

# City of Galveston Hazard Mitigation Plan

## 2012 Progress Report

May 24, 2012

### **Background:**

The Disaster Mitigation Act of 2000 (DMA2K) requires that applicants for FEMA mitigation grant funding have a FEMA-approved multi-hazard mitigation plan. This plan is required to describe the hazards that can affect the community, assess the community's risk from these hazards, and to describe actions or projects that the community desires to undertake to mitigate their vulnerability.

Plans may be single or multi-jurisdictional, but must conform to 44 CFR, Part 201 and all applicable mitigation planning guidance issued by FEMA. A community must be a participant in a current, FEMA-approved plan to be eligible for FEMA mitigation funding. Local mitigation plans must be reviewed, updated and re-approved at least every five (5) years.

Development of the City of Galveston's Hazard Mitigation Plan began in May 2010, and concluded in July 2010. The Hazard Mitigation Plan Steering Committee recommended approval of the draft plan for City Council review and submission to TDEM. The plan was presented to Council at the August 12<sup>th</sup> meeting, and submitted to TDEM on August 13<sup>th</sup>, 2010. TDEM and FEMA required 6-8 months for review of the plan.

TDEM and FEMA requested minor changes to the plan thus requiring its modification. The modified plan was published for additional public comments and responses from the required governmental entities and the final plan was submitted and adopted through resolution by City Council on May 12, 2011.

### **Progress Reporting Process:**

Per Section 10, Monitoring and Maintenance, the following is required:

*Informal Plan monitoring activities will be ongoing. In addition to the FEMA mandated five year update cycle, the Plan Review Team will perform an informal review of the Plan at least annually, or more often as circumstances require. At least annually, a progress report will be prepared, noting any updates to information in the Plan or progress that has been made towards the goals, objectives or actions identified in the Plan. These reports will be found in Appendix M.*

The annual review of the Hazard Mitigation Plan is to be completed by representatives from these departments: Office of Emergency Management, Planning and Community Development, and Public Works. Review shall include consideration of any change in the previous year for the following items: hazard conditions, vulnerability/risk conditions, public outreach and involvement, as well as action plan items. Documentation of these changes on an annual basis will be incorporated into the five-year update in 2016.

### **Review of Hazard Conditions – May 2011 through April 2012:**

During the review period of the 2012 Progress Report, the staff committee noted that there had been no coastal storm events to impact the community. The drought conditions that were in existence throughout the summer and fall of 2011, which resulted in water restrictions for the community, have eased due to winter and spring rain events. While there have been few notable man-made hazard events, a significant tank fire at a port-related facility occurred during the spring of 2012.

### **Review of Vulnerability Conditions – May 2011 through April 2012:**

Few changes to vulnerability conditions were documented in the 2012 review period. However, there were several code changes that will assist with reduction in the City's vulnerability over time. As part of the Progress Galveston project, the City prepared an Erosion Response Plan (ERP) to implement dune protection, beach access, and erosion response policies and objectives in the City's newly adopted 2011 Comprehensive Plan and Hazard Mitigation Plan and to comply with state regulations. There were also updates to the Zoning and Subdivision Regulations and Municipal Stormwater Permitting.

#### **Erosion Response Plan:**

Adoption of an ERP is essential if the City wishes to seek state Coastal Erosion Planning and Response Act (CEPRA) funding to complete projects including dune and wetlands restoration, beach nourishment, shore protection, and other coastal improvement projects. The ERP, adopted by City Council on April 12, 2012, is designed to achieve the following broad objectives:

- Reduce public expenditures for erosion and storm damage losses to public and private property, including public beaches;
- Ensure the health and stability of existing dune systems and dune vegetation;
- Encourage the natural recovery of dunes and beaches following storm-induced erosion;
- Provide for the establishment of new dunes through restoration projects; and
- Allow for the landward migration of beaches and dunes due to erosion.

Prepared in consultation with local stakeholders and the Texas General Land Office (GLO), the ERP includes the following elements:

- A review of existing shoreline conditions, including information regarding shoreline change or erosion rates;
- A definition of Dune Conservation Areas where beachfront dunes naturally occur and where restored dunes may be located;
- Construction prohibitions, exemptions, and standards for construction activities within and seaward of Dune Conservation Areas;
- A definition of Enhanced Construction Zones and standards for construction activities within these areas;
- Opportunities for mitigation, restoration, and preservation of dune systems;

- Strategies to improve public beach access;
- Procedures for post-storm damage assessment of beach access points; and
- Criteria for acquiring property within or seaward of the Dune Conservation Area.

Following adoption in April 2012, the ERP was forwarded to the GLO for review in May 2012. GLO comments are anticipated in summer 2012. The City can then proceed with revisions to the ERP, if needed, and updates to the City’s Dune Protection and Beach Access Plan and regulations in accordance with the ERP as part of the LDR update process.

