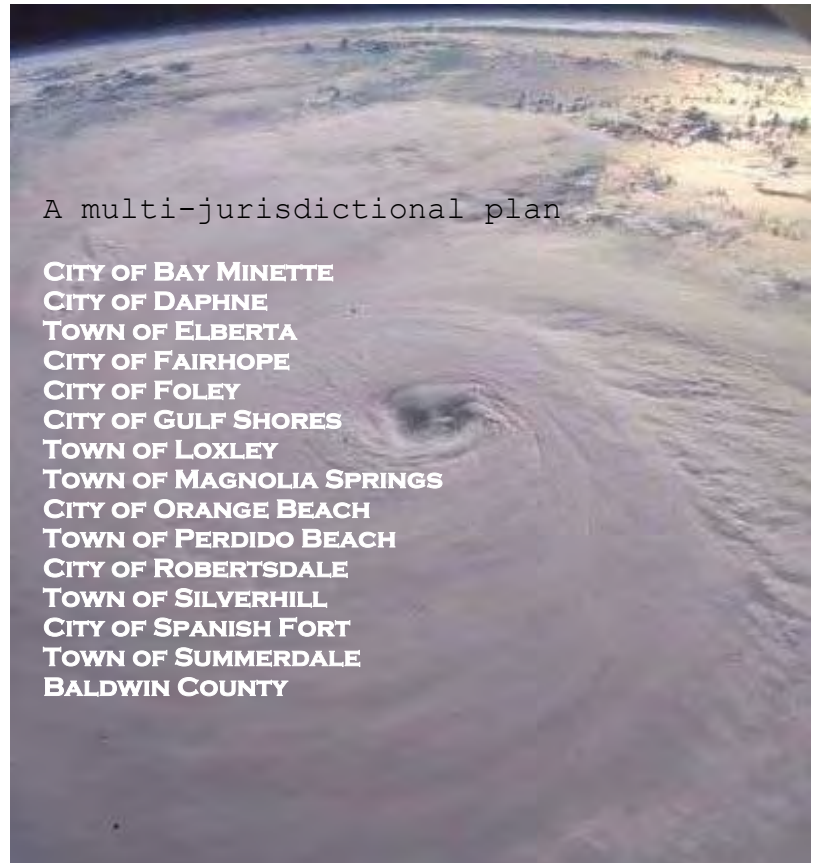


# BALDWIN COUNTY, ALABAMA

## Multi-Hazard Mitigation Plan

### Comprehensive Plan



A multi-jurisdictional plan

**CITY OF BAY MINETTE  
CITY OF DAPHNE  
TOWN OF ELBERTA  
CITY OF FAIRHOPE  
CITY OF FOLEY  
CITY OF GULF SHORES  
TOWN OF LOXLEY  
TOWN OF MAGNOLIA SPRINGS  
CITY OF ORANGE BEACH  
TOWN OF PERDIDO BEACH  
CITY OF ROBERTSDALE  
TOWN OF SILVERHILL  
CITY OF SPANISH FORT  
TOWN OF SUMMERDALE  
BALDWIN COUNTY**

Prepared under the direction of the  
Baldwin County Hazard Mitigation Planning Committee

With the support of the Baldwin County EMA by:



In association with:

**Hutchinson, Moore and Rauch, LLC**

Funding provided by the  
Alabama EMA through the  
FEMA Hazard Mitigation Grant Program

**December 30, 2010**

# 2010 Baldwin County, Alabama, Multi-Hazard Mitigation Plan

*City of Bay Minette, City of Daphne, Town of Elberta, City of Fairhope, City of Foley, City of Gulf Shores, Town of Loxley, Town of Magnolia Springs, City of Orange Beach, Town of Perdido Beach, City of Robertsdale, Town of Silverhill, City of Spanish Fort, Town of Summerdale, and Baldwin County*

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December 30, 2010



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## Chapter 1 – Introduction

- 1.1 Background
- 1.2 Authority
- 1.3 Funding
- 1.4 Eligibility for FEMA Hazard Mitigation Assistance Grants
- 1.5 Baldwin County, Alabama, Natural Hazards Mitigation Plan (2004) and Baldwin County, Alabama, Natural Hazards Mitigation Plan Update (2006)
- 1.6 The 2010 Baldwin County Multi-Hazard Mitigation Plan Update

### 1.1 Background

The 2010 Baldwin County Multi-Hazard Mitigation Plan is a multi-jurisdictional guide for all communities that have participated in the preparation of this plan through the Hazard Mitigation Planning Committee (HMPC). The jurisdictions that participated in the development of this plan include the cities of Daphne, Fairhope, Bay Minette, Foley, Spanish Fort, Gulf Shores, Orange Beach, Robertsdale, and the towns of Loxley, Magnolia Springs, Perdido Beach, Summerdale, Silverhill, Elberta and Baldwin County. It fulfills the requirements of the Federal Disaster Mitigation Act of 2000 (DMA 2000) as administered by the Alabama Emergency Management Agency (AEMA) and the Federal Emergency Management Agency (FEMA) Region IV.

### 1.2 Authority

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U. S.C. 5165 as amended by the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390), provides for States, Tribes, and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning. The National Flood Insurance Act of 1968, as amended, 42 U. S. C. 4001 *et seq.* reinforced the need and requirement for mitigation plans, linking flood mitigation assistance to State, Tribal and local mitigation plans.

FEMA has implemented the various hazard mitigation planning provisions through regulations in 44 CFR Part 201, which also permit man-made hazards to be addressed in a local mitigation plan. These Federal regulations describe the requirement for a State mitigation plan as a condition of pre- and post-disaster assistance as well as the mitigation plan requirement for local and Tribal governments as a condition of receiving hazard mitigation assistance. 44 CFR 201.6(d)(3) requires that a local jurisdiction must review and revise its local plan to reflect any changes and resubmit it for approval within five years of FEMA approval in order to remain eligible for mitigation grant funding.

### **1.3 Funding**

The Baldwin County EMA applied to the Alabama EMA for planning grant funds in 2007 to complete the 2009 update of this plan. In late 2008, the Alabama EMA awarded a \$65,925.00 planning grant funded through the FEMA Hazard Mitigation Grant Program (HMGP) to the Baldwin County Commission to fund 75% of the total cost of the five year plan update for all incorporated and unincorporated areas within Baldwin County.

### **1.4 Eligibility for FEMA Hazard Mitigation Assistance Grants**

Adoption of this plan is the initial step towards continuing eligibility for FEMA Hazard Mitigation Assistance (HMA) grant assistance to participating localities. These FEMA grants include the following programs:

1. The Hazard Mitigation Grant Program (HMGP). The HMGP provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.
2. The Pre-Disaster Mitigation Grant Program (PDM). The PDM program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.
3. The Flood Mitigation Assistance Program (FMA). The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist states and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).

4. The Repetitive Flood Claims (RFC) Program. The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to \$10 million is available annually for FEMA to provide RFC funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).
5. The Severe Repetitive Loss (SRL) Program. The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).

### **1.5 Baldwin County, Alabama, Natural Hazards Mitigation Plan (2004) and Baldwin County, Alabama, Natural Hazards Mitigation Plan Update (2006)**

The planning process began in March 2003 with the appointment of the Hazard Mitigation Planning Committee (HMPC) by the Local Emergency Planning Committee of the Baldwin County Emergency Management Agency (EMA). The committee first convened in March 2003. In June 2004, the plan was approved and adopted by the county and all participating municipalities. Major amendments to this plan were prepared following the devastation of Hurricane Ivan on September 15, 2004. Consequently, the plan was republished in 2006.

The 2004 Baldwin County, Alabama, Natural Hazards Mitigation Plan and the 2006 plan update include unincorporated and incorporated areas within Baldwin County. The plan addresses all natural hazards deemed to threaten property and persons within the county. Both short- and long-term hazard mitigation strategies are addressed, implementation tasks assigned, and funding alternatives identified.

### **1.6 The 2010 Baldwin County Multi-Hazard Mitigation Plan Update**

The Hazard Mitigation Planning Committee (HMPC) re-convened in March 2010 to update the 2004 plan and 2006 plan update as the 2010 Baldwin County Multi-Hazard Mitigation Plan, which addresses man-made hazards in addition to natural hazards. The Baldwin County Commission retained the firm of Lehe Planning, LLC, to prepare the plan under the direction of the HMPC and the Baldwin County EMA Director, Leigh Anne Ryals. The firm's manager, James E. Lehe, AICP, a professional urban planner, served

as the Planning Coordinator for the update. The 2010 HMPC represents unincorporated Baldwin County, the cities of Daphne, Fairhope, Bay Minette, Foley, Spanish Fort, Gulf Shores, Orange Beach, Robertsdale, and the towns of Loxley, Magnolia Springs, Perdido Beach, Summerdale, Silverhill, and Elberta, as well as other stakeholders and interested agencies. The HMPC convened on a regular basis during the update process to oversee the drafting of the plan. Through a comprehensive planning process and risk assessment, the plan creates a unified approach among all Baldwin County communities for dealing with identified hazards and associated risk issues. It serves as a guide for local governments in their ongoing efforts to reduce community vulnerabilities.



## Chapter 2 – Prerequisites

- 2.1 Federal Prerequisites
- 2.2 Plan Approval Required for Mitigation Grants Eligibility
- 2.3 Multi-Jurisdictional Participation
- 2.4 Multi-Jurisdictional Plan Adoption

### 2.1 Federal Prerequisites

This chapter of the Plan addresses the Prerequisites of 44 CFR Sections 201.6(a)(1) and (4) and (c)(5), as follows:

“Section 201.6(a) *Plan requirements*.

(1) A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants. ... A local government must have a mitigation plan approved pursuant to this section in order to apply for and receive mitigation project grants under all other mitigation grant programs.

(4) Multi-jurisdictional plans (e.g. watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan ... .

Section 201.6(c) *Plan content*. The plan shall include the following:

(5) *Documentation* that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.”

### 2.2 Plan Approval Required for Mitigation Grants Eligibility

FEMA approval of this plan is the initial step towards continuing eligibility for FEMA grant assistance to participating localities and school districts, under the following hazard mitigation assistance programs: the Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation Grant Program (PDM), the Flood Mitigation Assistance Program (FMA), the Repetitive Flood Claims (RFC) Program, and the Severe Repetitive Loss Program (SRL). Once the plan is approved pending adoption, the governing bodies of the participating jurisdictions and school districts must formally adopt the plan and submit their adopting resolutions to FEMA through the Alabama EMA to receive official FEMA approval. This process must take place within twelve months of FEMA's

notification of conditional approval pending adoption. If the plan is not approved by FEMA and locally adopted by resolution of the governing body, the jurisdiction or school board will not be eligible to apply for and receive project grants under any of the FEMA hazard mitigation assistance programs. Hazard mitigation assistance programs have additional requirements for grant eligibility depending on the program's funding source.

### **2.3 Multi-Jurisdictional Participation**

The Baldwin County EMA serves as the lead coordinating agency for mitigation planning. It has been working in conjunction with the Hazard Mitigation Planning Committee (HMPC) and has remained in contact and coordinated mitigation activities with all Baldwin County jurisdictions throughout the five year period since the initial 2004 plan was first approved. Baldwin County, the cities of Daphne, Fairhope, Bay Minette, Foley, Spanish Fort, Gulf Shores, Orange Beach, Robertsedale, and the towns of Loxley, Magnolia Springs, Perdido Beach, Summerdale, Silverhill, and Elberta, all have continued to participate in the 2010 plan update of the existing plan. Magnolia Springs and Perdido Beach were incorporated after the 2004 plan and 2006 plan amendment and are participating in this plan update. In addition to the participating jurisdictions, other stakeholders affected by the plan, including Federal, State, and regional agencies, business interests, academia, non-profits, and the general public contributed to the drafting of this Plan. (See Chapter 4 – “The Planning Process” for a more detailed explanation of the organization of the HMPC and the participation of stakeholders in the planning process.)

School districts are defined as local governments, according to Federal regulations at 44 CFR Section 201.2, and are therefore required to have a FEMA-approved a local mitigation plan to be eligible for project grants under FEMA hazard mitigation assistance programs. A school district may also demonstrate their participation as a separate government entity in another local government's approved mitigation plan to be eligible for project grants under FEMA hazard mitigation assistance programs.

The planning process presented many opportunities for multi-jurisdictional participation. (See Appendix I “Multi-Jurisdictional Participation Activities,” which shows the type of participation by Baldwin County jurisdictions.) These multi-jurisdictional participation opportunities included the following activities:

- Attendance and participation in 5 HMPC committee meetings between March and October 2010. (See Appendix G “Committee Meeting Documentation,” which includes agendas, sign-in sheets, and meeting minutes).
- Providing key staff support to complete HMPC exercises and questionnaires regarding local capabilities for conducting mitigation activities, the implementation status of the 2004 community mitigation action programs,

identifying and rating hazards, profiling hazards and hazard events, evaluating alternative mitigation measures, and updating plan goals and objectives.

- Reviewing and providing comments on draft plan sections.
- Compiling plans, studies, reports, regulations, ordinances, and codes related to hazard mitigation and making these documents available to planners for review.
- Conferring with planners during individual jurisdictional meetings during the drafting phase of the plan update.
- Providing information to the HMPC and planners on critical facilities and infrastructure.
- Attendance and participation in the Community Meeting held during the drafting phase of the plan update.
- Communicating with elected officials and other jurisdictional constituents on the scope and contents of the draft plan update.
- Conducting public hearings, which offered additional opportunities for public comments prior to formal adoption by the governing bodies.

Residents of each jurisdiction and other stakeholders were provided the following opportunities for participation in the planning process:

- Attending HMPC meetings as observers of these open public forums, which were publicly announced.
- Participating in the Community Meeting.
- Completing Public Questionnaires distributed at the Community Meeting.
- Accessing the plan update website at [baldwin.hazmitalabama.com](http://baldwin.hazmitalabama.com) to keep abreast of HMPC activities, review draft sections of the plan, and offer comments and suggestions through a special email account, [baldwin@hazmitalabama.com](mailto:baldwin@hazmitalabama.com).
- Contacting HMPC members and Baldwin County EMA staff.
- Contacting planners through a toll free number at 1-866-978-3633, established for the plan update or by email through the special email account noted above.
- Contacting elected officials of each jurisdiction.
- Attending public hearings of the local governing bodies and offering comments.

## 2.4 Multi-Jurisdictional Plan Adoption

The governing bodies of each participating jurisdiction have adopted the 2010 Baldwin County Multi-Hazard Mitigation Plan Update by resolution following public notice and hearing. Adoption followed notification from the Alabama EMA that the plan had received conditional approval from FEMA pending adoption. Adoption by all participating jurisdictions took place within one year of the notification of FEMA conditional approval, and afterwards, a certified copy of each adopting resolution was transmitted to FEMA through the Alabama EMA. Once the first resolution had been received by FEMA, the plan was formally approved on that date, which begins the next five year planning cycle. FEMA then issued a final approval notification. (The form of the adopting resolutions is

in Appendix J “Adopting Resolution”). Copies of the resolution are on file at the EMA and with each jurisdiction.

## Chapter 3 – Community Profiles

- 3.1 Federal Advisory Guidance for Community Profiles
- 3.2 Summary of Plan Updates
- 3.3 Geographic Setting and History
- 3.4 Government
- 3.5 Physical Features
- 3.6 Climate
- 3.7 Demographics
- 3.8 Economy
- 3.9 Utilities
- 3.10 Transportation

### 3.1 Federal Advisory Guidance for Community Profiles

This Chapter of the Plan addresses the advisory on page 27 of the FEMA Local Multi-Hazard Mitigation Planning Guidance, July 1, 2008, which suggests community profile information be included to provide context for understanding the plan:

“The planning team should consider including a current description of the jurisdiction in this section or in the introduction of the plan. The general description can include a socio-economic, historic, and geographic profile to provide a context for understanding the mitigation actions that will be implemented to reduce the jurisdiction’s vulnerability.”

### 3.2 Summary of Plan Updates

Table 3-1 summarizes changes made to the 2004 plan as a result of the 2010 plan update, as follows:

**Table 3-1. Summary of Plan Updates**

Section		Change
3.3	Geographic Setting and History	Update descriptions, maps, and data
3.4	Government	Update descriptions and data
3.5	Physical Features	Update descriptions
3.6	Climate	Update descriptions and data
3.7	Demographics	Update descriptions, map, and data
3.8	Economy	Update descriptions, map, and data
3.9	Utilities	Update descriptions
3.10	Transportation	Update descriptions

Map 3-1. Location of Baldwin County



### 3.3 Geographic Setting and History

#### Baldwin County

Baldwin County is older than Alabama. It was created by the Mississippi Territorial legislature on December 21, 1809. As depicted in Map 3-2, Baldwin County lies on the Gulf Coast in the southwestern corner of Alabama. It is bounded on the north by Clarke and Monroe Counties, on the east by Escambia County, Alabama and Escambia County, Florida, and on the west by Mobile County and Mobile Bay. Encompassing approximately 1,590 square miles, it is Alabama’s largest county by area.

Travel and tourism are the dominant industries in Baldwin County, which is home to Gulf Shores, Orange Beach, Gulf State Park, and Fort Morgan. Table 3-2 shows approximate distances from Baldwin County to major metropolitan areas. Map 3-3 depicts municipalities of Baldwin County.

Map 3-2. Baldwin County Detail

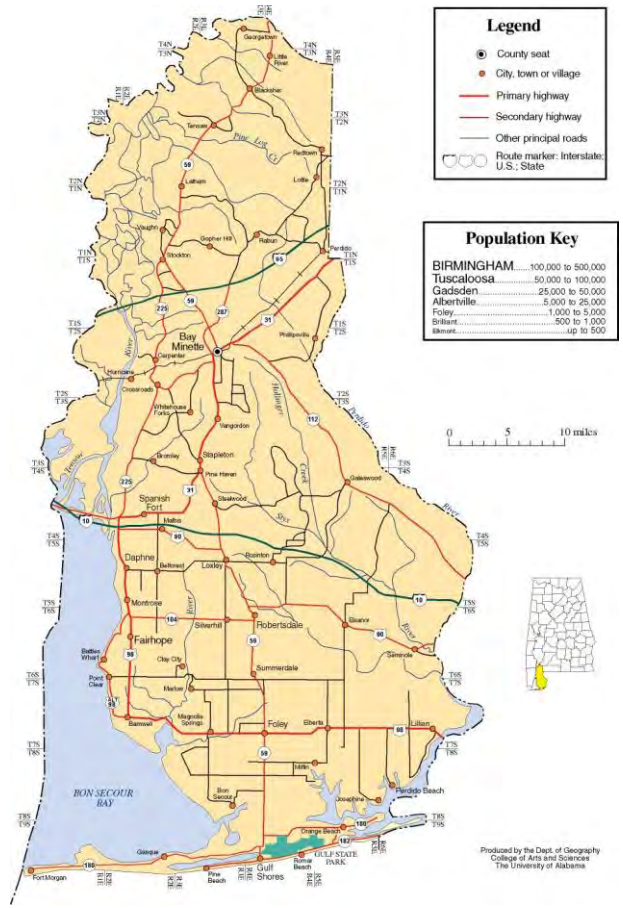
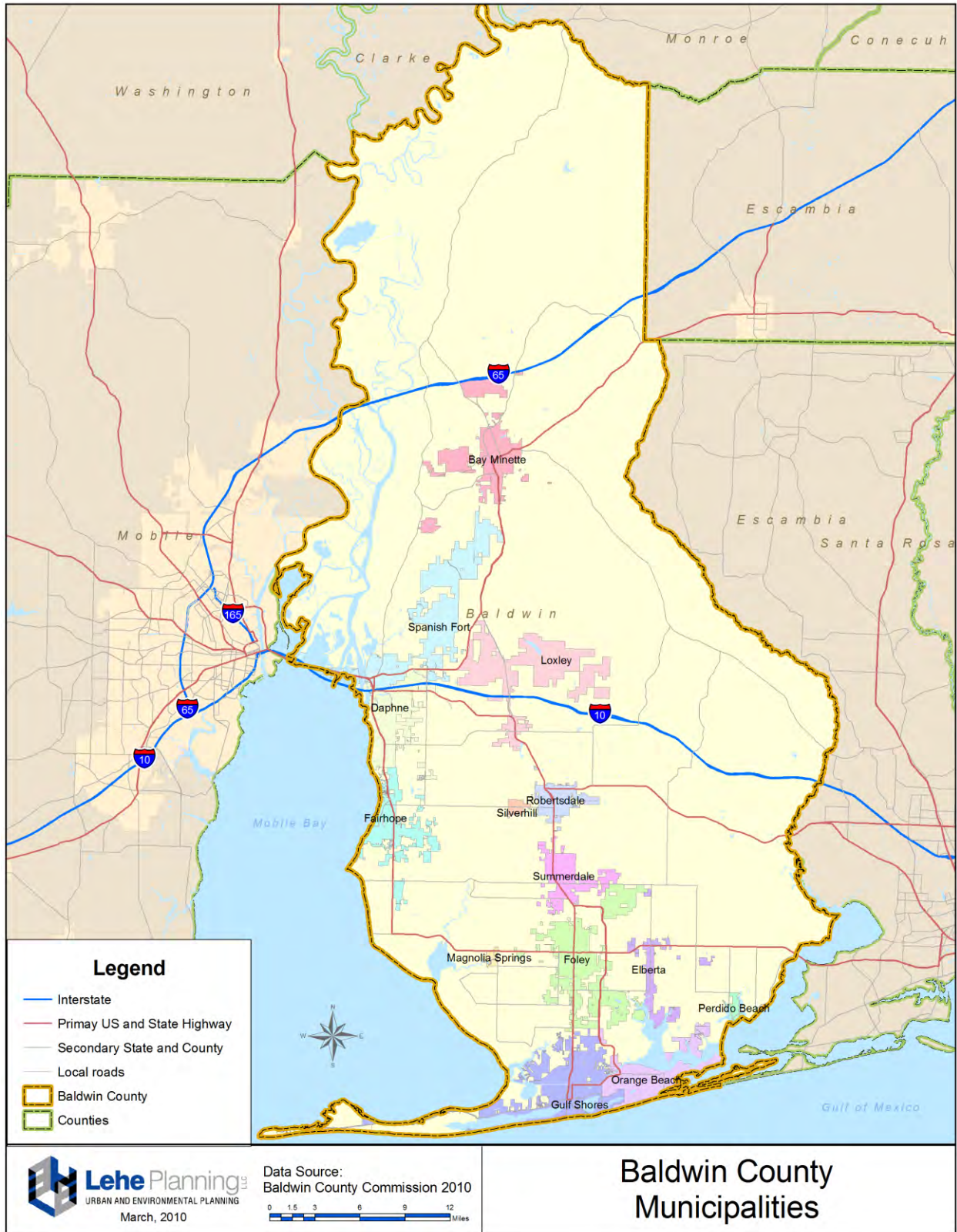


Table 3-2. Driving Distances to Nearby Cities

City	Mileage
Pensacola, Florida	34
Mobile, Alabama	38
New Orleans, Louisiana	179
Birmingham, Alabama	264
Atlanta, Georgia	343
Nashville, Tennessee	449
Dallas, Texas	650

Map 3-3. Baldwin County Municipalities





**City of Bay Minette**

The City of Bay Minette has been the county seat of Baldwin County since 1900. It is located in north central Baldwin County and does not border any other municipalities. Its estimated 2008 population is 8,043 and it encompasses 8.0 square miles. Despite its name, Bay Minette does not border the body of water also called Bay Minette, which is located along Mobile Bay. The City of Bay Minette is landlocked.

**City of Daphne**

The City of Daphne is located in west central Baldwin County. With an estimated 2008 population of 19,093 residents, Daphne is the largest municipality in Baldwin County by population. It has an area of approximately 14.1 square miles, of which 0.6 square miles are water. Daphne is known as the “Jubilee City,” a name that derives from the biological phenomenon called “jubilee,” in which large numbers of crab, shrimp, and other sea life wash ashore. Daphne served as the county seat of Baldwin County until 1900. Daphne was incorporated on July 8, 1927.

**Town of Elberta**

With an area of 0.7 square miles and a 2008 estimated population of 1,477, the Town of Elberta is the smallest municipality in Baldwin County by area and the fourth smallest by population. The town is named for the elberta variety of peach. Elberta was incorporated on December 9, 1952. The community was founded by the Baldwin County Colonization Company to provide land to German farmers who had immigrated from Germany to the United States.

**City of Fairhope**

The City of Fairhope borders Daphne to the south and is located in southwestern Baldwin County. It has an area of 11.0 miles and an estimated 2008 population of 17,147, which makes Fairhope the second largest municipality in Baldwin County by population. Fairhope was founded in 1894 as a utopian colony based on the idea of American economist Henry George that a single tax on the rental value of land should supply all government revenues. Today, 20 percent of the City of Fairhope is still owned by the Fairhope Single Tax Corporation, which provides 99-year leases to residents but does not allow its land to be sold.

**City of Foley**

With an estimated 2008 population of 13,807 residents, the City of Foley is Baldwin County’s third largest municipality by population. It has an area of 14.3 square miles and is located in south central Baldwin County. Foley is the third major city of the

Daphne-Fairhope-Foley Micropolitan Statistical area, which includes all of Baldwin County. Foley was founded by Chicago businessman John Burton Foley, who convinced Cornelius Vanderbilt to place a railroad station in Foley.

### **City of Gulf Shores**

The City of Gulf Shores is a seaside resort city that borders the Gulf of Mexico. With an area of 23.0 square miles, of which 18.4 square miles is land, the City of Gulf Shores is the largest municipality in Baldwin County by area. Its estimated 2008 population was 10,248, which marks more than a 100 percent increase from its 2000 population. Gulf Shores forms the middle link of a contiguous stretch of beachfront development running from unincorporated Fort Morgan to the City of Orange Beach.

### **Town of Loxley**

Located to the east of Daphne in central Baldwin County, the Town of Loxley has 1,998 residents and an area of 31.86 square miles. Loxley hosts the Baldwin County Strawberry Festival. Loxley does not border any other municipalities.

### **Town of Magnolia Springs**

Magnolia Springs incorporated June 29, 2006 as Baldwin County's thirteenth municipality. The incorporation was motivated in part by a desire to better protect local waterways and control rapid development in the area. Magnolia Springs has an estimated 2008 population of 699 residents. It sits on the Magnolia River to the west of Foley and comprises one square mile.

### **City of Orange Beach**

The City of Orange Beach is a seaside resort city that lies to the east of the City of Gulf Shores. It has an area of 11.4 square miles, of which 10.4 is land. Like Gulf Shores, Orange Beach has experienced a population increase of more than 80 percent since 2000. Its estimated 2008 population is 6,231.

### **Town of Perdido Beach**

The Town of Perdido Beach is the newest addition to the list of municipalities in Baldwin County. It was incorporated on June 10, 2009 and is located on the northern shore of Perdido Bay. The town had a population of 558 permanent residents in 2009 and encompasses 1.22 square miles.

**City of Robertsdale**

The City of Robertsdale is located in south central Baldwin County, to the north of Foley and to the east of Fairhope. Its estimated 2008 population is 4,964, and its area is 5.5 square miles. Robertsdale was incorporated in 1921 by the Southern Plantation Corporation of Chicago.

**Town of Silverhill**

With a 2008 estimated population of 698 and an area of 1.2 square miles, the Town of Silverhill is the smallest municipality in Baldwin County by population and the second smallest by area. Silverhill incorporated in 1926. Like other municipalities in southern Baldwin County, it was founded as a colonization project by a Chicago real estate company.

**City of Spanish Fort**

The City of Spanish Fort is located on Mobile Bay to the north of the City of Daphne and Interstate 10. The city has an estimated 2008 population of 5,780 residents and an area of 11.1 square miles, of which only 4.7 square miles is land. In 2000, Spanish Fort had the highest median household income—\$56,699—of any municipality in Baldwin County, as well as the lowest poverty rate—2.8 percent.

**Town of Summerdale**

The Town of Summerdale is located in south central Baldwin County. Its area is 5.2 square miles and its estimated 2008 population is 745.

**3.4 Government**

A four-member County Commission governs Baldwin County. Each commissioner serves a four-year term and must reside in the district he or she represents. Bay Minette is the county seat. The 14 municipalities located in the county utilize the mayor/council system of government.

**3.5 Physical Features**

Baldwin County is located in the Lower Coastal Plain of the Gulf Coastal Plain physiographic province. It consists of five different geologic formations. The northwest region encloses wetlands along the Mobile Bay and primarily consists of silt and clay sediments washed by the Alabama and Tombigbee Rivers from areas to the north. Elevations in this area range from sea level up to 200 feet above sea level. The south has a nearly level to sloping topography and ranges in elevation from 10 to 100 feet above sea level. The soil in this area consists of marine materials. The southern tip encompasses the sandy, coastal beaches along

the Gulf of Mexico. Elevation rises from sea level to a height of 20 feet above sea level in inland areas. The east has a hilly topography and ranges in elevation from 50 to 300 feet above sea level. Finally, the central part of the county, which envelopes most of the population, has a level to gently sloping topography that varies from 100 to 300 feet above sea level in elevation.

### 3.6 Climate

Baldwin County has a wet, sub-tropical maritime climate that is strongly influenced by weather systems in the Gulf of Mexico. Hot and humid summer months are tempered by cooling southerly breezes. High winds and heavy rainfall from hurricanes or tropical systems pose a threat during summer and fall. During the summertime, moisture from the Gulf of Mexico produces very humid conditions and occasional afternoon thunderstorms that may produce high winds, dangerous lightning, hail or tornadoes. Winters are mild and snowfall is very rare. Additional climate information is presented in Table 3-3.

**Table 3-3. Climate Information**

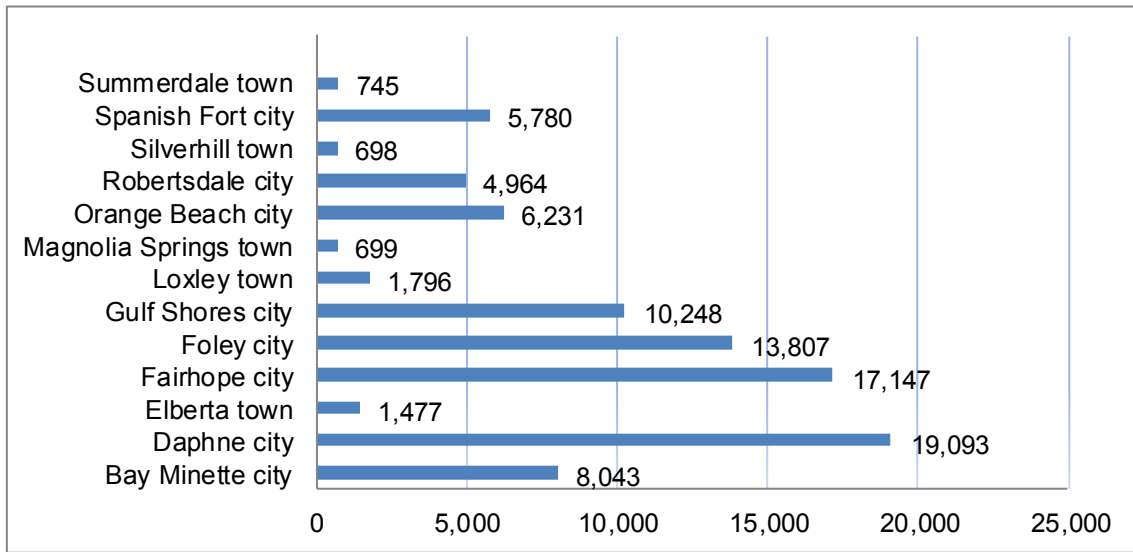
<b>Category</b>	<b>Average</b>
Annual Average Temperature	67.4° F
Avg. January Temperature	51.4° F
Average July Temperature	81.8° F
Average Annual Precipitation (inches)	64.0
Average Annual Snowfall	0.0
Growing Season Range	230 to 270 Days
Prevailing Wind Direction	South/ Southeast

### 3.7 Demographics

#### 2008 Population

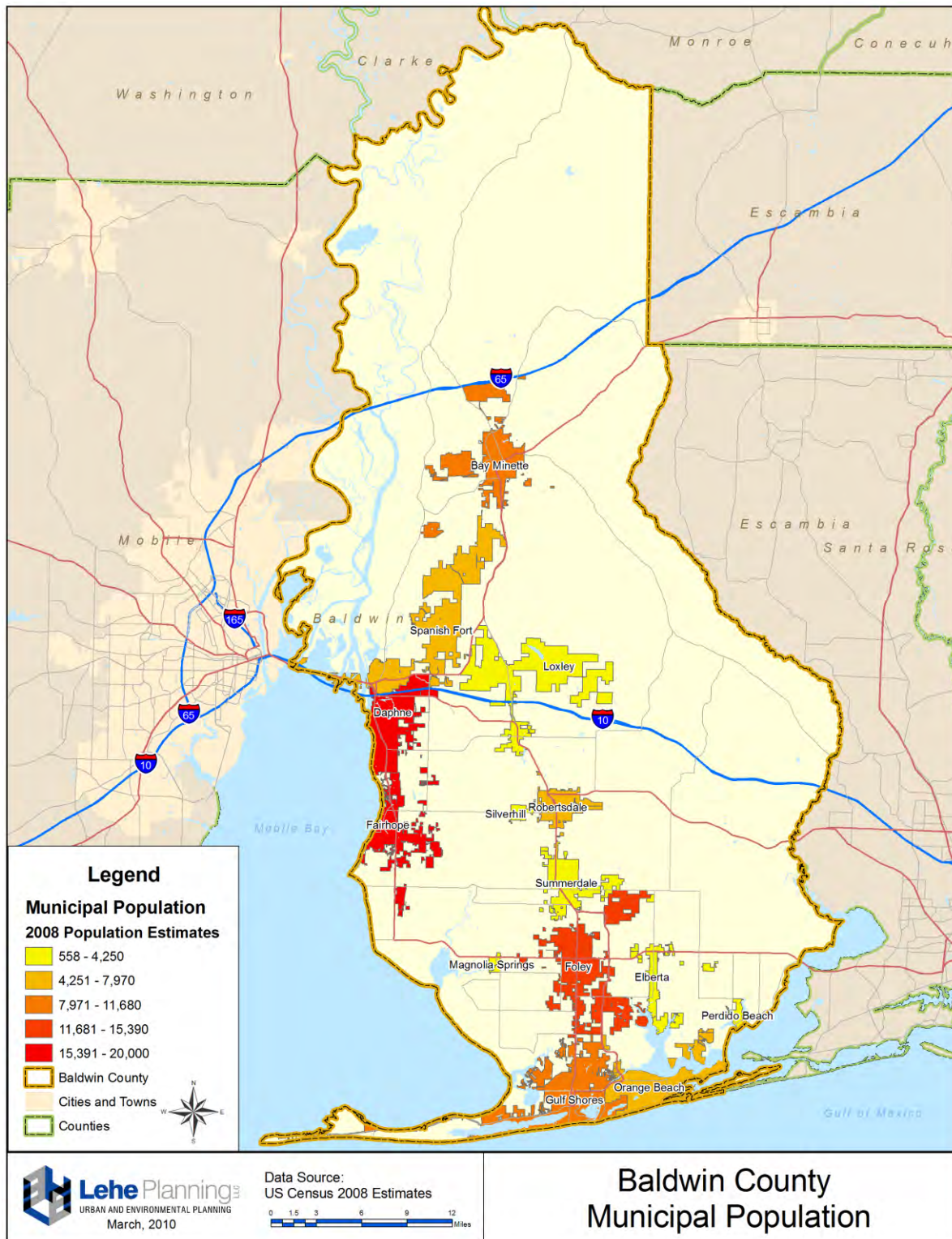
The latest U.S. Census estimates provide the latest population count for Baldwin County and its municipalities in 2008. As shown on Chart 3-1 “2008 Population by Municipality,” Daphne and Fairhope are the only cities in Baldwin County with populations greater than 15,000. A total of 90,728, or just over half of Baldwin County’s 174,439 residents, live in incorporated municipalities. The remaining 83,711 persons reside in unincorporated Baldwin County. Perdido Beach was not incorporated until 2009 so it is not included in Chart 3-1. Map 3-4 shows the population density of the county.

**Chart 3-1. 2008 Population by Municipality**

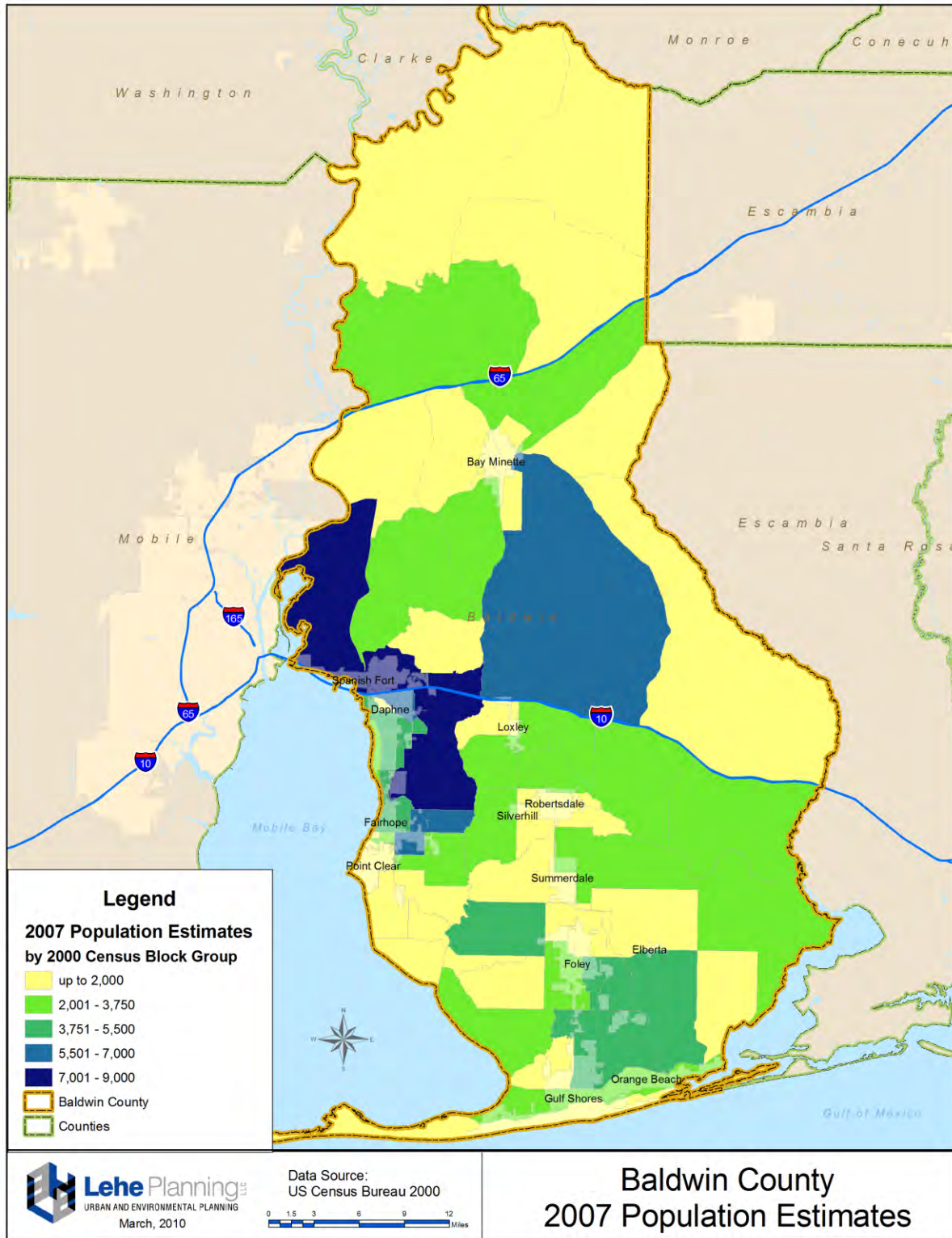


Source: U.S. Census Bureau, 2008 Population Estimates

**Map 3-4. 2008 Municipal Population, Baldwin County**



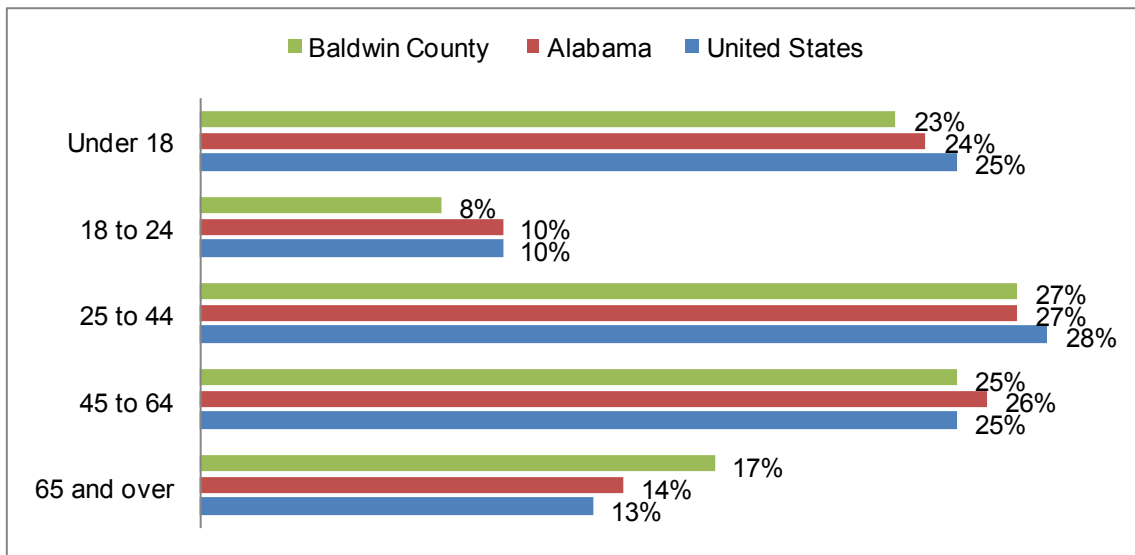
**Map 3-5. Population Density, Baldwin County**



**Social Characteristics**

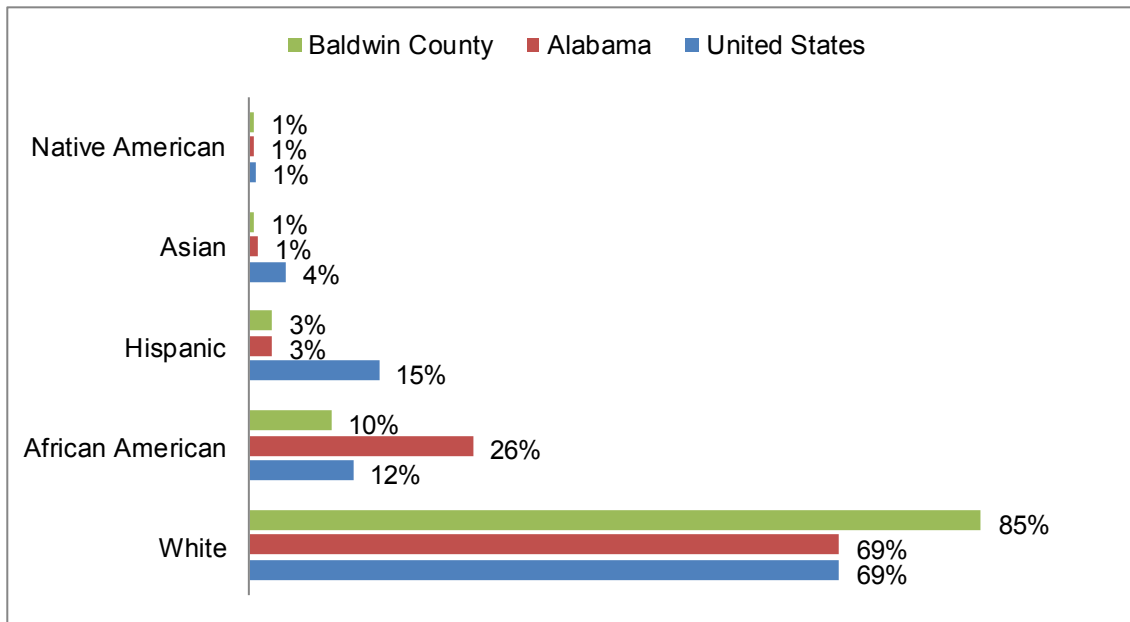
The following charts illuminate Baldwin County’s demography in 2008 and compare the county with the State of Alabama and the United States when possible. As displayed in Chart 3-2, senior citizens comprise a large share of Baldwin County’s population. As displayed in Chart 3-3, a significantly smaller share of Baldwin County’s population is African American than is the case for the State of Alabama.

**Chart 3-2. 2008 Population Distribution by Age, Baldwin County**





**Chart 3-3. Racial Composition of Baldwin County**

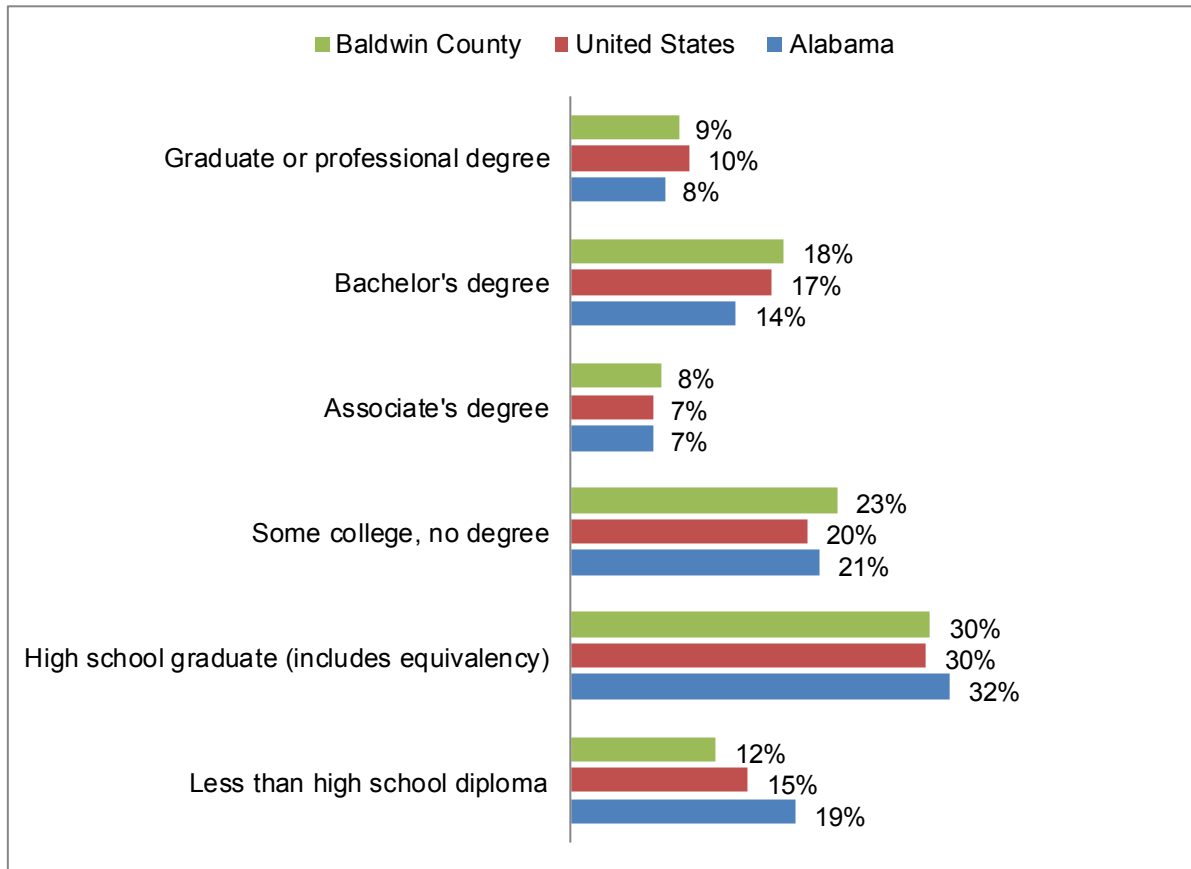


Source: U.S. Census Bureau, 2006-2008 American Community Survey

**Educational Attainment**

Chart 3-4 “Education Attainment of Baldwin County” illustrates the highest level of education attained by Baldwin County residents. Baldwin County’s population is significantly more educated than the general population of Alabama. The proportion of Baldwin County adults with a high school education or above is 88 percent—7 percent higher than the Alabama average. Likewise, 27 percent of Baldwin County’s over 25 population possesses a bachelor’s degree or higher. This proportion equals the national average and exceeds the Alabama average of 22 percent.

**Chart 3-4. Educational Attainment of Baldwin County**

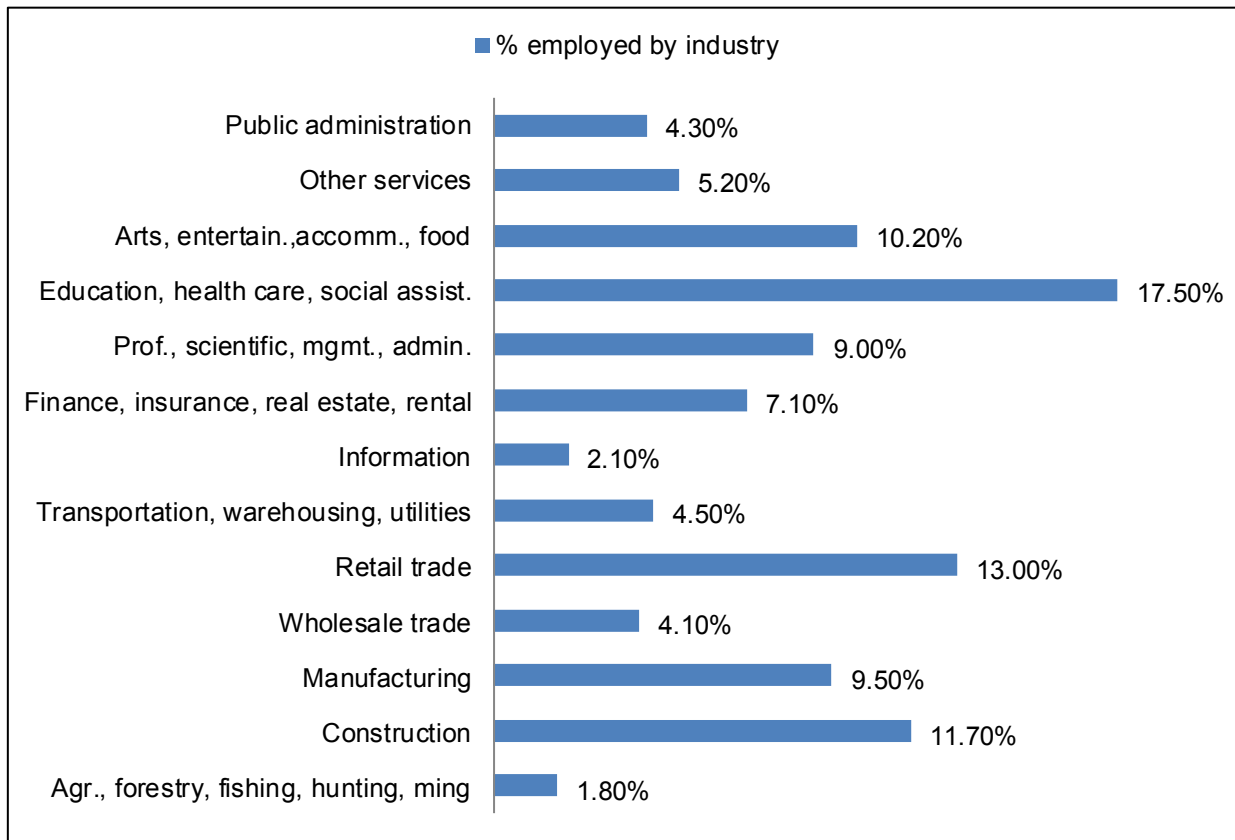


Source: U.S. Census Bureau, 2008 American Community Survey

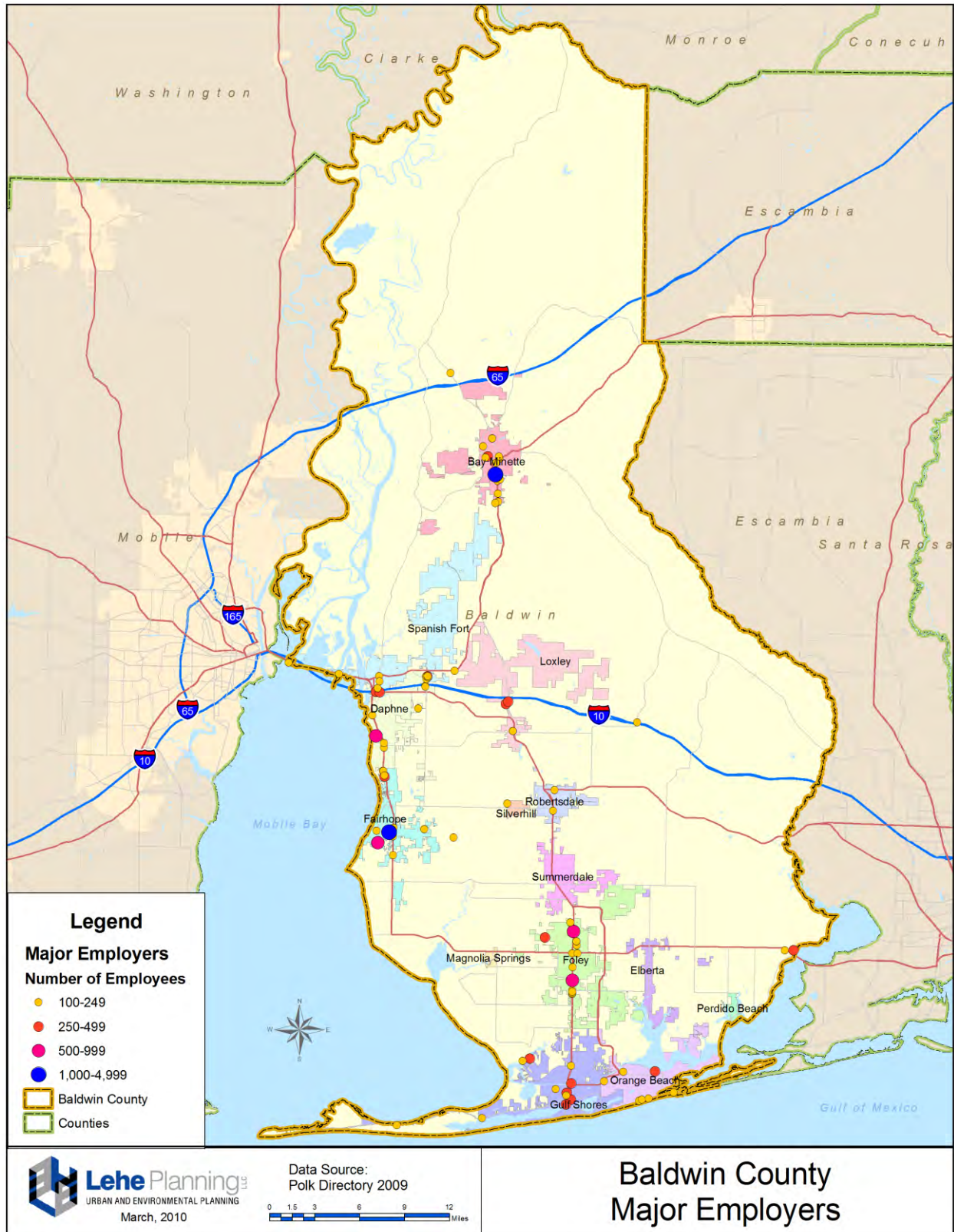
### 3.8 Economy

Baldwin County’s economy depends heavily on the service sectors. Retail and social services are the largest industries by employment. The Board of Education is the largest employer with 2,858 workers. The Tanger Outlet Mall, which markets itself to the Gulf Coast tourism industry, and Wal-Mart are the second and third largest employers, respectively. In the manufacturing sector, Standard Furniture employees 1400 people and Goodrich Aerospace employs 800. Chart 3-5 shows Baldwin County’s employment by industry. Map 3-5 shows the locations of major employers in Baldwin County.

**Chart 3-5. Employment by Industry, Baldwin County**



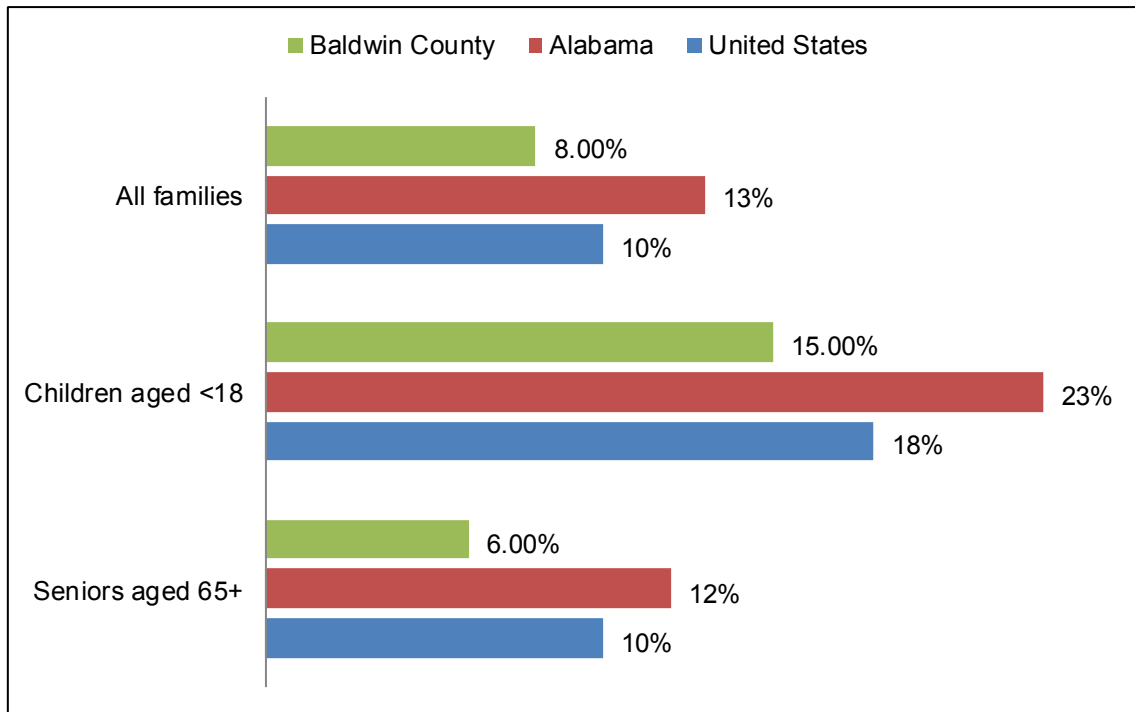
**Map 3-6. Major Employers, Baldwin County**



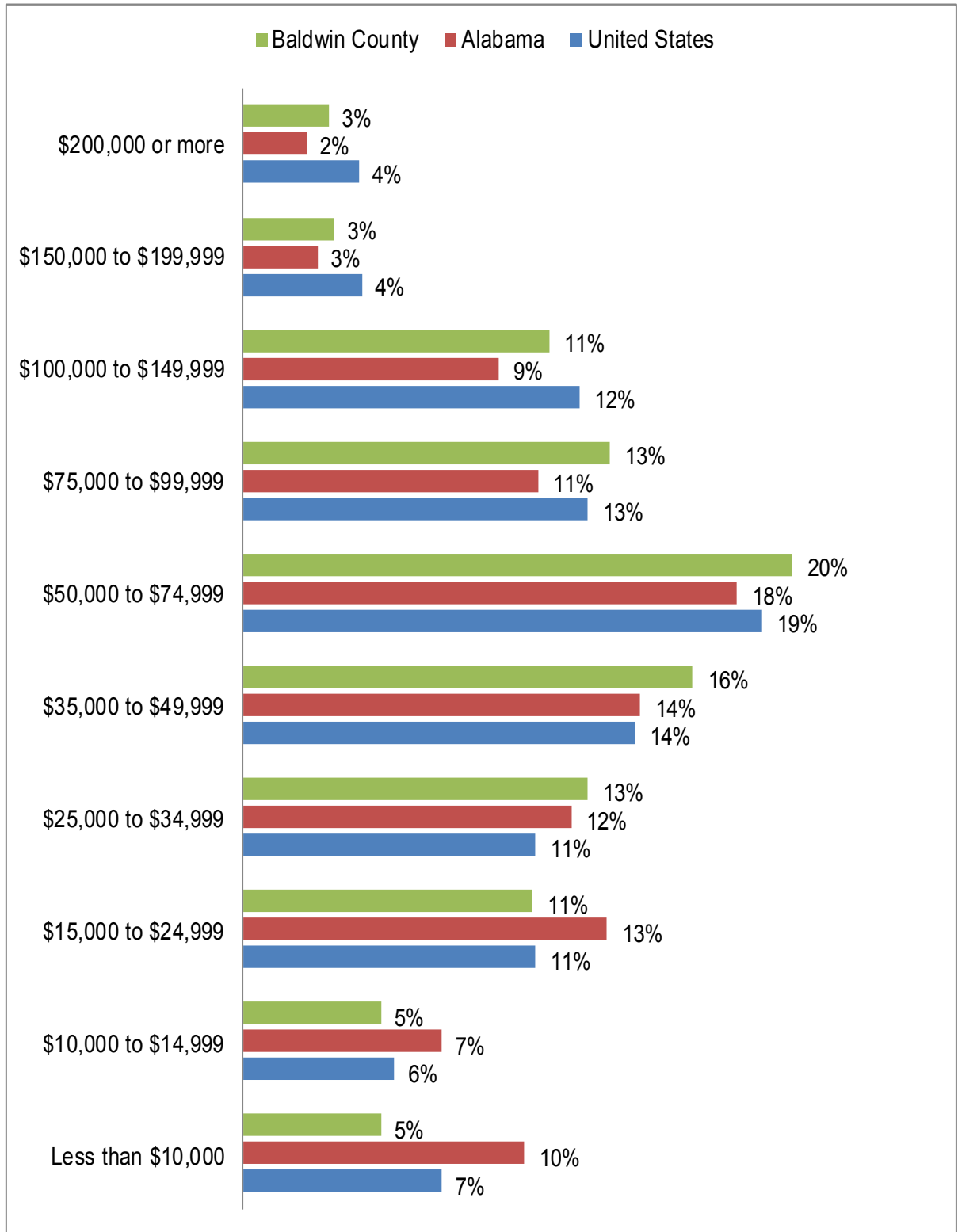
**Income**

According to the American Community Survey's 2006-2008 Three Year Estimates, Baldwin County has a median household income of \$50,626. Eleven percent of Baldwin County residents receive incomes below the poverty level, including 15 percent of children, as shown on Chart 3-6. However, only 6 percent of Baldwin County residents over the age of 65 are counted as below the poverty level—a low proportion due partly to income from Social Security and partly to Baldwin County's status as a popular destination for affluent retirees. Thirty-five percent of Baldwin County households receive income from Social Security. As illustrated in Chart 3-7, Baldwin County is more affluent on average than the State of Alabama.

**Chart 3-6. Poverty Rates by Demographic Group**



**Chart 3-7. Distribution of Income, Baldwin County**



### **3.9 Utilities**

#### **Electrical Power**

Baldwin EMC, Riviera Utilities (City of Foley) and the cities of Fairhope and Robertsdale distribute electric power to customers in their service territories. Power suppliers to other regions of Baldwin County are Alabama Power, Alabama Electric Cooperative and Alabama Municipal Electric Authority.

#### **Natural Gas**

Natural Gas is supplied by the United Gas Pipeline and distributed by the cities of Bay Minette, Daphne, Fairhope and Riviera Utilities (City of Foley).

#### **Water**

Baldwin County's municipalities and public and private water systems provide treated water to residential customers as well as businesses and industry. Excess capacity per system ranges from 70,000 to 3,000,000 gallons per day. Most cities have elevated water tanks for storage.

#### **Wastewater**

Ten municipal systems and Baldwin County Sewer Service provide wastewater services to residents, businesses, and industries. Excess capacity per system ranges from 50,000 to 1,000,000 gallons per day. The predominant treatment types are activated sludge, aeration, lagoon and bio-chemical treatments.

#### **Solid Waste**

Baldwin County operates its own federally permitted, subtitled landfill. Several transfer stations also serve as a point to transport waste to the landfill. The county and several private companies serving municipalities, as well as municipalities provide transportation to the landfill.

#### **Telecommunications**

Gulf Telephone and BellSouth provide state-of-the-art telecommunications including central offices, fiber optics, ISDN, POPS, high-speed internet, and other services. Cellular service is available through several well-known providers. Six regional and local television stations, five cable providers, and 17 regional and local radio stations serve the area.

*Source: Baldwin County Economic Development Alliance*

### **3.10 Transportation**

#### **Highway, Truck and Parcel**

Two interstate highways bisect Baldwin County to providing north/south and east/west routes. Interstate 65, which runs north to Nashville and Chicago, originates in Mobile. Interstate 10 begins in Jacksonville, Florida and terminates in Los Angeles, California. Three federal highways and ten state highways traverse the county. Seven truck terminals are located in Baldwin County with an additional 50 located in the surrounding metro area. All major parcel carriers provide service in Baldwin County. United Parcel Service (UPS) operates a terminal in Robertsdale.

#### **Public Transportation**

Baldwin County has received numerous awards for its county transportation system. The Baldwin County Rural Area Transportation System (BRATS) has 48 buses that transport employees to and from work. Each year, it transports over 700,000 passengers over its 68 regular routes.

#### **Rail**

One major Class I railroad, CSX, serves Baldwin County. CSX joins with three other Class I railroads in Mobile. Piggyback service, containerized service, and reciprocal switching are available in Mobile. There is also Amtrak passenger service in the Mobile metro area to New Orleans, Miami and Mobile.

#### **Water**

Baldwin County is located near the 1,000 mile Gulf Intracoastal Waterway, which is used for barge transportation from Brownsville, Texas to Saint Marks, Florida. The waterway has a depth of 12 feet, and its minimum width in Baldwin County is 125 feet. The waterway links to the Mobile Ship Channel, which has an average depth of 45 feet. This channel links to the Mobile River, providing access to the Tenn-Tom Waterway.

#### **Ports**

Baldwin County does not have its own port but is located between the Port of Mobile and the Port of Pensacola. The Port of Mobile acts as the hub of the Alabama State Docks, which operates several major cargo-handling facilities. Container cranes, bulk handling facilities, and a main docks complex with 26 general cargo piers are available to service most cargo needs. Special roll-on/roll-off berths are available with millions of square feet of storage space and other value-added port services.



**Air Service**

Municipal airports located in Bay Minette, Fairhope, Foley and Gulf Shores provide general aviation service. Regional commercial service is provided in Mobile and Pensacola, with 51 flights daily. In Mobile, carriers include Continental Express, Delta, Northwest Airlinck, Skywest, United Express, and US Airways Express. In Pensacola, carriers include Airtran, Comair, Continental, Delta, Northwest Airlinck, US Airways and US Airways Express.

Federal Express, UPS and several other companies provide air freight service. Air freight facilities connect to railways, the Port of Mobile, interstates, and a foreign trade zone. All four municipal airports offer lighted approaches.

## Chapter 4 - The Planning Process

- 4.1 Federal Requirements for the Planning Process
- 4.2 Summary of Plan Updates
- 4.3 Opportunities for Public Comment on the Plan
- 4.4 Opportunities for Involvement in the Planning Process
- 4.5 Review and Incorporation of Applicable Plans and Documents
- 4.6 How the Plan was Prepared
- 4.7 Who was Involved in the Planning Process
- 4.8 How the Public was Involved in the Planning Process
- 4.9 The Plan Review and Update Process

### 4.1 Federal Requirements for the Planning Process

This chapter of the Plan addresses the Planning Process requirements of 44 CFR Section 201.6 (b) and (c)(1) and the process for the plan review and update requirements of Section 201.6 (d)(3), as follows:

“201.6 (b) *Planning process*. An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. ”

“201.6 (c) *Plan content*. The plan shall include the following:

- (1) Documentation of the *planning process* used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.”

“201.6 (d) *Plan review.*

- (3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.”

## 4.2 Summary of Plan Updates

Table 4-1 summarizes changes made to the 2004 plan as a result of the 2010 plan update:

**Table 4-1. Summary of Plan Updates**

Section	Change	
4.3	Opportunities for Public Comment on the Plan	Adds new opportunities through toll free number, new Web site, and an updated public survey
4.4	Opportunities for Involvement in the Planning Process	Expanded opportunities
4.5	Review and Incorporation of Applicable Plans and Documents	Incorporated new studies; intensive examination of local tools
4.6	How the Plan was Prepared	Increased number and scope of HMPC meetings; more direct involvement and oversight by HMPC
4.7	Who was Involved in the Planning Process	Reorganized HMPC with new members
4.8	How the Public was Involved in the Planning Process	Increased involvement
4.9	The Plan Review and Update Process	This is the first 5 year review and update of the plan

## 4.3 Opportunities for Public Comment on the Plan

The Hazard Mitigation Planning Committee (HMPC) solicited public input into the mitigation plan through a public survey, public meetings and an internet Web site at [baldwin.hazardmitigationplan.com](http://baldwin.hazardmitigationplan.com). Residents were encouraged to provide input through their representative on the Committee from each jurisdiction. A toll free number, 866-978-3633, was available for the residents to reach the planning team. The plan on the Web site was available for public review and comment during the planning process. (Refer to Appendix H “Community Involvement Documentation” for further explanation and documentation).

A community meeting was held in October where members of the planning team and EMA were available to discuss the mitigation planning process and the community mitigation actions programs for each community. There were displays explaining the different hazards that could affect the communities. Severe weather information, mitigation measures, handbooks, and a Public Survey questionnaire were available. A

copy of the survey can be found in Appendix H “Community Involvement Documentation”.

A public hearing to receive comments was held by all jurisdictions prior to each adopting this Plan by resolution, as required by State law. The original resolutions and public hearing minutes are kept on file at the Baldwin County EMA offices.

#### **4.4 Opportunities for Involvement in the Planning Process**

A notice and survey were sent to various local and regional agencies with an interest in hazard mitigation, agencies that have the authority to regulate development, and representatives of businesses, academia and other private and non-profit interests notifying them of the draft plan and requesting their input and cooperation. (A copy of the notice and survey are included in Appendix H). Those agencies which received the notice and survey are listed below.

##### Federal Agencies

- National Weather Service – Mobile Office
- U.S.D.A. Natural Resources Conservation Service – Alabama District
- U.S. Army Corps of Engineers – Mobile District
- FEMA

##### State Agencies

- Alabama Emergency Management Agency (AEMA)
- Alabama Department of Economic and Community Affairs (ADECA)
- Alabama Department of Environmental Management (ADEM)
- Alabama Department of Transportation (ALDOT)
- Alabama Forestry Commission
- Geological Survey of Alabama
- Alabama Historical Commission

##### Local and Regional Agencies

- South Alabama Regional Planning Commission
- Baldwin County Economic Development Alliance

Neighboring Counties (represented by County EMA directors)

- Mobile County, Alabama
- Washington County, Alabama
- Clarke County, Alabama
- Monroe County, Alabama
- Escambia County, Alabama
- Escambia County, Florida

Business Interests

- Mobile Area Chamber of Commerce
- Alabama Gulf Coast Area Chamber of Commerce
- Central Baldwin Chamber of Commerce
- South Baldwin Chamber of Commerce
- North Baldwin Chamber of Commerce
- Eastern Shore Chamber of Commerce

Academia

- Baldwin County Public Schools – Board of Education
- Faulkner State Community College
- United States Sports Academy

Non-Profits and Other Agencies

- American Red Cross, Madison-Baldwin County Chapter
- South Baldwin Regional Medical Center
- Thomas Hospital
- Mercy Medical
- North Baldwin Infirmary

## **4.5 Review and Incorporation of Applicable Plans and Documents**

The participating jurisdictions provided copies of their plans, studies, reports, ordinances, regulations and technical information that they believed related to hazard mitigation to the planning team. The documents were closely examined to see what hazard mitigation measures were currently being pursued and what new measure could be included in future revisions of the existing documents. Some of these documents addressed specific natural hazards concerns – flood plain management, storm water detention, erosion and sedimentation control and shoreline management.

The following plans and documents were reviewed by the planning team:

- Comprehensive Plans - Elberta, Daphne, Robertsdale, Baldwin County, Orange Beach, Daphne
- Community Preservation and Growth Plans - Orange Beach
- Zoning Ordinances - Gulf Shores, Spanish Fort, Robertsdale, Bay Minette, Baldwin County, Summerdale, Orange Beach
- Building Codes and Related Ordinances - Gulf Shores, Foley, Elberta, Robertsdale, Bay Minette, Perdido Beach, Baldwin County, Summerdale, Orange Beach, Daphne
- Subdivision Regulations - Gulf Shores, Foley, Spanish Fort, Elberta, Robertsdale, Bay Minette, Summerdale, Orange Beach
- Land Use Plans - Daphne, Gulf Shores, Robertsdale, Baldwin County, Daphne
- Flood Damage Prevention Ordinances - Foley, Spanish Fort, Elberta, Perdido Beach, Baldwin County
- Standard Operating Procedures for Hurricanes - Gulf Shores
- Erosion and Sedimentation Control Regulations - Gulf Shores, Foley, Robertsdale
- Change of Grade of Land or Water Courses Ordinance - Foley
- Emergency Response or Operations Plan - Baldwin EMC, Fairhope
- Regulations on the Impacts of Wetlands - Gulf Shores, Orange Beach
- Regulations on Shoreline Construction - Foley, Orange Beach
- Tree and Natural Tree Preservation Ordinances - Foley
- Solid Waste Management Ordinances - Foley
- Flood Plain Management Ordinances - Orange Beach, Daphne
- Storm Water Management Plans - Robertsdale
- Wildfire Mitigation Plans - Bay Minette
- Open Burn Ordinance – Summerdale
- Fire Prevention and Safety Ordinance – Summerdale, Robertsdale
- U.S. Census Bureau and Alabama Data Center demographic and economic reports
- NOAA and NWS storm events records
- FEMA and local disasters reports
- Flood Insurance Studies and Flood Insurance Rate Maps
- Alabama State Hazard Mitigation Plan 2007

It is recommended that any pertinent mitigation strategies developed from this mitigation plan update be integrated into any revisions of existing comprehensive plans and future planning documents at the appropriate time. Specific measures for plan integration are included in the Community Mitigation Action Programs for each jurisdiction which can be found in Chapter 6 – “Mitigation Strategy.”

## 4.6 How the Plan was Prepared

From March 2010 through October 2010, the Baldwin County Hazard Mitigation Committee held five meetings to participate in the plan drafting process. Agendas and sign-in sheets from these meetings are on file in the EMA office and copies are included in Appendix G “Committee Meeting Documentation.” Committee members unable to attend a meeting received agendas and Committee assignments via fax, email, mail, telephone, or personal meetings with the planning team.

The first planning meeting was held on March 15, 2010. The meeting topics included an introduction to mitigation planning, a review of the 2004 plan, and a preview of the plan update process. Each member was given a copy of the 2004 summary of capabilities and asked to write down any changes to their jurisdiction’s capabilities since 2004. (See Appendix B “Community Mitigation Capabilities” for the results of this assessment). They were also provided a risk assessment handout which asked members to identify natural hazards they believed affected their jurisdiction and rate the extents and probabilities of future occurrences. (See Appendix D- “HMPC Hazard Identification and Ratings” for the results of this exercise). The members were also provided with draft copies of Chapters 1, 2 and 3 of the 2010 plan update for review and comment.

