
**Regulatory Survey for the
Armand Bayou Coastal Preserve**

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Houston-Galveston Area Council

**Galveston Bay National Estuary Program
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PREFACE

The National Estuary Program (NEP) was established by the Water Quality Act (WQA) of 1987. The Act authorizes the Administrator of the United States Environmental Protection Agency (EPA) to convene Management Conferences to develop Comprehensive Conservation and Management Plans (CCMP's) for estuaries of national significance that are threatened by pollution, development or overuse.

Galveston Bay was named for priority consideration for inclusion in the NEP in the WQA. The Governor of Texas submitted a Supplemental Nomination for Galveston Bay in May, 1987. EPA accepted the nomination and initiated the Management Conference for Galveston Bay in July, 1988. A cooperative agreement between Texas and the U.S. EPA was signed in October 1988, enabling developmental work to begin on the Galveston Bay National Estuary Program (GBNEP). (Appendix D contains additional details on the administrative structure and organization of the GBNEP, as well as addresses and phone numbers for principal contacts within the program. A comprehensive membership directory may also be obtained from the GBNEP Program Office.)

The GBNEP received approval for an Action Plan Demonstration Project from EPA Office of Marine and Estuarine Protection in July, 1989, and funding from EPA Region 6 in September, 1989. Such projects are designed to show near-term positive actions by National Estuary Programs. Under the GBNEP project, two new coastal preserves, Armand Bayou and Christmas Bay, were created under the existing joint Texas General Land Office (GLO)/Texas Parks and Wildlife Department (TPWD) Coastal Preserves Program. Armand Bayou, the focus of this regulatory survey, was recommended for Coastal Preserve designation due to its significance as one of the few bayou systems on the Texas Coast which has been relatively unaltered by human activities, although it is surrounded by developing urban areas.

This report contains comprehensive surveys of the regulatory authorities and programs governing the Armand Bayou Coastal Preserve. (Appendix E provides a list of the various agencies covered by this survey, with their addresses and phone numbers.) This information will be used to develop a management plan for the Preserve, and will also contribute to the baseline regulatory data for developing the Galveston Bay Comprehensive Conservation and Management Plan.

This study was conducted by the Houston-Galveston Area Council, under contract to the Galveston Bay National Estuary Program.

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REGULATORY SURVEY FOR THE ARMAND BAYOU COASTAL PRESERVE

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INTRODUCTION

Purpose

The purpose of this study is to describe the array of regulatory programs which govern the management of the Armand Bayou Coastal Preserve. This inventory will serve as the basis for identifying appropriate regulatory actions to address the environmental management needs of the Preserve. The findings of this report, along with those of the Environmental Inventory, will also be utilized in conducting a management effectiveness assessment on key regulatory programs affecting the preserve.

This report and the companion document for Christmas Bay are also "pilot studies" for future Bay-wide projects. The research methodology employed for these studies will be reviewed in developing an approach to conduct a regulatory survey and a management effectiveness assessment for the entire Galveston Bay system.

This report details the legislative basis for regulatory controls and the interrelationship of federal, state and local agencies in their administration. The specific areas of concern to be documented by this inventory are the identification of gaps or inadequacies in regulatory control, duplications of regulatory coverage, and opportunities for improved interagency coordination.

Scope

The regulatory programs surveyed for this report cover four broad areas of environmental management. These are: point sources of pollution; nonpoint sources of pollution; natural and living resources; and, public health. Under each of these categories, the regulation of specific types of activities in the study area has been analyzed.

Pertinent federal, state and local legislation is cited (complete legal references are contained in Appendix A), as are regulatory management responsibilities. The programmatic elements

of management covered in this report are: policy-setting; permitting/regulation; enforcement; monitoring; and emergency response. The responsibility of the agencies involved in these activities is described in the first four chapters of this report. Regulatory gaps, overlaps and interagency coordination issues are described in Chapter Five.

Study Area

Armand Bayou is a tidal tributary of Galveston Bay, located on its western shore. While much of the land immediately surrounding the bayou is undevelopable flood plain, its watershed includes or is bordered by several major and diverse urban activity centers. These include the NASA Johnson Space Center, the Bayport petrochemical complex, the Clear Lake oilfield, and the City of Houston's Ellington Field airport.

The physical characteristics of Armand Bayou have changed substantially since the 1950's, largely as a result of land subsidence from groundwater extraction. Subsidence of 5 to 7 feet has changed Armand Bayou from a wetland-bordered freshwater stream to a brackish tidal lake, nearly devoid of wetlands.

During the early 1970's, Armand Bayou received funding from several federal agencies who, in conjunction with the Texas Parks and Wildlife Department, the City of Pasadena and Harris County, cooperated to create the Armand Bayou Nature Center and the associated Armand Bayou Park. Approximately 2,500 acres of land surrounding Armand Bayou are currently publicly owned.

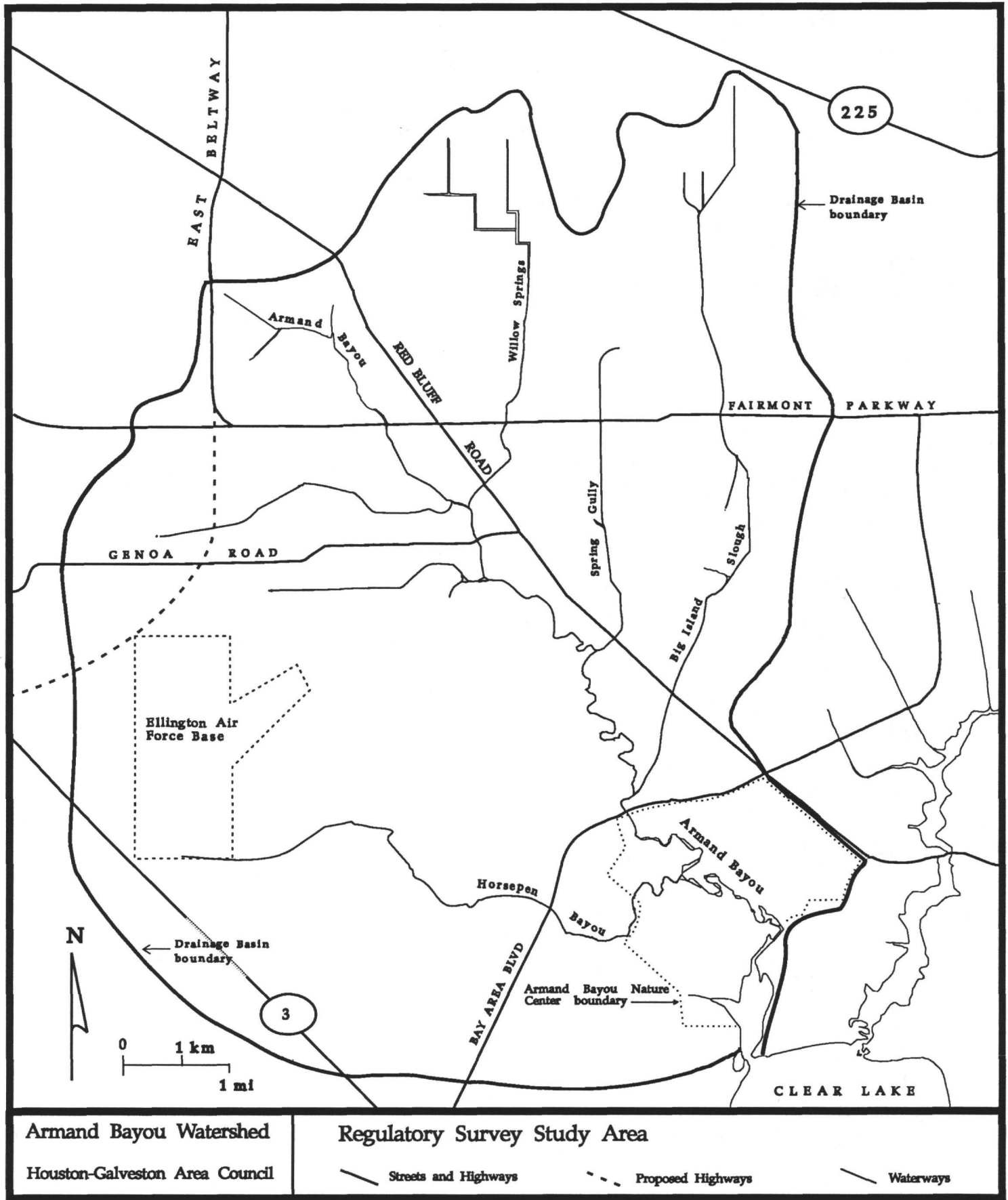
The water quality of Armand Bayou is poor. The bayou receives 6.2 million gallons per day of treated wastewater and the intensity of development surrounding the bayou has created concerns about nonpoint source water pollution.

The flora and fauna of the watershed are not well documented. As a result, its significance as a habitat is not clear. Nonetheless, its aesthetic and educational importance to the community has created strong public sentiment for preserving Armand Bayou from the impacts of future development.

The study area, shown in the map on page 3, covers the entire 40,647-acre watershed.

Methodology

Regulatory program information was gathered by researching pertinent legislation, regulations, and previous Galveston Bay plans and studies. In addition to this research, a survey of federal, state, and local agencies which regulate activities in the Armand Bayou watershed was conducted. The survey instrument was designed to gather information on the legislative and regulatory bases of the agency's programs, as well as to identify gaps and overlaps.



Federal, state, and local agencies with regulatory authority in the areas of point and nonpoint source pollution, natural and living resource management, and public health, were inventoried and appropriate recipients for the survey forms were identified. In the case of large agencies with regulatory programs in some or all of the management areas, surveys were distributed to several departments within the agency.

A total of forty-two surveys were mailed to regulatory agencies with jurisdiction in the Armand Bayou watershed. A total of thirty-nine responses were received from this survey.

A follow-up interview was conducted with all of the entities surveyed, whether or not they responded. There were ten surveys distributed to federal agencies, thirteen to state agencies, and nineteen to local agencies. Several additional agencies not included in the original survey were also interviewed.

A copy of the survey form is given in Appendix B. Survey respondents are cited in Appendix C, along with their addresses and phone numbers. The Bibliography lists selected publications consulted for the preparation of this report.

Report Organization

The regulatory programs surveyed in this report are described in additional detail under the following broad chapter headings:

- o point sources of pollution.
- o nonpoint sources of pollution.
- o natural and living resources.
- o public health.

Each of these chapters overviews existing and potential environmental impacts to the Armand Bayou watershed. Pertinent federal, state and local legislation and regulations are described, as are the management roles of the implementing agencies. Gaps, overlaps and interagency coordination issues were also identified through research, survey responses and interviews with agency staff. These are summarized in Chapter Five.

Many regulated activities in the watershed span several management categories. However, the management structure is described in the Chapter which was determined to best explain the regulatory activity. For a quick reference guide, a regulatory matrix has been prepared for each management type which outlines federal, state, and local agency roles. The matrices are presented in the Summary of Findings which follows.

SUMMARY OF FINDINGS

General

The Armand Bayou watershed has a complex regulatory structure. The management of activities with the potential to degrade or alter the environment is divided among eight federal and twelve state agencies, five local governments, and two special districts. (As mentioned earlier, Appendix E contains a complete listing of addresses and phone numbers for all agencies mentioned in this report. Appendix C provides a list of key contacts for those agencies.)

The regulatory framework governing a total of thirty-two types of activities with potential impacts to the Armand Bayou watershed was inventoried. Regulatory programs are categorized under the broad categories of: point sources of pollution; nonpoint sources of pollutions; natural and living resources; and public health protection. Most of the activities had at least some sort of regulatory framework in place. Exceptions, such as pollution from urban runoff, have regulations that are presently in the preparatory stage.

A basic regulatory framework for managing the Armand Bayou Coastal Preserve is in place. Most of the gaps identified were aspects of the regulations or in implementation. Improving interagency coordination will be critical for effective management of the preserve.

The following gaps, overlaps and opportunities for improved interagency coordination were identified in agency survey responses and through research of legislation, regulations and other reference materials.

GAPS, OVERLAPS AND INTERAGENCY COORDINATION

POINT SOURCES OF POLLUTION

Gaps

- o Standards for wastewater discharge permits are based only on regulated constituent contents in effluent. The impact of unregulated constituents and the potential impact of greatly increased wastewater discharges is not addressed.
- o The cumulative impacts of existing and new wastewater discharges are not addressed in the permit review process.
- o Oil and gas related wastewater disposal is regulated only for oil and grease, not other contaminants such as total suspended solids (TSS) and brine.
- o There is no formal environmental policy for the Texas Water Commission. Hence, permit reviews are not as comprehensive as would be desirable.

Overlaps and Interagency Coordination Issues

- o EPA and TWC overlap in permitting authority for wastewater discharges, at the present time. Opinions differ as to whether this overlap is a management problem or an additional safeguard.
- o The monitoring and inspection efforts of enforcement agencies are not coordinated.
- o There is no structured interaction between the state and local governments to reconcile state agency water quality management objectives with local facility development plans.

NONPOINT SOURCES OF POLLUTION

Gaps

- o While significant federal and state NPS regulations are forthcoming, none are currently in place.
- o There essentially is no local government regulatory framework for NPS in place, though one will soon be required by federal and state regulations.
- o While regulated, illegal disposal of hazardous waste is difficult to enforce--particularly household hazardous waste.
- o There are no local guidelines in place to govern erosion control.
- o Design of local storm sewer systems is generally geared towards flood control, not pollution abatement. The two objectives may be at cross purposes.
- o Not all activities which cause nonpoint source contamination of groundwater are directly regulated. TWC and TDH currently have a voluntary program for the protection of municipal water wells, however, Houston is the only local government in the watershed currently participating.
- o Water pollution threats may exist from already closed landfill sites.

Interagency Coordination Issues

- o It is not known whether EPA will require multiple NPDES permits for stormwater discharges from Houston, Harris County and each of the other cities in the watershed, or whether a single multi-jurisdictional permit will be employed.

Opportunities

- o There appear to be opportunities for local land uses and development/construction ordinances to be used for NPS management. Examples include erosion control on construction projects and land use controls aimed at preventing contamination in water well recharge zones.

NATURAL AND LIVING RESOURCE MANAGEMENT

Gaps - Wetlands

- o The Section 404 program only covers dredge and fill disposal projects. Other activities such as draining and clearing of wetlands are not regulated under the Clean Water Act, but through a variety of other regulations and inter-agency agreements.
- o Many minor dredge and fill projects are authorized under general or nationwide permits without individual review.
- o Section 404 permits do not fully evaluate all environmental impacts of wetlands projects.
- o There is no comprehensive inventory or monitoring of the extent of wetlands in the Armand Bayou watershed.
- o Enforcement of wetlands violation has been limited.
- o Management of small wetlands parcels is difficult.

Gaps - General

- o There is generally insufficient monitoring of living resources in the watershed.
- o There is a general lack of funding for enforcement of natural resource protection regulations.
- o Wildlife and habitat protection regulations generally only cover endangered, threatened, game or commercial species.
- o Nursery habitat provisions only cover shrimp fisheries.
- o Texas has no comprehensive Coastal Zone Management program.

Overlaps and Interagency Coordination Issues-Wetlands

- o Final authority for wetlands permitting and enforcement shared by Corps and EPA, needs additional clarification.
- o Concerns exist about the effectiveness of the multi-agency review process for wetlands permits.
- o No formal guidance has been given to regulatory agencies for implementing the President's stated "no-net-loss" policy.

Overlaps and Interagency Coordination Issues-General

- o Coordination of programs often suffers from differing orientations of participating agencies.

PUBLIC HEALTH

Gaps

- o Closure criteria for shellfish beds (oysters) are based on general weather patterns and not monitored water quality or other individual case evaluations.

REGULATORY MATRIX

The regulatory matrix provides an overview of the roles of the different federal, state and local agencies. (It should be noted that, aside from their existing regulatory duties, many of these agencies are participating directly in the five-year GBNEP planning effort, with agency representatives serving on the program's various policy and advisory committees.) The regulatory roles have been divided into five categories. The definitions of each of those roles are listed below.

SET POLICY: This category includes those regulatory agencies with the authority to implement legislative acts and to develop regulations and issue directives for the interpretation of permits and standards.

PERMIT/REGULATE: This category includes those agencies with responsibility for review and issuance of permits, licenses and other approvals required by agency regulations. Generally, this refers to reviews which must take place before an activity can commence or be renewed. Some agencies have lead status, others have coordination or review status.

ENFORCE: Enforcement activities may include inspections for permit compliance, periodic inspections to ensure no violations of regulations occur, and investigations of complaints. Also included are corrective actions whereby the agency defines the extent of a problem, specifies procedures for correction or mitigation and monitors compliance.

MONITOR: Monitoring refers to collection of data sufficient to analyze for trends or to notice deviations from accepted standards. In addition to public regulatory agencies, research organizations or non-profit groups may monitor, but not all are included in this matrix.

EMERGENCY RESPONSE: This category includes the agencies which would typically be among the first to provide a specialized response in an emergency situation. This response may include defining the extent of the problem, identifying hazards, and implementing first actions to alleviate the problem. Local emergency crews, such as police and fire departments are also likely to respond.

POINT SOURCE POLLUTION

<i>ACTIVITY</i>	<i>SET POLICY</i>	<i>REGULATE/ PERMIT</i>	<i>ENFORCE</i>	<i>MONITOR</i>	<i>EMERGENCY RESPONSE</i>
MUNICIPAL WASTEWATER DISCHARGES	EPA TWC CLWA	EPA TWC	EPA TWC CLWA, HC	TWC	TWC
INDUSTRIAL STORMWATER DISCHARGES (Uncontaminated runoff)	EPA TWC	EPA TWC	EPA TWC HC	TWC	TWC
DISCHARGE FROM OIL AND GAS ACTIVITIES	EPA RRC	EPA RRC	RRC		EPA RRC
SURFACE WATER QUALITY STANDARDS	EPA TWC	TWC	TWC	TWC ABNC	TWC, TPWD

NONPOINT SOURCE POLLUTION

<i>ACTIVITY</i>	<i>SET POLICY</i>	<i>REGULATE/ PERMIT</i>	<i>ENFORCE</i>	<i>MONITOR</i>	<i>EMERGENCY RESPONSE</i>
URBAN RUNOFF/STORM DRAINAGE**	EPA TWC HOU, PAS, HC	EPA TWC HOU, PAS, HC	EPA TWC HOU, PAS, HC	HOU, PAS, HC	N/A
INLAND EROSION AND SHORELINE EROSION	SCS, FEMA SWCB	FEMA SWCB	FEMA SWCB		N/A
GROUNDWATER CONTAMINATION	EPA TWC, TDH, RRC	EPA TWC, RRC	EPA TWC, RRC	TWC HOU	EPA TWC, RRC HOU, HC
HAZARDOUS WASTE DISPOSAL	EPA TWC, RRC	TWC, RRC	TWC, RRC		EPA TWC, RRC
SOLID WASTE DISPOSAL	EPA TWC, TDH	TWC, TDH	TWC, TDH	TDH	TDH HOU, HC
SEPTIC TANKS	TDH CITIES, HC	TDH CITIES, HC	TDH CITIES, HC		TDH HC
OIL AND GAS EXTRACTION	RRC, GLO	RRC, GLO	RRC, GLO	RRC, GLO	GLO, RRC, TWC
AIR EMISSIONS	EPA TACB	EPA TACB, TWC, TDH	TACB HOU, HC	TACB	TACB HOU

** The Environmental Protection Agency recently issued regulations for municipal stormwater systems. The Texas Water Commission will ultimately be involved in the permitting and regulatory process, and local governments will be required to regulate discharges into their drainage systems and monitor their water quality.