Zoning Code and Comprehensive Plan:

Amendments to the City of Galveston’s zoning code were also completed during the review period, particularly in the comprehensive update to the Subdivision Regulations. Changes to the rest of the zoning code, under the Progress Galveston Land Development Regulation project, will be completed by the end of 2012. The City of Galveston also adopted the 2011 Comprehensive Plan in October 2011.

The City's updated 2011 Comprehensive Plan, or Comp Plan, offers goals, objectives, actions, and strategies for the community's long-term growth and development. The Comp Plan, an important guide to local decision makers, addresses a wide range of important issues—from the rebuilding of neighborhoods damaged by Hurricane Ike to the quality and character of development island-wide.

The Comprehensive Plan Steering Committee created several subcommittees to focus on key strategic directions pertaining to the following existing and new elements:

- Housing and Neighborhoods Element;
- Economic Development Element;
- Land Use & Community Character Element;
- Historic Preservation Element;
- Natural Resources Element;
- Transportation Element;
- Infrastructure Element;
- Disaster Response Element; and
- Human Element.

Finalization of the Comp Plan was guided by an extensive public engagement process between April and June 2011. The process included: online distribution of the draft plan, community stakeholder workshops; a public opinion survey distributed to City residents and available online; and a series of focus groups conducted by the Center to Eliminate Health Disparities at UTMB Health to identify participants’ priorities and recommendations for the Comp Plan.

Municipal Stormwater Permit:

On January 26<sup>th</sup> 2012, the Galveston City Council passed ordinance number 12-006 for the regulation of discharges to the municipal separate storm sewer system (MS4). In addition to being a Federal mandate as part of the “Clean Water Act”, this will also serve as a mitigation

tool for the storm water system by minimizing the amount of solids that will make their way into said system. By this reduction of solids, the storm water flows will have less resistance and thus be allowed to flow freely from the areas impacted by the event.

### **Review of Public Outreach and Involvement – May 2011 through April 2012:**

The City of Galveston held its annual Hurricane Preparedness Meeting on May 18, 2011 at the Galveston Island Convention Center. Kelly George, with Witt and Associates, presented the final draft of the City’s Hazard Mitigation Plan during the meeting. The Governor’s proclamation on ‘Beach Safety Week’ Speakers included TDEM, County, UTMB, USCG, NWS and local management. Approximately 350 citizens attended the meeting.

The City of Galveston and the County of Galveston have expanded Citizen Emergency Response Team (CERT) training in 2011 – 2012. There have been approximately 70 people to complete the CERT training within the City and County of Galveston.

### **Updates to the Hazard Mitigation Action Plan – May 2011 through April 2012:**

The broad goals of the City of Galveston Hazard Mitigation Plan, as determined by the HMPSC, are as follows:

- Goal 1: Improve education and outreach efforts, specifically to the public, elected officials, municipal employees and local businesses, regarding the potential impacts of hazards and the identification of specific measures that can be taken to reduce those impacts.
- Goal 2: Improve capabilities, coordination and opportunities at the municipal level to plan and implement hazard mitigation projects, programs and activities, especially through the use of GIS, coordination with universities and colleges, and public/private partnerships.
- Goal 3: Develop hazard mitigation policies and programs designed to reduce the impact of natural and human caused hazards to people and property.
- Goal 4: Identify and implement hazard mitigation projects to reduce the impact of hazard events and disasters.

The HMPSC developed the following program of mitigation actions in response to the risk and capability assessments (see Sections 7 and 8) that will be implemented on a City-wide basis. These actions are presented in Table 9.3.3-1, and are organized by goal and objective. The actions presented in the table represent both previously identified actions from other planning efforts and newly-identified actions, determined through discussions with the HMPSC and City Staff.

Action items that were included in the 2010 County Update were considered and included by the HMPSC. Such actions are noted as “existing actions” in Table 9.3.3-1. Some actions may have been modified as a result of discussions among the HMPSC members.

Completed actions are indicated by shading. Those actions that were identified in previous planning efforts and are not yet been completed have been deferred. In all cases, these actions were not completed due to one or more of the following circumstances:

- Lack of available funding; or
- Resources otherwise directed towards response and recovery efforts following Hurricane Ike; or
- Interruption in normal operating procedures and scheduled projects following Hurricane Ike.

For the 2012 Progress Report, updated items are noted in **Bold** and underlined. If an action has been completed, it will be shaded and noted for the year of completion.

