

MITIGATION STRATEGY

Introduction

A mitigation strategy provides participating counties and municipalities in the H-GAC planning area with the basis for action. Based on the findings of the *Risk Assessment* and the *Capability Assessment*, the mission statement, goals and actions that follow are intended to guide both the day-to-day operations and the long-term approach taken by counties and municipalities to reduce the impacts of hazards. In order to achieve these aims, this section was separated into the following components:

- ? Mitigation Goals;
- ? Identification and Analysis of Mitigation Measures; and
- ? Mitigation Action Plan

The H-GAC Hazard Mitigation Plan was designed to be both comprehensive and strategic in nature. That is, the Plan was created to provide a comprehensive review of hazards and identify far-reaching policies and projects intended to not only reduce the future impacts of hazards, but also to assist the region, counties and municipalities achieve compatible economic, environmental and social goals. In addition, the Plan is strategic, in that all policies and projects were linked to departments or individuals responsible for their implementation. When possible, funding sources were identified that could be used to assist in project implementation.

The crucial basis for action in the H-GAC Hazard Mitigation Plan can be found in the **Mitigation Action Plan (MAP)**, which lists specific actions, a general description, those responsible for implementation, potential funding sources that may be used, and an estimated target date for completion. Each action was listed with the accompanying information. This approach provided those in charge of the Plan's overall implementation with a clear roadmap that can serve as an important monitoring tool. The collection of actions also serves as an easily understood menu of policies and projects for those decision makers who want to quickly review the most important part of the Plan.

Planning Approach

In order to guide the actions of those charged with implementation, the Plan follows a traditional planning approach, beginning with a **mission statement** that provides the overall guiding principle. **Goals** are intended to meet the intent of the mission statement. Next, **mitigation actions** are identified. These actions may include policies or projects designed to reduce the impacts of future hazard events. Each hierarchical step is intended to provide a clearly defined set of policies and projects based on a rational framework for action. The components of the planning framework are explained in greater detail below.



Hazard mitigation manifests itself in many forms, including preparedness; as is the case with this Texas Gulf Coast business owner who prepares for the potential impacts of Hurricane Lili in October 2002. (Photo by Lauren Hobart/ FEMA News Photo)

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

Mission Statement:	Provides guiding principles of the Hazard Mitigation Plan.
Goals:	Goals represent broad statements that provide the framework for achieving the intent of the mission statement.
Hazard Mitigation Policies:	Policies are defined as a course of action agreed to by members of the Planning Team.
Hazard Mitigation Projects:	Projects are defined as specific actions taken to address defined vulnerabilities to existing buildings or systems. Potential funding sources are listed for each project.
Mitigation Action Plan:	Prioritized listing of actions (policies and projects), including a categorization of mitigation technique, hazards addressed, individual or organization responsible for implementation, estimated timeline for completion, and potential funding source(s).

Mission Statement

Develop and maintain a comprehensive pre and post-disaster hazard mitigation program guided by enhanced education and outreach efforts, new policies and programs, improved planning processes based on study findings, and improved evacuation procedures leading to the creation of policies and projects designed to reduce the vulnerability of individuals, families, households, businesses, infrastructure and critical facilities to the negative effects of natural and human-caused hazards.

Mitigation Goals

The goals listed below are the result of an inclusive planning process described in Section 2. The goals were created as part of four separate brainstorming sessions, where county and municipal representatives agreed upon broad mitigation categories that provided the basis for the formulation of regional mitigation goals. Mitigation categories and goal statements are listed below:

Mitigation Categories

Montgomery/ Walker:

- ? Education and Outreach
- ? Policy
- ? Planning/Study

Galveston/ Brazoria:

- ? Training
- ? Public Education and Outreach

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

- ? Structural Mitigation Measures (Public Infrastructure)
- ? Projects/ Structural Mitigation (Residential)
- ? Programs
- ? Evacuation
- ? Planning