RESOURCE MANAGEMENT

ACTIVITY	SET POLICY	REGULATE/ PERMIT	ENFORCE	MONITOR	EMERGENCY RESPONSE
WETLANDS (Includes habitat management and discharge of fill materials)	EPA, CORPS, FWS, SCS TPWD	CORPS, EPA, FWS, ASCS TWC, TPWD	CORPS, EPA, ASCS	FWS TPWD	N/A
STREAM BED	CORPS TPWD, GLO	CORPS TPWD, GLO	CORPS TPWD, GLO	GLO	N/A
WATERFOWL MANAGEMENT	FWS TPWD	FWS TPWD	FWS TPWD	FWS TPWD	N/A
SPORT FISHING	TPWD	TPWD	TPWD	TPWD	N/A
ENDANGERED SPECIES	FWS, NMFS TPWD	FWS, NMFS TPWD	FWS TPWD	FWS TPWD	N/A
LAND SUBSIDENCE/ GROUNDWATER EXTRACTION	HGCSD	HGCSD	HGCSD	HGCSD	N/A
SURFACE WATER EXTRACTION	TWC, TPWD	TWC	TWC, TPWD	TWC	N/A
FLOODPLAIN MANAGEMENT	FEMA HOU, HC	FEMA TWC HOU, HC	FEMA HOU, HC	FEMA HOU, HC	FEMA HOU, HC
NATURAL AQUATIC RESOURCES AND CHARACTERISTICS	TPWD, TWDB			TPWD, TWDB	
LAND USE AND DEVELOPMENT	CITIES, HC	CITIES, HC	CITIES, HC	CITIES, HC	N/A

PUBLIC HEALTH

<i>ACTIVITY</i>	<i>SET POLICY</i>	<i>REGULATE/ PERMIT</i>	<i>ENFORCE</i>	<i>MONITOR</i>	<i>EMERGENCY RESPONSE</i>
FISH CONTAMINATION	TDH, TPWD	N/A	TDH	TDH	TDH, TPWD
CONTACT RECREATION	TDH	TDH PAS, HC	TDH PAS, HC		TDH HC

MATRIX ACRONYMS

FEDERAL

CG	Coast Guard
CORPS	Army Corps of Engineers
DOT	Department of Transportation
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FWS	Fish & Wildlife Service
NMFS	National Marine Fisheries Service
SCS	Soil Conservation Service

STATE

DPS	Department of Public Safety
GLO	General Land Office
RRC	Railroad Commission
SDPHT	Department of Highways and Public Transportation
SWCB	Soil and Water Conservation Board
TACB	Air Control Board
TDA	Department of Agriculture
TDH	Department of Health
TPWD	Parks and Wildlife Department
TWC	Water Commission
TWDB	Water Development Board

LOCAL-Armand Bayou

ABNC	Armand Bayou Nature Center
CLWA	Clear Lake Water Authority
DPK	Deer Park
HC	Harris County
HGCSD	Harris-Galveston Coastal Subsidence District
HOU	Houston
LAP	La Porte
LEPC	Local Emergency Planning Committee
PAS	Pasadena

CHAPTER ONE

MANAGEMENT OF POINT SOURCES OF POLLUTION

CHAPTER OUTLINE

Regulatory Issues

- Municipal wastewater discharges
- Industrial wastewater discharges
- Uncontaminated stormwater runoff from industrial facilities
- Discharges from oil and gas drilling

Federal Legislation

- Federal Water Pollution Control Act
- Water Quality Act
- National Environmental Policy Act

Federal Regulatory Agencies

- Environmental Protection Agency

Texas Regulations

- Texas Water Code
- Texas Natural Resource Code

Texas Regulatory Agencies

- Texas Water Commission
- Texas Railroad Commission
- Texas Water Development Board

Local Regulations

- Industrial pretreatment requirements.

Local Regulatory Agencies

- Harris County
- City of Houston
- City of Pasadena

Other Local Agencies

- Municipal Utility Districts
- Clear Lake Water Authority
- Houston-Galveston Area Council

EXISTING AND POTENTIAL ENVIRONMENTAL IMPACTS

Point source pollution emanates from a single defined source. Examples include sewer treatment plant discharges and industrial storm water runoff. There are three municipal wastewater treatment plants (WWTP) within the study area, discharging a total of 6.2 million gallons per day (MGD) of treated wastewater into the Armand Bayou watershed. These facilities are shown on the map on page 15.

Two of the WWTP's are operated by the Clear Lake Water Authority (CLWA) and the third is the Pecan Plantation Mobile Home Park WWTP. The CLWA facilities receive pretreated industrial discharges from the National Aeronautic and Space Administration's (NASA) Johnson Space Center and from Ellington Field. The Metro Central WWTP is currently the subject of controversy over tentative plans to expand its capacity to 50 MGD, bringing in wastewater from far outside the watershed.

There are two significant point source dischargers of stormwater in the watershed. In Bayport, the Lyondell facility discharges large quantities of stormwater into Big Island Slough. OxyPetrochemical also discharges into Big Island Slough. Other intermittent dischargers include ICI Americas, Inc., in Bayport, Hughes Sand Pits, Inc., and NASA-Ellington Field (see map on page 15).

LEGISLATIVE SUMMARY

Federal Legislation

Federal Water Pollution Control Act (Clean Water Act)

The Federal Water Pollution Control Act of 1972 and its subsequent amendments form the legislative basis for regulating point source discharges. Commonly referred to as the Clean Water Act (CWA), this legislation established a combined federal/state system of water quality control. The CWA set forth criteria for developing water quality standards and effluent limitation guidelines under the National Pollution Discharge Elimination System (NPDES). Once a state has devised a program which meets federal minimum requirements, it can apply to the EPA for permission to administer its own program. The TWC has applied to the EPA for NPDES designation, however, the application is currently under review.

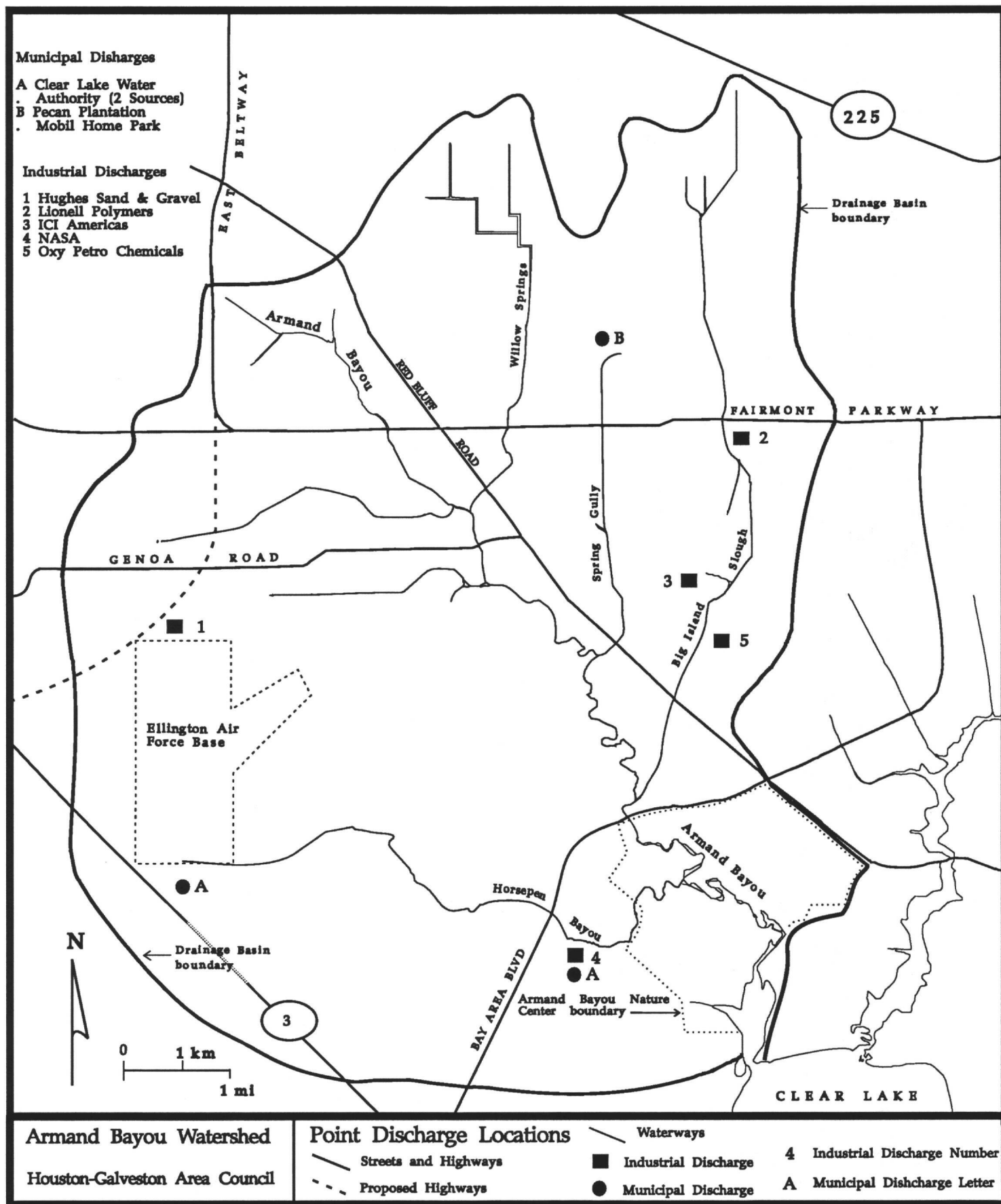
Section 403 of the CWA established a set of criteria for the discharge of point source pollutants into the oceans, territorial sea, or waters of the contiguous zone. The criteria determine the degradation of the waters of the territorial seas, the contiguous zone, and the oceans, including: the effect of disposal of pollutants on human health or welfare (including plankton, fish, shellfish, wildlife, shorelines, and beaches); marine life; and the effect on alternate uses of the oceans. If the information regarding any proposed discharge is insufficient, the permit will not be issued.

Financial Assistance

Financial assistance is authorized by Section 405, the Construction Grants and Loan Program. Monies are available for construction of new treatment facilities required under the CWA. The grant program was gradually phased out by amendments to the 1972 Act, shifting the financial burden to state and local governments.

Pretreatment Requirements

The CWA also established the National Pretreatment Program. Under Section 307, all publicly-owned treatment works (POTW's) enforce "General Pretreatment Regulations" and "National Categorical Standards." These regulations and standards require industries to treat the release of any pollutants that might interfere with the POTW process or cause harmful effects to effluent water quality. Treatment also can include installation of pollution abatement equipment.



Texas Legislation and Regulations

Texas Water Code

As enacted by the Texas Water Quality Act, the Texas Water Code provides for the conservation and development of Texas' water resources. These water resources include virtually all surface water, watercourses and groundwater inside the territorial limits of the state. The Code also provides for the "National Pollutant Discharge Elimination System" which may delegate to the state of Texas in accordance with sec. 402(b) of the Clean Water Act. As mentioned previously, the Texas Water Commission application for the NPDES permit program is currently under EPA review.

The Code authorizes the TWC to issue permits for the discharge of waste or pollutants into or adjacent to the waters of the state. The TWC may refuse to issue a permit if it violates the provisions of any state or federal law, rule, or regulation. At this time permit applications must be submitted to both the TWC and the EPA. The code also prohibits any person to discharge from a point source of any waste or pollutant. Any person who violates this provision is subject to a civil penalty not less than \$50 nor more than \$10,000 per violation.

Texas Natural Resources Code

The Texas Natural Resources Code, gives the Texas Railroad Commission (RRC) authority to regulate discharge from storage, handling, transportation, reclamation or disposal of waste materials resulting from activities associated with the exploration, development, or production of oil, gas, or geothermal resources. The RRC requires permitting of injection wells related to oil and gas activities.

FEDERAL REGULATORY AGENCIES

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency's (EPA) general charge is to protect and enhance the environment now and for the future to the fullest extent possible under federal law. The agency's mission is to control and abate pollution in the areas of air, water, solid waste, pesticides, radiation and toxic substances. Its mandate is for an integrated, coordinated attack on environmental pollution in cooperation with state and local governments. EPA's responsibilities and activities are broad and often conducted cooperatively with other agencies. The following is a breakdown of EPA's major point source-related program responsibilities in the Armand Bayou watershed.

Water Quality

Under the Clean Water Act, EPA has major responsibilities for management of water quality with the primary objective being to "restore and maintain the chemical, physical, and

biological integrity of the Nation's waters." The Clean Water Act provides EPA with a number of authorities, including: setting and enforcing water quality standards; administration of the National Pollutant Discharge Elimination System (NPDES) for municipal and industrial wastewater discharges; providing federal funds for construction of wastewater treatment systems (this role is being replaced by State Revolving Loan Fund); and State and areawide planning and management programs to coordinate broad-based pollution control decisions and to implement feasible methods to achieve clean water goals.

Under the NPDES program, EPA may delegate wastewater discharge permitting to a state. Texas has not, as yet, been delegated this authority, though this designation is currently pending. As a result, wastewater treatment facilities must currently be permitted both by EPA and the Texas Water Commission.

TEXAS REGULATORY AGENCIES

Texas Water Commission

The Texas Water Commission (TWC) is the lead agency in the management of point sources of water pollution in the Armand Bayou watershed. Supervision of water districts, the water quality programs (permits, enforcement and planning), and the certification program for wastewater treatment plant operators all lie within its jurisdiction.

The TWC is organized along programmatic lines with permitting, enforcement and planning responsibilities for each major program divided into several divisions. The divisions with responsibilities for point source activities in the Armand Bayou watershed are: Office of Hearings Examiners (conducts public hearings for wastewater treatment permit applications, enforcement); Office of Public Interest (represents the public interest in environmental quality and consumer protection issues under the Commission's jurisdiction); Legal (preparation/revision of agency rules, legal counseling concerning permit application processing, administrative enforcement actions, hearings and administrative lawsuits involving the agency); Water Utilities (water district supervision); Water Quality (prevention, control and abatement of water pollution, coordinating all water quality planning in the state in cooperation with regional agencies and local governments, processing wastewater permit applications, developing municipal and industrial NPDES permits for EPA, providing enforcement activities to identify violations of permits and bring them into compliance, and certification of wastewater treatment plant operators); and Field Operations (administration of the local field office and operation of a wet chemistry laboratory in Houston).

Water Quality Standards

The TWC sets surface water quality standards for Texas stream segments, as required by Section 303 of the Clean Water Act. The types of standards which the TWC may set are

somewhat open, but all must be approved by EPA. Water quality standards are subject to review at a minimum of once every three years. This review process includes public review and comment.

The Texas Surface Water Quality Standards contain general goals and criteria to prevent degradation of waters, as well as numerical criteria for toxic constituents, site-specific uses, application of standards and determination of standards attainment.

For Armand Bayou, segment 1113, the following standards apply:

Water Uses - contact recreation; high quality aquatic habitat.

Numerical Criteria - 4.0 milligrams per liter dissolved oxygen; 6.5-9.0 pH range; 200/100 milliliters fecal coliform; maximum temperature of 95 degrees Fahrenheit.

These standards are currently scheduled for public hearing in December 1990.

The "Clear Lake Rule"

There are also specific standards for the Clear Lake Watershed, which includes Armand Bayou, established under the Texas Water Code. The so-called "Clear Lake Rule" sets discharge effluent criteria for all municipal wastewater discharges that are more stringent than typical permit requirements in other watersheds. These criteria are:

<u>Item</u>	<u>Maximum Effluent Concentration (mg/l)</u>	
	<u>30-day Average</u>	<u>7-day Average</u>
Biochemical Oxygen Demand 5-Day (BOD5)	5	10
Total Suspended Solids (TSS)	12	20
Ammonia as nitrogen (NH3-N)	2	10

This rule also requires all industrial discharges to "... improve and upgrade waste treatment facilities and operations as needed to achieve, at a minimum, effluent limitations commensurate with the treatment efficiencies required of municipal waste discharges to the Clear Lake Watershed." Industrial discharges may be required to meet even more stringent effluent limitations if warranted by water quality considerations, as determined on a case-by-case basis.

Wastewater Discharge Permitting

At least partial implementation of EPA's point source program is carried out through the Texas Water Commission. The implementation tools include: the development of NPDES permit discharge limits, enforcement of NPDES permits; development of pretreatment and sludge management programs; management of state construction grant programs (sec. 106 grant); water quality planning (sec. 205 (j)(1) grant); and funding of state revolving loan fund (sec. 603(c)(2) grant).

The State of Texas is currently awaiting final approval from EPA on delegation of the NPDES Permit Program. If this delegation is made, the TWC will be the sole permitting agency for municipal and industrial wastewater discharge. It is anticipated that delegation will occur by the end of 1990.

The TWC's wastewater discharge permit evaluations include a technical review period, during which the applicant has an opportunity to provide information to assist staff in developing a site-specific assessment and a draft permit. All preliminary determinations by TWC staff--including instream uses, impact analysis, antidegradation, effluent limits and other specifications--are subject to additional review, comment and revision through a public hearing process.

TWC permits include requirements for biomonitoring to screen for toxic substances which have been listed by EPA in "Establishment of Ambient Criteria to Limit Human Exposure to Contaminants in Fish and Shellfish." Additional toxicants may be evaluated on a case-by-case basis. The frequency of biomonitoring is dependent upon the size of the discharge and associated potential problems.

Water Pollution Control and Abatement Program

The Municipal Water Pollution Control and Abatement Program is the vehicle through which the Texas Water Commission will regulate all municipalities with a population of 5,000 or more for activities having the potential for causing pollution of the groundwater or surface water. Cities within the Armand Bayou watershed subject to this program are Houston, Pasadena, Deer Park, and La Porte. TWC's development of regulations for the program is currently in a review and comment phase.

The activities which will be addressed by this program are those that pose direct threats to water quality within a municipality's boundaries and extraterritorial jurisdiction. The program addresses point sources of pollution by requiring wastewater treatment plants to be permitted and to be in compliance with all local, state, and federal permit and pretreatment requirements and construction standards. The program will require cities to: develop and maintain an inventory of all significant waste discharges to the water within the city and, if the city chooses, within its extraterritorial jurisdiction; monitor all significant waste discharges; collect and conduct periodic inspections and tests of the waste discharges being monitored; and have a cooperative procedure with TWC for obtaining compliance. Proposed regulations call for cities to collect an annual fee for operation of the Control and

Abatement Program and to remit, annually, five percent to the Water Commission for technical assistance and support. Currently no direction has been offered to cities as to the method of fee collection.

Texas Railroad Commission

Generally, the Texas Railroad Commission (RRC) has regulatory jurisdiction over the discharge and disposal of waste materials that result from activities associated with the exploration, development, and production of oil, gas or geothermal resources.

The Oil and Gas Division is the largest division within the agency and is responsible for administering the permit program (permits, enforcement) as it relates to the discharge of oil and gas wastes. Discharges permitted by the RRC may not cause a violation of the surface water quality standards established by the TWC.

Discharges of water produced from oil and gas facilities must be permitted by the RRC. Permit holders must submit quarterly reports to the RRC District Office in Houston. RRC staff monitor point source discharges on a random basis approximately once per month. Inspections of point source discharges are also made if a permit is transferred or complaints are filed. If RRC staff note an oil and/or grease concentration of greater than twenty-five milligrams per liter, the permit holder is notified and an inspection is conducted. Texas Parks and Wildlife Department game wardens assist the RRC in observing oil and gas facilities in the field and reporting apparent irregularities.

The RRC is currently developing an NPDES Permit Program and has adopted a new rule containing provisions necessary for the RRC to conduct the program for discharges of produced water and other oil and gas wastes. This rule will become effective upon delegation of the NPDES program by EPA.

Texas Water Development Board

The Texas Water Development Board (TWDB) has the primary responsibility for water supply and for administering water financing for the state. These programs have potential impact on the Armand Bayou watershed in that they can be used by local entities for the construction of wastewater treatment plants which discharge to the Bayou or its tributaries. TWDB is currently responsible for the administration of the Texas Water Development Fund, Water Assistance Fund and the Federal Construction Grants Program and the State Revolving Loan Fund Program (SRF). These programs are used to fund a political entity's new or expanded facilities. The TWDB approves and monitors the design, size, cost, construction, and financing of such projects. TWDB also approves planning grants for studying local water problems and needs.

The storage acquisition program, originally for water supply and flood control, was extended to apply to regional water and sewer facilities so they, like reservoirs, could be built with excess capacities.

Facilities and projects constructed with TWDB financial assistance must come under the guidelines of other agencies which regulate the particular type of project. For instance, a wastewater treatment facility would have to meet TWC design criteria and discharge requirements.

Construction Grants Program

This program makes grants available to local communities for up to 55% of the costs of certain components of public wastewater collection and treatment facilities to help meet water quality requirements of the Texas Water Code and Clean Water Act. As a result of the 1987 amendments to the Clean Water Act, this grant program has been gradually converted to a State Revolving Loan Fund (SRF). The Construction Grants Division administers this program.

State Revolving Loan Fund

The SRF is administered by the Construction Grants Division. The SRF is a perpetual revolving loan fund based on federal capitalization grants and a required 20% state match. The Water Development Board offers low-interest loans. The repayments of principal and interest on these loans will be used for new loans for other projects.

Water Development Fund

The Water Development Board also provides funding for regional wastewater treatment systems through the Water Development Fund. This program is also a low-interest loan program administered by the Development Fund Manager's Office. Financing is also available for regional water facilities, flood control projects, and projects designed to convert from the use of ground water to surface water.

LOCAL REGULATORY AGENCIES

Local Responsibilities under the National Pretreatment Program

The Clean Water Act established an industrial pretreatment program for discharges into municipal wastewater treatment systems. The 1977 Clean Water Act Amendments mandated additional regulation of pollutants in industrial discharges to municipal systems. In response to this mandate, the National Pretreatment Program was developed in 1981.

The National Pretreatment Program is designed to prevent interference with the biological treatment process in wastewater treatment facilities, prevent the pass-through of pollutants and to prevent the contamination of sewage sludge by limiting industrial discharges to municipal systems. Pretreatment reduces the strengths and quantities of toxic materials,

minimizing risk to treatment plant workers and reducing damage to sewers and treatment plant equipment. Municipalities are responsible for enforcing general Pretreatment Program regulations. There are approximately twenty-six types of industry which are required to meet National Categorical Standards for pretreatment prior to discharge to municipal systems.

The general pretreatment requirements outline the responsibilities of all entities involved in pretreatment program implementation. They also outline two sets of standards. The "general and specific prohibition" clause prohibits the release of any pollutants that may interfere with the treatment process or cause harmful effects. Said pollutants include those which could interfere with the treatment process, cause fire or explosion, flow obstruction, corrosion, or excess heating of wastewater. The National Categorical Standards are technology-based effluent standards requiring certain industries to install pollution abatement equipment that treats wastewater to the quality that would be permitted in a direct discharge to state waters.