**Table 9.3.3-1  
City of Galveston –Mitigation Action Plan**

| <b>City of Galveston – Mitigation Action Plan</b>   |  |                               |                       |                                    |  |                                |                 |                 |
|---|--|-------------------------------|-----------------------|------------------------------------|--|--------------------------------|-----------------|-----------------|
| <b>Proposed Action</b>  | <b>Hazard(s) Addressed</b>   | <b>New or Existing Action</b> | <b>Estimated Cost</b> | <b>Potential Funding Source(s)</b> | <b>Agency / Department Responsible</b> | <b>Implementation Schedule</b> | <b>Comments</b> | <b>Priority</b> |
| <b>Goal 1:<br/>Improve education and outreach efforts, specifically to the public, elected officials, municipal employees and local businesses, regarding the potential impacts of hazards and the identification of specific measures that can be taken to reduce those impacts.</b> |  |                               |                       |                                    |  |                                |                 |                 |
| <b>Objective 1.1:<br/>Educate the public and others on actions they can take to prevent or reduce loss or life or property damage from all hazards.</b>   |  |                               |                       |                                    |  |                                |                 |                 |
| Provide hazard and disaster awareness and preparedness information to the public, both residents and visitors.  | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | Existing (On-going)           | \$2,000               | General Fund                       | Office of Emergency Management         | 2011-2016<br>Ongoing annually  |                 | High            |

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|---|--|--------------------------------|-----------------------|------------------------------------|--|--------------------------------|---|-----------------|
| <p>Use internet to provide information to residents and visitor regarding natural disasters, preparation and protection.</p> <p>Investigate use of social media to provide information.</p> <p>Maintain use of One Call Reaches All as means of notification and information.</p> | <p>Biologic Event;<br/>Coastal Erosion;<br/>Coastal Retreat;<br/>Coastal Subsidence;<br/>Drought;<br/>Environmental Disaster;<br/>Extreme Wind;<br/>Flooding;<br/>Hazardous Materials Incident;<br/>Lightning;<br/>Sea Level Change;<br/>Terrorism;<br/>Tsunami;<br/>Wildfire / Urban Fire</p> | Existing (Modified) (Deferred) | \$5,000               | General Fund                       | Office of Emergency Management         | 2011-2016<br>Ongoing annually  | This activity is on-going in the aftermath of Hurricane Ike | High            |
| <p>Conduct town meeting prior to start of hurricane season, to provide information to residents.</p>  | <p>Extreme Wind;<br/>Flooding</p>  | Existing (On-going)            | \$2,000               | General Fund                       | Office of Emergency Management         | 2011-2016<br>Ongoing Annually  | This activity occurs annually prior to hurricane season.    | High            |

**City of Galveston – Mitigation Action Plan**

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|---|--|--------------------------------|-----------------------|--|---|--------------------------------|---|-----------------|
| Purchase and distribute NOAA All-Hazard radios or other public notification devices to public facilities, schools, day cares, medical facilities, critical facilities, and large public gathering places. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | Existing (Modified) (Deferred) | \$100 per unit        | FEMA HMGP  | Office of Emergency Management  | 2011-2016                      | Applies to existing and future development. | High            |
| Implement public information and education campaign to educate residents and businesses about benefits of xerogardening and xeriscaping.  | Drought  | Existing (Deferred)            | \$5,000               | General funds, Texas Agriculture Extension Service | Planning and Community Development, Office of Emergency Management      | 2011-2016                      | Applies to existing and future development. | High            |
| Implement public information and education campaign to educate residents and businesses about hazardous materials incidents, evacuation procedures in the event of an accident, and sheltering-in-place.  | Hazardous Materials Incident   | Existing (Deferred)            | \$2,500               | Private Funds, General funds, FEMA HMGP            | Galveston Fire Department, Office of Emergency Management, Public Works | 2011-2016                      |   | High            |

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|---|---|-------------------------------|-----------------------|--|---|--------------------------------|---|-----------------|
| Implement public information and education campaign to educate residents and businesses on how to reduce the threat of urban fires and wildfires. | Wildfire / Urban Fire   | Existing (Deferred)           | \$2,500               | FEMA HMGP, Texas Forest Service, General Funds | Galveston Fire Department, Office of Emergency Management                                     | 2011-2016                      | Applies to existing and future development.   | High            |
| Increase on-island CERT capability and capacity.  | Biologic Event; Coastal Erosion; Coastal Retreat; Coastal Subsidence; Drought; Environmental Disaster; Extreme Wind; Flooding; Hazardous Materials Incident; Lightning; Sea Level Change; Terrorism; Tsunami; Wildfire / Urban Fire | <b><u>On-going</u></b>        | \$5,000               | General Funds                                  | <b><u>Office of Emergency Management/ Galveston County Office of Emergency Management</u></b> | 2011-2016                      | <b><u>3 classes of CERT training on-island in 2010 – 2011 with 70 graduates</u></b> | Moderate        |

**Goal 2:**  
**Improve capabilities, coordination and opportunities at the municipal level to plan and implement hazard mitigation projects, programs and activities, especially through the use of GIS, coordination with universities and colleges, and public/private partnerships.**

