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**Shoreline Management Demonstration Project  
for  
Galveston Bay**

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Prepared for  
Galveston Bay National Estuary Program  
by  
Houston-Galveston Area Council

January 2000

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## Executive Summary

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This project was funded through a grant from the U.S. Environmental Protection Agency (EPA) under a contract between the Galveston Bay Estuary Program (GBEP), Texas Natural Resource Conservation Commission (TNRCC) and the Houston-Galveston Area Council. The purpose of this project was to identify shoreline management issues, evaluate the existing management structure, and to develop tools and resources to help improve shoreline management. The project study area is within the City of Dickinson, along Dickinson Bayou, in an area bounded by IH-45 on the west, FM 517 on the north, SH 3 on the east, and Hughes Road on the south. This area was chosen due to its manageable size and because the issues of this area are representative of those facing other Galveston Bay communities.

### Shoreline Management Issues (pages 5-6)

High priority shoreline management issues for the study area were identified from *The Galveston Bay Plan* and *The State of the Bay* proceedings as well as discussions with federal and state natural resource agency and City of Dickinson staff, and a meeting with the City of Dickinson City Council. These issues fall generally into the following categories:

<i>Shoreline loss</i>	erosion, subsidence, sea level rise, damage from storm events, boat wakes
<i>Habitat loss/degradation</i>	loss of wetlands, removal of vegetation or other habitat, introduced species, point and nonpoint source water pollution
<i>Public Use and Safety</i>	shoreline almost entirely privately owned, limited public access, removal of storm debris, hazardous structures, flood hazards
<i>Management Challenges</i>	dispersed management authority, limited resources for in-depth evaluation and enforcement, public resistance to additional regulations and taxes, limited financial assistance resources

### Baseline Data of Shoreline Development in the Study Area (pages 7-9)

Existing Shoreline Conditions. Approximately 53% of the linear footage of Dickinson Bayou shoreline within the study area has some type of erosion control structure. The predominant bulkhead construction material is wood, though there are rock and concrete structures in place.

Existing Land Use. Existing land is composition in the 766-acre study area is shown as follows:

- Single-Family (42%)
- Mobile Home (2%)
- Multi-Family (1%)
- Commercial (4%)
- Public (1%)
- Park (2%)
- Institutional (8%)
- Residential Vacant (10%)
- Vacant (2%)
- Undeveloped (28%)

There are only two public access points to Dickinson Bayou within the study area: Paul Hopkins Park and the boat ramp at SH 3.

### Future Shoreline Development Potential (page 10)

The potential for development of undeveloped, vacant, and residential vacant is determined by the physical characteristics of the land including road access, size of the lot, surrounding development, and water access. It is assumed that of the vacant and undeveloped land in the study area, 64% has "high" potential for future development, 32% has "medium" development potential, and 4% has "low" development potential.

### Shoreline Management Methods (pages 12-21)

#### *Regulatory Methods*

The majority of shoreline management issues that arise from regulated activities fall into the following categories: shoreline construction; dredge/fill or other alterations of wetlands; land development and construction; wastewater discharges; groundwater extraction; oil and gas extraction; and, watercraft operation.

### ***Shoreline structures***

Activities that involve the construction of structures, such as bulkheads or piers are regulated through U.S. Army Corps of Engineers (Corps) "Section 10" permits. If the activity involves the discharge of dredged materials, a Corps "Section 404" permit is also required. A permit and lease contract with the Texas General Land Office (GLO) may also be necessary if the structure is to be built over state-owned submerged lands. The City of Dickinson may also require shoreline structures if they are deemed necessary for flood protection. Galveston County approval is required for county-maintained drainage conveyances.

### ***Dredge/Fill and Other Wetlands Alterations***

Activities involving dredge/fill or other alterations to wetlands require a Corps Section 404 permit. This permitting process involves interagency review by multiple federal and state natural resource management agencies.

### ***Land Development and Building Construction***

The City of Dickinson regulates development through its subdivision and planning and development ordinances and building code. These ordinances do not directly address shoreline management, as there is no shoreline zone. However, the City does regulate minimum lot size and for commercial developments, sets maximum building coverage limits and requires setbacks and landscaping. Dickinson also controls development in flood hazard areas, including any alterations to flood plains and natural drainage channels. Dickinson does not have a zoning ordinance and does not directly regulate the location of land use.

EPA stormwater discharge permits are required for construction projects that will disturb five or more acres of land and for industrial and certain commercial land uses.

### ***Wastewater Discharges***

The Texas Natural Resource Conservation Commission (TNRCC) regulates wastewater discharges. Currently, there are eight discharge permits within the Dickinson Bayou watershed and none within the study area.

### ***Groundwater Extraction***

The TNRCC regulates groundwater extraction. Dickinson is required to draw 90% of its water supply from surface water. The Harris-Galveston Coastal Subsidence District also limits groundwater extraction to prevent further subsidence.

### ***Oil and Gas Extraction***

Oil and gas extraction, as well as underground oil and gas pipelines, are regulated by the Railroad Commission of Texas (RRC).

### ***Watercraft Operation***

The U.S. Coast Guard regulates watercraft operation. The City of Dickinson also has a waterways ordinance governing watercraft operations, though enforcement is limited. The Galveston County Sheriff Marine Division enforces provisions of this ordinance.

These regulatory methods are limited in that they tend to be reactive and focused on individual activities rather than more comprehensive shoreline management planning. Responsibility for permitting and enforcement is dispersed among multiple agencies. Short timetables for permit processing and agency staff/resource limitations also limit the depth of review performed. Enforcement is often difficult, due to resource limitations.

There appears to be significant potential for expanding the regulatory role of local governments in shoreline management. Cities have broad authority to regulate development and land use, and can individually tailor their regulations to further community goals and objectives. A Model Shoreline Development Ordinance was developed as part of this project to provide a resource for cities interested in strengthening their shoreline management capabilities.

### ***Non-Regulatory Methods***

Acquisition of shoreline land is an effective non-regulatory form of shoreline management, providing public access and management oversight. However, acquisition is expensive, particularly in already developed areas. Acquisition by non-profits or other management arrangements, such as conservation easements, is another method that may be employed to complement public land acquisition.

There are a variety of grant and technical assistance programs available for forms of shoreline management, although these resources are somewhat limited and have restrictions on the use of funds that may limit their utility. Public awareness and education programs are also effective tools in building public support for regulatory or financial management methods, or to influence individual behavior where no regulatory structure exists.

### ***Interagency Coordination***

The GBEP provides a framework for interagency coordination and information sharing. There are also several institutionalized examples of interagency coordination in the review of Section 10 and Section 404 permits, and projects subject to the review of the Coastal Coordination Council. However, coordination is limited by the fact that the authority for permitting and enforcement is still divided among multiple agencies, each with their own legislative mandates.

### ***Recommendations for Improving Shoreline Management***

- Promote the incorporation of shoreline management into local comprehensive plans and establish a forum for local government coordination of shoreline management planning.
- Encourage local government adoption of shoreline protection measures in their development ordinances, using the model ordinance developed through this project.
- Develop a program to educate local government staff on effective shoreline management techniques and federal and state permit requirements, and encourage them to share this information with property owners and developers.
- Encourage land acquisition projects that provide multiple benefits in the areas of shoreline protection, habitat preservation, flood control and recreation; explore possibilities of multi-jurisdictional financing of such projects.
- Support the efforts on non-profit organizations involved in shoreline land acquisition.
- Continue strategically pursuing available grant funds for shoreline management and habitat demonstration projects and publicize results.
- Continue broad-based public education and awareness efforts on shoreline management issues and programs.
- Develop educational materials aimed at private property owners and developers on shoreline management and habitat preservation techniques.

### **Model Shoreline Ordinance (pages 22-41)**

Working with the Houston-Galveston Area Council and using the resource materials developed through this project, environmental attorneys with the Law Firm of Fulbright and Jaworski, L.L.P., prepared a model Shoreline Protection Ordinance that can be employed by cities.

The model ordinance provides for enhanced management within a shoreline protection zone (250' from the shoreline), private property, and public safety through design standards, construction standards, and a permitting process that requires permits for construction, clearing, grading, stripping, excavating, and filling. The 250 foot buffer zone for shoreline protection is consistent with other shoreline management ordinances across the nation.

### **Directory of Shoreline Management Resources (pages 42-58)**

In the course of the research, a significant array of resources were assembled. These are briefly summarized in a bibliography. A list of web sites is also given. These materials have been made available to GBEP for distribution to local governments.

## **Introduction**

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The Houston-Galveston Area Council (H-GAC) is submitting this report to the Galveston Bay Estuary Program (GBEP) in partial fulfillment of deliverables required under Texas Natural Conservation Commission (TNRCC) Contract 7200000018. This report was reviewed during a regular meeting of the Dickinson City Council on December 13, 1999.

### **Purpose and Scope**

The purpose of this project was to identify shoreline management issues, evaluate the existing management structure, and to develop tools and resources to help implement recommendations for Shoreline Management contained in the *Galveston Bay Plan*.

The Dickinson Bayou watershed is representative of the entire bay area and has been used for a number of other GBEP studies and demonstration projects. The 766-acre project study area is in the City of Dickinson, along Dickinson Bayou, in an area bounded by IH-45 on the west, FM 517 on the north, SH 3 on the east, and Hughes Road on the south. The City of Dickinson provided information about the bayou and surrounding land and worked with H-GAC to uncover the management issues and challenges posed by the study area. The issues associated with the study area are representative of those faced by other Galveston Bay communities, which allows the findings of this study to benefit both the City of Dickinson and other Bay communities.

This report contains the following elements:

- Executive Summary
- Shoreline Management Issues
- Baseline Data on Shoreline Development in the Study Area
- Future Shoreline Development Potential
- Shoreline Management Methods
- Model Shoreline Development Ordinance
- Directory of Shoreline Management Resources

## **Shoreline Management Issues**

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High priority shoreline management issues were identified from *The Galveston Bay Plan* (Publication GBNEP-49) and *The State of the Bay: A Characterization of the Galveston Bay Ecosystem* (Publication GBNEP-44). This issues list was further expanded through interviews with staff from federal and state natural resource management agencies and the City of Dickinson, and meetings with the Dickinson City Council. A list of these issues is presented below.

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<b>Shoreline Loss</b>	Erosion Adverse impacts of structures built on/in/over publicly-owned land and water: Bulkheads, revetments, dikes, docks, piers, pipelines, barges, oil/gas structures, abandoned structures Adverse impacts associated with particular shoreline uses: Marinas, recreational cabins, houseboats, canal-access subdivisions Land surface subsidence from groundwater, natural resource extraction Damage from hurricanes, tropical storms, flooding Adverse impacts of recreation Boat and jet ski wakes Long-term sea level rise Loss of sediment due to erosion control structures
<b>Habitat Loss/Degradation</b>	Wetlands degradation and loss Loss of bank vegetation Loss of submerged aquatic vegetation beds Shoreline water/sediment quality problems Impacts on recreation, shellfish harvesting, aesthetics Navigational dredging and disposal of dredged material Exotic/introduced species Nutria, grass carp, fire ants, Chinese tallow trees Reduced fresh water inflow (plus diminished sediments and nutrients) Cumulative impact of population growth and associated shoreline land development Wastewater discharges, polluted stormwater runoff Failing/inadequate septic tanks and on-site sewage disposal facilities Illegal dumping (on land and into waterways and storm drains) Oil spills and releases of hazardous materials
<b>Public Use and Safety</b>	Shoreline access Much of the shoreline is privately owned, limited access to publicly-owned shoreline Limited public open space Impacts of development (degraded aesthetics, views) Inappropriate siting of particular land uses and/or conflicts with other uses. Shoreline hazards Storm debris, derelict structures Flood hazards Litter and debris Impacts of recreation (noise, boating safety, property damage)

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<b>Management Challenges</b>	<p>Avoiding/minimizing/mitigating development impacts effectively</p> <p>Dispersed management authority            Not comprehensive, inadequate coordination</p> <p>Public resistance to greater regulation, additional taxes, more government involvement in local land use regulation</p> <p>Inadequate funding/support for direct technical assistance to landowners</p> <p>Need for additional resources to support a larger local government management role</p> <p>Limited county authority in unincorporated areas</p> <p>Inadequate notice of proposed development for effective review and comment/resistance on part of developers to further delaying development review process</p> <p>Inadequate support for recreational activities            Parks, boat ramps, piers, trails</p> <p>Inadequate information on shoreline access and facility needs (and potential adverse impacts from increased public use)</p> <p>Inadequate coordination in planning for and providing shoreline access and recreational facilities</p> <p>Inadequate public awareness of shoreline issues</p> <p>Inadequate staff/resources to monitor development impacts and track management results</p> <p>Difficulty of securing new funds or diverting existing public funds (plus cost of maintaining existing public lands and facilities)</p>
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## **Baseline Data on Shoreline Development in the Demonstration Area**

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The baseline data collection effort focused on land uses in the area bounded by IH-45 on the west, FM 517 on the north, SH 3 on the east, and Hughes Road on the south. Additionally, because a number of the priority issues identified dealt with the shoreline itself, rather than surrounding uses, an additional visual survey of existing shoreline conditions was conducted. The results of the land use inventory and shoreline conditions survey are presented in Map 1 on the following page. This map also shows a 250-foot zone on either side of Dickinson Bayou. *This delineation was added for illustrative purposes only as an example of an area that would be subject to the provisions of the Model Shoreline Development Ordinance, presented later in this report.*

### ***Existing Shoreline Conditions***

H-GAC and GBEP conducted a visual survey of shoreline conditions by videotaping the entire shoreline within the study area. The purpose of this survey was to determine the extent to which the shoreline had been reinforced by erosion control structures and to note other shoreline management issues.

Erosion control structures, or bulkheads, were generally divided into the following categories.