City of Houston

The City of Houston Municipal Code requires any person drilling or operating a well for oil and gas to provide appropriately for the disposal of salt water or other impurities which may also be produced in the drilling process, and prevent the contamination of the water supply of the city. The Texas Railroad Commission issues permits for oil and gas wells and regulates the operation of these wells. The City of Houston building code authorizes where one can construct an oil or gas well.

Although Houston does not currently have a wastewater discharge in the Armand Bayou watershed, the City's Public Health Engineering section is authorized to work with the TWC to enforce water quality regulations that apply to wastewater discharges.

City of Pasadena

Pasadena also has the authority to require pretreatment of industrial discharges into its municipal system. However, the City's discharges are now all diverted to the Houston Ship Channel, as required by the TWC. Incinerators are the only other point source of pollution regulated by the City of Pasadena.

Harris County

The Harris County Pollution Control Department is a local entity enabled by state legislation to enforce regulations governing air and water quality. The HCPCD assists the TACB with the inspection of permitted stationary source air emissions. In the event of an emergency, the HCPCD assists with the compliance monitoring and with clean-up operations.

The HCPCD also inspects, monitors and enforces permitted municipal and industrial wastewater discharges and works with the TWC to locate and identify unpermitted discharges. HCPCD has also performed special studies for the TWC related to wastewater discharge permit applications.

OTHER LOCAL AGENCIES

Municipal Utility Districts

In the Armand Bayou Watershed there are currently three operating Municipal Utility Districts (MUD's). They are the Bayfield Public Utility District, Gulfway Utility District, and Harris County MUD #67. These MUD service areas are shown on the map on page 24. The Clear Lake Water Authority provides wastewater treatment for these MUD's and their flood control activities are maintained by the Harris County Flood Control District.

MUD's can be given many different responsibilities, including many common municipal services. These powers include wastewater treatment, solid waste disposal, fresh water supply, and park systems. MUD's are granted taxing authority to pay for bonds and various other stipulations placed in the deed by the developer. Some MUD's are granted even further taxing authority, by a general election, to pay for aspects not covered in the bond payment (i.e. park system and solid waste disposal). MUD's generally do not have any regulatory powers.

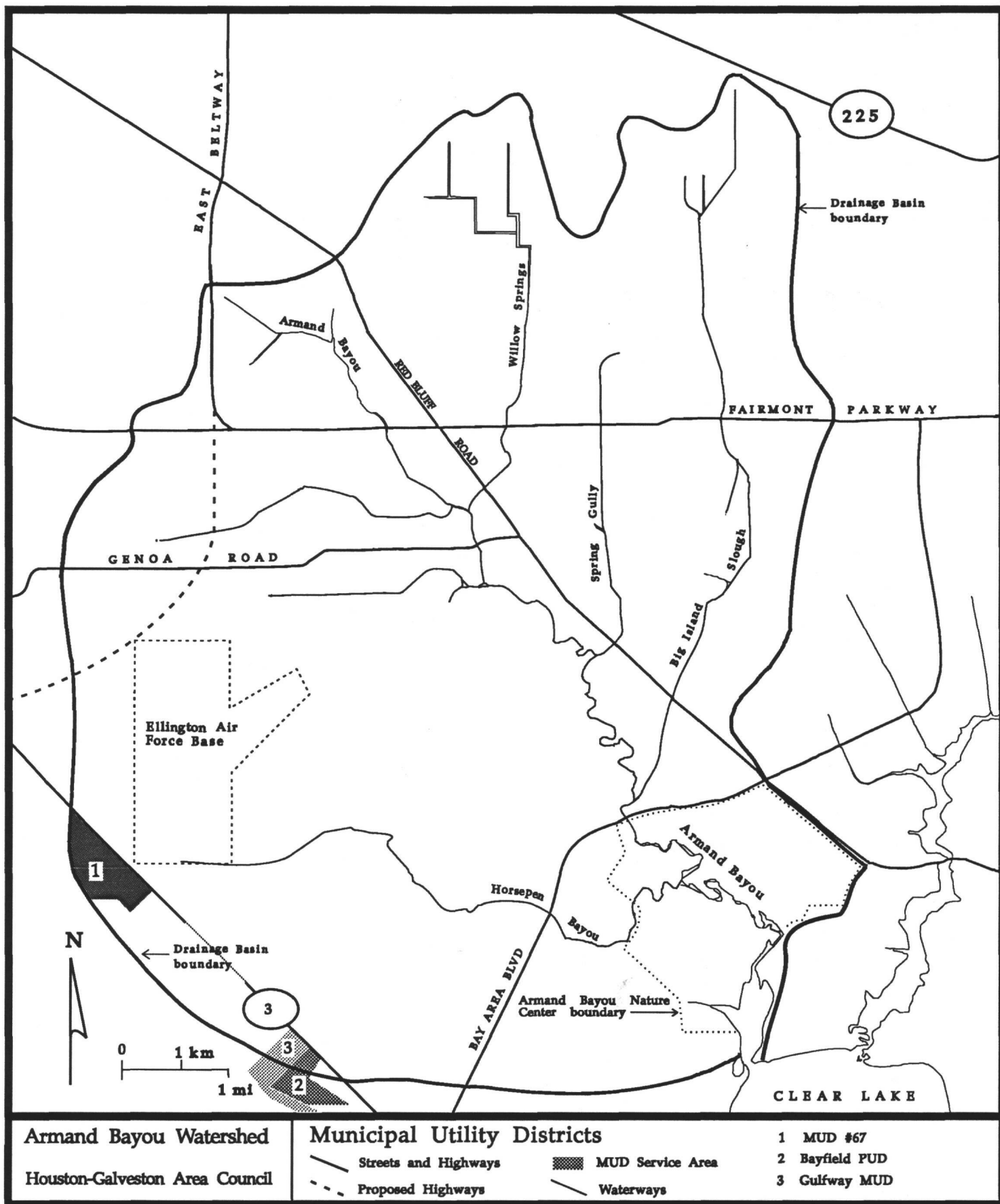
Clear Lake City Water Authority

The Clear Lake City Water Authority (CLCWA) manages the two municipal sewer treatment plants in the Armand Bayou. The CLCWA establishes locations of sewer lines, applicable fees and system-wide standards.

The CLCWA requires a pretreatment program for all of its commercial and industrial customers. A program must include provisions for grease traps, sampling and testing, prohibited discharges, and penalties. The CLCWA Policy Manual lists the standards for these requirements, including the list of unacceptable wastes.

Houston-Galveston Area Council

The Houston-Galveston Area Council (H-GAC) is a voluntary association of approximately 150 local governments in the Gulf Coast Area. H-GAC was certified by the Governor of Texas as the regional water quality planning agency in 1979. Since that time, H-GAC has been conducting areawide water quality management planning under Sections 205 and 208 of the Water Quality Act. H-GAC's planning has addressed a number of water quality management issues, but a primary focus has remained the forecasting of future wasteloads from municipal point source discharges. The TWC uses these forecasts in their water quality monitoring efforts and in evaluating discharge permits.



CHAPTER TWO

MANAGEMENT OF NONPOINT SOURCES OF POLLUTION

CHAPTER OUTLINE

Regulatory Issues

- Urban runoff and stormwater discharges
- Groundwater contamination
- Water pollution from aerial fallout

Federal Legislation

- Federal Water Pollution Control Act
- Water Quality Act
- Resource Conservation and Recovery Act
- Hazardous and Solid Waste Act
- Comprehensive Environmental Response,
Compensation and Liability Act
- Toxic Substances Control Act
- Federal Insecticide, Fungicide and
Rodenticide Act
- Clean Air Act

Texas Legislation and Regulations

- Texas Water Code
- Texas Natural Resources Code
- Texas Health and Safety Code
- Texas Clean Air Act

Local Regulations

- Floodplain and building codes
- Development ordinances
- Septic tank ordinances

Federal Regulatory Agencies

- Environmental Protection Agency
- Federal Emergency Management Agency
- Soil Conservation Service

Texas Regulatory Agencies

- Texas Water Commission
- Texas Railroad Commission
- Texas Department of Health
- Texas Soil and Water Conservation Board
- Texas Water Development Board
- Texas Air Control Board

Local Regulatory Agencies

- Harris County
- City of Houston
- City of Pasadena
- City of Deer Park
- City of La Porte

Other Local Agencies

- Houston-Galveston Area Council

EXISTING AND POTENTIAL ENVIRONMENTAL IMPACTS

Nonpoint source (NPS) water pollution may be transmitted by urban runoff, groundwater infiltration, or aerial fallout. Unlike a point source of pollution, such as a wastewater treatment discharge, NPS pollutants have usually been diffused spatially and over time. As a result, the origins and extent of NPS pollution are difficult to quantify.

Owing to the intensity of development in the Armand Bayou watershed, concerns over NPS from urban runoff are high. Though regulations will soon go into effect requiring municipalities to develop NPS management practices, such controls are generally not in place today. A recent private storm drainage project in the study area has also created considerable controversy. The Friendswood Development Company is constructing a major drainage channel for a new subdivision which would have traversed Armand Bayou Park to reach the Bayou. However, after considerable negotiation, the drainage easement was relocated and a detention basin and underground box culvert were added to the project design. The detention basin will be designed to reduce pollutant loadings to the bayou.

Other potential NPS problems associated with storm sewer systems are illicit commercial and industrial discharges and the disposal of household hazardous wastes. Local governments in the watershed monitor for illicit discharges, but enforcement is difficult. Individuals disposing of household hazardous wastes, such as used oil and solvents, into the municipal drainage system may also generate considerable NPS pollution.

Two airports are located within the watershed, both of which may be potential contributors of NPS pollutants to Armand Bayou. These are the City of Houston's Ellington Field airport, and the City of LaPorte Airport. These facilities will be required to develop additional NPS management practices as a result of forthcoming federal regulations.

NPS pollution may also occur underground. Septic tanks, underground storage tanks, and oil and gas wells are all possible contributors to groundwater contamination in the watershed. Another potential NPS pollutant is leachate from landfills and hazardous waste sites. There is currently one active and one closed landfill in the watershed. Three other active and two closed landfills are located on the watershed's periphery. These solid waste disposal sites are shown on the map on page 28.

There has been a high level of oil and gas drilling activity in the watershed. The RRC has issued over a total of over one hundred permits for oil and gas drilling wells, though it is not known how many of these wells are active. The greatest density of wells is located along Armand Bayou south of Baywood Country Club.

At present, there are no hazardous waste sites within the study area, though a controversial hazardous waste incinerator, to be located in LaPorte, has just been approved by the TWC. Owing to the amount of heavy industry surrounding Armand Bayou, the possibility exists

that additional hazardous waste facilities could be sited in or near the watershed, as do concerns about illegal disposal.

The potential for airborne contaminants to enter the water is also an NPS threat. The watershed contains thirteen industrial facilities permitted for air emissions, and numerous others are located in the vicinity. These emissions include a variety of substances which can enter the water through rainfall, fog or dust. The impact and extent of aerial fallout is very difficult to monitor and study, though the amount of direct fallout is generally thought to increase with proximity to the emission source. Permitted air emissions are shown on the map on page 29.

LEGISLATIVE SUMMARY

Federal Legislation

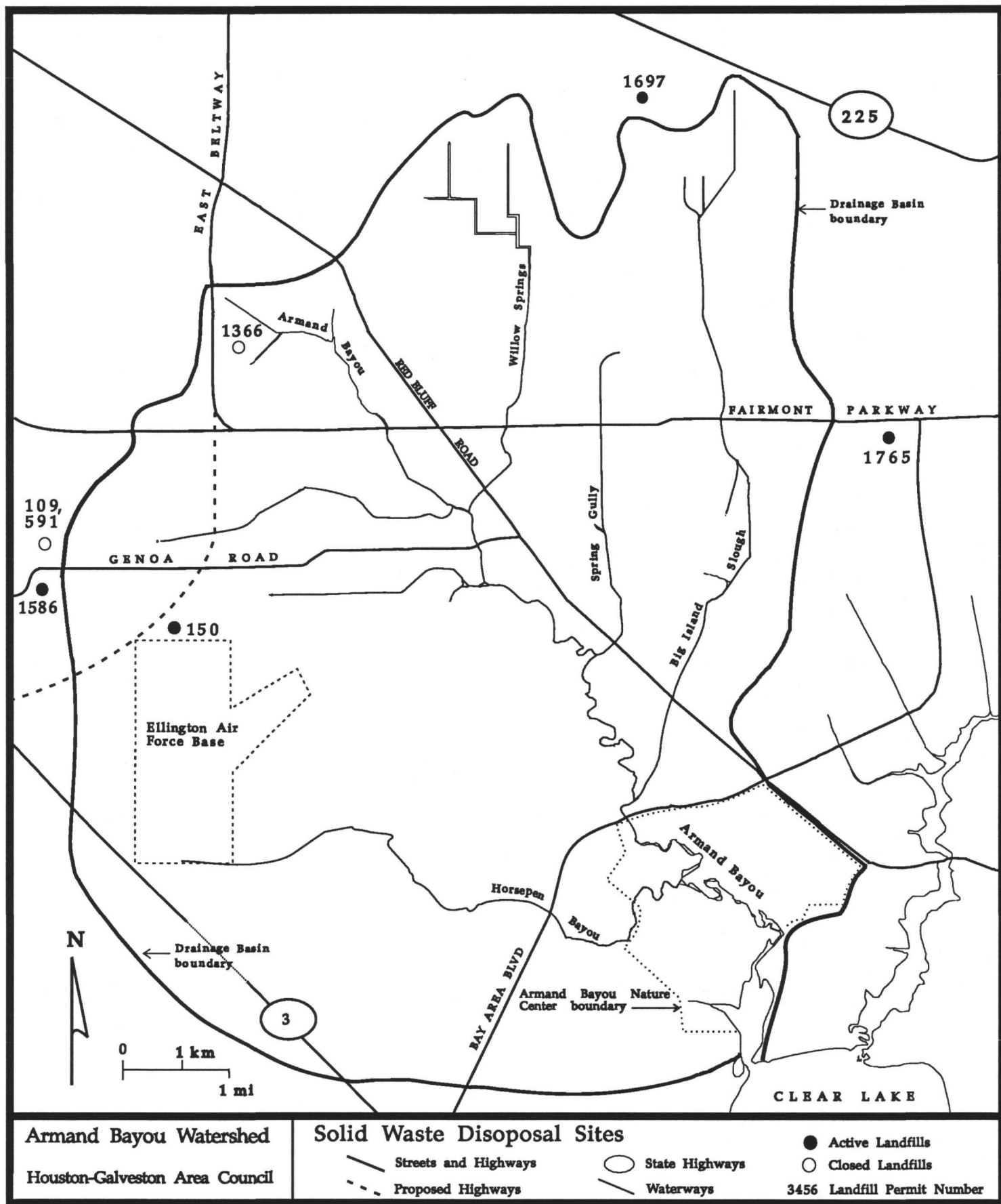
Federal Water Pollution Control Act (Clean Water Act)

The Clean Water Act (CWA) provided the foundation for the National Pollutant Discharge Elimination System (NPDES). This program made a federally authorized permit necessary for the discharge of any pollutant into navigable waters from a point source. Under this broad definition, stormwater outfalls associated with both municipal and industrial drainage systems were considered point sources of pollution and would require an NPDES permit. EPA's first municipal stormwater regulations were issued in 1973. Over the next fourteen years, several iterations of these regulations were developed. The concept of an "area permit," covering an entire system rather than one for each outfall evolved over this time. However, all of the proposed and final rules met with negative response, as well as legal action, and the municipal stormwater permit program was never actually implemented.

Water Quality Act (WQA) of 1987, Section 405

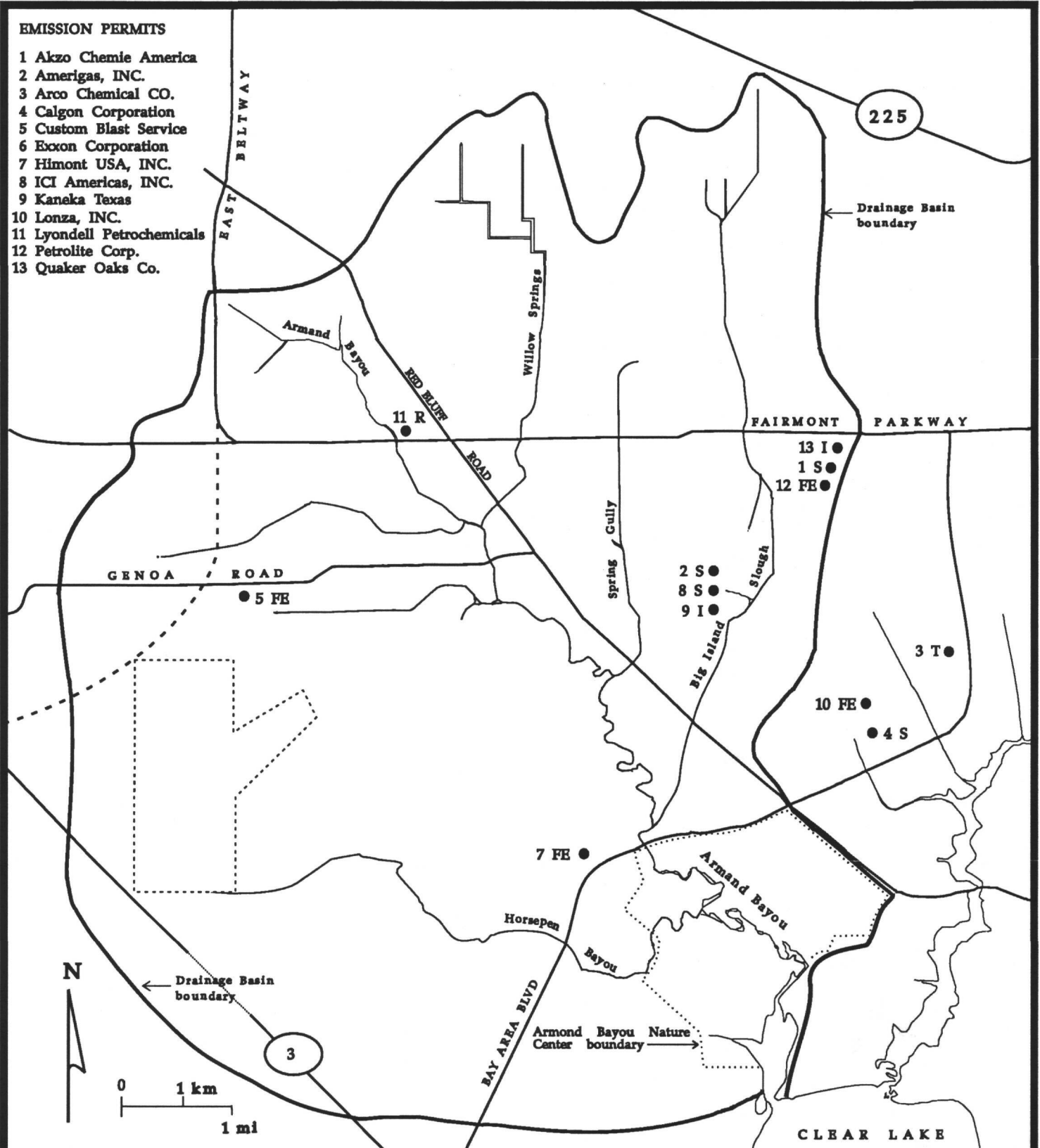
The Clean Water Act was amended by Section 405 of the WQA, which established basic provisions for controlling stormwater pollution. Section 405 cancelled previous stormwater permit requirements and set forth a new regulatory framework. The system-wide permitting concept was maintained and systems were divided into three categories: industrial and large municipal systems (serving a population of 250,000 or more); medium municipal systems (serving populations of 100,000 to 250,000); and all others.

Stormwater as defined by the WQA includes surface runoff and street wash water. Sampling, testing, and quantitative characterizations will focus on major outfalls of thirty-six inches or more in diameter or those draining an area of fifty or more acres. Also included in this category are outfalls draining industrial areas of two or more acres through a twelve inch diameter or larger pipe.



EMISSION PERMITS

- 1 Akzo Chemie America
- 2 Amerigas, INC.
- 3 Arco Chemical CO.
- 4 Calgon Corporation
- 5 Custom Blast Service
- 6 Exxon Corporation
- 7 Himont USA, INC.
- 8 ICI Americas, INC.
- 9 Kaneka Texas
- 10 Lonza, INC.
- 11 Lyondell Petrochemicals
- 12 Petrolite Corp.
- 13 Quaker Oaks Co.



Armand Bayou Watershed

Houston-Galveston Area Council

Air Emissions

- Streets and Highways
- - - Proposed Highways

- Waterways
- FE Fugitive Emissions
- I Incinerator

- R Reactor
- S Stack
- T Tank

Water Quality Act, Section 319

The Water Quality Act also established NPS assessment and management requirements for states and authorized approximately \$400 million from 1988-91 to assist states with NPS management programs. Under Section 319, each state is required to identify water bodies significantly impacted by NPS pollution, as well as specifying and categorizing NPS pollutants. In addition, states are required to include an evaluation of existing NPS control procedures and programs. The statewide assessment for Texas, which was conducted by the Texas Water Commission (TWC) in 1988, did not contain any stream segments in the Armand Bayou watershed.