The Committee meeting held on April 5, 2010, addressed the findings of the previous exercises and the planning team described in detail the different hazards and how their risks vary throughout Baldwin County and its communities. Man-made hazards were introduced during this meeting and the committee was given a man-made hazard risk assessment exercise to fill out and return to the EMA. The implementation status exercise was handed out during this meeting and members were asked to review the mitigation measures they chose for the 2006 amended plan and indicate if the measure had been met or not, and if not, why. (See Appendix C - “2004 Plan Implementation Status”)

The Committee reconvened on April 22, 2010 at which time members reviewed their findings on man-made hazard risks and were introduced to the different mitigation strategies that could be considered when deciding on a community action program. Also discussed were the impacts on the communities by the different hazards and how the risks vary from area to area within the county. The members were introduced to the 5 main goals of mitigation actions, possible mitigation measures, and the STAPLEE method for deciding the worth of different mitigation measures. They were provided a listing of alternative mitigation measures to begin the mitigation action program selection process.

The final planning meeting before the development of the draft plan was held on June 9, 2010. The members reviewed the 5 main goals of mitigation actions and STAPLEE. Members were given a worksheet of mitigation measures from which they

could choose the mitigation measures that most suited their jurisdiction. There was additional space at the end of the worksheet to add mitigation measures they felt should be included for their jurisdiction.

The Committee members turned in their mitigation ideas to the EMA for inclusion in the draft plan and the planning team referenced all the information provided from the members' participation in Committee meetings and in Committee exercises to incorporate into the plan update.

The Committee reconvened on October 2010 to complete the draft review and discussions of all components of the 2010 draft plan. The planning team assembled the final draft plan for submission to the Alabama Emergency Management Agency for review and approval.

## **4.7 Who was Involved in the Planning Process**

### **4.7.1 The Hazard Mitigation Planning Committee**

The Baldwin County Hazard Mitigation Planning Committee (HMPC), comprised of representatives from all the jurisdictions and organizations concerned with hazard mitigation, guided the development of this plan. The membership of the HMPC and the jurisdictions and organizations represented are listed below:

- Dale Byrne, County Jail Warden, Baldwin County S. O.
- Carla Wasdin, R.N. D.O.N./Jail, Baldwin County S.O.
- John Byrd, GIS Analyst, Baldwin County Commission
- Ken McIlwain, Baldwin County Commission
- Tucker Stuart, Baldwin County Commission
- Mike Howell, Building Official, Baldwin County
- Nancy Mackey, Planner, Baldwin County Planning Department
- Leigh A. Ryals, Director, Baldwin County EMA
- Chad R. Thomas, Power System Control Coordinator, Baldwin EMC
- Steve Irvin, PE, Baldwin County EMC
- Tim Hobbs, Baldwin County EMC
- Philip Byars, Fire Chief, Bay Minette
- Denise Penry, PW Accountant, Daphne
- Melvin McCarley, PW Superintendent, Daphne
- Steve Kirkpatrick, Council Member, Elberta
- Caryn Woerner, Planning and Zoning Administrator, Elberta
- Jimmie Davis, Police Department, Fairhope
- Barry Fulford, CBO/CFM, Fairhope
- Sudan Bozeman, Police Department, Fairhope



- Joseph A. Bouzan, Emergency Management Coordinator, Foley
- Rachel Keith, Assistant to the Emergency Coordinator, Foley
- Randy Bishop, Deputy Chief of Police, Foley
- Joey Darby, Fire Chief, Foley
- Tommy Herndon, Executive Director, Golden Living Center – Foley
- Arthur Bourne, EMA Director, Gulf Shores
- Keith Martial, Fire and Rescue, Gulf Shores
- Brandon Franklin, Building Official, Gulf Shores
- Andy Bauer, Gulf Shores
- Ed Vaughn, Fire Department, Loxley
- Raymond Lovell, Fire Department, Loxley
- Thomas Hudson, Loxley
- Bob Holt, Councilman, Magnolia Springs
- Landon K. Smith, Building Official/Floodplain Mgr, Orange Beach
- J.T. Abbott, Asst. Fire Chief, Perdido Beach
- Doug Crieghton, Perdido Beach VFD
- Al Thompson, Councilman, Perdido Beach
- Dave Creighton, President Perdido Beach VFD, Perdido Beach
- Marcus Flint, Riviera Utilities
- Greg Smith, PE, City Engineer, Robertsdale
- Scott Gilbert, Public Works Director, Robertsdale
- Steve Williams, Silverhill
- Bruce Renkert, Building Official, Spanish Fort
- D. R. Riebeling, Police Chief, Summerdale
- Tiffany Lynn, Clerk, Summerdale
- David Wilson, Mayor, Summerdale
- Jenny Guerry, Alabama Department of Public Health
- Teresa Porter, Alabama Department of Public Health
- Teddy King, Alabama Department of Public Health

*Note: The Baldwin County EMA serves as the lead local agency supporting the drafting, adoption, and ongoing implementation of the plan. The EMA supports committee activities and represents the interests of all Baldwin County jurisdictions and agencies, including school boards and utilities.*

#### **4.7.2 The Mission of the Hazard Mitigation Planning Committee**

The Committee chose to retain the mission statement from the 2004 plan for this update:

*The mission of the Baldwin County Hazard Mitigation Planning Committee is to oversee and establish a comprehensive hazard mitigation planning process that:*

- *Engages public participation and support;*
- *Facilitates Federal, state, regional and local agencies' coordination;*
- *Constantly monitors and evaluates the potential risks of hazards to life and property;*
- *Actively mobilizes all available community resources and measures to mitigate the threats of hazards; and,*
- *Results in programmed actions with specific results.*

### **4.7.3 Preparation of the Plan Update**

This 2010 plan update was prepared under the direction of the Hazard Mitigation Planning Committee with the support of the Baldwin County EMA. The Baldwin County Commission retained the consulting firm of Lehe Planning, LLC, the same firm that assisted with the 2004 plan, to prepare the 2010 update. A professional urban planner James E. Lehe, AICP, served as Plan Coordinator. A professional planner will continue to provide guidance and support to the Committee with any revisions, amendments, or updates to this Plan.

## **4.8 How the Public was Involved in the Planning Process**

The public was given many opportunities to participate in the plan update. The opportunities ranged from being an active participant during committee meetings to offering comments through the internet and over the telephone. All Hazard Mitigation Planning Committee meetings were announced and open to the public.

The HMPC sponsored a special community meeting held on October 13, 2010. At that meeting the plan, hazards, and mitigation measures were discussed among participants. Displays and handouts regarding various hazards were made available to the public. The public was encouraged to fill out a public survey about the risks and threats of hazards. (The results from those surveys can be found in Appendix H "Community Involvement Documentation.")

A toll free number (1-866-978-3633) was made available for interested parties to contact the planning team with questions and comments. They were also encouraged to email their comments to [baldwin.hazardmitigationplan.com](http://baldwin.hazardmitigationplan.com).

At the end of the planning process, the public was invited to attend the public hearing held by each jurisdiction prior to plan adoption allowing individuals a final opportunity for public comments.

For more detailed documentation and additional discussion of public involvement, see Appendix H "Community Involvement Documentation".

## 4.9 The Plan Review and Update Process

The plan review and update process resulted in a comprehensive update of the entire 2004 plan elements, which was achieved through a process that involved the following tasks, among others:

- Update of the Community Profiles to reflect changed demographics, economic characteristics, and growth and development trends.
- A detailed assessment of local capabilities to carry out mitigation measures.
- An evaluation of the status and effectiveness of Community Mitigation Action Programs adopted in the 2004 plan, which was reflected in the 2010 Action Programs for each jurisdiction.
- A reassessment of risks to include detailed research and analysis of hazards affecting the communities, as well as adding man-made hazards to the Risk Assessment.
- A thorough update of critical facilities and assessment of vulnerabilities.
- A reexamination of development trends and exposure to risks.
- A review and recommitment to the vision for disaster-resistant communities; modifications to the 2004 goals; and support of the 2007 State goals for hazard mitigation.
- Identification and analysis of a comprehensive range of mitigation alternatives.
- A reprioritization of mitigation actions and projects.
- Revised mitigation action programs for each jurisdiction to better reflect the results of the plan update.
- Revisions to the plan maintenance procedures to institute streamlined amendments and better insure continuous monitoring and implementation of mitigation actions.

## Chapter 5 – Risk Assessment

- 5.1 Federal Requirements for Risk Assessments
- 5.2 Summary of Plan Updates
- 5.3 Identification of Hazards Affecting Each Jurisdiction
- 5.4 Hazard Profiles
- 5.5 Vulnerability of Structures within Each Jurisdiction
- 5.6 Estimate of Dollar Losses to Vulnerable Structures
- 5.7 General Description of Land Uses and Development Trends
- 5.8 Repetitively-Damaged NFIP-Insured Structures
- 5.9 Summary of Hazards and Community Impacts
- 5.10 Risks that Vary Among the Jurisdictions

### 5.1 Federal Requirements for Risk Assessments

This chapter of the Plan addresses the Risk Assessment requirements of 44 CFR Section 201.6 (c)(2), as follows:

~~201.6 (c)(2)~~ A *Risk Assessment* that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment shall include:

- (i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
- (ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
  - A. The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
  - B. An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate;
  - C. Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

- (iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area."

## 5.2 Summary of Plan Updates

Table 5-1 summarizes updates to the 2005 plan:

**Table 5-1. Plan Updates**

Section		Change
5.3	Identification of Hazards Affecting Each Jurisdiction	Updates to hazard identifications and descriptions.
5.4	Hazard Profiles	Improves descriptions of locations and extents; updates Past Events; improves mapping.
5.5	Vulnerability of Structures within Each Jurisdiction	Provides HAZUS-MH inventory data and population estimates.
5.6	Estimate of Dollar Losses to Vulnerable Structures	Provides HAZUS-MH loss estimates and losses from historical records.
5.7	General Description of Land Uses and Development Trends	Reserved.
5.8	Repetitively-Damaged NFIP-Insured Structures	Addresses new requirement.
5.9	Summary of Hazards and Community Impacts	Previously mentioned in hazard profiles; more community specific impact descriptions.
5.10	Risks that Vary Among the Jurisdictions	Improved explanation of how risks vary.

## 5.3 Identification of Hazards Affecting Each Jurisdiction

### 5.3.1 Types of Hazards

Hazards affecting each jurisdiction are listed in Table 5-2 . This table also highlights the relationships between hazards. The 2004 Baldwin County Natural Hazards Mitigation Plan also lists natural hazards, but this 2010 plan goes further to identify links between associated hazards. Detailed descriptions appear in Appendix D, "Hazard Identification, Ratings and Descriptions."

**Table 5-2. Identified Baldwin County Hazards**

Hazards	Associated Hazards	Jurisdictions Affected				
<p><b>Hurricanes</b></p>	<p>Tropical Storms Tropical Depressions Severe Storms High Winds Floods Storm Surge Tornadoes</p>	<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>				
		<p><b>Floods</b></p>		<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>		
				<p><b>Severe Storms</b></p>	<p>Thunderstorms Hail Lightning High Winds Tornadoes Floods</p>	<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>

Hazards	Associated Hazards	Jurisdictions Affected				
<p><b>Tornadoes</b></p>	<p>High Winds Severe Storms</p>	<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>				
		<p><b>Wildfires</b></p>		<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>		
				<p><b>Drought/Heat Waves</b></p>	<p>Extreme Heat Wildfires Sinkholes</p>	<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>

Hazards	Associated Hazards	Jurisdictions Affected				
<p><b>Winter Storms/Freezes</b></p>	<p>Snow Storms Ice Storms Extreme Cold</p>	<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>				
		<p><b>Earthquakes</b></p>	<p>Landslides</p>	<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>		
				<p><b>Dam/Levee Failures</b></p>	<p>Floods</p>	<p>Baldwin County</p> <p>Bay Minette</p> <p>Daphne</p> <p>Elberta</p> <p>Fairhope</p> <p>Foley</p> <p>Gulf Shores</p> <p>Loxley</p> <p>Magnolia Springs</p> <p>Orange Beach</p> <p>Perdido Beach</p> <p>Robertsdale</p> <p>Silverhill</p> <p>Spanish Fort</p> <p>Summerdale</p>



Hazards	Associated Hazards	Jurisdictions Affected
<p><b>Landslides</b></p>		Baldwin County
		Bay Minette
		Daphne
		Elberta
		Fairhope
		Foley
		Gulf Shores
		Loxley
		Magnolia Springs
		Orange Beach
		Perdido Beach
		Robertsdale
		Silverhill
		Spanish Fort
Summerdale		
<p><b>Sinkholes (Land Subsidence)</b></p>		Baldwin County
		Bay Minette
		Daphne
		Elberta
		Fairhope
		Foley
		Gulf Shores
		Loxley
		Magnolia Springs
		Orange Beach
		Perdido Beach
		Robertsdale
		Silverhill
		Spanish Fort
Summerdale		
<p><b>Man-made Hazards</b></p>		Baldwin County
		Bay Minette
		Daphne
		Elberta
		Fairhope
		Foley
		Gulf Shores
		Loxley
		Magnolia Springs
		Orange Beach
		Perdido Beach
		Robertsdale
		Silverhill
		Spanish Fort
Summerdale		

### 5.3.2 Sources for Identifying Baldwin County Hazards

The planning team used the following sources to identify hazards:

1. HMPC Hazard Identification and Ratings Exercise. The Hazard Mitigation Planning Committee began the 2010 hazard identification process by completing an exercise to evaluate the list of hazards identified in the 2004 plan, which is reported in Appendix D –HMPC Hazard Identification and Ratings.” A similar exercise was administered for the 2004 plan, and Appendix D compares the results.
2. 2007 Alabama State Plan. The 2007 update of the Alabama State Plan served as an additional resource. The planning team compared the list of hazards in the State Plan with the local list and noted the differences. Table 5-3 highlights these differences.

**Table 5-3. Comparison of Identified Baldwin County Hazards to State Plan**

Hazards Identified in 2007 Alabama State Plan	Equivalent 2010 Baldwin County Identified Hazards	Differences
Floods (storm surge, riverine, flash floods, etc.)	Floods	Coastal and riverine flooding; Baldwin County plan associates storm surge with hurricanes.
High Winds (hurricanes, tornadoes and windstorms)	Tornadoes – High Winds Severe Storms – High Winds Hurricanes – High Winds	High winds included as components of tornadoes, severe storms, and hurricanes in Baldwin County plan.
Winter/ice Storms	Winter Storms/Freezes	Baldwin County plan identifies extreme cold as an associated hazard.
Landslides	Landslides	Baldwin County plan identifies mudslides as an associated natural hazard.
Land Subsidence	Sinkholes (Land Subsidence)	Difference in terminology.
Earthquakes	Earthquakes	Baldwin County plan identifies landslides as an associated natural hazard.
Droughts	Droughts/Heat Waves	Included as a component of droughts/heat waves in Baldwin County plan. Baldwin County plan identifies sinkholes as a consequence of droughts/heat waves.
Hail	Severe Storms – Hail	Included as a component of severe storms in Baldwin County plan.
Wildfires	Wildfires	Baldwin County plan associates wildfires with droughts/heat waves.
Extreme Temperatures	Droughts/Heat Waves – Extreme Heat Winter Storms/Freezes – Extreme Cold	Included as components of droughts/heat waves and winter storms/freezes in Baldwin County plan.
Lightning	Severe Storms – Lightning	Included as a component of severe storms in Baldwin County plan.

Hazards Identified in 2007 Alabama State Plan	Equivalent 2010 Baldwin County Identified Hazards	Differences
Dam Failures	Dam/Levee Failures	Baldwin County plan associates floods with dam/levee failures.
Tsunamis	None	Scientists agree that tsunamis are not a threat to coastal Alabama.

3. List of Federally-Declared Disasters. Federal disaster declarations were an additional source for hazard identification. Baldwin County was included in 21 federal disaster declarations from 1973-2009. However, it should be noted that not all of these disasters occurred within Baldwin County's borders, as FEMA often includes a "buffer" area of adjoining counties in its disaster declarations in case damage is more widespread than initially reported. All declarations that have been issued since 1973 are included in Table 5-4.

**Table 5-4. 1973-2009 Federal Disaster Declarations Affecting Baldwin County**

Disaster No.	Description	Date	Declaration Type
369	Tornado	5/3/1973	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
3045	Drought	8/16/1977	PA-AB, HM
598	Hurricane	9/13/1979	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
619	Severe Storms	4/20/1980	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
639	Flood	5/14/1981	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
742	Hurricane	9/7/1985	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
861	Severe Storms	3/23/1990	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
3096	Snow	3/23/1990	PA-AB, HM
1070	Hurricane	10/10/1995	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
1185	Severe Storms	7/25/1997	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
3133	Hurricane	9/28/1998	PA-AB, HM
1250	Hurricane	10/6/1998	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
1438	Hurricane	10/9/2002	PA-ABCDEFGF, HM
1466	Severe Storms, Tornadoes and Flooding	5/12/2003	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
1549	Hurricane Ivan	9/15/2004	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
1593	Hurricane Dennis	7/10/2005	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
1605	Hurricane Katrina	8/29/2005	IA, PA-ABCDEFGF, DH, DUA, IFG, HM
1789	Hurricane Gustav	9/10/2008	IA, PA-ABCDEFGF, DH, DUA, IFG,

Disaster No.	Description	Date	Declaration Type
			HM
1797	Hurricane Ike: Severe Storms, Flooding	9/26/2008	PA-AB, HM
1835	Severe Storms, Flooding, Tornadoes	4/28/2009	PA-ABCDEFG, HM
1866	Tropical Storm Ida	12/22/2009	PA-AB, HM
<b>* Declaration Type / Description Key:</b>			
IA – Individual assistance		PA-A – Debris removal	
PA – Public assistance		PA-B – Protective measures	
DH – Disaster housing		PA-C – Roads and bridges	
CC – Crisis counseling		PA-D – Water control facilities	
DFA – Direct federal assistance		PA-E – Public buildings	
DUA – Disaster unemployment assistance		PA-F – Public utilities	
HM – Hazard mitigation		PA-G – Recreation	
IFG – Individual and family grant		SA – Stafford Act	
SBA – Small Business Administration		403C – Department of Defense	

Source: FEMA, Region IV

#### 4. Other Hazard Identification Sources.

- Local expertise provided by Baldwin County EMA staff and local government professionals
- Discussions with residents who served on the HMPC and participated in community events and surveys
- Interviews with professionals at the National Weather Service, Geologic Survey of Alabama, Alabama EMA, and the Alabama Forestry Commission
- The National Weather Service
- The NOAA Storm Events Database
- Extensive internet research

## 5.4 Hazard Profiles

### 5.4.1 Hurricanes Profile

Hurricanes typically form in early fall, after months of summer weather have warmed the waters of the mid-Atlantic to their warmest temperatures of the year. Evaporation from the ocean fuels the development of constant tropical storms, of which the most powerful become hurricanes. Baldwin County's location at the center of the Gulf Coast puts the county at risk of hurricane landfalls. The Alabama EMA has included Baldwin in the Primary Hurricane Risk Area.

#### Location

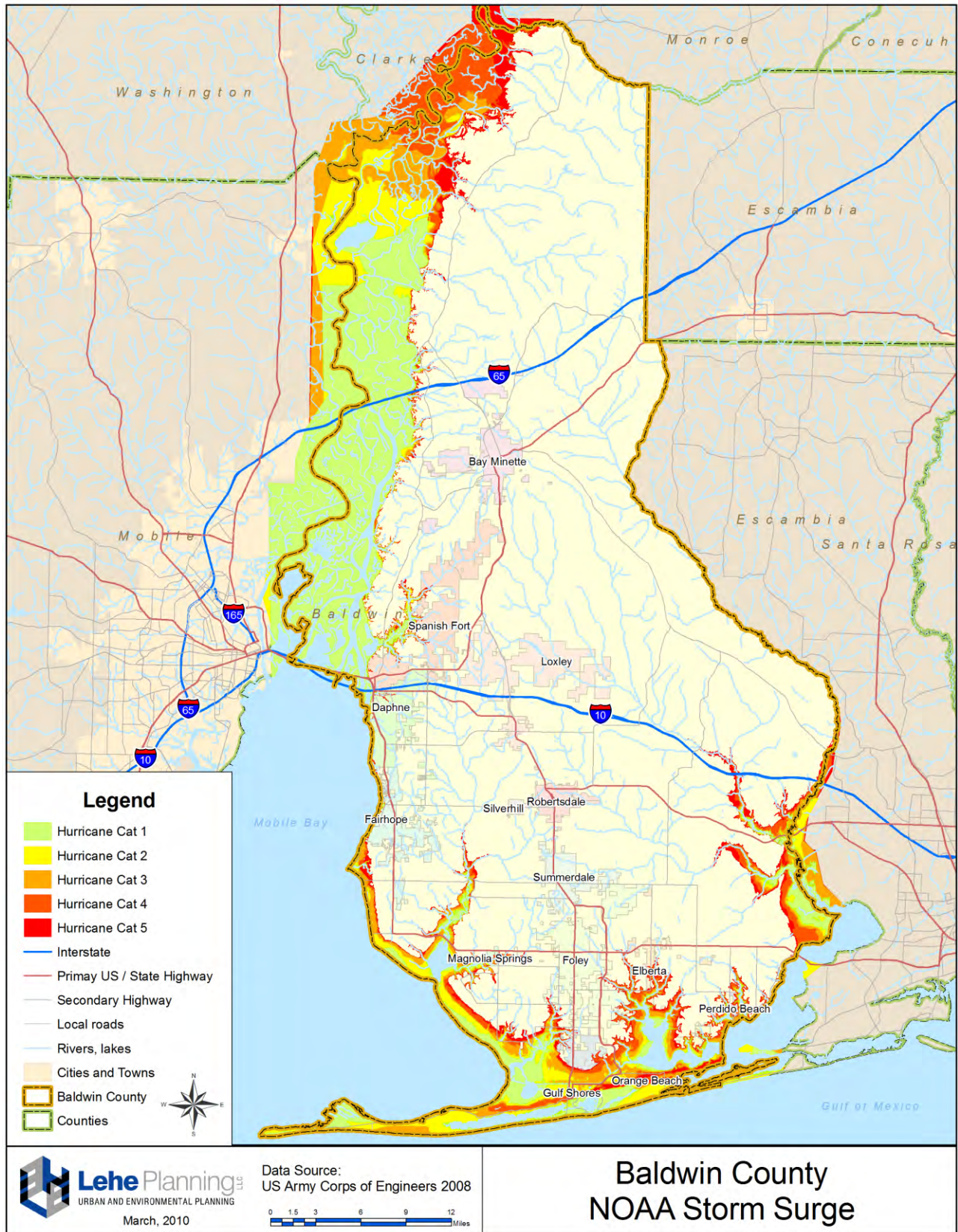
Although all of Baldwin County faces the risk of significant hurricane damage, certain areas are relatively more susceptible to associated hazards.

Coastal communities, including Gulf Shores, Orange Beach, Perdido Beach and nearby unincorporated areas, are most at risk of high winds and *storm surge*. Hurricane strength is measured by wind speed, which tends to be highest when the hurricane first makes landfall. *Storm surge* occurs when a hurricane's high winds push water up higher than sea level. As the hurricane meets land, the swell of water spills over suddenly onto low-lying coastal areas.

**Extent**

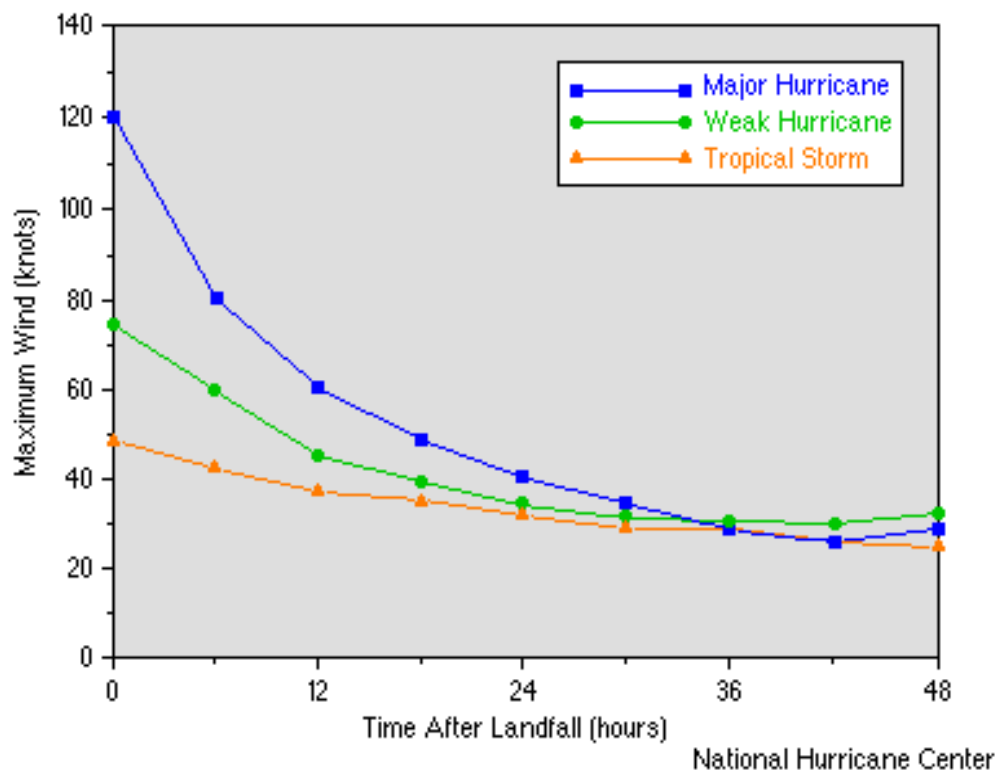
For Baldwin County, storm surge is the most dangerous hazard associated with hurricanes. Storm surge extent depends upon wind speed, the proximity of the affected area to the coast, and underwater geography. Map 5-1 delineates areas subject to storm surge.

**Map 5-1. Storm Surge, Baldwin County**



The second most dangerous hazard associated with hurricanes is high winds. Chart 5-1 illustrates how a hurricane's wind speed falls so by half within 24 hours of landfall. However, every Baldwin County community lies within the distance a hurricane could cover within several hours of land fall, so most areas should expect wind speeds near initial values.

**Chart 5-1. Wind Speed Decay**



Source: National Hurricane Center

Hurricanes often produce torrential rains, which may last days. Flooding from heavy rains in advance of a landfall can sometimes be compounded by tidal surge. Slow-moving hurricanes, such as Hurricanes Danny and Georges (described below) pose the greatest risk of flooding and can drop more than 25 inches of rain.

Tornadoes are a third hazard associated with hurricanes and are often the most deadly aspect of the storm. Ten percent of damage attributable to hurricanes results from tornadoes. Records show half of all hurricanes produce a tornado capable of damaging property. Tornadoes typically form within 12 hours of landfall—a timeframe that allows for tornadoes to strike anywhere in Baldwin County.

### Past Events

Since 1900, Alabama has endured many powerful hurricanes. Descriptions of recent hurricanes give context to the threat Baldwin County faces.

Hurricane Elena, a Category 3 storm with sustained winds of 124 miles per hour, made landfall on September 2, 1985, near Biloxi, Mississippi, causing extensive damage along the Florida, Mississippi and Alabama coasts. The eye of the storm passed 30 miles south of Mobile, Alabama, battering Gulf Shores in Baldwin County, and Dauphin Island in Mobile County. Baldwin and Mobile counties were declared disaster areas on September 7, 1985 due to Elena. Damage from Hurricane Elena was caused, for the most part, by wind, with additional damage from storm surge and wave action. Shoreline properties in Baldwin and Mobile Counties were affected with the most extensive damage concentrated on the western end of Dauphin Island.

Three hurricanes impacted Alabama in 1995. Hurricane Allison caused a scare to Alabama and Florida residents in June of that year. There was relatively little damage, and Alabama was affected only by the evacuees from the Florida coast. Hurricane Erin in August caused extensive crop damage in Escambia County and damages in Baldwin, Washington, Clarke, and other southwestern Alabama counties. Hurricane Opal was the most devastating hurricane of the 1995 season to impact the State of Alabama.

Hurricane Opal, a Category 4 hurricane, made landfall on October 4, 1995, and moved northeast across the state of Alabama. Wind speeds at landfall were 125 miles per hour. In the coastal Alabama communities of Baldwin and Mobile counties, storm surge severely eroded beaches; damaged piers, docks, boats and roads; and flooded low-lying areas. Heavy rains, high winds, and tornadoes

**Figure 5-1. Hurricane Opal Track**

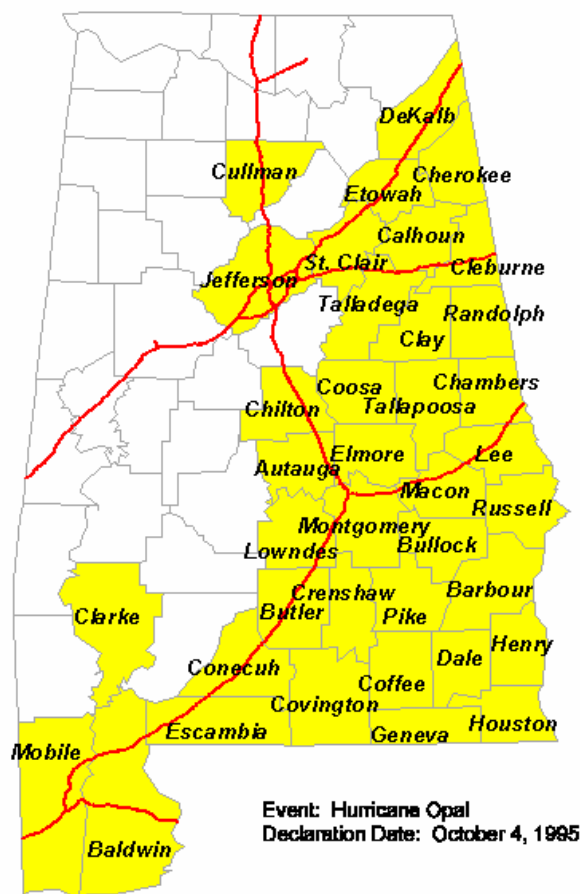


National Hurricane Center

accompanying Opal caused flooding, blocked roads, and downed power lines. The overall effect of Hurricane Opal was a displacement of sand, destruction of the primary dune system, and overall narrowing of the beach in many areas.

More than one half of the state's counties were included in the disaster declaration areas. The Alabama counties affected were concentrated in the eastern half of the state and along the southern border westward to the Mississippi line, is illustrated by Map 5-2. The area contains a total population of 2,982,088, and includes the three largest cities in the state, Birmingham, Mobile, and Montgomery.

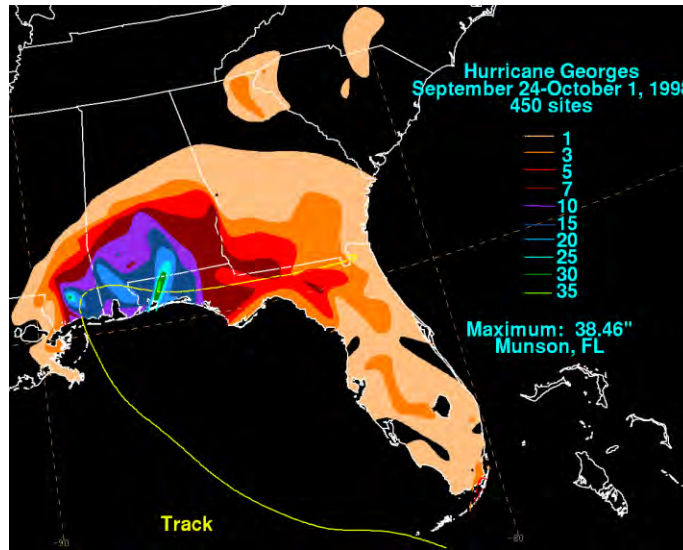


**Map 5-2. Alabama Counties affected by Hurricane Opal**

Hurricane Danny made landfall in Mobile Bay on July 19, 1997. The storm is remarkable for stalling in Mobile Bay for two days, during which time 25 in. of rain fell in Baldwin County. Areas around the Fish River in central Baldwin County suffered extensive flood damage, and the heavy rainfall destroyed crops in rural areas.

Hurricane Georges, a Category 2 hurricane, made landfall on September 28, 1998 near Biloxi, Mississippi. Like Hurricane Danny, Hurricane Georges was slow-moving, so most of its damage is attributable to floods resulting from heavy rainfall. Bay Minette reported rainfall of 29.66 inches. Fort Morgan reported a storm surge of 11.9 ft. Damage estimates for Hurricane Georges include \$18.2 million for unincorporated areas of Baldwin County and \$28.7 million for the City of Orange Beach. (Source: U.S.G.S Hurricane Georges Brochure).

**Figure 5-2. Hurricane Georges Rainfall**

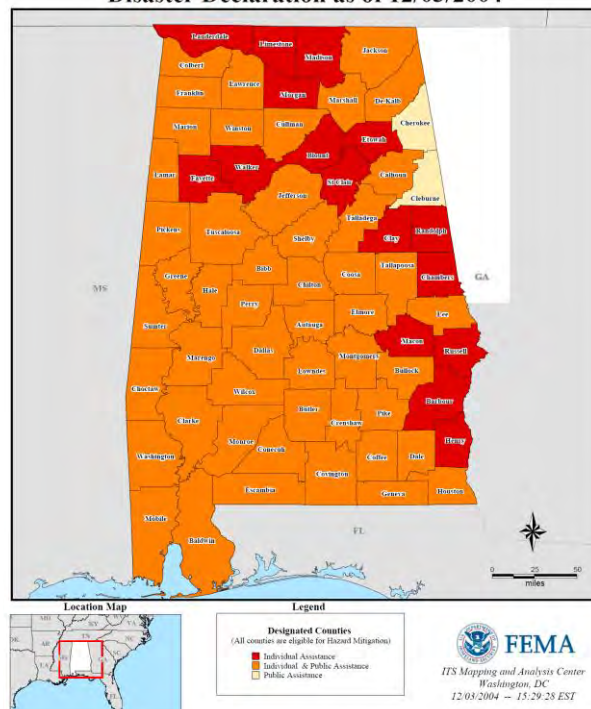


Hydrometeorological Prediction Center report on Hurricane Georges

Hurricane Ivan, a Category 5 hurricane, made landfall near Gulf Shores on September 16, 2004 with maximum sustained winds of 130 mph. Ivan produced a 12 ft. storm surge, heavy rains and more than 100 tornadoes. The damage, which was concentrated in Baldwin and Escambia Counties, is estimated at \$14 billion. With a death toll of 57, Ivan is remembered as one of the most powerful and deadly hurricanes in Gulf Coast history.

**Figure 5-3. Hurricane Ivan Disaster Declaration Area**

FEMA-1549-DR, Alabama  
Disaster Declaration as of 12/03/2004

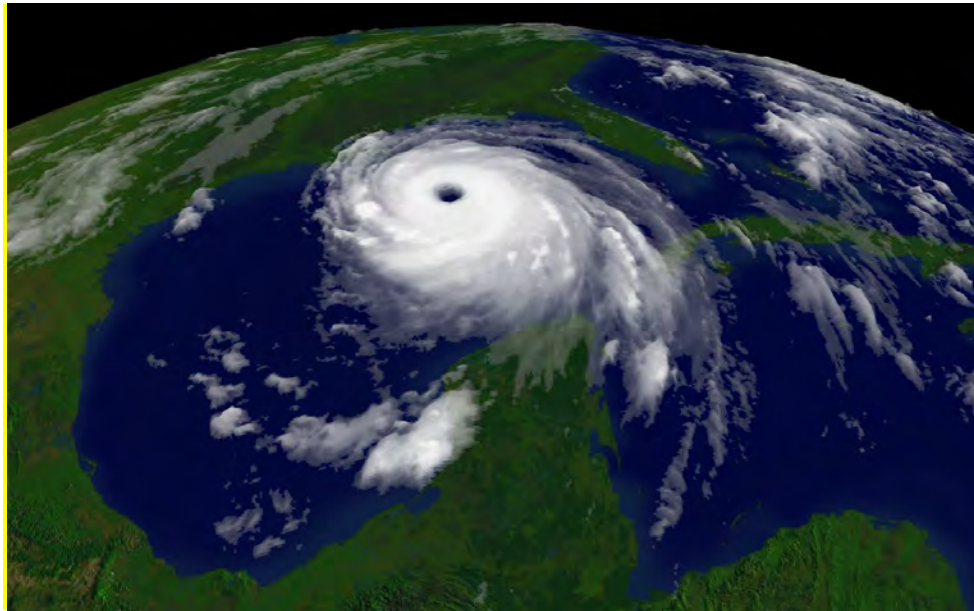


The hurricane season of 2005 produced a record number of named storms in the Atlantic and Gulf Coast regions. There were 27 named storms and several either threatened or impacted the Gulf Coast. Those with the greatest impact to Alabama include tropical storms Arlene and Cindy and hurricanes Dennis and Katrina.

Hurricane Dennis, a Category 3 hurricane, made landfall in the western Florida panhandle on July 10, 2005, bringing storm surge and wind damage along the Florida and Alabama coasts, as well as scattered wind and flood damage in Georgia, Mississippi and Tennessee. The storm caused over \$2 billion in damages and 12 deaths in the United States.

Hurricane Katrina, a Category 3 hurricane at landfall, made landfall in southeastern Louisiana. A storm surge between 12 and 16 feet struck Mobile Bay. Oil rigs collapsed and washed ashore across Alabama's Gulf Coast. Katrina is remembered for its massive size, death toll of 1300, and damage estimate of over \$100 billion--making it the costliest natural disaster in U.S. history.

**Figure 5-4. Hurricane Katrina Approaching the Gulf Coast**



National Oceanic and Atmospheric Administration

**Map 5-3. Alabama County Disaster Designations for Hurricane Katrina**

**FEMA-1605-DR, Alabama  
Disaster Declaration as of 10/05/2005**

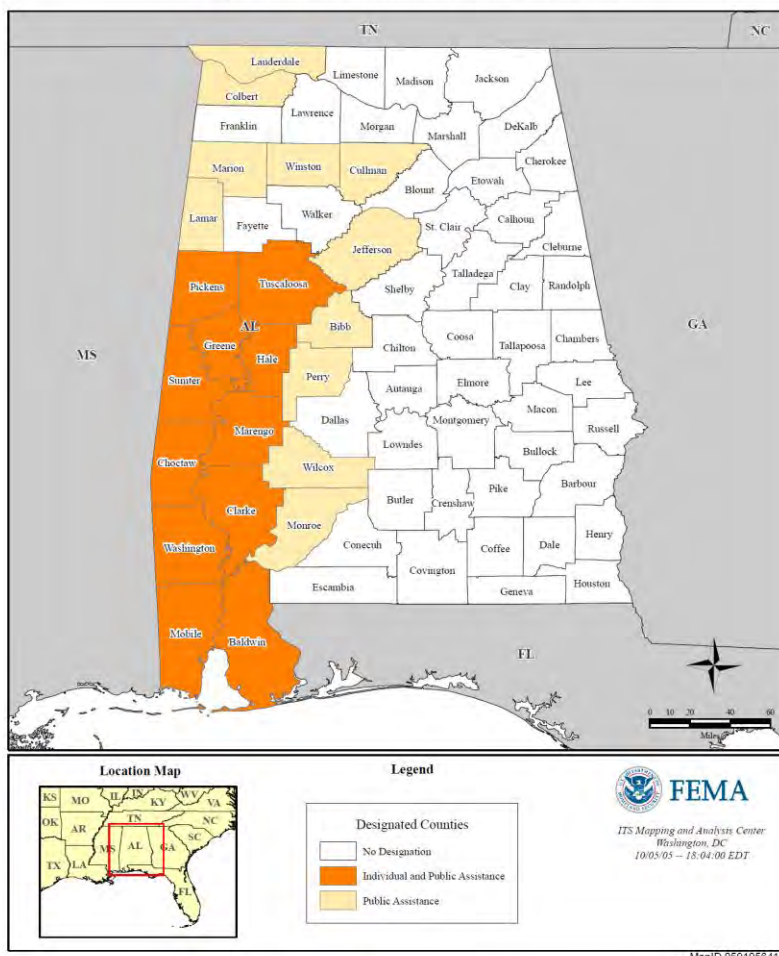


Table 5-5 encapsulates the history of hurricanes impacting Baldwin County since 1893. Maps 5-4 and 5-5 illustrate that Baldwin County can expect to endure a named hurricane at least once each decade. Table 5-6 summarizes storms and damage estimates over the last fifteen years, as recorded at the National Climatic Data Center (NCDC).

**Table 5-5. Baldwin County Area Hurricane History**

DATE	CATEGORY	NAME	NOTES
10/3/1893	unknown		Mobile deluged. Water Driven in from the Bay Far Up in the City. Winds of 75 miles per hour.
9/27/1906	unknown		Moved inland in Pensacola, strongest to hit Pensacola since 1736
7/5/1916	3		The pressure measured at Fort Morgan was 28.38 inches, or 961 Mb. The Hurricane made landfall just west of Mobile.
10/18/1916	3		Winds reached 114 mph at landfall. It moved inland over Pensacola.

DATE	CATEGORY	NAME	NOTES
9/20/1926	3		The pressure at Perdido Beach measured 28.20 inches, or 955 Mb. Significant flooding occurred in South Mobile and Baldwin Counties.
8/17/1969	5	Camille	The strongest known land-falling hurricane in recorded history. Winds were estimated at 190 mph at landfall. Hurricane Camille was extremely small, and moved inland near Bay St. Louis, MS. Great damage occurred throughout coastal Mississippi, with a recorded pressure of 26.84 inches, or 909 Mb. The storm surge was estimated at 22-25 feet. The devastation of Camille inspired the Saffir-Simpson Hurricane Scale.
9/12/1979	3	Frederic	Frederic strengthened from a category one to a category four storm in 30 hours while in the Gulf of Mexico, but weakened before landfall. The sustained winds reached 100 mph at landfall with gusts near 145 mph. Frederic moved inland near Mobile Bay and the Dauphin Island Bridge. The wind resulted in incredible damage to Mobile. Frederic was the first major hurricane to affect Mobile since 1926.
9/2/1985	3	Elena	Hurricane Elena, with sustained winds of 124 mph, made landfall on September 2, 1985 near Biloxi, causing extensive damage along the Florida, Mississippi and Alabama coasts. The eye passed 30 miles south of Mobile, battering Gulf Shores and Dauphin Island. Wind gusts were estimated at up to 132 miles per hour on Dauphin Island. Storm surge reached 6 to 8 feet in an area from Dauphin Island west to Gulfport. The rainfall amounts were light, averaging about 2.5 inches in the Mobile area.
8/3/1995	2	Erin	Hurricane Erin had winds of 100 mph at landfall, and it moved inland near Pensacola, FL. Hurricane Erin was the first of two local Hurricanes in 1995.
10/4/1995	3	Opal	Hurricane winds were estimated near 115 mph at landfall, and Opal moved inland near Santa Rosa Island, FL. Opal reached category four strength, rapidly intensifying from a category one hurricane in only 18 hours. Hurricane Opal attained category four status 200 miles south of Pensacola. Before landfall, Opal weakened to a category three, but still caused major damage in Pensacola. The storm surge reached 12-20 feet. The highest rain total near Pensacola in the Ellyson community reached 15.45 inches.
7/19/1997	1	Danny	Hurricane Danny had wind gusts reaching 80 mph at landfall as it crossed Mullet Point south of Point Clear in Baldwin County. Hurricane Danny then stalled over Mobile Bay and brought record flooding to south Alabama. Rain totals at the Dauphin Island Sea Lab reached 36.71 inches with 25.98 inches of that in seven hours.

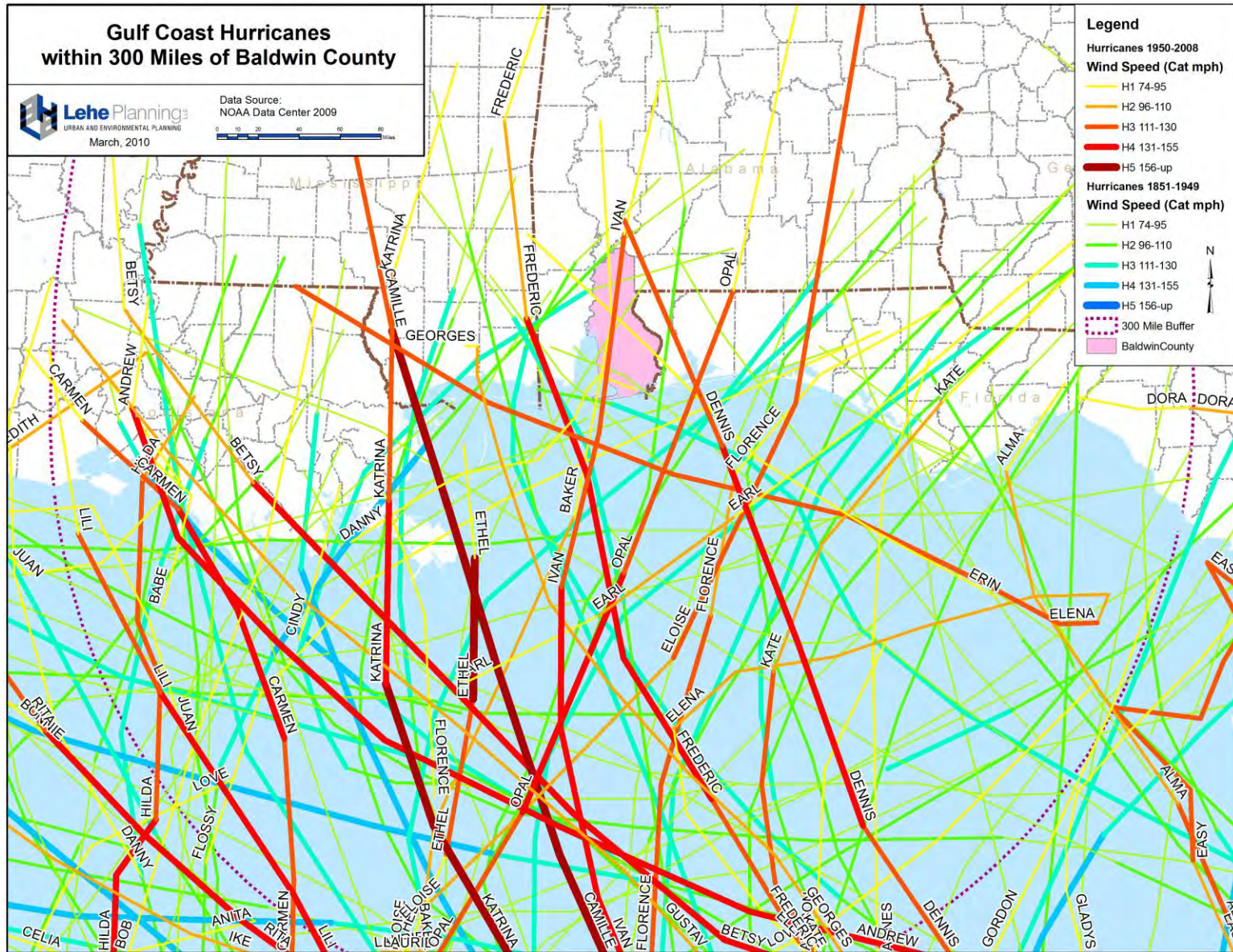
DATE	CATEGORY	NAME	NOTES
9/28/1998	2	Georges	Hurricane Georges delivered sustained winds of 103 mph at landfall, and then it moved inland near Biloxi MS. Georges produced 16.7 inches of rain in Pascagoula. The storm surge reached 12 feet near Fort Morgan, and Georges produced 25 foot waves in the Gulf of Mexico. Georges slowed in forward speed once it approached Alabama. This led to huge rain amounts. In Bay Minette, a rain total of nearly 30 inches was recorded.
9/16/2004	3	Ivan	Hurricane Ivan had winds around 120 mph at landfall, and it moved inland near Gulf Shores. Ivan was the strongest Hurricane from Baldwin to Santa Rosa Counties in more than 100 years. 160 miles inland, near Demopolis, AL, a wind gust near 90 mph was recorded. Rain totals reached 15.75 inches in Pensacola, with a storm surge in Escambia Bay of 12 feet.
7/10/2005	3	Dennis	Hurricane Dennis carried winds of 121 mph at landfall, as it moved inland near Navarre Beach. Dennis had an extremely small eye, and was only significant in a localized area. Dennis prompted a large scale evacuation as it reached category four status in the Gulf of Mexico before it weakened near the central Gulf coast.
8/29/2005	3	Katrina	Hurricane Katrina had winds at landfall estimated at 120 mph. It moved inland near Waveland MS. Katrina was the costliest and one of the deadliest U.S. disasters. Hurricane Katrina produced a 27 ft. storm surge in Hancock County, MS, and breached levees in New Orleans. The highest storm surge along Mobile Bay reached 12 feet at the USS Alabama along I-10. The death toll was over 1,800.

Source: National Hurricane Center

Map 5-4. Hurricanes/Tropical Storms 1950-2004



Map 5-5. Hurricane Paths, 1851-2005





**Table 5-6. Annual Summary of Hurricane/Tropical Storm Events in Baldwin County**

Year	Hurricane	Deaths	Injuries	Total Damages
1995	2	0	0	\$78,000,000
1997	1	1	0	\$63,000,000
1998	2	1	0	\$179,210,000
2000	1	0	0	\$10,000
2001	1	0	0	\$40,000
2002	3	0	0	\$6,765,000
2004	2	0	0	\$2,525,000,000
2005	5	0	0	\$1,121,900,000
2008	3	0	0	\$0
<b>TOTAL</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>\$3,973,925,000</b>
<b>Annual Average</b>	<b>1.4</b>	<b>0.1</b>		<b>\$283,851,786</b>

Source: National Climatic Data Center

### Probability of Future Events

Baldwin County is highly susceptible to hurricanes. Based on historical data, the county can expect nearly three hurricanes or tropical storms every two years. Average annual damages are estimated to be \$280 million.

### 5.4.2 Floods Profile

On October 19, 2007, rainfalls totaled 5 to 10 inches throughout the southern areas of Baldwin County, south of I-10. Several roads flooded by high water had to be closed, and a few homes were flooded by several inches. Over the first week of April, 2005, an estimated 10 to 20 inches of rain fell across the southern parts of the county, culminating in heavy rains of six to eight inches over a twelve hour period on April 6, 2005 causing road closures and damage to bridges. Flooding is a frequent and recurring natural hazard within Baldwin County. Such events confirm the Hazard Mitigation Planning Committee (see Appendix D –HMPC Hazard Identification and Ratings”) assessment that floods pose serious concerns to most Baldwin County communities, especially coastal communities. NOAA records from the Storm Events Database confirm this finding.

### Location

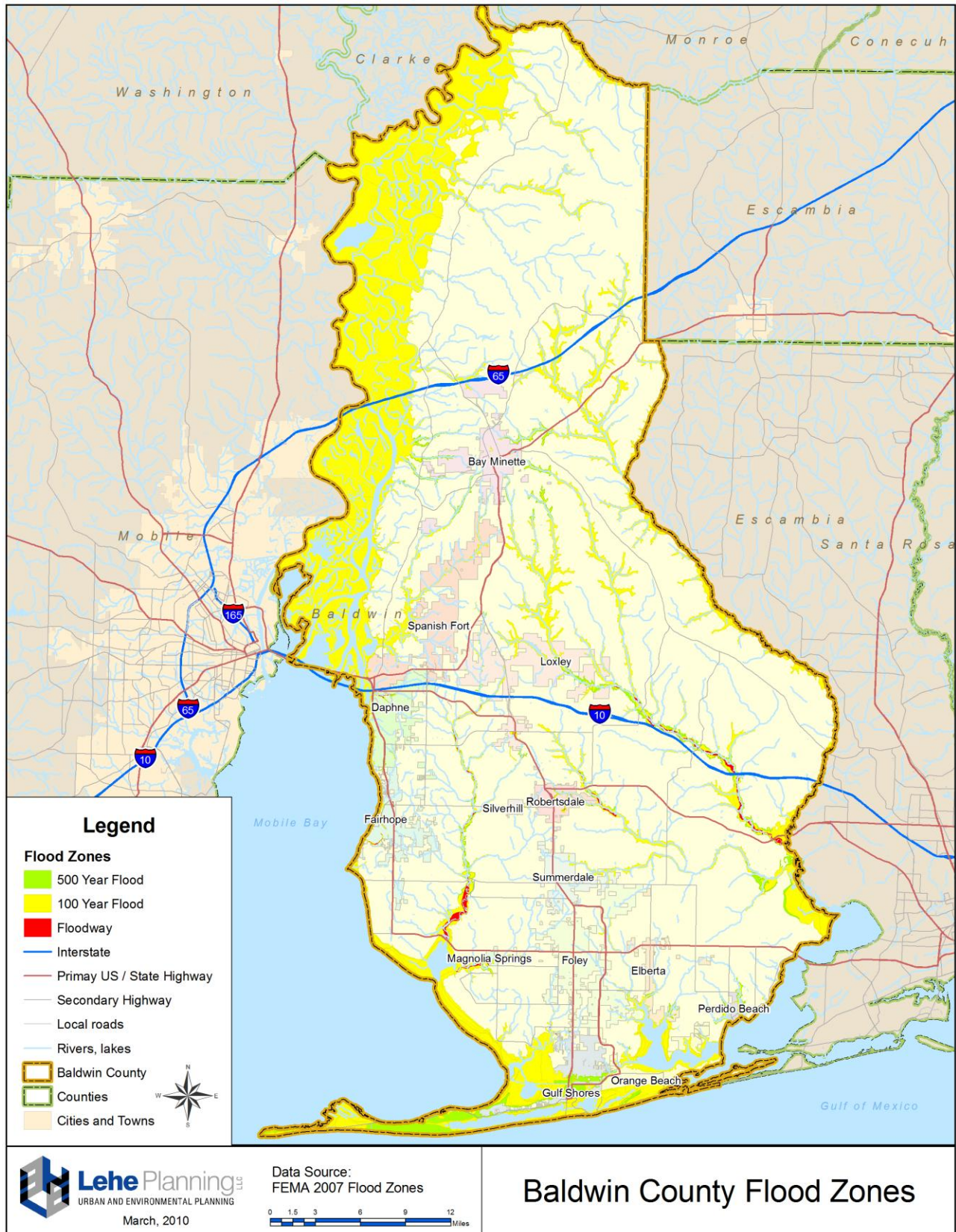
The planning team reviewed Flood Insurance Rate Maps (FIRM), Federal disaster declarations, Planning Committee input, and the Storm Events Database to profile the history of floods in Baldwin County. Most flooding occurs along the Fish River in southwestern Baldwin County and the Styx River in east-central Baldwin County. Other flood-prone bodies include the Mobile River, Perdido River, Bay Minette Creek, Hollinger Creek and their tributaries.

Baldwin County is at risk of riverine and coastal flooding (refer to Appendix D for definitions of flooding types). Map 5-6 shows the location of flood zones depicted on the FIRM. Gulf Shores, Orange Beach, Perdido Beach, and the Ft. Morgan Peninsula are at the greatest risk for coastal flooding, as each is located along the coastline and are extremely vulnerable to weather in the Gulf of Mexico. The City of Fairhope and unincorporated Point Clear are also vulnerable to flooding from the Fish River and its tributaries, as are unincorporated communities in the Styx River Basin.

**Extent**

For a given rainfall, the extent of flooding depends on the amount of rainfall and the capacity of natural water channels and local drainage infrastructure to discharge floodwaters. Channel maintenance, a robust drainage infrastructure system, and hazard mitigation—such as buyouts, building retrofits, advanced warning, and sound construction practices—can greatly diminish the threat flooding poses. Construction along coastal zones increases exposure to flooding, where strict construction standards must be met by coastal zone flood hazard prevention ordinances. As shown on map 5-6, 100 year flood zones, both coastal and riverine, encompass extensive areas of Baldwin County and can cause widespread damage.

**Map 5-6. Flood Zones**



### Past Events

The National Climatic Data Center (NCDC) Storm Events Database indicates frequent flooding since 1995. There have been 56 floods reported for Baldwin County—four per year—as summarized in Table 5-7 “Annual Summary of Flood Events, Baldwin County, 1995-2009”. According to NCDC estimates, damage has averaged \$165,000 per year and \$40,000 per event.

**Table 5-7. Annual Summary of Flood Events, Baldwin County 1995-2009**

Year	Floods	Deaths	Injuries	Total Damages
1995	3	0	0	\$13,000
1996	2	0	0	\$202,000
1997	1	0	0	\$0
1998	8	0	0	\$1,175,000
1999	1	0	0	\$5,000
2001	2	0	0	\$18,000
2002	3	0	0	\$0
2003	7	0	0	\$500,000
2004	2	0	0	\$0
2005	6	0	0	\$260,000
2006	4	0	0	\$20,000
2007	4	0	0	\$100,000
2008	7	0	0	\$27,000
2009	6	0	0	0
<b>TOTAL</b>	<b>56</b>	<b>0</b>	<b>0</b>	<b>\$2,320,000</b>
<b>Annual Average</b>	<b>4.0</b>	<b>0</b>	<b>0</b>	<b>\$165,714</b>

Source: National Climatic Data Center

### Probability of Future Events

Historical data indicates Baldwin County averages 4 floods per year. Because floods are closely associated with hurricanes, expectations for hurricane season should be closely monitored to create expectations for severe flooding.

#### 5.4.3 Severe Storms Profile

Severe storms are dangerous, because they are accompanied by high winds, lightning, tornadoes, hail and flooding. Like hurricanes, severe storms represent a combination of hazards, but, unlike hurricanes, severe storms occur during every season and strike with little advance warning.

According to the Hazard Mitigation Planning Committee (see Appendix D “HMPC Hazard Identification and Ratings”) and surveys of community opinions, severe storms are the second most dangerous natural hazard threatening Baldwin County. NOAA records affirm this perception.

### Location

All areas of Baldwin County have experienced severe storms frequently. However, because severe storms form without precise geographic borders, it is difficult to map their precise locations.

### Extent

The extent of severe storm damages depends upon the inches of precipitation, hail size, lightning intensity, wind speed and other factors. Large amounts of rainfall in short time periods induce flash and riverine flooding. Large hail is very rare, and damage is generally limited to automobiles and minor building damage such as cracked windows and roof damage. Lightning is most commonly responsible for wildfires. By toppling trees, high winds cause power outages, damages to structures, and road closures.

### Past Events

The Storm Events Database of the National Climatic Data Center (NCDC) indicates frequent annual severe storm occurrences since 1955 (Summarized in Table 5-8). The database shows nearly 380 severe storm events for Baldwin County—roughly seven per year—including 134 reports of damage from thunderstorms, 32 from lightning, and 134 from hail. The database also shows \$3 million in damages since 1955.

**Table 5-8. Annual Summary of Severe Storm Events, 1955-2009 (NCDC)**

Year	Type	Number	Deaths	Injuries	Total Damages
1955	Hail	1	0	0	\$0
1959	Thunderstorm/High Wind	1	0	0	\$0
1962	Thunderstorm/High Wind	1	0	0	\$0
1963	Thunderstorm/High Wind	1	0	0	\$0
1971	Thunderstorm/High Wind	2	0	0	\$0
1972	Hail	1	0	0	\$0
1973	Hail	2	0	0	\$0
1974	Hail	2	0	0	\$0
1974	Thunderstorm/High Wind	1	0	0	\$0
1975	Thunderstorm/High Wind	3	0	0	\$0
1977	Hail	1	0	0	\$0
1977	Thunderstorm/High Wind	3	0	0	\$0
1980	Thunderstorm/High Wind	3	0	0	\$0
1982	Thunderstorm/High Wind	4	0	0	\$0
1983	Thunderstorm/High Wind	7	0	0	\$0
1984	Thunderstorm/High Wind	4	0	0	\$0
1985	Hail	2	0	0	\$0
1985	Thunderstorm/High Wind	8	0	0	\$0
1986	Thunderstorm/High Wind	7	0	0	\$0
1987	Hail	2	0	0	\$0

<b>Year</b>	<b>Type</b>	<b>Number</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Total Damages</b>
1987	Thunderstorm/High Wind	4	0	1	\$0
1988	Hail	4	0	0	\$0
1988	Thunderstorm/High Wind	3	0	0	\$0
1989	Hail	1	0	0	\$0
1989	Thunderstorm/High Wind	8	0	0	\$0
1990	Hail	1	0	0	\$0
1990	Thunderstorm/High Wind	12	0	0	\$0
1991	Hail	1	0	0	\$0
1991	Thunderstorm/High Wind	5	0	0	\$0
1992	Hail	2	0	0	\$0
1992	Thunderstorm/High Wind	8	0	0	\$0
1993	Hail	2	0	0	\$0
1993	Thunderstorm/High Wind	2	0	0	\$0
1994	Hail	1	0	0	\$0
1994	Lightning	2	0	0	\$55,000
1994	Thunderstorm/High Wind	5	0	0	\$506,000
1995	Hail	12	0	0	\$1,000
1995	Lightning	1	0	0	\$10,000
1995	Thunderstorm/High Wind	18	0	0	\$100,000
1996	Hail	8	0	0	\$1,000
1996	Lightning	2	0	0	\$25,000
1996	Thunderstorm/High Wind	9	0	1	\$105,000
1997	Hail	16	0	0	\$3,000
1997	Lightning	2	0	0	\$93,000
1997	Thunderstorm/High Wind	8	0	1	\$29,000
1998	Hail	10	0	0	\$0
1998	Lightning	3	0	0	\$180,000
1998	Thunderstorm/High Wind	10	0	0	\$199,000
1999	Hail	7	0	0	\$0
1999	Lightning	7	0	0	\$21,000
1999	Thunderstorm/High Wind	9	0	1	\$178,000
2000	Hail	5	0	0	\$0
2000	Lightning	1	0	0	\$5,000
2000	Thunderstorm/High Wind	11	0	0	\$106,000
2001	Hail	1	0	0	\$0
2001	Lightning	3	0	0	\$48,000
2001	Thunderstorm/High Wind	7	1	0	\$129,000
2002	Hail	5	0	0	\$0
2002	Lightning	1	0	0	\$30,000
2002	Thunderstorm/High Wind	8	0	0	\$106,000

Year	Type	Number	Deaths	Injuries	Total Damages
2003	Hail	18	0	0	\$5,000
2003	Thunderstorm/High Wind	8	0	0	\$45,000
2004	Thunderstorm/High Wind	3	0	0	\$20,000
2005	Hail	8	0	0	\$4,000
2005	Lightning	2	2	0	\$0
2005	Thunderstorm/High Wind	4	0	0	\$50,000
2006	Hail	13	0	0	\$0
2006	Lightning	5	1	2	\$145,000
2006	Thunderstorm/High Wind	8	0	0	\$94,000
2007	Hail	3	0	0	\$8,000
2007	Lightning	3	0	1	\$310,000
2007	Thunderstorm/High Wind	7	0	0	\$55,000
2008	Hail	3	0	0	\$0
2008	Thunderstorm/High Wind	5	0	0	\$140,000
2009	Hail	2	0	0	\$0
2009	Thunderstorm/High Wind	4	0	0	\$135,000
<b>TOTAL</b>		<b>377</b>	<b>4</b>	<b>7</b>	<b>\$2,941,000</b>

Source: National Climatic Data Center

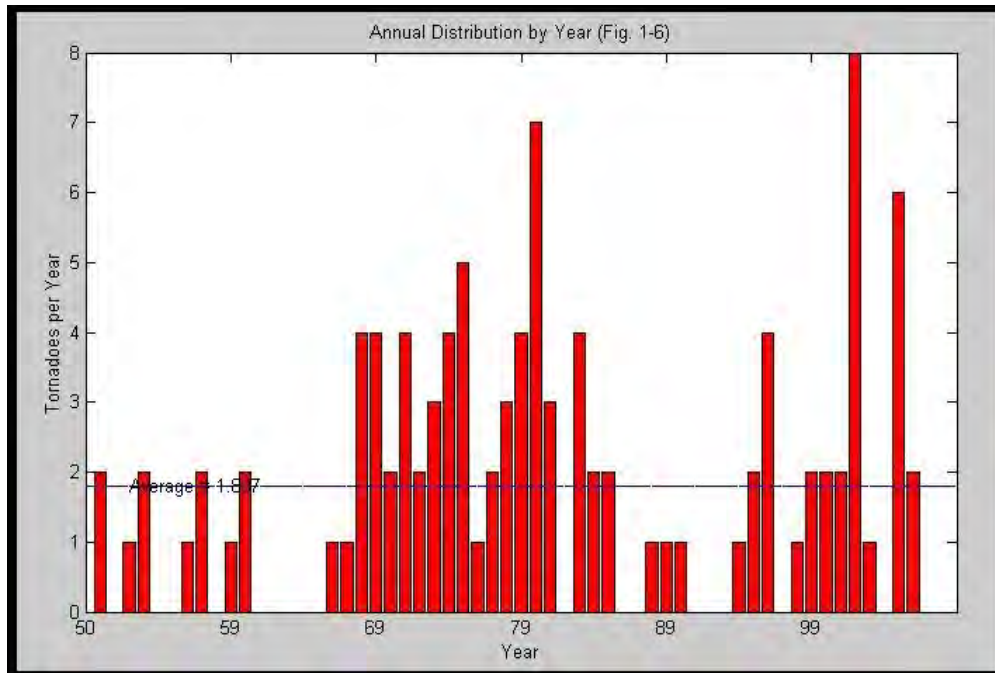
### Probability of Future Events

Severe storms will certainly strike Baldwin County every year and in every jurisdiction. Past trends average seven storms per year. High winds and hail infrequently accompany severe storms in Baldwin County but can cause significant property damage.

#### 5.4.4 Tornadoes Profile

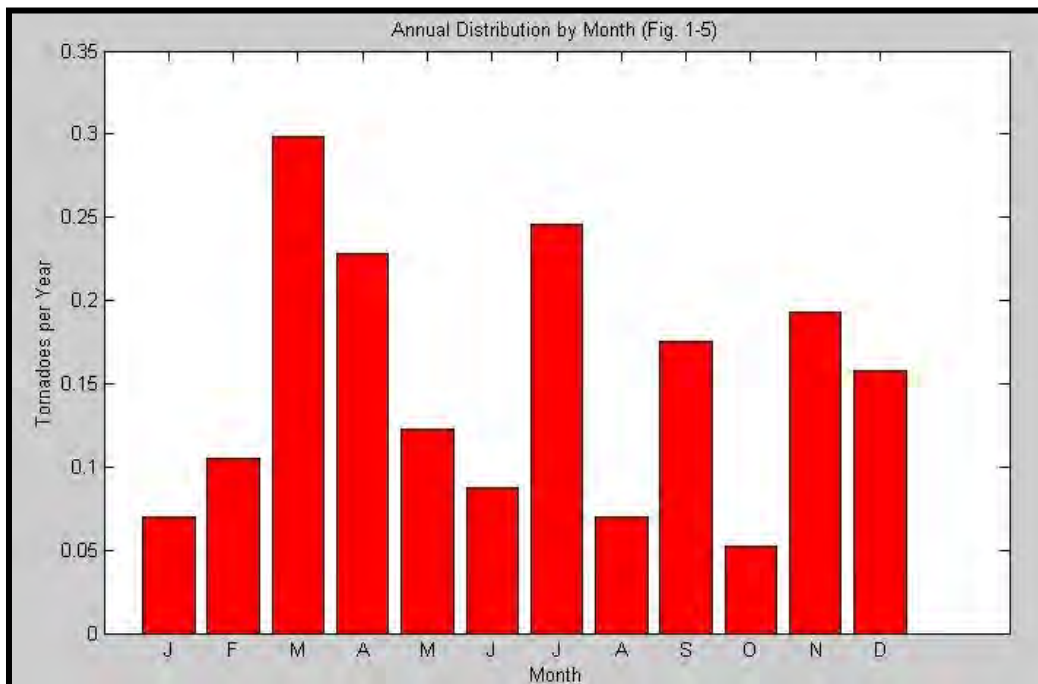
A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It forms alongside thunderstorms and hurricanes when cool air suddenly forces a band of warm air to rise rapidly. According to the Hazard Mitigation Planning Committee (HMPC), tornadoes pose a significant threat: hazard exposure, risk severity, and the probability of future events are third highest for tornadoes among all identified hazards. Chart 5-2 shows Baldwin County averaged less than two tornadoes per year between 1950 and 2006. Chart 5-3 shows these tornadoes occur most frequently during the spring during the period between July and November. Chart 5-4 indicates that they tend to occur in the afternoons and evenings. (Data by VorTek, LLC, SATT software shows tornadoes within 40 mile of the center of Baldwin County.)

**Chart 5-2. Tornadoes per Year, 1950-2006, Baldwin County**



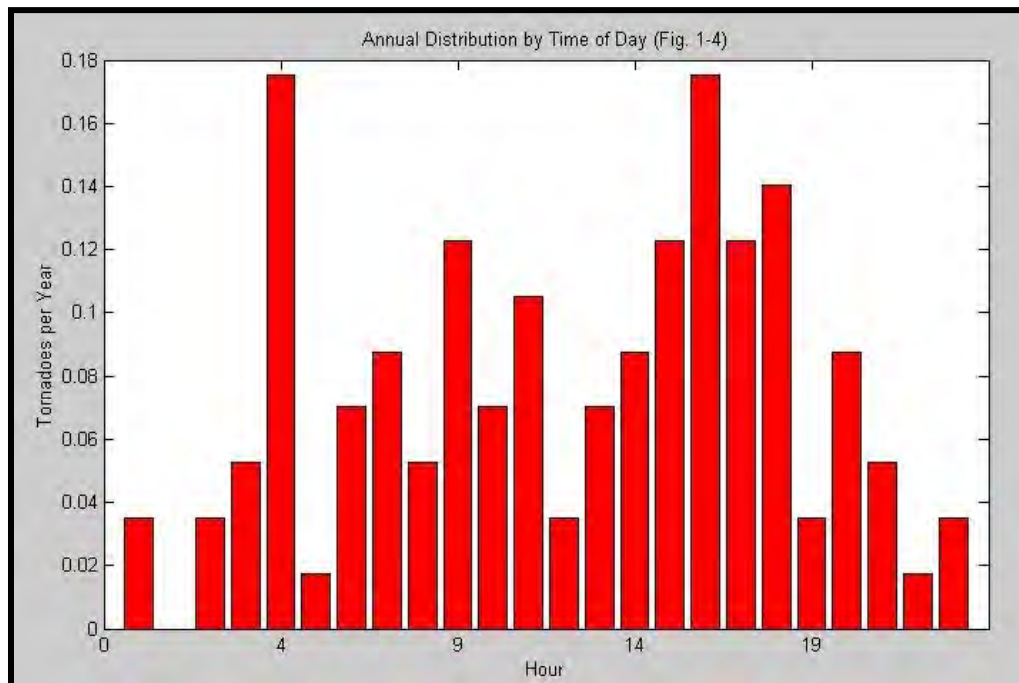
Source: VorTek, LLC. SATT 3.0 Site Assessment of Tornado Threat software

**Chart 5-3. Monthly Tornado Frequency, 1950-2006, Baldwin County**



Source: VorTek, LLC. SATT 3.0 (Site Assessment of Tornado Threat) software



**Chart 5-4. Hourly Tornado Frequency, 1950-2006, Baldwin County**

Source: VorTek, LLC. SATT 3.0 (Site Assessment of Tornado Threat) software

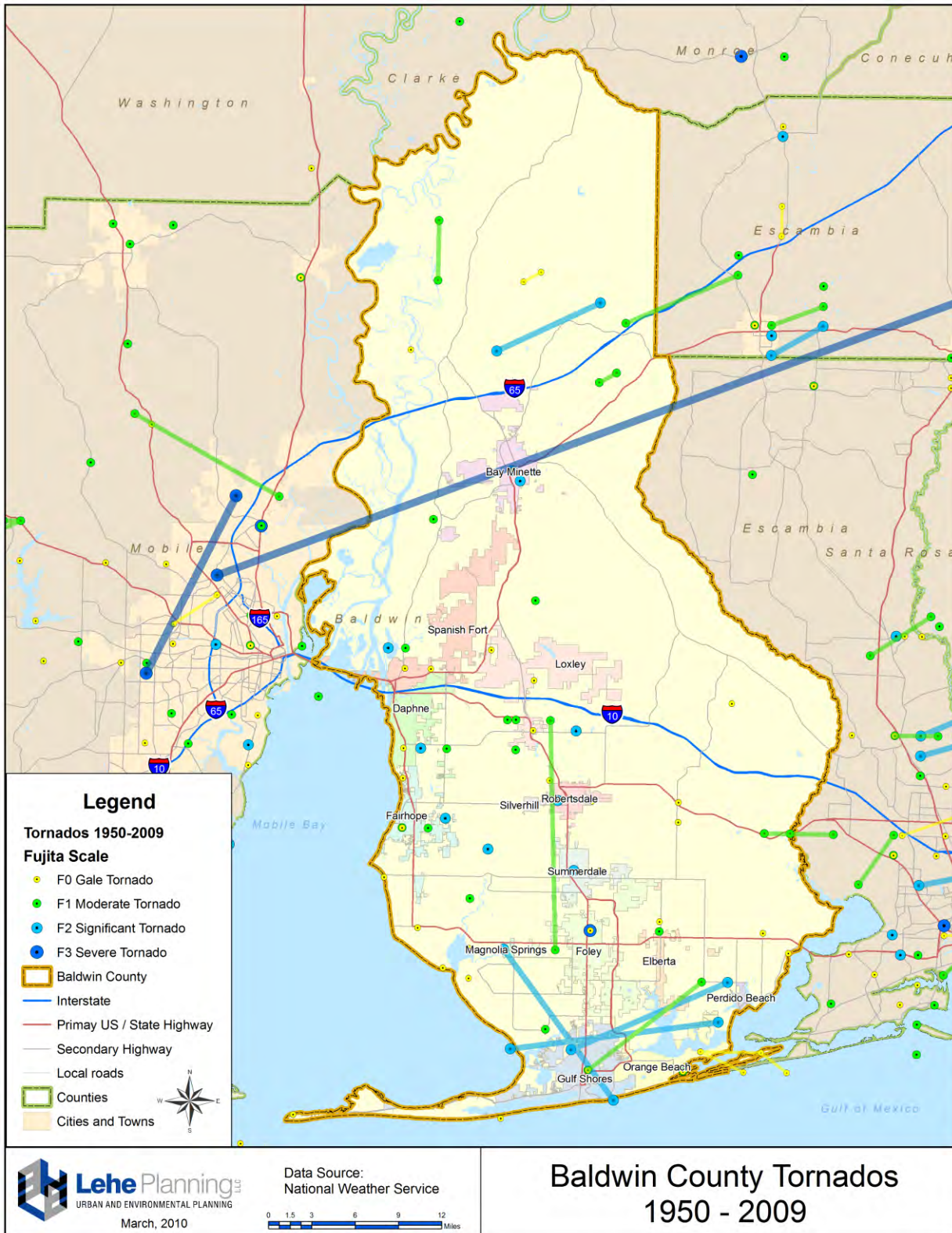
### Location

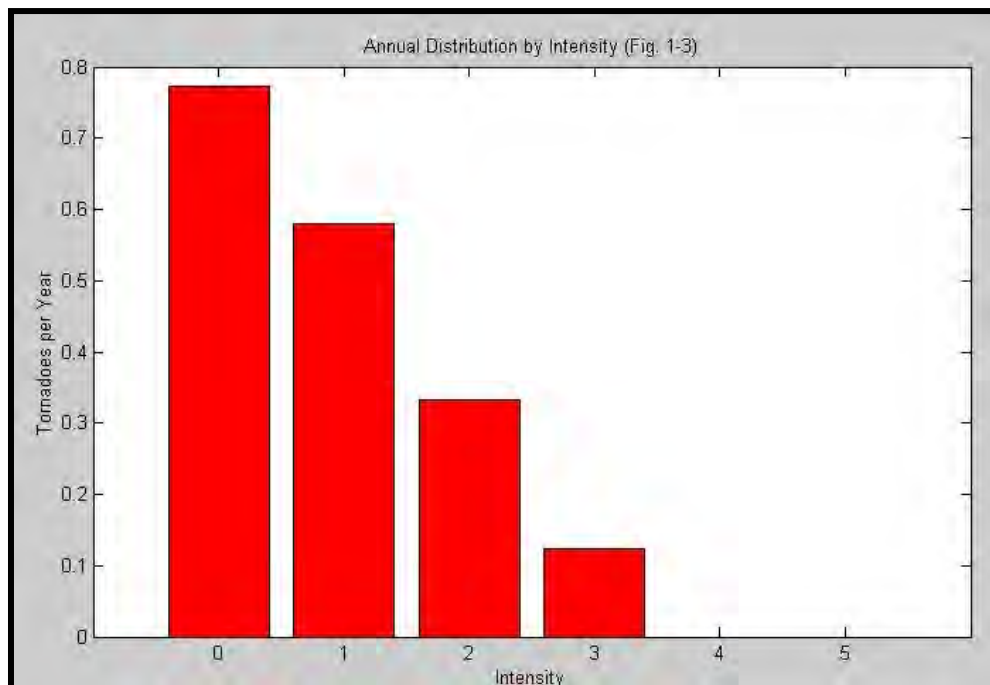
Tornadoes are generally not location-specific hazards. Therefore, all Baldwin County locations and jurisdictions bear an equal risk. Map 5-7 shows touchdown locations and paths of tornadoes since 1950. The map affirms tornadoes can occur anywhere.