**Objective 2.1:**  
**Acquire and maintain detailed data regarding vulnerabilities, including critical facilities and historic assets, so that these resources can be prioritized and assessed for mitigation actions.**

**City of Galveston - Mitigation Action Plan**

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|---|--|----------------------------------|------------------------|------------------------------------|--|--------------------------------|---|-----------------|
| Work cooperatively with NOAA and other agencies to conduct workshop/study on sea level rise in Galveston. | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Sea Level Change  | New                              | \$5,000+               | General Funds, NOAA                | Planning and Community Development     | 2011-2016                      |   | Moderate        |
| Development of Sustainability Plan/Program Implementation.  | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | <b><u>On-going/ Underway</u></b> | <b><u>\$50,000</u></b> | General Funds, CDBG                | Planning and Community Development     | 2011-2016                      | Applies to existing and future development.<br><b><u>Expected adoption of Sustainable Action Plan by the end of 2012.</u></b> | Moderate        |

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|---|--|-------------------------------|-----------------------|---|--|--------------------------------|--|-----------------|
| Development of Greenprinting Plan for areas east of West End study. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | New                           | \$5,000               | General Funds, Texas Parks and Wildlife, CDBG | Planning and Community Development/<br><b><u>Public Works Department</u></b> | 2011-2016                      | "Greenprinting" refers to a strategy to manage growth that ensures quality of life, clean air and water, recreation and economic health. Applies to existing and future development. | Moderate        |

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|---|--|-------------------------------|-----------------------|------------------------------------|--|--------------------------------|---|-----------------|
| Develop proposed land use mapping to allow easier consideration of hazards in future development. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | <u>Existing/ Underway</u>     | <u>\$15,000</u>       | General Funds, CDBG                | Planning and Community Development     | 2011-2016                      | Applies to future development.<br><br><u>Expected completion by the end of 2012.</u>      | Moderate        |
| Consider / Development of structural acquisition plan/procedures.                                 | Flooding   | <u>Existing/ Underway</u>     | \$5,000               | General Funds                      | Planning and Community Development     | 2011-2016                      | Applies to existing structures.<br><br><u>Included in the Erosion Response Plan (ERP)</u> | Moderate        |
| Consider / Development of structural elevation plan/procedures.                                   | Flooding   | New                           | \$5,000               | General Funds                      | Planning and Community Development     | 2011-2016                      | Applies to existing structures.   | Moderate        |

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|--|--|-------------------------------|-----------------------|--|--|--------------------------------|---------------------------------|-----------------|
| Consider alternative methodologies for determination of substantial damage.  | Extreme Wind<br>Flooding<br>Wildfire / Urban Fire  | New                           | \$5,000               | General Funds  | Planning and Community Development     | 2011-2016                      | Applies to existing structures. | Moderate        |
| Consider / Contract for historic property mitigation study, to determine best practices for mitigation of homes on larger scale. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | New                           | \$50,000              | General Funds, THC, GHF, National Park Service, CDBG | Planning and Community Development     | 2011-2016                      | Applies to existing structures. | Moderate        |

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|--|--|-------------------------------|-----------------------|------------------------------------|--|--------------------------------|-----------------|-----------------|
| Digitalization of paper records, city-wide, for access post-disaster (mitigate data loss and allow for continuity of operations/government). | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | <u>Existing/ Underway</u>     | \$5,000+              | General Funds, FEMA HMGP, CDBG     | <u>City Secretary's Office with assistance from City Departments such as:</u> Planning and Community Development, Municipal Utilities, Office of Emergency Management, IT/Finance Department | 2011-2016                      |                 | Moderate        |

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|--|--|-------------------------------|-----------------------|------------------------------------|---|--------------------------------|--|-----------------|
| Develop detailed inventory of critical facilities, to include elevations, square footage and contents inventory.                                 | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | New                           | \$5,000               | General Funds                      | Planning and Community Development,<br>Municipal Utilities,<br>Office of Emergency Management | 2011-2016                      | Applies to existing and future development.  | High            |
| <b>Goal 3:</b>   |  |                               |                       |                                    |   |                                |  |                 |
| <b>Develop hazard mitigation policies and programs designed to reduce the impact of natural and human caused hazards to people and property.</b> |  |                               |                       |                                    |   |                                |  |                 |
| <b>Objective 3.1:</b>  |  |                               |                       |                                    |   |                                |  |                 |
| <b>Seek ways to reduce losses to the National Flood Insurance Program, and to increase participation in and compliance with the NFIP.</b>        |  |                               |                       |                                    |   |                                |  |                 |
| Consider joining the NFIP's Community Rating System.   | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Flooding;<br>Sea Level Change;<br>Tsunami   | Existing (On-going)           | \$10,000              | General Funds                      | Planning and Community Development  | 2011-2016                      | No cost to join program, though administrative costs will be incurred to maintain membership | Moderate        |