Another requirement of Section 319 was the development of statewide NPS management programs by 1991. These programs are to include the identification of the "best management practices" (BMP's) to reduce loadings from each problem pollutant category identified in the assessment.

The Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976 to regulate the management of solid and hazardous waste, although it was not fully implemented until the 1980's. Under RCRA, the EPA is responsible for categorizing wastes and their life cycles, defining hazardous wastes, developing control standards, and establishing a permit program for hazardous waste treatment, storage, and disposal facilities.

Hazardous & Solid Waste Act

The 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA prohibited land disposal of many types of hazardous wastes and required the use of special containment and collection facilities to prevent groundwater contamination. The HSWA also established a new program for regulating underground storage tanks.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

Commonly known as the Superfund Act, CERCLA was enacted in 1980 in response to the growing number of abandoned and often undocumented hazardous waste sites. The purpose of the Act was to provide emergency response and clean-up capabilities for chemical spills and releases from hazardous waste treatment, storage, and disposal sites. CERCLA authorized the EPA to require "responsible parties" to clean up hazardous waste sites. This notion of "responsible party" gave the EPA an opportunity to address not only those parties who owned and operated the facilities, but also those who generated or transported the wastes.

Toxic Substances Control Act

The Toxic Substances Control Act, 1976 (TSCA), regulates the production, processing, distribution, use, and disposal of hazardous materials. TSCA provides for the control of hazardous materials by authorizing the EPA to identify and regulate such substances. The principal purpose of this Act is to identify, reduce, and eliminate chemicals which may pose unreasonable risks to human health or the environment.

TSCA requires the chemical industry to submit records to the EPA which demonstrate that the manufacture, processing, use, and disposal of chemical substances do not cause undue health and environmental effects. The TSCA also addresses marine waste disposal by regulating disposal of wastes contaminated with PCB's.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), first enacted in 1947, is similar to the TSCA, however, it addresses only pesticides. The last amendment to FIFRA, passed in 1980, altered the focus of the Act from pesticide quality control to the protection of public health and the environment.

FIFRA mandates the EPA to register new pesticides to ensure that when properly used, they will not pose an "unreasonable" risk to human health and the environment. The pesticide registration process includes all pesticides marketed within the United States and requires specific tests to demonstrate that the pesticides will not cause adverse effects to humans or the environment. Primary enforcement for pesticide violations is carried out by states, under EPA oversight.

Clean Air Act

The Clean Air Act (CAA) of 1970 and its subsequent amendments seek to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare." The CAA creates a system of national ambient air quality standards designed to control designated "criteria pollutants."

The national ambient air quality standards include limitations on the release of hazardous substances and standards for new stationary and motor vehicle sources. States are granted primary responsibility for the implementation, maintenance, and enforcement of air quality standards through a State Implementation Plan (SIP). The SIP focuses attention on areas of the state that do not meet federal emission standards for criteria air pollutants and contains implementation and monitoring standards.

Numerous amendments to the Clean Air Act were passed during the most recent session of Congress, including new ambient air quality standards, attainment deadlines, and the classification of additional air toxics.

Texas Legislation and Regulations

Texas Water Code

The Texas Water code authorized the Texas Water Commission (TWC) and the Texas Soil and Water Conservation Board (TSWCB) to promulgate regulations to reduce NPS pollutants, such as erosion, sedimentation, and agricultural and urban runoff. The TWC is currently developing its statewide NPS management plan but has not, as yet promulgated

these regulations. The TSWCB has not developed regulations either but is continuing to expand its education programs.

Under the Water Code, the TWC enforces rules and regulations concerning the protection and preservation of underground, subterranean, and percolating water. The owner of a water well which has salt water or water containing minerals or other substances which negatively affect vegetation or agriculture is required to securely plug or case the well. This requirement is intended to prevent water from escaping from the stratum into another water-bearing stratum or onto the surface of the ground.

Texas Natural Resources Code

The Texas Natural Resources Code establishes the Texas Railroad Commission (RRC) as the state regulatory agency for waste disposal and pollution associated with oil and gas drilling. Under the Code, the RRC regulates injection wells, pipelines, drilling, and plugging oil and gas wells. The RRC has the authority under the Natural Resources Code to control NPS from oil and gas operations, but has not established a control program. The RRC will enforce whatever requirements are established under the NPDES program upon delegation from EPA.

Texas Health and Safety Code (S.B. 1519)

Texas Senate Bill 1519 mandates solid waste management planning on the state, regional and local level and established a fifty cent per ton solid waste disposal fee. This legislation creates a planning framework for waste reduction and facility siting issues appropriates additional funding for enforcement of illegal dumping and inspection of existing landfills. The requirements of this Act are codified in the Texas Health and Safety Code in Chapter 363.

Texas Clean Air Act

The Texas Clean Air Act (TCAA) seeks to safeguard the state's air resources from pollution by controlling or abating air pollution and emissions of air contaminants. The TCAA authorizes the Texas Air Control Board (TACB) to formulate requirements for industrial emissions of air contaminants and to control emissions from the burning of waste and combustible material. The TCAA also requires the TACB, in cooperation with the Department of Public Safety and the State Department of Highways and Public Transportation, to establish a program of motor vehicle inspection and maintenance in Harris County.

Local Ordinances

Aside from ordinances prohibiting non-permitted discharges into municipal storm sewer systems, there is no local regulatory framework for NPS management. However, municipal zoning or subdivision ordinances could be employed to limit certain types of land uses in areas such as aquifer recharge zones or sensitive watersheds. Additionally, construction

regulations could also be used to require measures to reduce NPS from soil erosion. It is anticipated that these types of provisions will be incorporated into local government codes as a result of forthcoming EPA and TWC regulations.

FEDERAL REGULATORY AGENCIES

U.S. Environmental Protection Agency

Stormwater Runoff

Under the Clean Water Act (CWA), the Environmental Protection Agency (EPA) has major responsibilities for NPS water pollution management. EPA recently completed final rules for a stormwater discharge permit program that will require some industries, cities, and other governmental entities in the Armand Bayou watershed to apply for National Pollution Discharge Elimination System (NPDES) permits for stormwater outfalls. In effect, this program proposes nonpoint source controls for regulation as a point source discharge.

Participation in the program is determined by population size, so the release of 1990 Census data in April 1991 may bring additional communities under the permit program. The program places municipal storm sewer systems into categories based on the size of the populations they serve: "large" systems serve a population of 250,000 or more; "medium" systems serve between 100,000 and 250,000; and all others serve under 100,000. A two-part permit application process will be required of each large and medium system. Large systems must submit their Part 1 applications within 12 months after the EPA publishes its regulations, and Part 2 applications are due 24 months after publication. Medium systems must submit Part 1 applications within 18 months, and Part 2 applications within 30 months of publication. In their Part 1 applications, municipalities must provide background information on their storm sewer systems, sources and discharges, and existing management programs. Part 2 applications will require greater detail on sources and discharges, as well as proposals for new management programs and a fiscal analysis. According to EPA staff, many of the program's requirements are similar to those which were proposed in 1988, including the need to perform field screening for illicit connections and illegal dumping. Municipalities also must monitor representative outfalls during several storm events to complete certain required analyses.

With regard to industrial permits, all industrial stormwater discharges will now require a permit whether the discharge is made directly to waters of the United States or to a municipal storm sewer system. Under the 1988 draft regulations, only the direct dischargers would have needed a permit.

EPA has not yet determined how many NPDES stormwater permits will be required in the Armand Bayou watershed. If each governmental entity is required to have a permit, Harris County and the City of Houston will be in the first round and the City of Pasadena in the

second. There has been some discussion of EPA allowing a joint City of Houston/Harris County permit, which might also include Pasadena, Deer Park and LaPorte. There have also been proposals to establish permits on a watershed basis. However, while representing a more comprehensive approach to the NPS issue, multi-jurisdictional permits may have administrative, financial and legal shortcomings.

In general, NPDES stormwater permits will require sampling, testing, and quantitative characterization of major municipal storm sewer discharges. Permits will require management and control techniques to reduce the discharge of pollutants to the maximum extent practicable (MEP). The proposed structure of permit applications will promote the development of comprehensive stormwater quality management programs to achieve MEP goals.

The proposed rule leaves considerable discretion to EPA in reviewing permits. This discretion provides for flexibility in interpreting regulations in different regions, but it also is a cause of concern because of the uncertainty over what will constitute an acceptable NPS management program.

Groundwater Contamination

Another role of EPA is the protection of groundwater resources, including the regulation of hazardous waste transport and disposal. RCRA and CERCLA give EPA significant responsibilities for the management of hazardous and other solid wastes as it pertains to groundwater protection. These responsibilities include: identifying general hazardous waste characteristics and specific hazardous wastes; enforcement of RCRA regulations; developing standards applicable to generators and transporters of hazardous waste, and operators of hazardous waste treatment, storage and disposal facilities; and, helping states develop comprehensive programs for managing non-hazardous solid waste.

The Superfund Program gives EPA the authority to take remedial actions for sites listed on the National Priorities List. It also allows EPA to take immediate short term removal actions where a situation or site poses an imminent threat, including hazardous chemical spills, improper disposal of hazardous materials or other immediate dangers.

In the area of solid waste management, EPA's proposed changes to "Subtitle D" of RCRA will establish more stringent requirements for the siting, design, and operation of landfills. Among the new requirements will be the addition of leachate collection and groundwater monitoring systems. Thirty-year post-closure maintenance will also be required. Final Subtitle D regulations are expected to be issued in early 1991.

Air Quality

The Clean Air Act sets air quality standards for criteria pollutants which EPA is responsible for implementation through State Implementation Plans (SIP). The Texas Air Control Board (TACB) is the state agency responsible for SIP development. Under the SIP, the TACB has been delegated responsibility for monitoring, enforcement and establishing

regulations. Substantial revisions to the Clean Air Act were passed during the most recent session of Congress, including new ambient air quality standards, attainment deadlines, and the classification of additional air toxics..

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) is responsible for the administration of the National Flood Insurance Program (NFIP) and emergency response in the case of natural disasters such as floods or hurricanes. To participate in the NFIP, communities must satisfy FEMA regulations for floodplain management. Each of these generally include requirements and restrictions for building permits, development plan review, and location of septic tank systems within the floodplain. These requirements can allow a community control over certain nonpoint sources of pollution. Of primary importance are sediment from erosion, septic tank discharges, and location of hazardous materials storage. All of the cities within the Armand Bayou watershed participate in the National Flood Insurance Program.

U.S. Soil Conservation Service

The U. S. Department of Agriculture Soil Conservation Service's (SCS) role in the Armand Bayou watershed is to provide technical assistance on request in the area of renewable natural resources. NPS activities involving the SCS are primarily aimed at limiting sediment contributions through soil erosion control. When requested, SCS will assist local jurisdictions to develop resource management plans, ordinances, policies or regulations. However, the SCS itself does not have regulatory authority in these areas.

TEXAS REGULATORY AGENCIES

Texas Water Commission

As the lead state agency for water quality management, the Texas Water Commission (TWC) is responsible for implementing NPS management activities. Upon delegation of NPDES authority by EPA, the TWC will have the responsibility to administer the stormwater permit program. Proposed rules for the Municipal Water Pollution Control and Abatement Program contain requirements for storm sewer discharges and runoff and erosion control. These rules are currently undergoing review by other public agencies and interested parties and are expected to be issued in early 1991.

TWC is the State Coordinating Agency under the State Flood Control and Insurance Act of 1969. This Act authorizes political subdivisions to implement necessary actions to qualify for the National Flood Insurance Program. TWC provides floodplain management technical

assistance to local governments and assists FEMA on monitoring visits to local governments. These monitoring visits or "assistance contacts" are used to determine if local governments are having problems complying with FEMA regulations and if so, to provide assistance.

The TWC also has jurisdiction over the following activities: hazardous waste management (permits, enforcement and planning); response to spills of oil and hazardous material; administration of the state's hazardous waste injection well program, and the regulation of water wells.

Hazardous and Solid Waste Division

The Hazardous and Solid Waste Division of TWC processes applications and issues permits for storage, treatment and disposal of industrial solid wastes and hazardous wastes. The TWC permits underground injection wells and maintains a registration file of hazardous and solid waste generators, transporters and facilities. The TWC also regulates small quantity hazardous waste generators and responds to Superfund site problems through authority delegated by EPA. Additionally, the TWC administers the State Superfund Program, which provides for response to sites not on the National Priority List.

Water Rights and Uses Division

The Water Rights and Uses Division administers the Underground Storage Tank (UST) Program using standards developed by EPA for regulating UST's and dealing with leaking underground storage tanks (LUST) under the Hazardous and Solid Waste Amendments. The program includes a registration element for identifying underground storage tanks throughout the state (about 150,000). In addition, the Division provides groundwater protection services and addresses environmental and safety problems associated with underground storage tanks.

Field Operations Division

The Field Operations Division oversees the local TWC district offices. The District 7 Office, located in Houston, is responsible for monitoring surface and groundwater quality, hazardous, and solid waste and underground storage tanks. This office responds to citizen complaints and emergency situations such as hazardous materials spills.

TWC shares spill response authority with the Texas Railroad Commission (RRC) for spills of harmful amounts of crude oil occurring during transportation or in coastal waters. Spill response is handled in accordance with the "State of Texas Oil and Hazardous Substances Spill Contingency Plan". This plan defines a harmful amount of crude oil spilled on the ground to be five or more barrels. Any quantity spilled in water is considered to be harmful. TWC will take the lead in directing and approving the cleanup of a spill of a harmful quantity of crude oil from a truck on a highway, from a railcar, or from a vessel. Spills under the authority of the TWC are to be reported to the district office and/or the Texas Emergency Response Center located in Austin.

Texas Railroad Commission

The Texas Railroad Commission (RRC) regulates handling, transportation, reclamation or disposal of waste materials resulting from activities associated with the exploration, development, or production of oil, gas, or geothermal resources. Through a series of Statewide Rules (SR), the RRC regulates the casing, cementing, drilling, and plugging of oil and gas wells (SR 13 & 14). The RRC's jurisdiction also covers waste from the transportation of oil prior to refining and gas prior to its use in any manufacturing process or as a residential or industrial fuel.

Statewide Rule 8 expressly prohibits oil and gas operators from causing or allowing the pollution of surface or ground water. However, incidents of accidental flow line breaks, tank leaks or overflows, and other similar problems are not completely unavoidable because of mechanical or electrical failures. Best Management Practices (BMP's) employed by the RRC to address these situations include the use of educational seminars to inform oil and gas operators and other interested persons about RRC rules and procedures relating to surface and ground water protection.

Though the RRC has the authority to develop an NPS management program for oil and gas activities, no such program is currently in place. However, upon Texas' receiving NPDES designation from the EPA, the RRC will be responsible for the permitting of discharges from oil and gas operations.

Texas Department of Health

Landfill Regulation

The Texas Department of Health's (TDH) Bureau of Solid Waste Management (Bureau), is responsible for developing municipal solid waste management regulations to maintain and protect the public health. The Bureau is responsible for permitting and inspection of solid waste management facilities and investigation of illegal waste sites. The Bureau also monitors groundwater and surface water around active and closed municipal solid waste sites in order to prevent contamination of groundwater. There is one active and one closed landfill within the Armand Bayou watershed. Three active and two closed landfills are on the periphery of the watershed.

The Bureau has established standards for the siting, design, construction, operation, and maintenance of solid waste management facilities, most of which are equivalent to those developed by the EPA. The Bureau coordinates with the TWC and TACB in solid waste management facility permitting to insure that sites are placed in such a location as to protect the public health of adjacent land owners. Public health considerations in the siting process include: adjacent land uses; groundwater monitoring; liner systems; runoff protection; cover requirements; air emissions; and buffering requirements. The TDH takes the lead in aspects concerning public health during the permitting process. Once permitted, municipal

solid waste management facilities are routinely inspected to insure their continued appliance to operational standards. Inspection continues for up to five years past closure.

EPA's proposed "Subtitle D" landfill regulations will be much more stringent than current TDH requirements and will require significant new enforcement efforts. However, TDH has significantly increased its monitoring and enforcement program through a fifty cent per ton solid waste disposal fee established by the 1989 Texas Legislature.

Septic Tank Regulation

The design, installation and operation of on-site sewerage facilities (OSSF), or septic tanks, is regulated by TDH through agency-developed standards and criteria. It is also the general policy of TDH, under Chapter 25 of the Texas Administrative Code, Secs. 301.101 - 301.109, to promote local regulation of OSSF. Local governments are encouraged to develop their own on-site waste disposal orders. However, they must use TDH standards, at a minimum. TDH is also required to review all local governments' OSSF regulatory programs.

Texas Soil and Water Conservation Board

The Texas Soil and Water Conservation Board (TSWCB) is the designated agency for implementing state laws concerning the protection and conservation of soil resources. The TSWCB encourages and assists in formulating local management plans for establishing standards for agricultural and silvicultural practices. Coordination for plans is dependent on agreements with the landowner and the SCS.

Texas Water Development Board

The Texas Water Development Board was delegated authority for administering the State Revolving Loan Fund in April, 1988. The Board's involvement in nonpoint source management focuses on the eligible use of these loan funds for projects which implement the State Nonpoint Source Management Program. Currently there are no such projects targeted for the Armand Bayou watershed.

Texas Air Control Board

The Texas Air Control Board (TACB) operates under statutory authority of the Texas Clean Air Act. The TACB is responsible for the development and maintenance of the state plan for air quality management. TACB develops and enforces air pollution regulations and conducts engineering reviews of proposed new stationary sources to ensure that abatement technologies and systems meet standards.

The state plan for air pollution control is the Statewide Implementation Plan (SIP). This document describes the administrative and operational methods to be used to meet Federal

Clean Air Act requirements. The major goal of the SIP and the federal requirements is to accomplish emission reductions.

Permitting authority for most air emissions activities is under the jurisdiction of the TACB. Permits are required for construction or operation of any facility that has the potential to emit pollutants into the atmosphere. However, the TWC and the TDH have jurisdiction for toxic and solid waste incinerator permits, respectively. Guidelines and performance standards for regulations and permits are contained in the Federal CAA, the Texas CAA and TACB rules. Prior to permit issuance, consultations are held with local pollution control agencies, such as the City of Houston and the Harris County Pollution Control Department. The permit applications undergo a review process to evaluate facility plans and specifications.

LOCAL REGULATORY AGENCIES

City of Houston

Storm Drainage

The City of Houston shares responsibility with the Harris County Flood Control District (HCFCD) for maintaining the urban storm drainage system within its jurisdiction as well as for flood plain management. Houston is responsible for its underground municipal storm sewer system, as well as certain larger open drainage channels. HCFCD is responsible for outfall drainage from the Houston municipal system and maintenance of the majority of open drainage channels in the watershed.

Illicit discharges into the storm sewer system also represent a potential source of nonpoint source water pollution. The City of Houston Municipal Code requires a permit for any discharge of liquid or gaseous waste into the storm sewer system or other waters, and regularly conducts inspections and responds to complaints involving illicit connections.

Both Houston and HCFCD review applications for subdivision and development of land and building permits to ensure compliance with storm drainage requirements. However, Houston has no provision in these requirements for the management of NPS pollution.

Ellington Field airport is managed by the City of Houston Department of Aviation. At present, the City is preparing to comply with EPA's new final rule on airport industrial discharges. The Department of Aviation will be required to evaluate potential nonpoint problems and develop mitigation strategies.

Groundwater Protection

Groundwater contamination is another NPS concern. Houston has no regulations governing

land use over well recharge zones, though the City is currently participating in the state Wellhead Protection Program. The City also prohibits new septic tanks in the Armand Bayou watershed. Groundwater contamination problems are investigated by both the Public Works and Health Departments. Houston also reviews specifications for grease traps in building design and the City's Health Department performs annual inspections to ensure that grease traps are functioning properly.

City of Pasadena

Storm Drainage

The City of Pasadena also maintains its underground municipal storm sewer system, but it does not control any major drainage channels. Pasadena reviews development, subdivision, and construction projects for drainage and requires a special permit for development in flood prone areas. These reviews do not include a nonpoint source pollution element.

Drainage planning is conducted by a City Commission on Flood Control and Drainage, which oversees the inspection of drainage and flood control facilities. At this time, there is no NPS pollution control strategy in the City's drainage plans, other than prohibiting any non-permitted wastewater discharges into the storm sewer system or other waters.

Groundwater Protection

Groundwater contamination is investigated by the City's Public Works Department and the Harris County Pollution Control Department. The City of Pasadena permits septic tanks, but does not have local requirements beyond state regulations. Both permitting and inspection responsibilities are handled by the City's Director of Public Health.

City of Deer Park

Deer Park requires a special development permit for construction on flood prone land and prohibits fill and new construction in floodways. The Department of Public Works oversees the regulation of floodways. The City is responsible for its internal drainage system prior to discharge to open drainage ways which are regulated by HCFCD.