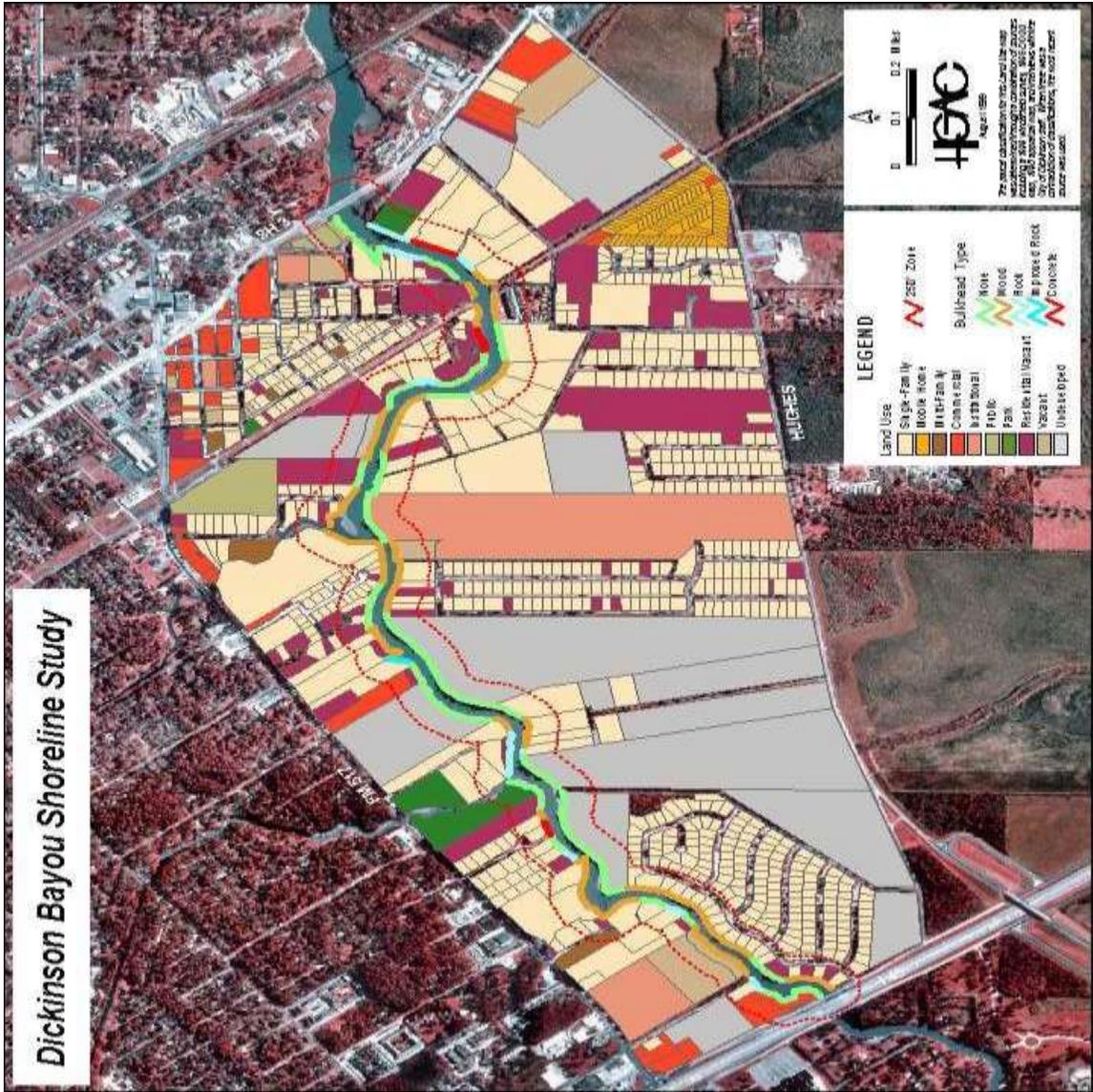
- Wood: bulkheads constructed entirely of wood.
- Rock: bulkheads constructed of loose rock.
- Improved rock: bulkheads constructed of rock that is either attached to the bank or substantially stacked.
- Concrete: bulkheads constructed of concrete bags linked together by PVC pipe.

Shoreline conditions on the videotape were compared to known reference points and digitized into a Geographic Information System (GIS). The GIS was used to estimate the linear shoreline footage (north and south sides combined) as 7,828 feet. Bulkhead information, taken from the video survey, was then entered into the GIS shoreline database. From this database estimations of the total linear footage of the various types of bulkhead were calculated. The following table shows the number of land parcels and estimated linear footage of each type of bulkhead in the study area.

Bulkheads Type	Total		Percentage	
	Parcels	Linear Footage	Parcels	Linear Footage
None	38	3,670	34%	47%
Wood	55	3,012	49%	38%
Rock	14	816	13%	10%
Concrete	4	262	4%	3%
Improved Rock	1	69	1%	1%

### ***Existing Land Use***

Existing land use information for the study area was collected under the protocols established in the Quality Assurance Project Plan (QAPP). Three sources of data were used for this survey: Digital Orthophotography Quarter-Quadrangles (DOQQ); 1999 parcel and land use data, obtained in digital form from the Galveston County Appraisal District (GCAD); a windshield survey of the study area conducted in July 1999, and interviews with the City of Dickinson staff. In the cases of inconsistencies between these information sources, the final determination of land use was made from the visual survey and/or the interviews. Existing land uses were then categorized into one of the following categories commonly used for city planning purposes: single-family residential; mobile home; multi-family; commercial; public; and, park (there was no industrial land identified within the study area). For the purposes of this inventory, residential vacant land is land platted for residential use and is currently unoccupied. Vacant land is defined as land that is cleared but currently has no use. Undeveloped land is defined as still largely vegetated with no major apparent alterations.



The following table shows the amount of acreage and parcels of each land use category.

<i>Land Use</i> <b>Category</b>	Totals		Percentage	
	Acreage	Parcels	Acreage	Parcels
Commercial	30	46	4%	5%
Single-Family	325	704	42%	70%
Multi-Family	5	8	1%	1%
Mobile Home	13	95	2%	9%
Park	12	4	2%	<1%
Public	10	5	1%	<1%
Institutional	61	4	8%	<1%
Residential Vacant	75	108	10%	11%
Vacant	19	12	2%	1%
Undeveloped	217	16	28%	2%

Single-family residential is the predominant land use category in the study area, both in terms of acreage (42%) and number of parcels (70%). Single-family residences are probably lower in the intensity of their environmental impacts than industrial or commercial land uses. However, residential development does impact shoreline habitat by runoff from lawns and residential streets, alterations to natural habitat, and introduction of non-indigenous species. Additionally, the fact that most of the developed land with direct shoreline frontage is designated single-family means that both the financial burden of and the responsibility for maintaining bulkheads falls to the private land owner. Institutional land uses, which include schools, churches, and public facilities are the next largest category of developed land in the study area in terms of acreage. The amount of study area land in other categories is relatively small.

Undeveloped land accounts for 28% of the acreage of the study area. Much of this land is contained in several large tracts. There is also a significant amount of vacant land platted for residential uses. These lots may be platted in neighborhoods or as large individual tracts. While there is limited vacant land available, the large parcels of undeveloped land along the bayou may be considered for public uses and conservation easements.

There are a limited number of parks in the study area and only two direct public access points on Dickinson Bayou--Paul Hopkins Park and the boat ramp facility at State Highway 3.

#### ***Data Sources***

For other communities wishing to conduct a similar assessment of land uses in a shoreline area, the data sources employed in this study should be available. The DOQQ imagery can be obtained from the Texas Natural Resource Information System (TNRIS) by calling (512) 463-8337, from the Houston-Galveston Area Council (H-GAC) by calling (713) 627-3200, or from private vendors. Digital land use data and parcel boundaries are available from the Galveston County Central Appraisal District (Harris County Appraisal District also has land use data available, but there are some restrictions on its use). The analysis of digital data was conducted using the ESRI ArcView Geographic Information System software. Windshield surveys can be conducted using the generalized land use categories employed in this assessment of baseline conditions.

The Bureau of Economic Geology has data available from studies it has performed tracking shoreline erosion. The General Land Office has prepared a natural resource inventory for Galveston Bay, compiled from various data sources, available in both printed and digital format. Satellite imagery that can be interpreted to delineate general land use and land cover can be obtained from private vendors. FEMA's Flood Insurance Rate Maps are also available in paper and digital format.

## Future Shoreline Development Potential

Assumptions regarding future development potential were made for the 312 acres of land within the study area that is currently vacant or undeveloped. Interviews were conducted with City of Dickinson staff to identify known future projects or development proposals, as well as to ascertain obstacles to developing certain land parcels. Based on these interviews and an assessment of existing land use patterns in the study area, the following set of "decision rules" were developed for grouping vacant or undeveloped parcels into one of three categories of future development potential.

### *Low Development Potential*

- No road access,
- Extremely small parcels, and/or
- Known barriers to development

### *Medium Development Potential*

- Neighborhood streets or other roadway access, or
- Adjacent to existing commercial land use or other development

### *High Development Potential*

- Major highway access (IH-45 or SH-3) and Adjacent Land Development; or
- Waterfront and roadway access; or
- Major roadway access (FM 517, Pine, Main, and Hughes), adjacent commercial development, and large parcel.
- Existing development proposal or permit in progress

A decision was made not to include a map in this report identifying the assumptions for individual parcels because of possible implications to the property owners. The following table shows the amount of acres and parcels of the three land uses divided into the Low, Medium, and High categories.

### Development Potential of Undeveloped, Vacant and Residential Vacant Land Uses

	Undeveloped		Vacant		Residential Vacant		Totals		% of Total Acreage
	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	
<b>Low</b>	1.12	1	1.80	3	10.57	30	13.49	34	4%
<b>Medium</b>	51.90	5	7.27	5	39.34	45	98.51	55	32%
<b>High</b>	164.28	10	10.08	4	25.88	33	200.24	47	64%
<b>Totals</b>	217.30	16	19.15	12	75.79	108	312.24	136	
<b>% of Total</b>	70%	12%	6%	9%	24%	79%			

### *Conclusions*

Almost all the undeveloped land in the study area appears to have high (64%) or medium (32%) potential for future development. Since the City of Dickinson does not have zoning, it is difficult to project precise locations of specific and uses, but it is assumed that future development will generally follow existing land use patterns.

## Shoreline Development Checklist

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Activity	Permits Currently Required for 1999
Shoreline Structure Bulkheads Seawalls Jetties Groins Piers Docks Navigational dredging Placement of dredged materials	<p>Corps of Engineers Section 10 permit required if in tidally influenced area (Section 404 permit required if discharge of dredged materials involved).</p> <p>Texas General Land Office (GLO) Permit/Lease (if over state-owned submerged lands).</p> <p>City of Dickinson can require these structures if deemed necessary for flood protection.</p> <p>Galveston County Engineering/Drainage District approval required for structures in tributaries to Dickinson Bayou and County-maintained drainage conveyances.</p>
Dredge/fill or other alteration of a wetlands	<p><i>Corps of Engineers</i> Section 404 permit and 401 certification.</p> <p><i>GLO</i> approval required if in a state-owned wetlands.</p>
Land development and construction	<p><i>City of Dickinson</i> Subdivision Plat, Development Permit and/or Building Permit. A permit is also required for land clearance or landscaping activities that involve alteration to a flood plain or stream channel.</p> <p><i>Galveston County Engineering</i> approval is required for project drainage plans.</p> <p><i>Water Control Improvement District #1</i> approval is required for water distribution/wastewater collection plans.</p> <p><i>Corps</i> Section 404 permit if in a wetlands and Section 401 certification.</p> <p><i>General Land Office</i> permit/lease required if over state-owned submerged lands.</p> <p><i>Environmental Protection Agency</i> NPDES permit if construction will disturb 5+ acres of land and for regulated industrial and commercial land uses. (New permits and those being renewed will now be handled by the TNRCC.)</p>
Wastewater discharges	<p>Texas Natural Resource Conservation Commission (TNRCC) TPDES wastewater discharge permit.</p>
Groundwater Extraction	<p>TNRCC permit required.</p> <p>City of Dickinson water supply must be derived from 90% surface water sources under requirements of the Harris-Galveston Coastal Subsidence District.</p>
Oil and Gas Extraction	<p>Texas Railroad Commission (RRC) permit</p>
Watercraft Operation	<p>Subject to rules of the Coast Guard, State Water Safety Code, City of Dickinson Waterways Code. Enforced by the Coast Guard, Texas Parks and Wildlife Department (TPWD), Galveston County Sheriff's Marine Division.</p>

## Shoreline Management Methods--Agency Roles

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### Federal Agencies

#### Army Corps of Engineers

<http://www.wetlands.com/regs/tpige00a.htm>

<http://www.usace.army.mil/inet/functions/cw/cecwo/reg/rhsec10.htm>

<http://www.usace.army.mil/inet/functions/cw/cecwo/reg/sec404.htm>

#### Regulatory Programs

##### Section 10 and Section 404 Permits

The U.S. Army Corps of Engineers (Corps) administers permitting programs established by Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

Section 10 permits are required in waters subject to the ebb and flow of tide, up to the mean high water mark, for the following activities

- Bulkheads
- Seawalls
- Jetties
- Groins
- Piers
- Docks
- Navigational dredging
- Placement of dredged materials

Section 404 requires a permit for the disposal of dredged materials into “waters of the U.S.” or for excavation and dredge/fill activities in wetlands. If an activity is subject to both laws, a joint “Section 10/404” permit process is employed. If negative impacts to the wetlands are deemed unavoidable, a permit applicant must mitigate habitat losses through the creation of new wetland habitat at a 2:1 or 1.5:1 ratio. This is now often accomplished through “mitigation banking.”

Section 10 and Section 404 permits require an Environmental Assessment or possibly an Environmental Impact Statement, prepared by the Corps for review and approval by the U.S. Environmental Protection Agency (EPA), under the National Environmental Policy Act (NEPA). The Corps and EPA are jointly responsible for enforcing violations, which are subject to fines, civil and criminal penalties.

The Texas Natural Resource Conservation Commission (TNRCC) must also issue a water quality certification for these permits under Section 401 of the CWA. Additionally, the following agencies also review and comment on the permits: U.S. Fish and Wildlife Service (FWS); National Marine Fisheries Service (NMFS), the Texas Parks and Wildlife Department (TPWD) and the Texas General Land Office.

Many of the types of shoreline structural projects in the study area and along Galveston Bay are covered under “general permits” for projects of similar nature that will create minimal individual and/or cumulative environmental impacts. General permits apply to many smaller structures such as bulkheads, piers and decks for individual residential properties. More substantial improvements, such as bulkhead of 500 or more feet in length, require a full permit review.

### ***Non-Regulatory Programs***

The Corps is responsible for major navigation and drainage projects throughout the Galveston Bay system. These projects are subject to extensive environmental review, as well as an assessment of their economic benefits, though the Corps' primary mission is construction and maintenance, not environmental management.

### **Environmental Protection**

#### **Agency**

EPA Hotline:  
1-800-832-7828

#### **Website:**

<http://www.epa.gov>

### ***Regulatory Programs***

#### Wastewater Discharge Permits

Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES) permitting program for wastewater discharges. In 1998, EPA delegated authority for the issuance of new wastewater discharge permits to the TNRCC. The EPA and TNRCC jointly enforce these permits through administrative order, fines, and civil and criminal penalties.

There are currently eight discharge permits in Dickinson Bayou watershed, but none within the project study area.

#### Stormwater Discharge Permits

EPA also has responsibility for issuing NPDES permits for stormwater discharges (though this responsibility will eventually be delegated to the TNRCC). NPDES stormwater permits are required for any land development/construction activity that will disturb five (5) or more acres of land to ensure that proper methods for controlling polluted runoff are in place. Industrial and certain commercial land uses are also subject to NPDES permit requirements for controlling polluted runoff. Agricultural uses, aside from concentrated animal feeding operations, are not subject to NPDES requirements.

Local governments with storm drainage conveyances also are subject to the stormwater permit requirements. Large governmental jurisdictions fell under Phase I of this program and those permits are already in place. The City of Dickinson and a number of other Galveston Bay area communities will be required to have permits under Phase II of this program by January 31, 2003.

### ***Non-regulatory programs.***

EPA provides grants to support projects for environmental education, reducing nonpoint source pollution, promoting sustainable development, and implementing recommendations of Comprehensive Conservation Management Plans for Estuaries of National Significance.

### **Fish and Wildlife Service**

<http://www.fws.gov>  
<http://www.southwest.fws.gov>

### ***Regulatory Programs***

The U.S. Fish and Wildlife Service (FWS) is responsible for wildlife law enforcement, including the federal Endangered Species Act. The FWS also reviews and comments on Section 10/404 permit applications under the Clean Water Act and other projects requiring federal permits or funding.

**National Marine Fisheries Service**  
Southwest Region, Long Beach, CA

Web Site:  
<http://www.nmfs.gov>

**Natural Resources Conservation Service**  
Web Site:  
<http://www.nrcs.usda.gov>

**Coast Guard**  
Web Site:  
<http://www.uscg.mil>

**Federal Emergency Management Agency**  
Regional Main Line:  
940-898-5399  
  
<http://www.fema.gov>

## **State Agencies**

**Texas Natural Resource Conservation Commission**  
  
Web Site:  
<http://www.tnrcc.state.tx.us>

### ***Non-Regulatory Programs***

The FWS is responsible for management of federal wildlife refuges management, habit enhancement and research programs. It also is responsible for a variety of public education programs, including publications, visitor centers, nature trails and recreational activities.