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|---|--|-------------------------------|-----------------------|------------------------------------|--|--------------------------------|---|-----------------|
| Consider adoption and enforcement of freeboard requirement into City’s Flood Damage Prevention Ordinance. | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (On-going)           | \$2,500               | General Funds                      | Planning and Community Development     | 2011-2016                      | Action is currently under consideration for implementation. Would apply to future development and any existing structures designated as substantially damaged or improved.<br><br><u>Included for City-owned facilities and CDBG-DR projects.</u> | Moderate        |
| Increase number of floodplain managers in the building division through training and certification.       | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Flooding;<br>Sea Level Change;<br>Tsunami | New                           | \$10,000              | General Funds, FEMA                | Planning and Community Development     | 2011-2016                      |   | Moderate        |
| Identify Repetitive Loss flooding properties for future mitigation projects.                              | Flooding;<br>Tsunami   | Existing (Complete)           | Unknown               | General Funds, FEMA                | Planning and Community Development     | <b>Action Completed 2011</b>   | Action has been completed, and will be removed in next Plan update.   | Medium          |

**Objective 3.2:**

**Consider measures to ensure that modifications to existing development, as well as any future development, will not put people or property in harm’s way, or will not increase threats to existing properties.**

**City of Galveston – Mitigation Action Plan**

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|---|---|---------------------------------------|-----------------------|--|---|--------------------------------|--|-----------------|
| Support aggressive beach nourishment program to address critical erosion areas.                               | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (On-going by GLO) | Unknown               | USACE, GLO, CIAP, GLO CEPRA                              | GLO, Planning and Community Development               | 2011-2016                      | This action is on-going in the aftermath of Hurricane Ike. | High            |
| Restore destroyed dune systems to decrease / mitigate damage to public and private property.                  | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (On-going by GLO)            | Unknown               | FEMA HMGP/PDM/FMA, State (CEPRA) and local grants, USACE | GLO, Planning and Community Development               | 2011-2016                      | This action is on-going in the aftermath of Hurricane Ike. | High            |
| Install shoreline protection devices in areas subject to coastal erosion to reinforce dune systems.           | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (Deferred)        | \$175,000             | FEMA HMGP, USACE, GLO                                    | GLO, Planning and Community Development, Public Works | 2011-2016                      |  | Moderate        |
| <b>Goal 4:</b>  |   |                                       |                       |  |   |                                |  |                 |
| <b>Identify and implement hazard mitigation projects to reduce the impact of hazard events and disasters.</b> |   |                                       |                       |  |   |                                |  |                 |
| <b>Objective 4.1:</b>   |   |                                       |                       |  |   |                                |  |                 |
| <b>Pursue opportunities to mitigate identified Repetitive Loss and Severe Repetitive Loss properties</b>      |   |                                       |                       |  |   |                                |  |                 |

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| <b>Proposed Action</b>  | <b>Hazard(s) Addressed</b>  | <b>New or Existing Action</b>  | <b>Estimated Cost</b>     | <b>Potential Funding Source(s)</b>   | <b>Agency / Department Responsible</b> | <b>Implementation Schedule</b> | <b>Comments</b>  | <b>Priority</b> |
|---|---|--------------------------------|---------------------------|--|--|--------------------------------|--|-----------------|
| Elevation, acquisition or other mitigation of identified Repetitive Loss and Severe Repetitive Loss properties.   | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (Deferred) | \$50,000+ (per structure) | CDBG, FEMA HMGP/<br>PDM/ FMA/<br>SRL/ RFC,<br>Property Owners,<br>NFIP ICC | Planning and Community Development     | 2011-2016                      | Applies to existing structures.  | High            |
| <b>Objective 4.2:</b>   |   |                                |                           |  |  |                                |  |                 |
| <b>Pursue opportunities for structural mitigation projects and other projects to protect infrastructure from hazards.</b>                               |   |                                |                           |  |  |                                |  |                 |
| Exposed concrete and rebar on public beaches – remove debris and threat to public and private property – reducing property damage during hazard events. | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | <b>Completed</b>               | Unknown                   | FEMA Public Assistance,<br>GLO, CEPRA,<br>Texas Beach Sweep, CDBG          | <b>Texas General Land Office (GLO)</b> | <b>Action Completed 2012</b>   | This action is on-going in the aftermath of Hurricane Ike<br><br><b>Action has been completed and will be removed in the next Plan update.</b> | High            |
| Elevate coastal roads to better protect public during evacuation and to protect the roads from flood damage, where technically feasible.                | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (Deferred) | Unknown                   | Potential funding from TXDot, CDBG   | FHWA, TXDoT, Public Works              | 2011-2016<br>Ongoing project   | Applies to existing and future coastal roads.  | High            |