The City of Deer Park has zoning regulations, though these do not have specific NPS management provisions for storm drainage or groundwater infiltration. However, Deer Park does not allow new septic tanks within its city limits.

City of La Porte

La Porte also regulates its internal drainage system up to the point of discharge to the HCFCD's open drainage system. The City aggressively pursues illicit discharges to the

stormwater system. The City of La Porte has zoning regulations and subdivision ordinances regulated by the Department of Public Works. However, neither of these ordinances have NPS management provisions. The La Porte Airport is also located within the Armand Bayou watershed, and will require an NPDES stormwater discharge permit.

It is also the policy of the City of La Porte to not allow new septic tanks. The City operates a landfill within the watershed which is regulated by the City and TDH.

Harris County

Storm Drainage

The Harris County Flood Control District (HCFCD) maintains the county drainage system which consists of open ditches, streams and bayous. Individual cities within the Armand Bayou watershed are responsible for maintaining their internal drainage systems up to the point of discharge to the County system. The HCFCD is responsible for administering the County's development review for drainage plans and its Floodplain Management Program. However, there are currently no specific NPS requirements or guidelines for development.

Groundwater Protection

The Harris County Engineer's Office is responsible for regulating septic tank systems in the unincorporated areas of Harris County. The Engineer's Office is also responsible for pursuing complaints related to the surface discharge of all septic tank systems in Harris County. In this matter, the Engineer's Office works jointly with the Harris County Health Department (Sanitary Engineering), which responds to complaints of failing septic tank systems.

OTHER LOCAL AGENCIES

Houston-Galveston Area Council

Under the Texas Health and Safety Code, the Houston-Galveston Area Council (H-GAC) is the state-designated solid waste planning agency for the upper Gulf Coast region. Over the next two years, H-GAC will be working with local governments, including all of those in the Armand Bayou watershed, to prepare a comprehensive solid waste management plan to submit to the TDH.

Elements of the plan will include targets for waste reduction, recycling, incineration and landfill disposal. Additionally, the plan will contain siting criteria for landfills, incinerators and other solid waste facilities with the potential to impact the environment. By virtue of having a TDH-adopted plan, H-GAC will have the authority to review permit applications against these facility siting criteria.

Gulfway Utility District
1301 Leeland Street
Houston, TX 77002

Harris County Flood Control District
9900 Northwest Freeway, Suite 200
Houston, TX 77092
713/684-4000

Harris County Engineer
Harris County Administration Building
1001 Preston Avenue
Houston, TX 77002
713/221-5370

Harris County Health Department
Environmental Health Division
PO Box 25349
Houston, TX 77265
713/620-6860

Harris County Municipal Utility
District #67
2703 Tangle
Houston, TX 77005

Harris County Pollution Control
PO Box 6031
Pasadena, TX 77056
713/920-2831

Harris-Galveston Coastal Subsidence
District
1660 West Bay Area Boulevard
Friendswood, TX 77546
713/486-1105

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CHAPTER THREE

NATURAL AND LIVING RESOURCE MANAGEMENT

CHAPTER OUTLINE

Regulatory Issues

- Protection and management of living resources and habitat
- Protection and management of wetlands
- Management of submerged lands
- Surface and ground water extraction
- Oil and chemical spill response

Federal Legislation

- National Environmental Policy Act
- Executive Order 11514
- Endangered Species Act
- Fish and Wildlife Coordination Act
- Executive Order 11990
- Federal Water Pollution Control Act
- Emergency Wetlands Resources Act
- Rivers and Harbors Appropriation Act
- Federal Emergency Management Act
- National Flood Insurance Act
- Executive Order 11988
- Marine Plastic Pollution Research and Control Act
- Migratory Bird Hunting and Conservation Stamp Act
- Executive Order 11989

Texas Regulations

- Texas Water Code
- Texas Natural Resources Code
- Coastal Public Lands Management Act
- Coastal Coordination Act
- Oil and Hazardous Substances Spill Prevention and Control Act

Local Regulations

- Groundwater extraction regulations
- Local land use and development regulations
- Bird sanctuary designation
- Local park development programs

Federal Regulatory Agencies

- Fish and Wildlife Service
- Environmental Protection Agency
- Corps of Engineers
- Soil Conservation Service
- National Oceanic and Atmospheric Administration
- National Marine Fisheries Service
- Coast Guard
- Federal Emergency Management Agency

Texas Regulatory Agencies

- Texas General Land Office
- Texas Parks and Wildlife Department
- Texas Water Commission

Local Regulatory Agencies

- Harris-Galveston Coastal Subsidence Dist.
- Harris County
- City of Houston
- City of Pasadena
- City of Deer Park
- City of La Porte

Other Local Agencies

Houston-Galveston Area Council

Non-profit entities

Galveston Bay Foundation

Armand Bayou Nature Center

EXISTING AND POTENTIAL ENVIRONMENTAL IMPACTS

Natural and living resource management involves the protection and efficient utilization of these vital resources. Key issues in the Armand Bayou Coastal Preserve include the protection and conservation of living resources, protection of wetlands and other habitat, and the regulation of surface and groundwater extraction.

The physical characteristics of the watershed have been substantially altered by human activity. One of the most significant impacts has been land subsidence caused by groundwater extraction. Over this century, the watershed has experienced subsidence ranging from up to nine feet in the northern portion to up to five feet in the south. As a result, Armand Bayou has changed from a freshwater stream bordered by wetlands to a brackish tidal lake, nearly devoid of wetlands. The U.S. Fish and Wildlife Service mapped wetlands in the watershed in 1956 and 1979. The 1979 map showed that Armand Bayou experienced a net loss of 91% of its wetland acreage and has only twenty-four acres remaining.

Through the Harris-Galveston Coastal Subsidence District's planning and regulatory efforts, there has been a major shift from ground to surface water use, reducing subsidence to minimal levels. However, within a 5.5-mile radius of the center of the watershed, there are still thirty-eight active wells that pumped 2,483 million gallons in 1989.

Though there are no reservoirs on Armand Bayou and no agricultural or municipal interests which withdraw water, the use of surface water has been a controversial issue in the past. In 1989, the Baywood Country Club proposed to withdraw water to irrigate a golf course. After considerable review of the potential impacts of the project by the Texas Parks and Wildlife Department, the Texas Water Commission issued a permit to withdraw 125 acre-feet of water per year. Potential future demands of water from Armand Bayou are unknown.

There is limited data on the living resources that are specific to the study area. Hence, Armand Bayou's importance as a wildlife habitat is unclear. There have been no reports of submerged aquatic vegetation in Mud Lake or Armand Bayou. There is also no quantitative information on the water birds associated with the bayou and there are no colonial waterbird nesting sites within the watershed. It is possible that the endangered brown pelican and the threatened reddish egret may occasionally appear on Armand Bayou.

However, it would not normally be considered a primary habitat for either species. It is believed that the lower reach of Armand Bayou may be a potentially valuable nursery habitat for certain commercial and recreational finfishes and shellfishes.

The watershed experienced intense land development during the 1960's. However, a restudy of floodplain elevations due to subsidence rendered 800 acres along the bayou as undevelopable. However, aside from floodplain regulations, local land use controls have limited application for habitat management. The City of LaPorte, however, is designated as a bird sanctuary, making it illegal to hunt or trap any birds or wild fowl within the city.

Over 2,100 acres along Armand Bayou have been included in Armand Bayou Park, which was created to preserve the natural characteristics on both sides of the lower reach of the bayou. Additionally, the City of Pasadena is developing a linear park along waterways in the study area.

During the preparation of this report, the question was raised whether or not designation and acceptance of Armand Bayou into the Texas Coastal Preserve Program requires an Environmental Impact Statement to be done. The Texas Parks and Wildlife Department and the Texas General Land Office are the two state agencies involved with the Coastal Preserve Program. The National Environmental Policy Act does not affect the state. Additionally, no federal permit is required and federal monies will not be used to manage the Preserve. Based on these facts, no Environmental Impact Statement is needed. There could be an EIS required for a project that would impact the Preserve if that project meets the criteria of requiring a federal permit or receiving federal dollars for construction.

LEGISLATIVE SUMMARY

Federal Legislation

National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) requires an environmental assessment on any federally funded or permitted project with the potential to impact the natural environment. If potential environmental impacts are ascertained, an Environmental Impact Statement (EIS) must be prepared. The EIS requires documentation of adverse environmental effects, evaluation of alternatives, and an assessment of the relationships between short-term uses of the impacted environmental resource as opposed to its long-term productivity.

Executive Order 11514, as amended by Executive Order 11991

Executive Order 11514 outlined for federal agencies what their responsibilities would be in implementing the National Environmental Policy Act of 1969. The Order also charged the President's Council on Environmental Quality with leading and monitoring the incorporation of national environmental goals into the routine activities of all federal agencies. Aside from

these procedural instructions, the Order called for federal leadership "in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life." By emphasizing broad public disclosure and input, interagency and intergovernmental coordination, and wide-ranging review and reform of federal agency practices, the Order reflected the idealism of NEPA itself. But the Order also pointed out the need for clarity and practicality in environmental matters. Federal agencies must insure that Environmental Impact Statements are useful, concise, to the point, focus on key issues and real alternatives, and do all this with a minimum of paperwork and extraneous data collection. Finally, the Order assigns the Council on Environmental Quality to arbitrate potential conflicts between federal agencies over NEPA implementation.

Endangered Species Act

The Endangered Species Act enables the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) to render a judgement on any activity which will adversely affect an endangered species. This Act also authorizes the development of recovery plans to schedule necessary actions to restore endangered plants and animals to a more secure and stable biological environment.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act provides for natural resource management agencies to have subject matter jurisdiction for other agencies' activities and permits. For example, the FWS would review a dredge and fill permit application for wildlife impacts.

Executive Order 11990

Executive Order 11990 was issued by President Carter to avoid to the extent possible the destruction or modification of wetlands. In general, the order instructs federal agencies to minimize the destruction, loss or degradation of wetlands and to preserve their beneficial uses. The order does not apply to federal permits issued to private parties for activities involving wetlands on non-federal lands.

Federal Water Pollution Control Act (Clean Water Act) and Subsequent Amendments

The Clean Water Act (CWA), Section 404, created the permit program for the discharge of dredged or fill material into navigable waters and adjacent wetlands. This program is administered by the Corps of Engineers with oversight by the Environmental Protection Agency.

Section 401 of the Water Quality Act of 1987, amended the CWA by requiring certification of state agency review of any 404 permit. The Texas Water Commission is the state agency responsible for this certification. The Texas Parks and Wildlife Department (TPWD) and General Land Office (GLO) are also part of the review process.

Section 320 of the Clean Water Act establishes the National Estuary Program (NEP). This section authorized the establishment of the Galveston Bay National Estuary Program and allocated its funding.

Emergency Wetlands Resources Act

The Emergency Wetlands Resources Act (EWRA) provides for the conservation and protection of the wetlands of the United States in order to maintain the public benefits they provide. EWRA requires the cooperation of federal, state and local governments to realize these goals. For this purpose, the TPWD is responsible for completing a plan for wetlands consistent with the National Wetlands Priority Conservation Plan.

Rivers and Harbors Appropriation Act

The Rivers and Harbors Act gives the Corps of Engineers the authority to regulate any type of work in navigable waters of the United States. The primary purpose of this legislation is to protect navigable waters from obstruction or alteration. However, activities permitted under this act may require review under NEPA, Endangered Species, or Fish and Wildlife Coordination.

Federal Emergency Management Act

This Act, which established the Federal Emergency Management Agency (FEMA), provides for floodplain management and the protection of wetlands. This Act provides guidance to states and localities to minimize the destruction, loss, or degradation of wetlands, as well as to restore and preserve the beneficial attributes of floodplains.

The National Flood Insurance Act

The Act makes available flood insurance coverage for citizens of the United States through coordinated efforts of federal, state and local governments. This law was enacted in an effort to alleviate the financial burden placed on the private insurance industry to provide such coverage. Its impact on natural and living resource management pertains to restrictions which must be placed on development in flood-prone areas in order for communities to participate in the program.

Executive Order 11988

Executive Order 11988 was also issued by President Carter to minimize adverse impacts associated with the occupancy and modification of floodplains. In general, the order instructs federal agencies to reduce the risk of flood loss, to minimize the impact of floods on human health, safety and welfare, and to protect the beneficial uses of floodplains. Under this order, federal agencies are to consider alternatives to proposed actions by the agency or allowed by the agency in a floodplain.

Other

The Marine Plastic Pollution Research and Control Act (MPPRCA) determines the regulations for disposal of marine debris. The Migratory Bird Hunting and Conservation Stamp Act (MBHCSA) requires the acquisition of a stamp or permit for the hunting of migrating birds. The MBHCSA also seeks to maintain the conservation of certain species of migrating birds.

Executive Order 11989 was issued by President Carter in 1977 to clarify the authority of federal agency heads to regulate the use of off-road vehicles on public lands under their purview. When off-road vehicles are found to be causing "considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources" of certain public areas or trails, agency heads are authorized to immediately close such areas to off-road vehicles. These closings may continue until adequate mitigation steps have been taken and prevention of renewed damage is assured. Relevant federal agencies are also empowered to identify those public lands which are not suitable for off-road vehicle use at any time and which will remain closed to such use under adopted agency policy.

Texas Legislation and Regulations

Texas Water Code

The Texas Water Code encompasses a number of natural resource management issues. Under the code, the TPWD and the Texas Water Development Board have responsibility, in cooperation with other agencies, to establish and maintain a continuous bay and estuary data collection and evaluation program. This program includes studies and analyses to determine the bay conditions necessary to support a sound ecological environment.

The Water Code also establishes the permitting program for surface water extraction and provides for flood insurance and floodplain management, as set forth under the provisions of the National Flood Insurance Act.

Texas Natural Resources Code

The Texas Natural Resources Code governs the GLO's management of submerged lands, as well as coastal wetlands. The Natural Resources Code also governs oil and gas extraction activities, and also provides for the protection of certain manmade resources, such as archaeological sites.

The Coastal Public Lands Management Act

The Coastal Public Lands Management Act (CPLMA) seeks to preserve the natural resources of coastal public land through management programs. The CPLMA designated the GLO as the lead agency over a management program for developing future objectives, policies, and standards for planning and regulating the use of coastal public land resources.

The Coastal Coordination Act

The Coastal Coordination Act was to provide for a more effective and efficient use of public funds and facilities in coastal resource areas by making the state's existing coastal management processes more visible and accessible to the public. Studies of coastal problems and issues were to be addressed by a council which was created under this Act, but that is presently inactive.

Texas Oil and Hazardous Substances Spill Prevention and Control Act

The Texas Oil and Hazardous Substances Spill Prevention and Control Act establishes the Texas Water Commission (TWC) as the state's lead agency in spill response and authorizes the TWC to issue any rules necessary to fulfill the Act's requirements. The Act also creates a Regional Response Team of federal and state agencies to devote personnel and equipment to be utilized for spill clean-up. However, coordination problems in recent spills in Galveston Bay have raised concerns on the present method for spill response. At least two bills creating new response systems are expected to be presented in the 1991 legislative session.

Local Ordinances

Other than the City of La Porte's Bird Sanctuary designation, there are limited local controls governing natural and living resource management. Local ordinances such as zoning, subdivision controls and building permits could possibly be employed to protect valuable habitats or other sensitive areas. However, there are few examples in Texas of local development regulations addressing living resource issues.

FEDERAL REGULATORY AGENCIES

U.S. Fish and Wildlife Service

The U.S. Department of Interior's Fish & Wildlife Service (FWS) is the agency charged with protecting and conserving fishes, wildlife (birds and most mammals), and their habitats for the benefit of the public. This agency manages the taking of migratory game birds and conducts monitoring and research associated with changes in fish and wildlife populations. Examples of FWS research include surveillance of the effects of pesticides, heavy metals and thermal pollution.

The FWS is also a reviewing agency for Environmental Impact Statements and federal permits. The FWS alone cannot stop a particular action, but it is considered powerful in light of the fact that it can require further review of a project's impacts on wildlife. The review and comment authority of the FWS encompasses a range of federal permitting agencies. Under the Endangered Species Act, the FWS has the authority to render a finding as to the harm that an activity may cause an endangered species and can also take legal action against those parties who threaten endangered species and critical habitats. The FWS provides the same consultations under Section 7 of the Act, which requires that all federal agencies consult with the Department of the Interior on endangered species and critical habitat issues arising from federally-sponsored or permitted projects.

The FWS is also part of the multi-agency Regional Response Team to deal with oil spills. In this capacity, the FWS works to protect, clean up and mitigate impacts to wildlife and provides technical assistance to the lead agency, generally the Coast Guard or EPA.

Wetlands

The FWS has completed the National Wetlands Priority Plan, which provides guidance for identifying the more important, scarce, or vulnerable wetlands. The Priority Plan, as mandated by the EWRA, also required FWS regional offices to create concept plans that address local and site-specific actions. In 1989 the Region II Wetlands Regional Concept Plan was completed. The concept plan included a list of areas in Texas to receive priority consideration for federal and state Land and Water Conservation Funds. However, no areas in Armand Bayou were included in the plan.

U.S. Environmental Protection Agency

The Environmental Protection Agency (EPA) is also a lead agency in wetlands management. Under Section 404 of the Clean Water Act, EPA is required to prepare guidelines in conjunction with the Corps of Engineers to use in issuing permits for the disposal of dredge and fill materials into navigable waters and adjacent wetlands. EPA has oversight authority for administering the permit program as well as enforcement authority. If a determination is made that a discharge of dredge and fill material will adversely affect municipal water supplies, wildlife, recreation areas, or shellfish beds and fishery areas, EPA may prohibit the use of a specific disposal site.

EPA has adopted the goal of the National Wetlands Policy Forum to achieve no net loss of the nation's remaining wetland base. EPA has responsibility for wetland management planning through the Advanced Identification Process. This process establishes a plan for specific areas relative to their wetlands characteristics. The characteristics are assessed and the functional attributes are detailed. The process is used to streamline the permitting process in designated areas and to safeguard pristine areas.

EPA is also a member of the Regional Response Team for oil spills. The U.S. Coast Guard directs response operations in tidal waters and EPA directs clean-up operations in non-tidal waters.

U.S Army Corps of Engineers

The U.S. Army Corps of Engineers (Corps) is authorized under Section 404 of the Clean Water Act to issue and enforce permits for discharge of dredge and fill materials into navigable waters and adjacent wetlands. Permits are issued under guidelines jointly

developed with EPA. Comments on Section 404 permits are provided to the Corps by the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service under the Fish and Wildlife Coordination Act, and by the Texas Water Commission, Texas Parks and Wildlife Department, and General Land Office, under Section 401 of the Water Quality Act.

The Corps has the responsibility for determination of wetlands. Determinations are typically made upon request by property owners or individuals interested in purchasing property where a wetland designation may be an issue. State or local entities can also request determination. The Corps has an informal agreement with the FWS by which the Corps will invite FWS to participate in wetland determination. For the period 1989 - June, 1990, the Corps has conducted two wetland determinations and evaluated three pipeline crossings in the Armand Bayou watershed.

The Corps has authority under the Rivers and Harbors Act to regulate any type of work in navigable waters. Examples include Corps review of permits for the construction of discharge pipes or piers to determine the impact of the construction on the waterway and adjacent wetlands.

Soil Conservation Service

The United States Department of Agriculture Soil Conservation Service (SCS) assists local governments in creating plans for renewable natural resources, including sediment and erosion control, flood control, reclamation area development, and tree preservation. While it has no regulatory or enforcement authority, the SCS will assist local governments in developing management plans, ordinances, policies or regulations. The SCS coordinates its activities closely with the Harris County Soil and Water Conservation District.

The SCS is also responsible for the mapping and designation of wetlands on agricultural lands, and it inspects those farmers who have completed a wetland conservation plan. The SCS reports any violations of conservation plans to the Harris County Committee of the Agriculture Stabilization and Conservation Service.

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) is part of the United States Department of Commerce. The NOAA is responsible for gathering, processing and issuing information on weather conditions, river water weight, coastal tides, and current movement of oceans. In addition, the NOAA issues warnings for tornadoes, floods and seismic seawaves. The NOAA provides current environmental data, ocean surveys and measurements, and technical research publications dealing with earth sciences.

National Marine Fisheries Service

The National Marine Fisheries Service (NMFS), which is part of the NOAA, regulates fisheries management, primarily of offshore species. The NMFS has advisory status under the Fish and Wildlife Coordination Act and National Environmental Policy Act for federal construction or permits in the waters of the United States.

The Endangered Species Act requires the FWS and NMFS to determine if any proposed federal action will have an adverse effect on a threatened or endangered species. The judgment is generally made in consultation between the FWS, NMFS, and the sponsoring agency. Projects which exhibit possible negative impacts on the threatened or endangered species will not receive a federal permit or federal funds.

U.S. Coast Guard

The Coast Guard is a branch of the Department of Transportation. The Coast Guard has jurisdiction within the navigable waters of the Armand Bayou watershed over emergency response to spill contamination and boating safety.

The Coast Guard is the implementing agency for a national contingency plan for oil spill response in tidal waters (EPA directs clean-up in non-tidal waters). As the lead agency, the Coast Guard directs a Regional Response Team, which includes federal agencies such as EPA, FWS, NMFS and the Corps of Engineers. If a spill has public health implications, the Center for Disease Control in Atlanta is requested to join the team. State agencies are represented on the response team by the Texas Water Commission.