### ***Regulatory Programs***

The National Marine Fisheries Service (NMFS) is responsible for ensuring compliance with federal laws involving species and habitat protection for marine wildlife. The NMFS reviews and comments on Section 10/404 permits applications and other projects requiring federal permits or funding with respect to their potential impact on marine wildlife habitat.

### ***Non-Regulatory Programs***

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), formerly known as the U.S. Soil Conservation Service, provides technical assistance for conservation projects, water quality and other natural resource management efforts. It also provides technical and financial assistance through its Resource Conservation and Development (RC&D) program.

### ***Regulatory Programs***

The Coast Guard is responsible for enforcing maritime laws in coastal areas.

### ***Regulatory Programs***

The Federal Emergency Management Agency (FEMA) is responsible for establishing standards for construction in flood prone areas. Communities must comply with these provisions to be eligible to participate in the National Flood Insurance Program (NFIP). Local government compliance with the NFIP is monitored by the TNRCC.

### ***Non-Regulatory Programs***

FEMA is responsible for issuing disaster relief funds to state and local governments. It also conducts a number of disaster mitigation programs, which include grants to state and local governments for mitigation planning and implementation. FEMA also produces a variety of publications and maintains a web site with educational information on mitigating the impacts of natural disasters.

### ***Regulatory Programs***

#### **Texas Pollutant Discharge Elimination System (TPDES)**

With EPA delegation, the TNRCC is responsible for the issuance of NPDES wastewater discharge permits. The TNRCC is also responsible for monitoring and enforcement against violation at treatment facilities

The TNRCC has begun phasing the expiration of permits by major watersheds so that there can be more consideration of the cumulative impacts of wastewater discharges. The TNRCC is also in the process of

establishing “Total Maximum Daily Load” (TMDL) requirements for waterways that do not meet standards for their designated uses. These TMDL’s will be used in fashioning permit requirements.

#### Federal Clean Water Act, Section 401

Section 401 of the Federal Clean Water Act (CWA) requires the state of Texas to certify that a proposed CWA Section 404 permit will not violate water quality standards. The TNRCC makes these certifications for all projects except those related to the exploration, development and production of oil, gas, or geothermal resources, which are certified by the Railroad Commission of Texas.

#### National Flood Insurance Program

The TNRCC also coordinates the National Flood Insurance Program (NFIP) for the Federal Emergency Management Agency (FEMA), which requires local governments to meet FEMA standards for the regulation of new construction and improvements in flood prone areas.

#### ***Non-regulatory Programs***

The TNRCC administers several EPA grant programs to combat nonpoint source pollution and to promote regional water quality planning. Also, under the Texas Clean Rivers Program, the TNRCC helps coordinate and fund water quality monitoring programs, tailored to address the individual issues of the state’s major river basin.

The Galveston Bay Estuary Program (GBEP) is also administered by the TNRCC. GBEP is responsible for coordinating the implementation of the recommendations of the *Galveston Bay Plan*, through grant funding, coordination, and project review.

#### **Texas General Land Office**

Web Site:

<http://www.glo.state.tx.us>

#### ***Regulatory Programs***

##### Coastal Public Land Management

Under the Texas Coastal Public Lands Management Act of 1973, GLO approval is required for any proposed project that will impact state-owned submerged lands, defined as those below the mean high water line in an area of tidal influence. This includes the erection of a dock, pier or any other structure and/or the discharge of dredged or fill material into any state-owned wetlands.

The GLO will inspect the site of a proposed project and evaluate its impact on the submerged land. If approved, the GLO will draw up a contract to issue a lease or easement. The GLO also determines if the proposed project is consistent with the Texas Coastal Management Program

##### Open Beaches Act and Dune Protection

The GLO is responsible for enforcing the Texas Open Beaches Act, which requires free public access to coastal beaches, and the Texas Dune Protection Act, which grants coastal counties the authority to develop dune protection lines. Both of these laws apply to the Gulf Coast and are not a factor in shoreline management within the study area.

##### Texas Coastal Management Program

GLO is responsible for ensuring that projects requiring federal, state or local permits or funding are consistent with the Texas Coastal

Management Program (CMP). GLO staffs a multi-agency Coastal Coordination Council (CCC), which reviews the projects and determines their consistency with the CMP. Projects above a certain threshold size may be referred to the CCC for review. Three member agencies must request this review by the CCC.

#### Oil Spill Prevention and Response

The GLO is responsible for oil spill prevention and response. Under the authority of the Oil Spill Prevention and Response Act, the GLO requires vessels, offshore and onshore facilities to maintain oil spill prevention and contingency plans. The GLO also administers a fund from taxes and penalties to provide for oil spill response.

#### *Non-Regulatory Programs*

The GLO is the lead agency responsible for the Texas Coastal Management Program and the Coastal Wetlands Conservation Plan. The GLO receives funding under the federal Coastal Zone Management Act to provide grants for a variety of coastal management projects. Under the Texas Coastal Erosion Planning and Response Act, passed in 1999, state grant funds will also be available from GLO for shoreline erosion control projects.

On behalf of the CCC, the GLO also offers technical assistance and educational materials on the various coastal permitting processes and appropriate management of state-owned submerged lands. GLO has also taken an active role in promoting wetlands conservation planning.

#### **Texas Parks and Wildlife Department**

Web Site:  
<http://www.tpwd.state.tx.us>

#### *Regulatory and Enforcement Programs*

The TPWD is responsible for enforcing Texas State laws protecting fish and wildlife. The TPWD also reviews and comments on projects requiring Section 10/404 permits, evaluating their potential impact on wildlife habitat. Recreational boating on inland waters is also regulated by the TPWD.

#### *Non-Regulatory Programs*

TPWD manages state parks and wildlife refuges, and also provides grant funding to local governments for parks, boat ramps and other recreational facilities.

#### **Railroad Commission of Texas**

Web Site:  
<http://www.rrc.state.tx.us>

#### *Regulatory Programs*

The Railroad Commission of Texas (RRC) issues permits for drilling and discharge of drilling waste in Texas waters and inland oil and gas exploration and development activities.

**Local Agencies  
(specific to the study  
area)**

**City of Dickinson**

Main Line:  
(281) 337-2489

***Regulatory Programs***

Development Regulations

The City of Dickinson regulates land development and construction within its boundaries under its *Subdivision Ordinance, Planning and Development Code, and Building Code*.

Subdivisions. Property owners who intend to subdivide their land for future development must receive City approval for their subdivision “plat.” The City’s subdivision ordinance sets requirements for minimum lot size and building setback, street plans and dimensions, and the provision of utilities and drainage.

Planning and Development. Dickinson does not have a zoning ordinance dictating the location of specific land uses. However, the City’s *Planning and Development Code* sets forth standards for certain types of development. Multi-family structures have building size and setback requirements. Commercial development is subject to a more extensive set of requirements that must be approved in the site development plan. These requirements include provisions for buffers, landscaping, parking and maximum lot coverage by commercial buildings (40%).

This ordinance also includes requirements that the applicant document compliance with federal standards for stormwater runoff, flooding/drainage, and local requirements for water and wastewater. City staff also checks to see if the necessary Section 10/404 permits have been obtained.

The ordinance discourages the development of flood prone properties where it would cause peril to life and property. New construction or substantial improvements in the floodway are prohibited. The flood control section of the code also requires the use of bulkheads, seawalls and pilings where deemed necessary to prevent the weakening and destruction of structures and other improvements. While not specifically a shoreline management tool, the flood hazard provisions in the code restricts development and alterations to floodplains, streams and channels.

Building Code. While the building code is not specifically a shoreline management tool, in order to obtain a building permit, an applicant must demonstrate compliance with subdivision and planning and development requirements.

Other Ordinances

The City also has a Waterways Ordinance that prohibits the creation of damaging boat wakes. This ordinance is enforced by the Galveston County Sheriff’s Marine Division.

**Galveston County**  
Galveston County  
Engineering Department  
(409) 770-5552

***Regulatory Programs***

Drainage Requirements

The Galveston County Engineering Department oversees Galveston County Drainage Districts #1 and #2. These drainage districts have jurisdiction over tributaries and drainage channels into Dickinson Bayou (the Corps has jurisdiction within the main channel). The County Engineers Office reviews development plans with respect to their management of stormwater runoff. Permits must also be obtained from the drainage district and the Corps for dredging or structural activities in Dickinson Bayou tributaries.

**Harris-Galveston Coastal  
Subsidence District**

Main Line:  
(281) 486-1105

***Regulatory Programs***

Groundwater Extraction

The Harris-Galveston Coastal Subsidence District (HGCSA) regulates groundwater extraction in Harris and Galveston Counties to limit further land subsidence. Within the study area, groundwater may only account for 10% of the water supply. The HGCSA estimates that Dickinson currently utilizes 90-95% surface water and most new development is expected to receive water from surface sources.

**Water Control  
Improvement District #1**

Main Line:  
(281) 337-1576

***Regulatory Programs***

Water and Wastewater Services

Galveston County Water Control Improvement District (WCID) #1 provides water and wastewater service for Dickinson Bayou. Subdivisions and other developments must obtain approval from WCID #1 for their water distribution and wastewater collection system plans.

***Regulatory Management Methods***

Of the regulatory management methods currently in place, the Corps' Section 10/404 permit program and the GLO's management program for state-owned submerged lands exert the most direct control over development and construction along the shoreline. The City of Dickinson's code of ordinances also has some limited shoreline management applications, such as minimum lot size, maximum allowable building lot coverage for commercial buildings, and restrictions on development in flood-prone areas. The City can also require the use of bulkheads, seawalls, or other erosion control structures when deemed necessary. Dickinson's water safety code also prohibits the creation of "hazardous wakes or washes" from boats and other waterborne recreational vehicles--a potential cause of shoreline erosion. The Galveston County Sheriff's Marine Division enforces these provisions. The Harris-Galveston Coastal Subsidence District limits groundwater extraction to prevent further coastal subsidence. Galveston County reviews the drainage plans of development projects and issues permits for any structural modifications to tributaries and drainage channels leading into Dickinson Bayou.

EPA's NPDES stormwater permit requirements for local governments may represent another, if more indirect, shoreline management tool. These permits are currently required of "large" local governments. In the Galveston Bay area, a joint permit was required of Harris County, the Harris County Flood Control District, the City of Houston, and the Texas Department of Transportation. The City of Dickinson will be required to have an NPDES permit by 2003, as will the following other local governments surrounding Galveston Bay: Bayou Vista, Baytown, Deer Park, Friendswood, Galena Park, Galveston, Hitchcock, La Marque, La Porte, Morgan's Point, Nassau Bay, Seabrook, Shoreacres, Texas City, Webster, Brazoria and Galveston Counties. To satisfy NPDES stormwater permit requirements, local governments may employ "best management practices" (BMP's) for preventing nonpoint source pollution in shoreline areas. These BMP's can also provide erosion control and habitat conservation benefits. Individual stormwater discharge permit requirements for projects involving the

disturbance of large parcels (5+ acres) of land may also provide another opportunity for providing shoreline erosion control.

Regulatory management methods provide a basis for review of proposed activities by agencies and the public and are enforceable. However, regulatory approaches also have several limitations. Permitting programs tend to be reactive and generally focused on individual activities rather than on more comprehensive shoreline management planning. Short timetables for permit processing and agency staff/resource limitations do not allow for the as thorough an evaluation of environmental impacts as may be desirable. Federal and state regulations, while providing some flexibility and discretion by the administrative agency, are necessarily broad and may not always represent the best approach to specific local situations. Finally, while there are significant administrative, civil, and criminal penalties for violations, enforcement is often difficult due to resource limitations.

There appears to be significant potential for expanding the regulatory role of local governments in shoreline management. Cities have broad authority to regulate development and land use, and can individually tailor their regulations to further community goals and objectives. A Model Shoreline Development Ordinance is presented later in this report to provide a resource for cities interested in strengthening their shoreline management capabilities. Adoption of these types of controls could also help cities comply with federal flood insurance and stormwater runoff regulations. However, as with state and federal agencies, local governments typically have limited staff and resources available for processing, reviewing and enforcing regulations. There is also a considerable resistance on the part of property owners and the general public to the imposition of additional government controls on private property and new taxes. A local shoreline development ordinance would also not be a viable management tool in unincorporated areas outside of the extraterritorial jurisdiction of cities, since Texas counties do not have general ordinance-making authority.

#### ***Non-Regulatory Methods***

The most effective form of non-regulatory shoreline management is direct land acquisition by government agencies. Public ownership provides the benefit of long-term management oversight and public access to the shoreline resources. The most common basis for land acquisition by a public agency is for parks, wildlife preserves or for flood control purposes. The main limitation of land acquisition as a shoreline management tool is its expense, particularly in already developed areas, and the lack of resources available to public agencies. Public land acquisition may also raise objections from property owners.

Land may also be acquired by non-profit organizations, which can then either manage the property or deed it to a public agency. There are also several methods of "less than fee simple" land acquisition that can provide protection for shoreline habitat resources. One such tool that has been employed in the study area is a "conservation easement." The conservation easement is granted by the property owner, restricting its use and allowing access by a wildlife management entity to ensure its habitat values are maintained. In the Galveston Bay Area, the non-profit Legacy Land Trust is actively promoting the use of this tool. The one conservation easement granted along Dickinson Bayou was one of the first in this region, though the Legacy Land Trust is negotiating several other major projects elsewhere in the Galveston Bay System. The main benefits of this approach are that it can be employed at no public cost and can provide a tax benefit to the property owner. Its limitations are that the property is still private and does not provide any public access benefits, and the tax advantages vary depending on the financial situation of the property owner.

A number of federal and state grant programs are available to support shoreline management activities. Federal funds for coastal zone management and coastal resource improvement are administered by the GLO, under the guidance of the Coastal Coordination Council (CCC), in the form of a grant program. Grants are awarded on a competitive basis for coastal erosion, wetland protection, water supply, water quality, dune protection, and shoreline access projects. The CCC has awarded approximately \$6 million in grant funds under the Texas Coastal Management Program (CMP) thus far, and expects to have \$1.8 million available in its next grant cycle. However, these funds are for use along the entire Texas Gulf Coast, meaning that resources available for Galveston Bay and the study area specifically may be limited in any given year. There are also restrictions on the use of these funds for "hard" erosion control structures, such as bulkheads, and a prohibition on projects that result in an improvement to private property. These restrictions would limit the utility of this program in the study area.

There are a number of additional federal grant programs that could be used to enhance shoreline management capabilities. These include EPA's grant to support National Estuary Program implementation activities, environmental education, nonpoint source pollution prevention, water quality planning, and sustainable development. Other potential sources include the USFWS coastal ecosystem program and the USDA resource conservation grant and technical assistance programs. The GBEP is actively involved in working with various public, private and non-profit stakeholders in the management of Galveston Bay to pursue these sources of funding to implement recommendations of the *Galveston Bay Plan*. The TPWD also has a grant program to support the development of local parks and recreation facilities.

In 1999, the Texas Legislature passed the Coastal Erosion Planning and Response Act (CEPRA), to provide a state funding source to address coastal erosion problems. This fund will be supported through an increase in the hotel/motel tax in Texas' 18 coastal counties. Through this tax and other funding sources, it is estimated that \$7.5 million per year will be made available for coastal erosion projects. The rules for this grant program are still under development. However, it is anticipated that, like the CMP funds, it will emphasize "soft" rather than "hard" erosion control measures and will have limitations on uses that improve private property.

Public awareness and education programs are also key non-regulatory shoreline management tools. The non-profit Galveston Bay Foundation has a broad program that includes education materials and programs, public awareness events, and providing information to key decision-makers on issues affecting the bay system. The GBEP also conducts and provides "pass-through" funding for various public information programs. These have included several educational outreach efforts on the values of wetlands conducted by the Texas Marine Extension Service in the Dickinson study area. The GLO has produced a variety of technical assistance materials and programs, offering guidance for businesses on the various coastal permitting processes and a handbook for local governments for coastal wetlands conservation planning.