Liberty/ Chambers:

- ? Stormwater Policies/ Projects
- ? Education and Outreach
- ? Development Policies
- ? Evacuation
- ? Codes and Regulations
- ? Planning

Austin/ Waller:

- ? Education and Outreach
- ? Drainage Issues
- ? Policy/ Regulations

The categories developed at the bi-county meetings were evaluated, commonalities were identified across counties, and goal statements were developed that encompass the HGAC region. These goal statements are:

Mitigation Goals

- Goal #1** **Improve education and outreach efforts regarding preparedness and mitigation actions that can be implemented by citizens, businesses and county and municipal government officials.**
- Goal #2** **Develop hazard mitigation policies and programs designed to reduce the impact of natural and human-caused hazards on people and property.**
- Goal #3** **Conduct studies and implement planning processes to increase the understanding of local hazard vulnerability.**
- Goal #4** **Identify and implement hazard mitigation projects to reduce the impact of hazard events and disasters.**
- Goal #5** **Improve evacuation procedures for natural and human-caused hazards.**

The goals of this Plan reflect similar goals to those found in the State of Texas Mitigation Plan and those of the National Flood Insurance Program. This similarity is not intentional, due to the fact that neither of those sets of goals was presented to members of the Regional Hazard Mitigation Team prior to their independent determinations. This approach was purposeful in fostering an environment that did not manipulate the goal-making process in any particular

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

direction based on preceding determinations. It is, however understandable that the goals established through these three separate efforts are similar because of the similar purposes of the NFIP, the State of Texas Mitigation Plan, and the H-GAC Regional Hazard Mitigation Plan.

<p><i>State of Texas Mitigation Planning Goals:</i></p> <ul style="list-style-type: none"> ? <i>Reduce or eliminate hazardous conditions that cause loss of life;</i> ? <i>Reduce or eliminate hazardous conditions which inflict injuries;</i> ? <i>Reduce or eliminate hazardous conditions which cause property damage;</i> ? <i>Reduce or eliminate hazardous conditions which degrade important natural resources; and</i> ? <i>Reduce flood losses through wise use of floodplains.</i>

Identification and Analysis of Mitigation Measures

In formulating this *Mitigation Strategy*, a wide range of activities were considered in order to help achieve the goals of participating jurisdictions. **Table 6.1** lists all of the mitigation actions that were identified by participants in the planning process. These actions were identified during the cardstorming exercise at each Mitigation Strategy meeting held across the region.¹

**Table 6.1
All Mitigation Actions Considered by Jurisdictions**

Action	Jurisdiction	County	Category	Hazard
Increase drainage by area creeks	Conroe	Montgomery	Project	Flood
Establish early warning system	Huntsville	Walker	Project	Tornado
Purchase weather tracker system	Huntsville	Walker	Project	Multiple
Establish auto call out system	Huntsville	Walker	Project	Multiple
Emergency info source (designated AM radio station)	Huntsville	Walker	Project	Multiple
71 homes in 100 yr floodplain - restrict new construction	Oak Ridge North	Montgomery	Policy	Flood
Improve drainage to reduce BFE	Oak Ridge North	Montgomery	Project	Flood
Buy out homes that are repetitive loss homes	Oak Ridge North	Montgomery	Project	Flood
Select near-by site to store and process limbs, trees and other debris - choose a site, assign a management crew and set an access/egress route	Oak Ridge North	Montgomery	Plan/Study	Wind
Railroad forms east border of City - I-45 forms west border of city - Develop evac plans for down-wind homes	Oak Ridge North	Montgomery	Plan/Study	Hazardous Materials
Develop evac plans for danger close homes	Oak Ridge North	Montgomery	Plan/Study	Hazardous Materials
Maintain checklist with contact numbers for railroad reaction crews and local Haz Mat First Responders	Oak Ridge North	Montgomery	Policy	Hazardous Materials
maintain fuel and repair parts to keep water plant open for 7 to 10 days	Oak Ridge North	Montgomery	Policy - Project	Multiple

¹ The cardstorming exercise and Mitigation Strategy Meetings are described in more detail in Section 2, *Planning Process*.