As the lead agency and first point of contact, the Coast Guard directs and approves all actions pertaining to clean-up operations. The current spill response policy requires responsible parties to contact clean-up operators to work under the direction of the Coast Guard, while the Regional Response Team approves major actions and provides technical assistance. The Coast Guard has a Marine Safety Office located at the Port of Houston, which houses a strike team. The team's responsibility is to quickly reach the spill site and direct on-site clean-up operations.

In addition to spill response oversight, the Coast Guard enforces marine debris regulations. Marine debris may be reported by the perpetrator or the public, or may be observed by the Coast Guard. Penalties and regulations are defined under RCRA, CERCLA or the MPPRCA.

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) is the lead policy and coordination agency for disaster planning and relief. Through the National Flood Insurance Program,

FEMA works with communities to regulate land uses in flood-prone areas. Because of flood plain impacts, FEMA also reviews actions that deal with dredging, shoreline erosion, coastal land use, and wetlands. Primarily FEMA is known for its assistance efforts after hurricanes or floods. However, FEMA also offers relocation assistance after industrial disasters.

TEXAS REGULATORY AGENCIES

Texas General Land Office

The Texas Coastal Public Lands Management Act assigned management responsibilities for coastal public lands to the Texas General Land Office (GLO). The GLO also has regulatory control over stream bottoms and natural resources on coastal public lands and controls all activities which may have an impact on them, including dredging, oil and gas recovery, and shoreline erosion.

Activities such as construction of piers, placement of pipelines, dredging of channels, and mineral exploration activities on state land require prior authorization from the GLO and payment of the appropriate fees. Revenue generated by GLO permits, easements and leases is placed in the Texas Permanent School Fund, administered by the School Land Board.

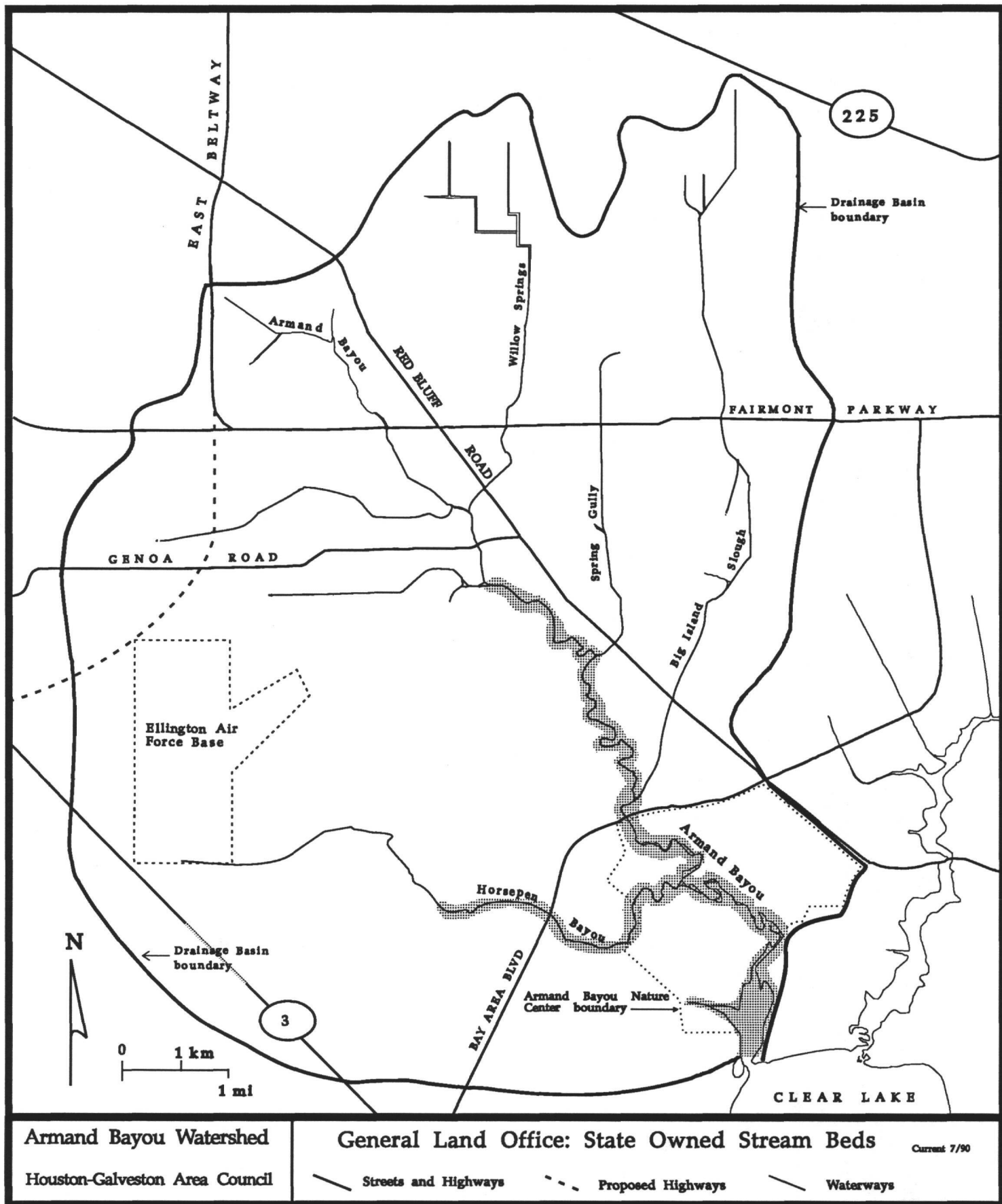
When an application for the use of state lands is received, the GLO conducts an environmental review to determine if the proposed work is an appropriate use of state resources. The review includes assessment of possible alternatives that would minimize adverse environmental impacts. The application is then presented to the School Land Board, and, if approved, a contract between the applicant and General Land Office is prepared.

These contracts typically contain provisions to protect natural resources on state lands and mitigation in instance where environmental damage is unavoidable. For the most part, mitigation is viewed as a last resort, in that it generally occurs after damage has been done.

The map on page 54 shows the approximate boundaries of state-owned lands in Armand Bayou. The GLO monitors activities in the Armand Bayou watershed to prevent unauthorized uses of state-owned lands, and issues permits for activities as discussed above. The Surveying Division of the GLO has prepared maps showing the limits of state ownership in the Armand Bayou watershed, and GLO also maintains maps showing natural resources on state lands, such as oyster reefs, bird rookeries, pipeline crossings, biologic assemblages, and wetlands.

Submerged Lands Management

The GLO submerged land management program includes coordination with other agencies



to track Corps of Engineers permits and to be consistent with other agencies' environmental policies in its actions. One such example is coordination with the TWC in its evaluation of water quality impacts of dredge and fill disposal projects (Clean Water Act Section 401 program). The GLO recently received a grant from EPA for wetlands coordination with the TWC. It is hoped that this project will lead to a Memorandum of Understanding among state agencies on wetlands and perhaps result in the development of joint standards.

Texas Coastal Preserve Program

The Texas Legislature has specifically provided for the GLO to lease appropriate coastal lands to the Parks & Wildlife Department (TPWD) to be managed as preserves. The two agencies have established a cooperative effort which allows for the strengths of each to be used to ensure long-range protection, enhancement and public use of coastal resources. GLO and TPWD have executed a Memorandum of Agreement (MOA) which establishes principles of the program and rules of procedure. The MOA requires that recommendations for Coastal Preserve areas be presented to both the Parks and Wildlife Commission and the School Land Board for inclusion in the program.

Recognizing diverse coastal natural resources and broad public concerns, the preserve program has been developed to accomplish four primary goals.

1. Protect fragile biological communities, including important colonial bird nesting sites.
2. Protect unique coastal areas.
3. Explore methods for recognizing preservation, enhancement, and appropriate public use opportunities.
4. Actively involve all concerned and knowledgeable persons and organizations.

Armand Bayou and Christmas Bay, two highly unique areas of the Galveston Bay system, have been designated as Coastal Preserve Areas. This regulatory study, along with other studies which are underway, will be used in the development of a management plan for the Armand Bayou Coastal Preserve.

Texas Parks and Wildlife Department

The TPWD manages the state's fish, wildlife, and wetland resources. A statewide systems of parks, preserves, and wildlife management areas is supervised by the Department. Under the Texas Coastal Preserve Program described above, the TPWD also manages certain state coastal lands leased to it by the General Land Office. The TPWD reviews and comments on any federal project that has the potential to affect these resources.

The disturbance or taking of streambed material on state-owned lands is regulated by the Department. The TPWD also monitors fish and shellfish populations, fishery harvests, bay

and estuarine resources, and dredge disposal. The TPWD sets policy and makes project review determinations based on the results of this monitoring.

The TPWD Enforcement Division regulates the taking of fish, shellfish, and wildlife. These regulations are enforced by game wardens, who are commissioned peace officers. The TPWD conducts research and assists in improving management practices for water resources and wetlands, as well as for uplands. These programs are intended to protect and enhance wildlife resources.

Wetlands

The TPWD also has a significant management role over wetlands and is the state agency designated to comment on federal Section 404 permits. Under the EWRA, the TPWD is required to complete a plan for wetlands that is consistent with the *National Wetlands Priority Conservation Plan*, in order to receive federal land and water conservation funds. The TPWD completed the *Texas Wetlands Plan: Addendum to the 1985 Texas Outdoor Recreation Plan* in 1988. The plan included guidelines for management, policy, regulations, acquisition, information, funding, and education guidelines. It also covered the status and trends in wetlands management, but it did not include a priority list for acquisition. However, TPWD worked in conjunction with the FWS to complete the *FWS Region II Wetlands Regional Concept Plan*. As mentioned previously, there are no priority wetlands designated in the Armand Bayou watershed.

Nursery Area Designation

The Texas Legislature has delegated authority to the TPWD to regulate the Texas shrimp fishery. A key element of this authority is the protection of designated nursery areas, which are defined as tributary bays, bayous, inlets, lakes and rivers which are proven as significant growth and development environments for postlarval and juvenile shrimp. These areas do not include outside waters, major bays, or bait bays. While Armand Bayou meets these physical requirements, it is not documented as having a significant fishery (*An Environmental Inventory of Armand Bayou*, McFarlane and Shead) and is not a designated nursery area under the TPWD program.

Texas Water Commission

Water Rights Permitting

The Texas Water Commission (TWC) Water Rights and Uses Division processes and evaluates permit applications to use State surface water. For example, the TWC, in cooperation with the TPWD, established low flow criteria in a case where the Baywood Country Club submitted a permit application to withdraw water from Armand Bayou to irrigate a golf course. In accordance with the TWC's permit application process, a public hearing was held and opponents had an opportunity to comment and offer suggestions regarding disposition of the application request.

In general, permit applications to withdraw surface water require a study by the TWC to determine if enough water is available. The applicant must also provide notice to downstream water rights holders and publishes notice of the application. If there is no protest, the permit is presented to the 3-member Texas Water Commission for action. However, if there is a protest, a public hearing date is set by a TWC Hearings Examiner and all parties to the application are notified. The hearing is held to gather information and the examiner prepares a proposal for decision which is presented to the Commission at a regularly scheduled meeting, at which further testimony may be offered.

The TPWD is always a party to these applications and is provided with permit information. (This cooperative arrangement between the TWC and TPWD was formalized by an Interagency Cooperation Contract in 1990.) The TPWD review assists the TWC in determining acceptable low flow conditions to prevent degradation of habitat and water quality by removal of freshwater, which leads to saltwater intrusion.

Dredge and Fill Disposal

The 401 Certification Program (Water Quality Act Section 401) provides for state agency review and comment on applications for dredge and fill disposal. The TWC is the state agency responsible for administering this program, though the TPWD and the GLO are also involved in the review process.

The Corps of Engineers makes the determination as to whether a Section 404 permit is needed for a project. When a 404 permit is required, the Corps issues a joint public notice on behalf of itself and the TWC and requests that the TWC review the application. The TWC review primarily addresses water quality standards. Habitat issues are reviewed by the TPWD and submerged land management issues are reviewed by the GLO.

If there are no comments from state reviewing agencies or the public, the 404 permit application is certified by the TWC and the certification is forwarded to the Corps for final permit action. If there is any concern over a permit application, additional information is sought from the applicant and a site assessment is required. The site assessment is typically involves the Corps, U.S. Fish and Wildlife Service, TPWD and the GLO.

Spill Response

The TWC is the lead state agency on the Regional Response Team for oil and chemical spills. The TWC directs the Texas Spill Response program and administers the State Spill Response fund, which provides assistance for clean-up costs, particularly for chemical spills. The GLO and TPWD are also involved in spill response and mitigation strategies.

There are currently several proposals to consolidate spill response activities, either under the TWC, GLO or a local umbrella organization. Among the considerations is the establishment of a crude oil shipping fee which would help to pay for equipment and staff for spill response efforts. It is expected that these proposals will be filed as bills in the next Texas legislative session.

LOCAL REGULATORY FRAMEWORK

Harris-Galveston Coastal Subsidence District

The Harris-Galveston Coastal Subsidence District (H-GCSD) was created by the 64th Texas Legislature in 1975 to regulate the withdrawal of groundwater within Harris and Galveston Counties. The H-GCSD was established ". . . for the purpose of ending subsidence which contributes to or precipitates flooding, inundation or overflow of any area within the district . . ."

The H-GCSD has policy-making, permitting and regulatory enforcement authority, and has developed a comprehensive long-range plan which sets goals for decreasing groundwater dependence through the year 2020. The long range plan identified eight (8) regulatory areas, and set limits on groundwater withdrawal in each area. Armand Bayou lies within Regulatory Area #1, in which groundwater withdrawal is presently limited to 10% or less of total water use.

H-GCSD permits are required for all individual wells with a casing greater than five inches in diameter. The only exception is for any person who owns just one well less than five inches in diameter. Individuals owning multiple wells must also have an H-GCSD permit.. The H-GCSD periodically monitors elevation changes in the region and has a continuing program to promote conservation of groundwater to reduce withdrawal.

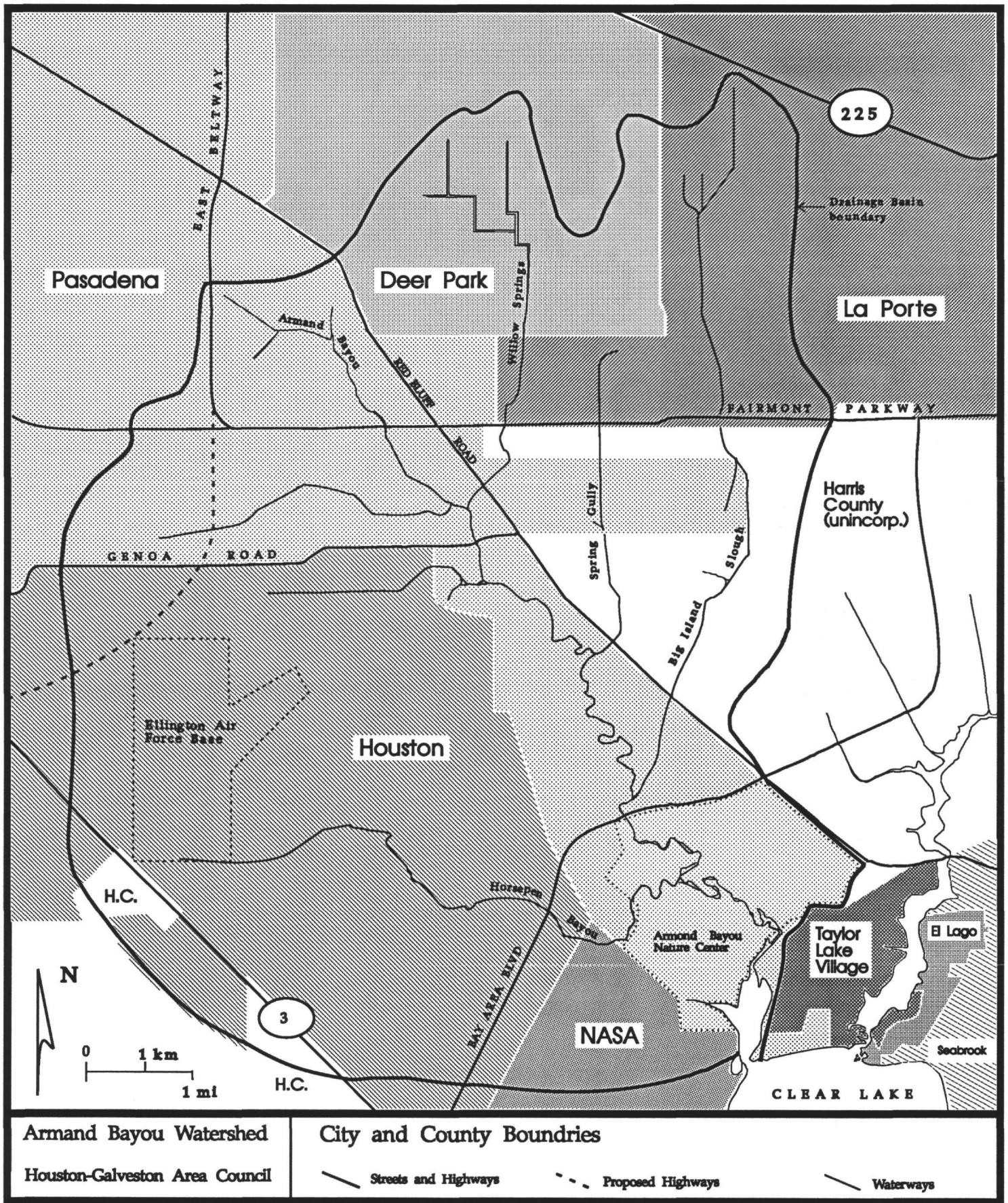
City and County Governments

Policy governing the protection of wildlife, habitat and water resources is generally set at the federal or state level. However, most conservation programs are to some degree impacted by land development, which is primarily regulated by local governments. While local governments in Texas have not traditionally used development regulations for habitat management, zoning, subdivision and construction-related ordinances are a potential tool for bridging gaps in federal and state programs.

Development in the Armand Bayou watershed is regulated by the City of Houston, the City of Pasadena, the City of Deer Park and the City of LaPorte, and Harris County. The jurisdictional boundaries of these local governments are shown on the map on page 59.

City of Houston

The City of Houston encompasses approximately 15,500 acres within the Armand Bayou watershed, including most of Horse Pen Bayou. About one-half of the city territory within the watershed is currently undeveloped. The other half is largely characterized by residential development with higher intensity land uses. These include the NASA Johnson Space



Center, the City's Ellington Field airport, and commercial development in the Clear Lake community.

Houston has a capital improvements plan which guides the development of major public infrastructure improvements. Houston does not have a zoning ordinance to specifically regulate the location and intensity of land use. The enforcement of private deed restrictions is employed as a land-use control, but this method only applies to those subdivisions which have deed restrictions in force. The City is also involved only in enforcing those aspects of deed restrictions which govern residential land use.

Houston has a Development Ordinance which requires all land owners who are subdividing tracts of land to file plats. Additionally, all development on unsubdivided tracts requires a development plat. This procedure allows for the uniform extension of roads and public utilities and incorporation of general site design criteria, but again, it does not regulate the type or intensity of the land use.

Flood Plain Management rules and regulations are set in accordance with the Federal Emergency Management Agency. The City of Houston Municipal Code requires the control of filling, grading, dredging, and other development which may increase flood damage. The code also provides a regulatory system for the issuance of permits.

City of Pasadena

The City of Pasadena encompasses approximately 13,000 acres within the Armand Bayou watershed, including most of the main channel of Armand Bayou and small portions of Willow Spring Bayou and Big Island Slough. Most of the area surrounding Armand Bayou itself is residential or undeveloped. The area around Willow Spring Bayou includes undeveloped lands and the Pasadena Rodeo grounds. Big Island Slough abuts a heavy industrial district.

Pasadena has a comprehensive plan which guides capital improvement programming and suggests land development patterns. The plan indicates residential and open space development surrounding the main channel of Armand Bayou. Pasadena has also been acquiring land in this area to develop a linear park system.

Pasadena does not have a zoning ordinance to specifically regulate the location and intensity of land use. However, the enforcement of private deed restrictions is employed as a land use control. This method only applies to those subdivisions which have deed restrictions in force. Pasadena also has development criteria which limit the amount of lot coverage on patio home (50%) and apartment (70%) developments.

Habitable structures located within the 100-year flood plain must be at the flood plain elevation or one foot above the street. The City's building regulations define flood or

flooding as any "overflow or inland or tidal waters and unusual and rapid accumulation of runoff of surface water from any source." The regulations further define floodplain or flood-prone zone as "any land susceptible to being inundated by water from any source." A development permit is required for any construction upon such lands.

The Pasadena Code of Ordinances creates a city Commission on Flood Control and Drainage. This Commission regulates matters relating to flood control and drainage. The Commission inspects drainage and flood control facilities and reports its findings to the Mayor and City Council. The Commission also advises and recommends new programs to the City's elected officials.