Public awareness and education programs are essential for creating public support for regulatory tools and public expenditures. They can also impact private behavior in areas where there is no regulatory framework. Of course, educational and public awareness management approaches are not enforceable and can also require significant resources. To be effective, such campaigns generally require continuity and extensive follow-up.

#### *Interagency Coordination*

The GBEP provides a framework for interagency coordination and information sharing. The Galveston Bay Council has a broad base of public and private stakeholders involved in all aspects of bay management. The Council's Natural Resources Uses Subcommittee includes key staff from the various agencies involved in shoreline management. There is also multi-agency coordination on the Section 10/404 permit review process, including participation by the EPA, FWS, NMFS, GLO, TNRCC, and TPWD. The Galveston Bay Foundation, a non-profit organization whose goal is to preserve and enhance Galveston Bay, also participates in permit review.

A Beneficial Uses Group, involving multiple agencies was established to develop a plan for creating new wildlife habitat from the dredged material from the deepening/widening of the Houston Ship Channel. The *Galveston Bay Plan* calls for a permanent Interagency Coordinating Committee (ICC) to be established, modeled on this group to provide planning and oversight for the beneficial use of dredged materials throughout the Galveston Bay system.

Multi-agency permit review is also conducted through the Texas Coastal Management Program (CMP) by the Coastal Coordination Council (CCC), which includes representatives from the following state agencies: GLO; RRC; TPWD; TNRCC; the State Soil and Water Conservation Board; the Texas Transportation Commission; and, the Texas Water Development Board. Actions that require a federal license or permit, are a direct federal activity, or are federally funded are subject to the CMP. A proposed action may be referred to the council for review by any three CCC members.

The TNRCC is currently embarking on a process to develop Total Maximum Daily Loads (TMDL) for water bodies that do not meet water quality standards for their designated uses. The TMDL process will include the development of watershed management plans by broad public/private stakeholder groups.

Within the study area, the City of Dickinson staff coordinates with Galveston County on drainage aspects of permit review. WCID #1 approval is also required for water distribution and wastewater collection systems. Dickinson requires stormwater runoff calculations on certain projects, and that these be within standards set by FEMA and acceptable by the Corps. City staff also informs applicants if other Corps permits are required for the project. The Dickinson City Council has approved a contract with WCID #1, effectively making the WCID #1 General Manager the City Administrator. This transition took effect October 1, 1999.

In summary, while there is a relatively high level of interagency coordination, both in terms of information sharing and, in some cases, on formal permit review, the framework for shoreline management is fragmented among multiple federal, state and local agencies, each with their own legislative mandates and budget constraints. Financial assistance programs also often have restrictions on the use of funding imposed by their enabling legislation, in some cases limiting their viability. This is particularly true of programs that cannot be used to fund improvements to private property, which constitutes the majority of the shoreline in the Dickinson study area. While there is coordination between the city and county, and to some extent between the city and federal and state agencies, there is not currently a framework for local governments to coordinate their own shoreline management activities. Cities are restricted to planning within their own corporate boundaries and extraterritorial jurisdictions and, absent any state requirements for coordinated multi-jurisdictional planning, any such efforts would be purely voluntary. Smaller city governments also often have limited staff resources to devote to coordination efforts.

Based on this assessment, the following recommendations are offered:

- Promote the incorporation of shoreline management into local comprehensive plans and establish a forum for local government coordination of shoreline management planning.
- Encourage local government adoption of shoreline protection measures in their development ordinances, using the model ordinance developed through this project.
- Develop a program to educate local government staff on effective shoreline management techniques and federal and state permit requirements, and encourage them to share this information with property owners and developers.
- Encourage land acquisition projects that provide multiple benefits in the areas of shoreline protection, habitat preservation, flood control and recreation; explore possibilities of multi-jurisdictional financing of such projects.
- Support the efforts on non-profit organizations involved in shoreline land acquisition.
- Continue strategically pursuing available grant funds for shoreline management and habitat demonstration projects and publicize results.
- Continue broad-based public education and awareness efforts on shoreline management issues and programs.
- Develop educational materials aimed at private property owners and developers on shoreline management and habitat preservation techniques.

## **Model shoreline Protection Ordinance**

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Prepared by Edward C. Lewis of Fulbright & Jaworski L.L.P, November 29, 1999.

## **MODEL SHORELINE PROTECTION ORDINANCE**

**Prepared by**  
**Mr. Edward C. Lewis**  
**of**  
**Fulbright & Jaworski L.L.P.**

**For The Houston-Galveston Area Council**

This model ordinance is an excerpt from the *Shorline Management Demonstration Project for Galveston Bay* that was funded through a grant from the U.S. Environmental Protection Agency under a contract between the Galveston Bay Estuary Program, Texas Natural Resource Conservation Commission, and the Houston Galveston Area Council.

## Draft Shoreline Protection Ordinance

### 1.0 Purpose, Scope and Authority

#### 1.1\_ Purpose

The purpose of this ordinance is to safeguard persons, protect property, prevent damage to the environment, and promote the public welfare, specifically as they relate to shoreline areas. The City of [ ] specifically recognizes the economic, aesthetic, recreational, and environmental value of shoreline areas and the need to protect shoreline areas.

#### 1.2 Scope

This ordinance applies to all private and public land within the City's corporate limits and extraterritorial jurisdiction that lies within the Shoreline Protection Zone, as that term is defined in section 2.0 of this chapter.

### 2.0 Definitions

The following words and terms, when used in these regulations, shall have the meanings specified in this section, unless the context clearly indicates otherwise.

*Agricultural activities* means pasturing of livestock or use of land for planting, growing, cultivating, and harvesting crops for human or animal consumption.

*Applicant* means any person applying to the City for a permit under this Chapter.

*Building permit* is a permit issued by the City for the construction, erection, or alteration of a structure or building.

*City* means the City of [municipality].

*Clearing* means any activity that removes existing trees, shrubs, and/or vegetative ground cover.

*Construction* means causing or carrying out any building, bulkheading, filling, clearing, excavation, or substantial improvement to land or the size of any structure. "Building" includes, but is not limited to, all related site work and placement of construction materials on the site. "Filling" includes, but is not limited to, disposal of dredged materials. "Excavation" includes, but is not limited to, removal or alteration of dunes and dune vegetation and scraping, grading, or dredging a site. "Substantial improvements to land or the size of any structure" include, but are not limited to, creation of vehicular or pedestrian trails, landscape work that adversely affects dunes or dune vegetation, and increasing the size of any structure.

*Degradation* means any modifications, alterations, or effects on waters, associated wetlands, surface area, species composition, or usefulness for human or natural uses which are or may potentially be harmful or injurious to human health, welfare, safety, property, biological productivity, diversity, or stability or which unreasonably interfere with the reasonable use of property, including outdoor recreation. Degradation shall also include secondary or cumulative impacts.

*Eroding area* means a portion of the shoreline which is experiencing an historical erosion rate of greater than two (2) feet per year based on published data of the University of Texas at Austin, Bureau of Economic Geology, or if such data is not available from the Bureau of Economic Geology, based on any reliable method of measurement as determined by the City.

*Erosion* means the wearing away of land or the removal of beach and/or dune sediments by wave action, tidal currents, wave currents, drainage, or wind. Erosion includes, but is not limited to, horizontal recession and scour and can be induced or aggravated by human activities.

*Erosion response structure* means a hard or rigid structure built for shoreline stabilization which includes, but is not limited to, a jetty, retaining wall, groin, breakwater, bulkhead, seawall, riprap, rubble mound, revetment, or the foundation of a structure which is the functional equivalent of these specified structures.

*Excavation* means any act by which organic matter, earth, sand, gravel, rock or any other similar material is cut into, dug, quarried, uncovered, removed, displaced, relocated or bulldozed and shall include the conditions resulting therefrom.

*FEMA* means the United States Federal Emergency Management Agency, which administers the national flood insurance program and publishes the official flood insurance rate maps.

*Fill* means any act by which earth, sand, gravel, rock or any other material is deposited, placed, replaced, pushed, dumped, pulled, transported or moved by man, man-made device, or man-controlled device to a new location and shall include the conditions resulting therefrom.

*Flood plains* are lands which will be inundated by floods known to have occurred or that reasonably can be expected to occur from the overflow of inland or tidal waters and/or the accumulation of runoff of surface waters from rainfall. Flood plains include all areas subject to the 100-year flood.

*Marina* means a commercial waterfront facility whose principal use is the provision of publicly available services such as securing, launching, storing, fueling, servicing and repairing of watercraft.

*Permittee* means any person authorized to act under a permit or a certificate issued by the City.

*Primary structure* means any structure suitable for human habitation or use as an office space.

*Reference line* means:

For non-river natural fresh water bodies without artificial impoundments, the natural mean high water level.

For rivers, the ordinary high water mark. *Ordinary high water mark* means the line on the river bank, running parallel to the main stem of the river, established by fluctuations of water indicated by physical characteristics such as a clear, natural line impressed on the immediate bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

For artificially impounded fresh water bodies with established flowage rights, the limit of the flowage rights, and for water bodies without flowage rights, the waterline at full pond as determined by the elevation of the spillway crest.

For coastal waters, the highest observable tide line, which means a line defining the furthest landward limit of tidal flow, not including storm events, which can be recognized by indicators such as the presence of a strand line of flotsam and debris, the landward margin of salt tolerant vegetation, or a physical barrier that blocks further flow of the tide.

*Removal* means cutting vegetation to the ground or stumps, complete extraction, or killing by spraying.

*Retaining wall* means a structure designed primarily to contain material and to prevent the sliding of land.

*Seawall* means an erosion response structure that is specifically designed to withstand wave forces.

*Shoreline Protection Zone* is all land located within two hundred fifty (250) feet of the reference line.

*Stripping* means any activity that removes vegetative surface cover including tree removal, clearing, and storage or removal of top soil.

*Structure* includes, without limitations, any building, combination of related components constructed in an ordered scheme that constitutes a work or improvement constructed on or affixed to land. The term includes, but is not limited to, anything built for the support, shelter or enclosure of persons, animals, goods, property of any kind, as well as anything constructed or erected with a fixed location on or in the ground, exclusive of fences.

*Wetlands* means areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and than under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

*U.S.D.A.* means the United States Department of Agriculture.

### **3.0 Shoreline Protection Zone**

#### **3.1 Prohibited activities**

3.1.1. The following activities, unless specifically excepted, shall be prohibited within the Shoreline Protection Zone:

- A. Construction of buildings and structures, except for: (1) structures for which the City has granted a permit in accordance with this Chapter; or (2) minor structures for which no permit is required as specified in Section 3.2.1.B.
- B. Establishment or expansion of:
  1. salt storage yards; or
  2. automobile junk yards.
- C. Removal or clearing of vegetation, except as specifically authorized in this Chapter.
- D. Planting of new vegetation, except for native, salt-resistant (if applicable) species suitable for erosion control. [At the option of the City, additional language may be included which states: "A list of native vegetation species is available from the City building permits office."]
- E. Application of fertilizers, herbicides, or pesticides except as follows:
  1. Limestone may be used within twenty-five (25) feet of the reference line.
  2. Twenty-five (25) feet beyond the reference line, low phosphate, slow release nitrogen fertilizer or limestone, may be used on lawns or areas with grass.
- F. Disposal of all types of wastes.
- G. The storage of toxic or hazardous wastes or substances in outdoor containers not specifically designated and intended for storage of hazardous materials. Any storage of such wastes or substances shall be in sealed containers.
- H. Sand and gravel excavations and the processing of excavated materials.
- I. The generation, storage, transportation, or disposal of any solid waste or hazardous waste (as those terms are defined in 30 Texas Administrative Code chapter 335) that does not comply with the regulations of the Texas Natural Resource Conservation Commission.

## 3.2 Permitting

### 3.2.1 Permit requirements

- A. Except as otherwise provided in this ordinance, no person shall commence or perform any construction, clearing, grading, stripping, excavating, or filling of land which meets the following provisions without having first obtained a permit from the City.
1. Any land disturbing activity (*i.e.*, clearing, grading, stripping, excavation, fill, or any combination thereof) that will affect an area within the Shoreline Protection Zone in excess of 5000 square feet;
  2. Any land disturbing activity that will affect an area in excess of 500 square feet if the activity is within 25 feet of a reference line;
  3. Excavation, fill, or any combination thereof within the Shoreline Protection Zone that will exceed 100 cubic yards; or
  4. Construction of any dock or marina.
- B. A permit shall not be required for any of the following, provided that the person responsible for any such development implements necessary erosion and sediment control measures.
1. Excavation below final grade for the basement and footing of a single-family residence and appurtenant structures on a site in excess of two acres for which a building permit has been issued by the City;
  2. Any agricultural activities related to the implementation of conservation measures included in a farm conservation plan approved by a Soil and Water Conservation District;
  3. Installation, renovation, or replacement of a septic system to serve an existing dwelling or structure;
  4. Scenic, historic, wildlife or scientific preserves;
  5. Minor maintenance or emergency repair to existing structures or improved areas;
  6. Cleared walking trails having no structural components;
  7. Timber catwalks and docks having four feet or less in width;
  8. Recreational fishing or hunting and creation and maintenance of temporary blinds; or
  9. Constructing fences where no fill activity is required and where navigational access will not be impaired by construction of the fence.
- C. The City permits office shall take into consideration the purpose of this Chapter, the design standards set forth in section 3.4, the construction standards set forth in section 3.5, and the marina and dock standards set forth in section 4.0 (as applicable), when evaluating a permit application submitted in accordance with this Chapter. All persons, whether or not a permit is required by this Chapter, are encouraged to follow the above standards when undertaking any construction activities within the Shoreline Protection Zone.

### 3.3 Permitting Process

#### 3.3.1 Application Process

- A. Persons required to obtain a permit under this Chapter must apply to the office of the City that issues building permits. The applicant must supply information, using any forms designated by the City, which contains sufficient information to allow the City to verify that the requirements of this Chapter will be met.
- B. If possible, a permit issued under this Chapter should be issued as part of a building permit of the type issued by the City's building permits office.
- C. If a person plans to undertake construction activities, or phased construction activities, that will affect multiple lots within the Shoreline Protection Zone, that person must inform the permits staff of all anticipated construction activities, so that, if appropriate, a single permit may be issued to authorize and assure appropriate coordination of all planned construction activities.

3.3.2 Approval Process. The application approval, appeal, and variance processes utilized for building permits will apply to permits issued under this Chapter.

#### 3.3.3 Termination of permit

- A. A permit is voidable if the City finds that:
  - 1. The permit is inconsistent with state or federal law, or this ordinance at the time the permit was issued;
  - 2. A material change occurs after the permit is issued; or
  - 3. A permittee fails to disclose any material fact in the application.
- B. "Material change" includes, in the opinion of the City, human or natural conditions which have adversely affected the Shoreline Protection Zone that either did not exist at the time of the original application, or were not considered by the City in making the permitting decision because the permittee did not provide information regarding the site condition in the original application.
- C. A permit automatically terminates if construction comes to lie within the boundaries of the public beach by artificial means or by natural causes

### 3.4 Design Standards

#### 3.4.1 Natural vegetation buffer

- A. Natural vegetation buffers should be retained and protected wherever possible. Areas immediately adjacent to natural watercourses, lakes, ponds, and wetlands should be left undisturbed wherever possible. A minimum twenty-five (25) foot buffer strip of natural vegetation should be preserved along waterbodies and wetlands.
- B. If no natural vegetation buffer exists, strips of buffer vegetation shall be planted between development activities and the reference line. Buffers shall be a minimum of ten (10) feet wide and shall be composed of native species. Wider buffers may be required, if necessary to prevent significant adverse effects to the shoreline or areas within the Shoreline Protection Zone, at the sole discretion of the City. The City permits office is instructed to develop a list of native species to be made available to the public upon request.