MITIGATION STRATEGY

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

Action	Jurisdiction	County	Category	Hazard
ID citizens that have special needs	Oak Ridge North	Montgomery	Policy	Multiple
Have emergency response crews to keep water plant and lines operational and keep lines of communication open	Oak Ridge North	Montgomery	Policy	Multiple
ID emergency treatment facilities that are operational	Oak Ridge North	Montgomery	Policy	Multiple
Educate emergency personnel and general population	Riverside	Walker	Education and Outreach	Hazardous Materials
Establish emergency preparedness procedures	Riverside	Walker		Hazardous Materials
Land acquisition for community park FM 2090 and US 59	Splendora	Montgomery	Project	Flood
Private property - due to inadequate drain pipes under railroad Ipes Rd and First St	Splendora	Montgomery	Project	Flood
Elevate two homes and acquire property on one home - Buck Rd	Splendora	Montgomery	Project	Flood
Educate public of hazards in area	Walker County	Walker	Education and Outreach	All
Education	Walker County	Walker	Education and Outreach	Flood
Enforcement	Walker County	Walker	Policy	Flood
Create multi-jurisdictional EOC	Walker County	Walker	Project	All
Buyout present properties that repetitively flood in NE part of County	Walker County	Walker	Project	Flood
Educate public on hazards of building in area (NE part of County)	Walker County	Walker	Education and Outreach	Flood
Control burning by Forest Service	Walker County	Walker	Policy	Wildfire
Better access roads	Walker County	Walker	Project	Wildfire
Buffer Zones in National Forest	Walker County	Walker	Policy	Wildfire
Need floodplain elevations on the Trinity River Basin	Walker County	Walker	Plan/Study	Flood
Need floodplain elevations on all Zone A areas	Walker County	Walker	Plan/Study	Flood
Need to define flood boundaries in relation to existing roads and landmarks. Current Zone A are shown but with out of date road system.	Walker County	Walker	Plan/Study	Flood
Study and make improvements to Crystal Creek from Montgomery St to Powell	Willis	Montgomery	Plan/Study - Project	Flood
Conduct overall drainage study of stormwater runoff in certain areas of city	Willis	Montgomery	Plan/Study	Flood
Have plan for emergency transportation across tracks and hazardous material spills containment	Willis	Montgomery	Plan/Study - Policy	Hazardous Materials
Provide Haz Mat responders with proper training and equipment	Woodlands	Montgomery	Project	Hazardous Materials
Designate Hazardous Materials Transportation Routes	Woodlands	Montgomery	Project	Hazardous Materials
Adopt County Fire Code	Woodlands	Montgomery	Policy	Wildfire
Require all residential/commercial structures to be sprinkled for fire protection	Woodlands	Montgomery	Policy	Wildfire
Adopt stormwater utility for dedicated funding to improve infrastructure			Policy	Flood
Clean up clutter in yards	Bayou Vista	Galveston		Hurricane
Storm windows or shutters for city buildings	Bayou Vista	Galveston		Hurricane
Better notification of older citizens - maybe get list of	Bayou Vista	Galveston	Public Education and	Hurricane

