a freshwater inflow-biological resources optimization model which will be used to determine the quantities and timing of freshwater needed to maintain the current abundance of biological resources. Continued monitoring of freshwater inflow quantity and timing is critical to the success of Bay management. To accomplish this monitoring objective the program will work with the U.S. Geological Survey to strengthen and improve the stream flow monitoring network in the Galveston Bay system.

Chapters 8 and 9 address the impacts of spills and dumping and of shoreline development on the Bay. The plan treats monitoring for these impacts as primarily programmatic, rather than environmental. Plans for assessing activities designed to reduce impacts to the system from spills include the tracking of: adoption of improved damage assessment procedures; bay-wide baseline data on pre-release conditions; and monitoring development of local measures to remove floating trash and debris from stormwater discharges. Tracking to assess progress in Shoreline Management actions plans will include: assessing local authorities for development of shoreline development regulations consistent with those outlined in the plan; monitoring for derelict structures and their removal; and actions directed at improving access to bay shoreline.

Water and Sediment Quality Improvement This monitoring element addresses relationships between water and sediment quality and pollutant loadings to the bay. Action plans were developed to address general water and sediment quality issues, non-point source issues and point source issues.

Monitoring of water and sediment quality emphasizes toxic substances and dissolved oxygen in certain tributaries and side bays. All monitoring activities will be made comparable through establishment of consistent performance criteria and development of effective quality assurance and quality control programs. An open-bay sampling program emphasizes the utilization of a probability-based, systematic sampling program to provide rigorous, unbiased estimates of environmental conditions in the open and tidal portions of the Bay. Monitoring in the bay watershed will be accomplished through the comparability element and coordination of efforts through local and state agencies and programs such as the Texas Clean Rivers Program.

Non-point source (NPS) runoff has been targeted as the second-most important priority problem to the bay. Chapter 11 outlines the monitoring efforts for the non-point source action plan. Plan actions to address non-point sources call for the development and implementation of Best Management Practices (BMPs) for reducing NPS loadings from existing urban development, new urban development, construction, agriculture, industry, and marinas. The major emphasis on monitoring progress toward attaining action plan objectives is reviewing the implementation and success of NPS BMPs and stormwater management plans. Most of the monitoring data to be utilized to monitor reductions in NPS loads will come from special pilot projects, NPDES stormwater permit reporting requirements (including wet weather sampling) and indirectly from other elements of the regional monitoring program.

Over the last three decades, there has been a dramatic reduction in point source loads to the bay, however there are still some areas of concern. Many municipal systems continue to bypass and have overflow and collection system problems. The primary concern being the discharge of raw or partially treated sewage to the bay. A second identified problem are the continued localized impacts of produced water discharges to aquatic life in the tidal zones of the bay. Monitoring emphasis here again emphasizes programmatic issues, such as development of dry-weather illegal connection programs and elimination of bypass and overflow problems. The

monitoring of fecal coliform bacteria under other elements of the regional monitoring program will provide information to document overall reductions in fecal coliform counts in the bay system. Proposed plan action on produced water dischargers calls for the issuance of an EPA general permit which would eliminate discharges from this source. Monitoring surveys will be developed to document environmental improvements resulting from this action.

Data Information Management System An important element of the Galveston Bay Regional Monitoring Program will be the improved management of monitoring of data to enhance communication of bay trends and conditions to managers and the public. A Data Information Management System (DIMS) is to be used to house and distribute the data collected through the monitoring activities of the program.

The program recommends development of a centralized data storage system utilizing the power of Geographical Information Systems to manage and present the data in a format useful to resource managers. The plan addresses the need to ensure long-term integrity, quality, and accessibility of data. Beyond this the system addresses the need to facilitate the integration and analysis of the data and to provide statistical, graphical, spatial analysis and mapping capabilities.

Critical to the development of a comprehensive Galveston Bay DIMS is the Texas Clean Rivers Program. The Clean Rivers program complements the Galveston Bay Program by providing a coordinated assessment of river basins, within the Galveston Bay estuary, utilizing a watershed management approach. Within the Galveston Bay watershed, the Clean Rivers Program is administered by the Houston-Galveston Area Council (H-GAC). Centralization of the data information resources of the Clean Rivers Program and the Galveston Bay Program within the H-GAC is the centerpiece of the Galveston Bay DIMS. Such an arrangement will simplify the tasks of storing, maintaining, locating, querying, and retrieving regional monitoring data.

Utilizing the Geographic Information System (GIS) already in place within H-GAC, a direct electronic link will be established between the H-GAC and the Galveston Bay Program to allow access to all information within the centralized data base. Information from this system will be available from the Galveston Bay Program as raw data, technical reports for the scientific community, and non-technical summaries for the public. This data will be used to assess plan progress with environmental actions on an annual basis. Results will be distributed through the Galveston Bay Program Publications, the State of the Bay Symposium to be held every two years, and other public and scientific forums.