- C. Where existing, a natural woodland buffer shall be maintained within one hundred fifty (150) feet of the reference line. The purpose of this buffer shall be to protect the quality of public waters by minimizing erosion, preventing siltation and turbidity, stabilizing soils, preventing excess nutrients and chemical pollution, maintaining natural water temperatures, maintaining a healthy tree canopy and understory, preserving fish, bird and wildlife habitat, and respecting the overall natural condition of the protected shoreline.

Within the natural woodland buffer of the protected shoreline, the following limitations shall apply:

1. Not more than a maximum of fifty (50) percent of the basal area trees, and a maximum of fifty (50) percent of the total number of saplings shall be removed for a twenty (20) year period. A healthy well-distributed stand of trees, saplings, shrubs, and ground covers and their living, undamaged root systems shall be left in place. Replacement planting with native or naturalized species may be permitted to maintain the fifty (50) percent level.
  2. Trees, saplings, shrubs and ground cover which are removed to clear an opening for building construction, accessory structures, septic systems, roadways, pathways, and parking areas shall be excluded when computing the percentage limitations.
  3. Dead, diseased, unsafe or fallen trees, saplings, shrubs, or ground cover may be removed. Their removal shall not be used in computing the percentage limitations.
  4. Stumps and their root systems which are located within fifty (50) feet of the reference line shall be left intact in the ground, unless removal is specifically approved by the City.
  5. Dead and living trees that provide dens and nesting places for wildlife are encouraged to be left undisturbed.
  6. Planting efforts that are beneficial to wildlife are encouraged to be undertaken.
- F. Any development shall leave a minimum of twenty (20) percent of the basal number of trees, shrubs, or other natural vegetation, at a site, except that development may occur even if it will result in less than twenty (20) percent of the basal rate if replacement of existing trees, shrubs, or other natural vegetation occurs at a minimum ratio of two to one (2:1).

#### 3.4.2 Setbacks

- A. No primary structure shall be located within fifty (50) feet of the reference line.
- B. Accessory structures such as storage sheds and gazebos but excluding automobile garages may be located within the fifty (50) foot setback as a special exception provided:
1. The location and construction of the structure is consistent with the intent of the ordinance to maintain a vegetated buffer.
  2. The structure is usually customary and incidental to a legally authorized use located within the Shoreline Protection Zone.
  3. No solvents, paints, pesticides, or other household hazardous materials shall be stored in such structures.

### 3.4.3 Building height and placement

- A. Building heights. No structure within the Shoreline Protection Zone may exceed two (2) stories or thirty-five (35) feet in height as measured from average ground level around the structure to the highest point on the roof, excluding chimneys.
- B. Building placement. Buildings should be sited to minimize impact on habitat and the watershed.

### 3.4.4 Impervious material coverage

- A. Total impervious surface, including but not limited to buildings, houses, parking lots, garages, accessory buildings, driveways, pools and walkways, is limited to twenty-five (25) percent of the land area of the entire site located within the Shoreline Protection Zone.

### 3.4.5 Flood control

- A. General flood protection requirements
  - 1. Permittees shall:
    - a. Not engage in construction that does not comply with FEMA's regulations governing construction in flood hazard areas; and
    - b. Design construction so as to minimize impacts on natural hydrology. Construction shall not cause erosion to adjacent properties or the public beach.
- B. All applications for construction within a flood plain shall include an analysis sufficient to indicate that the proposed construction activity will not increase erosion hazards or flood heights off the site of the construction due to filling, grading, dredging, or other construction activities affecting manmade or natural flood plains. Efforts should be made to minimize alterations to natural flood plains. Design standards for construction within the 100-year flood plain shall apply as follows:
  - 1. Anchoring. All new construction and substantial improvements of existing construction shall be anchored to prevent flotation, collapse or lateral movement of the structure during a 100-year flood.
  - 2. Construction materials and methods. All new construction and substantial improvements of existing construction shall be constructed with materials and utility equipment resistant to flood damage, and using methods and practices that will minimize flood damage and prevent the pollution of surface waters during a 100-year flood.
  - 3. Service facilities and utilities.
    - a. Electrical, heating, ventilation, plumbing, air conditioning and other service facilities shall be designed or located to prevent water from entering or accumulating within the components during a 100-year flood.
    - b. All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate both infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

- c. On-site sanitary sewage systems shall be located and constructed to avoid impairment to them or contamination from them during flooding, and shall not be installed wholly or partially in a flood plain.
- 4. Residential structures.
  - a. All new construction and substantial improvement of existing construction of residential structures shall be constructed with the lowest floor elevated to or above the flood protection elevation as delineated on the Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRM).
  - b. For all new construction and substantial improvements of existing construction, enclosed areas below the lowest floor that are subject to flooding shall be designed to equalize hydrostatic flood forces on exterior walls by allowing for automatic entry and exit of floodwater. Designs for meeting this requirement must either be certified as meeting this requirement by a registered professional engineer or architect, or must meet or exceed the following minimum standards:
    - (1) provide a minimum of two openings having a total net area of not less than one (1) square inch for every square foot of enclosed area subject to flooding;
    - (2) place the bottom of all openings no higher than one (1) foot above grade; and
    - (3) electrical, plumbing and other utility connections shall not be placed below the flood protection elevation.
- 5. Non-residential structures. New construction and substantial improvement of existing construction of nonresidential structures including attendant utility or sanitary facilities shall be constructed to meet the following minimum requirements:
  - a. walls below the flood protection elevation shall be substantially impermeable to the passage of water;
  - b. structural components shall resist hydrostatic and hydrodynamic loads and effects of buoyancy; and
  - c. be certified as meeting the standards of this article by a registered professional engineer or architect.
- 6. Subdivisions.
  - a. All preliminary subdivision proposals shall identify the area of special flood hazard, the elevation of the 100-year flood, and eroding areas.
  - b. All final subdivision plans shall identify the minimum flood plain elevation.
  - c. All public utilities and facilities in subdivisions shall be located and constructed to minimize flood damage, and shall be adequately drained to reduce exposure to flood hazards.

- d. Each subdivision lot must include a site suitable for constructing a structure in conformity with the standards of these flood damage prevention regulations.
  - e. The requirements of this subsection should be considered during the review and approval of subdivision proposals submitted to the City. Nothing in this subsection is intended to affect the procedure or timing requirements applicable to subdivision proposal review and approach.
7. All agreements for deed, purchase agreements, leases, or other contracts for sale or exchange of real property within an area of special flood hazard must contain in prominent visibility the following flood hazard warning in the document:

FLOOD HAZARD WARNING

This property may be subject to flooding. You should contact local building and zoning officials to obtain information about flood elevations and restrictions before making plans for the use of this property.

3.4.6 Septic Systems

- A. Septic tanks shall not be located closer than one hundred fifty (150) feet from the reference line. Septic systems may not be installed if the total number of residential units using septic systems along any portion of the Shoreline Protection Zone exceeds one unit per one hundred fifty (150) feet of shoreline frontage.
- B. The following conditions, based on the characteristics of the receiving soils as they relate to U.S.D.A., Natural Resources Conservation Service drainage classes shall dictate the setback requirements for all new leaching portions of new subsurface wastewater disposal systems adjacent to ponds, lakes, estuaries and the open ocean, as follows:
  - 1. Where the receiving soil down gradient of the leaching portions of a subsurface wastewater disposal system is a porous sand and gravel material with a percolation rate equal to or faster than two (2) minutes per inch, the setback shall be at least one hundred twenty-five (125) feet from the reference line;
  - 2. For soils with restrictive layers within eighteen (18) inches of the natural soil surface, the setback shall be at least one hundred (100) feet from the reference line; and
  - 3. For all other soil conditions, the setback shall be no less than seventy-five (75) feet.
  - 4. Adjacent to rivers, the setback shall be no less than seventy-five (75) feet.
- C. The placement of all septic tanks and leaching portions of subsurface wastewater treatment systems for replacement systems are encouraged to comply with the requirements of this section to the maximum extent feasible.
- D. Regardless of any other provision in this Chapter, the design, placement, construction, and operation of all septic systems must comply with the requirements of the Texas Natural Resource Conservation Commission or any other federal, state, or local agency with jurisdiction over septic systems.

### 3.5 Construction/Development Standards

#### 3.5.1 General

- A. All persons who undertake construction activity shall completely restore any portion of a Shoreline Protection Zone damaged during construction that is not paved, bulkheaded, or otherwise covered as a consequence of the construction. Complete restoration means that the damaged area shall, within five (5) years, be operating as effectively as the natural system did prior to being destroyed. This provision applies to all persons who undertake construction activities, regardless of whether a permit is required under this Chapter.
- B. Bulkheads shall be designed so that bulkheading does not result in erosion of adjacent shoreline areas not protected by bulkhead construction.
- C. Other reasonable protective measures necessary to prevent significant adverse effects in a Shoreline Protection Zone may be required. Protective measures may include, but are not limited to:
  - 1. Maintaining natural drainage patterns.
  - 2. Limiting the normal removal of vegetation to the minimum necessary to carry out the development activity.
  - 3. Expediently replanting denuded areas.
  - 4. Stabilizing banks and other unvegetated areas by siltation and erosion control measures.
  - 5. Minimizing the amount of fill used in the development activity.
  - 6. Disposing of dredged spoil at specified locations in a manner causing minimal environmental damage.
  - 7. Constructing channels at the minimum depth and width necessary to achieve their intended purposes and designing them to prevent slumping and erosion and allow revegetation of banks.
  - 8. Dredging wetlands at times of minimum biological activity to avoid periods of fish migration and spawning and other cycles and activities of wildlife.
  - 9. Designing, locating, constructing and maintaining all development in a manner that minimizes environmental damage.
  - 10. Prohibiting septic tanks or locating them away from high groundwater areas and peaty soils.
  - 11. Requiring the person undertaking construction activity and successor to record deed restrictions and other legal mechanisms to protect the environmentally sensitive areas and maintain the development.
- C. Land disturbance activities on the waterward side of any reference line shall be avoided, where possible. If disturbance activities are unavoidable, the following requirements shall be met:
  - 1. Construction vehicles shall be kept out of water bodies and off of any land on the waterward side of a reference line to the maximum extent practicable. Where

construction crossings are necessary, temporary crossings shall be constructed of non-erosive material, such as riprap or gravel.

2. The time and area of disturbance of water bodies and any land on the waterward side of any reference line shall be kept to a minimum. The water body channel, including beds and banks, shall be restabilized within forty-eight (48) hours after channel disturbance is completed, interrupted, or stopped.
3. Whenever channel relocation is necessary, the new channel shall be constructed in the dry and fully stabilized before flow is diverted.

### 3.5.2 Erosion Controls

#### A. General erosion protection requirements

##### 1. Permittees shall:

- a. Locate all construction sufficiently landward so as not to become an encroachment on the public beach;
- b. Not engage in any construction which may aggravate erosion;
- c. Not construct any new erosion response structure, except a retaining wall located greater than two hundred (200) feet landward of the reference line;
- d. Not maintain or repair an existing erosion response structure located on a public beach;
- e. Not maintain or repair an existing erosion response structure located less than two hundred (200) feet landward of the reference line that is more than fifty (50) percent damaged, except:
  - (1) When failure to repair the damaged structure will cause unreasonable hazard to a public building, public road, public water supply, public sewer system, or other public facility immediately landward of the structure; or
  - (2) When failure to repair the damaged structure will cause unreasonable flood hazard to habitable structures because adjacent erosion response structures will channel floodwaters to the habitable structure; and
- f. Not enlarge or improve an existing erosion response structure located less than two hundred (200) feet landward of the reference line.

#### B. Special requirements for eroding areas

1. In addition to the other requirements of these regulations, in eroding areas, permittees shall:
  - a. Construct structures in eroding areas in accordance with FEMA minimum standards and elevations.
  - b. Design structures located on property adjacent to the public beach so that the structures can be relocated; and

- c. Not pave or alter the ground below the lowest habitable floor, except for stabilization of driveways using gravel or crushed limestone.
2. If there is any conflict between the requirements of this section and the requirements of any other provision of these regulations, this section controls.

### 3.5.3 Sediment controls

- A. On-site sediment control measures, as specified by the following criteria, shall be constructed and functional prior to initiating clearing, grading, stripping, excavating or fill activities on the site.
  1. For disturbed areas draining less than one (1) acre, filter barriers (including filter fences, straw bales, or equivalent control measures) shall be constructed to control all offsite runoff. Vegetated filter strips, with a minimum width of twenty-five (25) feet, may be used as an alternative only where runoff in sheet flow is expected.
  2. For disturbed areas draining more than one (1) but less than five (5) acres, a sediment trap or equivalent control measure shall be constructed at the downslope point of the disturbed area.
  3. For disturbed areas draining more than five (5) acres, a sediment basin or equivalent control measure shall be constructed at the downslope point of the disturbed area.
  4. Sediment basins and sediment trap designs shall provide for both detention storage and sediment storage. The detention storage shall be composed of equal volumes of “wet” detention storage and “dry” detention storage and each shall be sized for the two (2) year, twenty-four (24) hour runoff from the site under maximum runoff conditions during construction. The release rate of the basin shall be that rate required to achieve minimum detention times of at least ten (10) hours. The elevation of the outlet structure shall be placed such that it only drains the dry detention storage.
  5. The sediment storage shall be sized to store the estimated sediment load generated from the site over the duration of the construction period with a minimum storage equivalent to the volume of sediment generated in one year.
  6. All temporary sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved with permanent soil stabilization measures. Trapped sediment and other disturbed soils resulting from the disposition of temporary measures should be permanently stabilized to prevent further erosion and sedimentation.
- B. Each site shall have graveled (or equivalent) entrance roads, access drives, and parking areas of sufficient length and width to prevent sediment from being tracked onto public or private roadways. Any sediment reaching a public or private road shall be removed by shoveling or street cleaning (not flushing) before the end of each workday and transported to a controlled sediment disposal area.
- C. Disturbed areas shall be stabilized with temporary or permanent measures within seven (7) calendar days following the end of active disturbance, or redisturbance, consistent with the following criteria:
  1. Appropriate temporary or permanent stabilization measures shall include seeding, mulching, sodding, and/or non-vegetative measures.

2. Areas having slopes greater than twelve (12) percent shall be stabilized with sod, mat or blanket in combination with seeding, or equivalent.
- D. Soil storage piles containing more than ten (10) cubic yards of material shall not be located with a downslope drainage length of less than twenty-five (25) feet to a roadway or drainage channel. Filter barriers, including straw bales, filter fence, or equivalent, shall be installed immediately on the downslope side of the piles.

#### 3.5.4 Dredging activities

- A. Any dredging shall be conducted at times of minimum biological activity to avoid fish migration and spawning, and other cycles and activities of wildlife.
- B. Any soils that results from dredging shall be disposed of at upland sites and stabilized within thirty (30) days, unless the spoil is causing turbidity or other problems, in which case the soils must be stabilized immediately.
- C. If dredging changes the littoral drift processes and causes adjacent shores to erode, the developer shall periodically replenish these shores with the appropriate quantity and quality of aggregate (sand).