### Extent

Baldwin County tornadoes tend to be moderate in severity and relatively infrequent, as indicated by Chart 5-5, “Annual Distribution of Tornadoes by Intensity” and Table 5-9, “Annual Summary of Baldwin County Tornado Events, 1950-2008. Also, refer to Map 5-7, which shows the intensity and geographic distribution of mapped tornadoes paths and locations since 1950. The average intensity of tornadoes since 1950 is less than F-1.

Map 5-7. Baldwin County Tornado Paths, Since 1950



**Chart 5-5. Annual Distribution of Tornadoes by Intensity**

Source: VorTek, LLC. SATT 3.0 (Site Assessment of Tornado Threat) software

### Past Events

NOAA National Climatic Data Center records indicate Baldwin County has been the site of 88 tornadoes since 1950, averaging over 1.5 annually. These tornadoes caused 85 injuries and property damages of nearly \$10 million. The data also indicates that the most severe tornado was an F2 in February 1981; it caused 62 injuries and \$2.5 million in damages while cutting a path 150 yards wide for 2 miles.

**Table 5-9. Annual Summary of Baldwin County Tornado Events 1950-2008**

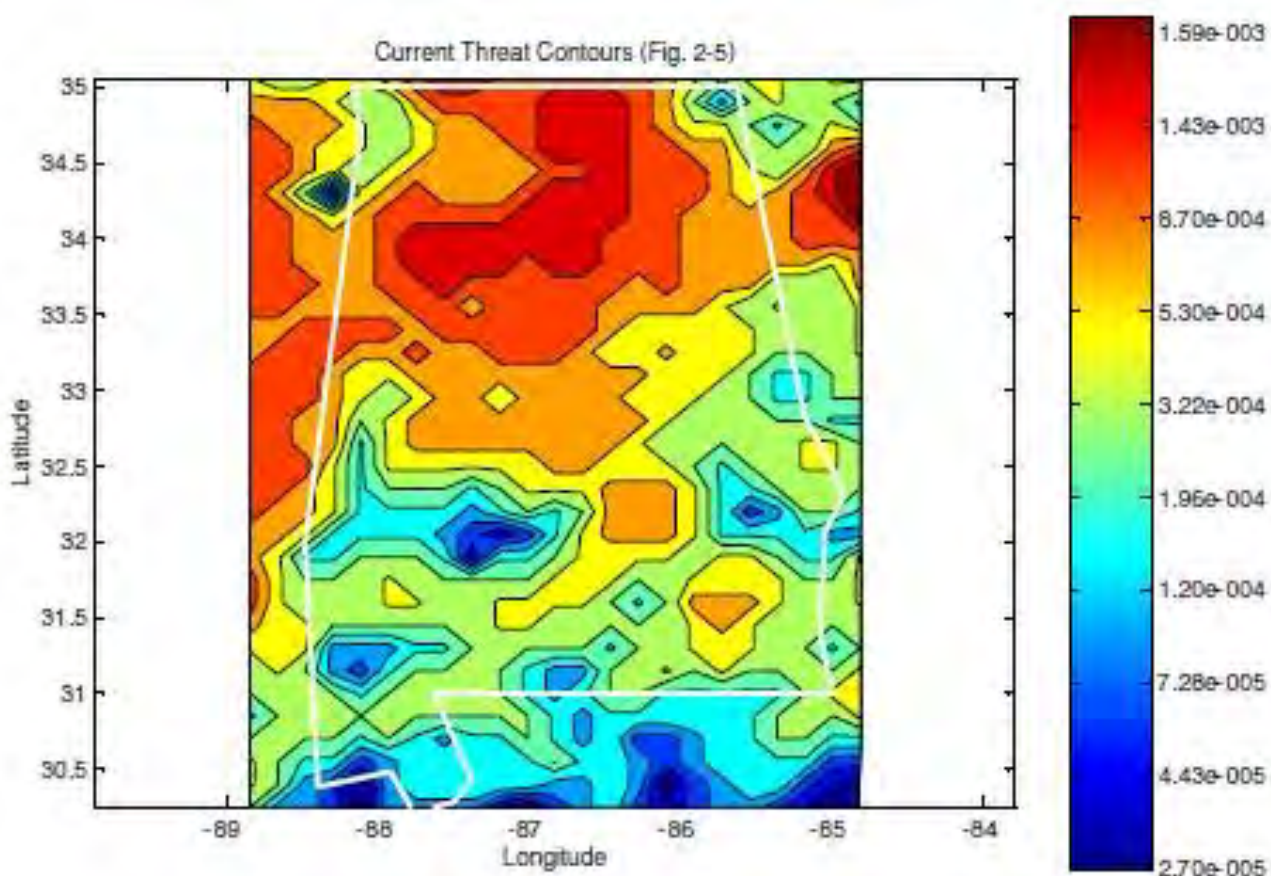
Year	Number	Deaths	Injuries	Total Damages
1950	1	0	0	\$3,000
1962	1	0	0	\$250,000
1964	1	0	3	\$25,000
1966	1	0	0	\$25,000
1967	2	0	1	\$275,000
1968	2	0	4	\$500,000
1969	2	0	0	\$0
1970	1	0	0	\$25,000
1971	2	0	0	\$500,000
1972	1	0	0	\$25,000
1973	1	0	0	\$3,000
1974	3	0	0	\$0

Year	Number	Deaths	Injuries	Total Damages
1975	5	0	0	\$328,000
1977	1	0	0	\$25,000
1978	1	0	0	\$0
1979	1	0	0	\$3,000
1980	4	0	0	\$100,000
1981	3	0	62	\$2,500,000
1982	2	0	0	\$28,000
1983	3	0	0	\$31,000
1985	5	0	0	\$103,000
1989	4	0	10	\$2,503,000
1990	4	0	0	\$0
1991	3	0	0	\$250,000
1992	1	0	1	\$25,000
1994	1	0	0	\$50,000
1995	1	0	0	\$0
1997	1	0	0	\$20,000
1998	2	0	0	\$3,000
1999	4	0	0	\$20,000
2000	4	0	0	\$360,000
2001	7	0	0	\$570,000
2002	3	0	0	\$50,000
2004	6	0	4	\$648,000
2005	1	0	0	\$4,000
2006	2	0	0	\$150,000
2008	1	0	0	\$20,000
<b>TOTAL</b>	<b>88</b>	<b>0</b>	<b>85</b>	<b>\$9,422,000</b>
<b>Annual Average</b>	<b>1.52</b>	<b>0</b>	<b>1.47</b>	<b>\$162,448</b>

Source: National Climatic Data Center

### Probability of Future Events

It is impossible to accurately predict the location or frequency of tornadoes in a given year, since past trends do not guarantee the likelihood of future events. However, over the long term, Baldwin County can expect about 1.5 tornadoes annually with minimal damages. The risk of tornadoes is evenly distributed across all areas of Baldwin County. Importantly, trends indicate tornadoes often accompany hurricanes. Since 1950, annual property damage due to tornadoes has averaged over \$160,000; injuries have averaged 1.5 per year. Map 5-8 illustrates tornado threat levels, based on historical data. Baldwin County lies within a low-threat area.

**Map 5-8. Alabama Tornado Threat Contours**

Source: VorTek, LLC. SATT 3.0 (Site Assessment of Tornado Threat) software

#### 5.4.5 Wildfires Profile

There are two types of wildfires experienced in Baldwin County: *wildland* wildfires and *interface* wildfires. *Wildland* fires burn only on vegetation and therefore occur in strictly rural areas. *Interface* wildfires burn on a mix of vegetation and human structures and therefore occur at the interface of human development and rural landscapes. Like wildland fires, interface fires can start due to lightning strikes. More commonly, though, interface wildfires are started by human activities, such as debris burning. Non-permitted burns are a major cause of interface wildfires.

There exist potential measures for reducing the risk of wildfires. Limiting underbrush vegetation through prescribed burns and herbicides reduces the fuel supply of potential wildfires. Public campaigns to spread fire safety strategies can reduce dangerous behavior such as leaving campfires untended or burning trash in forests.

#### Location

Unincorporated, rural areas of Baldwin County are most susceptible to wildfires, but, due to sparse development, the risks to life and property are lower in these areas.

The risks are greatest for sprawl areas where human development coexists with conditions amenable to wildfires.

**Extent**

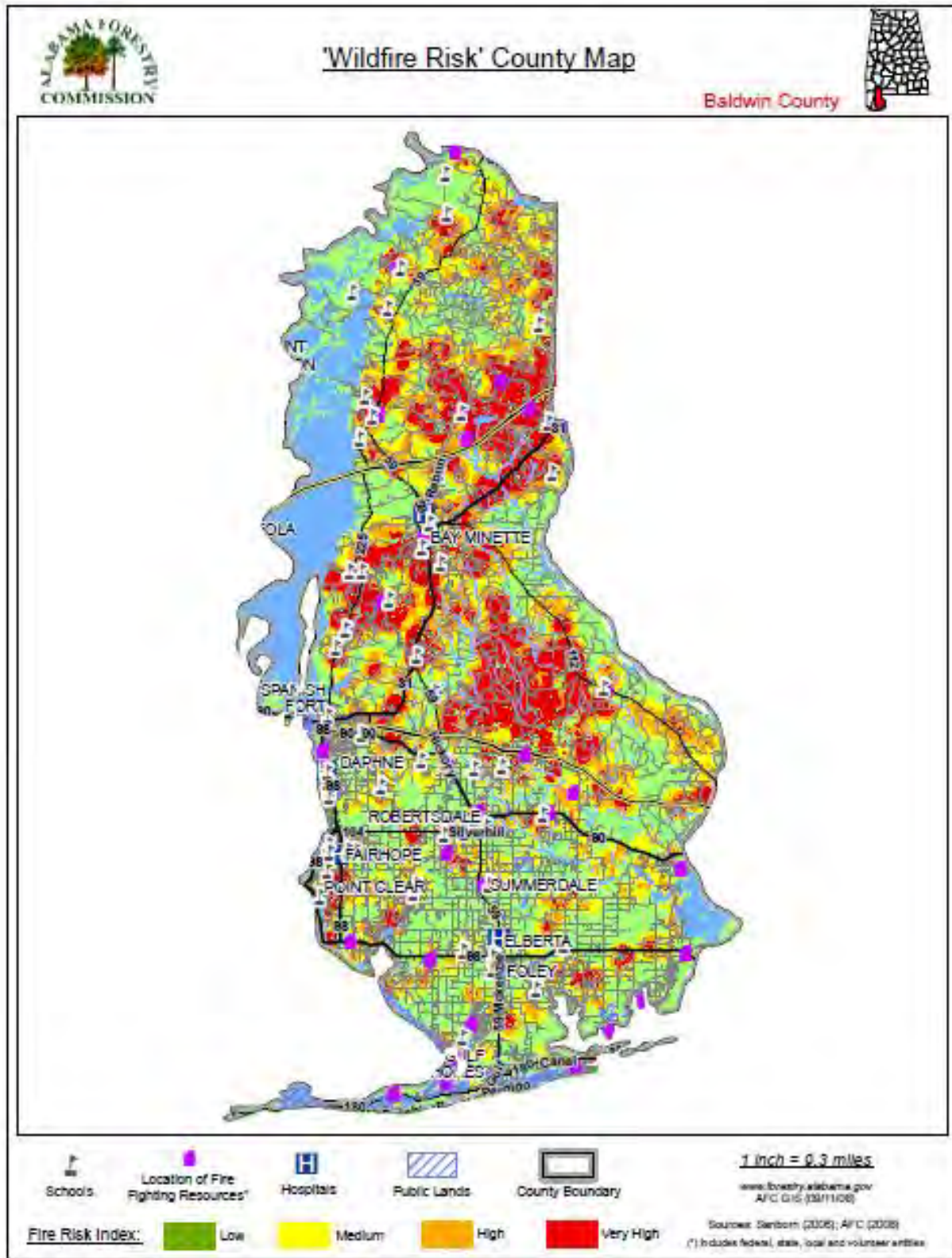
Baldwin County's extensive forest coverage creates an abundant and widespread fuel source for wildfires. Further, the County's weather conditions, drought and lightning from severe storms, can increase risks.

The wildland-urban interface, where urban development and humans interact with forested wildlands compound the extent of wildfires in Baldwin County. Unpermitted burns can contribute to the many causes of wildfires, with out-of-control burns that can rage, leading to extensive damage. Effective forest management practices call for prescribed burns, thinning, mowing and herbicidal applications to reduce hazardous concentrations of underbrush vegetation. Additionally, prescribed burns can help develop valuable wildlife habitats.

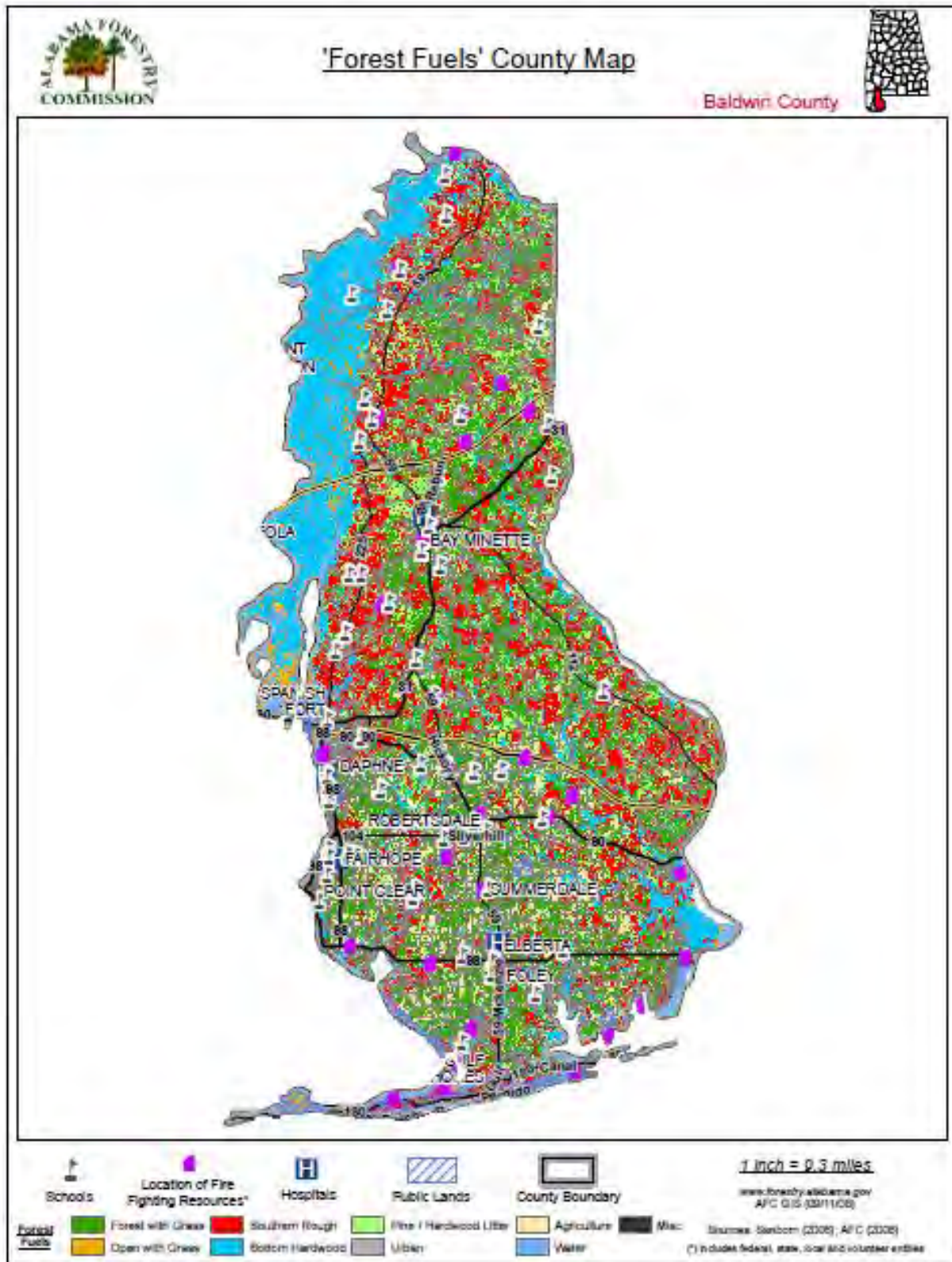
Local resources can affect the severity of wildfires and local capabilities for firefighting. Rural volunteer fire departments with limited resources often cannot handle firefighting demands when multiple fires break out.

Map 5-9 –Baldwin County Wildfire Risk,” denotes areas throughout the county at various risk levels for wildfires, and map 5-10 –Baldwin County Forest Fuels” shows the extent of forested lands and ground cover.

Map 5-9. Baldwin County Wildfire Risk



Map 5-10. Baldwin County Forest Fuels





**Past Events**

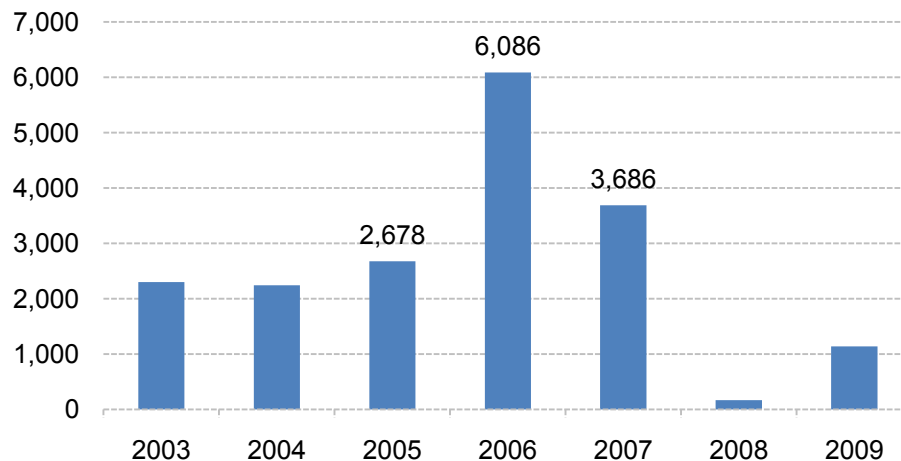
Among Alabama counties, Baldwin County is annually ranked first or second in both the number of wildfires and acreage lost to wildfire (see Map 5-11), Table 5-10 shows the number of fires suppressed by the Alabama Forestry Commission with the assistance of local Volunteer and Municipal Fire Departments from 1995 to 2009. Since 1995, Baldwin County has experienced 3,104 wildfires, which damaged 56,655 acres.

**Table 5-10. Annual Wildfires in Baldwin County Since 1995**

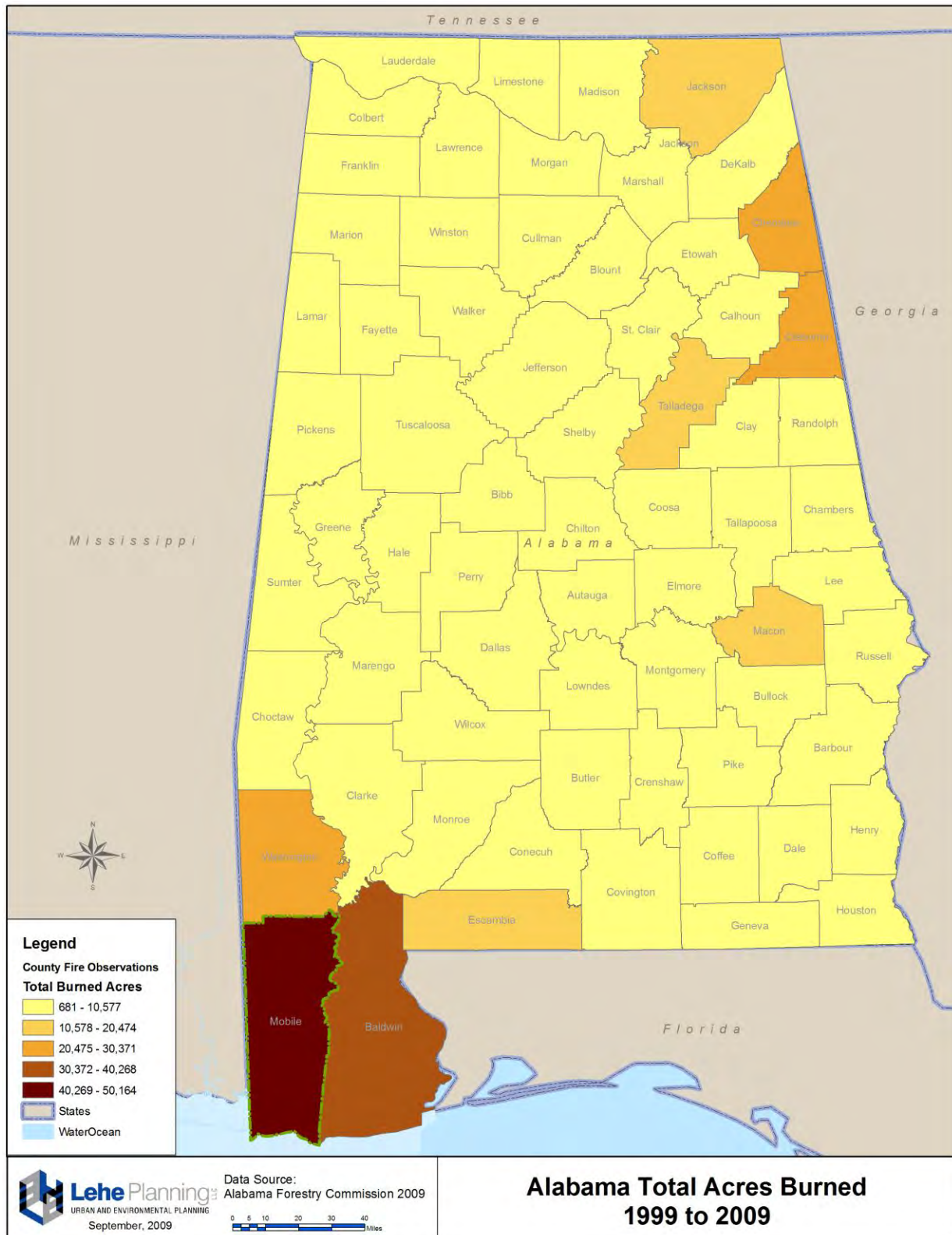
Year	Number of Fires	Acres Burned	Average Size
1995	220	2,855	13.0
1996	368	6,455	17.5
1997	172	3,605	21.0
1998	208	4,244	20.4
1999	340	3,891	11.4
2000	493	8,700	17.6
2001	148	5,099	34.4
2002	169	3,516	20.8
2003	154	2,300	14.9
2004	187	2,241	12.0
2005	147	2,678	18.2
2006	215	6,086	28.3
2007	157	3,686	23.5
2008	16	164	10.2
2009	110	1,136	10.3
<b>Total</b>	<b>3,104</b>	<b>56,655</b>	<b>273.7</b>
<b>Annual Average</b>	<b>207</b>	<b>3,777</b>	<b>18.1</b>

Source: Alabama Forestry Commission

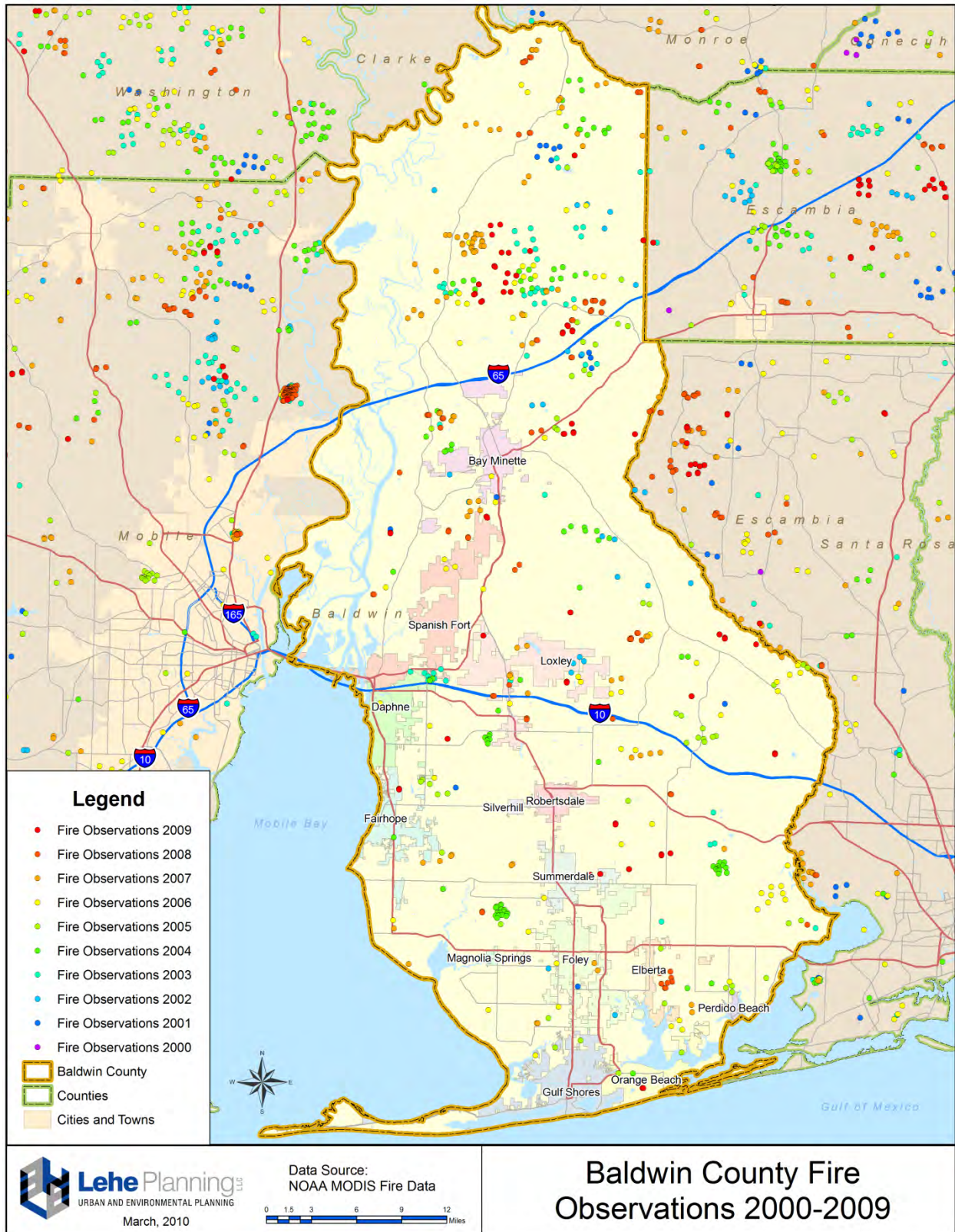
**Acreage Burned**



**Map 5-11. Alabama Total Acres Burned 1999-2009**



**Map 5-12. Baldwin County Fire Observation 2000-2009**

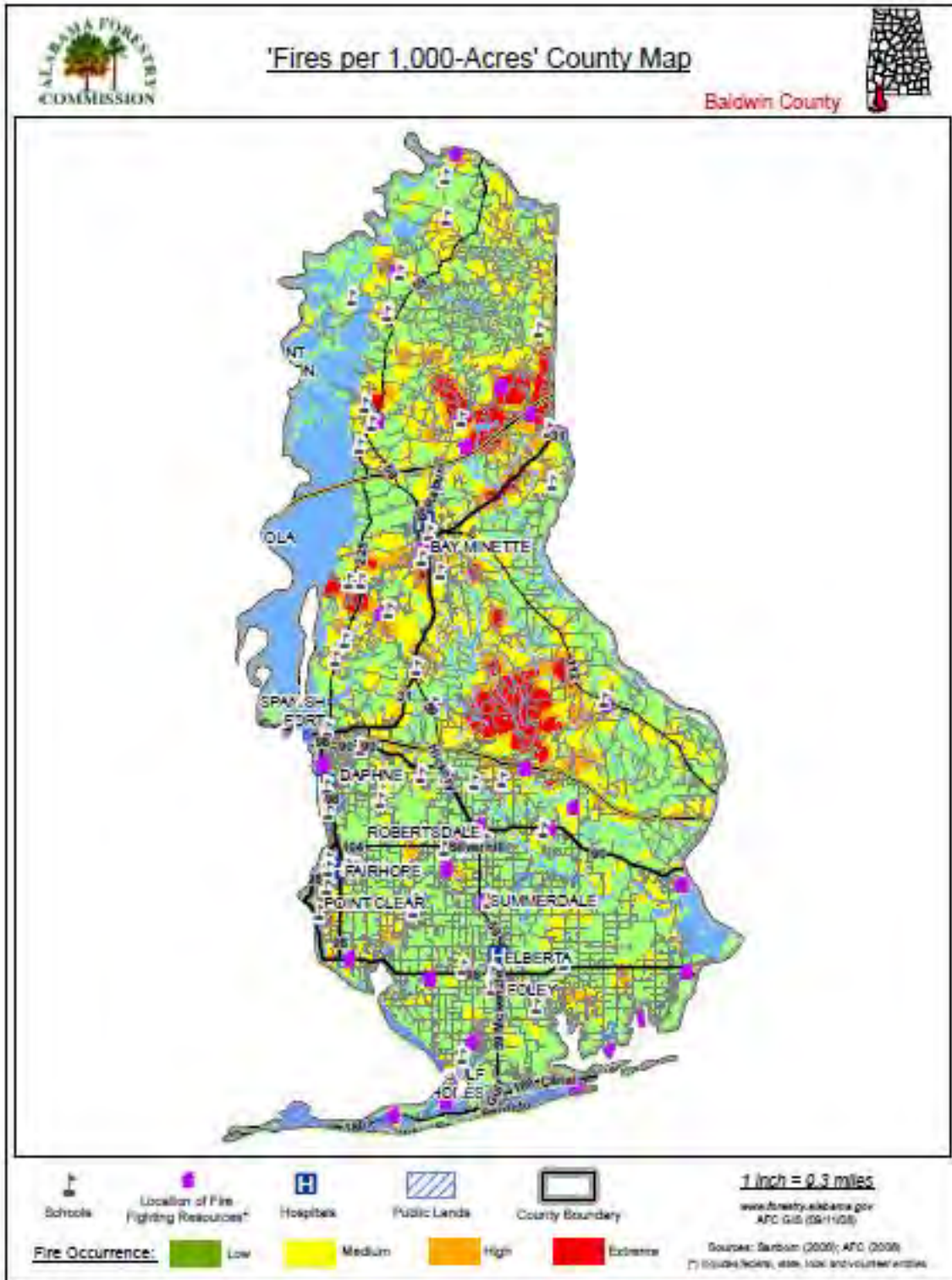


**Probability of Future Events**

The average number of fires over the last five years (2005-2009) is 129. The average number of acres burned annually over the last five years is 2,750, with an average of 18.1 acres consumed per fire. Factors that may alter this trend include the growth of sprawl in western and southern Baldwin County and weather patterns.

Historically there has been an increase in wildfire activity after hurricanes, which topple trees, thereby increasing the supply of dead timber that fuels wildfires. In the year 2006 following Hurricane Katrina in 2005, for example, the acreage burned jumped markedly, then declined.

Map 5-13. Baldwin County Fire Frequency, 2008



#### **5.4.6 Droughts/Heat Waves Profile**

Baldwin County may occasionally experience short droughts and extreme summer heat. The drought affecting a large part of Alabama from 2006 to 2008 had little impact on Baldwin County.

##### **Location**

Droughts and heat waves affect all areas of Baldwin County equally. However, wildfires fostered by drought conditions are most dangerous for residents living at the rural/urban interface.

##### **Extent**

Farmers and other citizens who depend on rainfall economically may incur material damages during a drought. Heat waves are frequently dangerous for senior citizens, especially those whose homes lack air conditioning.

##### **Past Events**

According to National Climatic Data Center (NCDC), no droughts were recorded in Baldwin County between 1950 and 2010. The NCDC database includes three recorded instances of extreme heat. Two occurred in 2000, including one fatality during a late June heat wave, and the other in August, 2007, when the entire state and much of the nation was in the midst of a two year drought, and Baldwin County reached "Drought Watch Status", one step below "Full Drought." Additionally, a federal disaster resulting from drought was declared on July 20, 1977, affecting Baldwin County.

##### **Probability of Future Events**

Although Baldwin County has no recent droughts, it is located in an area that may experience infrequent and short droughts. Extreme summer heat events are likely.

#### **5.4.7 Winter Storms/Freezes Profile**

Winter storms in this region of the county can form as a result of Arctic cold fronts meeting warm weather systems in the Gulf of Mexico. The risks of winter storms and freezes include frostbite and deaths from freezing, crop failure, power failure, and dangerously slippery roads.

##### **Location**

Baldwin County and its participating jurisdictions are all equally unlikely to experience winter storms. Areas farther from the coast are more susceptible to freezes, although the risk is still slight.

##### **Extent**

In Baldwin County, winter storms are infrequent and relatively mild when they occur, because the county is located so far to the south. However, in the event a winter storm takes place, the risk is commensurately greater, because residents and authorities are not equipped to handle the unfamiliar conditions.

Freezes are more common in Baldwin County than winter storms, but the county's semi-tropical location and low altitude make the severity of these events much less for Baldwin County than for other counties in Alabama.

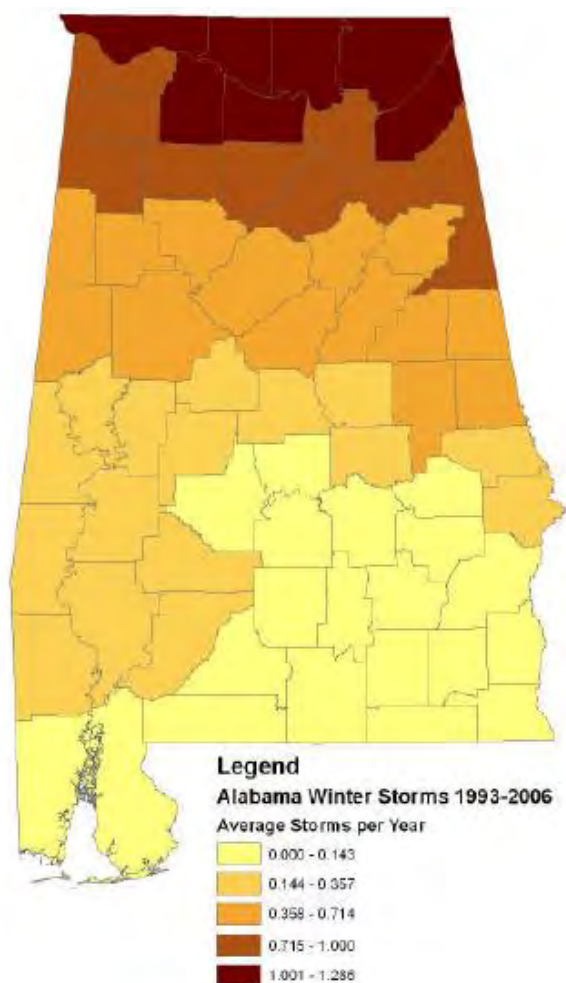
### Past Events

Baldwin County occasionally experiences winter storms and extreme colds. The National Climatic Data Center (NCDC) reports only two extreme winter storms: a February, 1996, winter storm that caused \$10,000 of damages, and no injuries or deaths; and a January, 2002, storm which resulted in no recorded damages, injuries or deaths.

### Probability of Future Events

As indicated in the committee's hazard identification exercise, Baldwin County is not at significant risk of winter storms. Map 5-14 shows that Baldwin County has experienced fewer winter storms than most Alabama counties, about one every 10 years.

**Map 5-14. Alabama Winter Storm Frequency 1993-2006**

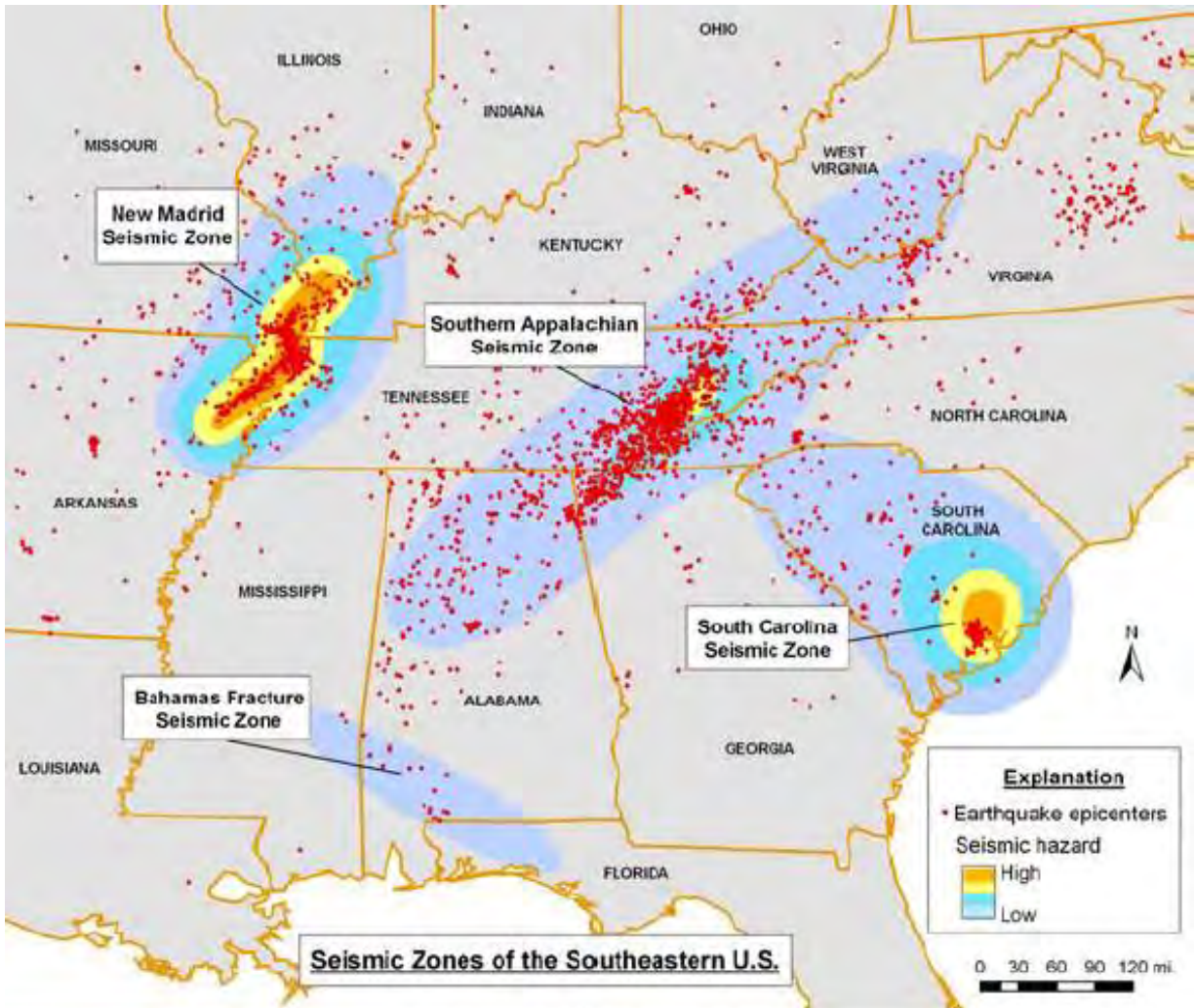


Source: 2007 Alabama State Plan

### 5.4.8 Earthquakes Profile

Hundreds of earthquakes have taken place in Alabama since 1886, when records begin. Map 5-15 “Seismic Zones in Southeastern United States” shows that Alabama’s boundaries enclose two seismic zones: the Southern Appalachian and the Bahamas Fracture. Most Alabama earthquakes have been associated with the Southern Appalachian Seismic Zone. Baldwin County borders the less active Bahamas Fracture Seismic Zone.

**Map 5-15. Seismic Zones in Southeastern United States**



Source: Geological Survey of Alabama, Mapping and Hazards Program

### Location

All areas of Baldwin County are equally at risk of earthquakes, based on historical trends and seismic analysis conducted by the Geological Survey of Alabama (GSA). According to the GSA, seismograph records indicate that earthquakes in the state are frequent but not strong enough to be felt on the surface. Damage reports of incidents have been relatively minor. As discussed in the “Earthquakes Description”



found in Appendix D, the severity of an earthquake is measured according to the Modified Mercalli Intensity Scale, or the Richter Scale. Chart 5-6 compares the two measures.

**Chart 5-6. Richter/Mercalli Intensity Scales**

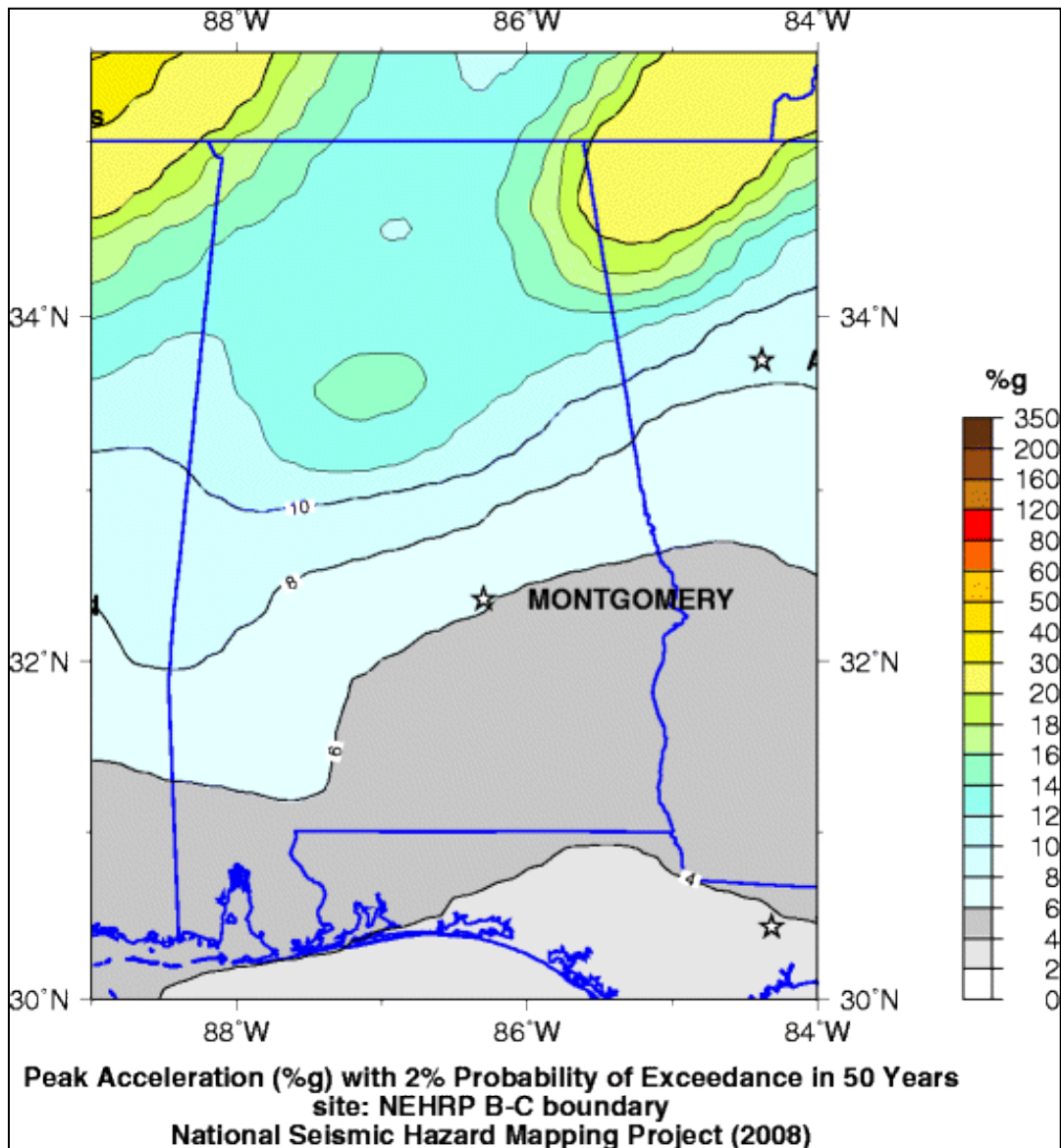
Richter Magnitude	Mercalli Intensity	Description
2	I	Usually not felt, but detected by instruments.
	II	Felt by very few people.
3	III	Felt by many, often mistaken for a passing vehicle.
	IV	Felt by many indoors, dishes and doors disturbed.
4	V	Felt by nearly everyone. People awakened. Cracked walls, trees disturbed.
5	VI	Felt by all. Many run outdoors. Furniture moves. Slight damage occurs.
	VII	Everyone runs outdoors. Poorly built buildings suffer severe damage. Slight damage everywhere else.
6	VIII	Everyone runs outdoors. Moderate to major damage. Minor damage to specially designed buildings. Chimneys and walls collapse.
7	IX	All buildings suffer major damage. Ground cracks, pipes break, foundations shift.
	X	Major damage. Structures destroyed. Ground is badly cracked. Landslides occur.
8	XI	Almost all structures fall. Bridges wrecked. Very wide cracks in ground.
	XII	Total destruction. Ground surface waves seen. Objects thrown into the air. All construction destroyed.

Source: Geological Survey of Alabama

### Extent

The USGS has developed a methodology for assessing the magnitude and frequency of seismic events. This methodology measures the probability of exceeding a peak ground motion measured as peak ground acceleration (PGA) within a given period of years. The PGA map (Map 5-16) for Alabama shows the potential severity of earthquakes in southwest Alabama, including Baldwin County, for a 50 year/2% probabilistic event is extremely low at 2-4%g, where %g is the percentage of the total horizontal ground acceleration of the earthquake event.

**Map 5-16. Peak Ground Acceleration for Alabama**

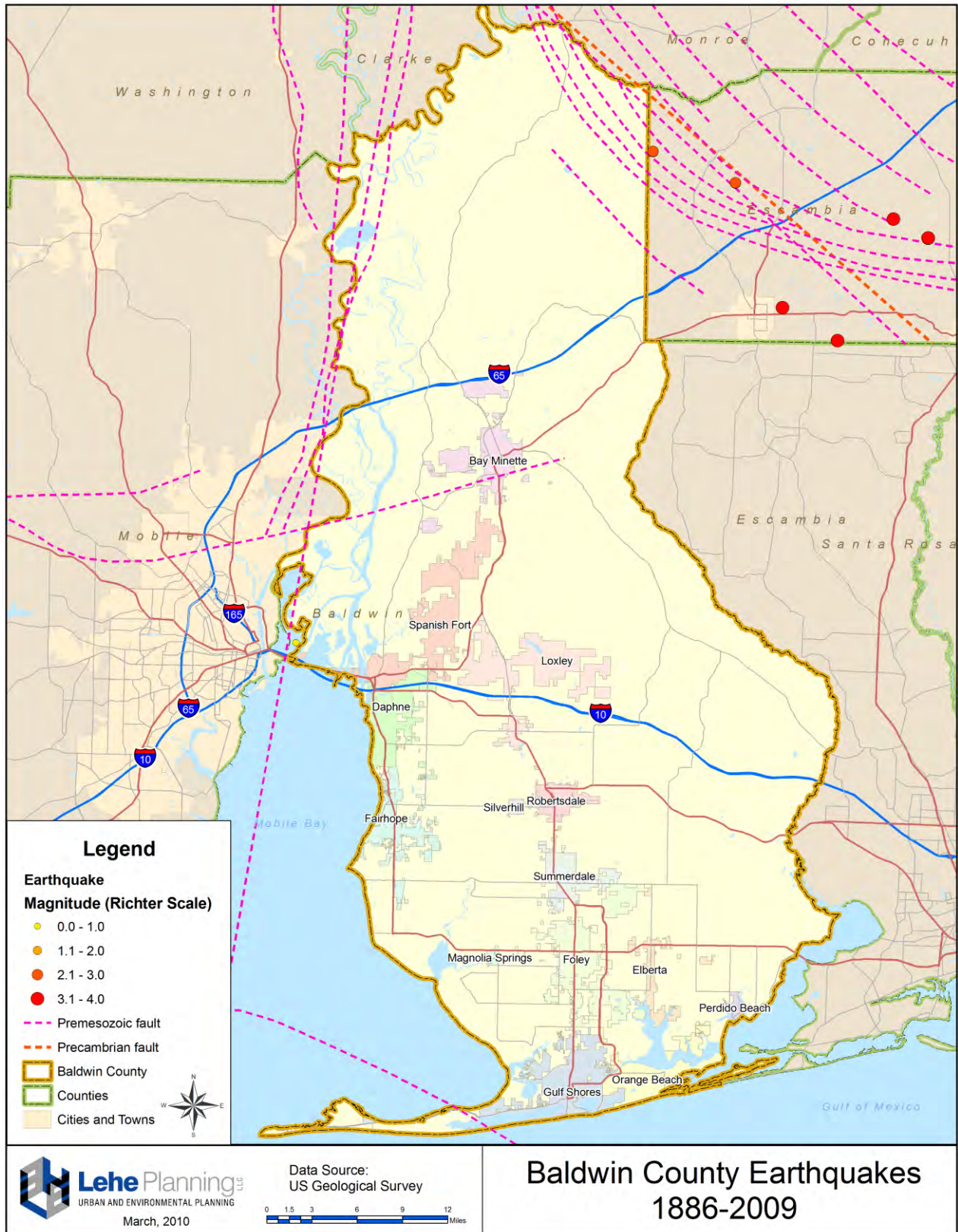


Source: United States Geological Survey, Earthquakes Hazards Program

**Past Events**

Map 5-17 “Baldwin County Earthquake Locations” shows the location and magnitude of recorded earthquakes from 1886 through May, 2009. Baldwin County has only experienced one earthquake, which occurred in 1929 and is estimated to have exhibited a magnitude between 1.0 and 1.9 on the Richter Scale. Only three earthquakes with a magnitude greater than 4.0 have been recorded in Alabama.

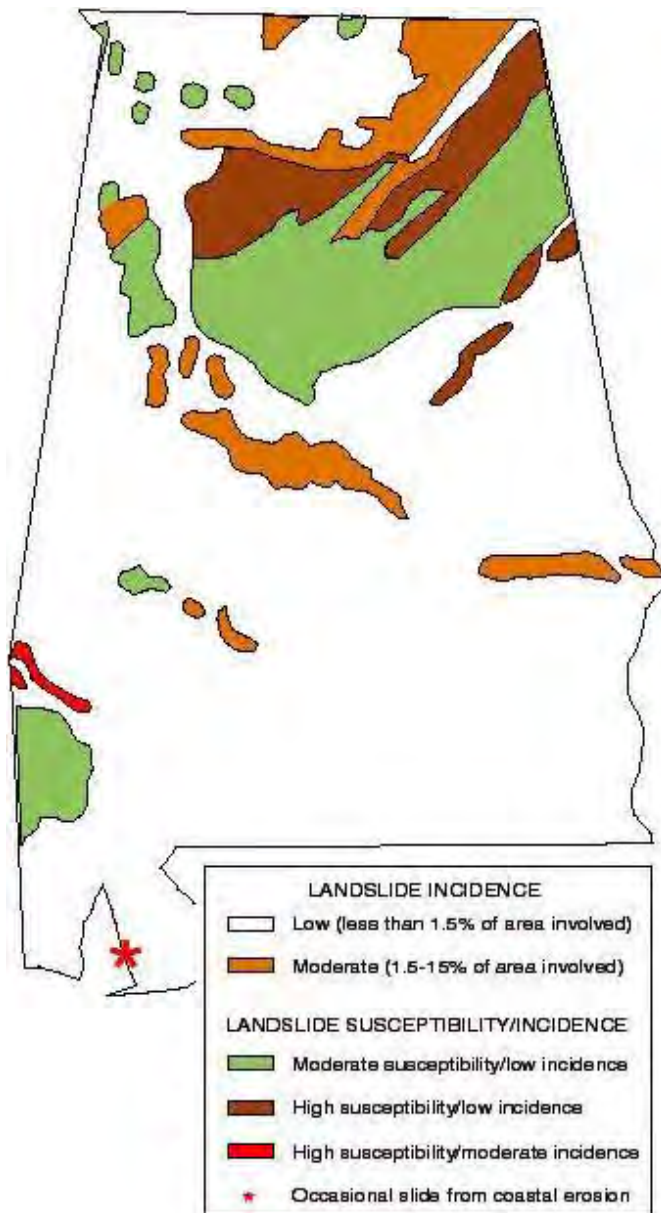
Map 5-17. Baldwin County Earthquake Locations



**Probability of Future Events**

Geologic Survey of Alabama (GSA) records and analysis suggest the likelihood of damaging earthquake is extremely low.

**Map 5-18. Alabama Landslide Hazard Areas**



Source: Geological Survey of Alabama

**5.4.9 Landslides**

Due to its generally level topography, Baldwin County is not susceptible to landslides.

**Location**

The hilly regions located primarily in the northern and eastern portions of Baldwin County are more susceptible to landslides than other areas, which are uniformly flat.

**Extent**

Baldwin County landslides are mild, because the flat topography precludes the mass and velocity that make landslides dangerous. The severity of a landslide in Baldwin County is primarily dependent on human or weather activity.

**Past Events**

Heavy rains from Hurricane Danny caused a landslide in Spanish Fort in 1997. USGS records show a total of five landslides, of which four were induced by construction activity alongside highways.

**Probability of Future Events**

Map 5-18 -Alabama Landslide Hazard Areas” shows areas of landslide risk for the State of Alabama as defined by the Geological Survey of Alabama. Baldwin County lies well outside the anticipate risk zones.

**5.4.10 Dam/Levee Failures Profile**

In Baldwin County, dam and levees have mainly been built to create reservoirs for water supplies and recreation. These dams and levees pose less of a threat than dams constructed for hydroelectric generation, because they contain much less water.

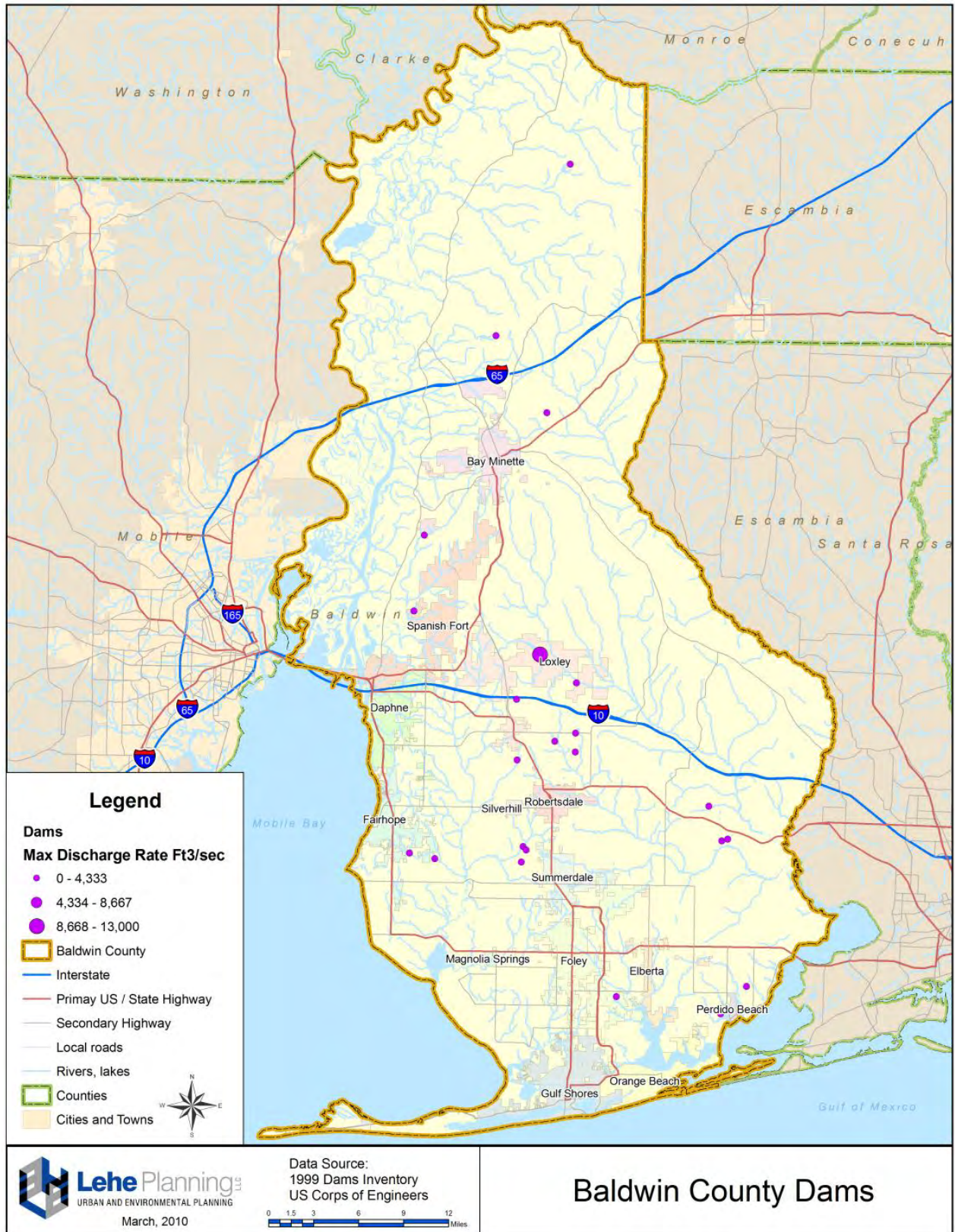
**Location**

Map 5-19 "Baldwin County Dam Locations" depicts the locations and classifications of Baldwin County dams.

**Extent**

None of Baldwin County's dams are categorized as having a "high" hazard classification. This classification system rates dams by the degree of downstream development; the rating is not indicative of the dam's construction or maintenance.

**Map 5-19. Baldwin County Dam Locations**



### Past Events

No known dams or levee failures have occurred in Baldwin County.

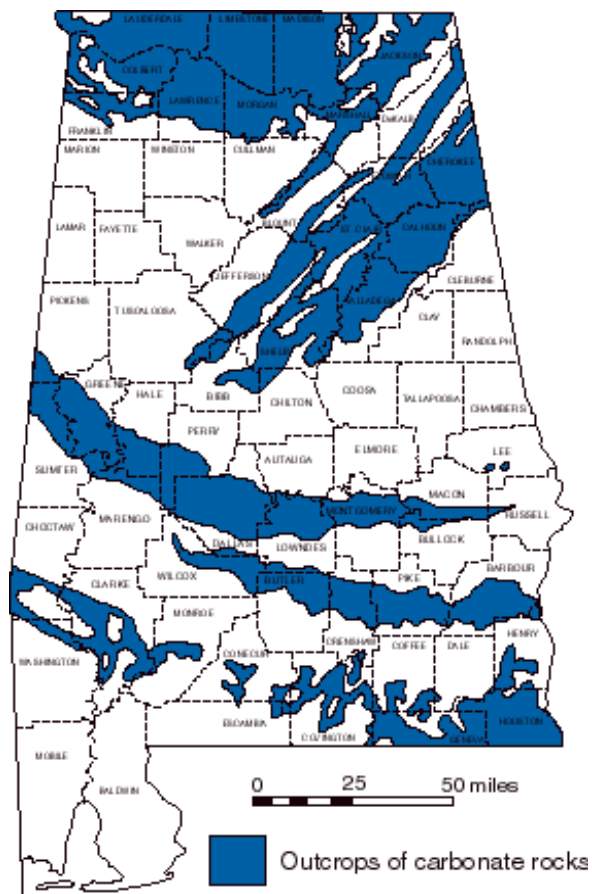
### Probability of Future Events

The probability of a catastrophic dam failure in Baldwin County is very slight. Detailed data about dam construction does not exist to rate the dams, but none of the dams would cause severe damage to developed areas in the event of failure.

#### 5.4.11 Sinkholes (Land Subsidence) Profile

Sinkholes are geological phenomenon characterized by a sudden collapse of the topsoil, which occurs when water bores channels in a sub-soil layer of limestone. Because Baldwin County is located in a coastal area, its geology lacks limestone formations (see Map 5-20 “Limestone Outcrops in Alabama”). The Hazard Mitigation Planning Committee (HMPC) assigned sinkholes a low threat and risk level, based on research and local perception.

**Map 5-20. Limestone Outcrops in Alabama**

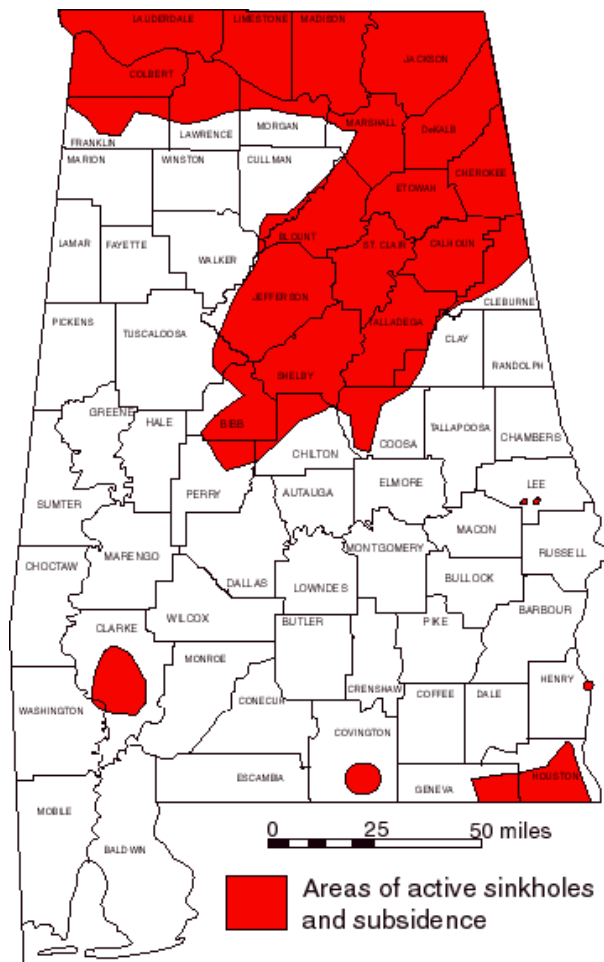


Source: Geological Survey of Alabama

**Location**

Sinkholes are an equally unlikely threat to all jurisdictions. Map 5-21 is based on data from the Geological Survey of Alabama, which concludes that no part of Baldwin County is prone to sinkholes.

**Map 5-21. Active Sinkhole Areas in Alabama**



Source: The Geological Survey of Alabama  
<http://www.gsa.state.al.us/gsa/geologic hazards/sinkholes/sinks2.html>

**Extent**

Any sinkhole in Baldwin County is likely to be a small-scale event.

**Past Events**

The GSA estimates over 4,000 sinkholes in Alabama; however, no historic data attests to any sinkholes in Baldwin County.



**Probability of Future Events**

Since Baldwin County lacks both a history of sinkholes and conditions conducive to sinkholes, the probability of future sinkholes is negligible. Ongoing data collection by the Geological Survey of Alabama may alter the outlook for sinkholes in Baldwin County. It is important for authorities to follow updates from the Geological Survey of Alabama.

**5.4.12 Man-Made Hazards Profile**

Man-made hazards are beginning to play a prominent role in hazard mitigation planning. These hazards include chemical spills, radiation leaks, and acts of terrorism. Hazardous material accidents are the main type of man-made hazard that concerned the Hazard Mitigation Planning Committee (HMPC) members, as reported in the hazard identification exercise (see Appendix D –HMPC Identification and Ratings) and discussed at committee meetings. These accidents can occur at any stage of a hazardous material's lifecycle, from extraction to manufacturing to storage to delivery.

**Location**

Baldwin County has eight facilities listed in CAMEO, which is a listing provided by the EPA of place places where hazardous chemicals are stored. See Map 5-22 for locations of hazardous materials.

In addition to the fixed facilities listed in CAMEO, there are trains and tractor trailers that transport hazardous materials through Baldwin County, particularly on Interstate 10. The 2010 BP oil spill, which released millions of gallons of oil onto Baldwin County's beaches and habitats, affirms that even hazardous materials sources far outside Baldwin County's borders can have devastating effects on Baldwin County's residents, properties and businesses.

**Extent**

The extent of technological hazards impacts and terrorist attacks can be quite severe, with potential for widespread damage to property and infrastructure and major loss of life and casualties, within any jurisdiction.

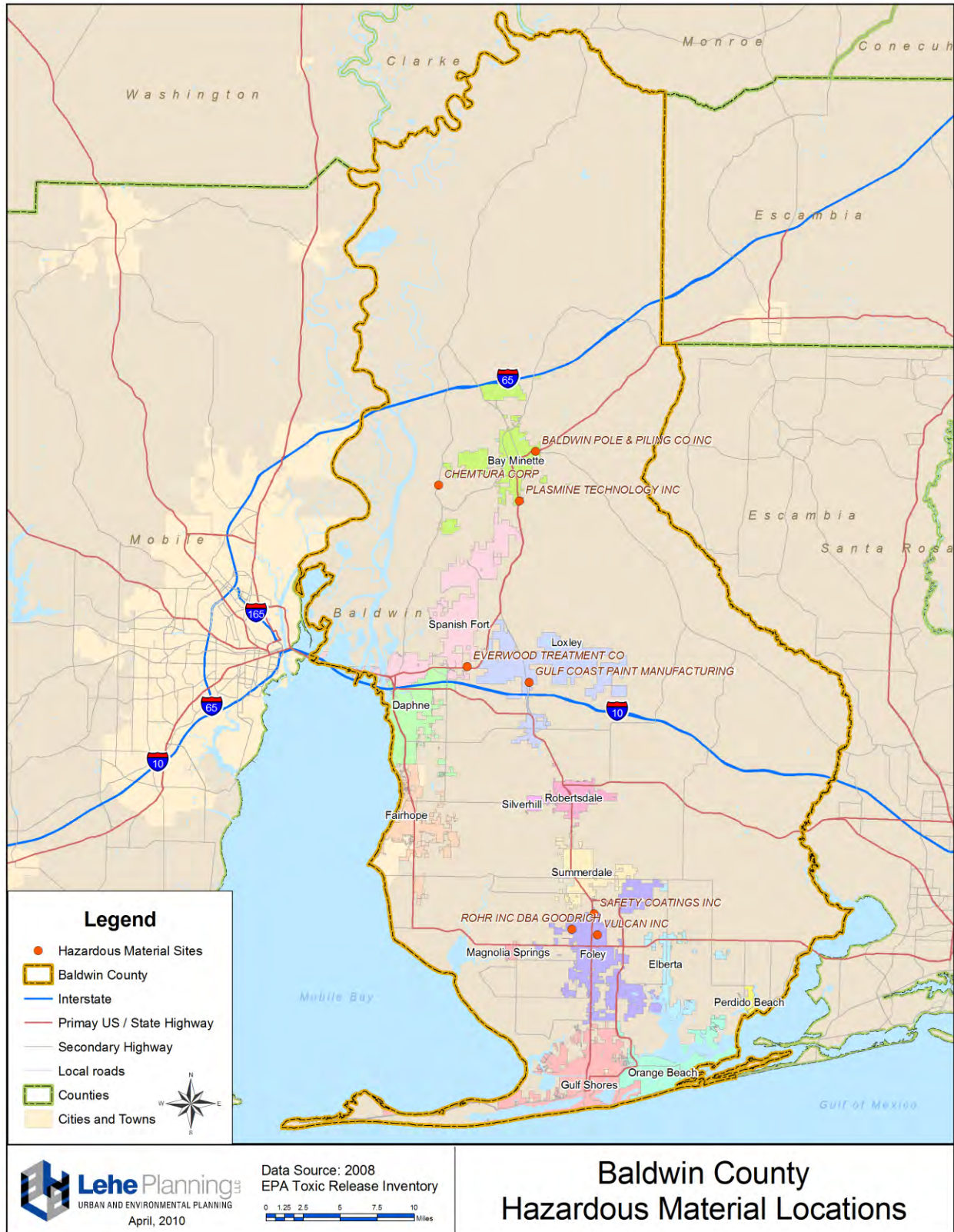
**Past Events**

The principal man-made hazard events that have occurred in Baldwin County are hazardous materials accidents. These have occurred at manufacturing sites, storage sites, and even during transport.

**Probability of Future Events**

Unpredictability is a vexing feature of man-made hazards. Earthquakes and tornadoes generally occur during specific seasons. Floods and earthquakes recur in fixed areas. Severe storms can be tracked through meteorology. Man-made hazards, however, can happen anytime and virtually anywhere.

Map 5-22. Hazardous Materials Storage



## 5.5 Vulnerability of Structures within Each Jurisdiction

### 5.5.1 Scope of Structure Inventory

Section 5.5 presents an inventory of existing and future buildings, critical facilities, and infrastructure. For the purposes of this risk assessment, *vulnerability* refers to the exposure of buildings, critical facilities, and infrastructure to a particular hazard and their susceptibility to damage from the hazard. The inventory in this section forms the loss estimates in Section 5.6 –“Estimate of Dollar Losses to Vulnerable Structures.”

### 5.5.2 Inventory Methodology

A countywide inventory of the number and property values of structures was created using FEMA’s HAZUS-MH, which is a risk assessment software tool for projecting losses from floods, hurricane winds, and earthquakes. The planning team used the latest edition of HAZUS-MH Hurricane Winds Module software (release MR-3, Patch 3, as of March 2009). HAZUS-MH modeled hurricane winds scenarios for Baldwin County using a Level 1 analysis, which utilizes data provided with the software and calculates damages at the county level. Calculations below the county level are not recommended, because accuracy tends to diminish.

Local GIS data was used to create maps and lists of critical facilities located in vulnerable areas. The GIS data came primarily from Baldwin County. Other mapping and data sources included the Geologic Survey of Alabama, U.S.G.S., National Weather Service, FEMA NFIP, U.S. Census Bureau, Alabama State Data Center, and the Alabama Forestry Commission.

The designation *building*, as used in this risk assessment, includes all walled and roofed structures. The designations *critical facilities* and *infrastructure* include the following structures, as classified by HAZUS-MH:

#### *Critical Facilities*

- Essential Facilities. These critical facilities are essential to the health and welfare of the entire Baldwin County population and are particularly critical following hazard events. Emergency response facilities (police, fire, and emergency management), medical care facilities (hospitals and other care facilities), schools, and shelters for evacuation are all examples of essential facilities.
- High Potential Loss Facilities. These critical facilities include military installations, nuclear power plants and dams.
- Hazardous Materials. These materials may pose a threat if disrupted by natural hazards and include hazardous industrial chemicals, explosives, flammables, toxins, and radioactive materials.

*Infrastructure*

- Transportation Systems Lifeline. These facilities include highways, bridges, tunnels, heavy/light railways, airports, buses, ports, and waterways.
- Lifeline Utility Systems Lifeline. These facilities are essential lifelines that include potable water, wastewater, natural gas, oil, electric, and communications systems.

*Other*

- User-Defined Facilities. The user may include additional facilities or systems unique to their study region which are not included in the general HAZUS-MH listing of critical facilities and infrastructure.

Critical facilities and infrastructure can be apportioned to each jurisdiction on the basis of population distribution, as follows:

**Table 5-11. Population Distribution by Jurisdiction**

Jurisdiction	2008 Population Estimate	% of Total
Bay Minette	8,043	4.6%
Daphne	19,093	10.9%
Elberta	1,477	0.8%
Fairhope	17,147	9.8%
Foley	13,807	7.9%
Gulf Shores	10,248	5.9%
Loxley	1,796	1.0%
Magnolia Springs	699	0.4%
Orange Beach	6,231	3.6%
Perdido Beach*	-	-
Robertsdale	4,964	2.8%
Silverhill	698	0.4%
Spanish Fort	5,780	3.3%
Summerdale	745	4.3%
Unincorporated	83,711	48.0%
Baldwin County	174,439	100.0%

\*Perdido Beach was not incorporated until June 10, 2009 and, at that time, had a population of 558, which is less than 1% of the total Baldwin County population.

**Source: U.S. Census 2008 Population Estimates**

The plan projects future number of buildings, critical facilities, and infrastructure to the year 2025 using the Alabama State Data Center's projection of Baldwin County population growth. Since no projections existed for individual jurisdictions, the County growth rate of 1.11 between 2000 and projected 2025 can be used to estimate a 2025 projected population for each jurisdiction. This growth projection method is not precise, but it does provide some indication of how growth might affect future exposure of structures to hazards.

**Table 5-12. 2025 County Growth Projection**

Projected County Growth 2000-2025				
	2000	2025	Number	Percent
Baldwin County	399,843	443,553	43,710	10.93%

Source: Alabama State Data Center

The percent exposure can be applied to the structure inventories to derive a general estimate of vulnerable structures by hazard. Most hazards are county-wide, but location-specific hazards – hurricane surge, flooding, wildfires, dam/levee failures, sinkholes and landslides – can vary from minimal vulnerability to as much as 100% of a community's total geographic area.