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| <b>Proposed Action</b>   | <b>Hazard(s) Addressed</b>  | <b>New or Existing Action</b>                | <b>Estimated Cost</b>                | <b>Potential Funding Source(s)</b>                        | <b>Agency / Department Responsible</b>   | <b>Implementation Schedule</b> | <b>Comments</b>   | <b>Priority</b> |
|--|---|--|--------------------------------------|---|--|--------------------------------|---|-----------------|
| Implement improved drainage projects and better maintenance program for clearing drainage ditches. | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (Deferred)               | Unknown                              | TWDB, FEMA HMGP, CDBG, Enterprise Funds                   | Public Works   | 2011-2016                      | Applies to existing and future drainage systems.  | High            |
| Elevation of structures at risk from flooding.   | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (Deferred)               | \$50,000 - \$100,000 (per structure) | CDBG, FEMA HMGP / PDM/ FMA/SRL, Property Owners, NFIP ICC | Planning and Community Development/<br><b><u>Grants and Housing Department</u></b> | 2011-2016                      | Will require coordination with TDEM and FEMA to address BCA issues.<br><br>Applies to existing structures. (Future structures will require elevation to meet current codes/ordinances.)<br><br><b><u>CDBG-DR projects and City-owned facilities</u></b> | Moderate        |
| Install security/surveillance equipment at all municipal facilities.                               | Hazardous Materials Incident;<br>Terrorism  | Existing (Modified) <b><u>(On-going)</u></b> | \$100,000                            | TDEM, DHS, General Funds                                  | Office of Emergency Management   | 2011-2016                      | Applies to existing and future development.   | High            |

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|--|--|-------------------------------|-----------------------|------------------------------------|--|-------------------------------------|---|-----------------|
| Purchase text equipment for local cable channel. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | Existing (Complete)           | \$20,000              | FEMA HMGP / PDM                    | PIO                                    | <b>Action Completed <u>2011</u></b> | Action has been completed, and will be removed in next Plan update. | High            |

**City of Galveston - Mitigation Action Plan**

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|---|--|--------------------------------|-----------------------|--|--|--------------------------------|--|-----------------|
| Identify and purchase needed vehicles and equipment for public safety departments.  | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | Existing (Modified) (On-going) | \$750,000             | FEMA PA, DHS, General Fund, CDBG, <u>Donations</u> | Fire Department, Police Department, Public Works, Beach Patrol, Office of Emergency Management | 2011-2016                      | Some equipment and vehicles will be or has been purchased through FEMA PA funding.<br><br><u>2010-2012: Police Dept purchased safe boat; Fire Dept purchased new pumper truck; Rescue Gear purchased/donated</u> | High            |
| Harden facility and improve security at 30 <sup>th</sup> Street Water Pump Station. | Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Terrorism   | Existing (Complete)            | <u>\$600,000</u>      | Unknown  | Municipal Utilities  | <u>Action Completed 2011</u>   | Action has been completed, and will be removed in next Plan update.  | Moderate        |

**City of Galveston – Mitigation Action Plan**

| <b>Proposed Action</b>  | <b>Hazard(s) Addressed</b>   | <b>New or Existing Action</b>  | <b>Estimated Cost</b>     | <b>Potential Funding Source(s)</b>                             | <b>Agency / Department Responsible</b> | <b>Implementation Schedule</b> | <b>Comments</b>   | <b>Priority</b> |
|---|--|--------------------------------|---------------------------|--|--|--------------------------------|---|-----------------|
| Harden facility and improve security at unmanned municipal utility facilities.                | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Sea Level Change;<br>Terrorism | <u>Existing/ Underway</u>      | <u>\$2,500,000</u>        | General Funds, DHS, TWDB, FEMA HMGP/PDM                        | Municipal Utilities                    | 2011-2016                      | Action will be dependent on availability of funding, and applies to both existing and future development. | Moderate        |
| Acquisition and demolition of structures damaged by flooding, including abandoned structures. | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami  | Existing (Modified) (On-going) | \$50,000+ (per structure) | CDBG, FEMA HMGP/ PDM/ FMA/ SRL/ RFC, Property Owners, NFIP ICC | Planning and Community Development     | 2011-2016                      | Applies to existing structures.   | Moderate        |
| Elevation or other flood protection of historic structures at risk from flooding.             | Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Extreme Wind;<br>Flooding;<br>Sea Level Change;<br>Tsunami  | Existing (Modified) (Deferred) | \$50,000+ (per structure) | CDBG, FEMA HMGP/ PDM/ FMA/ SRL/ RFC, Property Owners, NFIP ICC | Planning and Community Development     | 2011-2016                      | Applies to existing structures.   | Moderate        |