MITIGATION STRATEGY

HOUSTON - GALVESTON AREA COUNCIL REGIONAL HAZARD MITIGATION PLAN

Action	Jurisdiction	County	Category	Hazard
disabled and check on them when the storm is on the way			Outreach	
Deepen canals	Bayou Vista	Galveston	Structural Mitigation (Public)	Flood
Raise elevation of lots	Bayou Vista	Galveston		Flood
Raise bulk heads	Bayou Vista	Galveston	Structural Mitigation (Public)	Flood
Deepen ditches to help drain water	Bayou Vista	Galveston	Structural Mitigation (Public)	Flood
Raise elevation for certain roads	Bayou Vista	Galveston	Structural Mitigation (Public)	Flood
Better working relations with TXDOT	Brazoria	Brazoria	Evacuation	Hurricane
Preplanning with private and other agencies for storm cleanup	Brazoria	Brazoria	Planning	Hurricane
New outfall ditch directly into Brazos	Brazoria	Brazoria	Structural Mitigation (Public)	Flood
Increase stormwater detention areas - southeast part of town	Brazoria	Brazoria	Structural Mitigation (Public)	Flood
Designate routes for thru traffic in case of transportation incidents	Brazoria County	Brazoria		Hazardous Materials
Provide more public education concerning flood insurance and FEMA regulations	Brazoria County	Brazoria	Public Education and Outreach	Flood
Re-evaluate culverts on County roads	Brazoria County	Brazoria	Structural Mitigation (Public)	Flood
Clean drainage ditch culverts and bridges	Brazoria County	Brazoria	Structural Mitigation (Public)	Flood
Maintenance through spraying, mowing, debris removal of drainage ditches	Brazoria County	Brazoria	Structural Mitigation (Public)	Flood
Elevate homes with repetitive loss	Brazoria County	Brazoria	Structural Projects (Citizen)	Flood
improve evacuation - more signs on evacuation routes	Brazoria County	Brazoria	Evacuation	Hurricane
No handguns allowed in City limits	Dickinson	Galveston		Human caused hazards
Education - Information booths to place at businesses and fairs - newsletters	Dickinson	Galveston	Public Education and Outreach	Wind
Buy-out program	Dickinson	Galveston	Structural Projects (Citizen)	Flood
Drainage	Dickinson	Galveston	Structural Mitigation (Public)	Flood
House elevations	Dickinson	Galveston	Structural Projects (Citizen)	Flood
CRS	Dickinson	Galveston	Programs	Flood
Implement improved drainage projects and better maintenance program for cleaning drainage ditches	Galveston County	Galveston	Structural Mitigation (Public)	Flood
Exposed concrete and rebar on 60 miles of public beaches - remove debris and threat to public and private property - reducing property damage during events	Galveston County	Galveston	Structural Mitigation (Public)	Hurricane
Restore destroyed dune systems to decrease/mitigate damage to public/private property	Galveston County	Galveston	Structural Mitigation (Public)	Coastal Erosion/Hurricane
Install more geotube/reinforced dune systems	Galveston County	Galveston	Structural Mitigation (Public)	Coastal Erosion/Hurricane
Provide avenue for beachfront property to be bought out after they are deemed to be on the public beach	Galveston County	Galveston	Structural Projects (Citizen)	Flood
Implement aggressive beach nourishment program to	Galveston County	Galveston	Programs	Coastal