#### 3.5.5 Storm water

- A. Storm water conveyance channels, including ditches, swales, and diversions, and the outlets of all channels and pipes shall be designed and constructed to withstand the expected flow velocity from the ten (10) year frequency storm without erosion. All constructed or modified channels shall be stabilized within forty-eight (48) hours, consistent with the following standards:
  1. For grades up to four (4) percent, seeding in combination with mulch, erosion blanket, or an equivalent control measure shall be applied. Sod or erosion blanket or mat shall be applied to the bottom of the channel.
  2. For grades of four (4) to eight (8) percent, sod or an equivalent control measure shall be applied in the channel.
  3. For grades greater than eight (8) percent, rock, riprap, or an equivalent control measure shall be applied, or the grade shall be effectively reduced using drop structures.
- B. Any channels constructed shall be of a minimum depth and width capable of achieving the intended purposes. Sides of channels shall reflect an equilibrium shape to prevent slumping and erosion and to allow revegetation.
- C. Storm sewer inlets and culverts shall be protected by sediment traps or filter barriers meeting accepted design standards and specifications.
- D. If dewatering devices are used, discharge locations shall be protected from erosion. All pumped discharges shall be routed through appropriately designed sediment traps or basins, or equivalent.

## 4.0 Water-Related Uses

### 4.1. Marinas and Docks

- 4.1.1. No person shall construct or add to an existing dock, seawall, erosion response structure, mooring or piling, modify an existing submerged land lease, or conditions thereto, or conduct dredge or fill operations in, or contiguous to any water body without first obtaining any required authorizations from appropriate federal, state and city agencies.
- 4.1.2. No fish carcasses and debris shall be discharged into any water bodies.
- 4.1.3. No person who maintains or operates a dock shall allow or permit the disposal of fish carcasses, litter, sewage from boats, waste petroleum products or other pollutants into a body of water. Trash disposal receptacles shall be anchored to each dock to ensure compliance with the provisions of this article.
- 4.1.4. No fuel or oil shall be willfully or knowingly discharged into a body of water. No dock which sells fuel or oil shall be constructed, operated or maintained in a body of water unless an oil abatement plan, in accordance with Coast Guard guidelines, is available at each dock. A copy of the oil abatement plan must be filed with the City permits office:
  - A. Within 90 days after the effective date of this Chapter for existing facilities; or
  - B. Prior to operation, for new facilities.
- 4.1.5. No new or existing dock shall be constructed or modified such that the length of any pier as completed is greater than 20 percent of the width of the body of water in question at the place where the pier is located, or out 200 feet, whichever is less.
- 4.1.6. No piling(s) shall be added to the waterward end of any pier which piling(s) would make the total length of the dock more than 200 feet.
- 4.1.7. Where wet moorage is offered for rent, boats which have holding facilities for sewage, or where other recreational vehicles are allowed to stay overnight, then pump-out, holding or treatment facilities shall be provided by the developer for sewage and other wastes contained on vessels and vehicles. The facilities shall be conveniently available to all vessels and/or vehicles.
- 4.1.8. No discharge of water shall contain phosphorous or any other substance likely to cause a violation of the water quality standards.
- 4.1.9. No dock shall unreasonably interfere with the riparian rights of others.
- 4.1.10. No electrical or water service upon any dock shall be installed unless a permit is obtained from the City for that service.
- 4.1.11. No lot, or multi-contiguous lots, with less than fifty (50) feet of waterfront footage shall be allowed individual docks. Except as otherwise prohibited, lots may be combined with neighboring lots to meet the fifty (50) feet requirement.
- 4.1.12. Marinas shall be developed in accordance with the following:
  - A. Minimum shoreline frontage shall be three hundred (300) feet with an additional twenty-five (25) feet of shore frontage for each slip.
  - B. Off street parking shall be provided at a rate of five hundred (500) square feet per boat slip.
  - C. Submission of an environmental impact plan to the City permits office which indicates mitigation measures to minimize potential negative impact on the waters including, but not limited to:

1. Measures to be taken to prevent leakage or spills of fuels, lubricants, waste products or other potential pollutants into the waters.
2. Assurances that impacts on wetlands and related sensitive areas and habitats will be avoided.

#### 4.2 Boating Activities

- 4.2.1. Watercraft being operated within a distance of three hundred feet from the water's edge shall be operated at speeds not to exceed 8 miles per hour.
- 4.2.2. No boat or vessel shall operate at such speed that would create a wake that endangers other boats or vessels, swimmers or other persons within the water, or would contribute to any adjacent land erosion.
- 4.2.3. Any person who violates this subsection shall be liable to the City and any affected landowner for the value of damage caused through erosion of land and loss of natural resources. This remedy is addition to, and not in lieu of, any other remedies available under this Chapter.

### **5.0 Mitigation and Conservation**

#### 5.1 Mitigation

Mitigation procedures must be followed in any case where development degrades estuaries, wetlands, bayous, harbors or other natural resources.

##### 5.1.1 General

- A. Compensatory mitigation, by which environmentally sensitive lands are purchased, created, enhanced and/or restored to compensate for the loss of such lands, is required whenever required by the state or federal government in connection with development activities.
- B. The purchased, created, enhanced or restored environmentally sensitive land must be of the same type as that destroyed or degraded, and must be located within the Galveston Bay Estuary System.
- C. Compensatory mitigation shall not be the basis for approving a project that could not otherwise be approved.
- D. A developer of a compensatory mitigation plan shall grant a conservation easement on the newly purchased, created, enhanced or restored environmentally sensitive lands to protect them from future development.

##### 5.1.2 Determination of adequate mitigation

- A. Development projects reviewed and approved by appropriate state or federal agencies shall be deemed to comply with the city's mitigation provisions and standards.
- B. Any permit, authorization or statement by the regulatory agency of no jurisdiction due to the absence of such resource at the project site shall be acceptable to the city.
- C. The applicant for development approval shall submit to the city copies of any permit, authorization or statement prior to receiving any permit from the city if activities conducted pursuant to such city-issued permit would impact any natural resource requiring mitigation under this section.

- D. Violations of any conditions of any wetland or dredge and fill permits issued by state and federal agencies shall also be violations of this chapter and may be independently enforced by the City.

## 5.2 Conservation

Protection of shoreline intrinsically provides for the conservation of affected resources. Conservation also extends to the preservation of air quality, the protection of historical resources, and the protection of endangered species of plants and animals. This subsection provides regulatory controls intended to conserve these resources.

### 5.2.1 Fauna

Where development activity may threaten endangered wildlife, the following regulatory conditions apply:

- A. In areas known to be important to animal species designated by the United States Fish and Wildlife Service as endangered or threatened, reproduction, feeding or nesting of such species, all construction activities must comply with any relevant federal or state statutes or regulations. A violation of such statutes or regulations shall also be considered to be a violation of this Chapter and may be independently enforced by the City.

### 5.2.2 Air quality

Any development with point source emissions that may degrade air quality must comply with all applicable federal and state regulations regarding emission control.

### 5.2.3 Open burning

Open burning shall comply with 30 Texas Administrative Code Chapter 111. In addition, burn permits must be obtained from the City Fire Department prior to undertaking any planned outdoor burning activity in the Shoreline Protection Zone.

## **6.0 Consistency with the Texas Coastal Management Program**

### 6.1 Coastal Management Program Boundary

6.1.1 The following areas are within the CMP boundary and are subject to CMP consistency review: area that is seaward from FM Road 2004 to the junction of Interstate Highway (IH) 45 between Dickinson and La Marque, thence northwestward along IH 45 to the junction of IH 610 in Houston, thence east and northward along IH 610 to the junction of IH 10 in Houston, thence eastward along IH 10 to the Louisiana State line. The following areas are also included:

- A. Clear Creek from IH 45 to a point 110 yards upstream of FM Road 528 in Galveston /Harris County;
- B. Buffalo Bayou (Houston Ship Channel) from IH 610 to a point 440 yards upstream of Shepherd Drive in Harris County; and
- C. San Jacinto River from IH 10 upstream to the Lake Houston dam in Harris County.

6.1.2 This Chapter incorporates by reference the General Land Offices requirements for CNRA's contained in 31 Texas Administrative Code chapter 16. A violation of these requirements will be considered to be a violation of this Chapter and may be independently enforced by the City.

## **7.0 Incorporation of Corps of Engineers Wetland Regulations**

- 7.1 A. The following Corps of Engineers Regulations are incorporated by reference:
- 33 Code of Federal Regulations § 322 - Permits for Structures or Work in or Affecting Navigable Waters of the United States
  - 33 Code of Federal Regulations § 323 - Permits for Discharges of Dredged or Fill Material into Waters of the United States
  - 33 Code of Federal Regulations § 324 - Permits for Ocean Dumping of Dredged Material
  - 33 Code of Federal Regulations § 325 - Processing of Department of the Army Permits
  - 33 Code of Federal Regulations § 326 - Enforcement
  - 33 Code of Federal Regulations § 327 - Public Hearings
  - 33 Code of Federal Regulations § 328 - Definition of Waters of the United States
  - 33 Code of Federal Regulations § 329 - Definition of Navigable Waters of the United States
  - 33 Code of Federal Regulations § 330 - Nationwide Permit Program
- B. A violation of the Corps of Engineers regulations set forth above will also be considered to be a violation of this Chapter and may be independently enforced by the City.

## **8.0 Stormwater Permitting Regulations**

- 8.1 A. The stormwater permitting regulations contained in 40 Code of Federal Regulations § 122.26 and all general stormwater permits adopted by Region VI of the Environmental Protection Agency pursuant to those regulations are adopted by reference.
- B. A violation of the above regulations or general permits will also be considered to be a violation of this chapter and may be independently enforced by the City.

## **9.0 Subsidence**

- 9.1 A. The rules and regulations of the Houston/Galveston Coastal Subsidence District are adopted by reference.
- B. A violation of the rules or regulations of the Houston/Galveston Coastal Subsidence District will also be considered to be a violation of this Chapter and may be independently enforced.

## **10.0 Grandfather Protection for Existing Structures/Uses**

### **10.1 Non-conforming structures**

- 10.1.1 Unless expressly stated otherwise in this Chapter, existing non-conforming structures are not required to meet the standards in this Chapter or obtain a permit pursuant to this Chapter. However:
- A. No change in such a structure is permitted which would result in increasing the non-conformity with this Chapter in any way.
  - B. An expansion that increases the sewerage load to an on-site wastewater treatment system (e.g., additional bedrooms) shall require approval by the City.

- C. Between the non-conforming structure and the reference line, no alteration shall extend the structure closer to the water.
- D. Any repair or maintenance work to an existing, non-conforming structure that costs more than 50% of the cost that would be required to build a new structure will be considered construction of a new structure, which will be subject to the permitting and other standards of this Chapter.

## 10.2 Non-conforming uses

- 10.2.1 Existing uses which are non-conforming under this ordinance may continue until the use ceases to be active or is discontinued for a period of one year.
- 10.2.2 An existing non-conforming use may not be changed to another non-conforming use.
- 10.2.3 Existing non-conforming uses are encouraged to meet the standards set forth in this Chapter.

## 11.0 **Enforcement**

### 11.1 Penalties

- A. Any person found in violation of this ordinance shall be punished for each offense by a fine not exceeding \$1,000.00 or imprisoned for a term not exceeding sixty (60) days or both such fine and imprisonment. Each day any violation of any provision of this ordinance continues shall constitute a separate offense.
- B. In addition, the City may obtain injunctive relief for any violation of the provisions of this ordinance.

## **Shoreline Management Resources**

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The Shoreline Management Resources list is an inventory documenting the various reference materials that were compiled for this project. It is to be used as a quick reference section for local governments with shoreline management issues.

The inventory is divided into three sections, articles, ordinances, and web pages. The article section is further divided into four categories, including Texas, federal government, other states, and general organizations. The ordinance section contains ordinances concerning shoreline issues. The web page section is a list of useful web sites.

## Shoreline Management Resources: Articles

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### *Texas*

**"Briefing: Texas Water Quality Certification Program"**

Texas Natural Resource Conservation Commission  
Houston, TX  
August 5, 1998.

This executive summary condenses the proceedings of a training session for the 401 certification reviews of U.S. Army Corps of Engineers in the Texas water quality certification program for wetland permits.

***Texas Coastal Wetlands: A Handbook for Local Governments***

**Texas**  
General Land Office Resource Management Programs  
1995

In 1995, The General Land Office received a grant from the EPA to produce a coastal wetlands guide for local governments along the Texas coast. This guide lists techniques, sources of technical and financial assistance and contains recommendations for improving wetland management along the Texas Coast. Available in August 1996.

***A Guide to Pollution Prevention for Small Businesses***

Texas Natural Resource Conservation Commission  
Austin, TX  
June 1998

This guide is designed to help small businesses improve the quality of their operations and to reduce nonpoint source pollution. Additionally, this guide may be used by local governmental agencies, trade associations, nonprofits or other entities interacting with small businesses. The manual is separated into three parts: introductory information, information on operations that cause nonpoint source pollution at small businesses, and appendices of BMP's.

***Habitat Degradation Action Plan for the Gulf of Mexico (working draft #1)***

Habitat Degradation Subcommittee,  
EPA  
April 1992

This plan defines the primary activities necessary to reduce and eventually eliminate habitat degradation in the Gulf of Mexico.

**"Lines in the Sand: An Emergency Response to Coastal Erosion in Texas" *PA Times***

American Society for Public Administration  
Bojorques and Myers  
September 1998  
Vol. 21, No. 9

This article discusses the actions taken by city, county and state governments in Texas after recent natural disasters along the coast. Tropical Storm Josephine had a great effect on the Texas coast, although it never reached the mainland. High winds caused a buildup of water that increased the tides 2 to 3 feet above normal. Large quantities of sand were eroded away.

**"Sand Dollars: The Need For Coastal Erosion Prevention & Response in Texas"**

Bojorquez and Carr  
1998

"This paper provides an overview of coastal erosion; outlines the current legal framework of beach protection in Texas; identifies statutory weaknesses and gray areas in case law; discusses ongoing legislative activities; and urges the need for support from the Legislature in order for property owners, state agencies and local governments to take action to preserve Texas beaches."

***Texas Coastwide Erosion Response Plan: A Report to the 75<sup>th</sup> Legislature***

Texas General Land Office August 1996

The plan describes the state's existing policies for managing coastal erosion and proposes new ones. Among the proposed policies is a recommendation to

**Title 43. Transportation, Part I. Texas Dept of Transportation, Chapter 2. Environmental Affairs, Subchapter B. Memorandum of Understanding with the Natural Resources Agencies**

*Texas Register*  
November 1992  
pp. 7991-7927

***Vegetation for Erosion Control in Texas***  
Gulf of Mexico Program Office

***Wetlands Assistance Guide for Landowner***  
Texas Parks and Wildlife  
Julie K. Anderson

***Wetland Restoration and Creation in Dickinson Bay and Dickinson Bayou***  
Coastal Division,  
Texas General Land Office Calnan and Jennings  
September 1994

***Federal Government***

**Chapter 6: Streambank and Shoreline Erosion Management Measure EPA-840-B-92-002**  
January 1993

***Low Cost Shore Protection: A Guide for Local Government Officials***  
Army Corps of Engineers

establish a state-funding source for erosion response projects, which would allow Texas to attract crucial federal money. In addition to recommendations, this plan discusses the causes of erosion and critical erosion areas.

This document explains the Texas Department of Transportation's adoption of new 2.21 and 2.22, concerning purpose and memorandum of understanding with the Texas Parks and Wildlife Department.

This pamphlet discusses vegetation as an alternative method of maintaining dunes and shorelines. Marsh vegetation is relatively inexpensive and proven effective on some shorelines. Dune vegetation traps sand blown landward so that the dune is maintained naturally. Dune walkovers provide access to the beach while preventing damage from road cuts and trails.

In the past, landowners have seen wetlands as a problem between them and the development of their property. Wetlands protection agencies have been perceived as the enemy. This guide takes a different approach to this controversial issue. Wetlands have increased property values and are seen by some landowners now as an asset. This guide discusses the variety of approaches made to assist landowners in the protection of wetlands. Program contacts are provided for the landowner for each protection approach.