City of Deer Park

Deer Park encompasses approximately 3,700 acres within the Armand Bayou watershed, including much of the area around Willow Spring Bayou. Most of the area surrounding Willow Spring Bayou is residential or undeveloped.

The Code of Ordinances of the City of Deer Park establishes zoning regulations and districts in the City, and includes a comprehensive plan. Zoning regulations do not apply to those districts designated as "intensive industrial districts" (areas characterized by uses with offensive noise, smoke, dust, odor, heat or glare), though none of these are located within the watershed. The Zoning Ordinance does address residential and commercial districts. Most of the area immediately surrounding Willow Spring Bayou is zoned single-family residential, though there is also a small general commercial area.

City of La Porte

The City of La Porte encompasses approximately 3,500 acres in the Armand Bayou watershed. Most of the land area directly surrounding Big Island Slough is residential or undeveloped. A portion of the La Porte Municipal Airport is also located within the watershed.

La Porte has a comprehensive plan and also has an eight-category zoning ordinance. Maximum permissible lot coverage under this ordinance ranges from 30% for Heavy Industry to 75% for Townhomes. The Department of Public Works supervises the zoning. Section 22-1 of the municipal code sets forth ordinances governing subdivisions.

In addition, the City of La Porte's Animal and Fowl Ordinance 1065, states that the City of La Porte is designated as a bird sanctuary. Under this ordinance, it is "unlawful to trap, hunt, shoot, or attempt to shoot or molest in any manner any bird or wild fowl." Any violations of this ordinance are investigated by the City of La Porte's Department of Parks and Wildlife.

Harris County

Unincorporated portions of Harris County account for approximately 4,500 acres within the Armand Bayou watershed, including most of the area around Big Island Slough, which contains heavy industry, as well as several small residential and commercial areas in the far western portion of the watershed.

Counties in Texas have no authority to enact land use ordinances. As a result, local land development and usage can only be managed within those portions of the county which are within a municipality's Extraterritorial Jurisdiction (ETJ). The small unincorporated areas in the western portion of the watershed are within Houston's ETJ and fall under the same development requirements that would be necessary within Houston's city limits.

Local Emergency Planning Committees

Local Emergency Planning Committees (LEPC) are in place for each of the communities in the Armand Bayou watershed. The purpose of these committees is to delineate responsibilities and action plans should an emergency occur. In addition, the Bayport Risk Communication Projects (BRCP) has recently been organized. The BRCP is an amalgamation of area LEPC's which includes industry representatives and environmental groups and plays an interagency coordination role.

There are several proposals in development to provide additional spill response capacity at the local level. A private industry group has established a steering committee to develop plans for equipment sharing, funding and coordination for quick response to a spill. Local governments surrounding Galveston Bay have also proposed establishing a four county district which could provide equipment and manpower for spill response, particularly spills in shallow waters. Funding mechanisms for this proposal will likely be presented in the upcoming legislative session.

OTHER LOCAL AGENCIES

Houston-Galveston Area Council

As mentioned previously, the Houston-Galveston Area Council (H-GAC) is a voluntary association of approximately 150 local governments in the 13-county Gulf Coast area. While H-GAC is not a regulatory entity, it does influence the resource management practices of local governments in the Gulf Coast planning region through its environmental planning and outreach activities. H-GAC also represents the interests of its member governments, provides a public forum on issues of regionwide significance, and promotes regional planning and cooperative solutions to shared problems. Under the Texas Review and Comment

System, H-GAC's Project Review Committee and staff have the opportunity to consult on local projects, ranging from wastewater treatment plants to new park development. Finally, H-GAC focuses more closely on a range of regional environmental issues through its various advisory committees and task forces, all of which make recommendations to H-GAC's Natural Resources Advisory Committee.

NON-PROFIT ENTITIES

The Galveston Bay Foundation

The general purpose of the Galveston Bay Foundation (GBF) is to conserve and enhance the Galveston Bay ecosystem. The GBF brings together diverse interests in a forum for the identification and examination of the wide range of issues in the Bay system. Activities of the GBF include education, lobbying, litigation and initiating research about the Galveston Bay ecosystem. It is a goal of the GBF to develop a consensus when possible. The GBF is governed by a Board of Trustees and has a committee network which addresses different topical program areas, such as permit review and oil spill response.

Armand Bayou Nature Center

The Armand Bayou Nature Center (ABNC) is a preserve and education center encompassing approximately 2,100 acres in the Armand Bayou watershed. The land is owned by Harris County and lies within the city limit of Pasadena. Harris County has leased this land to the ABNC for 100 years for the purpose of education and stewardship. The ABNC is a privately funded non-profit organization whose primary responsibilities include education, monitoring, inter-agency coordination, and emergency response assistance.

ABNC education programs are organized for weekday school programs, the general public and travel/study programs. Its monitoring role includes activities related to water quality management and natural resource management. Examples include weekly seining to investigate fish and invertebrate populations and distribution; monthly cross-section bathymetry surveys and daily observations of visible water color changes. Water quality monitoring occurs also. Seasonal changes in the abundance, diversity and distribution of estuarine fauna are assessed from frequent quantitative seining. The ABNC has also been a major point of citizen contact for water quality issues in Armand Bayou, providing referrals on problems to the appropriate regulatory agency.

CHAPTER FOUR PUBLIC HEALTH PROTECTION

CHAPTER OUTLINE

Regulatory Issues

- Contamination of seafood
- Health risks associated with contact recreation

Federal Legislation

- Federal Water Pollution Control Act
- Water Quality Act

Federal Regulatory Agencies

- Environmental Protection Agency
- Coast Guard

State Legislation and Regulations

- Texas Health and Safety Code

State Regulatory Agencies

- Texas Department of Health

Local Regulations

- Local health ordinances

Local Regulatory Agencies

- City of Pasadena

EXISTING AND POTENTIAL ENVIRONMENTAL IMPACTS

Though Armand Bayou is not a major commercial or sport fishing area, its lower reaches may be a potentially valuable habitat for certain commercial and recreational finfishes and shellfishes. Hence, contamination of seafood could be a potential public health concern. There may also be some public health concerns associated with boating and swimming, although Armand Bayou itself is the only watercourse in the study area which is designated for contact recreation.

FEDERAL REGULATORY AGENCIES

U.S. Environmental Protection Agency

EPA is the final review and approval authority over state surface water quality standards. If a state's standards are not consistent with national goals of the Clean Water Act, EPA has the authority to require the standards be adjusted to be consistent.

United States Coast Guard

The Coast Guard is usually the agency of first response for chemical spills and, depending on the size of the spill, is the lead agency for the national emergency response team. The

lead role is shared with the EPA. Clean-up efforts are coordinated with the Corps of Engineers. If a spill may have public health implications then the Center for Disease Control in Atlanta is requested to join the team.

TEXAS REGULATORY AGENCIES

Texas Department of Health

Division of Shellfish Sanitation

The Division of Shellfish Sanitation in the Texas Department of Health monitors fish and shellfish species caught in Texas waters to insure that they are safe for human consumption. TDH also conducts studies to show areas likely to be contaminated by stormwater runoff.

TDH's Epidemiological Division reviews results of testing to determine the public health risk associated with chemical or bacterial contamination of fish or shellfish. Any serious problems discovered by the Divisions of Shellfish Sanitation are reported to the Texas Parks and Wildlife Department which is responsible for enforcement. The Division of Shellfish Sanitation will classify areas as opened or closed to shellfish harvest when human health risk are discovered and mark the area as polluted. The Division of Shellfish Sanitation also permits and regulates shellfish processing plants.

Other

TDH works in concert with local government health agencies in making determinations to close waters to contact recreation if there are potential public health risks.

LOCAL REGULATORY AGENCIES

City of Pasadena

Armand Bayou, the only watercourse within the watershed designated for contact recreation, lies primarily within Pasadena's boundaries. The City, along with the TDH, share responsibility and authority for closing Armand Bayou to contact recreation in the event of health concerns.

CHAPTER FIVE

GAPS, OVERLAPS AND INTERAGENCY COORDINATION

The following gaps, overlaps and opportunities for improved interagency coordination were identified in agency survey responses and through research of legislation, regulations and other reference materials.

POINT SOURCES OF POLLUTION

Gaps

- o Discharge permitting standards are based only on regulated constituent concentrations in the effluent. As a result, the impact of unregulated toxics and other constituents are not addressed through the permitting process. Additionally, there is no consideration of the other potential impacts of increased overall discharge volumes on a tidally influenced aquatic habitat such as Armand Bayou.
- o Lack of a formal environmental policy for the Texas Water Commission (TWC). An agency-wide environmental policy would help to strengthen TWC's expanding role in protecting the State's environment. One objective of such a policy could be to set forth a more comprehensive evaluation of the environmental impacts of wastewater discharges during the permit application process.
- o Lack of a cumulative assessment of the impact of existing and new wastewater discharges in the permit review process. EPA and TWC do not provide other reviewing agencies with data on the cumulative contributions of existing discharges to the watershed.
- o Oil and gas-related discharges are not regulated for all potential toxics. The Texas Railroad Commission (RRC) regulates wastewater discharges associated with oil and gas drilling activity. However, oil and grease are the only pollutants from these discharges which are regulated. Other pollutants with the potential to degrade the Armand Bayou environment, such as Total Suspended Solids and brines, are not regulated by the RRC.

Overlaps and Interagency Coordination

- o EPA and TWC currently overlap in permitting authority for municipal and industrial discharges. Permits are currently required from both agencies, though delegation of permitting authority to the TWC under the National Pollutant Discharge Elimination System (NPDES) is pending. While there is a duplication of effort in dual permitting there is some division of opinion as to whether this overlap is indeed a management problem. There are concerns that eliminating EPA's direct involvement in the process will leave uncertainty as to how determinations to require an Environmental Impact Statement will be made in the permitting process.

- o **Enforcement agencies could benefit from additional coordination.** Federal, state and local authorities all have some level of enforcement authority over point source discharges, however, there is currently no plan or policy to coordinate enforcement efforts by the various agencies involved. While enforcement by multiple autonomous agencies is a necessary part of a system of checks and balances, a coordination system could help to maximize the limited resources available.
- o **There is a lack of coordination between state and local government in planning the development or expansion of wastewater treatment facilities.** Local governments and municipal utility districts plan wastewater treatment facilities to meet their own needs. Environmental management objectives downstream are not necessarily a consideration. As a result state/local interaction in the facility development and expansion is dealt with at the permitting stage, after considerable planning has been conducted by the local government.

Closer coordination in watershed management would make local governments more aware of state management objectives and allow for mutually satisfactory solutions to be reached earlier in the facility planning process. Mitigation strategies may also be less expensive and more effective if developed in early project planning stages.

NONPOINT SOURCES OF POLLUTION

Gaps

- o **There are no federal or state regulations currently in place to manage nonpoint source water pollution from urban runoff.** EPA and TWC currently have the legislative authority to require local governments to implement nonpoint source water pollution management practices, although the regulations are not presently in place. The forthcoming EPA NPDES permit requirements for stormwater discharges, now expected to be issued in October 1990, will essentially require local governments to develop nonpoint source management plans. However, many questions about the permitting process remain, such as municipal vs. watershed-wide permits, local government's financial capability for compliance, EPA's resources for administering and enforcing a new program of this scale.

When promulgated, the TWC's pollution control and abatement program regulations will also require local governments to implement management practices to limit nonpoint source pollution. These rules are presently in the discussion stage and are not likely to be adopted before February or March 1991. Questions also remain about this program's cost to local governments and the resulting administrative and enforcement burden on TWC.

- o **Local governments in the Armand Bayou watershed do not have a regulatory framework in place to manage nonpoint source water pollution.** Future federal and state

requirements notwithstanding, none of the local governments presently have a comprehensive nonpoint source management program in place. Establishment of such programs will require additional regulation of development and construction activities, more aggressive enforcement of illegal disposal of hazardous waste in the stormwater system, costly monitoring and possibly structural controls.

- o **Preventing illegal discharge of pollutants into the storm sewer system is difficult, particularly at the household level.** Each of the cities and Harris County do investigate for illicit discharges. However, resources are limited for preventing non-structural discharges and the disposal of household hazardous waste via the stormwater system. Owing to the increasing expense of disposing of hazardous materials and the concentration of industrial and medical facilities in the region, the potential exists for illegal disposal of toxics which may present public health risks.
- o **There is currently no local regulation of erosion from construction projects.** Though local erosion control plans will be a requirement of the TWC pollution control and abatement program, the regulatory framework is not presently in place at the local government level. There is some debate about the actual contribution of pollutants from construction-related sediments, the cost-effectiveness of requiring such a program and its impacts on the construction industry.

Additionally, much of the watershed lies within unincorporated Harris County, which does not have ordinance-making authority. While erosion controls could be extended to cover the extraterritorial jurisdiction of municipalities, this measure would not be required under the proposed TWC regulations.

- o **Houston, Pasadena and unincorporated Harris County have limited land use controls.** Though these local governments have limited or indirect controls governing impervious surface ratios and noxious land uses, they do not have comprehensive zoning ordinances. As a result, land use is governed by a patchwork of development-related ordinances and private deed restrictions, making it more difficult to formulate strategies to manage development-related nonpoint source pollution.
- o **Design orientation of local storm sewer systems is geared toward flood control, not pollution abatement.** As a result, planned storm drainage projects may contribute to significant degradation of the water quality, but are not presently regulated for their water quality impacts.
- o **Not all activities which cause nonpoint source groundwater contamination are directly regulated.** The TWC and Texas Department of Health (TDH) currently have a voluntary program for the protection of municipal water wells. However, Houston is the only local government in the watershed currently participating. There is a current effort underway by TWC to enlist communities in this program.

- o **Water pollution threats may exist from landfill sites which are already closed.** While today's regulations governing landfill design and post-closure maintenance have extensive provisions for groundwater protection, the watershed does contain some older, closed landfills which may at some point pose a threat to groundwater.

Coordination

- o **EPA NPDES Stormwater Regulations are not clear as to how permitting will be handled in large, multi-jurisdictional urban areas.** Houston and the Harris County Flood Control District (HCFCD) will probably have to file some type of joint permit application. It is not known whether an HCFCD permit application will encompass Pasadena, Deer Park and LaPorte, or whether each city will be required to have its own permit. Permitting on a watershed-wide basis would be the most comprehensive management approach, but would be difficult to implement and administer.

Opportunities

- o **There appear to be opportunities for local land use and development/construction ordinances to be used in NPS management.** Examples include erosion control on construction projects and land use controls aimed at preventing contamination in well recharge zones.

NATURAL AND LIVING RESOURCE MANAGEMENT

Gaps-Wetlands

- o **The Section 404 program only covers dredge and fill disposal projects.** Other alterations to the wetlands environment, such as draining and clearing, are not regulated under the Clean Water Act, but through various other regulations and inter-agency agreements.
- o **Many minor dredge and fill projects are authorized under general or nationwide permits without individual review.** As a result, the cumulative impact of numerous small projects is unknown.
- o **Section 404 permit reviews do not fully evaluate environmental impacts.** Of particular concern is the lack of adequate assessments of the impacts of dredge and fill projects on non-game, non-endangered or threatened species and habitat.
- o **There is no comprehensive inventory or monitoring of the extent of wetlands in the Armand Bayou watershed.** Owing to the level of analysis required, wetlands determinations are made only upon request on a case-by-case basis.

- o **Enforcement of violations of Section 404 has been limited.** It is particularly difficult to monitor and enforce violations on small projects.
- o **Management of small parcels exchanged for filled wetlands is difficult.** Land exchange is an accepted mitigation technique in the permitting process. However, it is difficult and costly to manage numerous small parcels.

Overlaps and Coordination-Wetlands

- o **Final authority in enforcing wetlands legislation is unclear.** Permitting and enforcement of the section 404 program is jointly handled by the Corps of Engineers and the Environmental Protection Agency under a Memorandum of Agreement. However, as written, it appears as though each agency has the authority to overrule the other, based on economic or environmental concerns.
- o **Concerns exist about the effectiveness of multi-agency review process.** Under the Fish and Wildlife Coordination Act, other federal agencies such as the Fish and Wildlife Service review permits for associated environmental impact. However, permits have been issued in spite of concerns expressed by reviewing agencies.

At the state level, TWC and the Texas Parks and Wildlife Department also certify section 404 permits. However, these agencies currently conduct their review outside the context of a state coastal zone management plan.

- o **No formal guidance has been given to regulatory agencies for implementing the President's stated "no-net-loss" policy.** "No-net-loss" of wetlands is a stated national objective, however, there is no formal guidance to the agencies involved with permitting and reviewing as to the interpretation of this policy on a case-by-case basis.

Gaps-Other

- o **There is generally insufficient monitoring of living resources in the watershed.** There are gaps in the monitoring of shellfish or finfish movements and in monitoring non-game and non-endangered or non-threatened species.
- o **There is a general lack of funding for enforcement of natural resource protection regulations.** The Texas General Land Office (GLO), for example, currently has a field staff of 3 to cover the 4.5 million acres of submerged lands under its jurisdiction.
- o **Wildlife and habitat protection regulations generally only cover endangered, game or commercially valuable species.** The habitat value of Armand Bayou is not known and the watershed does not contain any major fisheries. Nonetheless, the living resources are

important to many residents in the surrounding area. Aside from the Coastal Preserves Program, there are limited tools to ensure against alterations of Armand Bayou.

- o **Nursery habitat provisions cover only coastal zone management program.** This is one of two coastal states which does not currently participate in the federal coastal zone management program. As a result, agencies such as the TWC and Texas Parks and Wildlife Department (TPWD) review and certify Section 404 permits outside the context of an overall plan.

The Texas General Land Office (GLO) is currently developing a Coastal Management Plan along with TPWD and other agencies. However, no funds for this plan have been appropriated by the Texas Legislature.

Overlaps and Coordination-General

- o **Coordination of programs often suffers from differing orientations of participating agencies.** At the federal level, the Corps of Engineers has a development orientation, whereas the EPA and FWS are conservation-oriented. At the state level, the GLO has a revenue-generating orientation which may not always be consistent with the conservation objectives of the TPWD. Additional coordination and development of consensus environmental objectives would make administration of regulations more effective, particularly in cases of joint administration and multi-agency reviews of permits.

PUBLIC HEALTH

Gaps

- o **Closure criteria for shellfish beds (oysters) are based on general weather patterns and not on monitored water quality or other individual case evaluations.** Closures are based on a set number of consecutive days of rainfall over a certain amount for the entire state. Variations of different waterbodies are not taken into account.

APPENDIX

APPENDIX A	Legislation and Regulations
APPENDIX B	Agency Survey Form
APPENDIX C	Survey Respondents
APPENDIX D	Galveston Bay National Esutary Program
APPENDIX E	Agency Directory

APPENDIX

FEDERAL LEGISLATION

Clean Air Act, U.S. Code, vol. 42, secs. 7402, 7521 (1970).

Comprehensive Environmental Response, Compensation and Liability Act, U.S. Code, vol. 42, secs. 9601-9675 (1980).

Endangered Species Act, U.S. Code, vol. 16, sec. 1531 et seq. (1974).

Emergency Wetlands Resources Act, U.S. Code, vol. 16, sec. 3901 (1986).

Federal Emergency Management Act, 44 CFR Parts 9, 9.1-9.18, 44 CFR 10.

Federal Insecticide, Fungicide, and Rodenticide Act, U.S. Code, vol. 7, sec. 136 et seq. (1947)

Federal Water Pollution Control Act, U.S. Code, vol. 33, secs. 106, 205, 319, 402, 405, 1251- 1376 (1972).

Fish and Wildlife Coordination Act, U. S. Code, vol. 16, secs. 661-667 (1974).

Hazardous and Solid Waste Amendments of 1984, Pub. L. 98-616.

Marine Plastic Pollution Research and Control Act, Pub.L. 100-200 (1987).

Migratory Bird Hunting and Conservation Stamp Act, Pub.L. 99-645, (1986).

National Environmental Policy Act, U.S. Code vol. 42, secs. 4321-4361 (1969).

National Flood Insurance Act, U.S. Code, vol. 42, secs. 4001-4128 (1968).

Resource Conservation and Recovery Act, U.S. Code, vol. 42, secs. 6901-6987 (1976).

Rivers and Harbors Appropriation Act, Pub.L. 87-830 (1899).

Safe Drinking Water Act, U.S. Code, vol. 42, secs. 300 et seq. (1976).

Toxic Substances Control Act, U.S. Code, vol. 15, secs. 2601 et seq. (1976).

Water Quality Act, Pub.L. 100-4, sec. 319 (1987).

FEDERAL RULES AND REGULATIONS

National Categorical Standards (40 CFR Part 403)

EXECUTIVE ORDERS

U.S. Presidential (Carter) Executive Order 11990, Protection of Wetlands, May 24, 1977.

U.S. Presidential (Carter) Executive Order 11988, Floodplain Management, May 24, 1977.

STATE LEGISLATION AND REGULATIONS

Texas. Clean Air Act. Health and Safety Code, secs. 382.001 et seq.

Texas. Coastal Coordination Act. Natural Resources Code, secs. 33.201-33.204.

Texas. Coastal Public Lands Management Act. Natural Resources Code, secs. 33.001-33.176, (1973).

Texas. Farm Bill. Agriculture Code, sec. 201.001.