MITIGATION STRATEGY

HOUSTON - GALVESTON AREA COUNCIL REGIONAL HAZARD MITIGATION PLAN

Action	Jurisdiction	County	Category	Hazard
address critical erosion areas				Erosion/Hurricane
Coastal roads need to be elevated to better protect public during evacuation and to protect the roads from reducing road damage	Galveston County	Galveston	Evacuation	Hurricane
Hold annual hurricane planning meeting - "Town Meeting"	Jamaica Beach	Galveston	Public Education and Outreach	Hurricane
Install flap valves or manual valves to stop the high tides from flooding the streets	Jamaica Beach	Galveston	Structural Mitigation (Public)	Flood
Provide beach and dune renourishment	Jamaica Beach	Galveston	Programs	Coastal Erosion/Hurricane
Investigate CRS	Jamaica Beach	Galveston	Programs	Flood
Investigate BCEGS	Jamaica Beach	Galveston	Programs	All
System to notify the public of approaching storms	Kemah	Galveston	Public Education and Outreach	Thunderstorms
Complete reengineering of storm sewer system	Kemah	Galveston	Structural Mitigation (Public)	Flood
Grade separation at SH 288 and This Way, Oak Drive, Plantation - consider cost sharing to elevate project(s)	Lake Jackson	Brazoria	Evacuation	Hurricane
Prepare flood modeling analysis rather than reacting piecemeal	Lake Jackson	Brazoria	Planning	Flood
Table-top workshop to discuss possible problems during weather events	Sweeny	Brazoria	Training	All
To work with drainage district on improvements with drainage problems	Sweeny	Brazoria	Structural Mitigation (Public)	Flood
Buying out 3 homes on Magnolia Street - they have water in homes even during small thunderstorms	Sweeny	Brazoria	Structural Projects (Citizen)	Flood
Coordinate efforts to remove fallen trees in roadways after storms	Sweeny	Brazoria		Wind
Work with local school district for possible use of buses to help evacuate nursing homes	Sweeny	Brazoria	Evacuation	Hurricane
Keep people informed by meetings, newsletters, etc	Tiki Island	Galveston	Public Education and Outreach	Hurricane
Improve CRS rating	Tiki Island	Galveston		Flood
Raise road leaving town towards Houston	Tiki Island	Galveston	Structural Mitigation (Public)	Flood
Improved drainage control Dixie Drive - Bond Issue	TXDOT, Lake Jackson, Clute	Brazoria	Structural Mitigation (Public)	Flood
Culverts all over town are too small	Ames	Liberty	Stormwater Policies/Projects	Flood
Educate community on dangers of hazardous toxic chemicals on rail cars	Ames	Liberty		Hazardous Materials
Poor drainage, culverts too small	Ames	Liberty	Stormwater Policies/Projects	Flood
Community plan for weather disaster	Ames	Liberty		All
Tie-down of mobile homes	Ames	Liberty		Wind
Restrict development in flood prone areas	Chambers Co	Chambers	Development Policies	Flood
Increase BFE	Chambers Co	Chambers	Development Policies	Flood
Strengthen elevation requirements and structural specs for mobile homes	Chambers Co	Chambers	Codes and Regulations	Flood
Permit propane tanks (require tie-downs)	Chambers Co	Chambers	Codes and Regulations	Flood

MITIGATION STRATEGY

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

Action	Jurisdiction	County	Category	Hazard
Raise 5th Street from Washington to Center Street	Cleveland	Liberty	Evacuation, Stormwater Projects	Flood
Require 25' setback ordinance (pipeline failure)	Cleveland	Liberty	Codes and Regulations	Hazardous Materials
Update flood map	Cleveland	Liberty	Planning	Flood
Increase storm drainage size on Main Street and FM 834, working with DOT due to state easements	Daisetta	Liberty	Stormwater Policies/Projects	Flood
Education of the public	Daisetta	Liberty		Hazardous Materials
Warning system update	Daisetta	Liberty		Hazardous Materials
Working with local industries	Daisetta	Liberty		Hazardous Materials
Educate City Council on benefits of mitigation and become more involved	Daisetta	Liberty	Education and Outreach	All
Retrofit high school with shutters for shelter during hurricanes/tornadoes, or fix buildings for shelter (City Hall, Community Center)	Daisetta	Liberty		Wind
Drainage CIP	Dayton	Liberty	Stormwater Policies/Projects	Flood
Increase capacity of rail and highway crossings	Dayton	Liberty	Stormwater Policies/Projects	Flood
Stormwater Management Plan	Dayton	Liberty	Stormwater Policies/Projects	Flood
Reroute underpass drainage discharge	Dayton	Liberty	Stormwater Policies/Projects	Flood
Drainage Ordinance for new development	Dayton	Liberty	Development Policies	Flood
Local chemical spill plan	Dayton	Liberty	Planning	Hazardous Materials
Join CRS	Dayton	Liberty	Planning	Flood
Propose study for evacuation of North side of City (only one road in or out) in case of derailment of chemical spill	Devers	Liberty	Evacuation	Hazardous Materials
Propose study with drainage district and Liberty County for ditch cleanout and better culverts	Devers	Liberty	Stormwater Policies/Projects	Flood
Identify who lives in the vicinity in case of blow out or rupture (pipelines)	Devers	Liberty	Planning	Hazardous Materials
Work with state agencies to get traffic lights installed at major intersections for evacuation routes	Devers	Liberty	Coordination/Evacuation	Flood
Dam releasing water	Kenefick	Liberty	Stormwater Policies/Projects	Flood
Poorly graded ditches on roads preventing rapid drainage of rainwater	Kenefick	Liberty	Stormwater Policies/Projects	Flood
Debris and woods stopping up culverts	Kenefick	Liberty	Stormwater Policies/Projects	Flood
County needs more coordination between pipeline company and LEPC	Liberty County	Liberty	Coordination	Pipelines
Join CRS	Liberty County	Liberty		Flood
Continued buy-out of floodplain property	Liberty County	Liberty	Stormwater Policies/Projects	Flood
Working with adjoining Counties on flood and drainage issues	Liberty County	Liberty	Coordination	
Public education on hurricane wind protection	Liberty County	Liberty	Education and Outreach	Hurricane
Code reinforcement for wind strapping of structures	Liberty County	Liberty	Regulations	Hurricane
Dedicate Haz Mat route public education and training	Liberty County	Liberty	Evacuation	Hazardous Materials