This study is a plan for demonstration project to help revive and create wetlands in Dickinson Bay and Bayou. These plans may be used in mitigation projects for activities requiring compensatory mitigation under Section 404 of the Clean Water Act. Information gathered in this report can also be used in predicting potential impacts of future development in the Dickinson Bayou watershed and the Dickinson Bay area.

This page provides a basic understanding of streambank and shoreline erosion dynamics.

This report is intended for planning, regulatory, and other local government officials involved in shoreline erosion prevention measures. This discussion is limited to the shorelines of sheltered waters that are not open to the direct action of oceanic waves. Erosion problems are often caused by a lack of understanding of shoreline process. This guide serves to provide a

greater understanding of the natural forces working against shorelines. It is important to note that “low cost” does not mean “cheap”, however means of protecting property are among the lower priced options available. The report is divided into five sections. Section 1 is a basic understanding of shoreline processes. Section 2 describes a variety of devices. Section 3 provides guidance for protection alternatives. Section 4 discusses permit requirements. Finally, Section 5 is a directory of help sources.

***Protecting Coastal and Wetland Resources: A Guide for Local Governments*** Office of Water, U.S. Environmental Protection Agency, Washington, D.C. October 1992

This 1992 document is the EPA's first attempt to present coastal and wetlands resource protection issues in a comprehensive guide for small-town planners, local government and citizens.

***Streambank Protection for Landowners and Local Governments***  
*Subdivision Ordinance* Village of Dickinson  
US Army Corps of Engineers Appendix A

This pamphlet discusses developing a plan of action to protect a streambank after the U.S. Congress passed the Streambank Erosion Control Evaluation and Demonstration Act of 1974, which authorized the Corps of Engineers to conduct a 7-year study to examine the causes of streambank erosion.

### ***Other States***

***Alabama Coastal Counties Environmental Handbook***  
Baldwin and Mobile Counties.  
July 1998

This handbook is for citizens who need information on agencies and organizations with jurisdiction over or interest in the environment of Alabama's coastal counties. The handbook consists of contacts of public agencies, governmental departments, programs and responsibilities of agencies. It serves mainly as a quick reference directory for different public environmental agencies.

**"Baywatch"**  
*Southwest Airlines Spirit*  
Jim Morrison  
February 1995  
p. 34

This article relates how Chesapeake Bay has changed since the times of John Smith in 1607 by interviewing oyster harvesters. The article goes on to say that the bay has changed since colonization. When trees were cut much erosion and runoff occurred. In addition, the trees served as filters for the watershed. Morrison also stresses the importance of how what happens on the land affects the bay and oysters.

**"Buying Farmland Development Rights: The Chester County Program"** *Land Use Law*  
Ann L. Strong  
May 1991  
pp. 3-7

This article is a commentary of Edward Thompson, Jr.'s 1989 recommendations on the use of development rights to protect farmland. Implementation of the Chester County Program began with approval in January 1991.

***Chesapeake Bay Restoration: Innovations at the Local Level***

The Chesapeake Bay Local Government Advisory Committee  
April 1991

The purpose of this manual is to provide cross sharing of information among local governments. Sections 1 and 2 of this manual are devoted to land use, planning and water quality in the Maryland, Virginia, and Pennsylvania areas. Sections 3,4, and 5 are concerned with public information and education, intergovernmental cooperation and financing.

***A Citizen's Streambank Restoration Handbook***  
Save Our Streams Program, Izaak Walton League of America, Inc.  
Firehock and Doherty  
Gaithersburg, Maryland  
January 1995

This handbook was written to inform citizens and local and state governments about stream restoration alternatives that can replace the traditional methods of channelization. This guide also addresses stream habitat and water quality issues. The authors provide a basic understanding of stream dynamics and land use impacts. Additionally, government planners and decision-makers can use this guide for an introductory understanding of ecological systems.

***City of Reno Wetland and Stream Environment Policy***

Reno Department of Planning and Community Development  
September 1991

"Wetlands and stream environments are the most productive wildlife habitats." The goal of this program is to prevent loss of these natural habitats.

***Environmental Land Planning Series: Site Planning for Urban Stream Protection***

Center for Watershed Protection,  
Silver Spring, Maryland  
Tom Schueler  
December 1995

This document presents a watershed approach to site planning through the description of ways to reduce pollutant loads and protect water resources. This document additionally stresses the importance of imperviousness, watershed-based zoning, the concentration of development, headwater sheets, stream buffers, green parking lots, and other land planning topics.

***Erosion, Land Use, and Stream Ecology: A Manual for Lake Champlain Basin Communities***

Corps Technical Report #3  
Lake Champlain Committee, Environmental Service  
Linda J. Henzel  
Burlington, Vermont  
1992

This manual is divided into four parts: Part 1 instructs the reader about streams. It discusses the functions of streams and watersheds and the effects of land use on them. Part 2 is a record of field observations of stream corridors, including a field observation sheet. Part 3 evaluates stream corridor data. Two case studies in Lake Champlain subwatersheds are used as examples. A topical index to concepts presented in the entire manual is found at the end of Part 3. Part 4 is a quick reference guide that provides an overview of the manual for citizens.

***Facilities Development Manual***

State of Wisconsin, Department of Transportation  
May 1987

This manual addresses the importance of erosion control in the preliminary design stage of construction. The manual also includes standard control measures.

**"A Guide to Virginia's Chesapeake Bay Preservation Act"**

*Environmental Reviews* Southeastern Virginia Planning District Commission  
March 1990

This guide describes features of the Chesapeake Bay Preservation Act Program and attempts to answer frequently asked questions about the 1988 Act.

***Landscaping Techniques and Materials for Urban***

This research project addresses lack of knowledge and

***Illinois Stream Corridors and Wetland Edges***  
Northeastern Illinois Planning Commission  
March 1993

awareness of efforts made in the preservation and restoration of riparian areas across the country in the public and private sectors. This project is an overview of work that has been done in the United States and Europe. This report should serve as a guide for basic information leading to further investigation.

***Practical Watershed Protection: A State-of-the-Art "How-to" for Protecting Growing Watersheds***  
Center for Watershed Protection,  
Silver Spring, Maryland  
October/November 1997

This manual is a compilation of papers relating to practical watershed protection. It is the result of a presentation by the Center for Watershed Protection during November 12 and 13th, 1997 in Fairhope, Alabama. It is divided into 9 sections or chapters. The first half of the chapters deals with effects on watersheds and the second half deals with watershed restoration techniques.

**"Preserving Farming Through Transferable Development Rights: A Case Study of Montgomery County, Maryland"** *American Land Forum Magazine*  
Richard E. Tustian  
pp. 63-76

This document is a case study of the planning and zoning practices of Montgomery County, Maryland.

***Restoring the Range: A guide to restoring, protecting and managing grazed riparian areas***  
Save Our Streams Program,  
Izaak Walton League of America, Inc.,  
Gaithersburg, Maryland  
Jay West  
May 1995

This guide discusses the problems associated with overgrazing of riparian vegetation by livestock and provides practical solutions to restoring damaged riparian areas.

***Standard Specifications for Road and Bridge Construction***  
State of Wisconsin, Department of Transportation  
1989

This document gives the specifications for road and bridge construction while maintaining minimizing erosion.

**"Transfer Development Rights: Compensation for Owners of Restricted Property"**  
*Zoning and Planning Law Report*  
Linda J. Bozung  
June 1983  
Vol. 6, No. 6  
129-136

This paper discusses the benefits of a TDR program, its obstacles to implementation and a case study of particular programs in Montgomery County, Maryland, Malibu-Santa Monica Mountains Area, California, and The Pinelands Area, New Jersey.

**"Wetlands Ordinance"**  
Gamebirds Unlimited  
Newport, Oregon  
February 1992

This paper discusses the topics of fill and removal and exceptions, mitigation plan, penalties, and includes wetlands definitions.

### **General Organizations**

#### **APA Planning and Law Division Newsletter**

September 1984

pp. 14-19

This newsletter discusses TDR use in The Pinelands, New Jersey and Dade County, Florida. In NJ, the central focus is the protection of a one million-acre tract of unique coastal plain pine forest. Suburb development of Philadelphia and New York has chipped away at the edges of the Pinelands. In May 1982 the Pinelands program included a proposal for a TDR Bank, which is similar to Montgomery County's in many respects. The East Everglades Area of Dade County, Florida has much in common with the Pinelands and Montgomery County concerning development and environmental conditions, although the program does not include a bank.

#### **"Considerations in Structuring TDR Programs"**

*Urban Land*

William F. Masterson October 1985

p. 29

TDR's have received a great deal of attention as a new way to achieve public land policy objectives. This article discusses what has been learned about designing these programs. Factors that aid in creating the TDR marketplace are discussed briefly.

#### **"Earthquakes and Other Geologic Hazards: Understanding, Living with, and Controlling Shoreline Erosion: A Guidebook for Shoreline Property Owners"**

*Natural Hazards Observer*

November 1996

p. 23

This guide provides an ecosystem approach to understanding and controlling inland lake and stream shoreline erosion through the discussion of physical processes (impacts of erosion, loss of vegetation and habitat, causes of erosion, preventive measures, and planning and erosion-control projects.

#### **Environmental Land Planning Series:**

##### **Riparian Buffer Strategies for Urban Watersheds**

Metropolitan Washington Council of Governments, Washington, D.C.

Jordan Heraty, Herson-Jones December, 1995

This document is a guide for riparian buffer programs used to mitigate the impact of urban areas on nearby streams. Recommendations on buffer designs are made based on a national survey of buffer programs and a comprehensive review of riparian buffer literature. Additionally, this document analyzes pollution prevention techniques and buffer pollutant removal potential.

#### **"Greenhouse Effect and Coastal Wetland Policy: How Americans Could Abandon an Area the Size of Massachusetts at Minimum Cost"**

*Environmental Management*

James G. Titus

1991

Vol. 15, No. 1, New York pp. 39-58

It is expected that sea level could rise 30-150 cm in the next century and more thereafter, causing a massive loss of coastal wetlands. Currently there are two strategies for protecting wetlands, but Titus proposes a third. In China and the Netherlands, dikes have been built for centuries. Wetlands in this case are squeezed between a progressing sea and protected land. In the United States, there is enough land to accommodate landward progression of wetlands, but governments cannot afford to buy all of the coastal lowlands that might potentially become wetlands. The third approach is to allow property owners to use coastal lowlands today as they choose, but set up laws to ensure that the land is abandoned if sea level rises enough to flood it.

**"The History and Use of Purchase of Development Rights in the United States" *Landscape and Urban Planning***

Jeffrey G. Buckland  
July 1987  
14: 237-252

This document traces the beginnings of separating interests in land as a preservation technique, with purchase of development rights (PDR) to preserve farmland as its focus. The first part of the paper begins with a review of available literature relating specifically to PDR. Next, a broad historical presentation of easements as a protection tool is made. Finally, a review of state and local programs using PDR to protect important farmland is provided. The conclusion of the article suggests that PDR will continue to receive consideration as a farmland protection strategy as more areas develop an interest and familiarity with the method.

**"Implementing a TDR Program, Part Two"**

*Planning and Zoning News*  
J. W. Cravens  
November 1990  
pp. 6-13

This article is the second part of a TDR program. It focuses on reviewing the basic TDR components that need to be implemented to assure program success and those principles that appear to enhance the success of a TDR program.

**"National Nonpoint Source Forum Recognizes Partnership Initiatives--TVA's Shoreline Management Initiative Shines."**

October/November 1995  
*Nonpoint Source News-Notes*  
pp. 7-9

TVA's Shoreline Management Initiative was created to consider alternative shoreline Management scenarios and to examine the economic and environmental impacts of residential shoreline development. The ultimate goal is to establish a policy and decision-making framework that will define a long-range strategy for shoreline development. The Initiative also makes sure that TVA's actions do not infringe on private property rights. TVA also assesses shoreline erosion conditions and attempts to characterize the shores based on degree of erosion. Additionally, TVA is working with farmers and marina owners.

**"The Purchase of Development Rights--Preserving Agricultural Land and Open Space"**

*American Planning Association Journal*  
Thomas L. Daniels  
Autumn 1991  
Vol. 57  
pp. 421-431

Purchase of development rights (PDR) has become a popular way to purchase development rights to privately held land. The majority of PDRs are found in the Northeast in urban fringe areas where there is intense pressure for farmland and open space to convert to urban uses. This paper discusses the pros and cons of PDR programs, alternative options of PDR, and PDR as a growth management tool.

**"Purchase of Development Rights: Ultimate Tool for Farmland Preservation"**

*Zoning and Planning Law Report*  
Edward Thompson, Jr. October 1989  
Vol. 12, No. 9, New York  
pp. 153-160

This paper discusses the benefits of PDRs for landowners so they may expand their farming operations, pay off debts, distribute their assets equally among farming and non-farming children or provide for a comfortable retirement while holding onto the family farm.

**"Reviews and Announcements: A Citizen's guide to Riparian Area Management." *Nonpoint Source News-Notes***

October/November 1995  
p. 27

The Lake County, Illinois Stormwater Management Commission has created a citizen's guide for riparian area management that covers water quality, riparian habitat, flooding, property value, and safety issues. The guide educates riparian homeowners on the causes and impacts of soil erosion, water quality

degradation, and the importance of using BMP's for watershed management. Additionally, the guide discusses how to properly install bank stabilization measures and advantages of native plants.

**"Structuring the Implementation of Transferable Development Rights"**

*Urban Land*

George M. Raymond July/August 1981

pp. 19-25

This article discusses the TDR concept and how it is most suitably used. The effects of TDR and taxation of land and fiscal considerations are discussed as well as the feasibility of a community-wide TDR district. Agricultural lands are treated as a special case.

**"TDRs: Agricultural Preservation"**

*Realtor Magazine*

Banach and Canavan

1983

pp. 28-33

The disappearance of farmland and open green space became a worry in the late 1950's. A promising measure of preventing the loss of agricultural land is TDR. This method gives farmland owners access to capital without forcing them off the land and gives developers more room to build where needed public services are available. This article describes the TDR process as well.

**"Tracking TDRs"**

*Urban Land*

May 1984

p. 40

This short article is a listing of the literature available on the TDR concept. Included are jurisdictions that have implemented programs for preserving historic landmarks and programs to preserve open space, sensitive areas, and agricultural land.

**"Transferable Development Rights, Part 1: A Tool for Guiding Growth"**

*Planning and Zoning News* J. W. Cravens

October 1990

pp. 5-12

This article helps explain the TDR concept, historical precedents, legal basis and important court decisions due to the growing interest in transferring development rights in the last twenty years to protect important resources.

**"Trends in governmental control of erosion and sedimentation in urban development"**

*Journal of Soil and Water Conservation*

James D. Mertes

November/December 1989 pp. 550-554

The aesthetic and ecological effects of soil erosion and sediment runoff as well as economic and social costs have produced enactment of strict regulations governing land-disturbing activities. Increasingly, federal, state, and local environmental programs are demanding erosion and sediment control plans before, during and after development.

**Water Resources Protection Technology: A Handbook of Measures to Protect Water Resources in Land Development**

The Urban Land Institute Tourbier and Westmacott.

1981

This report contains a description of measures to be used in urban development to prevent, reduce, or better potential problems adversely affecting water resources. Problems include runoff, decrease in infiltration, greater erosion and sedimentation, flooding, runoff pollution, and discharge of sewage effluent.

***"Zoning Exchange: Transfer of Development Rights  
and Credits"***  
Moore and Queale  
pp. 520-529

This document describes the difference between transferable development rights (TDR) and transferable development credit. Under TDR the development rights can be sold separately from the land. Under TDC, both the land and the credits remain intact until approval of the development proposal by the municipality. This is the major difference between the two methods. Benefits to the developer, property owner, and the public-at-large are also discussed.