### 5.5.3 HAZUS-MH Structure Inventory

#### General Description of the Planning Region

HAZUS-MH refers to the geographic study area as the *region*, which is all of Baldwin County, including all unincorporated areas and fourteen municipalities. A more complete description of the planning region is presented in Chapter 3 –Community Profiles.” The descriptions provided here were generated by the HAZUS-MH Global Reports for county-wide assessments of hurricanes. The Baldwin County region is generally described by HAZUS-MH, as follows:

- The geographical size of the region is 1,648 square miles.
- The region contains 23 census tracts.
- There were over 55,000 households in the region, with a total population of 140,415 persons, according to the 2000 Census.

**Table 5-13. HAZUS-MH Population and Building Value Data**

State	County Name	Population	Building Value (billions of dollars)		
			Residential	Non-Residential	Total
Alabama	Baldwin	140,415	\$7.944	\$2.846	\$10.790

- There are an estimated 75,000 buildings in the region with a total building replacement value (excluding contents) of 10.8 billion dollars (2002 dollars).
- Approximately 92% of the buildings (and 74% of the building value) are associated with residential housing.

#### Building Inventory

- HAZUS estimates that there are 75,818 buildings in the region which have an aggregate total replacement value of 10.8 billion (2002 dollars).

### Essential Facilities Inventory

- HAZUS-MH estimates the number of essential facilities, as follows: 4 hospitals with a total bed capacity of 437 beds, 62 schools, 24 fire stations, 16 police stations, and 1 emergency operations facility.

## 5.5.4 Existing and Future Structure Vulnerabilities by Hazard and Jurisdiction

### Buildings

The building exposure totals generated by HAZUS-MH are gross estimates that show relative vulnerability. The numbers provided in the HAZUS-MH reports are not based on actual field inventories, which is beyond the scope of this planning process. Many of the numbers provided by HAZUS-MH are generated from formulas based on national standards. For example, HAZUS-MH estimates 3,892 commercial buildings, but the actual number is likely to be higher. Where values are given for future conditions, the values are in present value dollars.

Building exposure in Baldwin County is mostly residential at about 74 percent. This ratio should remain constant through the 2025 plan horizon, and occupancy ratios are assumed constant for the purposes of this analysis.

**Table 5-14. Building Exposure by Occupancy**

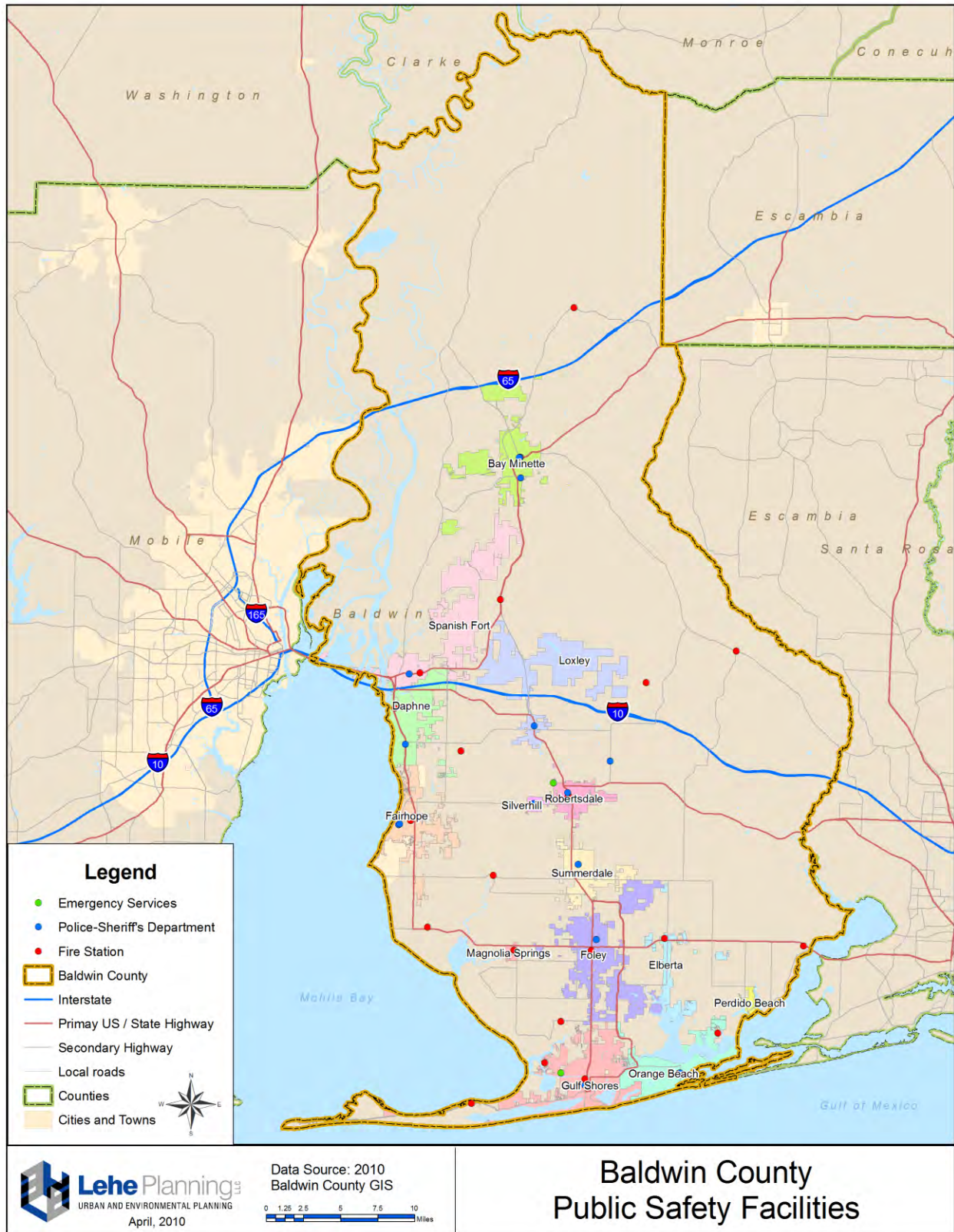
Occupancy	Existing Exposure (\$1,000)	Future Exposure (\$1,000)	% of Total
Agriculture	\$50,560	\$56,122	0.47%
Commercial	\$1,873,453	\$2,079,533	17.36%
Education	\$100,671	\$111,745	0.93%
Government	\$55,902	\$62,051	0.52%
Industrial	\$547,860	\$608,125	5.08%
Religious	\$217,758	\$241,711	2.02%
Residential	\$7,943,898	\$8,817,727	73.62%
<b>Total</b>	<b>\$10,790,102</b>	<b>\$11,977,013</b>	<b>100.00%</b>

Building values within each jurisdiction are expected to increase according to projected population increases. Communities need to be cognizant of the increasing risks and exposure resulting from growth.

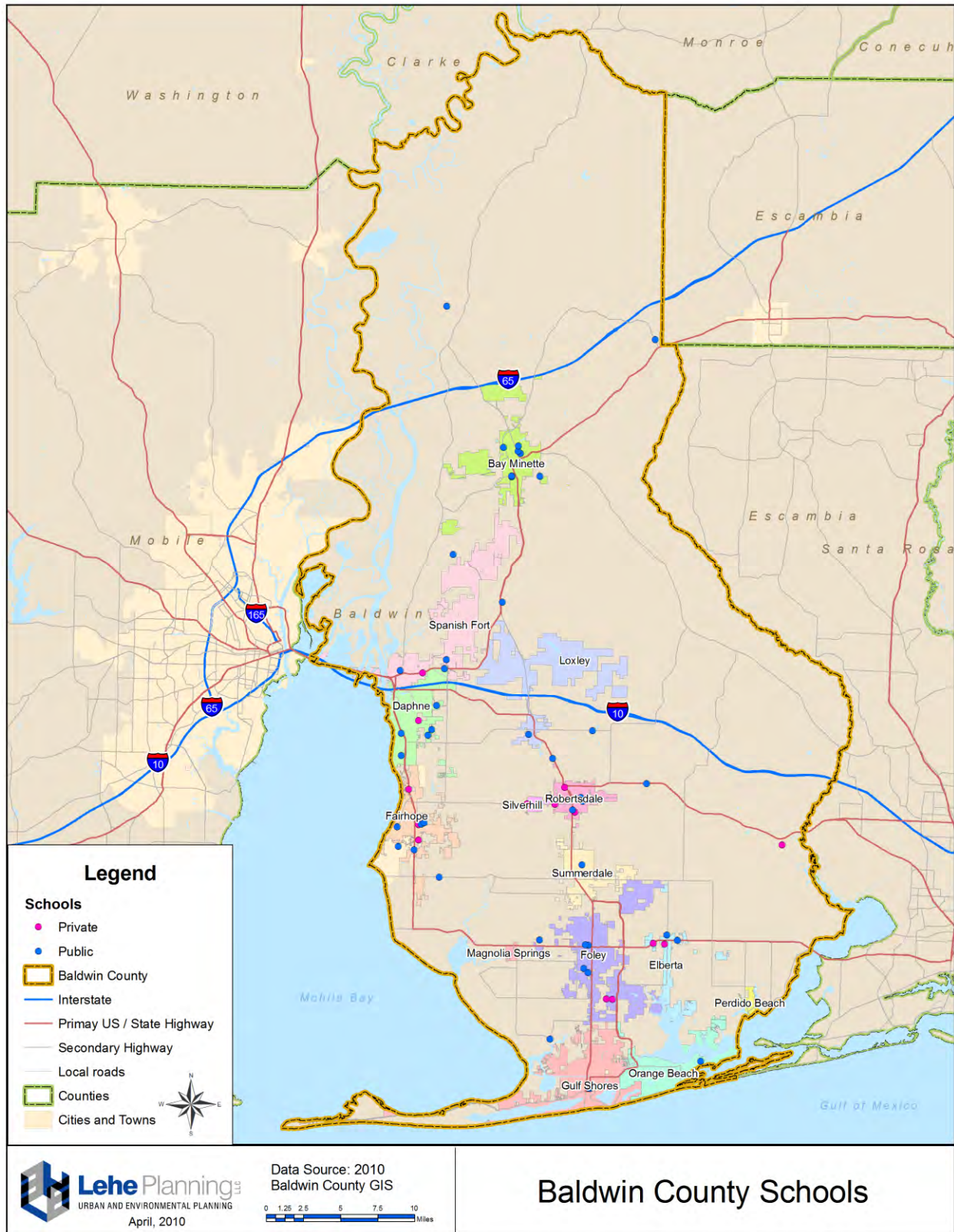
### Local Inventories of Critical Facilities and Infrastructure

The following maps show the locations of major critical facilities.

**Map 5-23. Public Safety Facilities**

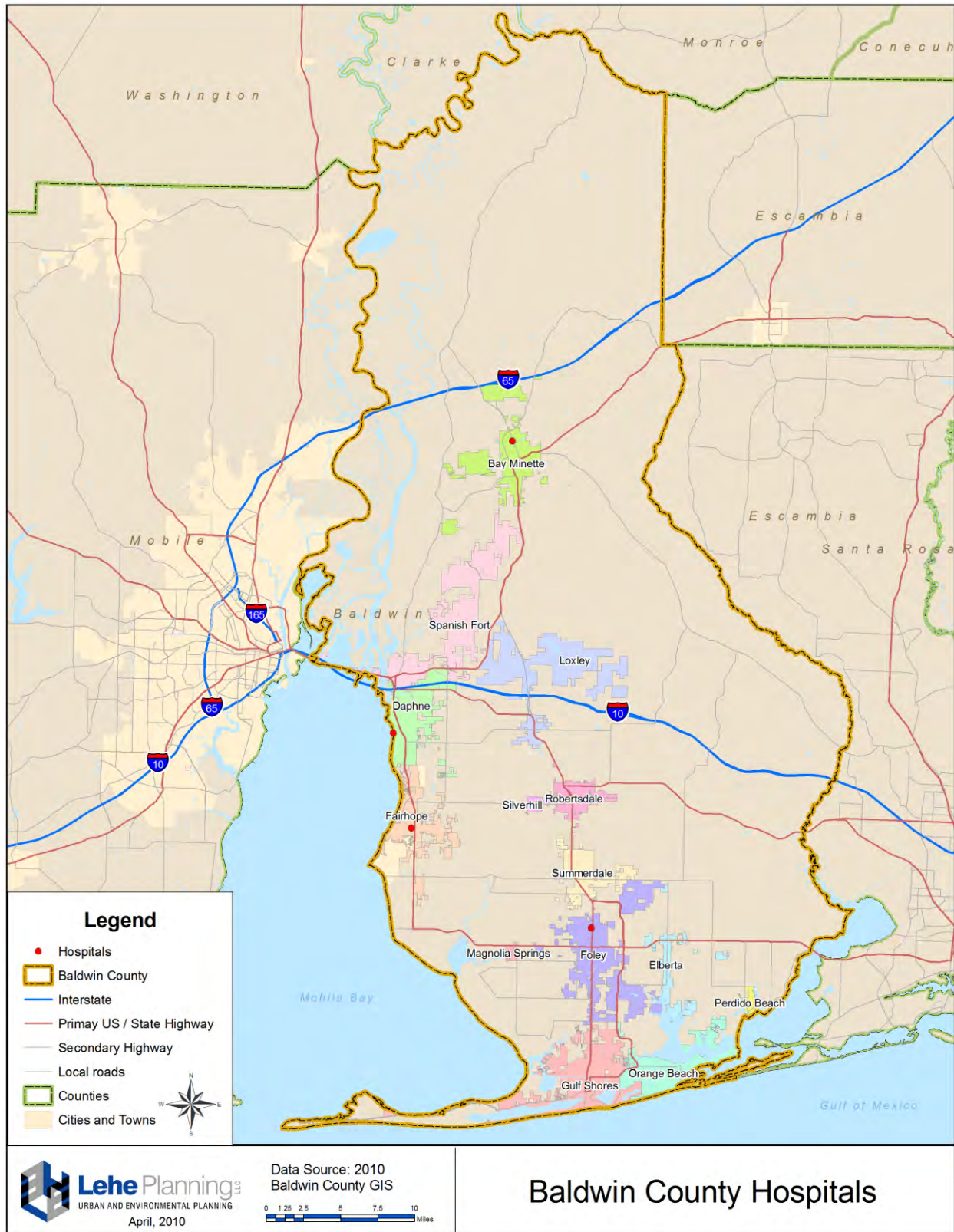


Map 5-24. Schools





Map 5-25. Hospitals



## 5.6 Estimate of Dollar Losses to Vulnerable Structures

### 5.6.1 Scope and Purpose of Loss Estimates

This section provides estimates of damages to vulnerable structures identified in Section 5.5. Although these estimates are broad, they can be useful in roughly assessing the benefits and costs of a proposed mitigation project. Moreover, these estimates provide a basis for selecting and prioritizing actions recommended by the Mitigation Strategy in Chapter 6.

This section also describes methodology and highlights limitations of insufficient data and lack of reliable methods. Measures for compiling and analyzing data to improve risk assessment studies appear in Section 5.6.5 –Recommended Risk Assessment Measures.”

As explained above, most hazards are county-wide. In the case of county-wide hazards, exposure is distributed uniformly over all municipalities and unincorporated areas. County-wide hazards include hurricane winds, tornadoes, severe storms, winter storms/freezes, droughts/heat waves, and earthquakes. In contrast, exposure to location-specific hazards—including hurricane storm surge, flooding, dam/levee failures, sinkholes and landslides—varies widely among jurisdictions.

### 5.6.2 Loss Estimate Methodology

#### Method 1: HAZUS-MH Loss Estimates for Hurricane Wind Damage

This plan estimates losses using HAZUS-MH Hurricane module, which was used as a basis for the vulnerable structures inventory of Section 5.5. HAZUS-MH uses approximations and algorithms to estimate losses due to hurricane winds, so results do not reflect actual losses with certainty. These loss estimates are most useful for judging the hazard’s risk *relative to* other hazards and the vulnerability of a structure *relative to* other structures, rather than as absolute measures of likelihood and economic appraisal.

HAZUS-MH offers three levels of analysis. Level 1, which was used for this plan, requires the least amount of local data and is sufficient for mitigation policy planning purposes. A Level 1 analysis relies on the national data set provided with HAZUS-MH. The analysis provides general loss estimates for earthquakes, floods, and hurricane winds. All loss estimates are at a county level, which is the smallest geographic area of meaningful analysis using HAZUS-MH.

#### Method 2: Estimates Based upon Historical Records

Data and records from Section 5.4 supplemented the HAZUS-MH data to prepare loss estimates. Damage data and records of previous occurrences were obtained from the following primary sources:

1. NFIP insurance claims data (see Section 5.8);

2. NOAA, National Climatic Data Center damage estimates (see damage summaries in Section 5.6 “Hazard Profiles” and Appendix E “Hazard Profile Data”)
3. National Weather Service Alabama Tornado database.
4. Alabama State Hazard Mitigation Plan, 2007 update, section 5.5 “Vulnerability Assessment and Loss Estimation.”

### 5.6.3 HAZUS-MH Loss Estimates

The planning team performed HAZUS-MH Hurricane studies to estimate losses. Global Summary and Quick Assessment Reports of the HAZUS-MH runs contain detailed results. These studies, maps, and reports were prepared by a qualified GIS professional with advanced HAZUS training classes completed at the FEMA Emergency Management Institute in Emmitsburg, Maryland, and extensive experience in its local application to mitigation planning. The following HAZUS-MH reports are on file with the Baldwin County EMA and available for public review:

1. HAZUS-MH Probabilistic 100-Year Hurricane Global Summary and Quick Assessment Reports, dated August 16, 2010.
2. HAZUS-MH Hurricane Frederic Global Summary and Quick Assessment Reports, dated August 15, 2010.
3. HAZUS-MH Hurricane Ivan Global Summary and Quick Assessment Reports, dated August 15, 2010.

### Hurricane Loss Estimates

The planning team used HAZUS-MH to assess three hurricane events: a 100-year scenario, the 1979 Frederic historical event, and the 2004 Ivan historical event. Hurricane Frederic and Ivan unleashed high winds and flooding and spawned tornadoes across Alabama, but HAZUS only assesses the hurricane wind effects of each event. The following tables 5-15 through 5-17 show the loss estimates generated by HAZUS-MH for each of these events, followed by maps 5-25 through 5-28, which show the geographic distribution of economic losses.

Probabilistic Hurricane Scenario. The HAZUS model estimates that the 50-year hurricane event would cause over \$1.1 billion in economic losses and damage more than half of buildings. The impacts would be much more severe for a 100-year hurricane event, which would cause close to \$3 billion of damage and harm almost three-quarters of all buildings. Finally, a 500-year hurricane event, with only a 0.2 percent of occurring in any year, would cause catastrophic damage throughout Baldwin County as a result of its coastal location. HAZUS estimates that nearly 90 percent of all buildings would suffer damage, and losses would total close to \$9 billion. Almost 25% of all buildings would be destroyed in a 500-year hurricane event.

The predicted damages would be compounded by storm surge and flooding since the HAZUS model only assesses wind effects. Inland communities, such as Bay

Minette and Loxley, would incur no additional damage from storm surge, but coastal communities, especially Perdido Beach, Orange Beach, and Gulf Shores can expect significantly more damage than HAZUS estimates, due to storm surge. Community impacts from hurricane winds can best be compared by a careful review of the HAZUS-generated maps (maps 5-26 through 5-29), which show the locations of estimated economic losses in relation to each municipality.

Hurricane Frederic Scenario. The HAZUS-MH assessment reports major building damage resulting from peak wind gusts of as high as 126 mph for Hurricane Frederic. Over 30 percent (23,000) of all buildings in Baldwin County would receive some damage and 400 of those damage buildings would be destroyed. HAZUS reports over \$0.5 billion in building and related damage.

Hurricane Ivan Scenario. HAZUS estimates this event would be somewhat less severe than Frederic with peak wind gusts of 108 mph. Should a hurricane of identical wind speed and track occur today, the County would incur approximately \$340 million in economic losses with over 24% of all buildings damaged.

**Table 5-15. 100 Year Hurricane Event Loss Estimates****General Building Stock**

<i>Occupancy</i>	<i>Building Count</i>	<i>Dollar Exposure (\$ K)</i>
Residential	69,773	7,943,898
Commercial	3,891	1,873,453
Other	2,154	972,841
<b>Total</b>	<b>75,818</b>	<b>10,790,192</b>

**Number of Residential Buildings Damaged**

<i>Return Period</i>	<i>Minor</i>	<i>Moderate</i>	<i>Severe</i>	<i>Destruction</i>	<i>Total</i>
10	830	53	1	0	884
20	9,184	1,562	57	57	10,860
50	23,470	10,292	1,664	1,091	36,517
100	23,270	17,670	5,910	4,025	50,876
200	5,068	4,195	6,687	13,031	28,981
500	10,537	16,705	16,792	18,572	62,606
1000	5,712	14,304	20,514	27,745	68,275

**Number of Buildings Damaged**

<i>Return Period</i>	<i>Minor</i>	<i>Moderate</i>	<i>Severe</i>	<i>Destruction</i>	<i>Total</i>
10	915	58	1	0	975
20	9,840	1,795	91	59	11,785
50	24,940	11,581	2,182	1,114	39,816
100	24,604	19,454	7,268	4,095	55,422
200	5,401	4,645	8,124	13,345	31,516
500	11,119	18,098	20,029	18,869	68,114
1000	6,026	15,419	24,482	28,208	74,135

**Shelter Requirements**

<i>Return Period</i>	<i>Displaced Households (#Households)</i>	<i>Short Term Shelter (#People)</i>
10	5	1
20	189	43
50	2,000	488
100	7,319	1,779
200	13,154	3,208
500	30,245	7,320
1000	39,982	9,769

**Economic Loss (x 1000)**

<i>Return Period</i>	<i>Property Damage (Capital Stock) Losses</i>		<i>Business Interruption (Income) Losses</i>
	<i>Residential</i>	<i>Total</i>	
10	20,269	21,515	1,883
20	118,050	139,008	24,657
50	694,854	907,223	200,527
100	1,800,342	2,367,087	521,534
200	3,462,091	4,544,766	829,755
500	5,498,163	7,360,057	1,359,338
1000	7,147,556	9,587,375	1,731,949
<b>Annualized</b>	<b>64,497</b>	<b>84,243</b>	<b>16,460</b>

**Table 5-16. Hurricane Frederic Loss Estimates****Number of Buildings Damaged**

<i>Damage State</i>	<i>Residential</i>	<i>Commercial</i>	<i>Other</i>	<i>Total</i>
Minor	15,000	700	400	16,000
Moderate	4,800	500	200	5,500
Severe	600	100	70	800
Destruction	400	<10	<10	400
<b>Total</b>	<b>21,000</b>	<b>1,200</b>	<b>600</b>	<b>23,000</b>

**Shelter Requirements**

Displaced Households (# Households)	800
Short Term Shelter (# People)	200

**Economic Loss ( \$ Millions )**

Capital Stock	417
Residential Property	337
Commercial Property	55
Other Property	24
<u>Business Interruption (Income)</u>	<u>87</u>
<b>Total Direct Economic Loss</b>	<b>503</b>

**Table 5-17. Hurricane Ivan Loss Estimates****Number of Buildings Damaged**

<i>Damage State</i>	<i>Residential</i>	<i>Commercial</i>	<i>Other</i>	<i>Total</i>
Minor	15,000	600	400	16,000
Moderate	3,600	400	200	4,200
Severe	300	70	50	400
Destruction	200	<10	<10	200
<b>Total</b>	<b>19,000</b>	<b>1,100</b>	<b>600</b>	<b>20,000</b>

**Shelter Requirements**

Displaced Households (# Households)	500
Short Term Shelter (# People)	100

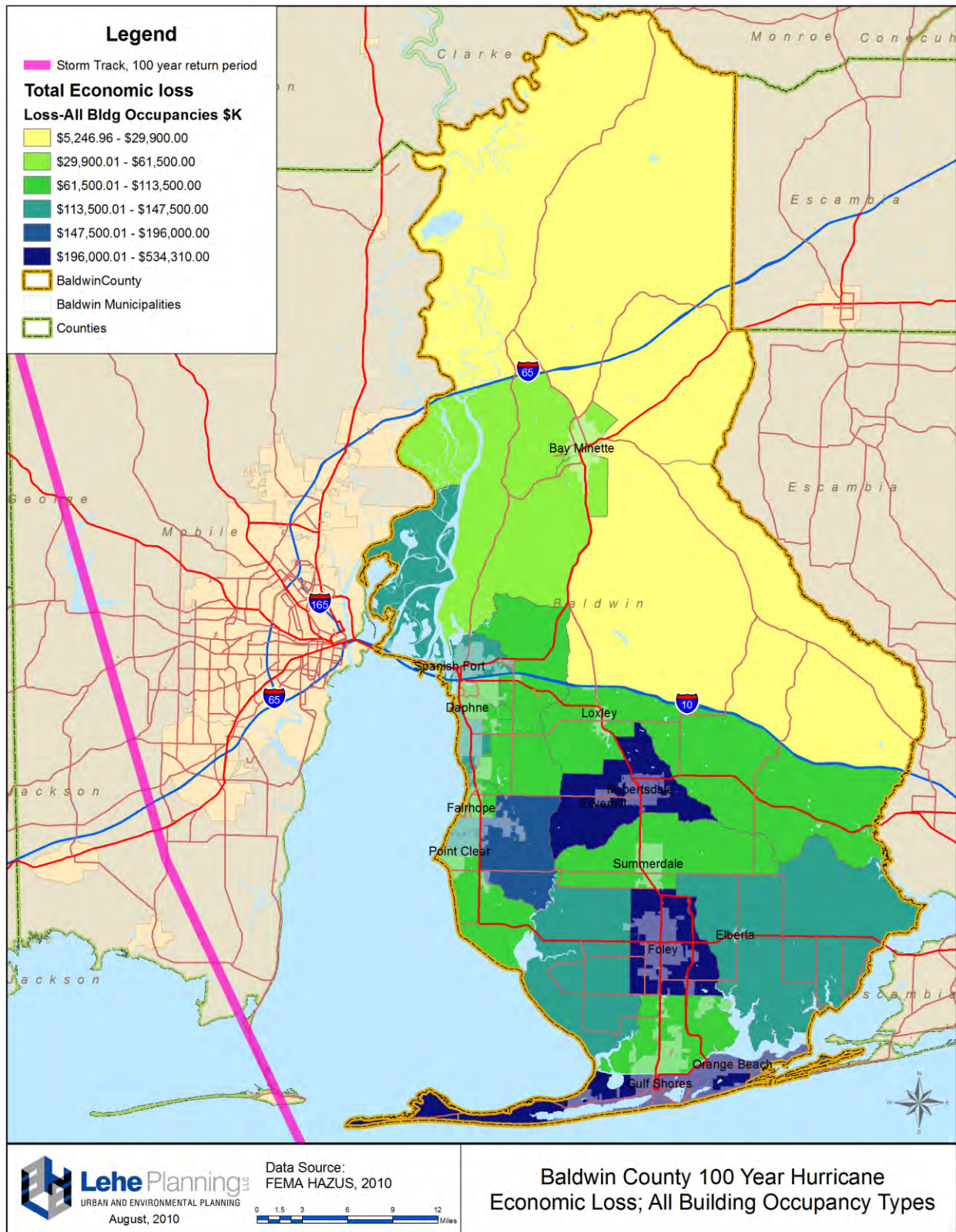
**Economic Loss ( \$ Millions )**

Capital Stock	284
Residential Property	230
Commercial Property	36
Other Property	18
<u>Business Interruption (Income)</u>	<u>56</u>
<b>Total Direct Economic Loss</b>	<b>340</b>

**Table 5-18. Comparative Hurricane Scenarios Economic Losses**

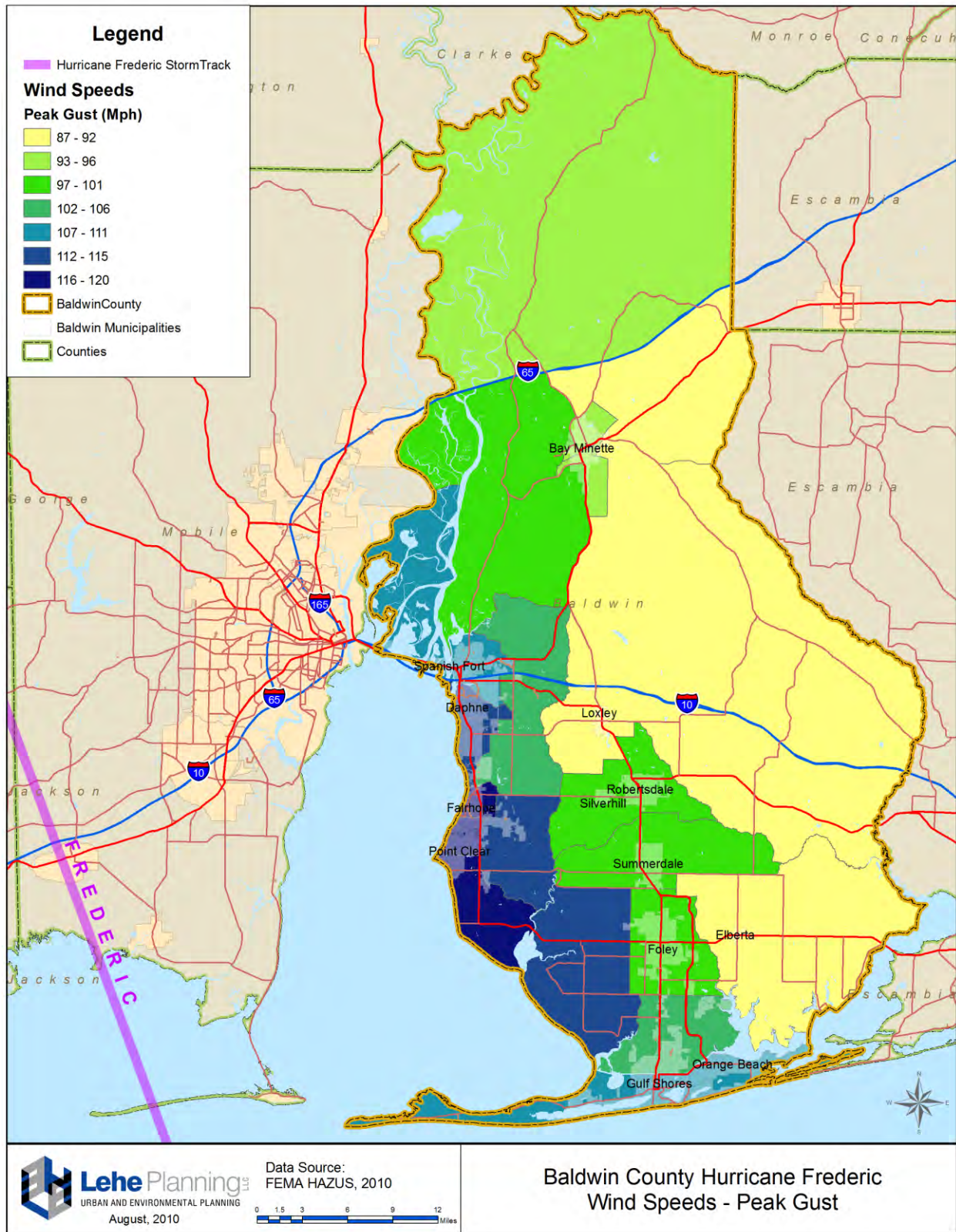
Hurricane Scenario	Total Bldgs.	Resid. Bldgs. Damaged	Total Bldgs. Damaged	% of Total Bldgs.	Resid. Damage (\$1,000)	Total Bldg. Damage (\$1,000)	Business Interruption Losses (\$1,000)	Total Economic Losses (\$1,000)
Hurricane Frederic	75,818	21,000	23,000	30.34%	\$337,000	\$416,000	\$87,000	\$503,000
Hurricane Ivan	75,818	19,000	20,000	26.38%	\$230,000	\$284,000	\$56,000	\$340,000
10 Yr.	75,818	884	975	1.29%	\$20,269	\$21,515	\$1,883	\$23,398
50 Yr.	75,818	36,517	39,816	52.52%	\$694,854	\$907,923	\$200,527	\$1,108,450
100 Yr.	75,818	50,876	55,422	73.10%	\$1,800,342	\$2,367,087	\$521,534	\$2,888,621
500 Yr.	75,818	62,606	68,114	89.84%	\$5,498,163	\$7,360,057	\$1,359,338	\$8,719,395
<i>Annualized Losses</i>	-	-	-	-	\$64,497	\$84,243	\$16,460	\$100,703

**Map 5-26. HAZUS-MH Economic Loss Estimate, 100-Year Probabilistic Event**

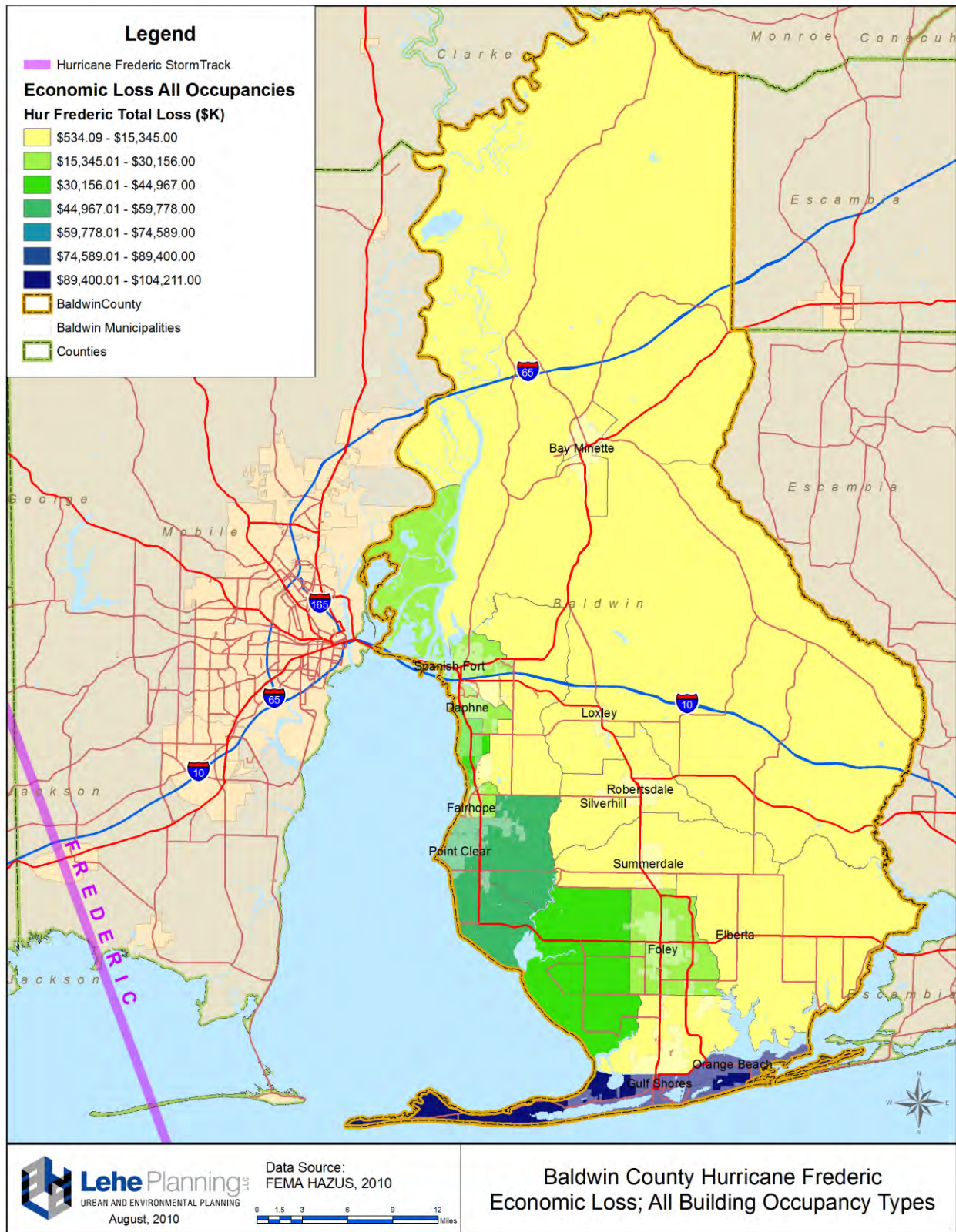




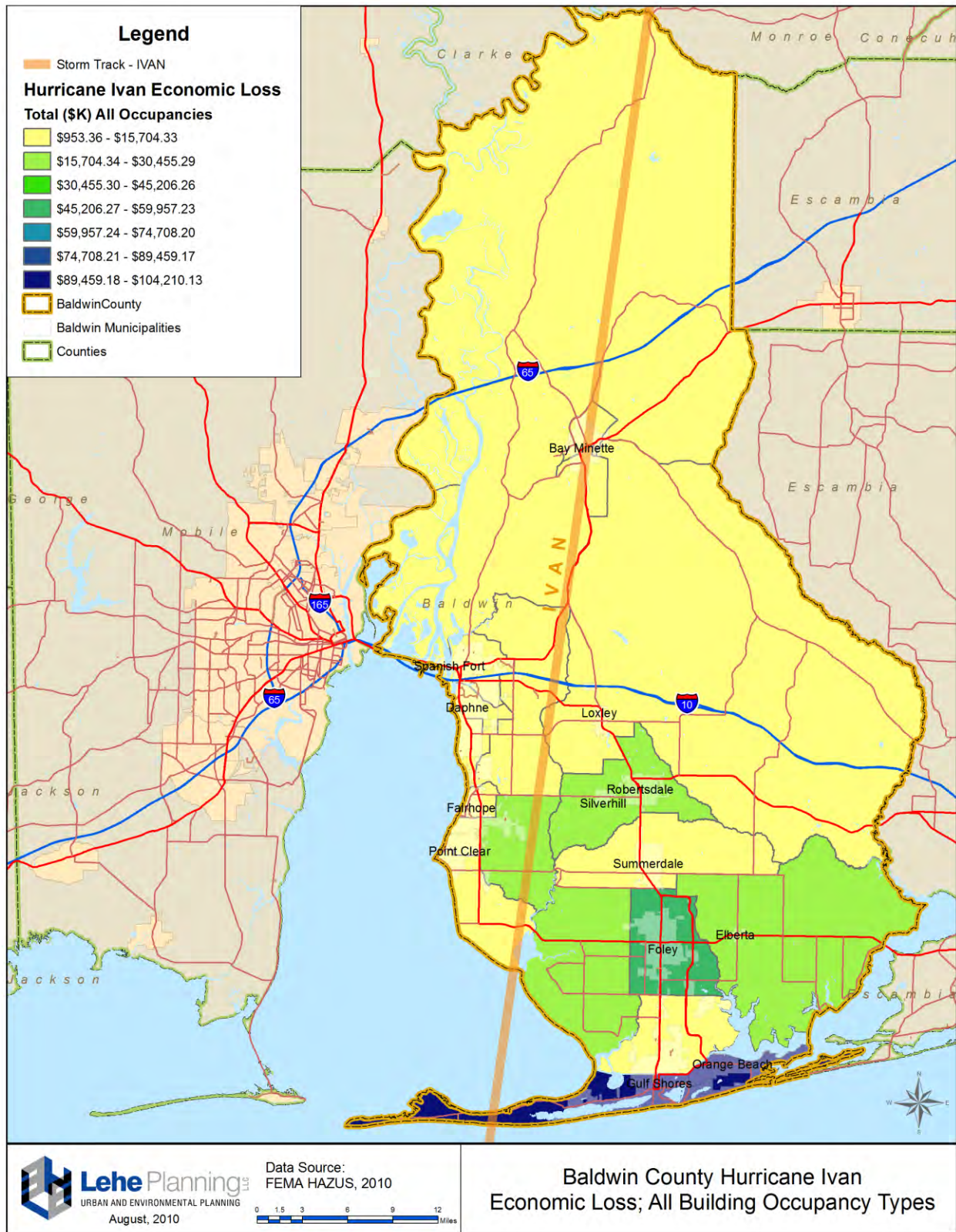
Map 5-27. HAZUS-MH Hurricane Wind Speed, Hurricane Ivan



**Map 5-28. HAZUS-MH Economic Loss Estimate, Hurricane Frederic**



**Map 5-29. HAZUS-MH Economic Loss Estimate, Hurricane Ivan**



#### **5.6.4 Loss Estimates Based on Historical Records**

##### **Severe Storms Loss Estimates**

As reported in the severe storms hazard profile in Section 5.4.3, National Climatic Data Center (NCDC) records show frequent annual severe storm occurrences since 1955. The database shows nearly 380 severe storm events for Baldwin County—roughly seven per year—including 134 reports of damage from thunderstorms, 32 from lightning, and 134 from hail. The database also shows \$3 million in damages since 1955.

##### **Tornado Loss Estimates**

According to the NOAA National Climatic Data Center and National Weather Service (NWS) records (see Section 5.4.4 “Tornadoes Profile”), Baldwin County has been the site of 88 tornadoes since 1950, averaging over 1.5 annually. These tornadoes caused 85 injuries and property damages of nearly \$10 million.

##### **Flood Loss Estimates**

The National Climatic Data Center (NCDC) Storm Events Database shows frequent flooding since 1995. There have been 56 floods reported for Baldwin County—four per year—for the 1995-2009 period with damages averaging \$165K per year and \$40K per event.

##### **Man-made Hazards Loss Estimates**

Dollar losses from the varied range of potential man-made hazards are impossible to predict, and, except for the 2010 Gulf oil spill, historical data is not available. The recent Gulf oil spill of April 20, 2010 has significant adverse economic impacts on Baldwin County with its 35 miles of exposed beach fronts. A September 2010 study estimated the economic impacts to coastal communities along Alabama’s shorelines in Baldwin and Mobile Counties at approximately \$824 million in lost earnings due to the oil spill.

##### **Loss Estimates for Remaining Hazards**

Historical data is not available to estimate losses from the remaining hazards identified in this Plan. In some cases, there have been no recorded events, such as dam/levee failures, and in other cases, no damages resulted from an event, as is the case for instances of earthquakes, landslides, and sinkholes.

#### **5.6.5 Recommended Risk Assessment Measures**

The Mitigation Strategy of this Plan should include both short term and long term measures to improve the completeness and reliability of loss estimates. These measures should carry out the following general objectives:

- ✓ Critical Facilities Assessments. Assess critical facilities (hospitals, schools, fire and police stations, special needs housing, and others) to address

building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.

- ✓ Geographic Information Systems (GIS). Maintain a comprehensive database of hazard locations, socio-economic data, infrastructure, and critical facilities inventories.
- ✓ Planning Studies. Conduct special plans and studies, as needed, to identify hazard risks and develop mitigation projects.

## 5.7 General Description of Land Uses and Development Trends

Baldwin County has experienced rapid growth over the past 20 years, during which time the county was the fastest growing county in Alabama. Between 2006 and 2008 alone, builders completed 3000 new condominiums and hotel rooms in Baldwin County.

Strong growth will continue in the future. For 2025, Baldwin County's 2007 Comprehensive Plan predicts a countywide total population of 279,315, up from the 2007 population of 174,031. Most of this growth will occur in the southwestern portion of the county. A first ring of development will intensify around the Daphne-Fairhope area on the west shore of Mobile Bay. For example, outside Spanish Fort, International Paper company has started selling properties for an 11,000 acre Large Scale Planned Unit Development called the Highlands. The plan calls for 28,000 homes and 7,000 jobs. A second ring of development will intensify land use around Gulf Shores and Orange Beach, in the coastal area of Baldwin County.

Baldwin County's future development will differ significantly from its past development in the degree of zoning. The Town of Magnolia Springs was incorporated in part to provide more authority for land use regulation around the Magnolia River. When Perdido Beach was incorporated by referendum in June 2009, the Mobile Register noted "supporters said that a town government would protect the 108-year-old community from encroachment by development interest and annexation-minded neighbors." The 2007 Comprehensive Plan endorses conservation districts to preserve habitats and wetlands. This trend could change the direction of development trends away from coastal areas, toward interior sections of the county with fewer restrictions of land use. Such a development pattern would reduce exposure to tidal surge and flooding relative to the continuation of prior trends.

## 5.8 Repetitively-Damaged NFIP-Insured Structures

FEMA defines a repetitive loss property as those which have two or more losses of at least \$1,000 and have been paid under the National Flood Insurance Program (NFIP) within any 10 year period. According to FEMA, there are 1,890 NFIP repetitive

loss structures within Baldwin County and the NFIP participating jurisdictions as of February 2010. The table below describes the number of policies in force and includes the number of repetitive loss properties by jurisdiction.

**Table 5-19 Repetitive Loss Properties by Jurisdiction**

Community Name	NFIP Policies in Force	Repetitive Loss Structures	Total RL Claims	Total RL Losses	Average RL Claim Paid
Baldwin County	9,551	122	266	\$20,105,025.20	\$75,582.80
Bay Minette	12	1	2	\$11,271.00	\$5,635.50
Daphne	390	15	58	\$5,120,194.54	\$88,279.22
Elberta		38	91	\$5,287,344.19	\$58,102.68
Fairhope	306	142	469	\$15,266,650.74	\$32,551.49
Foley	155	38	90	\$2,637,912.94	\$29,310.14
Gulf Shores	7,984	1,291	3,758	\$108,469,110.18	\$28,863.52
Loxley	31	2	4	\$97,550.41	\$24,387.60
Orange Beach	8,602	210	509	\$26,522,325.07	\$52,106.73
Robertsdale	37	3	6	\$443,553.67	\$73,925.61
Silverhill	6	6	10	\$2,609,776.02	\$260,977.60
Spanish Fort	47	5	10	\$3,791,073.81	\$379,107.38
Summerdale	2	17	40	\$8,079,513.21	\$201,987.83
<b>Total</b>	<b>27,123</b>	<b>1,890</b>	<b>5,313</b>	<b>\$198,441,300.98</b>	<b>\$37,350.14</b>

Source: NFIP State Coordinator 02/03/2010

The majority (82%) of the properties that have experienced repetitive losses are single family homes. The remaining properties are classified as other residential (6%), multi-family homes (5%), non-residential (4%) and condominiums (3%).

## 5.9 Summary of Hazards and Community Impacts

Table 5-20 summarizes each jurisdiction's vulnerability. Community impacts include the following descriptions and measurements:

**Location.** Location measures the geographic extent of the identified hazard in one of three ways, as follows:

- 1) *Community-wide* - the entire geographic area is affected;
- 2) *Partial* - a significant portion of the community is affected; or
- 3) *Minimal* - a negligible area is affected.

**Probability.** Probability measures the likelihood of the hazard occurring within the community, based on historical incidence. The scale for frequency runs as follows:

- 1) *Very high* - annually;
- 2) *High* - every two to three years;
- 3) *Moderate* - every three to ten years;
- 4) *Low* - every ten years; or
- 5) *Very low* - rare.

Extent. Extent measures the severity of the hazard and its potential to cause casualties, business losses, and damage to structures. The scale utilized runs as follows:

- 1) *Devastating* - the potential for devastating casualties, business losses, and structure damage;
- 2) *Significant* - the potential for some casualties and significant, but less than devastating, business losses and structure damage;
- 3) *Moderate* – moderate potential for economic losses and structure damage; or
- 4) *Slight* – slight or minimal potential for economic losses and structure damage.

Exposure. Exposure measures the percentage of structures within the community, including buildings, critical facilities, and infrastructure lifelines, that are exposed to the hazard. The classifications are defined as follows:

- 1) *High* - includes more than approximately 25 percent of the structures;
- 2) *Medium* - includes 10 percent to 25 percent of the structures; or
- 3) *Low* - includes less than 10 percent of the structures.

Damage Potential. Damage potential measures the damage that can be expected should an event take place. The classifications are defined as follows:

- 1) *High* - a hazard could damage more than 5 percent of the structures in a community;
- 2) *Medium* - a hazard could damage between 1 and 5 percent of the structures in a community; or
- 3) *Low* - a hazard could damage fewer than 1 percent of the structures in a community.

**Table 5-20. Summary of Hazards and Community Impacts**

Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
<b>Hurricanes</b>	Bay Minette	Community-wide	Moderate	Moderate	High	High
	Daphne	Community-wide	Moderate	Significant	High	High
	Elberta	Community-wide	Moderate	Significant	High	High
	Fairhope	Community-wide	Moderate	Significant	High	High
	Foley	Community-wide	Moderate	Significant	High	High
	Gulf Shores	Community-wide	Moderate	Devastating	High	High
	Loxley	Community-wide	Moderate	Moderate	High	High
	Magnolia Springs	Community-wide	Moderate	Significant	High	High
	Orange Beach	Community-wide	Moderate	Devastating	High	High
	Perdido Beach	Community-wide	Moderate	Devastating	High	High
	Robertsdale	Community-wide	Moderate	Moderate	High	High
	Silverhill	Community-wide	Moderate	Moderate	High	High
	Spanish Fort	Community-wide	Moderate	Significant	High	High
	Summerdale	Community-wide	Moderate	Moderate	High	High
Unincorporated	Community-wide	Moderate	Moderate	High	High	
<b>Severe Storms</b>	Bay Minette	Community-wide	Very High	Moderate	High	Low
	Daphne	Community-wide	Very High	Moderate	High	Low
	Elberta	Community-wide	Very High	Moderate	High	Low
	Fairhope	Community-wide	Very High	Moderate	High	Low
	Foley	Community-wide	Very High	Moderate	High	Low
	Gulf Shores	Community-wide	Very High	Moderate	High	Low
	Loxley	Community-wide	Very High	Moderate	High	Low
	Magnolia Springs	Community-wide	Very High	Moderate	High	Low
	Orange Beach	Community-wide	Very High	Moderate	High	Low
	Perdido Beach	Community-wide	Very High	Moderate	High	Low



Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
	Robertsdale	Community-wide	Very High	Moderate	High	Low
	Silverhill	Community-wide	Very High	Moderate	High	Low
	Spanish Fort	Community-wide	Very High	Moderate	High	Low
	Summerdale	Community-wide	Very High	Moderate	High	Low
	Unincorporated	Community-wide	Very High	Moderate	High	Low
Tornadoes	Bay Minette	Community-wide	High	Moderate	High	High
	Daphne	Community-wide	High	Moderate	High	High
	Elberta	Community-wide	High	Moderate	High	High
	Fairhope	Community-wide	High	Moderate	High	High
	Foley	Community-wide	High	Moderate	High	High
	Gulf Shores	Community-wide	High	Moderate	High	High
	Loxley	Community-wide	High	Moderate	High	High
	Magnolia Springs	Community-wide	High	Moderate	High	High
	Orange Beach	Community-wide	High	Moderate	High	High
	Perdido Beach	Community-wide	High	Moderate	High	High
	Robertsdale	Community-wide	High	Moderate	High	High
	Silverhill	Community-wide	High	Moderate	High	High
	Spanish Fort	Community-wide	High	Moderate	High	High
	Summerdale	Community-wide	High	Moderate	High	High
Unincorporated	Community-wide	High	Moderate	High	High	
Floods	Bay Minette	Minimal	Low	Slight	Low	Low
	Daphne	Partial	Moderate	Moderate	Low	Medium
	Elberta	Minimal	Low	Slight	Low	Low
	Fairhope	Partial	Moderate	Significant	Low	Medium
	Foley	Minimal	Low	Slight	Low	Low
	Gulf Shores	Partial	Moderate	Significant	Low	Medium
	Loxley	Partial	Moderate	Significant	Low	Medium

Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
	Magnolia Springs	Partial	Moderate	Significant	Low	Medium
	Orange Beach	Partial	Moderate	Significant	Low	Medium
	Perdido Beach	Partial	Moderate	Significant	Low	Medium
	Robertsdale	Minimal	Low	Slight	Low	Low
	Silverhill	Minimal	Low	Slight	Low	Low
	Spanish Fort	Minimal	Low	Slight	Low	Low
	Summerdale	Minimal	Low	Slight	Low	Low
	Unincorporated	Partial	Moderate	Slight	Low	Low
Wildfires	Bay Minette	Partial	Very High	Moderate	High	Medium
	Daphne	Minimal	Low	Slight	Low	Low
	Elberta	Minimal	Low	Slight	Low	Low
	Fairhope	Minimal	Low	Slight	Low	Low
	Foley	Minimal	Low	Slight	Low	Low
	Gulf Shores	Minimal	Low	Slight	Low	Low
	Loxley	Minimal	Low	Slight	Low	Low
	Magnolia Springs	Minimal	Low	Slight	Low	Low
	Orange Beach	Minimal	Low	Slight	Low	Low
	Perdido Beach	Minimal	Low	Slight	Low	Low
	Robertsdale	Minimal	Low	Slight	Low	Low
	Silverhill	Minimal	Low	Slight	Low	Low
	Spanish Fort	Minimal	Low	Slight	Low	Low
	Summerdale	Minimal	Low	Slight	Low	Low
Unincorporated	Partial	High	Moderate	High	Medium	
Drought/Heat Waves	Bay Minette	Community-wide	Very Low	Slight	High	Low
	Daphne	Community-wide	Very Low	Slight	High	Low
	Elberta	Community-wide	Very Low	Slight	High	Low
	Fairhope	Community-wide	Very Low	Slight	High	Low

Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
	Foley	Community-wide	Very Low	Slight	High	Low
	Gulf Shores	Community-wide	Very Low	Slight	High	Low
	Loxley	Community-wide	Very Low	Slight	High	Low
	Magnolia Springs	Community-wide	Very Low	Slight	High	Low
	Orange Beach	Community-wide	Very Low	Slight	High	Low
	Perdido Beach	Community-wide	Very Low	Slight	High	Low
	Robertsdale	Community-wide	Very Low	Slight	High	Low
	Silverhill	Community-wide	Very Low	Slight	High	Low
	Spanish Fort	Community-wide	Very Low	Slight	High	Low
	Summerdale	Community-wide	Very Low	Slight	High	Low
	Unincorporated	Community-wide	Very Low	Slight	High	Low
<b>Winter Storms/Freezes</b>	Bay Minette	Community-wide	Very Low	Slight	High	Low
	Daphne	Community-wide	Very Low	Slight	High	Low
	Elberta	Community-wide	Very Low	Slight	High	Low
	Fairhope	Community-wide	Very Low	Slight	High	Low
	Foley	Community-wide	Very Low	Slight	High	Low
	Gulf Shores	Community-wide	Very Low	Slight	High	Low
	Loxley	Community-wide	Very Low	Slight	High	Low
	Magnolia Springs	Community-wide	Very Low	Slight	High	Low
	Orange Beach	Community-wide	Very Low	Slight	High	Low
	Perdido Beach	Community-wide	Very Low	Slight	High	Low
	Robertsdale	Community-wide	Very Low	Slight	High	Low
	Silverhill	Community-wide	Very Low	Slight	High	Low
	Spanish Fort	Community-wide	Very Low	Slight	High	Low
	Summerdale	Community-wide	Very Low	Slight	High	Low
Unincorporated	Community-wide	Very Low	Slight	High	Low	
<b>Earthquakes</b>	Bay Minette	Community-wide	Very Low	Slight	High	Low

Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
	Daphne	Community-wide	Very Low	Slight	High	Low
	Elberta	Community-wide	Very Low	Slight	High	Low
	Fairhope	Community-wide	Very Low	Slight	High	Low
	Foley	Community-wide	Very Low	Slight	High	Low
	Gulf Shores	Community-wide	Very Low	Slight	High	Low
	Loxley	Community-wide	Very Low	Slight	High	Low
	Magnolia Springs	Community-wide	Very Low	Slight	High	Low
	Orange Beach	Community-wide	Very Low	Slight	High	Low
	Perdido Beach	Community-wide	Very Low	Slight	High	Low
	Robertsdale	Community-wide	Very Low	Slight	High	Low
	Silverhill	Community-wide	Very Low	Slight	High	Low
	Spanish Fort	Community-wide	Very Low	Slight	High	Low
	Summerdale	Community-wide	Very Low	Slight	High	Low
	Unincorporated	Community-wide	Very Low	Slight	High	Low
Dam/Levee Failures	Bay Minette	Minimal	Very Low	Slight	Low	Low
	Daphne	Minimal	Very Low	Slight	Low	Low
	Elberta	Minimal	Very Low	Slight	Low	Low
	Fairhope	Minimal	Very Low	Slight	Low	Low
	Foley	Minimal	Very Low	Slight	Low	Low
	Gulf Shores	Minimal	Very Low	Slight	Low	Low
	Loxley	Minimal	Very Low	Slight	Low	Low
	Magnolia Springs	Minimal	Very Low	Slight	Low	Low
	Orange Beach	Minimal	Very Low	Slight	Low	Low
	Perdido Beach	Minimal	Very Low	Slight	Low	Low
	Robertsdale	Minimal	Very Low	Slight	Low	Low
	Silverhill	Minimal	Very Low	Slight	Low	Low
	Spanish Fort	Minimal	Very Low	Slight	Low	Low

Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
	Summerdale	Minimal	Very Low	Slight	Low	Low
	Unincorporated	Minimal	Very Low	Slight	Low	Low
Landslides	Bay Minette	Minimal	Very Low	Slight	Low	Low
	Daphne	Minimal	Very Low	Slight	Low	Low
	Elberta	Minimal	Very Low	Slight	Low	Low
	Fairhope	Minimal	Very Low	Slight	Low	Low
	Foley	Minimal	Very Low	Slight	Low	Low
	Gulf Shores	Minimal	Very Low	Slight	Low	Low
	Loxley	Minimal	Very Low	Slight	Low	Low
	Magnolia Springs	Minimal	Very Low	Slight	Low	Low
	Orange Beach	Minimal	Very Low	Slight	Low	Low
	Perdido Beach	Minimal	Very Low	Slight	Low	Low
	Robertsdale	Minimal	Very Low	Slight	Low	Low
	Silverhill	Minimal	Very Low	Slight	Low	Low
	Spanish Fort	Minimal	Low	Slight	Low	Low
	Summerdale	Minimal	Very Low	Slight	Low	Low
Unincorporated	Minimal	Very Low	Slight	Low	Low	
Sinkholes (Land Subsidence)	Bay Minette	Minimal	Very Low	Slight	Low	Low
	Daphne	Minimal	Very Low	Slight	Low	Low
	Elberta	Minimal	Very Low	Slight	Low	Low
	Fairhope	Minimal	Very Low	Slight	Low	Low
	Foley	Minimal	Very Low	Slight	Low	Low
	Gulf Shores	Minimal	Very Low	Slight	Low	Low
	Loxley	Minimal	Very Low	Slight	Low	Low
	Magnolia Springs	Minimal	Very Low	Slight	Low	Low
	Orange Beach	Minimal	Very Low	Slight	Low	Low
Perdido Beach	Minimal	Very Low	Slight	Low	Low	

Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
	Robertsdale	Minimal	Very Low	Slight	Low	Low
	Silverhill	Minimal	Very Low	Slight	Low	Low
	Spanish Fort	Minimal	Very Low	Slight	Low	Low
	Summerdale	Minimal	Very Low	Slight	Low	Low
	Unincorporated	Minimal	Very Low	Slight	Low	Low
<b>Man-made Hazards</b>	Bay Minette	Minimal	Low	Slight	Low	Low
	Daphne	Minimal	Low	Slight	Low	Low
	Elberta	Minimal	Low	Slight	Low	Low
	Fairhope	Minimal	Low	Slight	Low	Low
	Foley	Minimal	Low	Slight	Low	Low
	Gulf Shores	Minimal	Low	Slight	Low	Low
	Loxley	Minimal	Low	Slight	Low	Low
	Magnolia Springs	Minimal	Low	Slight	Low	Low
	Orange Beach	Minimal	Low	Slight	Low	Low
	Perdido Beach	Minimal	Low	Slight	Low	Low
	Robertsdale	Minimal	Low	Slight	Low	Low
	Silverhill	Minimal	Low	Slight	Low	Low
	Spanish Fort	Minimal	Low	Slight	Low	Low
	Summerdale	Minimal	Low	Slight	Low	Low
Unincorporated	Minimal	Low	Slight	Low	Low	

## 5.10 Risks that Vary Among the Jurisdictions

This Plan has strongly emphasized the variations in risks among jurisdictions. In particular, the following sections contain specific references to jurisdictional variations:

- Hazard identification. Each jurisdiction was independently assessed to identify pertinent hazards, based on the sources noted in Section 5.3 ~~“Identification of Hazards Affecting Each Jurisdiction.”~~ Descriptions of hazards can be found in Appendix D, ~~“Hazard Identification, Ratings and Descriptions”~~.
- Hazard profiles. Each of the hazard profiles in Section 5.4 notes how the location, extent, past occurrences, and probability of future events may vary among all jurisdictions. Maps are included, where possible, to emphasize the locations of hazards in relation to jurisdictional limits.
- Summary of Community Impacts. Table 5-20 ~~“Summary of Hazards and Community Impacts”~~ summarizes how hazards impact each jurisdiction.

Risk may vary among jurisdictions, as described in Table 5-21 ~~“Jurisdictional Risk Variations.”~~ Table 5-21 presents an overview of the common and unique risks within each jurisdiction and the unique characteristics of those risks. The risk variations table uses the following terms, as defined here:

Variation of Risks. Measures whether a risk is common or unique, as follows:

- 1) *Common risk* - affects all areas equally; or
- 2) *Unique risk* - affects certain jurisdictions with varying probability and extent.

Location. Indicates whether a hazard’s impact varies within the community, as follows:

- 1) *Specific locations* - the hazard only threatens particular parts of the jurisdiction; or
- 2) *Not unique* - the hazard affects all parts of the jurisdiction.

Probability. Probability measures the likelihood of the hazard occurring within the community, based on historical incidence. The scale for frequency runs as follows:

- 1) *Very high* - annually;
- 2) *High* - every two to three years;
- 3) *Moderate* - every three to ten years;
- 4) *Low* - every ten years; or
- 5) *Very low* - rare.

Extent. Extent measures the severity of the hazard and its potential to cause casualties, business losses, and damage to structures. The scale utilized runs as follows:

- 1) *Devastating* - the potential for devastating casualties, business losses, and structure damage;
- 2) *Significant* - the potential for some casualties and significant, but less than devastating, business losses and structure damage;
- 3) *Moderate* – moderate potential for economic losses and structure damage; or
- 4) *Slight* – slight or minimal potential for economic losses and structure damage.



**Table 5-21. Jurisdictional Risk Variations**

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
Hurricanes	Unique Risk	Bay Minette	Specific Locations	Moderate	Significant
		Daphne	Specific Locations	Moderate	Significant
		Elberta	Specific Locations	Moderate	Devastating
		Fairhope	Specific Locations	Moderate	Significant
		Foley	Specific Locations	Moderate	Significant
		Gulf Shores	Specific Locations	Moderate	Devastating
		Loxley	Specific Locations	Moderate	Significant
		Magnolia Springs	Specific Locations	Moderate	Devastating
		Orange Beach	Specific Locations	Moderate	Devastating
		Perdido Beach	Specific Locations	Moderate	Devastating
		Robertsdale	Specific Locations	Moderate	Significant
		Silverhill	Specific Locations	Moderate	Significant
		Spanish Fort	Specific Locations	Moderate	Significant
		Summerdale	Specific Locations	Moderate	Significant
Unincorporated	Specific Locations	Moderate	Devastating		
Severe Storms	Common Risks	Bay Minette	Not Unique	Very High	Moderate
		Daphne	Not Unique	Very High	Moderate
		Elberta	Not Unique	Very High	Moderate
		Fairhope	Not Unique	Very High	Moderate
		Foley	Not Unique	Very High	Moderate
		Gulf Shores	Not Unique	Very High	Moderate
		Loxley	Not Unique	Very High	Moderate
		Magnolia Springs	Not Unique	Very High	Moderate
		Orange Beach	Not Unique	Very High	Moderate
		Perdido Beach	Not Unique	Very High	Moderate

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Robertsdale	Not Unique	Very High	Moderate
		Silverhill	Not Unique	Very High	Moderate
		Spanish Fort	Not Unique	Very High	Moderate
		Summerdale	Not Unique	Very High	Moderate
		Unincorporated	Not Unique	Very High	Moderate
<b>Tornadoes</b>	Common Risks	Bay Minette	Not Unique	High	Moderate
		Daphne	Not Unique	High	Moderate
		Elberta	Not Unique	High	Moderate
		Fairhope	Not Unique	High	Moderate
		Foley	Not Unique	High	Moderate
		Gulf Shores	Not Unique	High	Moderate
		Loxley	Not Unique	High	Moderate
		Magnolia Springs	Not Unique	High	Moderate
		Orange Beach	Not Unique	High	Moderate
		Perdido Beach	Not Unique	High	Moderate
		Robertsdale	Not Unique	High	Moderate
		Silverhill	Not Unique	High	Moderate
		Spanish Fort	Not Unique	High	Moderate
		Summerdale	Not Unique	High	Moderate
		Unincorporated	Not Unique	High	Moderate
<b>Floods</b>	Unique Risks	Bay Minette	Specific Locations	Low	Slight
		Daphne	Specific Locations	Moderate	Moderate
		Elberta	Specific Locations	Low	Slight
		Fairhope	Specific Locations	Moderate	Significant
		Foley	Specific Locations	Low	Slight
		Gulf Shores	Specific Locations	Moderate	Significant
		Loxley	Specific Locations	Moderate	Significant

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Magnolia Springs	Specific Locations	Moderate	Significant
		Orange Beach	Specific Locations	Moderate	Significant
		Perdido Beach	Specific Locations	Moderate	Significant
		Robertsdale	Specific Locations	Low	Slight
		Silverhill	Specific Locations	Low	Slight
		Spanish Fort	Specific Locations	Low	Slight
		Summerdale	Specific Locations	Low	Slight
		Unincorporated	Specific Locations	Moderate	Slight
<b>Wildfires</b>	Unique Risks	Bay Minette	Specific Locations	Very High	Moderate
		Daphne	Specific Locations	Low	Slight
		Elberta	Specific Locations	Low	Slight
		Fairhope	Specific Locations	Low	Slight
		Foley	Specific Locations	Low	Slight
		Gulf Shores	Specific Locations	Low	Slight
		Loxley	Specific Locations	Low	Slight
		Magnolia Springs	Specific Locations	Low	Slight
		Orange Beach	Specific Locations	Low	Slight
		Perdido Beach	Specific Locations	Low	Slight
		Robertsdale	Specific Locations	Low	Slight
		Silverhill	Specific Locations	Low	Slight
		Spanish Fort	Specific Locations	Low	Slight
		Summerdale	Specific Locations	Low	Slight
		Unincorporated	Specific Locations	High	Moderate
<b>Drought/Heat Waves</b>	Common Risks	Bay Minette	Not Unique	Very Low	Slight
		Daphne	Not Unique	Very Low	Slight
		Elberta	Not Unique	Very Low	Slight
		Fairhope	Not Unique	Very Low	Slight

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Foley	Not Unique	Very Low	Slight
		Gulf Shores	Not Unique	Very Low	Slight
		Loxley	Not Unique	Very Low	Slight
		Magnolia Springs	Not Unique	Very Low	Slight
		Orange Beach	Not Unique	Very Low	Slight
		Perdido Beach	Not Unique	Very Low	Slight
		Robertsdale	Not Unique	Very Low	Slight
		Silverhill	Not Unique	Very Low	Slight
		Spanish Fort	Not Unique	Very Low	Slight
		Summerdale	Not Unique	Very Low	Slight
		Unincorporated	Not Unique	Very Low	Slight
Winter Storms/Freezes	Common Risks	Bay Minette	Not Unique	Very Low	Slight
		Daphne	Not Unique	Very Low	Slight
		Elberta	Not Unique	Very Low	Slight
		Fairhope	Not Unique	Very Low	Slight
		Foley	Not Unique	Very Low	Slight
		Gulf Shores	Not Unique	Very Low	Slight
		Loxley	Not Unique	Very Low	Slight
		Magnolia Springs	Not Unique	Very Low	Slight
		Orange Beach	Not Unique	Very Low	Slight
		Perdido Beach	Not Unique	Very Low	Slight
		Robertsdale	Not Unique	Very Low	Slight
		Silverhill	Not Unique	Very Low	Slight
		Spanish Fort	Not Unique	Very Low	Slight
		Summerdale	Not Unique	Very Low	Slight
Unincorporated	Not Unique	Very Low	Slight		
Earthquakes	Common Risks	Bay Minette	Not Unique	Very Low	Slight

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Daphne	Not Unique	Very Low	Slight
		Elberta	Not Unique	Very Low	Slight
		Fairhope	Not Unique	Very Low	Slight
		Foley	Not Unique	Very Low	Slight
		Gulf Shores	Not Unique	Very Low	Slight
		Loxley	Not Unique	Very Low	Slight
		Magnolia Springs	Not Unique	Very Low	Slight
		Orange Beach	Not Unique	Very Low	Slight
		Perdido Beach	Not Unique	Very Low	Slight
		Robertsdale	Not Unique	Very Low	Slight
		Silverhill	Not Unique	Very Low	Slight
		Spanish Fort	Not Unique	Very Low	Slight
		Summerdale	Not Unique	Very Low	Slight
		Unincorporated	Not Unique	Very Low	Slight
Dam/Levee Failures	Unique Risks	Bay Minette	Specific Locations	Very Low	Slight
		Daphne	Specific Locations	Very Low	Slight
		Elberta	Specific Locations	Very Low	Slight
		Fairhope	Specific Locations	Very Low	Slight
		Foley	Specific Locations	Very Low	Slight
		Gulf Shores	Specific Locations	Very Low	Slight
		Loxley	Specific Locations	Very Low	Slight
		Magnolia Springs	Specific Locations	Very Low	Slight
		Orange Beach	Specific Locations	Very Low	Slight
		Perdido Beach	Specific Locations	Very Low	Slight
		Robertsdale	Specific Locations	Very Low	Slight
		Silverhill	Specific Locations	Very Low	Slight
		Spanish Fort	Specific Locations	Very Low	Slight

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Summerdale	Specific Locations	Very Low	Slight
		Unincorporated	Specific Locations	Very Low	Slight
<b>Landslides</b>	Unique Risks	Bay Minette	Specific Locations	Very Low	Slight
		Daphne	Specific Locations	Very Low	Slight
		Elberta	Specific Locations	Very Low	Slight
		Fairhope	Specific Locations	Very Low	Slight
		Foley	Specific Locations	Very Low	Slight
		Gulf Shores	Specific Locations	Very Low	Slight
		Loxley	Specific Locations	Very Low	Slight
		Magnolia Springs	Specific Locations	Very Low	Slight
		Orange Beach	Specific Locations	Very Low	Slight
		Perdido Beach	Specific Locations	Very Low	Slight
		Robertsdale	Specific Locations	Very Low	Slight
		Silverhill	Specific Locations	Very Low	Slight
		Spanish Fort	Specific Locations	Low	Slight
		Summerdale	Specific Locations	Very Low	Slight
		Unincorporated	Specific Locations	Very Low	Slight
<b>Sinkholes (Land Subsidence)</b>	Unique Risks	Bay Minette	Specific Locations	Very Low	Slight
		Daphne	Specific Locations	Very Low	Slight
		Elberta	Specific Locations	Very Low	Slight
		Fairhope	Specific Locations	Very Low	Slight
		Foley	Specific Locations	Very Low	Slight
		Gulf Shores	Specific Locations	Very Low	Slight
		Loxley	Specific Locations	Very Low	Slight
		Magnolia Springs	Specific Locations	Very Low	Slight
		Orange Beach	Specific Locations	Very Low	Slight
Perdido Beach	Specific Locations	Very Low	Slight		

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Robertsdale	Specific Locations	Very Low	Slight
		Silverhill	Specific Locations	Very Low	Slight
		Spanish Fort	Specific Locations	Very Low	Slight
		Summerdale	Specific Locations	Very Low	Slight
		Unincorporated	Specific Locations	Very Low	Slight
Man-made Hazards	Common Risk	Bay Minette	Not Unique	Low	Slight
		Daphne	Not Unique	Low	Slight
		Elberta	Not Unique	Low	Slight
		Fairhope	Not Unique	Low	Slight
		Foley	Not Unique	Low	Slight
		Gulf Shores	Not Unique	Low	Slight
		Loxley	Not Unique	Low	Slight
		Magnolia Springs	Not Unique	Low	Slight
		Orange Beach	Not Unique	Low	Slight
		Perdido Beach	Not Unique	Low	Slight
		Robertsdale	Not Unique	Low	Slight
		Silverhill	Not Unique	Low	Slight
		Spanish Fort	Not Unique	Low	Slight
		Summerdale	Not Unique	Low	Slight
Unincorporated	Not Unique	Low	Slight		

## Chapter 6 – Mitigation Strategy

- 6.1 Federal Requirements for the Mitigation Strategy
- 6.2 Summary of Plan Updates
- 6.3 Goals for Hazard Mitigation
- 6.4 Participation and Compliance with the National Flood Insurance Program (NFIP)
- 6.5 Implementation of Mitigation Actions
- 6.6 Multi-Jurisdictional Mitigation Action Program

### 6.1 Federal Requirements for the Mitigation Strategy

This chapter of the Plan addresses the Mitigation Strategy requirements of 44 CFR Section 201.6 (c) (3), as follows:

“201.6 (c)(3) *A mitigation strategy* that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:

- (i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
- (ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
- (iii) An Action Program describing how the actions identified in paragraph (c) (3) (ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
- (iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.”



## 6.2 Summary of Plan Updates

Table 6-1 summarizes changes made to the plan as a result of the 2010 plan update:

**Table 6-1. Summary of Plan Updates**

Section		Change
6.3	Goals for Hazard Mitigation	Goals and objectives from previous plans reviewed and modified based on current conditions; removed Emergency Services goal and hazard specific goals; expanded vision statement to include underlying principles and purposes; reviewed compatibility with State goals.
6.4	Participation and Compliance with the National Flood Insurance Program (NFIP)	Describes participation and ongoing commitments of NFIP participants to enhance flood plain management program activities.
6.5	Implementation of Mitigation Actions	Describes new selection criteria for mitigation actions and projects.
6.6	Multi-Jurisdictional Mitigation Action Program	Creates new five-year action programs for each participating community.

## 6.3 Goals for Hazard Mitigation

### 6.3.1 Description of How the Goals were Developed

The goals in the previous plans have been updated based on current conditions, including the following factors, among others:

- The completion of mitigation measures over the five-year plan implementation cycle (see Appendix C “Plan Implementation Status”);
- The 2010 update to the risk assessment in Chapter 5;
- The update to the risk assessment in the 2007 Alabama State Hazard Mitigation Plan; and
- The update of State goals and mitigation priorities reflected in the state plan.

To fully develop the 2010 goals, the planning team evaluated the 2004 Baldwin County, Alabama, Natural Hazards Mitigation Plan and, through a series of exercises Hazard Mitigation Planning Committee (HMPC), evaluated the validity and effectiveness of the goals from the previous plans and determined what goals should be consolidated and carried forward into the 2010 plan. The Hazard Mitigation Planning Committee (HMPC) determined that most of the goals statements should be retained in this 2010 update, and some goals have been modified for consistency with the state and long term recovery plans.

Among the considerations reviewed by the planning team and the HMPC during the process of updating the 2010 goals were the following concerns:

- Whether the previous goals and objectives adequately reflected the 2010 updates to the risk assessment;
- Whether the previous goals and objectives effectively directed mitigation actions and projects to reduce vulnerability to properties and infrastructure;
- Whether the previous goals and objectives supported the 2010 mitigation priorities established by the HMPC; and
- Whether the 2010 goals are consistent with the adopted goals of the 2007 Alabama State Hazard Mitigation Plan.

The updated goals are presented in Section 6.3.3 “Community Goals” and have also been incorporated into the “Multi-Jurisdictional Mitigation Action Program,” in Section 6.6 and the “Community Action Programs” in Volume II.