MITIGATION STRATEGY

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

Action	Jurisdiction	County	Category	Hazard
Raise roadway of Plum Grove Road at Orange Branch crossing and at Baptist Church loop and increase culvert size to better drain roadway	Plum Grove	Liberty	Stormwater Policies/Projects	Flood
Establish warning notification system for river levels (East Fork, San Jacinto) to facilitate timely evacuation	Plum Grove	Liberty	Evacuation	Flood
Coordinate with pipeline company to update contact lists and notification system to warn of pipeline problems that would impact the city	Plum Grove	Liberty	Coordination	Hazardous Materials
Emergency generators for City Hall	Plum Grove	Liberty		All
Public education and outreach	Austin County	Austin	Education and Outreach	Hazardous Materials
Subdivision development regulations in lowlying (wet) but not floodplain designated areas	Austin County	Austin	Policy/Regulations	Flood
Develop route around City of Bellville	Bellville	Austin	Policy/Regulations	Hazardous Materials
Educating the population	San Felipe	Austin	Education and Outreach	Flood
Educating the population	San Felipe	Austin	Education and Outreach	Pipeline
Flood hazard notification	San Felipe	Austin	Education and Outreach	Flood
Establishing local agreements with neighboring cities/counties	San Felipe	Austin	Drainage Issues	Flood
Establish evacuation procedures	San Felipe	Austin	Policy/Regulations	Flood
Outreach and public education	Sealy	Austin	Education and Outreach	Hazardous Materials
Improve response capabilities	Sealy	Austin		Hazardous Materials
Outreach and public education	Sealy	Austin	Education and Outreach	Tornadoes
Evacuation of mobile home parks	Sealy	Austin		
Building Code enforcement	Sealy	Austin		Tornadoes
Work with State Legislature to authorize additional powers to County and City authorities to regulate construction	Sealy	Austin	Policy/Regulations	All
Create County-wide drainage district	Sealy	Austin	Policy/Regulations	Flood
Educate the public in regards to buy-out plans offered by FEMA, USACE, etc.	Wallis	Austin	Education and Outreach	Flood
Routinely maintain storm drains, in general	Wallis	Austin	Drainage Issues	Flood
Coordinate with County to improve and maintain drainage. Elm Slough	Wallis	Austin	Drainage Issues	Flood

This list was then pared down by each jurisdiction to only those mitigation actions that are included in *Appendix A*. Some actions were eliminated from consideration because they were found not to be cost-feasible or because a lead agency or department responsible could not be identified. All actions chosen by county and municipal government officials fell into one of the broad categories of mitigation techniques listed below.