**City of Galveston – Mitigation Action Plan**

| <b>Proposed Action</b>  | <b>Hazard(s) Addressed</b>  | <b>New or Existing Action</b>  | <b>Estimated Cost</b>               | <b>Potential Funding Source(s)</b>      | <b>Agency / Department Responsible</b> | <b>Implementation Schedule</b> | <b>Comments</b>                            | <b>Priority</b> |
|---|---|--------------------------------|-------------------------------------|---|--|--------------------------------|--|-----------------|
| Study, evaluate, design and construct flood control methods, with particular emphasis on the protection of critical facilities and critical infrastructure. | Biologic Events;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (On-going) | \$50,000+ (per structure or device) | CDBG, FEMA HMGP/ PDM/ FMA, General Fund | Public Works                           | 2011-2016                      | Applies to existing and future structures. | Moderate        |
| Mitigation/hardening of substantially damaged structures (historic/non-historic).   | Extreme Wind;<br>Wildfire / Urban Fire  | Existing (Modified) (On-going) | \$50,000+ (per structure)           | CDBG, FEMA HMGP/ PDM, Property Owners   | Planning and Community Development     | 2011-2016                      | Applies to existing and future structures. | Moderate        |

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|--|--|--------------------------------|-----------------------|--|--|--------------------------------|--|-----------------|
| Identify critical facilities and other necessary public buildings that require emergency power generation - Purchase and install emergency power generators and related housing and connection equipment at all critical facilities or other necessary public buildings. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | Existing (Modified) (On-going) | Unknown               | FEMA HMGP, CDBG, General Funds, Enterprise Funds | Office of Emergency Management, Public Works | 2011-2016                      | Some facilities addressed after Ike. Additional facilities to be identified. Applies to existing and future development. | High            |

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|---|--|-------------------------------|---------------------------|--|--|--------------------------------|---|-----------------|
| Design and construct a Safe Room (using FEMA 361 design guidance) to house emergency personnel and first responders who must remain on the island during evacuations. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | Existing<br>(On-going)        | <b><u>\$10-\$15MM</u></b> | FEMA<br>HMGP/ PDM,<br>General Funds,<br>Donations,<br>CDBG | Office of<br>Emergency<br>Management, City<br>Manager's Office | 2011-2016                      | Project applied for under DR-1791 HMGP<br><br><b><u>2012: Still under investigation</u></b> | Moderate        |

**City of Galveston – Mitigation Action Plan**

| <b>Proposed Action</b>  | <b>Hazard(s) Addressed</b>  | <b>New or Existing Action</b>  | <b>Estimated Cost</b> | <b>Potential Funding Source(s)</b>                                    | <b>Agency / Department Responsible</b>   | <b>Implementation Schedule</b> | <b>Comments</b>   | <b>Priority</b> |
|---|---|--------------------------------|-----------------------|---|--|--------------------------------|---|-----------------|
| Perform retrofits of public utilities (including sanitary sewer and drinking water systems), which may include the following: inflow guards on manhole covers, elevated electrical components, flood proof or elevate utility structures within SFHAs, ring berms around critical facilities that cannot feasibly be elevated, watertight manhole covers, tied down fuel storage tanks. | Biologic Events;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Tsunami | Existing (Modified) (On-going) | \$5,000+ per project  | FEMA HMGP/ PDM/ FMA, General Funds, TWDB, CDBG                        | Public Works   | 2011-2016                      | Applies to existing structures.   | Moderate        |
| Increase native canopy by tree planting in public rights-of-way to reduce urban heat levels.  | Drought   | Existing (On-going)            | <b>\$500,000</b>      | Arbor Day Foundation General Funds, CDBG, <b>Donations, Residents</b> | Planning and Community Development, Public Works, <b>Parks and Recreation Department, Galveston Tree Committee</b> | 2011-2016                      | Applies to existing and future development.<br><b>2012: Development of the Broadway Landscape Rehabilitation and Maintenance Plan</b> | Moderate        |
| Develop and implement a system for early detection / notification of hazardous materials incidents, leaks and accidents.  | Hazardous Materials Incident  | Existing (Modified) (On-going) | \$25,000+             | Private funding   | Galveston Fire Department, Public Works, Office of Emergency Management  | 2011-2016                      | Cost would be dependent on material.<br><b>2012: Port of Galveston and UTMB have expanded capabilities</b>                            | Moderate        |