The previously approved plans also included objectives, and this update carries forward many of the same objectives. Some objectives have been modified and new objectives have been added to better identify and select among available mitigation measures that best respond to the considerations listed above (see Appendix F “Identification and Analysis of Mitigation Measures”). The implementation status report in Appendix C “Plan Implementation Status” documents the progress towards meeting the original objectives.

As further explained in Appendix F, a strategic planning approach has been used for identification and analysis of mitigation actions and projects. FEMA’s program categories for managing a successful mitigation program were used as guidelines for identifying and sorting the alternative mitigation measures:

- **Prevention.** Adopting and administering ordinances, regulations, and programs that manage the development of land and buildings to minimize risks of loss due to natural hazards.
- **Property Protection.** Protecting structures and their occupants and contents from the damaging effects of natural hazard occurrences, including retrofitting existing structures to increase their resistance to damage and exposure of occupants to harm; relocating vulnerable structures and occupants from hazard locations; and conversion of developed land to permanent open space through acquisition and demolition of existing structures.
- **Public Education and Outreach.** Educating and informing the public about the risks of hazards and the techniques available to reduce threats to life and property.
- **Natural Resources Protection.** Preserving and restoring the beneficial functions of the natural environment to promote sustainable community

development that balances the constraints of nature with the social and economic demands of the community.

- **Structural Projects.** Engineering structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of a hazard on a community.

The comprehensive listing of alternative mitigation measures within each of the above mitigation program areas was developed by the planning team (again, refer to Appendix F “Identification and Analysis of Mitigation Measures”). The process by which the Hazard Mitigation Planning Committee (HMPC) and local jurisdictions finally selected among the available mitigation measures applied the STAPLEE method. STAPLEE examines social, technical, administrative, political, legal, environmental, and economic considerations.

HMPC representatives from each jurisdiction participated in the evaluation and selection of the mitigation measures. Not all of the mitigation measures initially considered were included in the final Community Mitigation Action Programs (see Volume II “Community Action Programs”). The STAPLEE evaluation eliminated many of the measures. Also, some communities did not have the capabilities to carry out a particular measure under consideration or had other concerns revealed by the STAPLEE method.

A capability assessment was performed by the planning team to determine each participating community’s capability to implement their selected mitigation action program. A report of the assessment is documented in Appendix B - “Community Mitigation Capabilities.” The assessment includes, among other capability factors, a review of local plans, studies, regulatory tools and other local planning tools. Mitigation measures to improve these tools to better integrate mitigation objectives were considered and, where deemed appropriate, selected for the action programs.

In addition to STAPLEE and community capabilities, the communities examined other evaluation criteria, including consistency with the vision, goals, and objectives established for the 2010 plan update; cost effectiveness in terms of benefit to cost; FEMA and State funding priorities for Hazard Mitigation Assistance grants; and the fiscal and staffing capabilities of the jurisdictions for carrying out the measures.

The “2010-2015 Baldwin County Multi-Jurisdictional Mitigation Action Program,” as presented in Table 6-3 in Section 6.6, presents all of goals, objectives and measures chosen by each of the participating jurisdictions. The Community Action Programs in Volume II, which supplements Table 6-3, breaks out the same mitigation goals, objectives, and mitigation measures by community and adds the priority, timeframe for completion, and responsibility for implementation.

### **6.3.2 The Vision for Disaster-Resistant Baldwin County Communities**

The communities of Baldwin County envision active resistance to the threats of nature to human life and property through publicly supported mitigation measures with proven results. The communities within Baldwin County commit to reduce the exposure and risk of natural hazards by activating all available resources through cooperative intergovernmental and private sector initiatives and augmenting public knowledge and awareness.

This shared vision among all Baldwin County local governments can be achieved through a long-term hazard mitigation strategy that fully responds to the following hazards identified by this plan:

- tornadoes,
- severe storms,
- floods,
- earthquakes,
- winter storms/freezes,
- droughts/heat waves,
- dam/levee failures,
- wildfires,
- landslides, and
- sinkholes.

The attainment of this vision requires successful implementation of a comprehensive range of mitigation measures that promote the following underlying principles and purposes:

- to reduce or eliminate risks from natural hazards;
- to reduce the vulnerability of existing, new, and future development of buildings and infrastructure;
- to minimize exposure and vulnerability of people, buildings, critical facilities, and infrastructure to identified hazards;
- to increase public awareness and support of hazard mitigation;
- to establish interagency cooperation for conducting hazard mitigation activities;
- to strengthen communications and coordination among individuals and organizations;
- to integrate local hazard mitigation planning with State hazard mitigation planning, local comprehensive planning activities, and emergency operations planning; and

- to protect people and property and reduce losses and damages to buildings and infrastructure.

### 6.3.3 Community Goals

The goals for guiding the Mitigation Strategy and achieving the long-range vision shared among Baldwin County communities are presented here:

1. **Prevention Goal.** Manage the development of land and buildings to minimize risks of loss due to natural and man-made hazards.
2. **Property Protection Goal.** Protect structures and their occupants and contents from the damaging effects of natural and man-made hazards.
3. **Public Education and Awareness Goal.** Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.
4. **Natural Resources Protection Goal.** Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.
5. **Structural Projects Goal.** Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where found to be feasible, cost effective, and environmentally suitable.

### 6.3.4 Compatibility with 2007 Alabama State Plan Goals

The 2010 Baldwin County vision, goals, and objectives are reflective of the goals adopted in the 2007 Alabama State Hazard Mitigation Plan. The State plan includes the following six goals for statewide hazard mitigation:

1. Establish a comprehensive statewide hazard mitigation system.
2. Reduce the State of Alabama's risk from natural hazards.
3. Reduce vulnerability of new and future development.
4. Reduce the State of Alabama's vulnerability to natural hazards.
5. Foster public support and acceptance of hazard mitigation.
6. Establish interagency hazard mitigation cooperation.

Alabama local governments, including Baldwin County communities, are the fundamental building blocks of the "comprehensive statewide hazard mitigation system." The underlying principles and purposes of the 2010 Baldwin County goals, listed in Table 6.3, complement the remaining five State goals, as follows: (a) to reduce or eliminate risks from natural and man-made hazards; (b) to reduce the vulnerability of existing, new, and future development of buildings and infrastructure; (c) to minimize exposure and vulnerability of people, buildings, critical facilities, and infrastructure to

identified hazards; (d) to increase public awareness and support of hazard mitigation; and (e) to establish interagency cooperation for conducting hazard mitigation activities.

## **6.4 Participation and Compliance with the National Flood Insurance Program (NFIP)**

Baldwin County and all its municipal jurisdictions have been mapped and the floodplain identified. The 2004 plan (Mitigation Measure 1.3.1) recommended that the flood maps throughout the County be updated. The NFIP updated and digitized all of the maps in July 2007.

Baldwin County, the cities of Daphne, Fairhope, Bay Minette, Foley, Spanish Fort, Gulf Shores, Orange Beach and Robertsedale; the towns of Loxley, Perdido Beach, Silverhill and Summerdale are in good standing with the NFIP. All of these jurisdictions had their maps updated and digitized in 2007. The towns of Elberta and Magnolia Springs have not been mapped through the NFIP. All communities in Baldwin County have continued to effectively enforce and keep their floodplain ordinances current since their original entry into the program. Local flood plain ordinance administrators provide technical assistance to applicants and keep abreast of changes in flood plain management requirements through the State NFIP Coordinator. All communities have developed five-year action programs to improve local flood plain management programs (see specific action items for each community in Section #, Goal 1 Prevention, Objective 1.6, Flood Plain Management Regulations). Demonstrations of community commitment to effective implementation of the NFIP include the following actions:

- Longstanding records of continuous and effective enforcement of flood plain management ordinance requirements;
- Continuing education of local flood plain administrators;
- Community outreach to inform builders and property owners of flood plain management ordinance permitting requirements;
- Continuing updates of local flood plain ordinances for compliance with the most current NFIP standards;
- Maintaining the latest FIRM data in the County's GIS database for all communities;
- Ongoing relations by each community with the State NFIP Coordinator;
- Monitoring flooding events and damages in conjunction with the Baldwin County EMA;
- Encouragement to participate in the Community Rating System (CRS) program, through this hazard mitigation planning process and the HMPC; and
- Maintaining NFIP publications on hand by the Baldwin County EMA as technical support resources to local flood plain administrators and as public education information for the general public.

- The following Table 6-2 provides information on the NFIP participation status of Baldwin County jurisdictions:

**Table 6-2. NFIP Community Status, Baldwin County Jurisdictions**

Community ID	Jurisdiction	Current Effective Map Date	Status
015000	Baldwin County	07/17/2007	Participating
010004	Bay Minette	07/17/2007	Participating
010005	Daphne	07/17/2007	Participating
-	Elberta	-	Not mapped
010006	Fairhope	07/17/2007	Participating
010007	Foley	07/17/2007	Participating
015005	Gulf Shores	07/17/2007	Participating
010009	Loxley	07/17/2007	Participating
-	Magnolia Springs	-	-
015011	Orange Beach	07/17/2007	Participating
010523	Perdido Beach	7/17/2007	Participating
010222	Robertsdale	07/17/2007	Participating
010010	Silverhill	07/17/2007	Participating
010429	Spanish Fort	07/17/2007	Participating
010328	Summerdale	07/17/2007	Participating

Source: NFIP Community Status Book, 03/31/2010

## 6.5 Implementation of Mitigation Actions

The range of measures identified in Section 6.3 “Goals for Hazard Mitigation” was the source for all actions and projects selected by the Hazard Mitigation Planning Committee (HMPC) and the planning team for inclusion in the five-year Community Mitigation Action Programs for each jurisdiction. Each jurisdiction assigned a priority to selected measures, established a general completion schedule, assigned administrative responsibility for carrying out the measures, estimated costs, where possible, and identified potential funding sources, including potential eligibility for FEMA Hazard Mitigation Assistance Programs.

Social, technical, administrative, political, legal, environmental, and economic considerations, often referred to as the STAPLEE method, guided the evaluation of the range of measures considered by the Hazard Mitigation Planning Committee (HMPC) and its final recommended action programs for each participating jurisdictions. The STAPLEE method addressed the following areas of concern and responded to many of the questions presented here:

1. Social Considerations.

- *Environmental justice.* Will the proposed measure be socially equitable to minority, disadvantaged, and special needs populations, such as the elderly and handicapped?
- *Neighborhood impact.* Will the measure disrupt established neighborhoods or improve quality of life for affected neighborhoods?
- *Community support.* Is the measure consistent with community values? Will the affected community support the measure?
- *Impact on social and cultural resources.* Does the measure adversely affect valued local resources or enhance those resources?

2. Technical Considerations.

- *Technical feasibility.* Is the proposal technically possible? Are there technical issues that remain? Does the measure effectively solve the problem or create new problems? Are there secondary impacts that might be considered? Have professional experts been consulted?

3. Administrative Considerations.

- *Staffing.* Does the jurisdiction have adequate staff resources and expertise to implement the measure? Will additional staff, training, or consultants be necessary? Can local funds support staffing demands? Will the measure overburden existing staff loads?
- *Maintenance.* Does the jurisdiction have the capabilities to maintain the proposed project once it is completed? Are staff, funds, and facilities available for long-term project maintenance?
- *Timing.* Can the measure be implemented in a timely manner? Are the timeframes for implementation reasonable?

4. Political Considerations.

- *Political support.* Does the local governing body support the proposed measure? Does the public support the measure? Do stakeholders support the measure? What advocates might facilitate implementation of the proposal?

5. Legal Considerations.

- *Legal authority.* Does the jurisdiction have the legal authority to implement the measure? What are the legal consequences of taking



action to implement the measure as opposed to an alternative action or taking no action? Will new legislation be required?

6. Environmental Considerations.

- *National Environmental Policy Act (NEPA).* Will the measure be consistent with Federal NEPA criteria? How will the measure affect environmental resources, such as land, water, air, wildlife, vegetation, historic properties, archaeological sites, etc.? Can potentially adverse impacts be sufficiently mitigated through reasonable methods?
- *State and local environmental regulations.* Will the measure be in compliance with State and local environmental laws, such as flood plain management regulations, water quality standards, and wetlands protection criteria?
- *Environmental conservation goals.* Will the proposal advance the overall environmental goals and objectives of the community?

7. Economic Considerations.

- *Availability of funds.* Will the measure require Federal or other outside funding sources? Are local funds available? Can in-kind services reduce local obligations? What is the projected availability of required funds during the timeframe for implementation? Where funding is not apparently available, should the project still be considered but at a lower priority?
- *Benefits to be derived from the proposed measure.* Will the measure likely reduce dollar losses from property damages in the event of a hazard? To what degree?
- *Costs.* Are the costs reasonable in relation to the likely benefits? Do economic benefits to the community outweigh estimated project costs? What cost reduction alternatives might be available?
- *Economic feasibility.* Have the costs and benefits of the preferred measure been compared against other alternatives? What is the economic impact of the no-action alternative? Is this the most economically effective solution?
- *Impact on local economy.* Will the proposed measure improve local economic activities? What impact might the measure have on the tax base?
- *Economic development goals.* Will the proposal advance the overall economic goals and objectives of the community?

The STAPLEE evaluation also facilitated the prioritization of measures. If a measure under consideration was found to be financially feasible and had high ratings, it

was given a higher priority for implementation than measures that fell lower in the rating. Moreover, a general economic evaluation was performed as part of the STAPLEE method, as described above. Weighing potential economic benefits to reducing damages against costs made it possible to select among competing projects. Especially important to the selection process is the estimated cost and availability of funds through local sources and potential FEMA Hazard Mitigation Assistance (HMA) grant programs. Prior to implementation of projects proposed for HMA funding, a detailed benefit-cost analysis (BCA) will be required.

All of the above considerations and prioritization methods resulted in the final goals, objectives, and mitigation measures presented in Section 6.6, Table 6.3 “2010-2015 Baldwin County Multi-Jurisdictional Mitigation Action Program” and Volume II “Community Action Programs,” which supplements Table 6.3.

## **6.6 Multi-Jurisdictional Mitigation Action Program**

Table 6-3 - “2010-2015 Baldwin County Multi-Jurisdictional Mitigation Action Program” lists all goals, objectives, and mitigation measures for each participating jurisdiction. Separate action programs have been established for each community, which are presented in Volume II “Community Action Programs.” The proposed measures are within the authority of the jurisdiction or are part of a joint effort among multiple jurisdictions covered by this plan. Each jurisdiction participated in the development of its action program through its representative(s) on the Hazard Mitigation Planning Committee (HMPC), who identified and analyzed a comprehensive range of mitigation actions and projects that address each identified hazard. All actions included in these programs are achievable and within the capabilities of each jurisdictions. The planning team completed a comprehensive assessment of each jurisdiction’s capabilities to undertake hazard mitigation activities, and the results are reported in Appendix B- “Community Mitigation Capabilities.” The action programs include multiple mitigation actions for each jurisdiction and each profiled hazard.

This is an updated multi-jurisdictional plan for 2010. As such, the status of measures proposed in the last 2004 plan have been reported in Appendix C - “Plan Implementation Status,” which identifies each measure as completed, ongoing, not completed but deferred to the 2010 plan, or not completed and deleted from the 2010 plan update. The reasons for deferring or deleting a measure were categorized in the status report as lack of funding, administrative, political, technical, or legal. The updated plan also includes new mitigation measures added through the plan update process. The sources for these new measures are noted in Appendix F, Table F-1 “Alternative Types of Mitigation Measures.” The sources for new measures include those measures recommended for implementation by local governments in the 2007 Alabama State Plan update and measures recommended by the Hazard Mitigation Planning Committee (HMPC) and planning team in the 2010 plan update. Mitigation measures that remain unchanged from the previously approved plan include ongoing measures

and measures that were deferred for the reasons noted in the 2004 implementation status report.

Table 6-3 “2010-2015 Baldwin County Multi-Jurisdictional Mitigation Action Program” presents the goals, objectives, and mitigation measures selected for each of the participating communities. The hazards addressed by the measure are listed. *All*, where used to denote hazards addressed, includes all hazards identified in Chapter 5 “Risk Assessment.” Whether the measure would affect new or existing buildings and infrastructure is noted on the table, and each measure is identified as a *Project* or *Action*. Potential funding sources were identified and noted in the table. *FEMA HMA Grant* (Hazard Mitigation Assistance) funds, where noted as a possible funding source are subject to final eligibility determination, including, among other eligibility criteria, a positive benefit/cost analysis, and the availability of funds.

**Table 6-3. 2010-2015 Baldwin County Multi-Jurisdictional Mitigation Action Program**

Goal, Objectives and Mitigation Measures	Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1 <u>Goal for Prevention.</u> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1 <b><u>Comprehensive Plans and Smart Growth.</u></b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1 Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
1.1.2 Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
1.1.3 Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Baldwin County, Bay Minette, Daphne, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
1.2 <b><u>Geographic Information Systems (GIS).</u></b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.1 Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County, Bay Minette, Daphne, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	HMA

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1.2.2	Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.	Baldwin County, Elberta, Fairhope, Foley, Orange Beach	All	Both	Action	HMA
1.2.3	Create GIS systems for inventorying and assessing urban forest for in order to identify current and potential hazards and develop a comprehensive plan for managing urban forest.	Baldwin County, Fairhope, Foley, Orange Beach, Magnolia Springs, Silverhill, Spanish Fort	All	Both	Action	HMA
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
<b>1.3</b>	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					
1.3.1	Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.	Baldwin County, Elberta, Fairhope, Orange Beach, Robertsdale	Flooding	Both	Action	HMA
1.3.2	Identify existing culturally or socially significant structures and critical facilities within the jurisdiction that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	All	Existing	Action	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Action	TBD
1.3.4	Inventory and map existing fire hydrants throughout the jurisdiction, and identify areas in need of new fire hydrants.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Wildfires	Existing	Action	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	HMA
<b>1.4</b>	<b><u>Zoning.</u> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.1	Consider large lot size restrictions on flood prone areas designated on Flood Insurance Rate Maps.	Baldwin County, Daphne, Fairhope, Foley, Robertsdale	Flooding	Both	Action	Existing

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
1.4.4	Enact local ordinance that requires community storm shelters within sizeable mobile home parks and subdivisions.	Baldwin County, Daphne, Fairhope	Tornadoes, Hurricanes, Severe Storms	New	Action	Existing
1.5	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	New	Action	Existing
1.6	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator and FEMA's training center in Emmitsburg, Maryland.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1.6.5	Participate in the “Turn Around Don’t Drown” program by purchasing and installing signs in known flash flood bridge overpass locations.	Baldwin County, Daphne, Fairhope	Flooding	Existing	Project	Other
<b>1.7</b>	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	New	Action	Existing
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of “hurricane clips.”	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Tornadoes, Hurricanes, Severe Storms	New	Action	Existing
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Tornadoes, Severe Storms, Winter Storms/ffeezes, Hurricanes	Both	Action	HMA
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Silverhill, Spanish Fort, Summerdale	Wildfires	Both	Action	Existing
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Existing	Action	Existing
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Baldwin County, Bay Minette, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Silverhill, Spanish Fort, Summerdale	Tornadoes, Hurricanes, Severe Storms	New	Project	HMA
<b>1.8</b>	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
1.8.2	Establish ordinances to help mitigate fire hazards related to fuel buildup due to recent hurricanes, by raising tree canopies close to homes, thinning forests near urban areas, and removing trees that are too close to homes.	Baldwin County, Daphne, Fairhope, Orange Beach	Wildfires	Both	Action	Existing

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1.8.3	Establish ordinance for the planting of new urban forests or replacement of hurricane damaged urban forests using hurricane resistant tree species to mitigate wind and erosion problems, help beautify and promote healthy urban environments and reduce heating, cooling and storm runoff costs.	Baldwin County, Daphne, Fairhope, Foley, Orange Beach	Hurricanes, Wildfires	Both	Action	Existing
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Action	Existing
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Action	Existing
1.9.3	Establish urban forestry program to help mitigate storm water runoff common in areas with large impervious surfaces.	Baldwin County, Gulf Shores, Fairhope, Foley, Summerdale	Flooding	Both	Action	Existing
<b>1.10</b>	<b><u>Dam Safety Management.</u> Establish a comprehensive dam safety program.</b>					
1.10.1	Support legislation to establish a State dam safety program.	None	Dam/Levee Failure	Both	Action	Existing
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	Flooding, Tornadoes, Hurricanes, Severe Storms and Earthquakes	Existing	Action	HMA



Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1.12.2	Conduct wildfire vulnerability assessments, including the vulnerability of critical facilities and number of residential properties in these risk areas, and prepare a comprehensive inventory to identify high and moderate wildfire risk areas.	Baldwin County, Bay Minette, Fairhope, Foley, Orange Beach, Perdido Beach	Wildfire	Both	Project	HMA
2	<b>Goal for Property Protection: Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
2.1	<b>Building Relocation. Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Project	HMA
2.2	<b>Acquisition. Acquire flood prone buildings and properties and establish permanent open space.</b>					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Project	HMA
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Project	HMA
2.3	<b>Building Elevation. Elevate buildings in hazardous flood areas to safeguard against damages.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Project	HMA
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Project	HMA

Goal, Objectives and Mitigation Measures	Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source	
<b>2.4 <u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>						
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Project	HMA
<b>2.5 <u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>						
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding, Tornadoes, Hurricanes, Severe Storms and Earthquakes	Existing	Project	HMA
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding, Tornadoes, Hurricanes, Severe Storms and Earthquakes	Existing	Action	Existing
<b>2.6 <u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>						
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	All	Existing	Action	Existing
<b>2.7 <u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>						
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Severe storms	Existing	Project	TBD
2.7.2	Conduct ongoing tree trimming programs along power lines.	Baldwin County, Bay Minette, Fairhope	Severe storms	Existing	Action	TBD
<b>2.8 <u>Back Up Power:</u> Assure uninterrupted power supplies during emergency events.</b>						

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Hurricanes, Tornadoes, Severe Storms	Existing	Project	HMA
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.1	<b>Map Information.</b> Increase public access to Flood Insurance Rate Map (FIRM) information.					
3.1.1	Publicize the availability of FIRM information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.	Baldwin County, Fairhope, Orange Beach, Perdido Beach	All	Both	Action	Existing
3.2	<b>Outreach Projects.</b> Conduct regular public events to inform the public of hazards and mitigation measures.					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Baldwin County, Bay Minette, Daphne, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Silverhill, Spanish Fort, Summerdale	All	Existing	Action	Existing
3.2.3	Promote disaster resilience within the business community through workshops, educational materials and planning guides, intended to assist business owners in recovering from a disaster event in a timely manner.	Baldwin County, Fairhope, Foley, Gulf Shores, Orange Beach	All	Both	Action	Existing
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Silverhill, Spanish Fort	All	Both	Action	Existing
3.3	<b>Real Estate Disclosure.</b> Encourage real estate agents to disclose flood plain location for property listings.					
3.3.1	Arrange with the Multiple Listing Service (MLS) to require floodplain location disclosure as a condition for each real estate listing.	Fairhope, Orange Beach	Flooding	Existing	Action	Existing

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Baldwin County, Bay Minette, Daphne, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Silverhill, Spanish Fort	Flooding	Existing	Action	Existing
3.4	<b>Library.</b> Use local library resources to educate the public on hazard risks and mitigation alternatives.					
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	Baldwin County, Fairhope, Foley, Gulf Shores, Magnolia Springs, Orange Beach, Robertsdale, Summerdale	All	Both	Action	Existing
3.5	<b>Education Programs.</b> Use schools and other community education resources to conduct programs on topics related to hazard risks and mitigation measures.					
3.5.1	Distribute hazard mitigation brochures to students through area schools.	Baldwin County, Fairhope, Foley, Gulf Shores, Orange Beach, Summerdale	All	Both	Action	Existing
3.6	<b>Community Hazard Mitigation Plan Distribution.</b> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
3.7	<b>Technical Assistance.</b> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
3.8	<b>Mass Media Relations.</b> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
3.9	<b>Weather Radios.</b> Improve public access to weather alerts.					

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
3.9.1	Promote the use of weather radios in households and businesses.	Baldwin County, Bay Minette, Fairhope, Foley, Gulf Shores, Orange Beach, Perdido Beach, Summerdale	All	Both	Action	Existing
3.9.2	Require the installation of weather radios in all public buildings and places of public assembly.	Baldwin County, Bay Minette, Gulf Shores, Fairhope, Perdido Beach	All	Both	Action	Existing
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
<b>3.10</b>	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.1	Establish an ALERT flood warning system at strategic locations in the county, including at a minimum, sensors that provide real-time access to stream flow, stream stage, and precipitation data.	Baldwin County, Fairhope, Perdido Beach	Flooding	Both	Project	HMA
3.10.2	Ensure that the ALERT warning system links data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas.	Baldwin County, Fairhope, Perdido Beach	Flooding	Both	Project	HMA
3.10.3	Evaluate the feasibility of a shared tri-county ALERT system covering Baldwin, Escambia, and Mobile counties.	Baldwin County, Bay Minette, Fairhope, Perdido Beach, Summerdale	Flooding	Both	Project	HMA
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Baldwin County, Bay Minette, Fairhope, Loxley, Magnolia Springs, Orange Beach, Summerdale	All	Both	Project	HMA
3.10.5	Upgrade critical communications infrastructure.	Baldwin County, Fairhope, Foley, Magnolia Springs, Orange Beach, Robertsdale, Summerdale	All	Both	Project	HMA
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.1</b>	<b><u>Open Space Easements and Acquisitions.</u> Acquire easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands to assure permanent protection of these natural resources.</b>					

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
4.1.1	Increase open space acquisitions through the FEMA HMA Grant Programs and other flood plain acquisition efforts.	Baldwin County, Bay Minette, Fairhope, Loxley, Orange Beach	Flooding	Existing	Project	HMA
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Other
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Existing	Action	Existing
<b>4.3</b>	<b><u>Urban Forestry Programs.</u> Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.</b>					
4.3.1	Utilize technical assistance available from the Alabama Cooperative Extension System with Best Management Practices (BMP).	Baldwin County, Fairhope, Foley, Orange Beach	Flooding, Hurricanes, Wildfire	Existing	Action	Existing
4.3.2	Increase overall green spaces in cities by planting hurricane resistant trees with site and location taken into consideration.	Baldwin County, Fairhope, Foley, Orange Beach, Robertsdale, Summerdale	Flooding, Hurricanes, Wildfire	Both	Action	Existing
4.3.3	Develop an urban forestry management plan to ensure a progressive urban forestry program aimed at increasing forestry canopy, increased safety and planting hurricane resistant tree species.	Baldwin County, Fairhope, Foley, Orange Beach	Flooding, Hurricanes, Wildfire	Both	Action	Existing
<b>4.4</b>	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	Baldwin County, Daphne, Fairhope, Foley, Gulf Shores, Orange Beach, Perdido Beach, Robertsdale	Flooding, Hurricanes	Existing	Action	

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
4.4.2	Develop a coastal renourishment program.	Baldwin County, Daphne, Elberta, Fairhope, Gulf Shores, Orange Beach, Perdido Beach	Flooding, Hurricanes	Existing	Action	Other
4.5	<b><u>Water Resources Conservation Programs.</u> Protect water quantity and quality through water conservation programs to mitigate the effects of droughts and assure uninterrupted potable water supplies.</b>					
4.5.1	Enforce water use restrictions during periods of drought to conserve existing water supplies.	Baldwin County, Daphne, Fairhope, Orange Beach	Droughts/heat waves, wildfires	Both	Action	Existing
5	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
5.1	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
5.2	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Project	HMA
5.3	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Hurricanes, Tornadoes, Severe Storms	New	Project	HMA
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	Baldwin County, Bay Minette, Daphne, Fairhope, Foley, Orange Beach, Perdido Beach, Summerdale	Tornadoes, Hurricanes, Severe Storms	Existing	Project	HMA

Goal, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	Baldwin County, Bay Minette, Fairhope, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	Tornadoes, Hurricanes, Severe Storms	Both	Project	HMA



## Chapter 7 – Plan Maintenance Process

- 7.1 Federal Requirements for the Plan Maintenance Process
- 7.2 Summary of Plan Updates
- 7.3 Monitoring, Evaluating and Updating the Mitigation Plan
- 7.4 Incorporation of the Mitigation Plan into Other Planning Mechanisms
- 7.5 Continuing Public Participation in the Plan Maintenance Process

### 7.1 Federal Requirements for the Plan Maintenance Process

This Chapter of the Plan addresses the Plan Maintenance Process requirements of 44 CFR Sec. 201.6 (c) (4), as follows:

Sec. 201.6 (c) *Plan content*. The plan shall include the following:

(4) A *plan maintenance process* that includes:

- (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
- (ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.
- (iii) Discussion on how the community will continue public participation in the plan maintenance process.

### 7.2 Summary of Plan Updates

Table 7-1 summarizes changes made to the plan as a result of the 2010 plan update:

**Table 7-1. Summary of Plan Updates**

Section		Change
7.3	Monitoring, Evaluating, and Updating the Mitigation Plan	More active monitoring and streamlined plan amendment process; revised guidance for annual evaluation of plan status; refined and updated process.
7.4	Incorporation of the Mitigation Plan into Other Planning Mechanisms	Five-year compilation and review of all local planning mechanisms.
7.5	Continuing Public Participation in the Plan Maintenance Process	New public participation opportunities to be continuously monitored and annually evaluated.

## **7.3 Monitoring, Evaluating, and Updating the Mitigation Plan**

### **7.3.1 Ongoing Monitoring of the Plan**

The Hazard Mitigation Planning Committee's (HMPC) ongoing review process throughout the year should continually monitor the current status of the mitigation measures scheduled for implementation. Ongoing status reports of each jurisdiction's progress will be reviewed by the EMA Director and representatives from the HMPC and should include the following information:

- Actions that have been undertaken to implement the scheduled mitigation measure, such as, obtaining funding, permits, approvals or other resources to begin implementation.
- Mitigation measures that have been completed, including public involvement activities.
- Revisions to the priority, timeline, responsibility, or funding source of a measure and cause for such revisions or additional information or analysis that has been developed that would modify the mitigation measure assignment as initially adopted in the plan.
- Measures that a jurisdiction no longer intends to implement and justification for cancellation.

The ongoing review process may require adjustments to the selection of mitigation measures, priorities, timelines, lead responsibilities, and funding sources scheduled in the "Community Action Programs." In the event modifications to the plan are warranted as a result of the annual review or other conditions, the HMPC will oversee and approve all amendments to the plan by majority vote of a quorum of HMPC members. Conditions that might warrant amendments to this plan would include, but not be limited to, special opportunities for funding and response to a natural or man-made disaster. A copy of the plan amendments will be submitted by the Baldwin County EMA to all jurisdictions in a timely manner and filed with the Alabama EMA.

### **7.3.2 Evaluating the Plan**

Within sixty days following a significant disaster or an emergency event having a substantial impact on a portion of or the entire Baldwin County area or any of its jurisdictions, the HMPC will conduct or oversee an analysis of the event to evaluate the responsiveness of the Mitigation Strategy to the event and the effects on the contents of the Risk Assessment. The Risk Assessment should evaluate the direct and indirect damages, response and recovery costs (economic impacts) and the location, type, and extents of the damages. The findings of the assessment should determine any new mitigation initiatives that should be incorporated into this plan to avoid similar losses from future hazard events. The results of the assessment will be provided to those affected jurisdictions for review. These results also provide useful information when

considering new mitigation initiatives as an amendment to the existing plan or during the next five-year plan update period.

The HMPC will oversee an annual evaluation of progress towards implementation of the Mitigation Strategy. Any discussions and reports by the HMPC should be documented. When the plan is next revised, the evaluation findings can clearly justify and explain any revisions. In its annual review, the HMPC should discuss the following topics to determine the effectiveness of the implementation actions and the need for revisions to the Mitigation Strategy:

- Are there any new potential hazards that have developed and were not addressed in the plan?
- Have any disasters occurred and are not included in plan?
- Are there additional mitigation ideas that need to be incorporated into the plan?
- What projects or other measures have been initiated, completed, deferred or deleted?
- Are there any changes in local capabilities to carry out mitigation measures?
- Have funding levels to support mitigation actions either increased or decreased?

The HMPC may create subcommittees to oversee and evaluate plan implementation. This will be done at the Committee's discretion.

### **7.3.3 Plan Update Process**

Any of the following situations may require a review and update of the plan:

- Requirement for a five-year update.
- Change in federal requirements for review and update of the plan.
- Significant natural or man-made hazard event(s) before the expiration of the five-year plan update.

As stated above in Section 7.3.2, the HMPC will convene within 60 days of a significant disaster to discuss the potential need for any amendments to the plan. If there are no significant disasters which trigger an update, the current Federal guidelines require a five-year update.

The Baldwin County EMA will release or publish a notice to the public that an update is being initiated and provide information on meeting schedules, how and where to get information on the plan, how to provide comments on the plan, and opportunities for other public involvement activities. The EMA will then convene the HMPC and, with the assistance of EMA staff or a consultant, as deemed necessary, carry out the steps necessary to update the plan.

The initial steps for the five-year update to this plan should begin nine to twelve months before the current FEMA approval expiration, which takes into consideration the 90 day review process by the Alabama EMA and FEMA. Additional time for planning grants may require up to an additional year added to the start date. Once the Hazard Mitigation Planning Committee has been organized to oversee the update, the following steps will take place in order to facilitate the process:

- Step 1. Review of the most recent FEMA local mitigation planning requirements and guidance.
- Step 2. Evaluation of the existing planning process and recommendations for improvements.
- Step 3. Examination and revision of the risk assessment, including hazard identification, profiles, vulnerabilities, and impacts on development trends, to ensure accuracy and up-to-date information.
- Step 4. Update of mitigation strategies, goals and action items, in large part based on the annual plan implementation evaluation input.
- Step 5. Evaluation of existing plan maintenance procedures and recommendations for improvements.
- Step 6. Comply with all applicable Federal regulations and directives.

Ninety days prior to the anniversary date, a final draft of the revised plan will be submitted to the Alabama EMA for review and comments and then to FEMA for conditional approval. Once FEMA Region IV has issued a conditional approval, the updated plan will be adopted by all participating jurisdictions.

#### **7.4 Incorporation of the Mitigation Plan into Other Planning Mechanisms**

This plan supplements the most recent edition of the Baldwin County Emergency Operations Plan, which is administered through the Baldwin County Emergency Management Agency. Further, each governmental entity will be responsible for implementation of their individual Community Mitigation Action Programs based on priorities, funding availability, capabilities, and other considerations described in Chapter 6 – “Mitigation Strategy.” Because the 2010 Baldwin County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan, the mechanism for implementation of the various mitigation measures through existing programs may vary by jurisdiction. Each jurisdiction’s unique needs and capacities for implementation are reflected in its respective mitigation action program.

The Hazard Mitigation Planning Committee recognizes the importance of fully integrating hazard mitigation planning and implementation into existing local plans, regulatory tools, and related programs. This plan is intended to influence each jurisdiction’s planning decisions concerning land use, development, public facilities, and

infrastructure. Any updates, revisions, or amendments to the Baldwin County Emergency Operations Plan, local comprehensive plans, capital improvement budgets or plans, zoning ordinances and maps, subdivision regulations, building and technical codes, and related development controls should be consistent with the goals, objectives, and mitigation measures adopted in this plan. Each jurisdiction's commitment to this consistency is reflected in its respective mitigation action program. As part of the subsequent five-year update process, all local planning mechanisms should again be reviewed for effectiveness, and recommendations for new integration opportunities should be carefully considered. This type of evaluation was performed in the 2010 update and should follow in the next update cycle.

Multi-hazard mitigation planning should not only be integrated with local planning tools but into existing public information activities, as well as household emergency preparedness. Ongoing public education programs should stress the importance of managing and mitigating hazard risks. Public information handouts and brochures for emergency preparedness should emphasize hazard mitigation options, where appropriate.

Of particular importance to incorporating hazard mitigation planning into other planning programs, is the Baldwin County EMA's commitment to full integration of multi-hazard mitigation planning into its comprehensive emergency operations planning program and associated public emergency management activities, to the furthest possible extent.

## **7.5 Continuing Public Participation in the Plan Maintenance Process**

A critical part of maintaining an effective and relevant multi-hazard mitigation plan is ongoing public review and comment. Consequently, the Hazard Mitigation Planning Committee is dedicated to direct involvement of its citizens in providing feedback and comments on the plan throughout the five-year implementation cycle and interim reviews.

To this end, copies of this 2010 Baldwin County Multi-Hazard Mitigation Plan will be maintained in the offices of the Baldwin County EMA and the principal offices of all of the jurisdictions that participated in the planning process. After adoption, a public information notice will inform the public that the plan may be viewed at these offices or on the Web. The Baldwin County EMA website at [Baldwin.hazardmitigationplan.com](http://Baldwin.hazardmitigationplan.com) contains a link to download an on-line copy of the plan. Public comments can be received by the Baldwin County EMA by telephone, mail, or e-mail.

Public meetings will be held when significant modifications to the plan are required or when otherwise deemed necessary by the Hazard Mitigation Planning Committee. The public will be able to express their concerns, ideas, and opinions at the meetings. At a minimum, public hearings will be held during the annual and five-year

plan updates and to present the final plan and amendments to the plan to the public before adoption. Public opinion surveys are conducted during the community meetings and public involvement activities required for the five-year update and may be periodically administered by the Baldwin County EMA.

Extensive public involvement activities initiated by the 2010 planning process are well documented in Appendix H - "Community Involvement Documentation." Many of these activities will continue throughout the five-year implementation cycle and be evaluated for effectiveness at least annually by the Hazard Mitigation Planning Committee. Moreover, the public outreach goal of this plan and the associated objectives and mitigation measures commit each locality to implement a range of public education and awareness opportunities. The constant monitoring of these programmed mitigation actions assures ongoing public participation throughout the plan maintenance process.

2010

# BALDWIN COUNTY, ALABAMA

## MULTI-HAZARD MITIGATION PLAN

### COMMUNITY ACTION PROGRAMS

**CITY OF BAY MINETTE**  
**CITY OF DAPHNE**  
**TOWN OF ELBERTA**  
**CITY OF FAIRHOPE**  
**CITY OF FOLEY**  
**CITY OF GULF SHORES**  
**TOWN OF LOXLEY**  
**TOWN OF MAGNOLIA SPRINGS**  
**CITY OF ORANGE BEACH**  
**TOWN OF PERDIDO BEACH**  
**CITY OF ROBERTSDALE**  
**TOWN OF SILVERHILL**  
**CITY OF SPANISH FORT**  
**TOWN OF SUMMERDALE**  
**BALDWIN COUNTY**

Prepared under the direction of the  
Baldwin County Hazard Mitigation Planning Committee

With the support of the Baldwin County EMA by:



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## Community Action Programs

- 1.0 Development of Community Action Programs
- 2.0 Community Action Programs for Each Jurisdiction

### 1.0 Development of Community Action Programs

The Community Action Programs presented here supplement Table 6-3 “2010-2015 Baldwin County Multi-Jurisdictional Mitigation Action Program” found in Volume I, Chapter 6, Section 6.6. These Community Action Programs break out the same mitigation goals, objectives, and mitigation measures by community and add the priority, timeframe for completion, and lead responsibility for implementation. Section 6.3.1 “Description of How the Goals were Developed” describes the process leading to selection of mitigation measures by each jurisdiction.

In developing a list of mitigation measures for potential loss reduction, the planning team, in cooperation with the Hazard Mitigation Planning Committee (HMPC), consulted these four primary sources:

- 1) The 2004 Baldwin County, Alabama, Natural Hazard Mitigation Plan,
- 2) The 2007 Alabama State Hazard Mitigation Plan,
- 3) Appendix C – “Plan Implementation Status,” and
- 4) Appendix F – “Identification and Analysis of Mitigation Measures.”

First, the planning team examined the implementation status of the mitigation measures adopted by each community in the original 2004 plan. Next, the planning team reviewed the alternative measures with the HMPC (refer to Appendix F”. The HMPC then selected among alternatives to develop the overall county mitigation strategy and action program for each jurisdiction. The team also added the action items that are listed in the 2007 Alabama State Hazard Mitigation Plan mitigation strategy, in which the State assigned implementation responsibility to local jurisdictions. Finally, mitigation actions selected by the HMPC through various exercises were added to the list.

The results of the planning steps described above are each jurisdiction’s Community Action Program. Each participating jurisdiction was provided an opportunity to choose the measures for completion during the 2010-2015 five year plan update cycle. Jurisdictional representative were asked to rank the priority of each measure and choose a timeframe for completion. Measures could be ranked as short-range (less than two years), mid-range (two to five years), or long-range (five or more years). In addition, many measures that were ongoing activities carried over from the previous plans have been included. The party responsible for implementation of each measure has been identified, and estimated costs and funding source have been noted, if available. Most cost estimates will be provided at the time the measure is planned for implementation, or, if eligible for FEMA HMA funding, at the time of application.

## 2.0 Community Action Programs for Each Jurisdiction

The section presents the Community Action Programs adopted by each of the participating jurisdictions. The following key explains the components of the Community Action Programs:

### Key

- Action programs are in alphabetical order by jurisdiction.
- The action programs assign lead responsibility for implementation to a specific department or agency or position within the organization.
- Priorities are *High*, *Medium*, and *Low*.
- Timelines are *Short-Range* (less than 2 years), *Mid-Range* (2-5years), *Long-Range* (more than 5 years) or *Ongoing*.
- General cost estimates and potential funding sources are identified. FEMA Hazard Mitigation Assistance funds, where noted as a possible funding source, are subject to final eligibility determination, including, among other eligibility criteria, a positive benefit/cost analysis, and the availability of funds.
- *TBD* is "To Be Determined."

**2.1 Baldwin County Community Action Program**

<b>Baldwin County Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
<b>1</b>	<b><u>Goal for Prevention.</u> Manage the development of land and buildings to minimize risks of loss due to natural hazards.</b>					
<b>1.1</b>	<b><u>Comprehensive Plans and Smart Growth.</u> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.</b>					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Baldwin County EMA/ Planning Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Baldwin County EMA/ Planning Department	Medium	Mid-Range	Local Funds	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Baldwin County EMA/ Planning Department	Medium	Mid-Range	Local Funds	TBD
1.2	<b>Geographic Information Systems (GIS). Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.</b>					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA/ GIS Department/ Engineering Department	Medium	Mid-Range	HMA	TBD
1.2.2	Integrate FEMA HAZUS-MH applications for hazard loss estimates within local GIS program. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.	Baldwin County EMA/ GIS Department/ Engineering Department	High	Long-Range	HMA	TBD
1.2.3	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Baldwin County EMA/ GIS Department/ Engineering Department	Medium	Mid-Range	Local Funds	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each	Baldwin County EMA	Medium	Long-Range	Local	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	event. Enter and maintain these historical records in GIS.				Funds	
<b>1.3</b>	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					
1.3.1	Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.	Planning Department/ Building Department	Medium	Mid-Range	Grant Funds	TBD
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Mobile County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Planning Department/ Building Department	Medium	Mid-Range/Ongoing	HMA Grant	TBD
<b>1.4</b>	<b><u>Zoning.</u> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.4.1	Consider large lot size restriction on flood prone areas designated on Flood Insurance Rate Maps.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.4.4	Enact local ordinance that require community storm shelters within sizeable mobile home parks and subdivisions.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.5	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning Department/ Building Department/ Engineering Department	Medium	Mid-Range	Local Funds	TBD
1.6	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	County Commission	Medium	Mid-Range	Local Funds	TBD



Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Local Floodplain Manager	Medium	Mid-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
1.6.5	Participate in the "Turn Around, Don't Drown" program by purchasing and installing signs in known flash flood overpass locations.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
1.7	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Official	Medium	Mid-Range	Local Funds	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Official	Medium	Mid-Range	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Official	Medium	Mid-Range	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Official	Medium	Mid-Range	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Planning Department/ Building Department	Medium	Mid-Range	FEMA HMA Grant	TBD
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning Department	Medium	Mid-Range	Local Funds	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.8.2	Establish ordinances to help mitigate fire hazards related to fuel buildup due to recent hurricanes, by raising tree canopies close to homes, thinning forests near urban areas, and removing trees that are too close to homes.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.8.3	Establish ordinance for the planting of new urban forests or replacement of hurricane damaged urban forests using hurricane resistant tree species to mitigate wind and erosion problems, help beautify and promote healthy urban environments and reduce heating, cooling and storm runoff costs.	Planning Department	Medium	Mid-Range	Local Funds	TBD
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Planning Department	Medium	Ongoing	Existing	TBD
1.9.3	Establish urban forestry program to help mitigate storm water runoff common in areas with large impervious surfaces.	Planning Department	Medium	Ongoing	Existing	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Local Floodplain Manager	High	Short-Range	Local Funds	TBD

<b>Baldwin County Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Planning Department	Medium	Long-Range	FEMA HMA Grant	TBD
1.12.2	Conduct wildfire vulnerability assessments, including the vulnerability of critical facilities and number of residential properties in these risk areas, and prepare a comprehensive inventory to identify high and moderate wildfire risk areas.	Fire Department	Medium	Mid-Range	Local Funds	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Official	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Building Official	High	Short-Range	FEMA HMA Grant	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Building Official	High	Short-Range	TBD	TBD
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damage.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of building in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
2.6	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.7	<b><u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	Medium	Mid-Range	Local Funds	TBD
2.7.2	Conduct ongoing tree trimming programs along power lines.	Building Official	Medium	Mid-Range	Local Funds	TBD
2.8	<b><u>Back Up Power.</u> Assure uninterrupted power supplies during emergency events.</b>					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Baldwin County EMA	Medium	Mid-Range	FEMA HMA Grant	TBD
3	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					
3.2	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning Department	High	Short-Range	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning Department	High	Short-Range	Local Funds	TBD
3.2.3	Promote disaster resilience within the business community through workshops, educational materials and planning guides, intended to assist business owners in recovering from a disaster event in a timely manner.	Baldwin County EMA	High	Short-Range	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Local Floodplain Manger	High	Short-Range	Local Funds	TBD
<b>3.3</b>	<b><u>Real Estate Disclosure.</u></b> Encourage real estate agents to disclose flood plain location for property listings.					
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain disclosure when a property is for sale.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
<b>3.4</b>	<b><u>Library.</u></b> Use local library resources to educate the public on hazard risks and mitigation alternatives.					

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	Local Floodplain Manger	Medium	Long-Range	Local Funds	TBD
<b>3.5</b>	<b><u>Education Programs.</u></b> Use schools and other community education resources to conduct programs related to hazard risks and mitigation measures.					
3.5.1	Distribute hazard mitigation brochures to students through area schools.	Baldwin County EMA	High	Short-Range	Local Funds	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u></b> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
<b>3.7</b>	<b><u>Technical Assistance.</u></b> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manger	Medium	Short-Range	Local Funds	TBD
<b>3.8</b>	<b><u>Mass Media Relations.</u></b> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Local Government	Medium	Ongoing	Local Funds	TBD
<b>3.9</b>	<b><u>Weather Radios.</u></b> Improve public access to weather alerts.					



Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.9.1	Promote the use of weather radios in households and businesses.	Local Government	High	Short-Range	Existing	TBD
3.9.2	Require the installation of weather radios in all public buildings and places of public assembly.	Local Government	High	Short-Range	Existing	TBD
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Local Government	High	Short-Range	Existing	TBD
<b>3.10</b>	<b><u>Disaster Warning.</u></b> Improve public warning systems.					
3.10.1	Establish an ALERT flood warning system at strategic locations in the county, including at a minimum, sensors that provide real-time access to stream flow, stream stage, and precipitation data.	Local Government	High	Mid-Range	FEMA HMA Grant	TBD
3.10.2	Ensure that the ALERT warning system links data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas.	Local Government	High	Mid-Range	FEMA HMA Grant	TBD
3.10.3	Evaluate the feasibility of a shared tri-county ALERT system covering Baldwin, Escambia, and Mobile counties.	Local Government	High	Mid-Range	FEMA HMA Grant	TBD
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Local Government	High	Long-Range	FEMA HMA Grant	TBD
3.10.5	Upgrade critical communications infrastructure.	Local Government	High	Long-Range	TBD	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4	<b>Goal for Natural Resources Protection.</b> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.					
4.1	<b>Open Space Easements and Acquisitions.</b> Acquire easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands to assure permanent protection of these natural resources.					
4.1.1	Increase open space acquisitions through the FEMA HMA Grant Programs and other flood plain acquisition efforts.	County Commission	Medium	Mid-Range	FEMA HMA Grant	TBD
4.2	<b>River/Stream Corridor Restoration and Protection.</b> Restore and protect river and stream corridors within areas.					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning Department	Medium	Mid-Range	Local Funds	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning Department	Medium	Long-Range	Local Funds	TBD
4.3	<b>Urban Forestry Programs.</b> Maintain a healthy forest that can help mitigate damaging impacts of flooding, erosion, landslides and wildfires within urban areas.					
4.3.1	Utilize technical assistance available from the Alabama Cooperative Extension System with Best Management Practices (BMP).	County Commission	Medium	Mid-Range	Local Funds	TBD
4.3.2	Increase overall green spaces in cities by planting hurricane resistant trees with site and location taken into consideration.	County Commission	Medium	Mid-Range	Local Funds	TBD

Baldwin County Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.3.3	Develop an urban forestry management plan to ensure a progressive urban forestry program aimed at increasing forestry canopy, increased safety and planting hurricane resistant tree species.	County Commission	Medium	Mid-Range	Local Funds	TBD
<b>4.4</b>	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	County Commission	Medium	Mid-Range	Local Funds	TBD
4.4.2	Develop a coastal renourishment program.	County Commission	Medium	Mid-Range	Local Funds	TBD
<b>4.5</b>	<b><u>Water Resources Conservation Programs.</u> Protect water quantity and quality through water conservation programs to mitigate the effects of droughts and assure uninterrupted potable water supplies.</b>					
4.5.1	Enforce water use restrictions during periods of drought to conserve existing water supplies.	County Commission	High	Long-Range	Local Funds	TBD
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Official	Medium	Long-Range	Local Funds	TBD
<b>5.2</b>	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					

<b>Baldwin County Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>5.3</b>	<b><u>Community Shelters and Safe Rooms: Provide shelters from natural hazards for the safety of community residents.</u></b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD

## 2.2 Bay Minette Community Action Program

Bay Minette Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention. Manage the development of land and buildings to minimize risks of loss due to natural hazards.</b>					
1.1	<b>Comprehensive Plans and Smart Growth. Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.</b>					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning Department	High	Short- Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Planning Department	High	Short- Range	Local Funds	TBD

Bay Minette Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	GIS Department/ Engineering Department/ Baldwin County EMA	High	Mid-Range	HMA	TBD
1.3	<b>Planning Studies.</b> Conduct special studies, as needed, to identify hazard risks and mitigation measures.					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Baldwin County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Planning Department	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD

Bay Minette Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.4	<b>Zoning.</b> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.					
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.5	<b>Open Space Preservation.</b> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning Department	Medium	Long-Range	Local Funds	TBD
1.6	<b>Flood Plain Management Regulations.</b> Effectively administer and enforce local floodplain management regulations.					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and City Council	High	Short-Range	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	City Floodplain Manager	High	Short-Range	Local Funds	TBD

<b>Bay Minette Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	City Floodplain Manager	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	City Floodplain Manager	High	Short-Range	Local Funds	TBD
<b>1.7</b>	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	City Building Official	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	City Building Official	High	Ongoing	Local Funds	TBD



Bay Minette Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	City Building Official	High	Ongoing	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	City Fire Department	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	City Building Official	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	City Building Official	High	Ongoing	FEMA HMA Grant	TBD
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	City Building Official	Medium	Long-Range	Local Funds	TBD
1.9	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	City Building Official	Medium	Ongoing	Existing	TBD

<b>Bay Minette Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	City Building Official	Medium	Ongoing	Existing	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	City Floodplain Manager	Medium	Long-Range	Local Funds	TBD
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	City Building Official	Medium	Long-Range	FEMA HMA Grant	TBD
1.12.2	Conduct wildfire vulnerability assessments, including the vulnerability of critical facilities and number of residential properties in these risk areas, and prepare a comprehensive inventory to identify high and moderate wildfire risk areas.	Fire Department	Medium	Mid-Range	Local Funds	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					

<b>Bay Minette Community Action Program</b>						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u></b> Acquire flood prone buildings and properties and establish permanent open space					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.3</b>	<b><u>Building Elevation.</u></b> Elevate buildings in hazardous flood areas to safeguard against damages					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u></b> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.					

Bay Minette Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
2.5	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	City Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.6	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	City Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.7	<b><u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Planning Department	High	Ongoing	Local Funds	TBD
2.7.2	Conduct tree trimming programs along power lines.	Planning Department	Medium	Mid-Range	TBD	TBD

Bay Minette Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.2	<b>Outreach Projects.</b> Conduct regular public events to inform the public of hazards and mitigation measures.					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning Department	Medium	Ongoing	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning Department	Medium	Mid-Range	Local Funds	TBD
3.6	<b>Community Hazard Mitigation Plan Distribution.</b> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
3.7	<b>Technical Assistance.</b> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	City Floodplain Manger	High	Ongoing	Local Funds	TBD
3.8	<b>Mass Media Relations.</b> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.					

<b>Bay Minette Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and City Council / Baldwin County EMA	Medium	Ongoing	Local Funds	TBD
<b>3.9</b>	<b><u>Weather Radios.</u></b> Improve public access to weather alerts.					
3.9.1	Promote the use of weather radios in households and businesses.	Mayor and City Council	High	Short-Range	Existing	TBD
3.9.2	Require the installation of weather radios in all public buildings and places of public assembly.	Mayor and City Council	High	Short-Range	Existing	TBD
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and City Council	High	Short-Range	Existing	TBD
<b>3.10</b>	<b><u>Disaster Warning.</u></b> Improve public warning systems.					
3.10.5	Upgrade critical communications infrastructure.	Local Government	High	Long-Range	TBD	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u></b> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.					
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u></b> Restore and protect river and stream corridors within areas.					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	City Building Official	Medium	Mid-Range	Local Funds	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	City Building Official	Medium	Long-Range	Local Funds	TBD

Bay Minette Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
5	<b>Goal for Structural Projects.</b> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.					
5.1	<b>Drainage System Maintenance.</b> Improve maintenance programs for streams and drainage ways.					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Planning Department	Medium	Long-Range	Local Funds	TBD
5.2	<b>Reservoirs and Drainage System Improvements.</b> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Planning Department	Medium	Long-Range	Local Funds	TBD
5.3	<b>Community Shelters and Safe Rooms:</b> Provide shelters from natural hazards for the safety of community residents.					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	City Building Official	High	Short-Range	FEMA HMA Grant	TBD
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	City Building Official	High	Short-Range	FEMA HMA Grant	TBD
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	City Building Official	High	Short-Range	FEMA HMA Grant	TBD

**2.3 Daphne Community Action Program**

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention. Manage the development of land and buildings to minimize risks of loss due to natural hazards.</b>					
1.1	<b>Comprehensive Plans and Smart Growth. Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.</b>					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Community Development Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Mayor and City Council	Medium	Mid-Range	Local Funds	TBD



Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA	High	Short-Range	HMA	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.3	<b>Planning Studies.</b> Conduct special studies, as needed, to identify hazard risks and mitigation measures.					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Baldwin County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Community Development Department	Medium	Mid-Range	Local Funds	TBD

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3.4	Inventory and map existing fire hydrants throughout the jurisdiction, and identify areas in need of new fire hydrants.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Community Development Department	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD
<b>1.4</b>	<b>Zoning. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.1	Consider large lot size restrictions on flood prone areas designated on Flood Insurance Rate Maps.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.4.4	Enact local ordinance that requires community storm shelters within sizeable mobile home parks and subdivisions.	Community Development Department	Medium	Mid-Range	Local Funds	TBD

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.5	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Community Development Department	Medium	Long-Range	Local Funds	TBD
1.6	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and City Council	High	Short-Range	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	City Floodplain Manager	High	Short-Range	Local Funds	TBD
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	City Floodplain Manager	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	City Floodplain Manager	High	Short-Range	Local Funds	TBD

<b>Daphne Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.6.5	Participate in the "Turn Around Don't Drown" program by purchasing and installing signs in known flash flood bridge overpass locations.	City Floodplain Manager	High	Short-Range	Local Funds	TBD
<b>1.7</b>	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Inspection Department	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Inspection Department	High	Ongoing	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Community Development Department	High	Ongoing	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Inspection Department	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Inspection Department	High	Ongoing	Local Funds	TBD

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Community Development Department	Medium	Long-Range	Local Funds	TBD
1.8.2	Establish ordinances to help mitigate fire hazards related to fuel buildup due to recent hurricanes, by raising tree canopies close to homes, thinning forests near urban areas, and removing trees that are too close to homes.	Community Development Department	Medium	Long-Range	Local Funds	TBD
1.8.3	Establish ordinance for the planting of new urban forests or replacement of hurricane damaged urban forests using hurricane resistant tree species to mitigate wind and erosion problems, help beautify and promote healthy urban environments and reduce heating, cooling and storm runoff costs.	Community Development Department	Medium	Long-Range	Local Funds	TBD
1.9	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Community Development Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Community Development Department	Medium	Ongoing	Existing	TBD
1.11	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	City Floodplain Manager	Medium	Long-Range	Local Funds	TBD
1.12	<b>Critical Facilities Assessments.</b> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Community Development Department	Medium	Long-Range	FEMA HMA Grant	TBD
2	<b>Goal for Property Protection:</b> Protect structures and their occupants and contents from the damaging effects of natural hazards.					
2.1	<b>Building Relocation.</b> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Inspection Department	High	Short-Range	FEMA HMA Grant	TBD
2.2	<b>Acquisition.</b> Acquire flood prone buildings and properties and establish permanent open space.					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Building Inspection Department	High	Short-Range	FEMA HMA Grant	TBD

<b>Daphne Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
2.2.2	Utilize the recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Building Inspection Department	High	Short-Range	FEMA HMA Grant	TBD
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Building Inspection Department	High	Short-Range	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Building Inspection Department	High	Short-Range	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Inspection Department	High	Short-Range	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	City Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	City Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.6	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	City Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.7	<b><u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Inspection Department	High	Ongoing	Local Funds	TBD
2.8	<b><u>Back Up Power:</u> Assure uninterrupted power supplies during emergency events.</b>					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Community Development Department	Medium	Ongoing	FEMA HMA Grant	TBD
3	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					



Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.2	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Community Development Department	Medium	Ongoing	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Local Floodplain Manger	Medium	Ongoing	Local Funds	TBD
3.3	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Local Floodplain Manger	Medium	Long-Range	Local Funds	TBD
3.6	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
3.7	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manger	High	Ongoing	Local Funds	TBD
3.8	<b>Mass Media Relations.</b> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and City Council	Medium	Ongoing	Local Funds	TBD
3.9	<b>Weather Radios.</b> Improve public access to weather alerts.					
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and City Council	High	Short-Range	Existing	TBD
4	<b>Goal for Natural Resources Protection.</b> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.					
4.2	<b>River/Stream Corridor Restoration and Protection.</b> Restore and protect river and stream corridors within areas.					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Community Development Department	Medium	Long-Range	Local Funds	TBD
4.4	<b>Beach and Dune Protection/Renourishment.</b> Protect beaches and dunes from coastal and man-made erosion and renourish.					

Daphne Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.4.1	Restore and protect wetlands to enhance stormwater drainage.	Community Development Department	Medium	Long-Range	Local Funds	TBD
4.5	<b><u>Water Resources Conservation Programs.</u> Protect water quantity and quality through water conservation programs to mitigate the effects of droughts and assure uninterrupted potable water supplies.</b>					
4.5.1	Enforce water use restrictions during periods of drought to conserve existing water supplies.	Community Development Department	High	Short-Range	Local Funds	TBD
5	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
5.1	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Inspection Department	Medium	Long-Range	Local Funds	TBD
5.2	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Community Development Department	High	Short-Range	FEMA HMA Grant	TBD
5.3	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					

<b>Daphne Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Community Development Department	High	Short-Range	FEMA HMA Grant	TBD
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	Community Development Department	High	Short-Range	FEMA HMA Grant	TBD

**2.4 Elberta Community Action Program**

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3	<b>Planning Studies.</b> Conduct special studies, as needed, to identify hazard risks and mitigation measures.					

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3.1	Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Baldwin County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Planning Department	Medium	Mid-Range	TBD	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	High	Short-Range	Local Fund	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Public Works Department	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD
1.4	<b>Zoning. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning Department	Medium	Mid-Range	Local Funds	TBD

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning Department	Medium	Mid-Range	Local Funds	TBD
<b>1.5</b>	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning Department	Medium	Long-Range	Local Funds	TBD
<b>1.6</b>	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and Town Council	High	Short-Range	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Town Floodplain Manager	High	Short-Range	Local Funds	TBD
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Town Floodplain Manager	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active	Town Floodplain Manager	High	Short-Range	Local Funds	TBD

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	participation.					
1.7	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Official	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Official	High	Ongoing	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning Department	High	Ongoing	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Official	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Official	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and	Planning Department	High	Ongoing	FEMA HMA	TBD



Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	other public buildings where feasible.				Grant	
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning Department	Medium	Long-Range	Local Funds	TBD
1.9	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Planning Department	Medium	Ongoing	Existing	TBD
1.11	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Town Floodplain Manager	Medium	Long-Range	Local Funds	TBD
1.12	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate	Planning Department	Medium	Long-Range	FEMA HMA	TBD

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	damages from hazards.				Grant	
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages.</b>					

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non residential buildings, where feasible.	Town Floodplain Manager	Medium	Ongoing	FEMA HMA Funds	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.6	<b>Hazard Insurance Awareness.</b> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.7	<b>Critical Facilities Protection.</b> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	High	Ongoing	Local Funds	TBD
2.8	<b>Back Up Power:</b> Assure uninterrupted power supplies during emergency events.					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.2	<b>Outreach Projects.</b> Conduct regular public events to inform the public of hazards and mitigation measures.					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning Department	Medium	Ongoing	Local Funds	TBD
3.6	<b>Community Hazard Mitigation Plan Distribution.</b> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.					

Elberta Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
3.7	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manger	High	Ongoing	Local Funds	TBD
3.8	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and Town Council	Medium	Ongoing	Local Funds	TBD
3.9	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and Town Council	High	Short-Range	Existing	TBD
4	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
4.2	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning Department	Medium	Mid-Range	Local Funds	TBD

<b>Elberta Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning Department	Medium	Long-Range	Local Funds	TBD
<b>4.4</b>	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance stormwater drainage.	Planning Department	Medium	Long-Range	Local Funds	TBD
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Official	Medium	Long-Range	Local Funds	TBD
<b>5.2</b>	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Building Official	Medium	Long-Range	FEMA HMA Grant	TBD
<b>5.3</b>	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning Department	High	Short-Range	FEMA HMA Grant	TBD

## 2.5 Fairhope Community Action Program

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning Department	High	Ongoing	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning Department	High	Ongoing	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Planning Department	High	Ongoing	Local Funds	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.2	<b><u>Geographic Information Systems (GIS).</u> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.</b>					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	City Engineer/Baldwin County EMA	High	Short-Range	FEMA HMA Grant	\$35,000
1.2.2	Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.	City GIS Department/Engineer	High	Mid-Range	FEMA HMA Grant	\$25,000
1.2.3	Create GIS systems for inventorying and assessing urban forest for in order to identify current and potential hazards and develop a comprehensive plan for managing urban forest.	City GIS Department/Planning Department	High	Short-Range	Local Funds	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	City GIS Department/Planning Department	High	Ongoing	Local Funds	TBD
1.3	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					



Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3.1	Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.	City GIS Department/Planning Department/ City Engineer/ Local Floodplain Manager	High	Ongoing	Local Funds/ FEMA HMA Grant	TBD
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Mobile County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning Department	Low	Long-Range	TBD	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	City GIS Department/Planning Department/ City Engineer	Medium	Long-Range	FEMA HMA Grant	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	Medium	Ongoing	TBD	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Public Works Department	High	Ongoing	FEMA HMA Grant	TBD
1.4	<b>Zoning. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.1	Consider large lot size restrictions on flood prone areas designated on Flood Insurance Rate Maps.	Planning Department/ Local Floodplain Manager	High	Ongoing	Local Funds	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning Department/ Local Floodplain Manager	High	Ongoing	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning Department/ Local Floodplain Manager	High	Ongoing	Local Funds	TBD
1.4.4	Enact local ordinance that require community storm shelters within sizeable mobile home parks and subdivisions.	Planning Department/ Local Floodplain Manager	Low	Long-Range	Local Funds	TBD
1.5	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning Department	High	Ongoing	Local Funds	TBD
1.6	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator and FEMA's training center in Emmitsburg, Maryland.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Local Floodplain Manager	High	Ongoing	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Local Floodplain Manager	High	Ongoing	Local Funds	TBD
1.6.5	Participate in the "Turn Around Don't Drown" program by purchasing and installing signs in known flash flood bridge overpass locations.	Local Floodplain Manager	Medium	Mid-Range	TBD	TBD
1.7	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Official/ Local Floodplain Manager/ City Engineer	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Official/ City Engineer	High	Ongoing	Local Funds	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	City Engineer/ Planning Department	High	Ongoing	TBD	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Official	Medium	Mid-Range	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Official	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Building Official/ Planning Department/ Baldwin County EMA	Medium	Long-Range	FEMA HMA Grant	TBD
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning Department	High	Ongoing	TBD	TBD
1.8.2	Establish ordinances to help mitigate fire hazards related to fuel buildup due to recent hurricanes, by raising tree canopies close to homes, thinning forests near urban areas, and removing trees that are too close to homes.	City Council/ Planning Department	Low	Long-Range	TBD	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.8.3	Establish ordinance for the planting of new urban forests or replacement of hurricane damaged urban forests using hurricane resistant tree species to mitigate wind and erosion problems, help beautify and promote healthy urban environments and reduce heating, cooling and storm runoff costs.	City Council	Low	Long-Range	TBD	TBD
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning Department/ City Engineer	High	Ongoing	Local Funds	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Planning Department/ City Engineer	High	Ongoing	Local Funds	TBD
1.9.3	Establish urban forestry program to help mitigate storm water runoff common in areas with large impervious surfaces.	Planning Department	Low	Long-Range	Local Funds	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Maintain membership in the CRS Program; continue to upgrade rating.	Building Official	High	Ongoing	Local Funds	TBD
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Building Official/ Planning Department/ City Engineer	High	Long-Range	FEMA HMA Grant	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.12.2	Conduct wildfire vulnerability assessments, including the vulnerability of critical facilities and number of residential properties in these risk areas, and prepare a comprehensive inventory to identify high and moderate wildfire risk areas.	Planning Department/ Local Floodplain Manager	Medium	Long-Range	Local Funds	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Official/ Local Floodplain Manager	High	Ongoing	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Building Official/ Local Floodplain Manager	High	Ongoing	FEMA HMA Grant	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Building Official/ Local Floodplain Manager	High	Ongoing	FEMA HMA Grant	TBD
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages.</b>					

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Building Official/ Local Floodplain Manager	High	Ongoing	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Building Official	Medium	Long-Range	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Official/ Local Floodplain Manager	Medium	Long-Range	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Official/ City Engineer	High	Ongoing	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Building Official/ Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>2.6</b>	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Building Official/ Local Floodplain Manager	High	Ongoing	Local Funds	TBD
2.7	<b>Critical Facilities Protection.</b> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	Low	Long-Range	TBD	TBD
2.7.2	Conduct ongoing tree trimming programs along power lines.	Utility	High	Ongoing	Local Funds	TBD
2.8	<b>Back Up Power:</b> Assure uninterrupted power supplies during emergency events.					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Baldwin County EMA	High	Mid-Range	FEMA HMA Grant	TBD
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.1	<b>Map Information.</b> Increase public access to Flood Insurance Rate Map (FIRM) information.					
3.1.1	Publicize the availability of FIRM information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
3.2	<b>Outreach Projects.</b> Conduct regular public events to inform the public of hazards and mitigation measures.					



Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
3.2.3	Promote disaster resilience within the business community through workshops, educational materials and planning guides, intended to assist business owners in recovering from a disaster event in a timely manner.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
<b>3.3</b>	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.1	Arrange with the Multiple Listing Service (MLS) to require floodplain location disclosure as a condition for each real estate listing.	Local Floodplain Manager/ Baldwin County EMA	Low	Long-Range	Local Funds	TBD
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Local Floodplain Manager/ Baldwin County EMA	Medium	Long-Range	Local Funds	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.4	<b><u>Library.</u> Use local library resources to educate the public on hazard risks and mitigation alternatives.</b>					
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	Baldwin County EMA	Low	Long-Range	Local Funds	TBD
3.5	<b><u>Education Programs.</u> Use schools and other community education resources to conduct programs on topics related to hazard risks and mitigation measures.</b>					
3.5.1	Distribute hazard mitigation brochures to students through area schools.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
3.6	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
3.7	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manager/ Building Official	High	Ongoing	Local Funds	TBD
3.8	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Baldwin County EMA	High	Ongoing	Local Funds	TBD
<b>3.9</b>	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.1	Promote the use of weather radios in households and businesses.	Baldwin County EMA	Medium	Mid-Range	Local Funds	TBD
3.9.2	Require the installation of weather radios in all public buildings and places of public assembly.	Baldwin County EMA	Medium	Mid-Range	Local Funds	TBD
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Baldwin County EMA	Medium	Mid-Range	Local Funds	\$150,000
<b>3.10</b>	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.1	Establish an ALERT flood warning system at strategic locations in the county, including at a minimum, sensors that provide real-time access to stream flow, stream stage, and precipitation data.	Baldwin County EMA	High	Mid-Range	FEMA HMA Grant	TBD
3.10.2	Ensure that the ALERT warning system links data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas.	Baldwin County EMA	High	Mid-Range	FEMA HMA Grant	TBD
3.10.3	Evaluate the feasibility of a shared tri-county ALERT system covering Baldwin, Escambia, and Mobile counties.	Baldwin County EMA	High	Mid-Range	FEMA HMA Grant	TBD

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Baldwin County EMA	High	Mid-Range	FEMA HMA Grant	TBD
3.10.5	Upgrade critical communications infrastructure.	Baldwin County EMA	High	Mid-Range	FEMA HMA Grant	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.1</b>	<b><u>Open Space Easements and Acquisitions.</u> Acquire easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands to assure permanent protection of these natural resources.</b>					
4.1.1	Increase open space acquisitions through the FEMA HMA Grant Programs and other flood plain acquisition efforts.	Local Floodplain Manager/ Planning Department	Medium	Ongoing	FEMA HMA Grant	TBD
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Local Floodplain Manager/ Planning Department	High	Ongoing	Other	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Building Official	High	Ongoing	Local Funds	TBD
<b>4.3</b>	<b><u>Urban Forestry Programs.</u> Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.</b>					

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.3.1	Utilize technical assistance available from the Alabama Cooperative Extension System with Best Management Practices (BMP).	Planning Department	Medium	Ongoing	Local Funds	TBD
4.3.2	Increase overall green spaces in cities by planting hurricane resistant trees with site and location taken into consideration.	Planning Department	Medium	Ongoing	TBD	TBD
4.3.3	Develop an urban forestry management plan to ensure a progressive urban forestry program aimed at increasing forestry canopy, increased safety and planting hurricane resistant species.	Planning Department	Medium	Ongoing	TBD	TBD
<b>4.4</b>	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	Local Floodplain Manager/ Building Official	High	Short-Range	Local Funds	TBD
4.4.2	Develop a coastal renourishment program.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>4.5</b>	<b><u>Water Resources Conservation Programs.</u> Protect water quantity and quality through water conservation programs to mitigate the effects of droughts and assure uninterrupted potable water supplies.</b>					
4.5.1	Enforce water use restrictions during periods of drought to conserve existing water supplies.	Public Works	High	Ongoing	Local Funds	TBD
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					

Fairhope Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
5.1	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Public Works	High	Short-Range	Local Funds	TBD
5.2	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	City Engineer/ Public Works	High	Ongoing	FEMA HMA Grant	TBD
5.3	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Building Official/ Baldwin County EMA	Medium	Long-Range	Local Funds	TBD
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	Planning Department/ Baldwin County EMA	Medium	Long-Range	FEMA HMA Grant	TBD
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	Building Official/ City Council	Medium	Long-Range	FEMA HMA Grant	TBD

**2.6 Foley Community Action Program**

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Community Development Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Community Development Department	High	Short-Range	Local Funds	TBD

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Finance Department	High	Short-Range	Local Funds	TBD
1.2	<b><u>Geographic Information Systems (GIS).</u> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.</b>					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Community Development Department	High	Short-Range	HMA	TBD
1.2.2	Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.	Community Development Department	High	Short-Range	Local Funds	TBD
1.2.3	Create GIS systems for inventorying and assessing urban forest for in order to identify current and potential hazards and develop a comprehensive plan for managing urban forest.	Community Development Department/ Fire Department	Medium	Mid-Range	Local Funds	TBD
1.3	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					



<b>Foley Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>		<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	City Engineer	High	Short-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	High	Short-Range	Local Funds	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	City Engineer	High	Short-Range	FEMA HMA Grant	TBD
<b>1.4</b>	<b><u>Zoning.</u> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.1	Consider large lot size restrictions on flood prone areas designated on Flood Insurance Rate Maps.	Community Development Department	High	Short-Range	Local Funds	TBD
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Community Development Department	High	Short-Range	Local Funds	TBD
<b>1.5</b>	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Community Development Department	High	Short-Range	Existing	TBD
<b>1.6</b>	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator and FEMA's training center in Emmitsburg, Maryland.	Community Development Department	Medium	Mid-Range	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Community Development Department	High	Short-Term	Local Funds	TBD
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Community Development Department	High	Short-Term	Local Funds	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Community Development Department	High	Short-Range	Local Funds	TBD
<b>1.7</b>	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Community Development Department	High	Short-Range	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Community Development Department	High	Short-Range	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Fire Department	High	Short-Range	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Community Development Department	High	Short-Range	Local Funds	TBD
<b>1.8</b>	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce stormwater runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Community Development Department	High	Short-Range	Local Funds	TBD
1.8.3	Establish ordinance for the planting of new urban forests or replacement of hurricane damaged urban forests using hurricane resistant tree species to mitigate wind and erosion problems, help beautify and promote healthy urban environments and reduce heating, cooling and storm runoff costs.	Parks Department	High	Short-Range	Local Funds	TBD

<b>Foley Community Action Program</b>						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	City Council	High	Ongoing	Local Funds	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	City Council	High	Ongoing	Local Funds	TBD
1.9.3	Establish urban forestry program to help mitigate storm water runoff common in areas with large impervious surfaces.	Parks Department	High	Short-Range	Local Funds	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Community Development Department	Medium	Long-Range	Local Funds	TBD
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.2	Conduct wildfire vulnerability assessments, including the vulnerability of critical facilities and number of residential properties in these risk areas, and prepare a comprehensive inventory to identify high and moderate wildfire risk areas.	Fire Department/ Environmental Services	High	Short-Range	FEMA HMA Grant	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
2.1	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Community Development Department	Medium	Long-Range	FEMA HMA Funds	TBD
2.2	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Community Development Department	Medium	Long-Range	FEMA HMA Funds	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Community Development Department	Medium	Long-Range	FEMA HMA Funds	TBD
2.3	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Community Development Department	Medium	Long-Range	FEMA HMA Funds	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Community Development Department	Medium	Long-Range	FEMA HMA Funds	TBD
2.4	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Community Development Department	Medium	Long-Range	FEMA HMA Funds	TBD
2.5	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Community Development Department	High	Short-Range	FEMA HMA Funds	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Community Development Department	High	Short-Range	Local Funds	TBD
2.6	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Community Development Department	High	Short-Range	Local Funds	TBD
2.7	<b><u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	City Council	High	Short-Range	Local Funds	TBD
2.8	<b><u>Back Up Power:</u> Assure uninterrupted power supplies during emergency events.</b>					

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	City Council	High	Short-Range	FEMA HMA Grant	TBD
<b>3</b>	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					
<b>3.2</b>	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Community Development Department	High	Short-Range	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Fire Department	High	Short-Range	Local Funds	TBD
3.2.3	Promote disaster resilience within the business community through workshops, educational materials and planning guides, intended to assist business owners in recovering from a disaster event in a timely manner.	Chamber of Commerce	Low	Long-Range	Existing	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Community Development Department	High	Short-Range	Local Funds	TBD
<b>3.4</b>	<b><u>Library.</u> Use local library resources to educate the public on hazard risks and mitigation alternatives.</b>					

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	City Library	High	Short-Range	Local Funds	TBD
<b>3.5</b>	<b><u>Education Programs.</u> Use schools and other community education resources to conduct programs on topics related to hazard risks and mitigation measures.</b>					
3.5.1	Distribute hazard mitigation brochures to students through area schools.	Fire Department	High	Short-Range	Local Funds	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
<b>3.7</b>	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Building Official	High	Short-Range	Local Funds	TBD
<b>3.8</b>	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Public Information	High	Short-Range	TBD	TBD
<b>3.9</b>	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					



Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
3.9.1	Promote the use of weather radios in households and businesses.	Public Safety	High	Short-Range	Local Funds	TBD
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	City Council	Medium	Mid-Range	Existing	TBD
<b>3.10</b>	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.5	Upgrade critical communications infrastructure.	Public Safety	High	Short-Range	FEMA HMA Grant	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.3</b>	<b><u>Urban Forestry Programs.</u> Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.</b>					
4.3.1	Utilize technical assistance available from the Alabama Cooperative Extension System with Best Management Practices (BMP).	Parks Department	High	Short-Range	Local Funds	TBD
4.3.2	Increase overall green spaces in cities by planting hurricane resistant trees with site and location taken into consideration.	Parks Department	High	Short-Range	Local Funds	TBD
4.3.3	Develop and urban forestry management plans to ensure a progressive urban forestry program aimed at increasing forestry canopy, increased safety and planting hurricane resistant tree species.	Parks Department	High	Short-Range	Local Funds	TBD

Foley Community Action Program						
#	Goal, Objectives and Mitigation Measures		Priority	Timeline	Funding Source	Estimated Cost
4.4	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	Wolf Bay Watershed	Medium	Mid-Range	TBD	TBD
5	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
5.1	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	City Council	Medium	Long-Range	Existing	TBD
5.2	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	City Council	High	Short-Range	FEMA HMA Grant	TBD
5.3	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	City Council	High	Short-Range	FEMA HMA Grant	TBD

**2.7 Gulf Shores Community Action Program**

Gulf Shores Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b><u>Goal for Prevention.</u> Manage the development of land and buildings to minimize risks of loss due to natural hazards.</b>					
1.1	<b><u>Comprehensive Plans and Smart Growth.</u> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.</b>					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning and Zoning Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Mayor and City Council	Medium	Mid-Range	Local Funds	TBD

<b>Gulf Shores Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
<b>1.2</b>	<b><u>Geographic Information Systems (GIS).</u> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.</b>					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA	High	Short-Range	HMA	TBD
1.2.2	Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
<b>1.3</b>	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					
1.3.1	Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.	Planning and Zoning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Baldwin County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD

Gulf Shores Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Planning and Zoning Department	High	Short-Range	Local Fund	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Planning and Zoning Department	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD
1.4	<b>Zoning. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.5	<b>Open Space Preservation. Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD

<b>Gulf Shores Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
<b>1.6</b>	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and City Council	High	Short-Range	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Building Department	High	Short-Range	Local Funds	TBD
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Building Department	High	Short-Range	Local Funds	TBD
<b>1.7</b>	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Department	High	Ongoing	Local Funds	TBD

<b>Gulf Shores Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Department	High	Ongoing	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning and Zoning Department	High	Ongoing	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Department	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Department	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Planning and Zoning Department	High	Ongoing	FEMA HMA Grant	TBD
<b>1.8</b>	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					

Gulf Shores Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
1.9.3	Establish urban forestry program to help mitigate storm water runoff common in areas with large impervious surfaces.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Planning and Zoning Department	Medium	Long-Range	FEMA HMA Grant	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					



<b>Gulf Shores Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
<b>2.2</b>	<b>Acquisition.</b> Acquire flood prone buildings and properties and establish permanent open space.					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>2.3</b>	<b>Building Elevation.</b> Elevate buildings in hazardous flood areas to safeguard against damages.					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD

Gulf Shores Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.4	<b>Flood Proofing.</b> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Department	Medium	Ongoing	Local Funds	TBD
2.5	<b>Building Retrofits.</b> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Department	Medium	Ongoing	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Building Department	Medium	Ongoing	Local Funds	TBD
2.6	<b>Hazard Insurance Awareness.</b> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Building Department	Medium	Ongoing	Local Funds	TBD
2.7	<b>Critical Facilities Protection.</b> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.					
2.7.1	Install lightning and/or surge protection on existing critical	Building Department	High	Ongoing	Local	TBD

Gulf Shores Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	facilities.				Funds	
<b>2.8</b>	<b><u>Back Up Power:</u> Assure uninterrupted power supplies during emergency events.</b>					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Building Department	High	Ongoing	FEMA HMA Funds	TBD
<b>3</b>	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					
<b>3.2</b>	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning and Zoning Department	Medium	Ongoing	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
3.2.3	Promote disaster resilience within the business community through workshops, educational materials and planning guides, intended to assist business owners in recovering from a disaster event in a timely manner.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other	Building Department	Medium	Ongoing	Local Funds	TBD

Gulf Shores Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	natural hazard related questions.					
<b>3.3</b>	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>3.4</b>	<b><u>Library.</u> Use local library resources to educate the public on hazard risks and mitigation alternatives.</b>					
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	City Library	High	Short-Range	Local Funds	TBD
<b>3.5</b>	<b><u>Education Programs.</u> Use schools and other community education resources to conduct programs on topics related to hazard risks and mitigation measures.</b>					
3.5.1	Distribute hazard mitigation brochures to students through area schools.	Fire Department	High	Short-Range	Local Funds	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
<b>3.7</b>	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					

<b>Gulf Shores Community Action Program</b>						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Building Department	High	Ongoing	Local Funds	TBD
<b>3.8</b>	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and City Council	Medium	Ongoing	Local Funds	TBD
<b>3.9</b>	<b><u>Weather Radios.</u> Improve public access to weather alerts</b>					
3.9.1	Promote the use of weather radios in households and businesses.	Mayor and City Council	High	Short-Range	Existing	TBD
3.9.2	Require the installation of weather radios in all public buildings and places of public assembly.	Mayor and City Council	High	Short-Range	Existing	TBD
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and City Council	High	Short-Range	Existing	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.1</b>	<b><u>Open Space Easements and Acquisitions.</u> Acquire easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands to assure permanent protection of these natural resources.</b>					
4.1.1	Increase open space acquisitions through the FEMA HMA Grant Programs and other flood plain acquisition efforts.	Planning and Zoning Department	Medium	Mid-Range	FEMA HMA Grant	TBD

<b>Gulf Shores Community Action Program</b>						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.2	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
4.3	<b><u>Urban Forestry Programs.</u> Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.</b>					
4.3.1	Utilize technical assistance available from the Alabama Cooperative Extension System with Best Management Practices (BMP).	Planning Department	Medium	Ongoing	Local Funds	TBD
4.3.2	Increase overall green spaces in cities by planting hurricane resistant trees with site and location taken into consideration.	Planning Department	Medium	Ongoing	TBD	TBD
4.3.3	Develop an urban forestry management plan to ensure a progressive urban forestry program aimed at increasing forestry canopy, increased safety and planting hurricane resistant species.	Planning Department	Medium	Ongoing	TBD	TBD
4.4	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	Local Floodplain Manager/ Building Official	High	Short-Range	Local Funds	TBD
4.4.2	Develop a coastal renourishment program.	Local Floodplain	Medium	Ongoing	Local	TBD

Gulf Shores Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
		Manager			Funds	
5	<b>Goal for Structural Projects.</b> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.					
5.1	<b>Drainage System Maintenance.</b> Improve maintenance programs for streams and drainage ways.					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Department	Medium	Long-Range	Local Funds	TBD
5.2	<b>Reservoirs and Drainage System Improvements.</b> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Planning and Zoning Department	High	Short-Range	FEMA HMA Grant	TBD
5.3	<b>Community Shelters and Safe Rooms:</b> Provide shelters from natural hazards for the safety of community residents.					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning and Zoning Department	High	Short-Range	FEMA HMA Grant	TBD

**2.8 Loxley Community Action Program**

Loxley Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning and Zoning Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Mayor and City Council	Medium	Mid-Range	Local Funds	TBD
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					



<b>Loxley Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA	High	Short-Range	HMA	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
<b>1.3</b>	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Baldwin County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	High	Short-Range	Local Fund	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Public Works Department	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD

Loxley Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.4	<b>Zoning.</b> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.					
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.5	<b>Open Space Preservation.</b> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
1.6	<b>Flood Plain Management Regulations.</b> Effectively administer and enforce local floodplain management regulations.					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and City Council	High	Short-Range	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Building Department	High	Short-Range	Local Funds	TBD

<b>Loxley Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Building Department	High	Short-Range	Local Funds	TBD
<b>1.7</b>	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Department	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Department	High	Ongoing	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning and Zoning Department	High	Ongoing	Local Funds	TBD

<b>Loxley Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Department	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Department	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Planning and Zoning Department	High	Ongoing	FEMA HMA Grant	TBD
<b>1.8</b>	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Building Department	Medium	Long-Range	Local Funds	TBD

Loxley Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.12	<b>Critical Facilities Assessments.</b> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Planning and Zoning Department	Medium	Long-Range	FEMA HMA Grant	TBD
2	<b>Goal for Property Protection: Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
2.1	<b>Building Relocation.</b> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
2.2	<b>Acquisition.</b> Acquire flood prone buildings and properties and establish permanent open space.					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD

<b>Loxley Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Department	Medium	Ongoing	Local Funds	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Department	Medium	Ongoing	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Building Department	Medium	Ongoing	Local Funds	TBD

Loxley Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.6	<b>Hazard Insurance Awareness.</b> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Building Department	Medium	Ongoing	Local Funds	TBD
2.7	<b>Critical Facilities Protection.</b> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Department	High	Ongoing	Local Funds	TBD
2.8	<b>Back Up Power:</b> Assure uninterrupted power supplies during emergency events.					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Building Department	High	Ongoing	FEMA HMA Funds	TBD
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.2	<b>Outreach Projects.</b> Conduct regular public events to inform the public of hazards and mitigation measures.					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning and Zoning Department	Medium	Ongoing	Local Funds	TBD

<b>Loxley Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Building Department	Medium	Ongoing	Local Funds	TBD
<b>3.3</b>	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
<b>3.7</b>	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Building Department	High	Ongoing	Local Funds	TBD
<b>3.8</b>	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					



<b>Loxley Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and City Council	Medium	Ongoing	Local Funds	TBD
<b>3.9</b>	<b><u>Weather Radios.</u> Improve public access to weather alerts</b>					
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and City Council	High	Short-Range	Existing	TBD
<b>3.10</b>	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Mayor and City Council	High	Short-Range	FEMA HMA Grant	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.1</b>	<b><u>Open Space Easements and Acquisitions.</u> Acquire easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands to assure permanent protection of these natural resources.</b>					
4.1.1	Increase open space acquisitions through the FEMA HMA Grant Programs and other flood plain acquisition efforts.	Mayor and City Council	High	Short-Range	FEMA HMA Grant	TBD
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD

Loxley Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
<b>5</b>	<b>Goal for Structural Projects. Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b>Drainage System Maintenance. Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>5.2</b>	<b>Reservoirs and Drainage System Improvements. Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Building Department	Medium	Long-Range	FEMA HMA Grant	TBD
<b>5.3</b>	<b>Community Shelters and Safe Rooms: Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning and Zoning Department	High	Short-Range	FEMA HMA Grant	TBD

**2.9 Magnolia Springs Community Action Program**

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning and Zoning Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Mayor and Town Council	Medium	Mid-Range	Local Funds	TBD

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA	High	Short-Range	HMA	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.3	<b>Planning Studies.</b> Conduct special studies, as needed, to identify hazard risks and mitigation measures.					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Baldwin County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.3.2	Identify existing culturally or socially significant structures and critical facilities within participating jurisdictions that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning and Zoning Department	High	Short-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	High	Short-Range	Local Funds	TBD

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Public Works	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD
1.4	<b>Zoning. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.5	<b>Open Space Preservation. Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
1.6	<b>Flood Plain Management Regulations. Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and Town Council	High	Short-Range	Local Funds	TBD

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Building Department	High	Short-Range	Local Funds	TBD
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Building Department	High	Short-Range	Local Funds	TBD
1.7	<b>Building and Technical Codes. Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Department	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Department	High	Ongoing	Local Funds	TBD

<b>Magnolia Springs Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning and Zoning Department	High	Ongoing	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Department	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Department	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Planning and Zoning Department	High	Ongoing	FEMA HMA Grant	TBD
<b>1.8</b>	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require	Planning and Zoning	Medium	Ongoing	Existing	TBD

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	proper storm water infrastructure design and construction.	Department				
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Planning and Zoning Department	Medium	Long-Range	FEMA HMA Grant	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					



Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Town Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Town Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.3</b>	<b><u>Building Elevation.</u></b> Elevate buildings in hazardous flood areas to safeguard against damages.					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Town Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Town Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u></b> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Town Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u></b> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes,					

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	<b>severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Department	Medium	Ongoing	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Building Department	Medium	Ongoing	Local Funds	TBD
2.6	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Building Department	Medium	Ongoing	Local Funds	TBD
2.7	<b><u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Department	High	Ongoing	Local Funds	TBD
2.8	<b><u>Back Up Power:</u> Assure uninterrupted power supplies during emergency events.</b>					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Building Department	High	Ongoing	FEMA HMA Grant	TBD
3	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					

<b>Magnolia Springs Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
<b>3.2</b>	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning and Zoning Department	Medium	Ongoing	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Building Department	Medium	Ongoing	Local Funds	TBD
<b>3.3</b>	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>3.4</b>	<b><u>Library.</u> Use local library resources to educate the public on hazard risks and mitigation alternatives.</b>					
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	City Library	Medium	Ongoing	Local Funds	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations,</b>					

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	<b>businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
<b>3.7</b>	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Building Department	High	Ongoing	Local Funds	TBD
<b>3.8</b>	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and Town Council	Medium	Ongoing	Local Funds	TBD
<b>3.9</b>	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and Town Council	High	Short-Range	FEMA HMA Grant	TBD
<b>3.10</b>	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Mayor and Town Council	High	Short-Range	FEMA HMA Grant	TBD

Magnolia Springs Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.10.5	Upgrade critical communications infrastructure.	Mayor and Town Council	High	Short-Range	FEMA HMA Grant	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>5.2</b>	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Building Department	High	Ongoing	FEMA HMA Grant	TBD

<b>Magnolia Springs Community Action Program</b>						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
5.3	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning and Zoning Department	High	Short-Range	FEMA HMA Grant	TBD

## 2.10 Orange Beach Community Action Program

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b><u>Goal for Prevention.</u> Manage the development of land and buildings to minimize risks of loss due to natural hazards.</b>					
1.1	<b><u>Comprehensive Plans and Smart Growth.</u> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.</b>					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning Department	Medium	Mid-Range	Existing	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning Department	Low	Mid-Range	Existing	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Planning Department	Low	Mid-Range	Existing	TBD

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA	Low	Mid-Range	HMA	TBD
1.2.2	Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.	City GIS Department	Low	Long-Range	FEMA HMA Grant	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	City GIS Department	Medium	Mid-Range	Existing	TBD
1.3	<b>Planning Studies.</b> Conduct special studies, as needed, to identify hazard risks and mitigation measures.					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Mobile County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Building Official	Low	Long-Range	TBD	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Building Official	Low	Long-Range	TBD	TBD



Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	City Fire Department	Medium	Ongoing	TBD	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	City Engineer	Medium	Ongoing	FEMA HMA Grant	TBD
<b>1.4</b>	<b><u>Zoning.</u> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Local Government	Medium	Short-Range	Existing	TBD
<b>1.5</b>	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning Department	Medium	Ongoing	Existing	TBD
<b>1.6</b>	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator and FEMA's training center in Emmitsburg, Maryland.	Local Floodplain Manager	High	Ongoing	Existing	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Local Floodplain Manager	High	Ongoing	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Local Floodplain Manager	High	Ongoing	Existing	TBD
1.7	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Official	High	Ongoing	Existing	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Official	High	Ongoing	Existing	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	City Engineer	Medium	Ongoing	TBD	TBD

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Fire Chief	Medium	Ongoing	Existing	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Code Enforcement	Medium	Ongoing	Existing	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Building Official	Low	Ongoing	FEMA HMA Grant	TBD
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning Department	Low	Mid-Range	TBD	TBD
1.8.2	Establish ordinances to help mitigate fire hazards related to fuel buildup due to recent hurricanes, by raising tree canopies close to homes, thinning forests near urban areas, and removing trees that are too close to homes.	City Forester	Low	Low	TBD	TBD
1.8.3	Establish ordinance for the planting of new urban forests or replacement of hurricane damaged urban forests using hurricane resistant tree species to mitigate wind and erosion problems, help beautify and promote healthy urban environments and reduce heating, cooling and storm runoff costs.	City Forester	Low	Low	TBD	TBD
1.9	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	City Engineer	High	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	City Engineer	High	Ongoing	Existing	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Maintain membership in the CRS Program; continue to upgrade rating.	Local Floodplain Manager	High	Ongoing	Existing	TBD
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Building Official	Medium	Ongoing	FEMA HMA Grant	TBD
1.12.2	Conduct wildfire vulnerability assessments, including the vulnerability of critical facilities and number of residential properties in these risk areas, and prepare a comprehensive inventory to identify high and moderate wildfire risk areas.	Building Official	Medium	Ongoing	TBD	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.1.1	Pursue FEMA grant funds to relocate buildings out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Local Floodplain Manager	Medium	Long-Range	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Local Floodplain Manager	Medium	Long-Range	FEMA HMA Grant	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Local Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Local Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Local Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Local Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
2.5	<b>Building Retrofits. Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Local Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Local Floodplain Manager	Medium	Short-Range	Existing	TBD
2.6	<b>Hazard Insurance Awareness. Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD
2.7	<b>Critical Facilities Protection. Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	Low	Long-Range	TBD	TBD
2.8	<b>Back Up Power: Assure uninterrupted power supplies during emergency events.</b>					

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Public Works	Low	Long-Range	FEMA HMA Grant	TBD
<b>3</b>	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					
<b>3.1</b>	<b><u>Map Information.</u> Increase public access to Flood Insurance Rate Map (FIRM) information.</b>					
3.1.1	Publicize the availability of FIRM information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD
<b>3.2</b>	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD
3.2.3	Promote disaster resilience within the business community through workshops, educational materials and planning guides, intended to assist business owners in recovering from a disaster event in a timely manner.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD
<b>3.3</b>	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.1	Arrange with the Multiple Listing Service (MLS) to require floodplain location disclosure as a condition for each real estate listing.	Local Floodplain Manager	Medium	Ongoing	TBD	TBD
<b>3.4</b>	<b><u>Library.</u> Use local library resources to educate the public on hazard risks and mitigation alternatives.</b>					
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD
<b>3.5</b>	<b><u>Education Programs.</u> Use schools and other community education resources to conduct programs on topics related to hazard risks and mitigation measures.</b>					
3.5.1	Distribute hazard mitigation brochures to students through area schools.	Local Floodplain Manager	Medium	Ongoing	Existing	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	Medium	Mid-Range	Existing	TBD
<b>3.7</b>	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					



Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manager	High	Ongoing	Existing	TBD
<b>3.8</b>	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Baldwin County EMA	High	Short-Term	Existing	TBD
<b>3.9</b>	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.1	Promote the use of weather radios in households and businesses.	Baldwin County EMA	High	Short-Range	Existing	TBD
<b>3.10</b>	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Baldwin County EMA	Low	Long-Range	FEMA HMA Grant	TBD
3.10.5	Upgrade critical communications infrastructure.	Baldwin County EMA	Low	Long-Range	FEMA HMA Grant	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.1</b>	<b><u>Open Space Easements and Acquisitions.</u> Acquire easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands to assure permanent protection of these natural resources.</b>					

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.1.1	Increase open space acquisitions through the FEMA HMA Grant Programs and other flood plain acquisition efforts.	Local Government	Medium	Ongoing	FEMA HMA Grant	TBD
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Building Official	High	Ongoing	Other	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	City Engineer	Medium	Ongoing	Existing	TBD
<b>4.3</b>	<b><u>Urban Forestry Programs.</u> Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.</b>					
4.3.1	Utilize technical assistance available from the Alabama Cooperative Extension System with Best Management Practices (BMP).	City Forester	Medium	Ongoing	Existing	TBD
4.3.2	Create an integrated wildfire mitigation plan for Baldwin County.	City Forester	Low	Ongoing	TBD	TBD
4.3.3	Develop an urban forestry management plan to ensure a progressive urban forestry program aimed at increasing forestry canopy, increased safety and planting hurricane resistant species.	City Forester	Low	Ongoing	TBD	TBD
<b>4.4</b>	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	City Engineer	Medium	Ongoing	TBD	TBD

Orange Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.4.2	Develop a coastal renourishment program.	Coastal Resource Manager	High	Short-Range	Other	TBD
<b>5</b>	<b>Goal for Structural Projects. Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b>Drainage System Maintenance. Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	City Engineer	High	Short-Range	Existing	TBD
<b>5.2</b>	<b>Reservoirs and Drainage System Improvements. Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	City Engineer	High	Ongoing	FEMA HMA Grant	TBD
<b>5.3</b>	<b>Community Shelters and Safe Rooms: Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	City Engineer	Medium	Ongoing	Local Funds	TBD
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	Baldwin County EMA	Medium	Mid-Range	FEMA HMA Grant	TBD

**2.11 Perdido Beach Community Action Programs**

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Mayor and Town Council	Medium	Long-Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Mayor and Town Council	Medium	Long-Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Mayor and Town Council	Medium	Long-Range	Local Funds	TBD

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within participating jurisdictions that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Mayor and Town Council	Medium	Long-Range	Local Funds	TBD
1.5	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Mayor and Town Council	Medium	Long-Range	Local Funds	TBD
1.6	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and Town Council	Medium	Long-Range	Local Funds	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Official	Medium	Mid-Range	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Official	Medium	Mid-Range	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning Department/ Building Department	Medium	Mid-Range	Local Funds	TBD
1.9	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Planning Department	Medium	Ongoing	Existing	TBD
1.11	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
<b>1.12</b>	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Mayor and Town Council	Medium	Ongoing	FEMA HMA Grant	TBD
1.12.2	Conduct wildfire vulnerability assessments, including the vulnerability of critical facilities and number of residential properties in these risk areas, and prepare a comprehensive inventory to identify high and moderate wildfire risk areas.	Fire Department	Low	Long-Range	Local Funds	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Mayor and Town Council	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Mayor and Town Council	Medium	Ongoing	FEMA HMA Grant	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Mayor and Town Council	Medium	Ongoing	TBD	TBD
<b>2.3</b>	<b><u>Building Elevation.</u></b> Elevate buildings in hazardous flood areas to safeguard against damage.					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Mayor and Town Council	Medium	Ongoing	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Mayor and Town Council	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u></b> Encourage flood proofing of building in hazardous flood areas to safeguard against damages.					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Mayor and Town Council	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u></b> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.					



Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Mayor and Town Council	Medium	Ongoing	FEMA HMA Grant	TBD
2.6	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.7	<b><u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	Medium	Mid-Range	Local Funds	TBD
2.8	<b><u>Back Up Power.</u> Assure uninterrupted power supplies during emergency events.</b>					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Baldwin County EMA	Medium	Mid-Range	FEMA HMA Grant	TBD
3	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					
3.1	<b><u>Map Information.</u> Increase public access to Flood Insurance Rate Map (FIRM) information.</b>					
3.1.1	Publicize the availability of FIRM information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.	Mayor and Town Council	High	Short-Range	Local Funds	TBD

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.2	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Mayor and Town Council	High	Short-Range	Local Funds	TBD
3.6	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
3.7	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manger	Medium	Short-Range	Local Funds	TBD
3.8	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and Town Council	High	Ongoing	Existing	TBD
3.9	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.1	Promote the use of weather radios in households and businesses.	Mayor and Town Council	High	Short-Range	Existing	TBD

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.9.2	Require the installation of weather radios in all public buildings and places of public assembly.	Mayor and Town Council	High	Short-Range	Existing	TBD
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and Town Council	High	Short-Range	Existing	TBD
<b>3.10</b>	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.1	Establish an ALERT flood warning system at strategic locations in the county, including at a minimum, sensors that provide real-time access to stream flow, stream stage, and precipitation data.	Mayor and Town Council	High	Mid-Range	FEMA HMA Grant	TBD
3.10.2	Ensure that the ALERT warning system links data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas.	Mayor and Town Council	High	Mid-Range	FEMA HMA Grant	TBD
3.10.3	Evaluate the feasibility of a shared tri-county ALERT system covering Baldwin, Escambia, and Mobile counties.	Mayor and Town Council	High	Mid-Range	FEMA HMA Grant	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning Department	Medium	Mid-Range	Local Funds	TBD

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning Department	Medium	Long-Range	Local Funds	TBD
<b>4.4</b>	<b><u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.</b>					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	Planning Department	Medium	Mid-Range	Local Funds	TBD
4.4.2	Develop a coastal renourishment program.	Planning Department	Medium	Mid-Range	Local Funds	TBD
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Official	Medium	Long-Range	Local Funds	TBD
<b>5.2</b>	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>5.3</b>	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD

Perdido Beach Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD

## 2.12 Robertsdale Community Action Program

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Municipal Planning Commission	Medium	Short- Range	Local Funds	\$36,000
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Municipal Planning Commission	Medium	Mid-Range	Local Funds	TBD
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of	County GIS Department	High	Mid-Range	HMA	TBD

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	critical facilities within all jurisdictions.					
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	City Engineer	Medium	Long-Range	\$10,000	TBD
<b>1.3</b>	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					
1.3.1	Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.	City Engineer	Medium	Mid-Range	\$50,000	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	City Engineer	Medium	Mid-Range	\$20,000	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	Medium	Mid-Range	Local Funds	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Public Works	Medium	Mid-Range/Ongoing	\$120,000	TBD
<b>1.4</b>	<b><u>Zoning.</u> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.4.1	Consider large lot size restriction on flood prone areas designated on Flood Insurance Rate Maps.	Municipal Planning Commission	Low	Long-Range	Local Funds	TBD
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Municipal Planning Commission	Low	Long-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	City Engineer	Medium	Mid-Range	Local Funds	TBD
1.5	<b><u>Open Space Preservation.</u> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Municipal Planning Commission	Medium	Long-Range	Local Funds	TBD
1.6	<b><u>Flood Plain Management Regulations.</u> Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	City Engineer	Medium	Short-Range	Local Funds	\$1,500
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	City Engineer	Medium	Short-Range	Local Funds	TBD



Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Municipal Planning Commission	Low	Long-Range	Local Funds	TBD
1.7	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Official	Medium	Mid-Range	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Official	High	Mid-Range	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Municipal Planning Commission	Low	Long-Range	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Official	Medium	Short-Range	Local Funds	TBD
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Municipal Planning Commission	Medium	Long-Range	Local Funds	TBD
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Municipal Planning Commission	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Municipal Planning Commission	Medium	Ongoing	Existing	TBD
<b>1.11</b>	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Municipal Planning Commission	Medium	Ongoing	Existing	TBD
<b>2</b>	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
<b>2.1</b>	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Official	Medium	Ongoing	FEMA HMA Grant	TBD
<b>2.2</b>	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.3</b>	<b><u>Building Elevation.</u></b> Elevate buildings in hazardous flood areas to safeguard against damage.					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u></b> Encourage flood proofing of building in hazardous flood areas to safeguard against damages.					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u></b> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	City Engineer	Medium	Mid-Range	Local Funds	TBD
2.7	<b>Critical Facilities Protection.</b> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	Medium	Mid-Range	Local Funds	TBD
2.8	<b>Back Up Power.</b> Assure uninterrupted power supplies during emergency events.					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Baldwin County EMA	Medium	Mid-Range	FEMA HMA Grant	TBD
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.4	<b>Library.</b> Use local library resources to educate the public on hazard risks and mitigation alternatives.					
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	City Engineer	Low	Long-Range	Local Funds	TBD
3.6	<b>Community Hazard Mitigation Plan Distribution.</b> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.7	<b>Technical Assistance.</b> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manger	Medium	Short-Range	Local Funds	TBD
3.8	<b>Mass Media Relations.</b> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Public Works Director	High	Mid-Range	Local Funds	TBD
3.10	<b>Disaster Warning.</b> Improve public warning systems.					
3.10.5	Upgrade critical communications infrastructure.	Public Works Director	Medium	Short-Range	FEMA HMA Grant	TBD
4	<b>Goal for Natural Resources Protection.</b> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.					
4.2	<b>River/Stream Corridor Restoration and Protection.</b> Restore and protect river and stream corridors within areas.					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	City Engineer	Low	Mid-Range	Local Funds	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	City Engineer	Medium	Mid-Range	Local Funds	TBD

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.3	<b>Urban Forestry Programs.</b> Maintain a healthy forest that can help mitigate damaging impacts of flooding, erosion, landslides and wildfires within urban areas.					
4.3.2	Increase overall green spaces in cities by planting hurricane resistant trees with site and location taken into consideration.	Public Works Director	Low	Mid-Range	Local Funds	TBD
4.4	<b>Beach and Dune Protection/Renourishment.</b> Protect beaches and dunes from coastal and man-made erosion and renourish.					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	Public Works Director	High	Mid-Range	FEMA HMA Grant	
5	<b>Goal for Structural Projects.</b> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.					
5.1	<b>Drainage System Maintenance.</b> Improve maintenance programs for streams and drainage ways.					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	City Engineer	High	Long-Range	Local Funds	\$10,000
5.2	<b>Reservoirs and Drainage System Improvements.</b> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Public Works Director	High	Mid-Range	FEMA HMA Grant	\$500,000
5.3	<b>Community Shelters and Safe Rooms:</b> Provide shelters from natural hazards for the safety of community residents.					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public	Public Works Director	High	Mid-Range	FEMA HMA	\$1,500,000

Robertsdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	buildings such as schools and multi-purpose community centers.				Grant	

**2.13 Silverhill Community Action Program**

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning and Zoning Department	High	Short- Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	Mayor and Town Council	Medium	Mid-Range	Local Funds	TBD
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					



Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA	High	Short-Range	HMA	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
<b>1.3</b>	<b><u>Planning Studies.</u> Conduct special studies, as needed, to identify hazard risks and mitigation measures.</b>					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Baldwin County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	High	Short-Range	Local Fund	TBD
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Public Works Department	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.4	<b>Zoning.</b> Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.					
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.5	<b>Open Space Preservation.</b> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
1.6	<b>Flood Plain Management Regulations.</b> Effectively administer and enforce local floodplain management regulations.					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	Mayor and Town Council	High	Short-Range	Local Funds	TBD
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Building Department	High	Short-Range	Local Funds	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Building Department	High	Short-Range	Local Funds	TBD
1.7	<b><u>Building and Technical Codes.</u> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Department	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Department	High	Ongoing	Local Funds	TBD
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning and Zoning Department	High	Ongoing	Local Funds	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Department	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Department	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Planning and Zoning Department	High	Ongoing	FEMA HMA Grant	TBD
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
1.9	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper storm water infrastructure design and construction.	Planning and Zoning Department	Medium	Ongoing	Existing	TBD
1.11	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Building Department	Medium	Long-Range	Local Funds	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.12	<b>Critical Facilities Assessments.</b> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Planning and Zoning Department	Medium	Long-Range	FEMA HMA Grant	TBD
2	<b>Goal for Property Protection: Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
2.1	<b>Building Relocation.</b> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Department	High	Short-Range	FEMA HMA Grant	TBD
2.2	<b>Acquisition.</b> Acquire flood prone buildings and properties and establish permanent open space.					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.2.2	Utilize the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Town Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Department	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Department	Medium	Mid-Range	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Building Department	Medium	Ongoing	Local Funds	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.6	<b>Hazard Insurance Awareness.</b> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Building Department	Medium	Ongoing	Local Funds	TBD
2.7	<b>Critical Facilities Protection.</b> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Department	High	Ongoing	Local Funds	TBD
2.8	<b>Back Up Power:</b> Assure uninterrupted power supplies during emergency events.					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Building Department	Medium	Mid-Range	FEMA HMA Grant	TBD
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.2	<b>Outreach Projects.</b> Conduct regular public events to inform the public of hazards and mitigation measures.					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning and Zoning Department	Medium	Ongoing	Local Funds	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Building Department	Medium	Ongoing	Local Funds	TBD
<b>3.3</b>	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Building Department	Medium	Long-Range	Local Funds	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
<b>3.7</b>	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Building Department	High	Ongoing	Local Funds	TBD
<b>3.8</b>	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					



Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and Town Council	Medium	Ongoing	Local Funds	TBD
<b>3.9</b>	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and Town Council	High	Short-Range	Existing	TBD
<b>4</b>	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
<b>4.2</b>	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning and Zoning Department	Medium	Mid-Range	Local Funds	TBD
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning and Zoning Department	Medium	Long-Range	Local Funds	TBD
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Department	Medium	Long-Range	Local Funds	TBD

Silverhill Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
5.2	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Public Works Department	Medium	Long-Range	FEMA HMA Grant	TBD
5.3	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning and Zoning Department	High	Short-Range	FEMA HMA Grant	TBD
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	Planning and Zoning Department	High	Short-Range	Local Funds	TBD

## 2.14 Spanish Fort Community Action Program

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b><u>Goal for Prevention.</u> Manage the development of land and buildings to minimize risks of loss due to natural hazards.</b>					
1.1	<b><u>Comprehensive Plans and Smart Growth.</u> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.</b>					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Planning Department	High	Short- Range	Local Funds	\$60,000
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.1.3	Prepare a five-year capital improvements plan (CIP) to include capital projects that implements the natural hazards element of the community's comprehensive plan or projects identified in the Community Mitigation Action Program of this multi-hazard mitigation plan.	City Council	Medium	Mid-Range	Local Funds	TBD

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.2	<b>Geographic Information Systems (GIS).</b> Maintain a comprehensive database of hazards locations, socio economic data, infrastructure, and critical facilities inventories.					
1.2.1	Maintain a centralized, countywide natural hazards and risk assessment database in GIS that is accessible to local planners and emergency management personnel, including such data as, flood zones, geohazards, major drainages structures, dams/levees, hurricane surge areas, tornado tracks, disaster events and their extents, and a comprehensive inventory of critical facilities within all jurisdictions.	Baldwin County EMA	High	Short-Range	HMA	TBD
1.2.4	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3	<b>Planning Studies.</b> Conduct special studies, as needed, to identify hazard risks and mitigation measures.					
1.3.2	Identify existing culturally or socially significant structures and critical facilities within Mobile County that have the most potential for losses from natural hazard events and identify needed structural upgrades.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3.3	Evaluate elevation and culvert sizing of existing roadways in flash flood-prone areas to ensure compliance with current standards for design year floods, and develop a program for construction upgrades as appropriate.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.3.4	Inventory and map existing fire hydrants throughout the county, and identify areas in need of new fire hydrants.	Fire Department	High	Short-Range	Local Fund	TBD

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Public Works Department	Medium	Mid-Range/Ongoing	FEMA HMA Grant	TBD
1.4	<b>Zoning. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.</b>					
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.4.3	Require delineation of flood plain fringe, floodways, and wetlands on all plans submitted with a permit for development within a flood plain.	Planning Department	Medium	Mid-Range	Local Funds	TBD
1.5	<b>Open Space Preservation. Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.</b>					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Planning Department	Medium	Long-Range	Local Funds	TBD
1.6	<b>Flood Plain Management Regulations. Effectively administer and enforce local floodplain management regulations.</b>					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator or FEMA's training center in Emmitsburg, Maryland.	City Council	High	Short-Range	Local Funds	TBD

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.6.2	Maintain a library of technical assistance and guidance materials to support the local floodplain manager.	Local Floodplain Manager	High	Short-Range	Local Funds	TBD
1.6.3	Promote the adoption of uniform flood hazard prevention ordinance among all NFIP communities. The ordinance standards should encourage flood plain management that maintains the natural and beneficial functions of flood plains by maximizing the credits that could be obtained for "Higher Regulatory Standards" under the Community Rating System (CRS) Program.	Local Floodplain Manager	High	Short-Range	FEMA HMA Grant	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Local Floodplain Manager	High	Short-Range	Local Funds	TBD
1.7	<b>Building and Technical Codes. Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.</b>					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Building Official	High	Ongoing	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Building Official	High	Ongoing	Local Funds	TBD

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7.3	Relocate existing utility lines underground, where feasible and cost effective, and require, through local subdivision and land development regulations, the placement of all new utility lines underground for large residential subdivisions and commercial developments.	Planning Department	High	Ongoing	Local Funds	TBD
1.7.4	Ensure fire safety ordinances properly regulate open burning, the use of liquid fuel and electric space heaters.	Building Official	High	Ongoing	Local Funds	TBD
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Building Official	High	Ongoing	Local Funds	TBD
1.7.6	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.	Planning Department	High	Ongoing	FEMA HMA Grant	TBD
<b>1.8</b>	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Planning Department	Medium	Long-Range	Local Funds	TBD
<b>1.9</b>	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Planning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require	Planning Department	Medium	Ongoing	Existing	TBD

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	proper storm water infrastructure design and construction.					
1.11	<b><u>Community Rating System Program (CRS).</u> Increase participation of NFIP member communities in the CRS Program.</b>					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Local Floodplain Manager	Medium	Long-Range	Local Funds	TBD
1.12	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Planning Department	Medium	Long-Range	FEMA HMA Grant	TBD
2	<b><u>Goal for Property Protection:</u> Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
2.1	<b><u>Building Relocation.</u> Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
2.2	<b><u>Acquisition.</u> Acquire flood prone buildings and properties and establish permanent open space.</b>					



<b>Spanish Fort Community Action Program</b>						
<b>#</b>	<b>Goal, Objectives and Mitigation Measures</b>	<b>Lead Responsibility for Carrying Out Measure</b>	<b>Priority</b>	<b>Timeline</b>	<b>Funding Source</b>	<b>Estimated Cost</b>
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
2.2.2	Utilize the recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>2.3</b>	<b><u>Building Elevation.</u> Elevate buildings in hazardous flood areas to safeguard against damages</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.5	<b>Building Retrofits.</b> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Local Floodplain Manager	Medium	Ongoing	FEMA HMA Grant	TBD
2.5.2	Provide technical advisory assistance to building owners on available building retrofits to protect against natural hazards damages.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.6	<b>Hazard Insurance Awareness.</b> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
2.7	<b>Critical Facilities Protection.</b> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	High	Ongoing	Local Funds	TBD
2.8	<b>Back Up Power.</b> Assure uninterrupted power supplies during emergency events.					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Building Official	High	Ongoing	FEMA HMA Grant	TBD

<b>Spanish Fort Community Action Program</b>						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
<b>3</b>	<b><u>Goal for Public Education and Outreach.</u> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.</b>					
<b>3.2</b>	<b><u>Outreach Projects.</u> Conduct regular public events to inform the public of hazards and mitigation measures.</b>					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning Department	Medium	Ongoing	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning Department	Medium	Mid-Range	Local Funds	TBD
3.2.4	Distribute outreach materials to citizens, builders and business owners inquiring about a flood problem, a building permit or other natural hazard related questions.	Local Floodplain Manger	Medium	Ongoing	Local Funds	TBD
<b>3.3</b>	<b><u>Real Estate Disclosure.</u> Encourage real estate agents to disclose flood plain location for property listings.</b>					
3.3.2	Consider the enactment of a local ordinance or state law to require floodplain location disclosure when a property is listed for sale.	Local Floodplain Manger	Medium	Long-Range	Local Funds	TBD
<b>3.6</b>	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
3.7	<b><u>Technical Assistance.</u> Make qualified local government staff available to advise property owners on various hazard risks and mitigation alternatives.</b>					
3.7.1	Provide technical assistance to homeowners, builders, and developers on flood protection alternatives.	Local Floodplain Manger	High	Ongoing	Local Funds	TBD
3.8	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Local Government	Medium	Ongoing	Local Funds	TBD
3.9	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Local Government	High	Short-Range	Existing	TBD
4	<b><u>Goal for Natural Resources Protection.</u> Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.</b>					
4.2	<b><u>River/Stream Corridor Restoration and Protection.</u> Restore and protect river and stream corridors within areas.</b>					
4.2.1	Keep builders and developers informed of Federal wetlands permitting requirements of the Corps of Engineers.	Planning Department	Medium	Mid-Range	Local Funds	TBD

Spanish Fort Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
4.2.2	Adopt and/or enforce regulations prohibiting dumping and littering within river and stream corridors.	Planning Department	Medium	Long-Range	Local Funds	TBD
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Building Official	Medium	Long-Range	Local Funds	TBD
<b>5.2</b>	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Public Works Department	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>5.3</b>	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.1	Ensure the inclusion of storm shelters and/or safe rooms in public buildings such as schools and multi-purpose community centers.	Planning Department	High	Short-Range	FEMA HMA Grant	TBD
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	Planning Department	High	Short-Range	Local Funds	TBD

## 2.15 Summerdale Community Action Program

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1	<b>Goal for Prevention.</b> Manage the development of land and buildings to minimize risks of loss due to natural hazards.					
1.1	<b>Comprehensive Plans and Smart Growth.</b> Establish an active comprehensive planning program that is consistent with Smart Growth principles of sustainable community development.					
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions. Each plan should address natural hazards exposure and include long-term disaster resistance measures. The vulnerability and environmental suitability of lands for future development should be clearly addressed. Local plans should assess the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.	Mayor and Town Council	Medium	Mid-Range	Local Funds	TBD
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.	Mayor and Town Council	Medium	Mid-Range	Local Funds	TBD
1.3	<b>Planning Studies.</b> Conduct special studies, as needed, to identify hazard risks and mitigation measures.					
1.3.5	Identify problem drainage areas, conduct engineering studies, evaluate feasibility, and construct drainage improvements to reduce or eliminate localized flooding.	Mayor and Town Council	Medium	Mid-Range	FEMA HMA Grant	TBD

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.5	<b>Open Space Preservation.</b> Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Mayor and Town Council	Medium	Mid-Range	Local Funds	TBD
1.6	<b>Flood Plain Management Regulations.</b> Effectively administer and enforce local floodplain management regulations.					
1.6.1	Train local flood plain managers through programs offered by the State Flood Plain Coordinator and FEMA's training center in Emmitsburg, Maryland.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
1.6.4	Maintain membership for locally designated flood plain managers in the Association of State Flood Plain Managers and the Alabama Association Flood Plain Managers and encourage active participation.	Local Floodplain Manager	Medium	Mid-Range	Local Funds	TBD
1.7	<b>Building and Technical Codes.</b> Review local codes for effectiveness of standards to protect buildings and infrastructure from natural hazard damages.					
1.7.1	Promote good construction practices and proper code enforcement to mitigate structural failures during natural hazard events.	Community Development	Medium	Mid-Range	Local Funds	TBD
1.7.2	Evaluate and revise as appropriate, building codes for roof construction to maximize protection against wind damage from hurricanes, tornadoes, and windstorms; encourage installation of "hurricane clips."	Community Development	Medium	Mid-Range	Local Funds	TBD

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
1.7.5	Establish and enforce minimum property maintenance standards that reduce or eliminate unsafe structures.	Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.8	<b><u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.</b>					
1.8.1	Review and revise as necessary, landscaping standards for parking lots that reduce the size of impervious surfaces and encourage natural infiltration of rainwater.	Zoning Department	Medium	Mid-Range	Local Funds	TBD
1.9	<b><u>Storm Water Management.</u> Manage the impacts of land development on storm water runoff rates and to natural drainage systems.</b>					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Zoning Department	Medium	Ongoing	Existing	TBD
1.9.2	Develop, adopt and implement subdivision regulations that require proper stormwater infrastructure design and construction.	Zoning Department	Medium	Ongoing	Existing	TBD
1.9.3	Establish urban forestry program to help mitigate storm water runoff common in areas with large impervious surfaces.	Zoning Department	Medium	Ongoing	Existing	TBD
1.12	<b><u>Critical Facilities Assessments.</u> Perform assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) to address building and site vulnerabilities to hazards, identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.</b>					
1.12.1	Perform vulnerability assessments of critical facilities to identify retrofit projects to improve the safety of occupants and mitigate damages from hazards.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD



Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2	<b>Goal for Property Protection: Protect structures and their occupants and contents from the damaging effects of natural hazards.</b>					
2.1	<b>Building Relocation. Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.</b>					
2.1.1	Pursue FEMA grant funds to relocate buildings and infrastructure out of hazardous flood areas, with emphasis on pre-FIRM residential buildings, where deemed more cost effective than property acquisition or building elevation.	Building Official	Medium	Ongoing	FEMA HMA Grant	TBD
2.2	<b>Acquisition. Acquire flood prone buildings and properties and establish permanent open space.</b>					
2.2.1	Pursue grant funds to acquire and demolish flood prone or substantially damaged structures and replace with permanent open space.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
2.2.2	Utilize the the most recent NFIP repetitive loss property list, and other appropriate sources, to create and maintain a prioritized list of acquisition mitigation projects based on claims paid.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
2.3	<b>Building Elevation. Elevate buildings in hazardous flood areas to safeguard against damage.</b>					
2.3.1	Pursue grant funds to subsidize the elevation of certain buildings in flood prone areas where acquisition or relocation is not feasible, with emphasis on Pre-FIRM buildings; where feasible, elevation is preferable to flood proofing.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.3.2	Pursue grant funds to repair, elevate and weatherize existing homes for low- to moderate-income families.	Building Official	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>2.4</b>	<b><u>Flood Proofing.</u> Encourage flood proofing of building in hazardous flood areas to safeguard against damages.</b>					
2.4.1	Pursue FEMA grant funds for flood proofing pre-FIRM non-residential buildings, where feasible.	Building Official	High	Short-Range	FEMA HMA Grant	TBD
<b>2.5</b>	<b><u>Building Retrofits.</u> Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.</b>					
2.5.1	Pursue FEMA grant funds to retrofit existing buildings, critical facilities, and infrastructure against potential damages from natural and manmade hazards.	Building Official	Low	Long-Range	FEMA HMA Grant	TBD
<b>2.6</b>	<b><u>Hazard Insurance Awareness.</u> Increase public awareness of flood insurance and special riders that may be required for earthquake, landslide, sinkhole, and other damages typically not covered by standard property protection policies.</b>					
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.	Local Floodplain Manager	Medium	Ongoing	Local Funds	TBD
<b>2.7</b>	<b><u>Critical Facilities Protection.</u> Protect critical facilities from potential damages and occupants from harm in the event of hazards through retrofits or relocations of existing facilities located in high-risk zones or construction of new facilities for maximum protection from all hazards.</b>					
2.7.1	Install lightning and/or surge protection on existing critical facilities.	Building Official	Medium	Mid-Range	Local Funds	TBD

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
2.8	<b>Back Up Power.</b> Assure uninterrupted power supplies during emergency events.					
2.8.1	Pursue grant funding for the installation of back up power generators for critical facilities.	Baldwin County EMA	Medium	Mid-Range	FEMA HMA Grant	TBD
3	<b>Goal for Public Education and Outreach.</b> Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.					
3.2	<b>Outreach Projects.</b> Conduct regular public events to inform the public of hazards and mitigation measures.					
3.2.1	Continue to participate in environmental awareness events to provide the public information on hazard exposure and mitigation measures, such as City/County Day, Hurricane Awareness Week, and Severe Weather Week.	Planning Department	High	Short-Range	Local Funds	TBD
3.2.2	Conduct materials distribution, via the internet and other media, and other outreach activities and workshops to encourage families and individuals to implement hazard mitigation measures in their homes.	Planning Department	High	Short-Range	Local Funds	TBD
3.4	<b>Library.</b> Use local library resources to educate the public on hazard risks and mitigation alternatives.					
3.4.1	Through local libraries, maintain and distribute free and current publications from FEMA, NWS, USGS, and other federal and state agencies.	Local Floodplain Manger	Medium	Long-Range	Local Funds	TBD
3.5	<b>Education Programs.</b> Use schools and other community education resources to conduct programs related to hazard risks and mitigation measures.					
3.5.1	Distribute hazard mitigation brochures to students through area	Mayor and Town	High	Short-Range	Local	TBD

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	schools.	Council			Funds	
3.6	<b><u>Community Hazard Mitigation Plan Distribution.</u> Distribute the hazard mitigation plan to elected officials, interested agencies and organizations, businesses, and residents, using all available means of publication and distribution.</b>					
3.6.1	Distribute the 2010 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County EMA	High	Short-Range	Existing	TBD
3.8	<b><u>Mass Media Relations.</u> Utilize all available mass media, such as, newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking to increase public awareness and distribute public information on hazard mitigation topics.</b>					
3.8.1	Maintain appropriate media relationships to ensure the public is informed of hazard threats and means to mitigate property damages and loss of life.	Mayor and Town Council	Medium	Ongoing	Local Funds	TBD
3.9	<b><u>Weather Radios.</u> Improve public access to weather alerts.</b>					
3.9.1	Promote the use of weather radios in households and businesses.	Mayor and Town Council	High	Short-Range	Existing	TBD
3.9.3	Pursue grant funding to distribute weather radios and emergency response instructions to municipal residents.	Mayor and Town Council	High	Short-Range	Existing	TBD
3.10	<b><u>Disaster Warning.</u> Improve public warning systems.</b>					
3.10.3	Evaluate the feasibility of a shared tri-county ALERT system covering Baldwin, Escambia, and Mobile counties.	Mayor and Town Council	Low	Long-Range	FEMA HMA Grant	TBD

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Mayor and Town Council	High	Long-Range	FEMA HMA Grant	TBD
3.10.5	Upgrade critical communications infrastructure.	Police Department	Medium	Mid-Range		
<b>5</b>	<b><u>Goal for Structural Projects.</u> Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.</b>					
<b>5.1</b>	<b><u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.</b>					
5.1.1	Prepare and implement standard operating procedures and guidelines for drainage system maintenance.	Zoning Department	Medium	Mid-Range	Local Funds	TBD
<b>5.2</b>	<b><u>Reservoirs and Drainage System Improvements.</u> Control flooding through reservoirs and other structural improvements, where deemed cost effective and feasible, such as levees/floodwalls, diversions, channel modifications, dredging, drainage modifications, and storm sewers.</b>					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
<b>5.3</b>	<b><u>Community Shelters and Safe Rooms:</u> Provide shelters from natural hazards for the safety of community residents.</b>					
5.3.2	Pursue grant funds to establish a program for subsidizing safe room and storm shelter construction in appropriate locations and facilities.	Planning Department	Medium	Mid-Range	FEMA HMA Grant	TBD
5.3.3	Encourage the construction of safe rooms in new and existing	Planning Department	Medium	Mid-Range	Local Funds	TBD

Summerdale Community Action Program						
#	Goal, Objectives and Mitigation Measures	Lead Responsibility for Carrying Out Measure	Priority	Timeline	Funding Source	Estimated Cost
	homes and buildings.					

2010

# **BALDWIN COUNTY, ALABAMA**

## **Multi-Hazard Mitigation Plan**

### Appendices

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- C - 2004 PLAN IMPLEMENTATION STATUS**
- D - HMPC HAZARD IDENTIFICATION AND RATINGS**
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- F - IDENTIFICATION AND ANALYSIS OF MITIGATION MEASURES**
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- H - COMMUNITY INVOLVEMENT DOCUMENTATION**
- I - MULTI-JURISDICTIONAL PARTICIPATION ACTIVITIES**
- J - ADOPTING RESOLUTION**

Prepared under the direction of the  
Baldwin County Hazard Mitigation Planning Committee

With the support of the Baldwin County EMA by:



In association with:

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**December 30, 2010**





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# **Appendix A**

## **Federal Requirements for Local Mitigation Plans**



## App. A – Federal Requirements for Local Mitigation Plans

- 1.0 Compliance
- 2.0 44 CFR Sec. 201.6 (2008)

### 1.0 Compliance

The 2010 Baldwin County Multi-Hazard Mitigation Plan addresses the Local Mitigation Plans requirements of 44 CFR Sec. 201.6.

### 2.0 44 CFR Sec. 201.6 (2008)

**Section 201.6 Local Mitigation Plans.** The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the State to provide technical assistance and to prioritize project funding.

(a) *Plan requirements.*

- (1) A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants. The Administrator may, at his discretion, require a local mitigation plan for the Repetitive Flood Claims Program. A local government must have a mitigation plan approved pursuant to this section in order to apply for and receive mitigation project grants under all other mitigation grant programs.
- (2) Plans prepared for the FMA program, described at part 79 of this chapter, need only address these requirements as they relate to flood hazards in order to be eligible for FMA project grants. However, these plans must be clearly identified as being flood mitigation plans, and they will not meet the eligibility criteria for other mitigation grant programs, unless flooding is the only natural hazard the jurisdiction faces.
- (3) Regional Directors may grant an exception to the plan requirement in extraordinary circumstances, such as in a small and impoverished community, when justification is provided. In these cases, a plan will be completed within 12 months of the award of the project grant. If a plan is not provided within this timeframe, the project grant will be terminated, and any costs incurred after notice of the grant's termination will not be reimbursed by FEMA.
- (4) Multi-jurisdictional plans (e.g. watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan. State-wide plans will not be accepted as multi-jurisdictional plans.

(b) *Planning process.* An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

(c) *Plan content.* The plan shall include the following:

- (1) Documentation of the *planning process* used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
- (2) A *risk* assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment shall include:
  - (i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
  - (ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
    - A. The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
    - B. An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate;



- C. Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
  - (iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
- (3) A *mitigation strategy* that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:
- (i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
  - (ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
  - (iii) An action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
  - (iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
- (4) A *plan maintenance process that includes:*
- (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
  - (ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.
  - (iii) Discussion on how the community will continue public participation in the plan maintenance process.

- (5) *Documentation* that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

(d) *Plan review.*

- (1) Plans must be submitted to the State Hazard Mitigation Officer (SHMO) for initial review and coordination. The State will then send the plan to the appropriate FEMA Regional Office for formal review and approval. Where the State point of contact for the FMA program is different from the SHMO, the SHMO will be responsible for coordinating the local plan reviews between the FMA point of contact and FEMA.
- (2) The Regional review will be completed within 45 days after receipt from the State, whenever possible.
- (3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
- (4) Managing States that have been approved under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c) will be delegated approval authority for local mitigation plans, and the review will be based on the criteria in this part. Managing States will review the plans within 45 days of receipt of the plans, whenever possible, and provide a copy of the approved plans to the Regional Office. [67 FR 8848, Feb. 26, 2002, as amended at 67 FR 61515, Oct. 1, 2002; 68 FR 61370, Oct. 28, 2003; 69 FR 55096, Sept. 13, 2004; 72 FR 61748, Oct. 31, 2007]

## **Appendix B**

# **Community Mitigation Capabilities**



## **App. B - Community Mitigation Capabilities**

### 1.0 Scope and Methodology

#### **1.0 Scope and Methodology**

This report assesses community mechanisms that can affect hazard mitigation activities in a jurisdiction. This assessment provides an overview of the capabilities of Baldwin County jurisdictions to implement mitigation strategies, and it identifies any existing gaps or weaknesses that could hinder mitigation activities under consideration in this plan. The results of this assessment help determine the types of mitigation activities a local government can realistically undertake over its five-year action program framework included in Chapter 6 Mitigation Strategy.

The following table lists each jurisdiction in Baldwin County and shows the results of a comprehensive questionnaire that was distributed by the planning team to all participating jurisdictions. The survey results show whether or not certain indicators of a community's capabilities to carry out mitigation actions are in place. These indicators examine planning and regulatory tools, mitigation project experience, and staffing.

**Table B-1 Community Capabilities Assessment**

<b>JURISDICTION</b>	<b>enforce zoning ordinance</b>	<b>administer subdivision regulations</b>	<b>enforce building and technical codes</b>	<b>up-to-date comprehensive plan adopted in last 5 years</b>	<b>5-6 year capital improvements plan updated annually</b>	<b>experience with FEMA grant programs for hazard mitigation projects</b>	<b>professional urban planner on staff</b>	<b>professional engineer on staff</b>	<b>Certified Floodplain Manager on staff</b>	<b>full-time building inspector on staff</b>
Bay Minette	Y	N	Y	N	Y	Y	N	N	N	Y
Daphne	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Fairhope	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Foley	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Orange Beach	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Robertsdale	Y	N	Y	Y	N	Y	Y	N	N	Y
Spanish Fort	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Baldwin County Unincorporated	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Elberta	Y	Y	Y	Y	N	Y	N	N	N	Y
Gulf Shores	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loxley	Y	N	Y	Y	N	Y	N	N	N	Y
Magnolia Springs	Y	Y	Y	Y	N	N	Y	Y	N	Y
Silverhill	Y	N	Y	N	N	Y	N	N	N	Y
Summerdale	Y	Y	Y	Y	N	Y	Y	N	Y	Y
Perdido Beach	N	N	Y	N	N	N	Y	Y	N	Y

**KEY: Y = Yes N = No**

## **Appendix C**

# **2004 Plan Implementation Status**





## App. C - 2004 Plan Implementation Status

- 1.0 Scope and Methodology
- 2.0 Summary of Results

### 1.0 Scope and Methodology

As part of the 2010 plan update, each jurisdiction that participated in the 2004 planning process revisited its original five-year mitigation action program from the 2004 Baldwin County, Alabama, Natural Hazard Mitigation Plan. FEMA guidance requires this review of previous mitigation actions. The towns of Magnolia Springs and Perdido Beach were not incorporated at the time the 2004 plan was adopted. Each action or project must be identified as completed, ongoing, deleted or deferred actions. If a mitigation action remained unchanged, the jurisdiction must explain why no changes occurred. The community must also describe any challenges that hindered implementation of mitigation measures and how these might be dealt with in future updates. Technical, political, financial, legal, administrative, and agency coordination issues need to be evaluated for any potential hindrances to effective implementation of mitigation measures.

This appendix includes the Community Mitigation Action Programs adopted by Baldwin County and its participating jurisdictions in the 2004 plan as amended in 2006. Actions identified in the 2004 plan as amended in 2006 were evaluated to obtain the current implementation status. Each jurisdiction or agency responsible for implementing a mitigation measure in 2004 was asked to provide a status update by classifying each action as completed, ongoing but completed, deferred, or deleted. Agencies were asked to provide comments on any milestones achieved or impediments to implementation of the mitigation measures.

To accomplish this status assessment, a questionnaire based on the mitigation action program from the 2004 plan as amended in 2006 was sent to all members of the Hazard Mitigation Planning Committee and the lead agencies or persons responsible for implementing each action of the jurisdictions that participated in the original plan. The survey provided each jurisdiction with a mechanism to provide feedback on the implementation status of the mitigation measures along with any relevant comments.

Results from this survey are highlighted on the table found in this appendix. If a mitigation measure was deferred or recommended for deletion, the jurisdiction was required to give the reason. The reasons for deleting a measure were categorized as DE for economic, DA for administrative, DP for political, DT for technical, DL for legal, or DN for not needed. An explanation of each category is as follows:

<b>Economic</b>	Lack of funding or budget constraints impeded the implementation of the mitigation measure
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<b>Administrative</b>	Inadequate staff resources to implement and maintain the mitigation measure
<b>Political</b>	Lacks local political support of the mitigation measure
<b>Technical</b>	Mitigation measure was not technically feasible
<b>Legal</b>	Lacks the legal authority to implement the mitigation measure
<b>Not Needed</b>	The measure is no longer necessary

The towns of Magnolia Springs and Perdido Beach were not incorporated at the time of the original plan's adoption; therefore, they do not have data presented in "Table C-1 2004 Plan Implementation Status."

## 2.0 Summary of Results

- ✓ The 2004 Baldwin County Multi-Hazard Mitigation Plan as amended contained approximately 77 mitigation measures. The majority of the mitigation measures were completed or completed, but on-going.
- ✓ Some mitigation measures were deferred and most are due to be completed by the year 2011.
- ✓ The predominant reason given for deleting certain measures by individual jurisdictions was that the lead agency determined that the adopted mitigation measure was not economically feasible or they did not have the technical ability to carry out the measure.

The Key for Table C-1 is as follows:

- C** = Completed
- O** = Completed but Ongoing
- DF** = not completed, defer for the 2010 Plan Update
- DA** = delete for administrative reasons
- DE** = delete for economic reasons
- DL** = delete for legal reason
- DP** = delete for political reasons
- DT** = delete for technical reasons
- DN** = delete, not needed
- NR** = No Response
- NA** = Not Applicable

**Table C-1. 2004 Plan Implementation Status**

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
1.1.1	Maintain up-to-date comprehensive plans for all jurisdictions.		O	O			C	O						
1.1.2	Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.		DF	O			C	O						
1.1.3	Review and amend existing planning documents to be certain the vulnerability and environmental suitability of lands for future development are clearly addressed; local plans should address the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.		O	O			C	O						
1.2.1	Maintain risk assessment data in GIS, including flood zones, hurricane surge areas, tornado tracks, disaster events, and a comprehensive inventory of critical facilities within all jurisdictions.		?	C			O	O						
1.2.2	Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.		?	O			O	O						
1.2.3	Document the extents of each flooding event using GIS.		O	O			O	O						
1.2.4	Combine the GIS resources of Baldwin County and the Regional Planning Commission to create a natural hazards GIS that is accessible to mitigation planners and emergency management personnel.		?	O			O	O						
1.2.5	Create GIS systems for inventorying and assessing urban forest for identifying current and potential hazards and developing a comprehensive plan for managing urban forest.		?	O			O	O						

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
1.2.6	To expand on existing fiber infrastructure to link the County, Municipalities, the Board of Education, State Agencies and other Agencies to form an "extranet" for communications and sharing of information.		O	C			O	C			C			
1.3.1	Seek a countywide update of all FIRMs in digital format, with an emphasis on detailed studies of developed and developing areas with elevations provided and floodways delineated.		?	O			O	O						
1.3.2	Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.		O	O			O	O						
1.3.3	Initiate a detailed flood vulnerability assessment based on the surge conditions presented by Katrina.			DE			O	O						
1.4.1	Consider large lot size restrictions on flood-prone areas designated on Flood Insurance Rate Maps.		O	DT			O	C						
1.4.2	Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.		O	O			O	C						
1.5.1	Train local flood plain managers through programs offered through the State Flood Plain Manager and FEMA's training center in Emmitsburg, Maryland.		O	O			O	C						
1.5.2	Maintain a library of technical assistance and guidance materials to support the local flood plain manager.		O	O			O	O						
1.5.3	Obtain membership for local flood plain managers in the Association of State Flood Plain Managers.		O	O			O	O						
1.5.4	Promote the adoption of a uniform flood hazard prevention ordinance with higher regulatory standards that discourage flood plain development and seek to maintain the natural and beneficial functions of flood plains.		DF	O			C	C						

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
1.5.5	Enact flood hazard prevention ordinances and establish Elberta and Summerdale as regular members of the NFIP.		O	C				O						
1.6.1	Promote good construction practices and proper code enforcement to eliminate most structural problems during natural hazard events.		O	O			C	O						
1.6.2	Establish requirements for anchoring of LP tanks.		DF	C			O	C						
1.7.1	Evaluate the feasibility of ordinances to require community storm shelters within sizeable mobile home parks and subdivisions.		O	DN				DE						
1.7.2	Require the construction of safe rooms within new public buildings, such as new schools, libraries, community centers, and other public buildings where feasible.		O	O				O						
1.7.3	Construct free-standing public safe rooms and/or community shelters in vulnerable locations.		?	O				DE						
1.7.4	Encourage the construction of safe rooms in new and existing construction.		O	O			O	DE						
1.7.5	Distribute FEMA Publication 320 - <u>Taking Shelter From the Storm: Building a Safe Room in Your House</u> - through building permit and inspection offices.		DF	O			O	O						
1.8.1	Evaluate parking lot landscaping standards in zoning ordinances to encourage infiltration of rainwater where there are large expanses of impervious surfaces.		?	O			C	C						
1.8.2	Establish ordinances to help mitigate fire hazards related to fuel buildup due to recent hurricanes, by raising tree canopies close to homes, thinning forests near urban areas, and removing trees that are too close to homes.		C	O			C	C						

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
1.8.3	Establish ordinance for the planting of new urban forests or replacement of hurricane damaged urban forests using hurricane resistant tree species to mitigate wind and erosion problems, help beautify and promote healthy urban environments and reduce heating, cooling and storm runoff costs.		O	O			C	C						
1.9.1	Continue to enforce storm water management ordinance that maintains pre-development runoff rates.		O	O			O	O						
1.9.2	Engineer and construct improvements to the storm water management infrastructure.		O	O			O	O						
1.9.3	Establish urban forestry program to help mitigate storm water runoff common in areas with large impervious surfaces.		?	O			C	O						
1.10.1	Apply for and maintain membership in the CRS Program.		?	O				C						
1.10.2	Improve ratings of existing CRS communities.		?					O						
1.10.3	Encourage CRS communities to conduct joint public outreach programs.							O						
2.1.1	Provide financial assistance to relocate buildings out of hazardous flood areas; emphasis is on pre-FIRM residential buildings.			O				O						
2.2.1	Provide financial assistance to acquire flood prone buildings and properties; emphasis is on pre-FIRM residential buildings and critical facilities. Where large sections of neighborhoods are affected by flooding and selective acquisitions would render the neighborhood non-viable, all contiguous properties in that neighborhood.			O				O						

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
2.3.1	Provide financial assistance to elevate buildings for protection against flood damage; emphasis is on certain buildings, where acquisition or relocation is not feasible, constructed before the enactment of flood plain regulations (pre-FIRM buildings); elevation is preferred over flood proofing, where feasible.		?	0				0						
2.4.1	Provide financial assistance to flood proof buildings; emphasis is on non-residential buildings constructed before the enactment of flood plain regulations (pre-FIRM buildings).		?	0										
2.5.1	Provide technical assistance to owners of vulnerable buildings to advise on available building retrofits to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.		?	0				0						
2.5.2	Provide financial assistance to retrofit buildings for protection against flood damage; emphasis is on certain buildings, where acquisition or relocation is not feasible, constructed before the enactment of flood plain regulations (pre-FIRM buildings); elevation is preferred over flood proofing, where feasible.		?	0				0						
2.6.1	Promote the purchase of insurance coverage by property owners and renters for flood damages in high-risk areas.		0	0				0						
2.7.1	Establish beach renourishment and maintenance programs.			0				0						
2.7.2	Reestablish natural protective barriers.			0				0						
2.8.1	Initiate projects that will protect the transportation system.		0	0			0	0						
2.8.2	Install wind resistant traffic signals.		0	0			0	0						
2.8.3	Enhance/improve evacuation route and availability of public transportation.		0	0			0	0						
2.8.4	Improve bridges.		0	0			0	0						

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
3.1.1	Publicize the availability of FIRM information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.		?	O			O	O						
3.2.1	Identify environmental awareness events to integrate public information on hazard exposure and protection measures.		O	O				O						
3.3.1	Arrange with Multiple Listing Service (MLS) to require flood plain location disclosure as a condition for each real estate listing.		O	O				O						
3.4.1	Obtain free publications from FEMA, NWS, USGS, and other federal and state agencies and deposit these materials with local libraries.		DF	O				O						
3.4.2	Maintain local library repositories with the latest available publications.		O	O				O						
3.5.1	Distribute hazard mitigation brochures to area schools for distribution to students.		O	O				O						
4.1.1	Acquire open space, purchase easements, and accept donations of lands within environmentally significant and vulnerable locations through the Land Trust.		O	O				O						
4.2.1	Enforce dumping regulations.		O	O			O	O						
4.2.2	Enforce erosion and sedimentation control regulations.		O	O			O	O						
4.3.1	Seek technical assistance through the Alabama Cooperative Extension System with Best Management Practices (BMP) for channel and drainage system maintenance.		O	O			O	O						
4.3.2	Procure the services of a certified arborist or hire a city urban forester or horticulturalist to help establish an urban forestry program to inventory, assess, plan, maintain, and manage the urban forests.		O	O				O						



#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
4.3.3	Increase overall green spaces in the cities by planting hurricane resistant trees with site and location taken into consideration.		O	O			O	O						
4.3.4	Inventory and assess urban forests for improving urban forest management and maintenance, necessary for increasing safety, post-hurricane response effectiveness and managing urban forests under hurricane stress.		O	O			C	DF						
4.3.5	Train city horticulturalists, urban foresters, and ground maintenance crews on urban forest Best Management Practices to ensure proper planting and post planting is conducted to reduce hazard trees and increase urban tree canopy.		O	O			O	O						
4.3.6	Develop an urban forestry management plan to ensure a progressive urban forestry program aimed at increasing forestry canopy, increased safety and planting hurricane resistant tree species.		DF	O			C	C						
4.4.1	Provide alternate power sources for wastewater treatment stations to prevent spills of untreated wastewater into the watershed.		O	O				O						
5.1.1	Enhance the ALERT flood warning system at strategic locations in the county to cover vulnerable flood locations. Sensors should provide real-time access to stream flow, stream stage, and precipitation data, at the minimum. The system should link data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas. Evaluate the feasibility of a shared tri-county system covering Baldwin, Escambia, and Mobile counties.		O	O				C						
5.1.2	Establish a reverse 911 call system.		O	O				C						

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
5.1.3	Increase and enhance the county's ability to coordinate and disseminate public information regarding threats, evacuations and shelters, through a variety of media.		O	O				C						
5.2.1	Support the Alabama Skywarn Foundation efforts to distribute weather radios to low-income households, especially in rural areas outside of siren coverage areas.		?	O				O						
5.2.2	Promote the use of weather radios in households and businesses.		O	O				O						
5.3.1	Provide alternate power sources for water systems and mechanism for remote control and operations.		O	O				C						
5.4.1	Provide hardened facilities/safe rooms for first responders and essential personnel.		O	O				C						
5.4.2	Construct an emergency operations center for the municipalities of Orange Beach and Gulf Shores north of the intercoastal waterway.													
5.5.1	Establish an emergency two way radio communications channel for emergency personnel and acquire a sufficient number of radios for use by essential personnel.		O	C				O						
5.6.1	Develop and implement economic recovery plan including advertising and public information activities.		?	O				O						
5.7.1	Consider requiring new critical facilities be constructed with alternate power sources. Retrofit existing critical facilities with gas fired generators when possible.		O	O				C						
5.8.1	Acquire and maintain software that will maximize information management for mitigation and response functions.													
6.1.1	Enforce standard operating procedures for drainage system maintenance.		O	O			O	O						
6.2.1	Design and construct drainage system improvements.		O	O			O	O						

#	Mitigation Measure	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Orange Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
6.2.2	Initiate improvements to waste water collection system.													

## **Appendix D**

# **HMPC Hazard Identification and Ratings**



## App. D - HMPC Hazard Identification and Ratings

- 1.0 Scope and Methodology
- 2.0 Hazard Descriptions

### 1.0 Scope and Methodology

#### 1.1 The HMPC Hazard Identification Exercises

The tables in this Appendix show the results of the Hazard Mitigation Planning Committee (HMPC) responses to hazard identification exercises presented at its March 15, 2010, committee meeting. These results are not necessarily supported by other resources evaluated in Chapter 5 – Risk Assessment, but are, nonetheless, indicators of the location, probability, and extent of natural and man-made hazards affecting Baldwin County jurisdictions. These responses are those perceived by the HMPC membership, based on local knowledge and experience of the members. These exercises serve as a resource to help identify the hazards affecting each jurisdiction and determine the probability and extents (severity or magnitude) and how these measures of community impacts vary among Baldwin County jurisdictions. The averages of the ratings compare how the location and impacts of hazards could vary among the jurisdictions. The same exercise was administered during the drafting of the 2004 plan for natural hazards, and the results are compared. The 2010 and 2004 results are very similar, on average.

**Key.**

The following key to the tables describes the hazard ratings:

<b>LOCATION - WHETHER THE JURISDICTION IS AFFECTED BY THE HAZARD</b>
1 = YES
0 = NO
<b>PROBABILITY - THE LIKELIHOOD THAT THE HAZARD WOULD OCCUR IN THIS JURISDICTION</b>
5 - VERY HIGH
4 - HIGH
3 - MEDIUM
2 - LOW
1 - MINIMUM
<b>EXTENT - THE SEVERITY OR MAGNITUDE OF THE HAZARD SHOULD IT OCCUR IN THIS JURISDICTION</b>
5 - VERY HIGH
4 - HIGH
3 - MEDIUM
2 - LOW
1 - MINIMUM

## 1.2 Summary of Results

### Location of natural hazards

- ✓ The HMPC has identified the following hazards that could occur in all jurisdictions: hurricanes, tornadoes, severe storms, winter storms/freezes, and droughts/heat waves.
- ✓ Floods can occur in all jurisdictions, and flood studies confirm all jurisdictions are subject to flooding. Flood maps included in Chapter 5 – “Risk Assessment” show precise flood zones.
- ✓ All jurisdictions are subject to impacts from hurricanes, though only coastal communities would be affected by storm surge. The data suggests hurricane-generated wind, rain (flooding) and tornadoes from land falling hurricanes and tropical storms could have severe impacts on all communities.
- ✓ Gulf Shores, Orange Beach and Perdido Beach could incur inundation flooding from hurricane storm surge, while Fairhope, Spanish Fort and Daphne could experience storm surge impacts from major storms directly impacting Mobile Bay.
- ✓ Some communities did not find threats from landslides, sinkholes, dam/levee failures and earthquakes, although all communities could experience these disasters to some extent. See locational maps in Chapter 5 – “Risk Assessment.”

### Probability of natural hazards

- ✓ According to the HMPC hurricane generated high winds are the most likely natural hazard to occur with an average rating of 4.55, followed by hurricane surge and severe storms, each being rated 3.36, then coastal flooding, which received a 3.09 average score.
- ✓ The natural hazards that have some likelihood of occurring (less than 3.0 but greater than 2.0) include wildfires with a rating of 2.73, and tornadoes and droughts/heat waves, each averaging 2.45.
- ✓ The natural hazards least likely to occur across all of Baldwin County include riverine flooding (1.91), winter storms/freezes (1.55), earthquakes (0.82), sinkholes (0.64), dam/levee failures (0.55), and landslides (0.45).

### Extents of natural hazards

- ✓ The most potentially severe natural hazards are hurricane wind impacts, with a rating of 4.45. Hurricane storm surge was rated 3.36.
- ✓ Hurricane winds and tornadoes each scored 3.45, followed by severe storms which received a 3.09 rating from the HMPC, all could be moderately high in severity.
- ✓ Natural hazards considered by the HMPC to have a potential severity of low to medium in extent include coastal flooding (2.91), wildfires (2.64), earthquakes (2.27) and droughts/heat waves (2.09).
- ✓ The least severe impacts could be caused by winter storms/freezes (2.00), riverine flooding (1.82), sinkholes (0.82), dam/levee failures (0.64, and landslides 0.36).