Mitigation Techniques

1. Prevention

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

Preventative activities are intended to keep hazard problems from getting worse. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- ? Planning and Zoning
- ? Hazard Mapping
- ? Open Space Preservation
- ? Floodplain Regulations
- ? Stormwater Management
- ? Drainage System Maintenance
- ? Capital Improvements Programming
- ? Shoreline/ Riverine/ Fault Zone Setbacks

2. Property Protection

Property protection measures enable structures to better withstand hazard events, remove structures from hazardous locations, or provide insurance to cover potential losses. Examples include:

- ? Acquisition
- ? Relocation
- ? Building Elevation
- ? Critical Facilities Protection
- ? Retrofitting (i.e., wind proofing, flood proofing, seismic design standards, etc.)
- ? Insurance
- ? Safe Room Construction

3. Natural Resource Protection

Natural resource protection activities reduce the impact of hazards by preserving or restoring the function of natural systems. Examples of natural systems that can be classified as high hazard areas include floodplains, wetlands and barrier islands. Thus, natural resource protection can serve the dual purpose of protecting lives and property while enhancing environmental goals such as improved water quality or recreational opportunities. Parks, recreation, or conservation agencies and organizations often implement these measures. Examples include:

- ? Floodplain Protection
- ? Beach and Dune Preservation
- ? Riparian Buffers
- ? Fire Resistant Landscaping
- ? Erosion and Sediment Control
- ? Wetland Restoration
- ? Habitat Preservation
- ? Slope Stabilization

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

4. Structural Projects

Structural mitigation projects are intended to lessen the impact of hazards by modifying the environment or hardening structures. Structural projects are usually designed by engineers and managed or maintained by public works staff. Examples include:

- ? Reservoirs
- ? Levees, Dikes, Floodwalls or Seawalls
- ? Detention and Retention Basins
- ? Channel Modification
- ? Beach Nourishment
- ? Storm Sewer Construction

5. Emergency Services

Although not typically considered a mitigation technique, emergency services minimize the impact of a hazard on people and property. Actions taken immediately prior to, during, or in response to a hazard event include:

- ? Warning Systems
- ? Search and Rescue
- ? Evacuation Planning and Management
- ? Flood Fighting Techniques

6. Public Information and Awareness

Public Information and awareness activities are used to advise residents, business owners, potential property buyers and visitors about hazards and mitigation techniques they can use to protect themselves and their property. Examples of measures used to educate and inform the public include:

- ? Outreach and Education
- ? Training
- ? Speaker Series, Demonstration Events
- ? Real Estate Disclosure
- ? Hazard Expositions

Mitigation Techniques in the H-GAC Planning Area

County and municipal officials reviewed the findings of the *Capability Assessment* and *Risk Assessment* in order to determine feasible and effective mitigation techniques listed in **Table 6.1**. The Disaster Mitigation Act of 2000 specifies that state and local governments should prioritize actions based on the level of risk a hazard poses to the lives and property of a given jurisdiction. The Mitigation Matrix (**Figure 6.1**) served as a general guide; assisting local governments to make sure that they addressed, at a minimum, those hazards posing the greatest threat. Mitigation techniques, including prevention, property protection, natural resource protection, structural projects, emergency services, and public information and awareness were noted in the

MITIGATION STRATEGY

HOUSTON-GALVESTON AREA COUNCIL REGIONAL HAZARD MITIGATION PLAN

matrix if adopted by a participating jurisdiction. It is important to note that local Mitigation Action Plans in the HGAC planning area included an array of actions, not just those addressing high and moderate risk hazards.