## Shoreline Management Resources: Ordinances

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### **Chapter 69, Resource Protection, Memorandum of Understanding**

*Texas Register*  
February 9, 1993  
pp. 885-886

"The Texas Parks and Wildlife Commission in a regularly scheduled public hearing held January 21, 1993, adopts new 31 TAC 69.71, concerning a Memorandum of Understanding with the Texas Department of Transportation without changes to the proposed text as published in the December 18, 1992, issue of the *Texas Register* (17 TexReg 8880)"

### **Corpus Christi, Code of Ordinances**

"Beachfront Management and Construction

The purpose of this ordinance is to establish regulations for protection of dunes and public beaches.

### **Destin Land Development Code, Coastal Management and Conservation**

March 4, 1997

The purpose of this code is to establish regulations to protect coastal resources in a way that limits public expense, mitigates the impact of storms, and provides design standards.

### **"Erosion and Sediment Policies Now Statewide"**

*Wisconsin Professional Engineer* Michael Gonia, PE,  
and Judith Brown July/August 1989  
pp. 24-26

The Wisconsin Department of Transportation developed a policy that is recognized as one of the most effective in erosion and sediment control in the state. Construction sites often contribute to the pollution of streambeds, rivers and lakes by uncontrolled sediments.

### **"Erosion Control Strategies for Bay and Estuarine Beaches"**

*Coastal Management*  
Karl F. Nordstrom  
1989  
Vol. 17  
pp. 25-35

Bay and estuarine beaches are different from ocean beaches and require different management. Erosion rates are high in bays and estuaries. Strategies used in enhancing ocean beaches cannot necessarily be used for bays and estuaries. Strategies for such places should be designed specifically for a bayside location.

### **"From the States (Massachusetts: Riverfront Protection)."**

*Planning.*  
October 1996  
p. 30

Massachusetts Governor William F. Weld signed a bill limiting construction on the state's riverbanks. The compromise bill was heavily supported by environmental organizations and planners but opposed by real estate interests and large riverfront cities. The bill is considered an amendment to the existing wetlands protection law and incorporates an increased buffer zone with the wetlands law. Additionally, the bill alleviates concerns about a new bureaucracy through administration of already existing local conservation commissions.

### **"General Summary of City of Austin Watersheds Regulations--Related to Commercial Developments"**

Planning and Development, City of Austin  
Environmental and Conservation Services June 1992

This summary is a list of regulations pertaining to the urban watersheds, suburban watersheds, water supply suburban watersheds, water supply rural watersheds, and the Barton Springs Zone of Austin.

**"A Guide for Local Officials"**

*Model Soil Erosion and Sediment Control Ordinance*  
Northeastern Illinois Planning Commission.  
September 1991

This ordinance will assist local governments in better regulating construction and site erosion impacts.

**"A Guide for Local Officials"**

*Model Stream and Wetland Protection Ordinance for the Creation of a Lowland Conservancy Overlay District*  
Northeastern Illinois Planning Commission October 1988

This document is divided into two sections. The first is a question and answer section. The second part is the text of the model ordinance with a side-by-side 'commentary' that explains certain provisions, the ways in which provisions can be customized to local conditions, and sources of additional information.

**"A Helpful Tool for Developing Local Ordinances."**

*Nonpoint source News-Notes* April/May 1996  
p. 10

In April 1995, Terrene Institute in cooperation with the U.S. EPA released *Local Ordinances: A User's Guide*, with the underlying theme of preparing local ordinances and regulating development. An entire chapter is devoted to comprehending urban runoff and reporting recent study findings. The guide also provides scientific, environmental, and regulatory background.

***Lake Travis Nonpoint Source Pollution Control Ordinance***

8-15-1989  
Lower Colorado River Authority

"This policy establishes the Highland Lakes as the first priority in establishing programs for the control and prevention of nonpoint source water pollution. The regulatory program established by this ordinance for Lake Travis is the first part of a comprehensive effort to control nonpoint source pollution of the Highland Lakes."

**"Massachusetts to Curb Nonpoint Source Pollution"**

*Water Environment and Technology*  
September 1996  
p. 6

On August 7, Governor William Weld of Massachusetts signed a bill designed to control nonpoint source pollution by restricting shoreline development. Under this law, developers must exhibit that there will be no negative environmental impact. The conservation commissions and the Massachusetts Department of Environmental Protection are now authorized to study development impacts on flood control, pollution, storm damage, water supplies, groundwater, shellfish or wildlife habitats, and fisheries.

**Model Flood Plain Ordinance for Communities within Northeastern Illinois**

"The Model Flood Plain Ordinance is drafted to reflect the minimum requirements of the Federal Emergency Management Agency (FEMA) for eligibility of units of government in the National Flood Insurance Program as well as the requirements of the Illinois Department of Transportation, Division of Water Resources concerning development affecting floodways."

***Model Regulations--Urban Soil Sediment Pollution Control***

Division of Soil and Water Districts,  
Ohio Department of Natural Resources

These regulations are intended for municipalities and counties wanting to adopt an ordinance for controlling urban soil sediment pollution. The paper discusses general provisions, urban soil sediment pollution regulations, administration, penalties for violation,

April 1980

**Model Shoreland Protection Ordinance**

New Hampshire Office of State Planning  
August 8, 1992

**"Resolution No. 4541" Chapter 21.D of Comprehensive Plan**

City of Bellevue, Washington  
Passed by City Council  
May 1985

***Rules in Final Draft Form (Germane Modification***

***J)*** Labor and Human Relations, Department of Industry,  
State of Wisconsin  
Chapter ILHR 20 and section ILHR 21.125  
June 1991

***Suggested Soil Erosion and Sedimentation Control Ordinances***

Northeastern Illinois Planning Commission  
April 1980

***Summit County Land Use and Development Guide***

Chapter 6: Grading and Excavation Regulations  
October 1988

***Technical Manual for the Administration of the Lake Travis Nonpoint Source Pollution Ordinance***

9-12-1989

***Transfer of Development Rights***

City of La Quinta  
Approved April 1990

**"Transfer of Development Rights Highlights-- Changes in Zoning and Planning Law"**

Maryland Department of State Planning  
June 11, 1986

definitions and provides a table of permissible velocities for flowing water.

The purpose of this model is to provide municipalities with a shoreland protection ordinance that establishes a program for managing shoreland adjacent to water bodies.

"A RESOLUTION repealing the existing Natural Determinants Element of the Comprehensive Plan as adopted by Resolution No. 2354 and readopted by Resolution No. 2744; repealing existing Chapter 21.D of the Comprehensive Plan; adopting a new Natural Determinants Element of the Comprehensive Plan and Adopting a new Chapter 21.D of the Comprehensive Plan of the City of Bellevue"

These rules apply to soil erosion control procedures for one- and two-family dwelling construction sites. Also included are erosion control examples, illustrations and guidelines.

This model ordinance addresses the problem of erosion and sedimentation from areas undergoing urbanization. The ordinances allow county and municipalities to consider potential problems and include effective methods for their control.

"It is the intent of the grading and excavation regulations to safeguard the public health, safety, and welfare by requiring analysis of site conditions and soils in designing site work, controlling the amount of site disturbance and how disturbed areas are revegetated, and providing a means of enforcing County standards for road, driveway, parking area, and drainage design in the field."

"This manual will provide assistance to applicants in developing a permit application that includes a nonpoint source control plan that meets the ordinance requirements."

This chapter provides the process by which development rights or credits may be transferred from donor parcels to receiving parcels such as in Open space land use designations to enable it to be preserved as open space.

This document is a notice of changes in the zoning and planning law of Baltimore. The provision was called Article 66B Local governments attained the authority to establish programs to transfer development rights. The document further explains the TDR concept. Article 66B delegates basic

planning and land use regulatory powers to the State's municipalities, Baltimore City, and non-charter counties.

**"Volume III: Planning Standards and Guidelines"**  
*The New Jersey Preliminary State Development and  
Redevelopment Plan*  
New Jersey State Planning Commission  
January 1989

This plan discusses the natural and cultural resources and the protection of stream corridors.

## Shoreline Management Resources: Web Sites

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<b>Shoreline</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/BeachFactsSY.html">http://www.bergen.org/AAST/Projects/ES/BS/BeachFactsSY.html</a> <a href="http://sparky.nce.usace.army.mil/shore.protection">http://sparky.nce.usace.army.mil/shore.protection</a> <a href="http://ceres.ca.gov/coastalcomm/el_nino/shoreckl.html">http://ceres.ca.gov/coastalcomm/el_nino/shoreckl.html</a>
<b>Seawalls</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/def/seawall.html">http://www.bergen.org/AAST/Projects/ES/BS/def/seawall.html</a>
<b>Groins</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/def/groin.html">http://www.bergen.org/AAST/Projects/ES/BS/def/groin.html</a>
<b>Jetties</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/def/jetty.html">http://www.bergen.org/AAST/Projects/ES/BS/def/jetty.html</a>
<b>Dunes</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/def/dunes.html">http://www.bergen.org/AAST/Projects/ES/BS/def/dunes.html</a>
<b>Currents</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/def/currents.html">http://www.bergen.org/AAST/Projects/ES/BS/def/currents.html</a>
<b>Barrier Islands</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/def/barrierisland.html">http://www.bergen.org/AAST/Projects/ES/BS/def/barrierisland.html</a>
<b>Shoreline Standard Development</b>	<a href="http://www.keukalakeassoc.org/lake23.html">http://www.keukalakeassoc.org/lake23.html</a>
<b>Coastal Services Center</b>	<a href="http://www.csc.noaa.gov/id/text/shoreline.html">http://www.csc.noaa.gov/id/text/shoreline.html</a>
<b>National Oceanic and Atmospheric Administration</b>	<a href="http://www.csc.noaa.gov/">http://www.csc.noaa.gov/</a> <a href="http://www.csc.noaa.gov/cil/">http://www.csc.noaa.gov/cil/</a> <a href="http://www.csc.noaa.gov/text/cid.html">http://www.csc.noaa.gov/text/cid.html</a>
<b>Texas Geographic Resource</b>	<a href="http://www.utexas.edu/depts/grg/virtdept/resources/data/data.htm">http://www.utexas.edu/depts/grg/virtdept/resources/data/data.htm</a>
<b>Texas Natural Resources Information System</b>	<a href="http://www.tnris.state.tx.us/digital.htm">http://www.tnris.state.tx.us/digital.htm</a>
<b>Coastal GIS Bibliography</b>	<a href="http://www3.csc.noaa.gov/gisprojects/biblio/default.asp">http://www3.csc.noaa.gov/gisprojects/biblio/default.asp</a>
<b>Coastal Services</b>	<a href="http://www.csc.noaa.gov/newsletter/">http://www.csc.noaa.gov/newsletter/</a>
<b>Texas Coastal Management Program</b>	<a href="http://www.glo.state.tx.us/coastal/cmp.html">http://www.glo.state.tx.us/coastal/cmp.html</a>
<b>Coastal Zone Management</b>	<a href="http://www.nos.noaa.gov/ocrm/czm">http://www.nos.noaa.gov/ocrm/czm</a>
<b>Proposed Coastal Management Enhancement Act</b>	<a href="http://wave.nos.noaa.gov/ocrm/czm/welcome.html">http://wave.nos.noaa.gov/ocrm/czm/welcome.html</a>
<b>Texas General Land Office</b>	<a href="http://www.glo.state.tx.us/res_mgmt/coastal/index.html">http://www.glo.state.tx.us/res_mgmt/coastal/index.html</a> <a href="http://www.glo.state.tx.us/coastalpermits/">http://www.glo.state.tx.us/coastalpermits/</a> <a href="http://www.glo.state.tx.us/res_mgmt/coastal/duneprotect.html">http://www.glo.state.tx.us/res_mgmt/coastal/duneprotect.html</a>
<b>Coastal America</b>	<a href="http://www.coastalamerica.gov/">http://www.coastalamerica.gov/</a>
<b>Texas Sea Grant</b>	<a href="http://texas-sea-grant.tamu.edu">http://texas-sea-grant.tamu.edu</a>

<b>Chesapeake Bay</b>	<a href="http://www.chesapeake.org">http://www.chesapeake.org</a>
<b>The Coastal Barrier Resources System</b>	<a href="http://www.coastalliance.org/cbrs.htm">http://www.coastalliance.org/cbrs.htm</a>
<b>US Army Corps of Engineers-Galveston</b>	<a href="http://www.usace.mil/swg/">http://www.usace.mil/swg/</a>
<b>Coastal Bend Bays and Estuaries Program</b>	<a href="http://www.scitamucc.edu/ccbnep">http://www.scitamucc.edu/ccbnep</a>
<b>Natural Resources Code</b>	<a href="http://capitol.tlc.state.tx.us/statutes/codes/NR000015.html">http://capitol.tlc.state.tx.us/statutes/codes/NR000015.html</a>
<b>Galveston Island Convention and Visitor Bureau</b>	<a href="http://www.galvestontourism.com">http://www.galvestontourism.com</a>
<b>Galveston Bay Foundation</b>	<a href="http://www.galvbay.org">http://www.galvbay.org</a>
<b>Texas Natural Resource Conservation Commission</b>	<a href="http://www.tnrcc.state.tx.us">http://www.tnrcc.state.tx.us</a>
<b>Citizens Shoreline Inventory</b>	<a href="http://www.pugetsound.org/csi/default.html">http://www.pugetsound.org/csi/default.html</a>
<b>Shoreline Changes Project</b>	<a href="http://mgs.dnr.md.gov/coastal/shoreline.html">http://mgs.dnr.md.gov/coastal/shoreline.html</a>
<b>Coastal Planning and Engineering, Inc.</b>	<a href="http://www.cpeboca.com/index.html">http://www.cpeboca.com/index.html</a>
<b>Shoreline Management Act for the State of Washington</b>	<a href="http://mrsc.org/environment/shorelin.htm">http://mrsc.org/environment/shorelin.htm</a>
<b>Nonpoint Pollution Control Program</b>	<a href="http://www.epa.gov/OWOW/NPS/MMGI/Chapter6/index.html">http://www.epa.gov/OWOW/NPS/MMGI/Chapter6/index.html</a>
<b>Shoreline Stabilization Management Measure</b>	<a href="http://www.epa.gov/OWOW/NPS/MMGI/Chapter5/ch5-2d.html">http://www.epa.gov/OWOW/NPS/MMGI/Chapter5/ch5-2d.html</a>
<b>USEPA Office of Water-National Estuary Program, Oceans and Coastal Protection</b>	<a href="http://www.epa.gov/owowwtr1/estuaries/neplist.html">http://www.epa.gov/owowwtr1/estuaries/neplist.html</a> <a href="http://www.epa.gov/OWOW/oceans/">http://www.epa.gov/OWOW/oceans/</a>
<b>Tidal Estuaries and Ocean Shoreline Waters</b>	<a href="http://earth1.epa.gov/OW/resources/9698/chap4.html">http://earth1.epa.gov/OW/resources/9698/chap4.html</a>
<b>Systems Approach to Sediment Management in the State of Florida</b>	<a href="http://bigfoot.wes.army.mil/6519.html">http://bigfoot.wes.army.mil/6519.html</a>
<b>Coastal Zone Management Handbook</b>	<a href="http://www.floridaplants.com/CR/coastal.htm">http://www.floridaplants.com/CR/coastal.htm</a>
<b>Massachusetts Coastal Zone Management</b>	<a href="http://www.magnet.state.ma.us/czm/czm.htm">http://www.magnet.state.ma.us/czm/czm.htm</a>
<b>Beach Facts</b>	<a href="http://www.bergen.org/AAST/Projects/ES/BS/BeachFactsSY.html">http://www.bergen.org/AAST/Projects/ES/BS/BeachFactsSY.html</a>

**Gulf of Mexico Program**

<http://pelican.gmpo.gov/>

**Municipal Code**

<http://www.municode.com>