**Table D-1. Baldwin County HMPC Identification and Ratings of Natural Hazards**

Hazard	Geographic Area	Location (2005)	Location (2010)	Extent (2005)	Extent (2010)	Probability (2005)	Probability (2010)
<b>Flooding-Riverine</b>	Baldwin County						
	Bay Minette						
	Daphne		0		0		0
	Elberta		1		3		3
	Fairhope		1		4		4
	Foley		1		3		4
	Gulf Shores		0		0		0
	Loxley		1		3		2
	Magnolia Springs		1		3		4
	Orange Beach		0		0		0
	Perdido Beach		0		0		0
	Robertsdale						
	Silverhill						
	Spanish Fort		1		3		3
	Summerdale		1		1		1
<b>AVERAGE</b>			0.64		1.82		1.91
<b>Flooding-Coastal</b>	Baldwin County						
	Bay Minette						
	Daphne		1		3		3
	Elberta		1		3		3
	Fairhope		1		4		4
	Foley		1		2		2
	Gulf Shores		1		3		5
	Loxley		0		0		0
	Magnolia Springs		1		3		4
	Orange Beach		1		5		4
	Perdido Beach		1		4		3
	Robertsdale						
	Silverhill						
	Spanish Fort		1		4		5
	Summerdale		0		1		1
<b>AVERAGE</b>			0.82		2.91		3.09
<b>Hurricanes-surge</b>	Baldwin County						
	Bay Minette						
	Daphne		1		4		3
	Elberta		1		4		3
	Fairhope		1		5		5
	Foley		1		2		2
	Gulf Shores		1		5		5
	Loxley		0		0		0
	Magnolia Springs		1		3		4
	Orange Beach		1		5		5
	Perdido Beach		1		5		5
	Robertsdale						
	Silverhill						
	Spanish Fort		1		5		5
	Summerdale		0		0		0
<b>AVERAGE</b>			0.82		3.45		3.36



Hazard	Geographic Area	Location (2005)	Location (2010)	Extent (2005)	Extent (2010)	Probability (2005)	Probability (2010)	
<b>Hurricanes – High Winds</b>	Baldwin County							
	Bay Minette							
	Daphne		1		4		4	
	Elberta		1		4		3	
	Fairhope		1		5		5	
	Foley		1		4		4	
	Gulf Shores		1		5		5	
	Loxley		1		4		5	
	Magnolia Springs		1		3		4	
	Orange Beach		1		5		5	
	Perdido Beach		1		5		5	
	Robertsdale							
	Silverhill							
	Spanish Fort		1		5		5	
Summerdale		1		5		5		
	<b>AVERAGE</b>		1.00		4.45		4.55	
<b>Severe Storms</b>	Baldwin County							
	Bay Minette							
	Daphne		1		4		4	
	Elberta		1		3		3	
	Fairhope		1		4		5	
	Foley		1		3		4	
	Gulf Shores		1		2		3	
	Loxley		1		4		3	
	Magnolia Springs		1		3		3	
	Orange Beach		1		4		4	
	Perdido Beach		1		3		3	
	Robertsdale							
	Silverhill							
	Spanish Fort		1		4		5	
Summerdale		0		0		0		
	<b>AVERAGE</b>		0.91		3.09		3.36	
<b>Tornadoes</b>	Baldwin County							
	Bay Minette							
	Daphne		1		5		2	
	Elberta		1		3		3	
	Fairhope		1		3		3	
	Foley		1		4		2	
	Gulf Shores		1		1		1	
	Loxley		1		3		3	
	Magnolia Springs		1		4		3	
	Orange Beach		1		4		2	
	Perdido Beach		1		2		1	
	Robertsdale							
	Silverhill							
	Spanish Fort		1		4		4	
Summerdale		1		5		3		
	<b>AVERAGE</b>		1.00		3.45		2.45	

Hazard	Geographic Area	Location (2005)	Location (2010)	Extent (2005)	Extent (2010)	Probability (2005)	Probability (2010)
<b>Wildfires</b>	Baldwin County						
	Bay Minette						
	Daphne		1		3		3
	Elberta		1		2		1
	Fairhope		1		2		3
	Foley		1		3		5
	Gulf Shores		1		3		3
	Loxley		1		4		4
	Magnolia Springs		1		3		2
	Orange Beach		1		3		3
	Perdido Beach		1		2		1
	Robertsdale						
	Silverhill						
	Spanish Fort		1		3		3
Summerdale		1		1		2	
	<b>AVERAGE</b>		1.00		2.64		2.73
<b>Droughts/Heat Waves</b>	Baldwin County						
	Bay Minette						
	Daphne		1		1		3
	Elberta		1		1		1
	Fairhope		1		2		3
	Foley		1		4		3
	Gulf Shores		1		2		3
	Loxley		1		3		3
	Magnolia Springs		1		2		2
	Orange Beach		1		3		3
	Perdido Beach		0		0		0
	Robertsdale						
	Silverhill						
	Spanish Fort		1		3		4
Summerdale		1		2		2	
	<b>AVERAGE</b>		0.91		2.09		2.45
<b>Winter Storms/Freezes</b>	Baldwin County						
	Bay Minette						
	Daphne		1		1		2
	Elberta		1		1		1
	Fairhope		1		1		1
	Foley		1		4		2
	Gulf Shores		1		4		1
	Loxley		1		3		2
	Magnolia Springs		1		2		2
	Orange Beach		1		3		2
	Perdido Beach		0		0		0
	Robertsdale						
	Silverhill						
	Spanish Fort		1		2		3
Summerdale		1		1		1	
	<b>AVERAGE</b>		0.91		2.00		1.55

Hazard	Geographic Area	Location (2005)	Location (2010)	Extent (2005)	Extent (2010)	Probability (2005)	Probability (2010)
<b>Dam/levee Failures</b>	Baldwin County						
	Bay Minette						
	Daphne		1		3		3
	Elberta		0		0		0
	Fairhope		0		0		0
	Foley		1		1		1
	Gulf Shores		0		0		0
	Loxley		1		2		1
	Magnolia Springs		1		1		1
	Orange Beach		0		0		0
	Perdido Beach		0		0		0
	Robertsdale						
	Silverhill						
	Spanish Fort		0		0		0
Summerdale		0		0		0	
	<b>AVERAGE</b>		0.36		0.64		0.55
<b>Landslides</b>	Baldwin County						
	Bay Minette						
	Daphne		0		0		0
	Elberta		1		1		1
	Fairhope		0		0		0
	Foley		0		0		0
	Gulf Shores		0		0		0
	Loxley		0		0		0
	Magnolia Springs		1		1		1
	Orange Beach		0		0		0
	Perdido Beach		0		0		0
	Robertsdale						
	Silverhill						
	Spanish Fort		1		2		3
Summerdale		0		0		0	
	<b>AVERAGE</b>		0.27		0.36		0.45
<b>Sinkholes</b>	Baldwin County						
	Bay Minette						
	Daphne		1		3		2
	Elberta		1		2		2
	Fairhope		0		0		0
	Foley		0		0		0
	Gulf Shores		0		0		0
	Loxley		1		3		2
	Magnolia Springs		1		1		1
	Orange Beach		0		0		0
	Perdido Beach		0		0		0
	Robertsdale						
	Silverhill						
	Spanish Fort		0		0		0
Summerdale		0		0		0	
	<b>AVERAGE</b>		0.36		0.82		0.64

Hazard	Geographic Area	Location (2005)	Location (2010)	Extent (2005)	Extent (2010)	Probability (2005)	Probability (2010)
<b>Earthquakes</b>	Baldwin County						
	Bay Minette						
	Daphne		1		4		1
	Elberta		1		1		1
	Fairhope		1		1		1
	Foley		1		4		1
	Gulf Shores		0		0		0
	Loxley		1		5		1
	Magnolia Springs		1		1		1
	Orange Beach		1		5		1
	Perdido Beach		0		0		0
	Robertsdale						
	Silverhill						
	Spanish Fort		1		3		1
Summerdale		1		1		1	
	<b>AVERAGE</b>		0.82		2.27		0.82

**Table D-2. Baldwin County Identification and Ratings of Natural Hazards by Agencies**

Natural Hazard	Agency	Location (2010)	Extent (2010)	Probability (2010)
<b>Flooding-Riverine</b>	Riviera Utilities (Foley)	1	3	3
	<i>AVERAGE</i>	1.00	3.00	3.00
<b>Flooding-Coastal</b>	Riviera Utilities (Foley)	1	5	4
	<i>AVERAGE</i>	1.00	5.00	4.00
<b>Hurricanes-Surge</b>	Riviera Utilities (Foley)	1	4	5
	<i>AVERAGE</i>	1.00	4.00	5.00
<b>Hurricanes – High Winds</b>	Riviera Utilities (Foley)	1	4	5
	<i>AVERAGE</i>	1.00	4.00	5.00
<b>Severe Storms</b>	Riviera Utilities (Foley)	1	3	3
	<i>AVERAGE</i>	1.00	3.00	3.00
<b>Tornadoes</b>	Riviera Utilities (Foley)	1	3	2
	<i>AVERAGE</i>	1.00	3.00	2.00
<b>Wildfires</b>	Riviera Utilities (Foley)	0	0	0
	<i>AVERAGE</i>	0.00	0.00	0.00
<b>Droughts/Heat Waves</b>	Riviera Utilities (Foley)	1	1	1
	<i>AVERAGE</i>	1.00	1.00	1.00
<b>Winter Storms/Freezes</b>	Riviera Utilities (Foley)	0	0	0
	<i>AVERAGE</i>	0.00	0.00	0.00
<b>Dam/levee Failures</b>	Riviera Utilities (Foley)	1	3	1
	<i>AVERAGE</i>	1.00	3.00	1.00
<b>Landslides</b>	Riviera Utilities (Foley)	0	0	0
	<i>AVERAGE</i>	0.00	0.00	0.00

<b>Natural Hazard</b>	<b>Agency</b>	<b>Location (2010)</b>	<b>Extent (2010)</b>	<b>Probability (2010)</b>
<b>Sinkholes</b>	Riviera Utilities (Foley)	0	0	0
	<i>AVERAGE</i>	0.00	0.00	0.00
<b>Earthquakes</b>	Riviera Utilities (Foley)	0	0	0
	<i>AVERAGE</i>	0.00	0.00	0.00

**Table D-3. Manmade Hazards Identification Results**

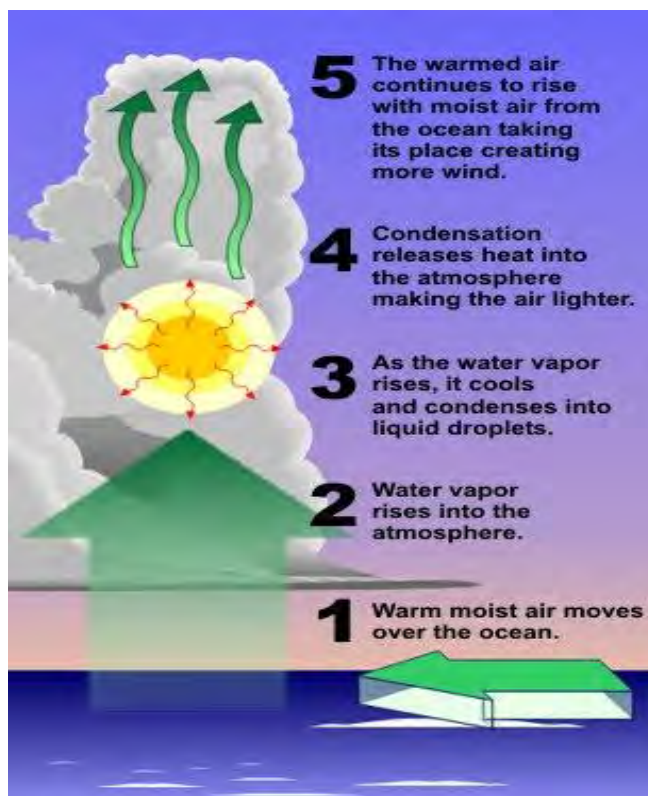
THREAT	Fairhope	Foley	Roberts-dale	Summer-dale	Orange Beach	Elberta	Perdido Beach	Baldwin Co.	Bay Minette	Daphne	Average
industrial fixed	5	2	3	2	1	5	2	3	3	3	2.9
industrial transport	4	3	1	3	3	3	2	3	3	3	2.8
Controls failure	4	2	1	3	1	3	1	2	2	3	2.2
<b>nuclear attack</b>	<b>5</b>	<b>5</b>	<b>1</b>	<b>5</b>	<b>5</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>3.5</b>
explosive blast	4	3	1	3	3	4	4	2	2	3	2.9
<b>disease/pandemic</b>	<b>3</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3.1</b>
<b>chemical attack</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>3</b>
<b>biological attack</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>3</b>
radiological attack	3	5	1	1	2	1	4	1	3	5	2.6
agriterrorism	3	3	1	4	1	1	2	1	3	5	2.4
armed attack	5	1	1	3	4	1	2	3	3	5	2.8
cyber attack	5	5	1	3	4	1	1	3	3	3	2.9

RISK	Fairhope	Foley	Roberts-dale	Summer-dale	Orange Beach	Elberta	Perdido Beach	Baldwin Co.	Bay Minette	Daphne	Average
<b>industrial fixed</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>2.1</b>
<b>industrial transport</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2.1</b>
Controls failure	3	2	1	1	1	1	1	2	2	1	1.5
nuclear attack	1	1	1	1	1	1	1	1	1	1	1
<b>explosive blast</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2.1</b>
<b>disease/pandemic</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2.6</b>
chemical attack	2	1	1	1	1	1	1	1	1	1	1.1
biological attack	2	1	1	1	1	1	1	1	1	1	1.1
radiological attack	2	1	1	1	1	1	1	1	1	1	1.1
agriterrorism	3	2	1	1	1	1	1	1	1	1	1.3
armed attack	3	1	1	2	1	1	1	3	1	1	1.5
<b>cyber attack</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>2.8</b>

## 2.0 Hazard Descriptions

### 2.1 Hurricanes Description

Hurricanes, as referred to in this plan, include all types of tropical cyclones: hurricanes, tropical storms, and tropical depressions. A tropical cyclone is a rotating weather system that develops in the tropics. A tropical depression is an organized system of persistent clouds and thunderstorms with low level closed circulation and maximum sustained winds of 38 mph or less. A tropical storm is an organized system of strong thunderstorms with a well-defined circulation and maximum sustained winds of 39 to 73 mph. All of these tropical cyclones begin as a disturbance. A disturbance may result from a number of different weather events including Easterly Waves, West African Disturbance Line, Tropical Upper Tropospheric Trough or an Old Frontal Boundary. In



**Figure D-1. How a Hurricane Forms**

Source: National Hurricane Center ([www.nhc.noaa.gov](http://www.nhc.noaa.gov))

order for a tropical disturbance to develop into a hurricane, three things must occur. First, the disturbance must gather energy and heat through contact with warm ocean waters. Next, added moisture evaporated from the sea surface provides power to the tropical storm. And last, the seedling storm forms a wind pattern near the ocean surface that spirals inward. Warm water is the most important of the three, as it provides the fuel for a disturbance to eventually develop into a hurricane. A hurricane is a tropical weather system with a well defined circulation and sustained winds of 74 mph or higher. Even inland areas, well away from the coastline, can experience destructive winds, tornadoes and floods from tropical storms and hurricanes.

The Atlantic hurricane season begins on June 1 and lasts through November. Within the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico annually there are an average of 11 tropical storms, 6

of which become hurricanes. In a typical three-year span, the US coastline is struck an average of five times, two that are major hurricanes (category 3 or higher.) Hurricanes pose the greatest threat to life and property, but tropical depressions and storms can also cause extensive damage and loss of life. Hurricanes are categorized on a scale of 1 to 5 based on their sustained wind speed. Herbert Saffir, a consulting engineer in Coral Gables, Florida, and Dr. Robert Simpson, then director of the National Hurricane Center, developed this scale in the 1970's. Category 3-5 hurricanes are considered to be major storms. The Saffir-Simpson scale



is based primarily on wind speeds and includes estimates of barometric pressure and storm surge associated with each of the five categories.

**Table D-4. Saffir-Simpson Scale**

Category	Wind Speed	Storm Surge (feet above normal sea level)	Expected Damage
1	74-95 mph	4-5 ft	<b>Minimal:</b> Damage is done primarily to shrubbery and trees, unanchored mobile homes are damaged, some signs are damaged, no real damage is done to structures
2	96-110 mph	6-8 ft	<b>Moderate:</b> Some trees are toppled, some roof coverings are damaged, major damage is done to mobile homes
3	111-130 mph	9-12 ft	<b>Extensive:</b> Large trees are toppled, some structural damage is done to roofs, mobile homes are destroyed, structural damage is done to small homes and utility buildings.
4	131-155 mph	13-18 ft	<b>Extreme:</b> Extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail, some curtain walls fail
5	>155 mph	>18 ft	<b>Catastrophic:</b> Roof damage is considerable and widespread, window and door damage is severe, there are extensive glass failures and entire buildings could fail.

Source: National Hurricane Center

The main parts of a hurricane are the eye, the eye wall, and rain bands. The **eye** of a hurricane is the calmest part. The eye is typically 20-40 miles across and has light winds that don't exceed 15 mph. An eye will usually develop when the maximum sustained wind speed is more than 74 mph. The strong rotation around the cyclone balances inflow to the center, causing air to ascend about 10-20 miles from the center forming the eye wall. A vacuum of air at the center is caused due to the strong rotation, the vacuum allows air flowing out of the top of the eye wall to turn inward and sink to replace the loss of air mass near the center. Due to the sinking air, cloud formation is suppressed. The passage of the eye is the calmest part of the hurricane. Since there is a light wind and fair weather, many believe that the storm has passed, which can prove dangerous. Immediately after the passage of the eye, the eye wall winds return but in an opposite direction.

The **eye wall** is the part of a hurricane where the strong winds meet the eye. The eye wall is a group of tall thunderstorms that produce heavy rain and the strongest winds within the storm. Changes in the structure of the eye and eye wall can cause changes in the wind speed, which is an indicator of the storm's intensity. An eye may grow or shrink in size and additional eye walls can form.

The **rain bands** are the outermost part of the hurricane. They are bands of clouds and thunderstorms that trail away from the eye wall in a spiral fashion. These bands produce heavy rain and strong winds, as well as potentially tornadoes.

A hurricane also has additional hazards associated with it, both direct and indirect. The secondary hazards include storm surge, wind gusts, squalls, inland flooding and tornadoes. **Storm surge** is water that is pushed toward the shore by the winds around the storm. Storm surge combines with the normal tides to create the hurricane storm tide. Wind driven waves also combine into hurricane storm tide. The rise in water level can cause severe flooding in coastal areas. The level of surge is dependent upon the slope of the continental shelf. A shallow slope off of the coast allows a higher surge to inundate the area.

**Figure D-2. Storm Surge**



Source: NWS Jet Stream- Online School for Weather at [www.srh.noaa.gov/srh/jetstream/tropics/tc\\_hazards.htm](http://www.srh.noaa.gov/srh/jetstream/tropics/tc_hazards.htm)

In addition to storm surge, hurricanes are also known for **damaging winds**. They are rated according to their sustained wind speed. This scale does not account for gusts and squalls. **Gusts** are short and rapid bursts in wind speed. They are caused by turbulence over land mixing faster air aloft to the surface. **Squalls** are longer period of increased wind speeds; they are normally located within the outer rain bands.

Hurricanes, tropical storms, and depressions many times bring torrential rains and flooding. This flooding may last many days after the storm has passed. The strength of the storm does not always affect the level of flooding. A slow, weak tropical storm can cause more damage due to flooding than a more powerful fast moving hurricane.

Tornadoes also may occur within a tropical cyclone. They are most likely to occur in the right-front quadrant of the storm, but can be embedded within the rain bands well away from the center of the storm. Some hurricanes produce no tornadoes, while others develop numerous ones. According to NOAA studies, half of all land falling hurricanes produce at least one tornado. The effects of a tornado, in addition to hurricane force winds, can produce substantial wind damages. A tornado can develop at any point during landfall, but normally occur within 12 hours after landfall, during daylight hours.

Due to the likelihood of a tornado within a hurricane, a tornado watch is normally issued along the anticipated path of a hurricane before landfall.

*(The description of hurricanes presented in this section is based upon information extracted from the NOAA publication Hurricanes Unleashing Nature's Fury, A Preparedness Guide, Revised January 2007 at <http://www.nws.noaa.gov/om/hurricane/pdfs/HurricanesUNF07.pdf> and the NWS Jet Stream Online School for Weather at [http://www.srh.noaa.gov/srh/jetstream/tropics/tropics\\_intro.htm](http://www.srh.noaa.gov/srh/jetstream/tropics/tropics_intro.htm)).*

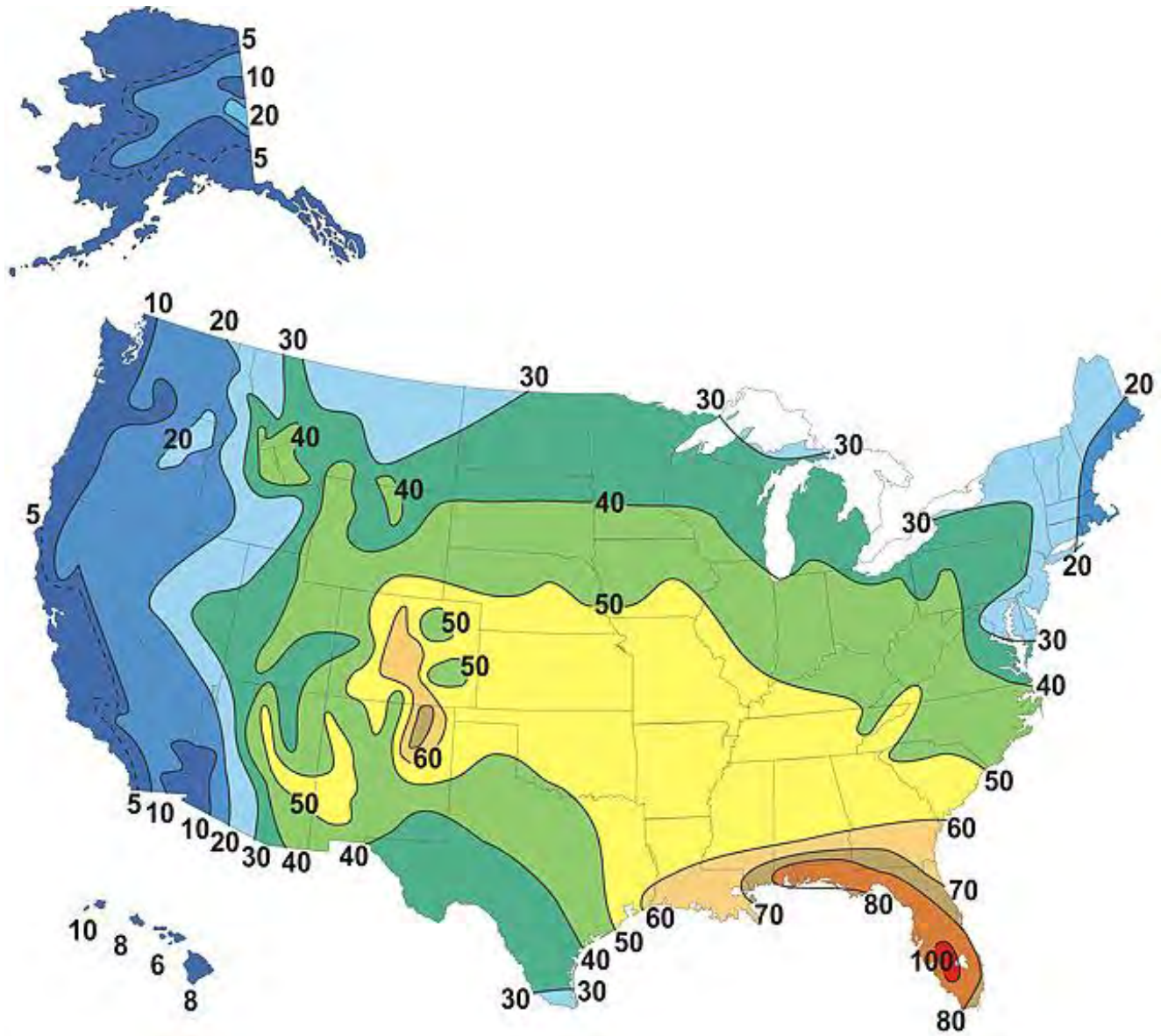
## **2.2 Severe Storms Description**

Severe storms, as referred to in this plan, include severe thunderstorms with damaging lightning, hail, and straight-line winds. Severe storms are also associated with tornadoes, hurricanes, and floods, which are described separately in this plan.

**Thunderstorms** affect relatively small areas when compared with hurricanes and winter storms. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Despite their small size, thunderstorms can be dangerous. Of the estimated 100,000 thunderstorms that occur each year in the United States, about 10 percent are classified as severe. The National Weather Service considers a thunderstorm severe if it produces hail at least 3/4-inch in diameter, winds of 58 mph or stronger, or a tornado.

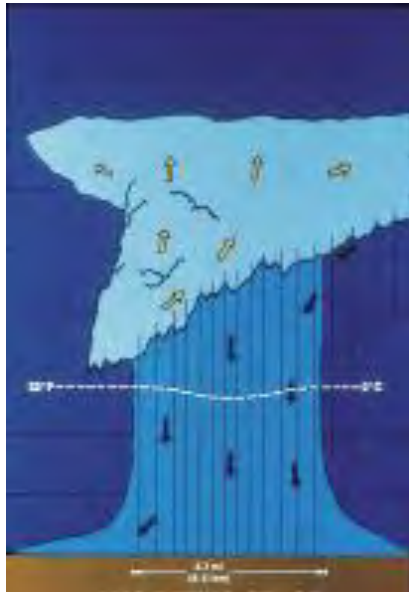
The National Weather Service estimates over 40,000 thunderstorms occur each day worldwide or close to 16 million annually. In the U.S., roughly 100,000 thunderstorms occur each year. The following map shows the average number of thunderstorm days each year throughout the U.S. The most frequent occurrence is in the southeastern states, with Florida having the highest incidence at 80 to 100+ thunderstorm days per year. Alabama's incidence is high at 50 to 80 thunderstorm days per year. Warm, moist air from the Gulf of Mexico and the Atlantic Ocean is most readily available to fuel thunderstorm development in this region of the country.

Map D-1. U.S. Average Thunderstorm Days per Year



Source: National Weather Service

**Figure D-3. Life Cycle of a Thunderstorm**

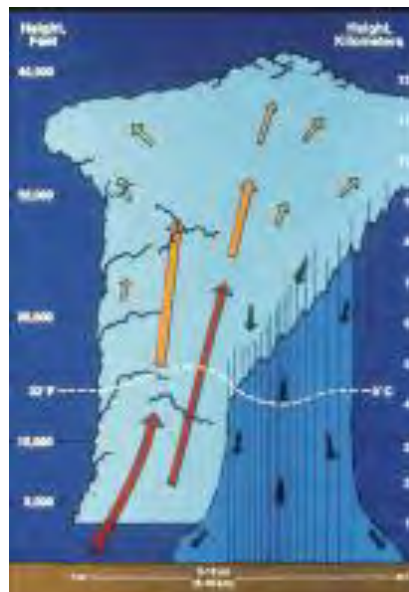
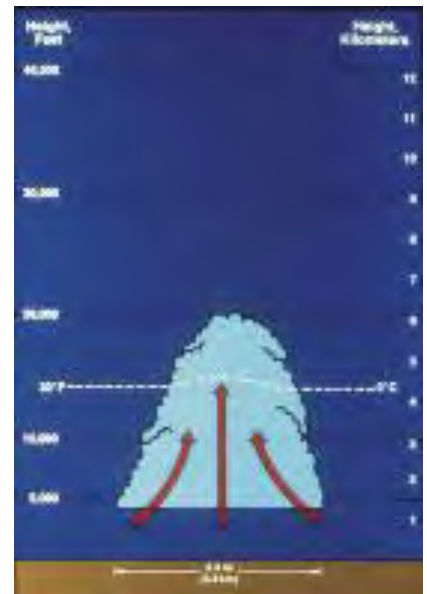


**Developing Stage**

- Towering cumulus cloud indicates rising air.
- Usually little if any rain during this stage.
- Lasts about 10 minutes.
- Occasional lightning.

**Mature Stage**

- Most likely time for hail, heavy rain, frequent lightning, strong winds, and tornadoes.
- Storm occasionally has a black or dark green appearance.
- Lasts an average of 10 to 20 minutes but may last much longer in some storms.



**Dissipating Stage**

- Rainfall decreases in intensity.
- Can still produce a burst of strong winds.
- Lightning remains a danger

Source: National Weather Service

**Lightning** results from the buildup and discharge of electrical energy between positively and negatively charged areas. Rising and descending air within a thunderstorm separates these positive and negative charges. Water and ice particles also affect charge distribution. A cloud-to-ground lightning strike begins as an invisible channel of electrically charged air moving from the cloud toward the ground. When one channel nears an object on the ground, a powerful surge of electricity from the ground moves upward to the clouds and produces the visible lightning strike.

Here are some facts about lightning from the National Weather Service:

- Lightning causes an average of 80 fatalities and 300 injuries each year.
- Lightning occurs in all thunderstorms.
- Each year lightning strikes the earth 20 million times. The energy from one lightning flash could light a 100-watt light bulb for more than three months.
- Most lightning fatalities and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.
- Lightning can occur from cloud-to-cloud, within a cloud, cloud-to-ground, or cloud-to-air.
- Lightning starts many fires in the western United States and Alaska.
- The air near a lightning strike is heated to 50,000°F--hotter than the surface of the sun!
- The rapid heating and cooling of the air near the lightning channel causes a shock wave that results in thunder.

Another damaging effect of severe storms is **hail**. Hail stones are large ice particles produced by intense thunderstorms. Strong rising currents of air within a storm, called updrafts, carry water droplets to a height where freezing occurs. Ice particles grow in size, becoming too heavy to be supported by the updraft, and fall to the ground. Large stones can fall at speeds faster than 100 mph. Hail causes substantial damage to property and crops each year in the U.S.



**Figure D-4. Hail Stones.**

Most thunderstorm wind damage is caused by straight-line winds, which can exceed 100 mph. One type of straight-line wind, the downburst, is a small area of rapidly descending air beneath a thunderstorm. A downburst can cause damage equivalent to a strong tornado.

*(The description of severe storms presented in this section is based upon information extracted from National Weather Service on-line publications at <http://www.srh.noaa.gov/jetstream/tstorms/>).*

### **2.3 Tornadoes Description**

Tornadoes are one of nature's most violent storms, which are characterized by a rapidly rotating column of air extending from the base of a thunderstorm to the ground. In an average year, approximately 1,000 tornadoes are reported across the United States, resulting in over 1,500 injuries and 80 deaths, the greatest number of wind-related deaths. The most violent tornadoes, with wind speeds of 250 mph or more, are capable of tremendous destruction. Damage paths can be more than one mile wide and 50 miles long. Tornadoes can occur anywhere and come in all shapes and sizes.

In Alabama, peak tornado season is generally March through May with a secondary season in late fall; however, tornadoes can strike at any time of the year if the essential conditions are present. Tornadoes in the peak season are often associated with strong, frontal systems that form in central states and move east. Occasionally, large outbreaks of tornadoes occur with this type of weather pattern. Several states may be affected by numerous severe storms and tornadoes.

Tornadoes can occur in thunderstorms that develop in warm, moist air masses in advance of eastward-moving cold fronts. These thunderstorms often produce large hail and strong winds, in addition to tornadoes. Thunderstorms spawn tornadoes when cold air overrides a layer of warm air, causing the warm air to rise rapidly. Tornadoes occasionally accompany tropical storms and hurricanes that move over land. They are most common to the right and ahead of the path of the storm center as it comes onshore. The winds produced from wildfires have also been known to produce tornadoes.

The following graphic describes the formation of a tornado:

**Figure D-5. How a Tornado Forms**

<p>▲ Before thunderstorms develop, a change in wind direction and an increase in wind speed with increasing height create an invisible, horizontal spinning effect in the lower atmosphere.</p>	<p>▲ Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical.</p>	<p>▲ An area of rotation, 2-6 miles wide, now extends through much of the storm. Most strong and violent tornadoes form within this area of strong rotation.</p>
<p>Woodward OK (Ron Przybylinski)</p> <p>▲ A lower cloud base in the center of the photograph identifies an area of rotation known as a rotating wall cloud. This area is often nearly rain-free. Note rain in the background.</p>	<p>Woodward OK (Ron Przybylinski)</p> <p>▲ Moments later a strong tornado develops in this area. Softball-size hail and damaging "straight-line" winds also occurred with this storm.</p>	

Source: Tornadoes – A Preparedness Guide, National Weather Service, February 1995.

Meteorologists rely on weather radar to provide information on developing storms. The National Weather Service is strategically locating Doppler radars across the country, which can detect air movement toward or away from the radar. Early detection of increasing rotation aloft within a thunderstorm can allow life-saving warnings to be issued before the tornado forms.

When conditions are favorable for severe weather to develop, a severe thunderstorm or tornado WATCH is issued. Weather Service personnel use information



from weather radar, spotters, and other sources to issue severe thunderstorm and tornado WARNINGS for areas where severe weather is imminent. Severe thunderstorm warnings are passed to local radio and television stations and are broadcast over local NOAA Weather Radio stations serving the warned areas. These warnings are also relayed to local emergency management and public safety officials who can activate local warning systems to alert communities.

In 1971, Dr. T. Theodore Fujita of the University of Chicago developed the original F-scale for wind damages, including tornadoes. The original F-scale, however, was recently replaced by an enhanced version effective February 1, 2007. The Enhanced F-scale is a more precise method of tornado damage assessment that classifies damage according to calibrations developed by engineers and meteorologists across 28 different types of damage indicators. The underlying premise is that a tornado scale needs to take into account the varying strengths and weaknesses of different types of construction. As with the original F-scale, the enhanced version rates the tornado as a whole based on most intense damage within the path. Historical tornadoes before February 1, 2007, will not be re-evaluated using the Enhanced F-scale.

**Table D-5. Enhanced F Scale for Tornado Damage**

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	4D-78	0	6D-85	<b>0</b>	<b>6D-85</b>
1	73-112	79-117	1	86-109	<b>1</b>	<b>86-110</b>
2	113-157	118-161	2	110-137	<b>2</b>	<b>111-135</b>
3	158-207	162-209	3	138-167	<b>3</b>	<b>136-165</b>
4	208-260	210-261	4	168-199	<b>4</b>	<b>166-200</b>
5	261-318	262-317	5	200-234	<b>5</b>	<b>Over 200</b>

Source: NOAA Storm Prediction Center's [On-Line Frequently Asked Questions about Tornadoes](http://www.spc.noaa.gov/faq/tornado/#f-scale3)

**Table D-6. Fujita Tornado Damage Scale**

SCALE	WIND ESTIMATE *** (MPH)	TYPICAL DAMAGE
F0	< 73	<b>Light damage.</b> Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	<b>Moderate damage.</b> Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	<b>Considerable damage.</b> Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	<b>Severe damage.</b> Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	<b>Devastating damage.</b> Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	<b>Incredible damage.</b> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Source: NOAA Storm Prediction Center's On-Line Frequently Asked Questions about Tornadoes  
(<http://www.spc.noaa.gov/faq/tornado/#f-scale3>)

*(The description of tornadoes presented in this section is based upon information extracted from the FEMA How to Guides Understanding Your Risks (FEMA 386-2), FEMA, August 2001, and Using HAZUS-MH for Risk Assessment (FEMA 433), FEMA, August 2004, Tornadoes – A Preparedness Guide, National Weather Service, February 1995, and the NOAA Storm Prediction Center's On-Line Frequently Asked Questions about Tornadoes (<http://www.spc.noaa.gov/faq/tornado/#f-scale3>).*

## 2.4 Floods Description

A flood is a natural event for rivers and streams. Excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers, lakes, and oceans that are subject to recurring floods.

Hundreds of floods occur each year, making it one of the most common hazards in all 50 states and U.S. territories. Floods kill an average of 150 people a year nationwide. They can occur at any time of the year, in any part of the country, and at any time of day or night. Floodplains in the U.S. are home to over nine million households. Most injuries and deaths occur when people are swept away by flood currents, and most property damage results from inundation by sediment-filled water.

Several factors determine the severity of floods, including rainfall intensity, other water source and duration. A large amount of rainfall over a short time span can result in flash flood conditions. A small amount of rain can also result in floods in locations where the soil is saturated from a previous wet period or if the rain is concentrated in an area of

impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas. Topography and ground cover are also contributing factors for floods. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. Frequency of inundation depends on the climate, soil, and channel slope. In regions where substantial precipitation occurs in a particular season each year, or in regions where annual flooding is derived principally from snowmelt, the floodplains may be inundated nearly every year. In regions without extended periods of below-freezing temperatures, floods usually occur in the season of highest precipitation. In areas where flooding is caused by melting snow, and occasionally compounded by rainfall, the flood season is spring or early summer.

Fortunately, most of the known floodplains in the United States have been mapped by FEMA, which administers the NFIP (National Flood Insurance Program). When a flood study is completed for the NFIP, the information and maps are assembled into a Flood Insurance Study (FIS). An FIS is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community and includes causes of flooding. The FIS report and associated maps delineate Special Flood Hazard Areas (SFHAs), designate flood risk zones, and establish base flood elevations (BFEs), based on the flood that has a 1% chance of occurring annually, or the 100-year flood. Paper FIRMs and FIS reports are gradually being replaced by DFIRMs (digital FIRMs).

The **100-year flood** designation applies to the area that has a 1 percent chance, on average, of flooding in any given year. However, a 100-year flood could occur two years in a row, or once every 10 years. The 100-year flood is also referred to as the **base flood**. The base flood is the standard that has been adopted for the NFIP. It is a national standard that represents a compromise between minor floods and the greatest flood likely to occur in a given area and provides a useful benchmark.

**Base Flood Elevation (BFE)**, as shown on the FIRM, is the elevation of the water surface resulting from a flood that has a 1% chance of occurring in any given year. The BFE is the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, the North American Vertical Datum (NAVD) of 1988, or other datum referenced in the FIS report.

**Special Flood Hazard Area (SFHA)** is the shaded A-Zone or V-Zone area on a FIRM that identifies an area that has a 1% chance of being flooded in any given year or the **100-year floodplain**. FIRMs show different floodplains with different zone designations, as shown on Table D-7 "Flood Zone Designations." These are used for insurance rating purposes, but are also necessary for flood permitting and flood hazard mitigation planning purposes. The **500-Year Floodplain** is the shaded X-Zone area shown on a FIRM that has a 0.2% chance of being flooded in any given year.

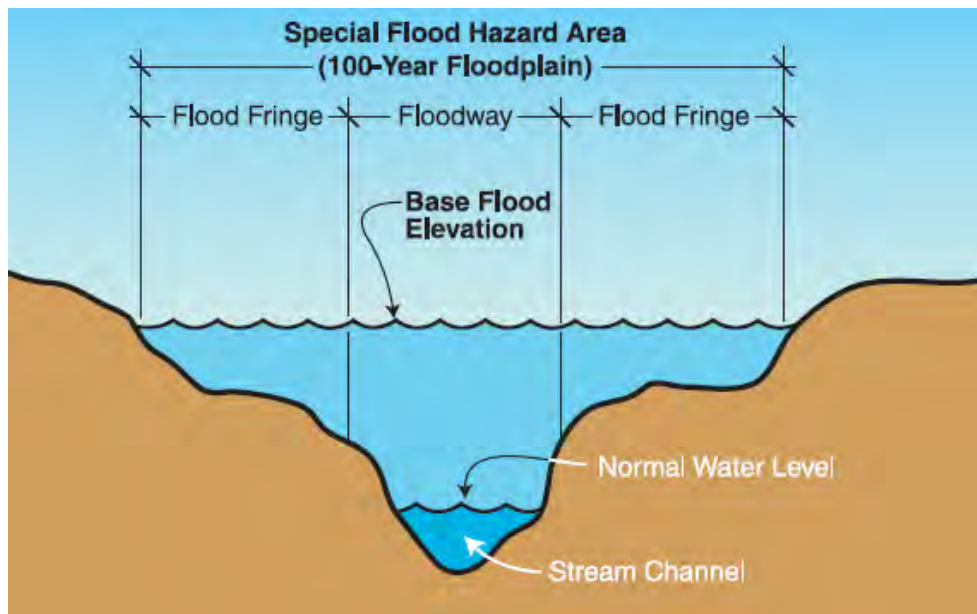
**Table D-7. Flood Zone Designations**

<b>A Zones</b>	100-year floodplain areas of high risk.	
	A	The base floodplain mapped by approximate methods, i.e., BFEs are not determined. This is often called an unnumbered A zone or an approximate A zone.
	AE	The base floodplain where base flood elevations are provided.
	AO	The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided.
	AH	Shallow flooding base floodplain. BFEs are provided.
	A99	Area to be protected from base flood by levees or Federal flood protection systems under construction. BFEs are not determined.
	AR	The base floodplain that results from the de-certification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection.
<b>V Zones</b>	100-year coastal floodplain areas of high risk	
	V	The coastal area subject to a velocity hazard (wave action) where BFEs are not determined on the FIRM.
	VE	The coastal area subject to a velocity hazard (wave action) where BFEs are provided on the FIRM.
<b>X Zones</b>	Areas of minimal to moderate risk outside the 100-year floodplain.	
	Shaded	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Also includes areas protected by levees from the 100-year flood and shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
	Unshaded	Area of minimal flood hazard determined to be outside the 500-year floodplain.
<b>D Zone</b>	Area of undetermined but possible flood hazards.	

Source: FEMA

**Floodway** is the stream channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood without substantial increases in flood heights. The **Flood Fringe** is the remainder of the 100-year floodplain.

The following graphic shows the components of a floodplain along a stream:

**Figure D-6. Flood Plain Cross Section**

Source: FEMA

A range of floods, other than just the 100-year flood, could happen within an area. Buildings in very close proximity to a stream or shoreline, for example, might experience flooding much more frequently.

*(The description of floods presented in this section is based upon information extracted from the FEMA How to Guide Understanding Your Risks (FEMA 386-2), FEMA, August 2001).*

## 2.5 Wildfires Description

Wildfires are a serious and growing hazard over much of the United States, posing great threats to life and property, particularly when moving from rural forest or rangeland into developed urban areas. Millions of acres burn every year in the United States as a result of wildfires, causing millions of dollars in damage. Each year more than 100,000 wildfires occur in the United States, almost 90 percent of which are started by humans; the rest are caused by natural causes, primarily lightning, other natural causes include sparks from falling rocks and volcanic activity. Weather is one of the most significant factors in determining the severity of wildfires. The intensity of fires and the rate with which they spread is directly related to wind speed, temperature, and relative humidity. Climatic conditions, such as long-term drought, also play a major role in the number and the intensity of wildfires.

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed and spread quickly and are usually signaled by dense smoke that fills the area for miles around.

Most wildfires fall within two categories: Wildland Fire and Wildland-Urban Interface fires. **Wildland fires** occur in areas where there is little development except for roads, railroads, power lines and other basic infrastructure. **Wildland-urban interface fires** occur in areas where development, primarily residential, meet wildland areas. Areas with a large amount of wooded, brush and grassy areas are at highest risk from wildfires.

The primary cause of wildfires is human activity, either intentional or accidental. Intentional fires may be started as prescribed burns, to drive game or arson. Accidental fires are caused by the carelessness of hikers or others traveling through wildland areas. The severity and duration of the fire is based upon numerous factors including available fuel, topography and weather conditions. Through efforts of the Alabama Forestry Commission, wildfires are decreasing. They have a fleet of airplanes available to patrol vulnerable areas. There is also a toll-free number in place for the public to call and report wildfires. The forestry commission does have firefighters available to respond to fires, but the effort is largely accomplished through a network of volunteer fire departments.

*(The description of wildfires presented in this section is based upon information extracted from the FEMA How to Guides Understanding Your Risks (FEMA 386-2), August 2001, Using HAZUS-MH for Risk Assessment How to Guide (FEMA 433), August 2004, and the Alabama Forestry Commission at <http://www.forestry.alabama.gov>).*

## 2.6 Droughts/Heat Waves Description

A drought can occur almost anywhere, and its features vary from place to place depending on culture and geography. According to the National Drought Mitigation Center (NDMC), there are four ways of measuring drought. First is a **meteorological drought**, which is a decrease in precipitation in some period of time. These are usually region-specific, and based on a thorough understanding of regional climatology. Meteorological measurements are the first sign of drought. An **agricultural drought** occurs when there is not enough soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought occurs after a meteorological drought, but before hydrological drought. **Hydrological drought** is deficiencies in surface and subsurface water supplies. It is measured as stream flow and at lake, reservoir and groundwater levels. There is a time lag between lack of rain and less water in rivers, streams, reservoirs and lakes. When precipitation is deficient over time, it will show in these water levels. The last type of drought defined by NDMC is a **socioeconomic drought**, which occurs when water shortages begin to affect people. In addition to the impacts discussed above, water level decline due to drought can also cause sinkholes to form.

The draft Alabama Drought Management Plan (2004) by the Office of Water Resources of the Alabama Department of Economic and Community Affairs (ADECA) explains the potential threats of droughts to Alabama and the need for effective drought planning and management, as follows:

*In recent years, drought conditions have endangered Alabama's water resources and adversely affected the livelihood of many people. Drought*

*is a natural event that, unlike floods or tornadoes, does not occur in a violent burst but gradually happens; furthermore, the duration and extent happens; furthermore, the duration and extent of drought conditions are unknown because rainfall is unpredictable in amount, duration and location. The devastation (environmental, social, and economic) experienced in recent years due to drought conditions has not been successfully mitigated because previous responses to drought conditions at all levels of government has been slow and fragmented, with little focus on preparedness and mitigation. In an effort to be more proactive, the Office of Water Resources worked closely with numerous local, state, and federal agencies and other water resources professionals to develop and implement this statewide approach to drought planning and management.*

The State drought plan establishes four phases of drought conditions – drought watch, advisory, warning, and emergency – identified by a compilation of drought indices, which include Crop Moisture Index, Palmer Drought Severity Index, Stream Flow, Reservoir Elevation Level, and Groundwater. Each of these phases requires varying levels of management. The U.S. Drought Monitor by the National Drought Mitigation Center (NDMC) uses a four-tier system to continuously monitor drought intensity based on another combination of drought indices. “D0” includes drought watch areas that are abnormally dry and on the verge of drought or recovering from drought. “D1” is the first drought stage with severe conditions, and “D4” is most intense drought stage with exceptional drought conditions. The primary adverse physical effects of drought are classified as “A” (adverse impacts to agricultural crops, pastures, and grasslands) or “H” (adverse impacts to hydrologic resources for water supply, including rivers, reservoirs, and groundwater).

According to NOAA, extreme heat is the number one weather related killer taking an average of 1,500 people in the U.S. annually. The National Weather Service issues watches and warnings when the heat index is expected to exceed 105°-110° F for at least two consecutive days. The heat index is given in degrees Fahrenheit and is a measure of how hot it really feels when the relative humidity is added to the actual air temperature.

**Table D-8. NOAA's National Weather Service Heat Index**

		Temperature (°F)															
		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
Relative Humidity (%)	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	134
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
	55	81	84	86	89	93	97	101	106	112	117	124	130	137			
	60	82	84	88	91	95	100	105	110	116	123	129	137				
	65	82	85	89	93	98	103	108	114	121	128	136					
	70	83	86	90	95	100	105	112	119	126	134						
	75	84	88	92	97	103	109	116	124	132							
	80	84	89	94	100	106	113	121	129								
	85	85	90	96	102	110	117	126	135								
	90	86	91	98	105	113	122	131									
	95	86	93	100	108	117	127										
100	87	95	103	112	121	132											

**Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity**

■ Caution   
 ■ Extreme Caution   
 ■ Danger   
 ■ Extreme Danger

Source: NOAA at <http://www.weather.gov/om/heat/index.shtml>

*(The description of droughts/extreme heat presented in this section is extracted from: National Drought Mitigation Center, Defining Drought: Overview at <http://drought.unl.edu/whatis/define.htm> and NOAA, Heat Wave: A Major Summer Killer at <http://www.noaa.gov/themes/heat.php>).*

**2.7 Winter Storms/Freezes Description**

Winter storms and blizzards originate as mid-latitude depressions or cyclonic weather systems, sometimes following the meandering path of the jet stream. A blizzard combines heavy snowfall, high winds, extreme cold, and ice storms. The origins of the weather patterns that cause severe winter storms are primarily from four sources in the continental United States. Winter storms in the southeast region of the United States are usually a result of Canadian and Arctic cold fronts from the north and mid-western states combining with tropical cyclonic weather systems in the Gulf of Mexico. Typical winter storms in the Southeast include ice storms, crop-killing freezes and occasional snow.



**Figure D-7. Types of Winter Precipitation**



Source: National Weather Service, Winter Storms, The Deceptive Killers at <http://www.weather.gov/os/winter/resources/winterstorm.pdf>

Types of events that occur within a winter storm include freezing rain, sleet, blizzards, and frost/freeze. **Freezing rain** is rain that freezes when it hits the ground which coats roads, trees and power lines. **Sleet** is rain that turns into ice pellets before hitting the ground. A **blizzard** is snowfall with sustained winds or frequent gusts up to 35mph and considerable amounts of blowing snow. The expectation is that blizzard conditions will last 3 or more hours. Freezes occur when the temperatures will go below freezing. Many times frost/freezes cause substantial damage to crops.

*(The description of winter storms/freezes presented in this section is extracted from NOAA/NWS's publication Winter Storms, The Deceptive Killers, A Preparedness Guide at <http://www.weather.gov/os/winter/resources/winterstorm.pdf>).*

**2.8 Earthquakes Description**

An earthquake is the shaking and vibration at the surface of the earth resulting from underground movement along a fault plane. Earthquakes are caused by the release of built-up stress within rocks along geologic faults or by the movement of magma in volcanic areas. They usually occur without warning and are usually followed by aftershocks. Earthquakes can affect hundreds of thousands of square miles and cause tens of billions of dollars of damage to property. An earthquake event can cause injury and loss of life to hundreds of thousands of persons and can greatly disrupt the social and economic functioning of the affected area. Secondary hazards during an earthquake may occur, such as surface faulting, sinkholes, and landslides.

The rupture or sudden movement of a fault causes earthquakes where stresses have accumulated along opposing fault planes of the earth's outer crust. These fault planes are usually found along the borders of the earth's tectonic plates, which generally follow the outlines of the continents. However, fault planes may occur at the interior of the plates. The plates range from 50 to 60 miles in thickness and move slowly and

continuously over the earth's interior. Where the plates move past each other, they continually bump, slide, catch, and hold. When the stress exceeds the elastic limit of the rock, an earthquake occurs. Generally, the larger the earthquake, the greater the potential for surface fault rupture.

The area of greatest seismic activity in the United States is along the Pacific coast in California and Alaska, but as many as forty states can be characterized as having at least moderate earthquake risk. For example, seismic activity has been recorded in Boston, Massachusetts; New Madrid, Missouri; and Charleston, South Carolina, places not typically thought of as earthquake zones. Areas prone to

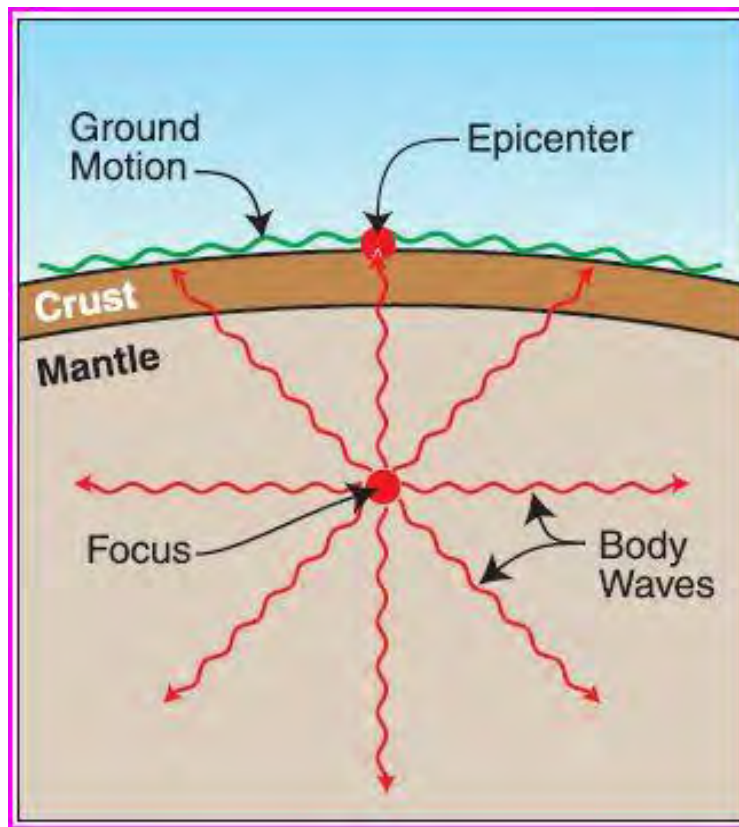


earthquakes are relatively easy to identify in the Western United States based on known geologic formations; however, predicting exactly when and where earthquakes will occur is very difficult everywhere. Records show that building inventories in 39 states are vulnerable to earthquake damage.

Most property damage and earthquake-related deaths result from the

failure and collapse of structures caused by **ground shaking or ground motion**. Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by an earthquake. The strength of the ground shaking is determined by the magnitude of the earthquake, the surface distance from the earthquake's epicenter and type of fault, and by the site and regional geology.

Ground shaking causes waves in the earth's interior, known as **seismic waves**, and along the earth's surface, known as **surface waves**. There are two types of seismic waves: *primary waves* which are longitudinal that cause back-and-forth oscillation along the direction of travel (vertical motion); and *secondary waves or shear waves* which are slower than primary waves and cause structures to vibrate from side-to-side (horizontal motion). Surface waves travel more slowly than and are usually significantly less damaging than seismic waves, illustrated by Figure D-8, below.

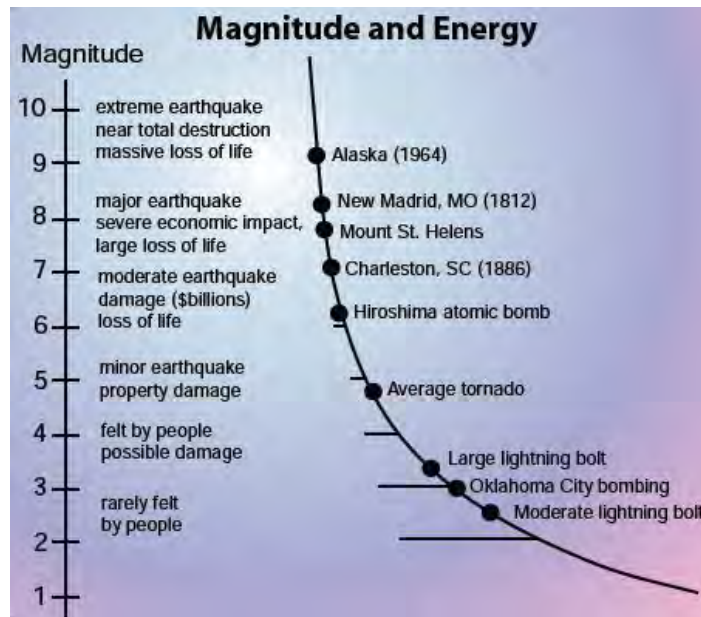
**Figure D-8. Seismic and Surface Waves**

Source: FEMA

Additional earthquake related hazards include landslides, liquefaction, and amplification. Earthquake-induced **landslides** are secondary earthquake hazards that occur from ground shaking. They can destroy roads, buildings, utilities, and other critical facilities necessary to respond to or recover from an earthquake. As sloped lands are developed, earthquake-induced landslides pose additional threats to homes and infrastructure.

Soil type can substantially increase earthquake risk. **Liquefaction** occurs when ground-shaking causes saturated soft soils to change from a solid to a liquid state. Liquefaction results in the loss of soil strength and three potential types of ground failure: lateral spreading, flow failure, and loss of bearing strength. Buildings and their occupants are at risk when the ground can no longer support buildings and structures. Areas susceptible to liquefaction include areas with high ground water tables and sandy soils. The extreme earthquake damage to San Francisco in 1989 was due to liquefaction of the soil used to fill in waterfront properties.

**Amplification** (strengthening) of shaking also results in areas of soft soils, which includes fill, loose sand, waterfront, and lakebed clays. Amplification increases the magnitude of the seismic waves generated by the earthquake.

**Chart D-1. Earthquake Magnitude Scale**

Source: USGS

Seismic activity is described in terms of magnitude and intensity. **Magnitude** describes the total energy released and **intensity** describes the effects at a particular location. Magnitude is defined as the measure of the amplitude of the seismic wave and is expressed by the Richter scale. The **Richter scale** is a logarithmic measurement where an increase in the scale by one whole number represents a tenfold increase in the measured amplitude of the earthquake. Geologists use other measures of magnitude and intensity such as Moment Magnitude, Energy Magnitude and others as described at [http://neic.usgs.gov/neis/phase\\_data/mag\\_formulas.html](http://neic.usgs.gov/neis/phase_data/mag_formulas.html).

Intensity is defined as the measure of the strength of the shock at a particular location and is expressed by the **Modified Mercalli Intensity (MMI) scale**. It was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. The scale consists of a series of certain key responses such as people awakening, movement of furniture, the damage to structures, and total destruction. The *lower* numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The *higher* numbers of the scale are based on observed structural damage. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects. Table D-9 compares the Modified Mercalli Intensity scale with the Richter scale.

**Table D-9. Earthquake Scales Comparison**

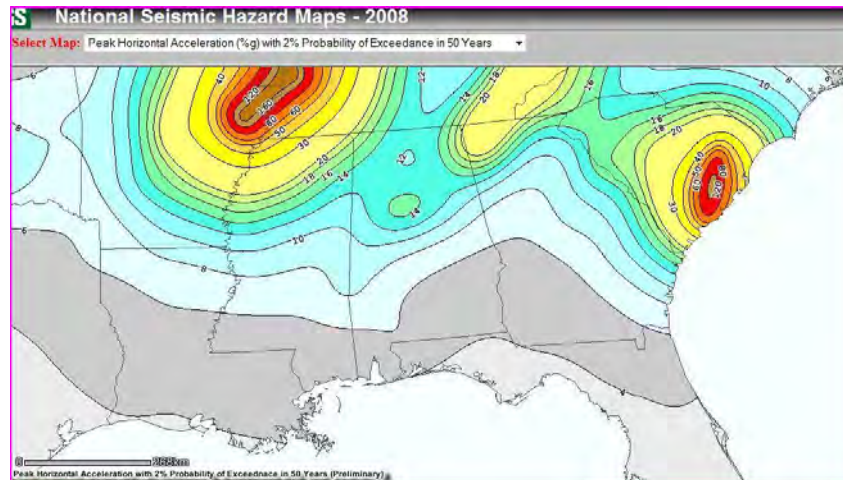
Modified Mercalli Intensity and Richter Scale Comparison			
SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	Instrumental	Detected only on seismographs	
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<5.4
VII	Very Strong	Mild Alarm; walls crack; plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>8.1

Source: FEMA

Another measurement of seismic activity is **Peak Ground Acceleration (PGA)**, which measures the rate of change of motion relative to the rate of acceleration due to gravity. An object falling to earth will fall faster and faster, until it reaches terminal velocity. This principle is known as **acceleration** and represents the rate at which speed is increasing. This movement can be described by its changing position as a function of time, or by its acceleration as a function of time. The peak acceleration is the maximum acceleration experienced by the object during the course of the earthquake motion. Peak ground acceleration can be measured in *g* (the acceleration due to gravity at the earth's surface is 9.8 meters per second squared). For example, acceleration of the ground surface of 244 cm/sec/sec (where *g* equals 9.8 meters per second squared) equals a PGA of 25.0 percent.

Map D-2 shows the 2008 Peak Ground Acceleration (PGA) values for the southeastern United States with a 2% chance of being exceeded over 50 years. This is a common earthquake measurement that shows three things: the geographic area affected (the areas shown in color), the probability of an earthquake at each given level of severity, and the severity (the PGA is indicated by color).

**Map D-2. 2008 PGA for Southeast  
Peak Ground Acceleration with 2% Probability of Exceedance in 50 Years**



Source: U.S. Geological Survey Earthquake Hazards Program

*(The description of earthquakes presented in this section is based upon information extracted from the FEMA How to Guides Understanding Your Risks (FEMA 386-2), August 2001, Using HAZUS-MH for Risk Assessment How to Guide (FEMA 433), August 2004, 2007 Alabama State Hazard Mitigation Plan, U.S. Geological Survey Earthquakes Hazard Program, and various FEMA-adopted plans).*

## 2.9 Dam/Levee Failures Description

Dam failure or levee failure can occur with little warning. Strong storms may produce a flood in a few hours or minutes for upstream locations, which can cause a dam or levee failure. Flash floods occur within six hours of the beginning of heavy rainfall and dam failure may occur within hours of the first sign of a breach. Dam failures are potentially



the worst flood event. There are more than 80,000 dams in the United States according to the 2007 update of the National Inventory of Dams. According to FEMA, one third of these pose a high or significant hazard to life and property if failure occurs. 56% of dams are privately owned, and the dam owner is responsible for the safety and liability of the dam as well for upkeep, upgrade and repair. This compounds the risk that is posed due to dam or levee failure.

(The description of dam/levee failures presented in this section is extracted from FEMA, *Disaster Types, Dam Failure* at <http://www.fema.gov/hazard/damfailure/index.shtm>).

## 2.10 Landslides Description

Landslides occur and can cause damage in all 50 States, at an annual cost of about \$3.5 billion per year (*FEMA 2005*). Between 25 and 50 deaths per year in the U.S. are attributable to landslides. Landslides cause damage to the natural environment and economic losses, due to reduced real estate values, decreased agricultural and forestry productivity, among other adverse economic effects.

Severe storms, earthquakes, coastal wave attack, and wildfires can cause widespread slope instability and result in landslides. Landslide danger may be high, even as emergency personnel are providing rescue and recovery services for these other hazard events.

A landslide is a downward and outward movement of slope-forming soil, rock, and vegetation under the influence of gravity, which includes a wide range of ground movement. Numerous types of events, including natural and man-made changes within the environment, can trigger landslides. Examples of these changes that cause weaknesses in the composition or structures of the rock or soil include heavy rain, changes in ground water level, seismic activity, or construction activity. Man-made landslides may result from activities such as terracing, cut and fill construction, building construction, mining operations, and changes in irrigation or surface runoff.

There are three different types of landslides: rock falls, slides, and flows. **Rock falls** are rapid movement of bedrock characterized by free-fall, bouncing and rolling. **Slides** are movements of soil or rock along a distinct surface of rupture that separates the slide material from the more stable underlying material. There are two major types of slides:



rotational and translational slides. In a **rotational slide** the surface of rupture is curved concavely upward and the slide block rotates around an axis parallel to the slope contours. A **translational slide** is a mass that moves down and outward along a relatively planar surface with little rotational movement or backward tilting. **Flows** are mass movements of water-saturated material. The movement of flows can be extremely rapid (debris avalanche), very rapid (debris flow) or very slow (earth flow).

Here are some significant landslide facts from the USGS:

- *Landslides often accompany earthquakes, floods, storm surges, hurricanes, wildfires, or volcanic activity. They are often more damaging and deadly than the triggering event (examples: the 1964 Alaska earthquake-induced landslides and the 1980 Mount St. Helens volcanic debris flow).*
- *Human activities and population expansion are major factors in increased landslide damage and costs.*
- *The May 1980 eruption of Mount St. Helens caused the largest landslide in history— a rock slide-debris avalanche large enough to fill 250 million dump trucks to the brim traveled about 14 miles, destroying nine highway bridges, numerous private and public buildings, and many miles of highways, roads, and railroads. The debris avalanche also formed several new lakes by damming the North Fork Toutle River and its tributaries. These lakes posed hazards to downstream communities because of the possible failure of the dams, which could have resulted in catastrophic flooding.*
- *Although the National Flood Insurance Act covers certain damage from “mudflows,” insurance against landslides is generally unavailable in most areas of the United States. As a result, many victims of landslides resort to litigation in order to recover damages.*

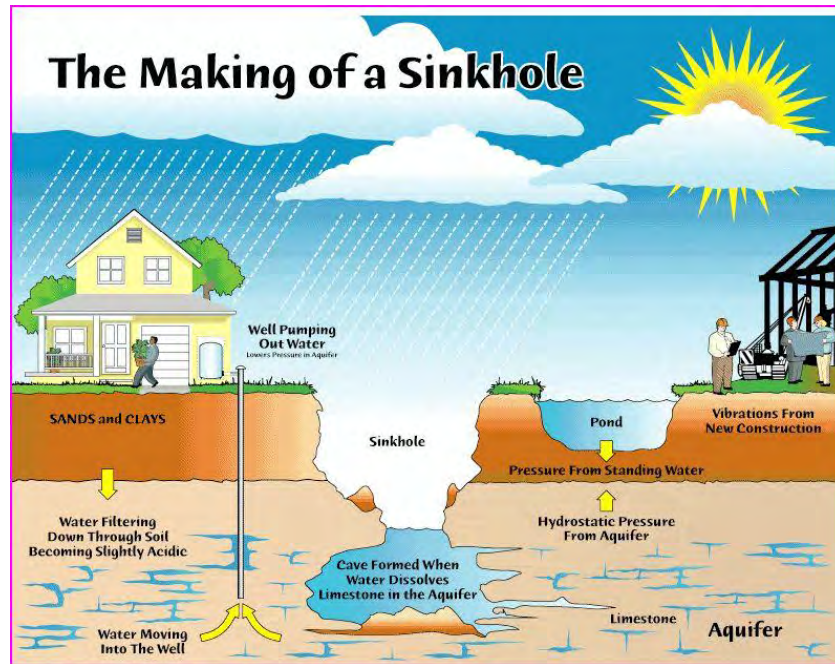
*(The description of landslides presented in this section is extracted from the Geological Survey of Alabama, Geologic Hazards Section at <http://www.gsa.state.al.us/gsa/geologichazards/landslides/index.html> and the U.S.G.S. Landslides Hazards Program at <http://landslides.usgs.gov> ).*

## **2.11 Sinkholes (Land Subsidence) Description**

Sinkholes are a naturally occurring geologic feature that can be hazardous to property and the environment. Their formation is due to water dissolving rock below the land surface. The types of rock most susceptible to sinkhole formation are limestone, carbonate rock and salt beds. As the rock dissolves, spaces and caverns develop underground, when large enough, the ground dramatically collapses leaving a visible sinkhole at the surface. Although normally no more than a nuisance, some sinkholes can become very large and a house or road may be on top when the collapse occurs. See Figure D-9, which shows the making of a sinkhole. Figure D-10 illustrates the formation of a collapse.

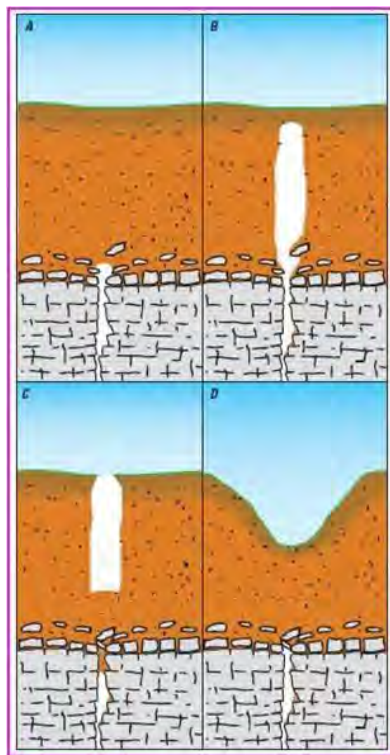


**Figure D-9. The Making of a Sinkhole**



Source: Southwest Florida Water Management District

**Figure D-10. Formation of a Collapse**



**A - Soil bridges gap where sediment has been washing into a solution enlarged fracture.**

**B - Over time, the void migrates upward through the soil.**

**C - After the bridge thins, a sudden collapse occurs.**

**D - The collapse often plugs the drain and erosion will, after many years, transform the collapse into a more bowl-shaped sinkhole.**

Source: U.S. Geological Survey Mid-Continent Geographic Science Center

Sinkholes range in size from several square yards to hundreds of acres. They may be quite shallow or may extend hundreds of feet deep. The most damage from sinkholes tends to occur in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. The picture in Figure D-11 shows a sinkhole that quickly opened up causing major damage to a house and yard.

**Figure D-11. Sinkhole Collapse of House**



Photo courtesy of Doug Gouze, 2006

Source: U.S. Geological Survey, Water Science for Schools

Sinkholes are triggered by a change in the local environment affecting the soil mass. Water is the most important agent effecting environmental changes; examples include water level decline, increased loading and ground water flow changes. Areas become more susceptible to sinkholes when new water-diversion systems are developed, the land surface is changed and when storage ponds are created. The weight of the new material can cause a collapse of the supporting rock resulting in a sinkhole.

Lowering water levels is one of the most significant triggering mechanisms for subsidence in a karst terrain. Water-level decline may occur naturally or be induced by man. Factors leading to a decline in water levels include the pumping of water from wells, localized drainage from construction, dewatering from mining, and periods of drought.

Sinkholes also threaten water and environmental resources by draining streams, lakes, and wetlands, and creating pathways for transmitting surface waters directly into underlying aquifers. Where these pathways are developed, movement of surface contaminants into the underlying aquifer systems can persistently degrade ground-water resources. In some areas, sinkholes are used as storm drains, and because they are a direct link with the underlying aquifer systems it is important that their drainage areas be kept free of contaminants. Conversely, when sinkholes become plugged, they can cause flooding by capturing surface-water flow and can create new wetlands, ponds, and lakes.

*(The description of sinkholes presented in this section is based upon information extracted from the FEMA How to Guide Understanding Your Risks (FEMA 386-2), FEMA, August 2001, and*

*other sources from the Geological Survey of Alabama Geological Hazards Program, Southwest Florida Water Management District, and the U.S. Geological Survey Mid-Centimeter Geographic Science Center).*

## 2.12 Man-Made Hazards Description

Man-made hazards are hazards that originate from human activity. The two categories of man-made hazards are **technological hazards** and **terrorism**. Technological hazards are accidental with unintended consequences. They often include the manufacture, transportation, storage and use of hazardous materials. The definition of terrorism has been established by Federal law, as follows: *“Terrorism includes the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.” 28 CFR Section 0.85.* In comparison to technological hazards, acts of terrorism are not accidental and the consequences are intentional.

**Technological hazards** are divided into three categories: fixed facility industrial accident, transportation industrial accident, and the failure of a supervisory control system. For an industrial accident, the hazard will either exist at a fixed location such as a manufacturing plant or storage facility, or while in transport, i.e. in a vehicle that is transporting it from one location to another or while it is moving through a pipeline from one location to another. Supervisory control system failure will affect which ever component within the system it is directing and the extents of the damage possible due to failure are usually easy to predict.

**Terrorism** includes: the use of weapons of mass destruction – biological, chemical, nuclear, and radiological weapons, explosives, and incendiary devices; arson; armed attacks; agriterrorism; an intentional hazardous materials release; industrial sabotage; and cyber-terrorism. It can be carried out domestically or internationally, by known or unknown assailants, locally or from a distance.

Man-made hazards are very difficult to assess, terrorism more so than technological hazards. Since terrorism involves the human mind and what actions a person may chose to take, the what, where, how and when is largely unpredictable. On the other hand, with technological hazards, since they primarily involve hazardous materials, the assessment of the manufacture, storage, transportation and use of the materials can at least answer to some degree the where, what and how and those answers can aid in the mitigation of some possible technological disasters. For this reason: ***the scope of man-made hazards addressed by the Mitigation Strategy in this plan is limited to mitigation of fixed location technological hazards involving hazardous materials.***

The extent of the effects of a man-made hazard can range from localized to widespread, depending on the type of incident, the mode of application, duration, dynamic/static characteristic and mitigating conditions. A conventional bomb could damage a building in which it was placed or an entire city can be in danger if a hazardous material is released into the water supply. Three noted modes of force to the

built environment involved by man-made hazards are: contamination, energy, and failure or denial of service. If a hazard remains for an extended period of time, the damage can be far reaching; however, if the hazard lasts for only a short time, the damage can usually be quickly determined and response can be swift and the disaster contained. A dynamic hazard is more damaging and unpredictable than a static hazard. Mitigating conditions can be deterrents or they can at least lessen the effects of a hazard at a certain location which also affects the extent of a disaster. The following table shows the different possible man-made hazards and their corresponding application mode, hazard duration, extent of effects - static/dynamic, mitigating and exacerbating conditions.

When trying to mitigate man-made hazards, measures must address security, unknown risks and civil liberties; concerns not raised by natural disasters. The events will usually occur in specific locations and mitigation measures can usually aid in the alleviation of man-made disasters. Those specific locations are known as critical facilities. In addition to the facilities usually addressed in vulnerability assessments for natural hazards, the following critical infrastructure is usually assessed: agriculture and food, water, public health, emergency services, defense industrial base, telecommunications, energy, transportation, banking and finance, chemicals and hazardous materials, and postal and shipping. Threats to infrastructure can be carried out by anyone who has the knowledge, opportunity and desire to do harm. They can be anyone from terrorists to upset employees and are therefore largely unidentifiable.

Table D-10 "Event Profiles for Terrorism and Technological Hazards," (from the FEMA "How to Guide" for man-made hazards) explains the ways in which man-made hazards can interact with the built environment. As presented in the FEMA Guide, for each type of hazard, the following factors are addressed:

- **Application mode** describes the human act(s) or unintended event(s) necessary to cause the hazard to occur.
- **Duration** is the length of time the hazard is present on the target. For example, the duration of a tornado may be just minutes, but a chemical warfare agent such as mustard gas, if not remediated, can persist for days or weeks under the right conditions.
- The **dynamic/static characteristic** of a hazard describes its tendency, or that of its effects, to either expand, contract, or remain confined in time, magnitude, and space. For example, the physical destruction caused by an earthquake is generally confined to the place in which it occurs, and it does not usually get worse unless there are aftershocks or other cascading failures; in contrast, a cloud of chlorine gas leaking from a storage tank can change location by drifting with the wind and can diminish in danger by dissipating over time.
- **Mitigating conditions** are characteristics of the target and its physical environment that can reduce the effects of a hazard. For example, earthen berms can provide protection from bombs; exposure to sunlight can render some biological agents ineffective; and effective perimeter lighting and surveillance can minimize the

likelihood of someone approaching a target unseen. In contrast, *exacerbating conditions* are characteristics that can enhance or magnify the effects of a hazard. For example, depressions or low areas in terrain can trap heavy vapors, and a proliferation of street furniture (trash receptacles, newspaper vending machines, mail boxes, etc.) can provide concealment opportunities for explosive devices.