**Figure 6.1
Mitigation Matrix**

MITIGATION TECHNIQUE	HIGH RISK HAZARDS			MODERATE RISK HAZARD
	<i>Hurricane Wind</i>	<i>Riverine Flooding</i>	<i>Drought</i>	<i>Coastal Flooding</i>
Prevention	X	X	X	X
Property Protection	X	X	X	
Natural Resource Protection	X	X		X
Structural Projects	X	X	X	
Emergency Services	X	X	X	
Public Information and Awareness	X	X	X	X

Mitigation Action Plan

The mitigation actions developed and adopted by participating jurisdictions are listed in Appendix A, *Locally-specific Mitigation Actions*. **Table 6.1** represents the general format in which each mitigation action was recorded. Each action has been designed to achieve the goals identified in the HGAC *Mitigation Strategy*. Each jurisdiction's mitigation actions form the basis of their Mitigation Action Plan. By identifying specific projects and policies, the local Mitigation Action Plans help lay the framework for participating counties and municipalities to engage in distinct actions that will reduce their exposure to future hazard events and disasters.

**Table 6.1
Mitigation Action Worksheet**

Mitigation Action	
a. Community Name:	
b. Action Item (Describe):	
c. Hazard(s):	
d. Lead Agency/ Department Responsible:	
e. Estimated Cost:	
f. Funding Method: (General Revenue, Contingency/ Bonds, External Sources, etc.)	
g. Implementation Schedule:	
h. Priority:	

- a. **Community Name:** Be sure to identify your community's name.
- b. **Action Item:** Identify specific actions that, if accomplished, will reduce vulnerability and risk in the impact area. Actions should match mitigation goals.
- c. **Hazard(s):** The hazard(s) the action attempts to mitigate.
- d. **Lead Agency/ Department Responsible:** Identify the local agency, department or organization that is best suited to accomplish this action.
- e. **Estimated Cost:** If applicable, indicate the cost to accomplish the mitigation action. This amount should be estimated until a final dollar amount can be determined.
- f. **Funding Method:** If applicable, indicate how the cost to complete the action will be funded. For example, funds may be provided from existing operating budgets (General Revenue), a previously established contingency fund (Contingency/ Bonds), or a federal or state grant (External Sources).
- g. **Implementation Schedule:** Indicate when the action will begin, and when the action is expected to be completed. Remember that some actions will require only a minimum amount of time, while others may require a long-term continuing effort.
- h. **Priority:** Indicate whether the action is a 1) High priority – short-term immediate – reducing overall risk to life and property; 2) Moderate priority – an action that should be implemented in the near future due to political or community support or ease of implementation; 3) Low priority – an action that should be implemented over the long term that may depend on the availability of funds. Prioritizing mitigation actions for each jurisdiction was based on the following five (5) factors: (1) effect on overall risk to life and

HOUSTON - GALVESTON AREA COUNCIL
REGIONAL HAZARD MITIGATION PLAN

property; (2) ease of implementation; (3) political and community support; (4) special emphasis on a general economic cost/benefit review²; and (5) funding availability.

As mentioned above, each action was prioritized by the jurisdiction that identified the action. An overall ranking of High, Moderate or Low was given to each action based on analysis of the action in terms of the five factors listed above.

The criteria above (items a. through h.) were also used by jurisdictions to evaluate the feasibility of actions that were identified in the cardstorming exercise (see **Table 6.1**). If a jurisdiction could not identify a department or agency responsible for implementing the action, or if the action was determined not to be cost feasible, it was eliminated from consideration.

Again, it is important to note that these mitigation actions are specific measures to be undertaken by the city or county. It is expected that this component of the Plan will be the most dynamic as it will be used as the primary indicator to measure the Plan's progress over time and will be routinely updated and/or revised as it is implemented and incorporated by the jurisdictions.

² Only a general economic cost/benefit review was considered through the process of selecting and prioritizing mitigation actions for each jurisdiction. Mitigation actions with "high" priority were determined to be the most cost effective and most compatible with each jurisdiction's unique needs. A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.