Texas. Hazardous Substances Spill Contingency Plan (1988).

Texas. Health and Safety Code secs. 382.001-382.115, 382.016, 382.037, 382.051, 382.054, 382.081-382.091

Texas. Natural Resources Code, chs. 81, 91, and 191.

Texas. Oil and Hazardous Substances Spill Prevention and Control Act. Water Code, sec. 26.262)

Texas. Senate Bill 1519. Task Force on Waste Management Policy (1989).

Texas. State Flood Control and Insurance Act. Water Code, (1969).

Texas. Water Code secs. 16.311-16.319, 16.058, 26.001 (5), 26.007, 28.011, 16.058

LOCAL ORDINANCES

City of Houston Building Code, sec 19-1 (b)(4), 19-16, ch. 42

City of Houston Municipal Code, ch. 31, Oil and Gas Wells

City of Houston Municipal Code, Health and Human Services Department section 21-146

Pasadena Code of Ordinances ch. 13 1/2 Flood Control & Drainage, Article II

Pasadena Municipal Code, ch. 9, sec. 117.7, 9-176, 9-193,

APPENDIX B
Agency Survey Form

ARMAND BAYOU REGULATORY SURVEY

Please complete and return this survey to H-GAC in the attached envelope by **March 30, 1990**. If additional space is required on any question, please use the back of this form.

AGENCY/ORGANIZATION _____ PHONE (____) _____
PREPARED BY _____ DATE _____
TITLE _____
ADDRESS _____

I. REGULATORY AUTHORITY

For which of the following does your agency have regulatory authority?

- | | |
|---|---|
| <input type="checkbox"/> Municipal/Industrial Discharge | <input type="checkbox"/> Fresh water inflows |
| <input type="checkbox"/> Dredging | <input type="checkbox"/> Instream water Quality |
| <input type="checkbox"/> Oil & gas related activity | <input type="checkbox"/> Marine debris |
| <input type="checkbox"/> Nonpoint source, please specify: | |
| <input type="checkbox"/> Stormwater run-off | <input type="checkbox"/> Wetlands |
| <input type="checkbox"/> Erosion | <input type="checkbox"/> Bay bottom |
| <input type="checkbox"/> Agricultural and | <input type="checkbox"/> Sea grasses |
| construction related erosion | <input type="checkbox"/> Oyster reefs |
| <input type="checkbox"/> Septic tanks | |
| Other _____ | <input type="checkbox"/> Fisheries |
| <input type="checkbox"/> Hazardous wastes | <input type="checkbox"/> Oysters |
| <input type="checkbox"/> Solid waste | <input type="checkbox"/> Shrimp |
| | <input type="checkbox"/> Water fowl |
| <input type="checkbox"/> Land subsidence | <input type="checkbox"/> Crabs |
| <input type="checkbox"/> Sedimentation | <input type="checkbox"/> Endangered Species |
| <input type="checkbox"/> Shoreline erosion | |
| <input type="checkbox"/> Coastal land use | <input type="checkbox"/> Ship channel |
| <input type="checkbox"/> Contact recreation | <input type="checkbox"/> Pipeline crossings |
| <input type="checkbox"/> Floodplain | <input type="checkbox"/> Air quality |
| | <input type="checkbox"/> Other |

II. ORGANIZATIONAL ROLE(S)

Please identify your agency/organization's area(s) of responsibility regarding environmental management of Armand Bayou.

[Please check specific area]

FUNCTIONAL/ TOPIC AREA

	<u>WATER QUALITY</u>	<u>PUBLIC HEALTH</u>	<u>RESOURCE MANAGEMENT</u>	<u>OTHER</u>
Regulatory (permitting authority)	_____	_____	_____	_____
Enforcement	_____	_____	_____	_____
Standard-setting or policy-making	_____	_____	_____	_____
Monitoring	_____	_____	_____	_____
Emergency response	_____	_____	_____	_____
Other	_____	_____	_____	_____

For each of the functional areas you checked, please describe in more detail by answering the following questions. Attach another sheet if more than three activities are indicated.

A. Briefly describe these activities. What is the purpose and goal of the activity? What programs is your organization responsible for?

B. What law/regulation governs or mandates this activity? For example, NEPA, city ordinance, state bill.

C. Please list any other agencies/organizations that administer related programs?

D. Are your activities coordinated with these other agencies? Please describe how this coordination occurs.

E. Do activities overlap, or complement one another? Are there gaps? Are there opportunities for enhancing the management framework?

III. REGULATORY STANDARDS

A. What standards are regulated by your agency? (For example, for local governments: land use/development regulations, water conservation, recycling)

B. Are you aware of additional pollutants or pollutant sources which are not regulated? Please specify and explain.

C. Are the roles of agencies responsible for regulating pollutants into Armand Bayou clear and distinct? Are there gaps, overlaps? What steps should be implemented to improve the framework within which regulatory activities occur?

D. What specific measures/ordinances have been enacted by your agency/entity that are intended to prevent/reduce pollution inputs to Armand Bayou? Please describe these measures.

E. What is your process for developing/revising public health/water quality standards? How frequently are standards updated? (Is there a relationship between medical/biological research, environmental problem, monitoring activities and regulatory standard development?)

IV. ENFORCEMENT ACTIVITIES

A. What tools does your agency have to effectively conduct enforcement activities? What additional tools could enhance your agency's capabilities? (For example, for local governments: code enforcement, zoning, etc.)

B. Are the roles of the agencies responsible for enforcing pollutants into Armand Bayou clear and distinct? Are there gaps, overlaps? What opportunities exist to improve the framework within which enforcement activities occur?

V. MONITORING ACTIVITIES

A. Does your agency/entity monitor the following? Please check if yes.

- ☐ Municipal wastewater discharge
- ☐ Industrial wastewater discharge
- ☐ Oil and gas development/production activities
- ☐ Marine environmental resources; please list type:

- ☐ Physical properties of the Bayou or Bay (such as circulation bathymetry) Please list type:

- ☐ Non-point source pollutants; please list type:

- ☐ Hazardous wastes
- ☐ Solid wastes
- ☐ Health effects
- ☐ Dredge disposal
- ☐ Endangered species
- ☐ Other, specify _____

B. Which of the following best describes the type of monitoring performed by your organization in Armand Bayou:

- ☐ Long-term measurement of a particular pollutant or pollution source
- ☐ Compliance monitoring with respect to discharge criteria
- ☐ Evaluation of environmental trends

Please describe these activities in more detail.

C. To whom are your monitoring results reported? How often?

D. Do you make this information available to the public? How?

E. Are there gaps or overlaps in monitoring activities? Are there opportunities for enhancing existing programs? If so, what are they?

VI. EMERGENCY INCIDENT RESPONSE

(Toxic spills, oil spills, accidents causing waste discharge violations)

A. In what type of incident/situation does your agency respond?

B. What is your agency's role in emergency incident response? Please describe.

C. What surveillance and enforcement steps occur after spills and discharge violations?

D. What are the interagency arrangements for dealing with emergency incidents?

Please provide any additional comments or recommendations that you may have.

**Please return the completed questionnaire to H-GAC in the attached envelope
by March 30, 1990 .**

**If you have any questions/comments please call
Lansingh Freeman, Environmental Planner, H-GAC at (713) 993-4563.**

Thank You For Your Efforts!

APPENDIX C

Survey Respondents

Federal Agencies

Federal Emergency Management Agency, Denton, Texas. Jim LeGrote, Insurance and Mitigation Division, Region VI, (Armand Bayou and Christmas Bay).

National Marine Fisheries Service, Habitat Conservation District, Galveston, Texas. Don Moore, Area Supervisor.

U.S. Army Corps of Engineers, Galveston District, Galveston, Texas. Marcus De LaRosa, Chief, Regulatory Branch.

U.S. Department of Agriculture, Soil Conservation Service, Angleton, Texas. John Campbell, District Conservationist (Christmas Bay).

U.S. Department of Agriculture, Soil Conservation Service, Houston, Texas. David Myers, District Conservationist (Armand Bayou).

U.S. Environmental Protection Agency, Water Quality Branch, Dallas, Texas. Ken Teague.

U.S. Fish & Wildlife Service, Division of Ecological Service, Houston, Texas. David Hankla.

U.S. Geological Survey, Houston, Texas. Fred Liscum.

State Agencies

Railroad Commission of Texas, Austin, Texas. Oil & Gas Division, Windle Taylor.

Texas Air Control Board, Austin, Texas. Bill Ehret .

Texas Department of Agriculture, Austin, Texas. Lea Aurelius.

Texas Department of Health, Austin, Texas. Water Hygiene Division, James E. Pope.

Texas Department of Health, Austin, Texas. T.A. Outlaw, Chief, Bureau of Solid Waste Management.

Texas Department of Health, Shellfish Sanitation Control Division, Austin, Texas. Richard Thompson, Director.

Texas Department of Highways & Public Transportation, Houston, Texas. Hans Chris Olavson, District Planning Administrator.

Texas Department of Public Safety, Division of Emergency Management, Austin, Texas. David Haun, Energy Management Resources Officer.

Texas General Land Office, Austin, Texas. C. Bruce Smith, Administrator, Technical Programs.

Texas Parks & Wildlife Department, Austin, Texas. Environmental Assessment Branch, Resource Protection Division, Rollin MacRae.

Texas State Soil & Water Conservation Board, Temple, Texas. James Moore, P.E., Engineer.

Texas Water Commission, Water Quality Division, Austin, Texas. Dan Beckett, Chief, Water Quality Standards & Evaluation Section.

Texas Water Development Board, Austin, Texas. Susan Schwartz, General Counsel.

Local Agencies

Armand Bayou Nature Center, Inc., Houston, Texas. Jim Larrabee, Executive Director.

Bayfield Public Utility District, Webster, Texas. Thomas A. Haydon, President.

B.W. Payne, President, Harris County MUD #67

City of Deer Park, Deer Park, Texas. Ray Jones, Director of Public Works.

City of Houston, Environmental Pollution Control, Houston, Texas. Terry Fisher.

City of Houston Public Works Department, Houston, Texas. Charles F. Settle, P.E., Manager, Planning & Program Division.

City of Houston Public Works Department, Houston, Texas. Mark Kosmoski, P.E., Assistant to the Director of Administration.

City of La Porte, La Porte, Texas. E. Matuszak, Councilman; Joel Albrecht, Director of Community Development.

City of Pasadena, Pasadena, Texas. Jimmie Coker, Director of Public Works.

Clear Lake Water Authority, Houston, Texas. David Plaisance, Director of Utilities.

Galveston Bay Foundation, League City, Texas. Linda Shead, Executive Director; Jim Blackburn, Legal Counsel.

Gulf Coast Waste Disposal Authority, Houston, Texas. Joe P. Teller, Manager of Special Projects & Technical Services.

Gulfway Utility District, Houston, Texas.

Harris County Flood Control District, Houston, Texas. Jim Green, Special Projects Director.

Harris County Health Department, Houston, Texas. John Williams, Director, Environmental Health Division.

Harris County Pollution Control, Pasadena, Texas. Allison Pierce, Director.

Harris-Galveston Coastal Subsidence District, Friendswood, Texas. Jim DeBerry, Assistant General Manager.

Taylor Lake Village, Seabrook, Texas. Alice Riley, City Secretary.

Terry A. Anderson, Harris County Engineer, Houston, Texas.

APPENDIX D

Galveston Bay National Estuary Program

(excerpted from the GBNEP Member Directory)

The Galveston Bay National Estuary Program (GBNEP) is a management conference composed of six committees and a Program Office. This organizational structure is shown on page 78. The committee members were appointed under the authority of Governor William P. Clements, Jr., and Robert Layton, Administrator, EPA Region VI, to represent the broadest possible spectrum of interested Galveston Bay users. One committee, the Galveston Bay Public Forum, is open to anyone with a desire to join. Numerous subcommittees have also been appointed for specific tasks, and these may also include individuals who are not conference members.

The function of the GBNEP is to create a Comprehensive Conservation and Management Plan (CCMP) for Galveston Bay by September 1994. This is part of a larger national EPA National Estuary Program to improve conditions in the nation's significant estuaries. Accomplishing this task will involve numerous environmental and economic factors, and an integration of the diverse agency jurisdictions now applying to Galveston Bay. Detailed plans for this work are outlined in the EPA-State Management Conference Agreement (Publication GBNEP-1, available from the Program Office).

The GBNEP is administered by the Program Manager and staff, who are Texas Water Commission employees hired with the approval of the Policy Committee.

Program ManagerDr. Frank S. Shipley
Public Participation Director.....Kevin Hamby
Research Administrator Russell Kiesling

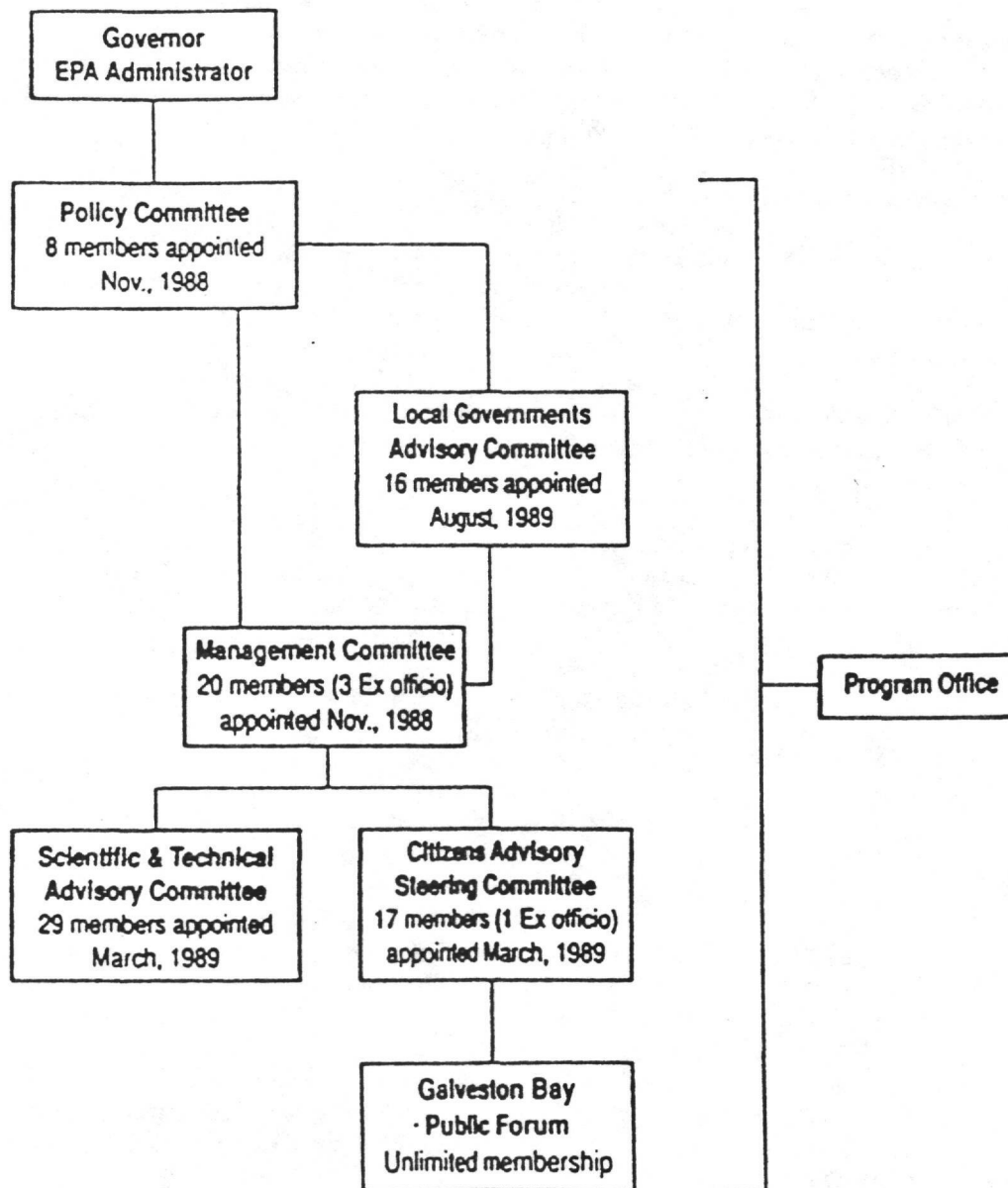
Galveston Bay National Estuary Program
University of Houston at Clear Lake
2700 Bay Area Boulevard
Box 164
Houston, Texas 77058
713/488-9495

The following officials of the U.S. Environmental Protection Agency are involved with the GBNEP at the regional and national levels:

Kenneth Teague
U.S. Environmental Protection Agency
Region VI
Technical Section
Water Quality Mgmt. Branch
1445 Ross Avenue
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214/655-7145

Lore Hantske
Technical Support Division
Office of Marine and Estuarine Protection - T
U.S. Environmental Protection Agency (WH556-F)
401 M Street, SW
Washington, DC 20460
202/475-7111

Galveston Bay National Estuary Program Management Conference Structure



GBNEP Policy Committee

The Honorable J. E. (Buster) Brown
Texas State Senate
PO Box 888
Lake Jackson, TX 77566
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District Engineer
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Area Supervisor
National Oceanic and Atmospheric
Administration
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Mr. Don Reynolds
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Dickinson, TX 77539
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Mr. Jack Steele
Executive Director
Houston-Galveston Area Council
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Mr. Dan Vaughan
McLeod, Apffel, Alexander and Powell
Attorneys at Law
PO Box 629
Galveston, TX 77553
409/488-7150

Mr. Gary Westmoreland
Assistant Conservationist
Soil Conservation Service
U.S. Department of Agriculture
101 South Main
Temple, TX 76501
817/774-1360

Ex Officio, Non-Voting Members:

The Honorable Ray Holbrook
County Judge
Galveston County
722 Moody
Galveston, TX 77550
409/766-2244
(Chairman, Local Governments Advisory
Committee)

Dr. Sammy M. Ray
Professor
Marine Biology Department
Texas A&M University at Galveston
PO Box 1675
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409/740-4526
(Chairman, Scientific/Technical Advisory
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Ms. Sharon Stewart
Texas Environmental Coalition
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(Chairwoman, Citizens Advisory Steering
Committee)

APPENDIX E

Agency Directory

Federal Agencies

Federal Emergency Management Agency
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National Marine Fisheries Service
Habitat Conservation Division
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Galveston, TX 77550
409/766-3699

U.S. Army Corps of Engineers
Regulatory Branch
Galveston District
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Galveston, TX 77553-1229
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Soil Conservation Service
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Houston, TX 77084
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U.S. Environmental Protection Agency
Water Quality Branch
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Dallas, TX 75202
214/655-7145

U.S. Fish and Wildlife Service
Division of Ecological Service
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Houston, TX 77058
713/750-1700

U.S. Geological Survey
2320 LaBranch, Room 1112
Houston, TX 77004
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State Agencies

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Austin, TX 78723
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Agricultural Resources Protection
Stephen F. Austin Building, 9th Floor
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Shellfish Sanitation Control Division
1100 West 49th Street
Austin, TX 78756
512/458-7510

Texas Department of Health
Solid Waste Management Division
1100 West 49th Street
Austin, TX 78756
512/458-7271

Texas Department of Health
Water Hygiene Division
1100 West 49th Street
Austin, TX 78756
512/458-7533

**Texas Department of Highways and Public
Transportation**
PO Box 1386
Houston, TX 77251
713/869-4571

Texas Department of Public Safety
Division of Emergency Management
PO Box 4087
512/465-2138

Texas General Land Office
Stephen F. Austin Building, 8th Floor
Austin, TX 78711
512/463-5055

Texas Parks & Wildlife Department
Environmental Assessment Branch
Resource Protection Division
4200 Smith School Road
Austin, TX 78744
512/389-4639

**Texas State Soil & Water Conservation
Board**
PO Box 658
Temple, TX 76503-0658
817/773-2250

Texas Water Commission
Water Quality Standards and Evaluation
Section
Water Quality Division
PO Box 13087, Capitol Station
Austin, TX 78711-3087
512/463-8412

Texas Water Development Board
PO Box 13231, Capitol Station
Austin, TX 78711-3231
512/463-7981

Local Agencies

Armand Bayou Nature Center
8600 Bay Area Boulevard
PO Box 58828
Houston, TX 77258
713/474-2551

Bayfield Public Utility District
430 El Toro
Webster, TX 77598

City of Deer Park
Department of Public Works
PO Box 700
Deer Park, TX 77536
713/479-2394

City of Houston
Environmental Pollution Control
7411 Park Place Boulevard
Houston, TX 77087
713/640-4266

City of Houston
Public Works Department
PO Box 1562
Houston, TX 77251
713/247-2507

City of Pasadena
Department of Public Works
PO Box 672
Pasadena, TX 77501
713/477-1511

City of Taylor Lake Village
1202 Kirby Road
Seabrook, TX 77586
713/474-2843

Clear Lake Water Authority
900 Bay Area Boulevard
Houston, TX 77058
713/488-1164

Galveston Bay Foundation
3027 Marina Bay Drive #110
League City, TX 77573
713/524-0240

Gulf Coast Waste Disposal Authority
Special Projects and Technical Services
910 Bay Area Boulevard
Houston, TX 77058
713/488-4115