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|---|---|----------------------------------|---------------------------|---|---|--------------------------------|--|-----------------|
| Investigate eligibility and benefits of National Weather Service's "StormReady" Community program – Apply for entry to program, if beneficial and feasible.   | Extreme Wind; Lightning   | Existing (Modified) (Deferred)   | \$2,500                   | Private Funds, General funds                              | Office of Emergency Management  | 2011-2016                      |  | Low             |
| Wind retrofit critical facilities and those other public buildings that must function following <u>an</u> extreme wind event.   | Extreme Wind  | Existing (Modified) (On-going)   | <b><u>\$125,000+</u></b>  | FEMA HMGP/ PDM, General Funds, CDBG, <b><u>EECDBG</u></b> | Office of Emergency Management, Planning and Community Development, Public Works, City Manager's Office | 2011-2016                      | Project for McGuire Dent Recreation Center submitted under DR-1791 HMGP. Applies to existing structures.<br><br><b><u>2012: EECDBG project to repair/improve City Hall windows and doors</u></b> | Moderate        |
| Develop and implement stormwater drainage system improvements.  | Flooding  | Existing (Deferred)              | <b><u>\$250M</u></b>      | General Funds, Enterprise Funds, TWDB, CDBG               | Public Works  | 2011-2016                      | Applies to existing and future development.  | Moderate        |
| Develop vegetation management program to mitigate spread and fueling of fires.  | Wildfire / Urban Fire   | Existing (Deferred)              | \$5,000                   | FEMA HMGP/ PDM, Texas Forest Service, General Funds, CDBG | Galveston Fire Department   | 2011-2016                      | Applies to existing and future development.  | Moderate        |
| Investigate ways to harden and protect facilities and infrastructure belonging to Gulf Coast Water Authority (Sole source provider of potable water to City) – Implement projects as funding becomes available. | Extreme Wind; Flooding; Hazardous Materials Incident; Sea Level Change; Terrorism | <b><u>Existing/ Underway</u></b> | <b><u>\$6,500,000</u></b> | General Funds, Enterprise Funds, FEMA HMGP/ PDM, CDBG     | Municipal Utilities   | 2011-2016                      | Applies to existing and future development.  | High            |

**City of Galveston – Mitigation Action Plan**

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|---|---|---------------------------------|---------------------------|--|---|--------------------------------|--|-----------------|
| Rehabilitate the 1894 Bayline, for use as emergency water connection in the event of failure or damage of the water main.   | Coastal Erosion; Coastal Retreat; Coastal Subsidence; Extreme Wind; Flooding; Hazardous Materials Incident; Sea Level Change; Terrorism | New<br><b><u>[Deferred]</u></b> | <b><u>\$8,000,000</u></b> | General Funds, Enterprise Funds, CDBG FEMA HMGP        | Municipal Utilities                                     | 2011-2016                      | Applies to existing equipment/structures.<br><br><b><u>2012: Pending funding</u></b> | High            |
| Implement plans for elimination of on-site sewage treatment.  | Biologic Event; Coastal Erosion; Coastal Retreat; Coastal Subsidence; Environmental Disaster; Flooding; Sea Level Change; Tsunami       | New                             | \$10,000+ per structure   | General Funds, Enterprise Funds, CDBG, Property Owners | Planning and Community Development, Municipal Utilities | 2011-2016                      | Applies to existing structures.  | Moderate        |
| Monitor funding sources for opportunities to provide assistance to homeowners for purchase of grinder pumps (maintenance would remain property owner's responsibility). | Biologic Event  | New                             | \$5,000+ per structure    | Unknown at this time                                   | Planning and Community Development, Municipal Utilities | 2011-2016                      | Applies to existing structures.  | Moderate        |

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|--|--|--|-----------------------|------------------------------------|--|--------------------------------|--|-----------------|
| Investigate and implement hardening of IT and phone (communication) infrastructure, to include off-site/remote facilities. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | <b><u>Existing</u></b><br><b><u>[On-going]</u></b> | \$5,000+              | General Funds, FEMA HMGP, CDBG     | Planning and Community Development, Municipal Utilities, Office of Emergency Management, IT/Finance Department | 2011-2016                      | Applies to existing and future infrastructure.<br><br><b><u>2012: Developing city-wide fiber network</u></b> | High            |

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|---|--|--|-----------------------|------------------------------------|--|--------------------------------|--|-----------------|
| Increased capacity/hardening for internal departmental communication. | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | <b><u>Existing</u></b><br><b><u>[On-going]</u></b> | \$5,000+              | General Funds, FEMA HMGP, CDBG     | Planning and Community Development, Municipal Utilities, Office of Emergency Management, IT/Finance Department | 2011-2016                      | Applies to existing and future infrastructure.<br><b><u>2012: Developing city-wide fiber network</u></b> | High            |

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|--|--|-------------------------------|-----------------------|------------------------------------|--|-------------------------------------|-----------------|-----------------|
| Develop a standby application for post-disaster code enforcement (includes building, compliance, planning, public works, etc). | Biologic Event;<br>Coastal Erosion;<br>Coastal Retreat;<br>Coastal Subsidence;<br>Drought;<br>Environmental Disaster;<br>Extreme Wind;<br>Flooding;<br>Hazardous Materials Incident;<br>Lightning;<br>Sea Level Change;<br>Terrorism;<br>Tsunami;<br>Wildfire / Urban Fire | <b><u>Complete</u></b>        | \$5,000               | General Funds                      | Planning and Community Development     | <b><u>Action Completed 2012</u></b> |                 | High            |