**Table D-10. Event Profiles for Terrorism and Technological Hazards**

Man-Made Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
<p><b>Conventional Bomb/ Improvised Explosive Device</b></p>	<p>Detonation of explosive device on or near target; delivery via person, vehicle, or projectile.</p>	<p>Instantaneous; additional "secondary devices" may be used, lengthening the time duration of the hazard until the attack site is determined to be clear.</p>	<p>Extent of damage is determined by type and quantity of explosive. Effects generally static other than cascading consequences, incremental structural failure, etc.</p>	<p>Overpressure at a given standoff is inversely proportional to the cube of the distance from the blast; thus, each additional increment of standoff provides progressively more protection. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting energy and debris. Exacerbating conditions include ease of access to target; lack of barriers/shielding; poor construction; and ease of concealment of device.</p>

<b>Man-Made Hazard</b>	<b>Application Mode</b>	<b>Hazard Duration</b>	<b>Extent of Effects; Static/Dynamic</b>	<b>Mitigating and Exacerbating Conditions</b>
<b>Chemical Agent</b>	Liquid/aerosol contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/containers; or munitions.	Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists.	Contamination can be carried out of the initial target area by persons, vehicles, water and wind. Chemicals may be corrosive or otherwise damaging over time if not remediated.	Air temperature can affect evaporation of aerosols. Ground temperature affects evaporation of liquids. Humidity can enlarge aerosol particles, reducing inhalation hazard. Precipitation can dilute and disperse agents but can spread contamination. Wind can disperse vapors but also cause target area to be dynamic. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects.

<b>Man-Made Hazard</b>	<b>Application Mode</b>	<b>Hazard Duration</b>	<b>Extent of Effects; Static/Dynamic</b>	<b>Mitigating and Exacerbating Conditions</b>
<b>Arson/ Incendiary Attack</b>	Initiation of fire or explosion on or near target via direct contact or remotely via projectile.	Generally minutes to hours.	Extent of damage is determined by type and quantity of device/accelerant and materials present at or near target. Effects generally static other than cascading consequences, incremental structural failure, etc.	Mitigation factors include built-in fire detection and protection systems and fire-resistive construction techniques. Inadequate security can allow easy access to target, easy concealment of an incendiary device and undetected initiation of a fire. Non-compliance with fire and building codes as well as failure to maintain existing fire protection systems can substantially increase the effectiveness of a fire weapon.
<b>Armed Attack</b>	Tactical assault or sniping from remote location.	Generally minutes to days.	Varies based upon the perpetrators' intent and capabilities.	Inadequate security can allow easy access to target, easy concealment of weapons and undetected initiation of an attack.
<b>Biological Agent</b>	Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point or line sources such as munitions, covert deposits and moving sprayers.	Biological agents may pose viable threats for hours to years depending on the agent and the conditions in which it exists.	Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infection can be spread via human or animal vectors.	Altitude of release above ground can affect dispersion; sunlight is destructive to many bacteria and viruses; light to moderate wind will disperse agents but higher winds can break up aerosol clouds; the micrometeorological effects of buildings and terrain can influence aerosolization and travel of agents.

<b>Man-Made Hazard</b>	<b>Application Mode</b>	<b>Hazard Duration</b>	<b>Extent of Effects; Static/Dynamic</b>	<b>Mitigating and Exacerbating Conditions</b>
<b>Cyber-terrorism</b>	Electronic attack using one computer system against another.	Minutes to days.	Generally no direct effects on built environment.	Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.
<b>Agriterrorism</b>	Direct, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock.	Days to months.	Varies by type of incident. Food contamination events may be limited to discrete distribution sites, whereas pests and diseases may spread widely. Generally no effects on built environment.	Inadequate security can facilitate adulteration of food and introduction of pests and disease agents to crops and livestock.
<b>Radiological Agent</b>	Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point or line sources such as munitions, covert deposits and moving sprayers.	Contaminants may remain hazardous for seconds to years depending on material used.	Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic.	Duration of exposure, distance from source of radiation, and the amount of shielding between source and target determine exposure to radiation.



Man-Made Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
<b>Nuclear Bomb</b>	Detonation of nuclear device underground, at the surface, in the air or at high altitude.	Light/heat flash and blast/shock wave last for seconds; nuclear radiation and fallout hazards can persist for years. Electromagnetic pulse from a high altitude detonation lasts for seconds and affects only unprotected electronic systems.	Initial light, heat and blast effects of a subsurface, ground or air burst are static and are determined by the device's characteristics and employment; fallout of radioactive contaminants may be dynamic, depending on meteorological conditions.	Harmful effects of radiation can be reduced by minimizing the time of exposure. Light, heat and blast energy decrease logarithmically as a function of distance from seat of blast. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting radiation and radioactive contaminants.
<b>Hazardous Material Release (fixed facility or transportation)</b>	Solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers.	Hours to days.	Chemicals may be corrosive or otherwise damaging over time. Explosion and/or fire may be subsequent. Contamination may be carried out of the incident area by persons, vehicles, water and wind.	As with chemical weapons, weather conditions will directly affect how the hazard develops. The micrometeorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects. Non-compliance with fire and building codes as well as failure to maintain existing fire protection and containment features can substantially increase the damage from a hazardous materials release.

*(The information presented in this section was extracted from the FEMA How to Guide Integrating Manmade Hazards into Mitigation Planning, FEMA 386-7 Version 2.0, FEMA, September 2003).*



# **Appendix E**

## **Hazard Profile Data**



## **App. E - Hazard Profile Data**

### 1.0 Records of Previous Occurrences of Hazard Events

#### **1.0 Records of Previous Occurrences of Hazard Events**

This section contains the detailed records of previous occurrences of hazard events reported in Section 5.4 “Hazard Profiles,” for events reported by the National Weather Service, the National Climatic Data Center, and the Geological Survey of Alabama.

## Past Occurrences of Hurricanes

**Table E-1. Baldwin County Hurricanes and Tropical Storms, 1950-2009**

**20 HURRICANE & TROPICAL STORM** event(s) were reported in **Baldwin County, Alabama** between **01/01/1995** and **07/31/2009**.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">Southwest Alabama</a>	08/03/1995	0900	Hurricane Erin	N/A	0	0	25.0M	1.0M
2 <a href="#">Southwest And South A</a>	10/03/1995	1200	Hurricane Opal	N/A	0	0	48.0M	4.0M
3 <a href="#">ALZ051 - 061&gt;064</a>	07/18/1997	12:00 PM	Hurricane	N/A	1	0	60.5M	2.5M
4 <a href="#">ALZ061&gt;064</a>	09/01/1998	03:00 PM	Hurricane	N/A	0	0	10K	0
5 <a href="#">ALZ051&gt;053 - 055&gt;064</a>	09/25/1998	09:00 AM	Hurricane	N/A	1	0	174.2M	5.0M
6 <a href="#">ALZ061&gt;064</a>	09/21/2000	09:00 AM	Tropical Storm	N/A	0	0	10K	0
7 <a href="#">ALZ061&gt;064</a>	08/04/2001	09:00 AM	Tropical Storm	N/A	0	0	40K	0
8 <a href="#">ALZ061&gt;064</a>	09/12/2002	09:00 AM	Tropical Storm	N/A	0	0	90K	0
9 <a href="#">ALZ061&gt;064</a>	09/24/2002	09:00 AM	Tropical Storm	N/A	0	0	6.5M	0
10 <a href="#">ALZ061&gt;064</a>	10/02/2002	09:00 AM	Hurricane	N/A	0	0	175K	0
11 <a href="#">ALZ051&gt;064</a>	09/13/2004	09:00 PM	Hurricane/typhoon	N/A	0	0	2.5B	25.0M
12 <a href="#">ALZ061&gt;064</a>	10/09/2004	03:00 PM	Tropical Storm	N/A	0	0	0	0
13 <a href="#">ALZ051&gt;056 - 059 - 061&gt;064</a>	06/10/2005	03:00 AM	Tropical Storm	N/A	0	0	1.5M	0
14 <a href="#">ALZ052&gt;053 - 061&gt;064</a>	07/05/2005	03:00 AM	Tropical Storm	N/A	0	0	300K	0
15 <a href="#">ALZ051 - 053&gt;056 - 059 - 061&gt;064</a>	07/09/2005	03:00 AM	Hurricane/typhoon	N/A	0	0	120.0M	100K
16 <a href="#">ALZ062</a>	07/10/2005	04:45 PM	Hurricane/typhoon	N/A	0	0	0	0
17 <a href="#">ALZ051&gt;052 - 061&gt;064</a>	08/27/2005	03:00 PM	Hurricane/typhoon	N/A	0	0	1.0B	0
18 <a href="#">ALZ061&gt;064</a>	08/23/2008	23:00 PM	Tropical Depression	N/A	0	0	0K	0K
19 <a href="#">ALZ061&gt;064</a>	08/31/2008	21:00 PM	Tropical Storm	N/A	0	0	0K	0K
20 <a href="#">ALZ061&gt;064</a>	09/01/2008	00:00 AM	Tropical Storm	N/A	0	0	0K	0K
TOTALS:					2	0	3.936B	37.600M

Includes other counties in Alabama.

Source: National Climatic Data Center

**Table E-2. Hurricanes Affecting Alabama Gulf Coast, 1893-Present (NWS)**

YEAR	DATE	CATEGORY	NAME	NOTES
1893	3-Oct	unknown		Mobile deluged. Water Driven in from the Bay Far Up in the City. Winds of 75 miles per hour.
1906	27-Sep	unknown		Moved inland in Pensacola, strongest to hit Pensacola since 1736
1916	5-Jul	3		The pressure measured at Fort Morgan was 28.38 inches, or 961 Mb. The Hurricane made landfall just west of Mobile.
1916	18-Oct	3		Winds reached 114 mph at landfall. It moved inland over Pensacola.
1926	20-Sep	3		The pressure at Perdido Beach measured 28.20 inches, or 955 Mb. Significant flooding occurred in South Mobile and Baldwin Counties.
1969	17-Aug	5	Camille	The strongest known land-falling hurricane in recorded history. Winds were estimated at 190 mph at landfall. Hurricane Camille was extremely small, and moved inland near Bay St. Louis, MS. Great damage occurred throughout coastal Mississippi, with a recorded pressure of 26.84 inches, or 909 Mb. The storm surge was estimated at 22-25 feet. The devastation of Camille inspired the Saffir-Simpson Hurricane Scale.
1979	12-Sep	3	Frederic	Frederic strengthened from a category one to a category four storm in 30 hours while in the Gulf of Mexico, but weakened before landfall. The sustained winds reached 100 mph at landfall with gusts near 145 mph. Frederic moved inland near Mobile Bay and the Dauphin Island Bridge. The wind resulted in incredible damage to Mobile. Frederic was the first major hurricane to affect Mobile since 1926.
1995	3-Aug	2	Erin	Hurricane Erin had winds of 100 mph at landfall, and it moved inland near Pensacola, FL. Hurricane Erin was the first of two local Hurricanes in 1995.
1995	4-Oct	3	Opal	Hurricane winds were estimated near 115 mph at landfall, and Opal moved inland near Santa Rosa Island, FL. Opal reached category four strength, rapidly intensifying from a category one hurricane in only 18 hours. Hurricane Opal attained category four status 200 miles south of Pensacola. Before landfall, Opal weakened to a category three, but still caused major damage in Pensacola. The storm surge reached 12-20 feet. The highest rain total near Pensacola in the Ellyson community reached 15.45 inches.
1997	19-Jul	1	Danny	Hurricane Danny had wind gusts reaching 80 mph at landfall as it crossed Mullet Point south of Point Clear in Baldwin County. Hurricane Danny then stalled over Mobile Bay and brought record flooding to south Alabama. Rain totals at the Dauphin Island Sea Lab reached 36.71 inches with 25.98 inches of that in seven hours.
1998	28-Sep	2	Georges	Hurricane Georges delivered sustained winds of 103 mph at landfall, and then it moved inland near Biloxi MS. Georges produced 16.7 inches of rain in Pascagoula. The storm surge reached 12 feet near Fort Morgan, and Georges produced 25 foot waves in the Gulf of Mexico. Georges slowed in forward speed once it approached Alabama. This led to huge rain amounts. In Bay Minette, a rain total of nearly 30 inches was recorded.
2004	16-Sep	3	Ivan	Hurricane Ivan had winds around 120 mph at landfall, and it moved inland near Gulf Shores. Ivan was the strongest Hurricane from Baldwin to Santa Rosa Counties in more than 100 years. 160 miles inland, near Demopolis, AL, a wind gust near 90 mph was recorded. Rain totals reached 15.75 inches in Pensacola, with a storm surge in Escambia Bay of 12 feet.
2005	10-Jul	3	Dennis	Hurricane Dennis carried winds of 121 mph at landfall, as it moved inland near Navarre Beach. Dennis had an extremely small eye, and was only significant in a localized area. Dennis prompted a large scale evacuation as it reached category four status in the Gulf of Mexico before it weakened near the central Gulf coast.
2005	29-Aug	3	Katrina	Hurricane Katrina had winds at landfall estimated at 120 mph. It moved inland near Waveland MS. Katrina was the costliest and one of the deadliest U.S. disasters. Hurricane Katrina produced a 27 ft. storm surge in Hancock County, MS, and breached levees in New Orleans. The highest storm surge along Mobile Bay reached 12 feet at the USS Alabama along I-10. The death toll was over 1,800.

National Hurricane Center

## Past Occurrences of Severe Storms

**Table E-3. Baldwin County Thunderstorm and High Wind Events, 1950-2009**

214 THUNDERSTORM & HIGH WIND event(s) were reported in Baldwin County, Alabama between 01/01/1950 and 12/31/2009.

Mag: Magnitude  
Dth: Deaths  
Inj: Injuries  
PrD: Property Damage  
CrD: Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">BALDWIN</a>	04/20/1959	1000	Tstm Wind	80 kts.	0	0	0	0
2 <a href="#">BALDWIN</a>	07/09/1962	1630	Tstm Wind	70 kts.	0	0	0	0
3 <a href="#">BALDWIN</a>	01/20/1963	1315	Tstm Wind	0 kts.	0	0	0	0
4 <a href="#">BALDWIN</a>	02/20/1971	1030	Tstm Wind	0 kts.	0	0	0	0
5 <a href="#">BALDWIN</a>	05/08/1971	1310	Tstm Wind	0 kts.	0	0	0	0
6 <a href="#">BALDWIN</a>	02/07/1974	0315	Tstm Wind	0 kts.	0	0	0	0
7 <a href="#">BALDWIN</a>	01/10/1975	1545	Tstm Wind	0 kts.	0	0	0	0
8 <a href="#">BALDWIN</a>	07/05/1975	1600	Tstm Wind	0 kts.	0	0	0	0
9 <a href="#">BALDWIN</a>	12/25/1975	1050	Tstm Wind	0 kts.	0	0	0	0
10 <a href="#">BALDWIN</a>	05/27/1977	1300	Tstm Wind	0 kts.	0	0	0	0
11 <a href="#">BALDWIN</a>	06/16/1977	1245	Tstm Wind	0 kts.	0	0	0	0
12 <a href="#">BALDWIN</a>	12/05/1977	0001	Tstm Wind	0 kts.	0	0	0	0
13 <a href="#">BALDWIN</a>	03/20/1980	2300	Tstm Wind	68 kts.	0	0	0	0
14 <a href="#">BALDWIN</a>	06/19/1980	1700	Tstm Wind	0 kts.	0	0	0	0
15 <a href="#">BALDWIN</a>	09/03/1980	1205	Tstm Wind	0 kts.	0	0	0	0
16 <a href="#">BALDWIN</a>	06/27/1982	1245	Tstm Wind	0 kts.	0	0	0	0
17 <a href="#">BALDWIN</a>	06/28/1982	1520	Tstm Wind	0 kts.	0	0	0	0
18 <a href="#">BALDWIN</a>	07/05/1982	1405	Tstm Wind	0 kts.	0	0	0	0
19 <a href="#">BALDWIN</a>	07/28/1982	2130	Tstm Wind	0 kts.	0	0	0	0
20 <a href="#">BALDWIN</a>	02/05/1983	2045	Tstm Wind	0 kts.	0	0	0	0
21 <a href="#">BALDWIN</a>	03/26/1983	1745	Tstm Wind	0 kts.	0	0	0	0
22 <a href="#">BALDWIN</a>	03/26/1983	1835	Tstm Wind	0 kts.	0	0	0	0
23 <a href="#">BALDWIN</a>	04/01/1983	2200	Tstm Wind	0 kts.	0	0	0	0
24 <a href="#">BALDWIN</a>	07/18/1983	1845	Tstm Wind	0 kts.	0	0	0	0
25 <a href="#">BALDWIN</a>	08/05/1983	1600	Tstm Wind	0 kts.	0	0	0	0
26 <a href="#">BALDWIN</a>	08/06/1983	1340	Tstm Wind	60 kts.	0	0	0	0
27 <a href="#">BALDWIN</a>	02/26/1984	2345	Tstm Wind	52 kts.	0	0	0	0
28 <a href="#">BALDWIN</a>	02/27/1984	0035	Tstm Wind	0 kts.	0	0	0	0
29 <a href="#">BALDWIN</a>	07/18/1984	1535	Tstm Wind	0 kts.	0	0	0	0



Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
30 <a href="#">BALDWIN</a>	10/15/1984	1030	Tstm Wind	0 kts.	0	0	0	0
31 <a href="#">BALDWIN</a>	04/05/1985	2020	Tstm Wind	0 kts.	0	0	0	0
32 <a href="#">BALDWIN</a>	04/28/1985	1955	Tstm Wind	0 kts.	0	0	0	0
33 <a href="#">BALDWIN</a>	05/01/1985	1755	Tstm Wind	0 kts.	0	0	0	0
34 <a href="#">BALDWIN</a>	05/21/1985	1530	Tstm Wind	52 kts.	0	0	0	0
35 <a href="#">BALDWIN</a>	05/21/1985	1530	Tstm Wind	52 kts.	0	0	0	0
36 <a href="#">BALDWIN</a>	06/26/1985	1802	Tstm Wind	70 kts.	0	0	0	0
37 <a href="#">BALDWIN</a>	09/23/1985	0659	Tstm Wind	0 kts.	0	0	0	0
38 <a href="#">BALDWIN</a>	10/28/1985	0205	Tstm Wind	0 kts.	0	0	0	0
39 <a href="#">BALDWIN</a>	06/21/1986	1620	Tstm Wind	0 kts.	0	0	0	0
40 <a href="#">BALDWIN</a>	07/20/1986	1710	Tstm Wind	0 kts.	0	0	0	0
41 <a href="#">BALDWIN</a>	07/24/1986	1445	Tstm Wind	0 kts.	0	0	0	0
42 <a href="#">BALDWIN</a>	07/30/1986	1745	Tstm Wind	0 kts.	0	0	0	0
43 <a href="#">BALDWIN</a>	07/30/1986	1745	Tstm Wind	0 kts.	0	0	0	0
44 <a href="#">BALDWIN</a>	08/02/1986	1355	Tstm Wind	0 kts.	0	0	0	0
45 <a href="#">BALDWIN</a>	08/26/1986	1445	Tstm Wind	0 kts.	0	0	0	0
46 <a href="#">BALDWIN</a>	02/28/1987	1035	Tstm Wind	0 kts.	0	0	0	0
47 <a href="#">BALDWIN</a>	07/26/1987	0100	Tstm Wind	0 kts.	0	1	0	0
48 <a href="#">BALDWIN</a>	09/08/1987	1800	Tstm Wind	70 kts.	0	0	0	0
49 <a href="#">BALDWIN</a>	09/08/1987	1900	Tstm Wind	0 kts.	0	0	0	0
50 <a href="#">BALDWIN</a>	06/09/1988	1715	Tstm Wind	0 kts.	0	0	0	0
51 <a href="#">BALDWIN</a>	06/09/1988	1940	Tstm Wind	0 kts.	0	0	0	0
52 <a href="#">BALDWIN</a>	06/09/1988	1940	Tstm Wind	0 kts.	0	0	0	0
53 <a href="#">BALDWIN</a>	04/04/1989	2115	Tstm Wind	0 kts.	0	0	0	0
54 <a href="#">BALDWIN</a>	05/07/1989	1430	Tstm Wind	0 kts.	0	0	0	0
55 <a href="#">BALDWIN</a>	06/07/1989	1430	Tstm Wind	0 kts.	0	0	0	0
56 <a href="#">BALDWIN</a>	06/08/1989	1300	Tstm Wind	0 kts.	0	0	0	0
57 <a href="#">BALDWIN</a>	06/08/1989	1545	Tstm Wind	0 kts.	0	0	0	0
58 <a href="#">BALDWIN</a>	06/08/1989	1744	Tstm Wind	0 kts.	0	0	0	0
59 <a href="#">BALDWIN</a>	06/15/1989	0350	Tstm Wind	0 kts.	0	0	0	0
60 <a href="#">BALDWIN</a>	06/15/1989	0350	Tstm Wind	55 kts.	0	0	0	0
61 <a href="#">BALDWIN</a>	02/10/1990	0730	Tstm Wind	0 kts.	0	0	0	0
62 <a href="#">BALDWIN</a>	02/22/1990	0245	Tstm Wind	0 kts.	0	0	0	0
63 <a href="#">BALDWIN</a>	06/28/1990	1452	Tstm Wind	0 kts.	0	0	0	0
64 <a href="#">BALDWIN</a>	07/18/1990	1305	Tstm Wind	0 kts.	0	0	0	0
65 <a href="#">BALDWIN</a>	08/05/1990	1350	Tstm Wind	0 kts.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
66 <a href="#">BALDWIN</a>	08/19/1990	1642	Tstm Wind	0 kts.	0	0	0	0
67 <a href="#">BALDWIN</a>	08/19/1990	1710	Tstm Wind	0 kts.	0	0	0	0
68 <a href="#">BALDWIN</a>	08/20/1990	1910	Tstm Wind	0 kts.	0	0	0	0
69 <a href="#">BALDWIN</a>	08/30/1990	1358	Tstm Wind	0 kts.	0	0	0	0
70 <a href="#">BALDWIN</a>	09/04/1990	1600	Tstm Wind	0 kts.	0	0	0	0
71 <a href="#">BALDWIN</a>	12/03/1990	0842	Tstm Wind	0 kts.	0	0	0	0
72 <a href="#">BALDWIN</a>	12/03/1990	0842	Tstm Wind	0 kts.	0	0	0	0
73 <a href="#">BALDWIN</a>	04/29/1991	1422	Tstm Wind	0 kts.	0	0	0	0
74 <a href="#">BALDWIN</a>	07/14/1991	1755	Tstm Wind	0 kts.	0	0	0	0
75 <a href="#">BALDWIN</a>	07/15/1991	1255	Tstm Wind	0 kts.	0	0	0	0
76 <a href="#">BALDWIN</a>	09/05/1991	1210	Tstm Wind	0 kts.	0	0	0	0
77 <a href="#">BALDWIN</a>	09/17/1991	1555	Tstm Wind	0 kts.	0	0	0	0
78 <a href="#">BALDWIN</a>	04/20/1992	1240	Tstm Wind	0 kts.	0	0	0	0
79 <a href="#">BALDWIN</a>	04/20/1992	1250	Tstm Wind	0 kts.	0	0	0	0
80 <a href="#">BALDWIN</a>	04/20/1992	1305	Tstm Wind	0 kts.	0	0	0	0
81 <a href="#">BALDWIN</a>	06/15/1992	0445	Tstm Wind	0 kts.	0	0	0	0
82 <a href="#">BALDWIN</a>	06/15/1992	0505	Tstm Wind	0 kts.	0	0	0	0
83 <a href="#">BALDWIN</a>	07/16/1992	1512	Tstm Wind	0 kts.	0	0	0	0
84 <a href="#">BALDWIN</a>	11/04/1992	0740	Tstm Wind	0 kts.	0	0	0	0
85 <a href="#">BALDWIN</a>	11/04/1992	0845	Tstm Wind	0 kts.	0	0	0	0
86 <a href="#">BALDWIN</a>	08/02/1993	1515	Thunderstorm Winds	0 kts.	0	0	0	0
87 <a href="#">BALDWIN</a>	08/02/1993	1600	Thunderstorm Winds	0 kts.	0	0	0	0
88 <a href="#">Bay Minette</a>	05/15/1994	1920	Thunderstorm Winds	0 kts.	0	0	0	0
89 <a href="#">Foley</a>	06/16/1994	1500	Thunderstorm Winds	50 kts.	0	0	500K	0
90 <a href="#">Loxley</a>	08/05/1994	1300	Thunderstorm Wind	0 kts.	0	0	1K	0
91 <a href="#">Robertsdale</a>	09/10/1994	1135	Thunderstorm Winds	0 kts.	0	0	5K	0
92 <a href="#">Stockton</a>	11/06/1994	0415	Thunderstorm Wind	50 kts.	0	0	0	0
93 <a href="#">Fairhope</a>	01/06/1995	1200	Thunderstorm Winds	0 kts.	0	0	5K	0
94 <a href="#">Robertsdale</a>	01/06/1995	1210	Thunderstorm Winds	0 kts.	0	0	1K	0
95 <a href="#">Central</a>	01/06/1995	1750	Thunderstorm Winds	0 kts.	0	0	50K	0
96 <a href="#">Barnwell</a>	02/03/1995	1930	Thunderstorm Winds	0 kts.	0	0	5K	0
97 <a href="#">Stockton</a>	04/21/1995	0300	Thunderstorm Winds	0 kts.	0	0	1K	0
98 <a href="#">Hurricane</a>	04/23/1995	1815	Thunderstorm Winds	0 kts.	0	0	1K	0
99 <a href="#">Stockton And</a>	05/09/1995	2215	Thunderstorm Winds	0 kts.	0	0	1K	0
100 <a href="#">Fairhope</a>	05/10/1995	0400	Thunderstorm Winds	0 kts.	0	0	1K	0
101 <a href="#">Foley</a>	05/11/1995	1757	Thunderstorm Winds	0 kts.	0	0	1K	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
102 <a href="#">Seminole</a>	05/11/1995	1820	Thunderstorm Winds	0 kts.	0	0	1K	0
103 <a href="#">Silverhill</a>	07/08/1995	1645	Thunderstorm Winds	0 kts.	0	0	1K	0
104 <a href="#">Orange Beach</a>	07/09/1995	1625	Thunderstorm Winds	0 kts.	0	0	1K	0
105 <a href="#">Fairhope/silverhill/f</a>	07/10/1995	0410	Thunderstorm Winds	0 kts.	0	0	4K	0
106 <a href="#">Mobile Bay</a>	07/12/1995	1345	Thunderstorm Winds	0 kts.	0	0	2K	0
107 <a href="#">Foley</a>	07/12/1995	1420	Thunderstorm Winds	0 kts.	0	0	1K	0
108 <a href="#">Daphne</a>	08/16/1995	1830	Thunderstorm Winds	0 kts.	0	0	2K	0
109 <a href="#">Robertsdale</a>	12/18/1995	1100	Thunderstorm Winds	0 kts.	0	0	2K	0
110 <a href="#">Gulf Shores</a>	12/18/1995	1710	Thunderstorm Winds	0 kts.	0	0	20K	0
111 <a href="#">Latham</a>	01/26/1996	04:15 PM	Tstm Wind	50 kts.	0	0	2K	0
112 <a href="#">Tensaw</a>	01/26/1996	06:10 PM	Tstm Wind	50 kts.	0	0	2K	0
113 <a href="#">Bay Minette</a>	03/07/1996	04:15 AM	Tstm Wind	45 kts.	0	1	2K	0
114 <a href="#">Stockton</a>	05/24/1996	01:29 PM	Tstm Wind	55 kts.	0	0	1K	0
115 <a href="#">Loxley</a>	08/12/1996	01:00 PM	Tstm Wind	40 kts.	0	0	1K	0
116 <a href="#">Summerdale</a>	08/24/1996	02:55 PM	Tstm Wind	45 kts.	0	0	90K	0
117 <a href="#">Bay Minette</a>	08/25/1996	01:50 PM	Tstm Wind	50 kts.	0	0	3K	0
118 <a href="#">Summerdale</a>	09/21/1996	09:30 AM	Tstm Wind	50 kts.	0	0	3K	0
119 <a href="#">Orange Beach</a>	11/05/1996	06:00 PM	Tstm Wind/hail	40 kts.	0	0	1K	0
120 <a href="#">Magnolia Spgs</a>	01/15/1997	08:55 PM	Tstm Wind	52 kts.	0	0	1K	0
121 <a href="#">Blacksher</a>	01/24/1997	06:40 AM	Tstm Wind	50 kts.	0	0	2K	0
122 <a href="#">Malbis</a>	01/24/1997	09:00 AM	Tstm Wind	55 kts.	0	1	15K	0
123 <a href="#">Ft Morgan</a>	04/11/1997	02:50 PM	Tstm Wind	50 kts.	0	0	0	0
124 <a href="#">Stockton</a>	06/20/1997	02:15 PM	Tstm Wind	50 kts.	0	0	2K	0
125 <a href="#">Seminole</a>	06/27/1997	03:25 PM	Tstm Wind/hail	45 kts.	0	0	1K	0
126 <a href="#">Fairhope</a>	07/11/1997	05:30 PM	Tstm Wind	50 kts.	0	0	3K	0
127 <a href="#">Loxley</a>	08/20/1997	04:45 PM	Tstm Wind	50 kts.	0	0	5K	0
128 <a href="#">Gulf Shrs</a>	01/07/1998	07:30 AM	Tstm Wind	50 kts.	0	0	25K	0
129 <a href="#">Whitehouse Forks</a>	01/07/1998	07:30 AM	Tstm Wind	70 kts.	0	0	25K	0
130 <a href="#">Seminole</a>	01/07/1998	08:20 AM	Tstm Wind	50 kts.	0	0	3K	0
131 <a href="#">Elsanor</a>	01/22/1998	07:57 AM	Tstm Wind	50 kts.	0	0	3K	0
132 <a href="#">Magnolia Spgs</a>	01/22/1998	10:45 AM	Tstm Wind	50 kts.	0	0	3K	0
133 <a href="#">Spanish Ft</a>	02/11/1998	01:55 AM	Tstm Wind	55 kts.	0	0	12K	0
134 <a href="#">Countywide</a>	06/05/1998	11:25 PM	Tstm Wind	60 kts.	0	0	100K	0
135 <a href="#">Seminole</a>	07/05/1998	04:00 PM	Tstm Wind	50 kts.	0	0	3K	0
136 <a href="#">Perdido</a>	07/26/1998	07:12 PM	Tstm Wind	50 kts.	0	0	5K	0
137 <a href="#">Orange Beach</a>	09/28/1998	09:50 AM	Tstm Wind	50 kts.	0	0	20K	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
138 <a href="#">Bay Minette</a>	01/02/1999	10:35 AM	Tstm Wind	55 kts.	0	0	3K	0
139 <a href="#">Lillian</a>	01/02/1999	12:00 PM	Tstm Wind	55 kts.	0	0	5K	0
140 <a href="#">Fairhope</a>	03/03/1999	12:40 AM	Tstm Wind	58 kts.	0	0	30K	0
141 <a href="#">Elsanor</a>	03/09/1999	05:10 AM	Tstm Wind	70 kts.	0	1	70K	0
142 <a href="#">Gulf Shrs</a>	03/09/1999	05:55 AM	Tstm Wind	60 kts.	0	0	50K	0
143 <a href="#">Stockton</a>	03/13/1999	07:20 PM	Tstm Wind	58 kts.	0	0	10K	0
144 <a href="#">Seminole</a>	03/13/1999	09:10 PM	Tstm Wind	50 kts.	0	0	3K	0
145 <a href="#">Little River</a>	07/30/1999	02:55 PM	Tstm Wind	50 kts.	0	0	4K	0
146 <a href="#">Foley</a>	08/14/1999	02:20 PM	Tstm Wind	50 kts.	0	0	3K	0
147 <a href="#">Tensaw</a>	01/10/2000	01:00 AM	Tstm Wind	50 kts.	0	0	5K	0
148 <a href="#">Tensaw</a>	03/03/2000	07:40 PM	Tstm Wind	50 kts.	0	0	3K	0
149 <a href="#">Stapleton</a>	03/11/2000	10:40 AM	Tstm Wind	50 kts.	0	0	3K	0
150 <a href="#">Tensaw</a>	06/24/2000	02:20 PM	Tstm Wind	55 kts.	0	0	5K	0
151 <a href="#">Bay Minette</a>	07/21/2000	01:45 PM	Tstm Wind	70 kts.	0	0	8K	0
152 <a href="#">Silverhill</a>	07/21/2000	02:55 PM	Tstm Wind	70 kts.	0	0	10K	0
153 <a href="#">Rosinton</a>	07/21/2000	12:20 PM	Tstm Wind	60 kts.	0	0	7K	0
154 <a href="#">Elsanor</a>	08/10/2000	02:25 PM	Tstm Wind	55 kts.	0	0	5K	0
155 <a href="#">Stockton</a>	08/27/2000	03:30 PM	Tstm Wind	70 kts.	0	0	50K	0
156 <a href="#">Daphne</a>	09/02/2000	05:25 PM	Tstm Wind	55 kts.	0	0	5K	0
157 <a href="#">Loxley</a>	09/05/2000	03:05 PM	Tstm Wind	50 kts.	0	0	5K	0
158 <a href="#">Stockton</a>	03/12/2001	11:55 AM	Tstm Wind	65 kts.	0	0	10K	0
159 <a href="#">ALZ063&gt;064</a>	06/11/2001	09:30 AM	High Wind	45 kts.	0	0	10K	0
160 <a href="#">Stockton</a>	08/19/2001	12:45 PM	Tstm Wind	50 kts.	0	0	8K	0
161 <a href="#">Fairhope</a>	10/13/2001	07:00 PM	Tstm Wind	50 kts.	0	0	10K	0
162 <a href="#">Summerdale</a>	10/13/2001	07:10 PM	Tstm Wind	60 kts.	0	0	40K	0
163 <a href="#">Gulf Shrs</a>	10/13/2001	07:22 PM	Tstm Wind	60 kts.	0	0	50K	0
164 <a href="#">ALZ062</a>	10/13/2001	09:00 AM	High Wind	0 kts.	1	0	1K	0
165 <a href="#">Fairhope</a>	04/08/2002	07:25 PM	Tstm Wind	55 kts.	0	0	15K	0
166 <a href="#">Summerdale</a>	07/01/2002	04:30 PM	Tstm Wind	55 kts.	0	0	5K	0
167 <a href="#">Josephine</a>	08/25/2002	02:50 PM	Tstm Wind	60 kts.	0	0	35K	0
168 <a href="#">Daphne</a>	11/05/2002	01:30 PM	Tstm Wind	60 kts.	0	0	15K	0
169 <a href="#">Stockton</a>	12/19/2002	04:30 PM	Tstm Wind	50 kts.	0	0	8K	0
170 <a href="#">Daphne</a>	12/19/2002	06:00 PM	Tstm Wind	50 kts.	0	0	8K	0
171 <a href="#">Summerdale</a>	12/24/2002	04:30 AM	Tstm Wind	50 kts.	0	0	10K	0
172 <a href="#">Gulf Shrs</a>	12/31/2002	08:40 AM	Tstm Wind	55 kts.	0	0	10K	0
173 <a href="#">Fairhope</a>	02/21/2003	02:48 PM	Tstm Wind	53 kts.	0	0	5K	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
174 <a href="#">Robertsdale</a>	03/12/2003	04:00 PM	Tstm Wind	55 kts.	0	0	5K	0
175 <a href="#">Summerdale</a>	03/13/2003	02:40 AM	Tstm Wind	50 kts.	0	0	3K	0
176 <a href="#">Magnolia Spgs</a>	03/13/2003	05:29 PM	Tstm Wind	50 kts.	0	0	5K	0
177 <a href="#">Latham</a>	05/02/2003	04:00 PM	Tstm Wind	50 kts.	0	0	5K	0
178 <a href="#">Stockton</a>	07/01/2003	01:35 AM	Tstm Wind	50 kts.	0	0	5K	0
179 <a href="#">Summerdale</a>	08/16/2003	02:05 PM	Tstm Wind	50 kts.	0	0	7K	0
180 <a href="#">Belforest</a>	11/18/2003	02:20 PM	Tstm Wind	50 kts.	0	0	10K	0
181 <a href="#">Bay Minette</a>	06/02/2004	09:30 AM	Tstm Wind	50 kts.	0	0	10K	0
182 <a href="#">Silverhill</a>	06/03/2004	06:30 AM	Tstm Wind	55 kts.	0	0	5K	0
183 <a href="#">Spanish Ft</a>	07/25/2004	01:40 PM	Tstm Wind	55 kts.	0	0	5K	0
184 <a href="#">Orange Beach</a>	01/29/2005	09:25 AM	Tstm Wind	50 kts.	0	0	15K	0
185 <a href="#">Loxley</a>	03/27/2005	02:35 AM	Tstm Wind	50 kts.	0	0	10K	0
186 <a href="#">Loxley</a>	04/01/2005	05:05 AM	Tstm Wind	50 kts.	0	0	15K	0
187 <a href="#">Lottie</a>	05/24/2005	08:05 PM	Tstm Wind	50 kts.	0	0	10K	0
188 <a href="#">Bay Minette</a>	01/17/2006	09:20 AM	Tstm Wind	50 kts.	0	0	10K	0
189 <a href="#">Seminole</a>	05/08/2006	10:05 PM	Tstm Wind	55 kts.	0	0	10K	0
190 <a href="#">Gulf Shrs</a>	06/23/2006	01:25 PM	Tstm Wind	50 kts.	0	0	20K	0
191 <a href="#">Gulf Shrs</a>	06/23/2006	12:50 PM	Tstm Wind	50 kts.	0	0	10K	0
192 <a href="#">Foley</a>	07/20/2006	01:20 PM	Tstm Wind	50 kts.	0	0	10K	0
193 <a href="#">Bay Minette</a>	08/30/2006	04:15 PM	Tstm Wind	50 kts.	0	0	12K	0
194 <a href="#">Bay Minette</a>	08/30/2006	04:45 PM	Tstm Wind	50 kts.	0	0	12K	0
195 <a href="#">Miflin</a>	11/15/2006	10:25 AM	Thunderstorm Wind	50 kts.	0	0	10K	0K
196 <a href="#">Belforest</a>	05/13/2007	13:20 PM	Thunderstorm Wind	50 kts.	0	0	5K	0K
197 <a href="#">Robertsdale</a>	06/09/2007	15:25 PM	Thunderstorm Wind	52 kts.	0	0	0K	0K
198 <a href="#">Summerdale</a>	06/09/2007	15:40 PM	Thunderstorm Wind	52 kts.	0	0	10K	0K
199 <a href="#">Fairhope</a>	07/11/2007	19:10 PM	Thunderstorm Wind	50 kts.	0	0	10K	0K
200 <a href="#">Spanish Ft</a>	07/14/2007	14:35 PM	Thunderstorm Wind	50 kts.	0	0	10K	0K
201 <a href="#">Belforest</a>	07/14/2007	14:40 PM	Thunderstorm Wind	50 kts.	0	0	10K	0K
202 <a href="#">Spanish Ft</a>	08/24/2007	14:22 PM	Thunderstorm Wind	52 kts.	0	0	10K	0K
203 <a href="#">Loxley</a>	02/12/2008	17:15 PM	Thunderstorm Wind	50 kts.	0	0	55K	0K
204 <a href="#">Gulf Shrs</a>	03/01/2008	03:51 AM	Thunderstorm Wind	50 kts.	0	0	18K	0K
205 <a href="#">Fairhope</a>	05/15/2008	10:15 AM	Thunderstorm Wind	50 kts.	0	0	12K	0K
206 <a href="#">Summerdale</a>	05/15/2008	10:25 AM	Thunderstorm Wind	54 kts.	0	0	30K	0K
207 <a href="#">Fairhope</a>	06/29/2008	07:45 AM	Thunderstorm Wind	55 kts.	0	0	25K	0K
208 <a href="#">Robertsdale</a>	03/27/2009	03:12 AM	Thunderstorm Wind	75 kts.	0	0	0K	0K
209 <a href="#">Robertsdale</a>	03/27/2009	03:15 AM	Thunderstorm Wind	104 kts.	0	0	125K	0K

<b>Location or County</b>	<b>Date</b>	<b>Time</b>	<b>Type</b>	<b>Mag</b>	<b>Dth</b>	<b>Inj</b>	<b>PrD</b>	<b>CrD</b>
210 <a href="#">Daphne</a>	07/31/2009	03:15 AM	Thunderstorm Wind	52 kts.	0	0	10K	0K
211 <a href="#">Seminole</a>	08/04/2009	16:15 PM	Thunderstorm Wind	52 kts.	0	0	10K	0K
212 <a href="#">Phillipsville</a>	08/05/2009	14:45 PM	Thunderstorm Wind	52 kts.	0	0	10K	0K
213 <a href="#">Phillipsville</a>	08/05/2009	15:05 PM	Thunderstorm Wind	52 kts.	0	0	10K	0K
214 <a href="#">Gulf Shrs</a>	12/24/2009	17:38 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K

## Past Occurrences of Lightning

**Table E-4. Baldwin County Lightning Events, 1950-2009**

**32 LIGHTNING** event(s) were reported in **Baldwin County, Alabama** between **01/01/1950** and **07/31/2009**.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">Bay Minette</a>	09/08/1994	0658	Lightning	N/A	0	0	5K	0
2 <a href="#">Spanish Fort</a>	09/08/1994	0715	Lightning	N/A	0	0	50K	0
3 <a href="#">Fairhope</a>	07/10/1995	0514	Lightning	N/A	0	0	10K	0
4 <a href="#">Loxley</a>	04/14/1996	09:00 PM	Lightning	N/A	0	0	25K	0
5 <a href="#">Bay Minette</a>	08/25/1996	02:00 PM	Lightning	N/A	0	0	0	0
6 <a href="#">Loxley</a>	01/24/1997	11:30 PM	Lightning	N/A	0	0	90K	0
7 <a href="#">Robertsdale</a>	08/09/1997	03:00 PM	Lightning	N/A	0	0	3K	0
8 <a href="#">Daphne</a>	01/22/1998	07:45 AM	Lightning	N/A	0	0	100K	0
9 <a href="#">Bay Minette</a>	03/08/1998	05:30 AM	Lightning	N/A	0	0	20K	0
10 <a href="#">Bay Minette</a>	07/24/1998	01:05 PM	Lightning	N/A	0	0	60K	0
11 <a href="#">Loxley</a>	03/09/1999	03:00 AM	Lightning	N/A	0	0	0	0
12 <a href="#">Loxley</a>	03/13/1999	09:00 PM	Lightning	N/A	0	0	0	0
13 <a href="#">Loxley</a>	07/30/1999	02:32 PM	Lightning	N/A	0	0	5K	0
14 <a href="#">Belforest</a>	07/30/1999	03:17 PM	Lightning	N/A	0	0	5K	0
15 <a href="#">Rosinton</a>	07/30/1999	03:17 PM	Lightning	N/A	0	0	3K	0
16 <a href="#">Silverhill</a>	07/30/1999	03:17 PM	Lightning	N/A	0	0	5K	0
17 <a href="#">Daphne</a>	07/30/1999	05:40 PM	Lightning	N/A	0	0	3K	0
18 <a href="#">Daphne</a>	09/02/2000	04:00 PM	Lightning	N/A	0	0	5K	0
19 <a href="#">Bay Minette</a>	05/28/2001	02:00 PM	Lightning	N/A	0	0	25K	0
20 <a href="#">Daphne</a>	08/19/2001	01:30 PM	Lightning	N/A	0	0	3K	0
21 <a href="#">Ft Morgan</a>	09/08/2001	06:30 AM	Lightning	N/A	0	0	20K	0
22 <a href="#">Bay Minette</a>	08/29/2002	02:00 PM	Lightning	N/A	0	0	30K	0
23 <a href="#">Gulf Shrs</a>	07/23/2005	11:13 AM	Lightning	N/A	2	0	0	0
24 <a href="#">Daphne</a>	08/24/2005	02:00 PM	Lightning	N/A	0	0	0	0
25 <a href="#">Daphne</a>	05/29/2006	02:45 PM	Lightning	N/A	0	1	15K	0
26 <a href="#">Gulf Shrs</a>	07/06/2006	10:09 AM	Lightning	N/A	0	1	0	0
27 <a href="#">Elberta</a>	07/16/2006	08:30 AM	Lightning	N/A	1	0	0	0
28 <a href="#">Spanish Ft</a>	08/15/2006	09:40 PM	Lightning	N/A	0	0	100K	0
29 <a href="#">Daphne</a>	10/17/2006	07:00 AM	Lightning	N/A	0	0	30K	0K

<b>Location or County</b>	<b>Date</b>	<b>Time</b>	<b>Type</b>	<b>Mag</b>	<b>Dth</b>	<b>Inj</b>	<b>PrD</b>	<b>CrD</b>
30 <a href="#">Belforest</a>	05/13/2007	13:00 PM	Lightning	N/A	0	0	60K	0K
31 <a href="#">Fairhope</a>	07/11/2007	19:35 PM	Lightning	N/A	0	0	250K	0K
32 <a href="#">Marlow</a>	08/09/2007	14:30 PM	Lightning	N/A	0	1	0K	0K
TOTALS:					3	3	922K	0



## Past Occurrences of Hail

**Table E-5. Baldwin County Hail Events, 1950-2009**

**134 HAIL** event(s) were reported in **Baldwin County, Alabama** between **01/01/1950** and **07/31/2009**.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">BALDWIN</a>	07/19/1955	1330	Hail	0.75 in.	0	0	0	0
2 <a href="#">BALDWIN</a>	03/18/1972	1527	Hail	0.75 in.	0	0	0	0
3 <a href="#">BALDWIN</a>	03/31/1973	1945	Hail	1.75 in.	0	0	0	0
4 <a href="#">BALDWIN</a>	06/19/1973	1320	Hail	1.75 in.	0	0	0	0
5 <a href="#">BALDWIN</a>	01/20/1974	0820	Hail	1.00 in.	0	0	0	0
6 <a href="#">BALDWIN</a>	04/04/1974	1340	Hail	0.75 in.	0	0	0	0
7 <a href="#">BALDWIN</a>	12/05/1977	0001	Hail	1.75 in.	0	0	0	0
8 <a href="#">BALDWIN</a>	04/15/1985	2026	Hail	0.75 in.	0	0	0	0
9 <a href="#">BALDWIN</a>	05/01/1985	1812	Hail	1.75 in.	0	0	0	0
10 <a href="#">BALDWIN</a>	07/26/1987	0035	Hail	1.00 in.	0	0	0	0
11 <a href="#">BALDWIN</a>	07/28/1987	1435	Hail	0.75 in.	0	0	0	0
12 <a href="#">BALDWIN</a>	03/26/1988	0825	Hail	0.75 in.	0	0	0	0
13 <a href="#">BALDWIN</a>	04/18/1988	1517	Hail	1.75 in.	0	0	0	0
14 <a href="#">BALDWIN</a>	06/09/1988	1745	Hail	0.75 in.	0	0	0	0
15 <a href="#">BALDWIN</a>	11/04/1988	1345	Hail	1.50 in.	0	0	0	0
16 <a href="#">BALDWIN</a>	06/07/1989	1407	Hail	0.75 in.	0	0	0	0
17 <a href="#">BALDWIN</a>	02/10/1990	0815	Hail	0.75 in.	0	0	0	0
18 <a href="#">BALDWIN</a>	05/06/1991	0425	Hail	1.00 in.	0	0	0	0
19 <a href="#">BALDWIN</a>	05/26/1992	1420	Hail	1.00 in.	0	0	0	0
20 <a href="#">BALDWIN</a>	08/10/1992	1515	Hail	1.75 in.	0	0	0	0
21 <a href="#">BALDWIN</a>	03/30/1993	1340	Hail	1.00 in.	0	0	0	0
22 <a href="#">BALDWIN</a>	03/30/1993	1405	Hail	1.75 in.	0	0	0	0
23 <a href="#">Daphne</a>	03/25/1994	0250	Hail	0.88 in.	0	0	0	0
24 <a href="#">Tensaw</a>	02/03/1995	1815	Hail	0.75 in.	0	0	0	0
25 <a href="#">Lottie</a>	02/17/1995	0800	Hail	0.75 in.	0	0	0	0
26 <a href="#">Daphne</a>	03/15/1995	1250	Hail	1.75 in.	0	0	0	0
27 <a href="#">Spanish Fort</a>	03/15/1995	1320	Hail	1.75 in.	0	0	0	0
28 <a href="#">Stapleton</a>	03/15/1995	1400	Hail	0.88 in.	0	0	0	0
29 <a href="#">Bay Minette</a>	03/15/1995	1445	Hail	0.75 in.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
30 <a href="#">Bay Minette</a>	03/15/1995	1455	Hail	0.75 in.	0	0	0	0
31 <a href="#">Bay Minette</a>	03/15/1995	1500	Hail	0.75 in.	0	0	0	0
32 <a href="#">Bay Minette</a>	03/15/1995	1700	Hail	0.88 in.	0	0	0	0
33 <a href="#">Gulf Shores</a>	04/11/1995	1924	Hail	0.75 in.	0	0	0	0
34 <a href="#">Gulf Shores</a>	04/11/1995	1945	Hail	0.88 in.	0	0	1K	0
35 <a href="#">Gulf Shores</a>	05/11/1995	1750	Hail	0.75 in.	0	0	0	0
36 <a href="#">Bay Minette</a>	02/19/1996	05:15 PM	Hail	1.75 in.	0	0	0	0
37 <a href="#">Robertsdale</a>	03/18/1996	04:30 AM	Hail	1.75 in.	0	0	0	0
38 <a href="#">Elberta</a>	04/14/1996	06:20 PM	Hail	1.75 in.	0	0	0	0
39 <a href="#">Robertsdale</a>	04/14/1996	08:00 PM	Hail	0.75 in.	0	0	0	0
40 <a href="#">Bay Minette</a>	05/23/1996	04:15 PM	Hail	1.75 in.	0	0	0	0
41 <a href="#">Bay Minette</a>	08/25/1996	03:00 PM	Hail	0.75 in.	0	0	0	0
42 <a href="#">Orange Beach</a>	11/05/1996	06:00 PM	Tstm Wind/hail	40 kts.	0	0	1K	0
43 <a href="#">Tensaw</a>	12/12/1996	08:10 PM	Hail	0.75 in.	0	0	0	0
44 <a href="#">Fairhope</a>	01/24/1997	06:00 PM	Hail	1.75 in.	0	0	0	0
45 <a href="#">Silverhill</a>	01/24/1997	06:15 PM	Hail	1.75 in.	0	0	0	0
46 <a href="#">Robertsdale</a>	01/24/1997	06:50 PM	Hail	1.75 in.	0	0	0	0
47 <a href="#">Orange Beach</a>	01/24/1997	08:00 PM	Hail	0.75 in.	0	0	0	0
48 <a href="#">Fairhope</a>	01/24/1997	08:03 PM	Hail	0.75 in.	0	0	0	0
49 <a href="#">Fairhope</a>	01/24/1997	08:45 PM	Hail	0.75 in.	0	0	0	0
50 <a href="#">Orange Beach</a>	01/24/1997	10:00 PM	Hail	0.75 in.	0	0	0	0
51 <a href="#">Stockton</a>	04/21/1997	05:20 PM	Hail	1.00 in.	0	0	0	0
52 <a href="#">Bay Minette</a>	04/21/1997	05:57 PM	Hail	1.75 in.	0	0	0	0
53 <a href="#">Stapleton</a>	04/22/1997	08:30 PM	Hail	1.00 in.	0	0	0	0
54 <a href="#">Bay Minette</a>	04/22/1997	08:50 PM	Hail	0.75 in.	0	0	0	0
55 <a href="#">Stockton</a>	04/22/1997	09:40 PM	Hail	0.75 in.	0	0	0	0
56 <a href="#">Robertsdale</a>	04/22/1997	10:55 PM	Hail	0.75 in.	0	0	0	0
57 <a href="#">Chrysler</a>	05/27/1997	10:00 PM	Hail	0.75 in.	0	0	0	0
58 <a href="#">Seminole</a>	06/27/1997	03:25 PM	Tstm Wind/hail	45 kts.	0	0	1K	0
59 <a href="#">Seminole</a>	11/06/1997	11:20 AM	Hail	1.75 in.	0	0	2K	0
60 <a href="#">Stockton</a>	03/05/1998	01:30 PM	Hail	0.88 in.	0	0	0	0
61 <a href="#">Perdido</a>	03/05/1998	02:30 PM	Hail	0.75 in.	0	0	0	0
62 <a href="#">Latham</a>	04/08/1998	08:35 AM	Hail	0.75 in.	0	0	0	0
63 <a href="#">Little River</a>	04/08/1998	09:00 AM	Hail	0.75 in.	0	0	0	0
64 <a href="#">Little River</a>	04/17/1998	05:45 PM	Hail	1.00 in.	0	0	0	0
65 <a href="#">Little River</a>	04/17/1998	06:25 PM	Hail	1.00 in.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
66 <a href="#">Bay Minette</a>	05/03/1998	07:08 PM	Hail	0.75 in.	0	0	0	0
67 <a href="#">Bay Minette</a>	05/03/1998	07:38 PM	Hail	1.75 in.	0	0	0	0
68 <a href="#">Bay Minette</a>	05/03/1998	08:11 PM	Hail	0.75 in.	0	0	0	0
69 <a href="#">Little River</a>	08/30/1998	03:15 PM	Hail	0.75 in.	0	0	0	0
70 <a href="#">Stapleton</a>	01/09/1999	04:50 AM	Hail	0.75 in.	0	0	0	0
71 <a href="#">Perdido</a>	03/09/1999	02:40 AM	Hail	1.00 in.	0	0	0	0
72 <a href="#">Robertsdale</a>	03/09/1999	04:15 AM	Hail	0.75 in.	0	0	0	0
73 <a href="#">Ft Morgan</a>	05/04/1999	01:00 PM	Hail	0.75 in.	0	0	0	0
74 <a href="#">Stapleton</a>	05/04/1999	03:15 PM	Hail	0.75 in.	0	0	0	0
75 <a href="#">Daphne</a>	06/08/1999	02:32 PM	Hail	0.88 in.	0	0	0	0
76 <a href="#">Loxley</a>	07/30/1999	01:30 PM	Hail	0.75 in.	0	0	0	0
77 <a href="#">Ft Morgan</a>	01/24/2000	01:15 AM	Hail	0.75 in.	0	0	0	0
78 <a href="#">Perdido</a>	03/29/2000	02:15 PM	Hail	0.88 in.	0	0	0	0
79 <a href="#">Rosinton</a>	07/21/2000	12:20 PM	Hail	1.00 in.	0	0	0	0
80 <a href="#">Loxley</a>	08/09/2000	05:00 PM	Hail	0.75 in.	0	0	0	0
81 <a href="#">Loxley</a>	09/05/2000	03:05 PM	Hail	0.88 in.	0	0	0	0
82 <a href="#">Daphne</a>	03/12/2001	02:45 AM	Hail	0.75 in.	0	0	0	0
83 <a href="#">Daphne</a>	04/03/2002	03:40 PM	Hail	1.00 in.	0	0	0	0
84 <a href="#">Daphne</a>	04/03/2002	03:40 PM	Hail	1.00 in.	0	0	0	0
85 <a href="#">Loxley</a>	05/29/2002	01:35 PM	Hail	1.00 in.	0	0	0	0
86 <a href="#">Robertsdale</a>	05/29/2002	02:10 PM	Hail	0.88 in.	0	0	0	0
87 <a href="#">Robertsdale</a>	05/29/2002	02:20 PM	Hail	0.88 in.	0	0	0	0
88 <a href="#">Foley</a>	03/12/2003	03:40 PM	Hail	0.75 in.	0	0	0	0
89 <a href="#">Elberta</a>	03/12/2003	04:00 PM	Hail	1.00 in.	0	0	0	0
90 <a href="#">Seminole</a>	03/13/2003	02:40 AM	Hail	0.75 in.	0	0	0	0
91 <a href="#">Bay Minette</a>	03/13/2003	04:50 PM	Hail	1.00 in.	0	0	0	0
92 <a href="#">Bay Minette</a>	04/25/2003	07:10 PM	Hail	1.75 in.	0	0	5K	0
93 <a href="#">Stapleton</a>	04/25/2003	07:35 PM	Hail	0.75 in.	0	0	0	0
94 <a href="#">Loxley</a>	04/25/2003	08:15 PM	Hail	0.75 in.	0	0	0	0
95 <a href="#">Latham</a>	05/02/2003	03:40 PM	Hail	1.75 in.	0	0	0	0
96 <a href="#">Stockton</a>	05/02/2003	04:55 PM	Hail	1.75 in.	0	0	0	0
97 <a href="#">Dyas</a>	05/02/2003	05:35 PM	Hail	0.75 in.	0	0	0	0
98 <a href="#">Little River</a>	05/02/2003	09:05 PM	Hail	0.75 in.	0	0	0	0
99 <a href="#">Little River</a>	05/03/2003	01:35 AM	Hail	1.00 in.	0	0	0	0
100 <a href="#">Little River</a>	05/03/2003	10:05 AM	Hail	0.75 in.	0	0	0	0
101 <a href="#">Seminole</a>	05/03/2003	11:35 AM	Hail	0.75 in.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
102 <a href="#">Daphne</a>	07/12/2003	04:30 PM	Hail	0.75 in.	0	0	0	0
103 <a href="#">Foley</a>	07/17/2003	02:30 PM	Hail	0.88 in.	0	0	0	0
104 <a href="#">Gulf Shrs</a>	07/17/2003	02:52 PM	Hail	1.00 in.	0	0	0	0
105 <a href="#">Bay Minette</a>	08/06/2003	05:20 PM	Hail	1.75 in.	0	0	0	0
106 <a href="#">Perdido</a>	03/26/2005	03:05 PM	Hail	1.00 in.	0	0	0	0
107 <a href="#">Loxley</a>	03/27/2005	02:35 AM	Hail	0.75 in.	0	0	0	0
108 <a href="#">Vaughn</a>	03/27/2005	02:50 AM	Hail	1.00 in.	0	0	0	0
109 <a href="#">Foley</a>	04/06/2005	02:05 PM	Hail	0.75 in.	0	0	0	0
110 <a href="#">Bay Minette</a>	04/22/2005	08:26 PM	Hail	1.00 in.	0	0	0	0
111 <a href="#">Bay Minette</a>	04/22/2005	09:23 PM	Hail	0.75 in.	0	0	0	0
112 <a href="#">Whitehouse Forks</a>	04/26/2005	02:38 PM	Hail	1.75 in.	0	0	4K	0
113 <a href="#">Elberta</a>	04/30/2005	09:25 AM	Hail	0.75 in.	0	0	0	0
114 <a href="#">Perdido Beach</a>	01/13/2006	09:25 AM	Hail	0.75 in.	0	0	0	0
115 <a href="#">Fairhope</a>	04/21/2006	05:55 PM	Hail	0.75 in.	0	0	0	0
116 <a href="#">Seminole</a>	04/25/2006	05:00 PM	Hail	0.75 in.	0	0	0	0
117 <a href="#">Whitehouse Forks</a>	05/08/2006	09:25 PM	Hail	0.88 in.	0	0	0	0
118 <a href="#">Spanish Ft</a>	05/09/2006	09:45 AM	Hail	0.88 in.	0	0	0	0
119 <a href="#">Malbis</a>	05/09/2006	10:30 AM	Hail	0.75 in.	0	0	0	0
120 <a href="#">Crossroads</a>	05/09/2006	12:20 PM	Hail	0.75 in.	0	0	0	0
121 <a href="#">Whitehouse Forks</a>	05/09/2006	12:30 PM	Hail	0.75 in.	0	0	0	0
122 <a href="#">Bay Minette</a>	05/23/2006	03:45 PM	Hail	0.88 in.	0	0	0	0
123 <a href="#">Silverhill</a>	05/29/2006	02:25 PM	Hail	0.75 in.	0	0	0	0
124 <a href="#">Foley</a>	06/23/2006	12:45 PM	Hail	1.75 in.	0	0	0	0
125 <a href="#">Loxley</a>	08/08/2006	02:55 PM	Hail	0.75 in.	0	0	0	0
126 <a href="#">Elberta</a>	08/09/2006	12:30 PM	Hail	1.75 in.	0	0	0	0
127 <a href="#">Perdido</a>	05/11/2007	13:10 PM	Hail	0.75 in.	0	0	0K	0K
128 <a href="#">Loxley</a>	06/09/2007	16:15 PM	Hail	1.75 in.	0	0	8K	0K
129 <a href="#">Malbis</a>	06/27/2007	14:15 PM	Hail	1.00 in.	0	0	0K	0K
130 <a href="#">Daphne</a>	02/12/2008	17:30 PM	Hail	0.88 in.	0	0	0K	0K
131 <a href="#">Foley</a>	05/25/2008	14:05 PM	Hail	1.00 in.	0	0	0K	0K
132 <a href="#">Bay Minette</a>	12/24/2008	17:40 PM	Hail	1.00 in.	0	0	0K	0K
133 <a href="#">Elsanor</a>	03/27/2009	21:05 PM	Hail	1.75 in.	0	0	0K	0K
134 <a href="#">Loxley</a>	04/13/2009	06:30 AM	Hail	0.75 in.	0	0	0K	0K
TOTALS:					0	0	21K	0

## Past Occurrences of Tornadoes

Table E-6. Baldwin County Tornadoes, 1840 - 2008  
Alabama Tornado Database

Year	Month	Day	Time (CST)	County	Damage Scale	Path Length (Miles)	Fatalities	Injuries	Location
2008	9	1	1205	Baldwin	F0	0.1	0	0	<b>1 N Elberta</b> A weak tornado briefly touched down just north of Elberta. The tornado blew down a couple of trees and a trailer home had roof damage.
2006	11	15	909	Baldwin	F1	1.3	0	0	<b>0.3 SE Dyas-1 WNW Dyas</b> A tornado touched down along Hollingsworth Road in the Dyas community where it blew down several trees. It continued east northeast reaching F1 strength where it crossed over Dyas Road about a mile north of Brushy Creek. A house on the east side of the road sustained considerable roof damage. Two sheds, a barn, horse pen and a screened in porch were destroyed. Numerous debris from this property were blown into an adjacent field and the owner said several items were found as far as a half mile away. The tornado quickly weakened and dissipated at the end of Sanks Road.
2006	11	15	848	Baldwin	F0	1.1	0	0	<b>3.8 NE Rabun-3.5 NNE Rabun</b> A weak tornado touched down along Old Ganey Road blowing down several trees on both sides of the road. The tornado generally paralleled the roadway to the intersection of Silas Ganey Road where it began to parallel that road for a brief period. The tornado then crosses Majors Creek then dissipated shortly thereafter. No structures were in the path of the tornado.
2005	8	28	1804	Baldwin	F0	0.5	0	0	<b>Fort Morgan</b> A weak tornado developed along the outer bands of Hurricane Katrina. The weak tornado blew down several trees and power lines just east of Fort Morgan.
2004	11	27	1155	Baldwin	F1	1	0	0	<b>Seminole</b> An F1 tornado touched down just west of Seminole and damaged several homes near the Styx and Perdido rivers. Most of the damage was to roofs with numerous trees blown down. The tornado tracked east and moved into Escambia County Florida. No injuries were reported.
2004	11	27	1145	Baldwin	F0	0.1	0	0	<b>1 S Elsanor</b> A weak tornado briefly touched down just west of County Road 87 south of Elsanor. The tornado turned over a couple of trailers that were damaged during Hurricane Ivan. Trees were also blown down. The tornado went back into the clouds near County Road 87.
2004	11	27	1135	Baldwin	F0	1.5	0	0	<b>2 NW Robertsdale</b> A weak F0 tornado touched down just northeast of Robertsdale. The tornado first touched down along County Road 55 and moved northeast before dissipating just west of U. S. Highway 90. Trees were blown down with some minor structural damage along the track of the storm. A truck was also blown over. No injuries occurred. This weak tornado actually split from the same storm that spawned the tornado in Summerdale at about the same time.
2004	11	27	1135	Baldwin	F2	4.5	0	4	<b>Summerdale</b> An F2 touched down just west of Summerdale along County Road 32. The tornado then tracked east northeast and moved through downtown Summerdale. The tornado continued moving east and went back into the clouds east of Summerdale. Most of the damage from the tornado occurred in downtown Summerdale. Bleachers from a new ball field were found about a quarter mile away next to a house. A

Year	Month	Day	Time (CST)	County	Damage Scale	Path Length (Miles)	Fatalities	Injuries	Location
									school bus was pushed sideways 15 to 20 feet by the winds. Five homes were destroyed with 35 to 40 homes suffering damage. Four minor injuries were reported. People heard the warning and took cover before the tornado hit. This same area was hit hard by Hurricane Ivan in September.
2004	11	24	755	Baldwin	F0	0.1	0	0	<b>Fairhope</b> The large waterspout that moved across Mobile Bay moved ashore near Fairhope and quickly dissipated. No damage from the weak tornado was found.
2004	9	15	1302	Baldwin	F0	3	0	0	<b>3 SE Josephine-1 SW Josephine</b> A weak tornado entered Baldwin county from Escambia county in Florida near Ono Island and moved rapidly west northwest and dissipated just southwest of Josephine. The weak tornado caused minor damage. Most of the area had been evacuated due to Hurricane Ivan.
2002	11	5	1340	Baldwin	F0	0.1	0	0	<b>Barnwell</b> A weak tornado downed trees and power lines near the Barnwell community. The same storm produced some minor roof damage and downed more trees near Elsanor a few minutes later.
2002	9	25	1906	Baldwin	F0	0.1	0	0	<b>Gulf Shores</b> A weak tornado damaged a building near the Gulf of Mexico in Gulf Shores. The storm that spawned the tornado moved in from the Gulf. The building suffered minor roof damage and several windows were blown out.
2002	9	25	1825	Baldwin	F0	0.1	0	0	<b>Gulf Shores</b> A weak tornado moved across part of Gulf State Park. The tornado was spawned from a storm that moved in from the Gulf of Mexico. The weak tornado flipped a couple of trailers and also blew down trees and power lines in the Park.
2001	10	13	1345	Baldwin	F0	0.3	0	0	<b>Spanish Fort</b> An F0 tornado touched down along the eastern portions of Meaheer Park on the Causeway just west of Spanish Fort. The tornado jumped across the Causeway and touched down in the Pineda Island subdivision. Several trees were damaged along the tornado path.
2001	10	13	1244	Baldwin	F2	0.7	0	0	<b>Robertsdale</b> An F2 tornado touched down southeast of Robertsdale. The tornado first touched down just south of County Road 83 and Hubard road intersection where it tracked north and damaged seventeen manufactured homes and completely destroyed three others. Several large Pecan trees were also blown down. No injuries were reported.
2001	10	13	1240	Baldwin	F0	0.2	0	0	<b>Foley</b> Another tornado briefly touched down, about 20 minutes after the first one, near the Grove Home Park. The F0 blew down several trees and a large fence near the Park along County Road 65.
2001	10	13	1225	Baldwin	F3	0.2	0	0	<b>Foley</b> An F3 tornado initially touched down just south of the Grove Home Park on County Road 16. The tornado then tracked north just east of County Road 65 to County Road 12, just southwest of Foley. The tornado blew down numerous trees, destroyed a manufactured home and damaged several others in the Grove Home Park. The tornado destroyed two large cement block buildings and damaged another three near County Road 12. A large panel truck filled with heavy tools was picked up and carried about 60 feet, and several other cars were thrown 15 to 25 feet. No injuries were reported.

Year	Month	Day	Time (CST)	County	Damage Scale	Path Length (Miles)	Fatalities	Injuries	Location
2001	10	13	1200	Baldwin	F0	0.2	0	0	<b>Gulf Shores</b> A strong waterspout moved ashore in Gulf Shores near State Highway 59 where it damaged several small booths associated with the Shrimp Festival. The tornado tracked north and damaged some roofs to homes along 6th avenue.
2001	10	13	635	Baldwin	F0	0.1	0	0	<b>Montrose</b> An F0 tornado briefly touched down along U. S. Highway 98 near Montrose. The tornado blew several trees down.
2001	10	13	630	Baldwin	F1	0.1	0	0	<b>Fairhope</b> An F1 tornado touched down for a short time near Fairhope. The tornado caused major damage to a warehouse roof and two large metal doors were blown in. Several trees and a fence were also blown down.
2000	11	8	1245	Baldwin	F0	0.1	0	0	<b>Elsanor</b> Two off duty meteorologists observed a tornado that briefly touched down in a field just north of Elsanor and south of I-10. No damage from the tornado was found. After briefly touching down, the tornado quickly dissipated. This was the fourth tornado to touch down in Baldwin county in a two hour period.
2000	11	8	1150	Baldwin	F1	2.5	0	0	<b>Fairhope</b> A tornado, the third in Baldwin county in a 45 minute time period, developed and followed a path very similar to a weaker tornado that occurred about 20 minutes earlier. This tornado touched down near the intersection of Highway 27 and Highway 32, moved northeast into the Woodmere subdivision (the same subdivision affected by a weaker tornado some 20 minutes earlier). This tornado produced moderate roof and structural damage to several homes in the Woodmere subdivision. The tornado then continued northeast into the Quail Creek subdivision, where it produced minor damage to a few homes, mainly to garage doors. The damage path through the two subdivisions was intermittent, suggesting that the tornado skipped across the ground. As the tornado moved out of the Quail Creek subdivision, it lifted off the ground, but continued moving northeast as a funnel cloud. Reports of a funnel cloud, not in contact with the ground, were received as the parent thunderstorm moved northeast toward Interstate 10 and then east of Bay Minette.
2000	11	8	1125	Baldwin	F0	1	0	0	<b>Fairhope</b> A tornado, the second in Baldwin county in a 20 minute time period, formed just south of Fairhope. The tornado touched down just south of the intersection of Highway 27 and Highway 32, narrowly missing a trailer park and a nearby school, but producing some tree damage and minor damage to one trailer just south of the intersection. The tornado then skipped along Highway 27 for about one mile, where it caused minor damage to one home in the Woodmere subdivision.
2000	11	8	1105	Baldwin	F1	1	0	0	<b>Foley</b> A low topped thunderstorm produced a brief F1 tornado about 1 mile Southeast of the community. The tornado first touched down in the Leisure Lakes subdivision causing minor roof damage to a few homes. The tornado then moved Northeast into the neighboring Glen Lakes subdivision, where it intensified and caused moderate roof and structural damage to several homes. The tornado then lifted back into the thunderstorm cloud.
1999	7	12	915	Baldwin	F0	0.1	0	0	<b>Point Clear</b> A waterspout moved ashore near Point Clear and quickly dissipated over land. No damage was found.

Year	Month	Day	Time (CST)	County	Damage Scale	Path Length (Miles)	Fatalities	Injuries	Location
1999	5	31	1442	Baldwin	F0	0.1	0	0	<b>Gulf Shores</b> A waterspout moved over the marshlands between Little Lagoon and Oyster Bay. The storm dissipated over the marshlands and no damage was found. No injuries were reported.
1999	5	29	1900	Baldwin	F0	0.1	0	0	<b>Fort Morgan</b> A waterspout came ashore along State Highway 180 about three miles east of Fort Morgan. The waterspout quickly dissipated but a building under construction had building material scattered and minor roof damage from the storm.
1999	2	23	1745	Baldwin	F0	2	0	0	<b>Summerdale</b> An F0 tornado briefly touched down around Alabama 59 near Summerdale in a trailer park. Several trailers had minor damage to skirting and one was shifted off its blocks. One tree had a branch blown off and an abandoned trailer on blocks was turned over. The tornado then moved east and skipped along the ground briefly touching down along County Road 38 where small trees and a fence were blown down. A Weather Service employee followed the storm east and said the funnel was rotating but it never appeared to touch down. The tornado then went back into the cloud before reaching Seminole.
1998	9	27	1655	Baldwin	F0	0.1	0	0	<b>3 N Loxley</b> A tornado briefly touched down just north of I-10 near the Loxley exit. The only damage was to trees and power lines.
1998	9	19	1300	Baldwin	F0	0.1	0	0	<b>Gulf Shores</b> A waterspout moved ashore near Gulf Shores and rapidly dissipated. No damage was found.
1995	4	22	1705	Baldwin	F0	0.1	0	0	<b>Loxley</b> A brief tornado touched down between Loxley and Stapleton. No damage was found.
1994	12	3	2130	Baldwin	F0	2	0	0	<b>Bay Minette</b> A weak tornado touched down on the south side of Bay Minette damaging the roof on one house, the roof on a lumber company, and destroying one mobile home. Several trees and power lines were also blown down.
1992	11	24	500	Baldwin	F1	2.5	0	1	<b>Bon Secour</b> A tornado briefly touched down near Bon Secour. One mobile was destroyed and one was damaged.
1991	4	29	1406	Baldwin	F0	0.3	0	0	<b>2 E Robertsdale</b> Several homes were extensively damaged.
1991	4	29	1402	Baldwin	F0	0.3	0	0	<b>Robertsdale</b> Minor residential damage was reported.
1991	3	1	1320	Baldwin	F0	0.3	0	0	<b>Orange Beach</b> Minor roof damage was reported.
1990	5	17	1610	Baldwin	F0	0.5	0	0	<b>6 SW Magnolia Springs</b> A waterspout moved onshore with no damage reported.
1990	3	15	1628	Baldwin	F0	0.3	0	0	<b>Elsanor</b> Several trees were uprooted.
1990	3	15	1612	Baldwin	F0	0.3	0	0	<b>Summerdale</b> Several mobile homes were damaged or knocked off their foundations.
1990	3	15	1545	Baldwin	F0	0.3	0	0	<b>Weeks Bay</b> A waterspout moved inland and damaged the roof of a home.
1989	11	7	100	Baldwin	F0	0.3	0	0	<b>20 SE Bay Minette</b> One barn was damaged, trees were uprooted, and the roof was blown off a trailer.
1989	6	8	855	Baldwin	F0	0.3	0	0	<b>3 NW Lillian</b> 8 homes and 2 barns were damaged.
1989	6	8	851	Baldwin	F1	2	0	10	<b>Alabama Point-Orange Beach</b> One home was totally destroyed and 5 sustained major damage. 17 homes received minor damage. One mobile home was destroyed and one mobile home was damaged.



Year	Month	Day	Time (CST)	County	Damage Scale	Path Length (Miles)	Fatalities	Injuries	Location
1989	5	19	1340	Baldwin	F0	0.3	0	0	<b>Weeks Bay</b> Little or no damage as a waterspout came ashore.
1985	10	29	950	Baldwin	F1	0.1	0	0	<b>Orange Beach</b> Brief tornado damaged a car and a store.
1985	9	23	630	Baldwin	F0	0.2	0	0	<b>Loxley</b> One truck was overturned and one building had its roof removed. Shingle damage was reported on 3 homes.
1985	7	6	300	Baldwin	F0	1	0	0	<b>Daphne</b> A waterspout moved onshore and damaged one home and knocked a few trees down.
1985	5	1	1755	Baldwin	F0	NA	0	0	<b>Fort Morgan</b> A small tornado touched down and blew down some trees and power lines along the Fort Morgan Highway.
1985	2	11	450	Baldwin	F1	2	0	0	<b>Loxley</b> Several outbuildings were destroyed, one home was unroofed, and one barn was unroofed. Several other homes sustained roof damage.
1983	11	15	705	Baldwin	F1	0.1	0	0	<b>Robertsdale</b> The roof of a coliseum was damaged and windows were broken out of one home.
1983	7	20	1545	Baldwin	F1	0.2	0	0	<b>Robertsdale</b> Extensive tree damage occurred and two structures were damaged by falling trees.
1983	4	14	612	Baldwin	F1	0.25	0	0	<b>2 E Fairhope</b> Several trees were snapped off or uprooted. Minor damage occurred to a few outbuildings.
1982	5	7	1238	Baldwin	F1	2	0	0	<b>Gulf Shores</b> A waterspout moved onshore near the state park. Some buildings sustained minor roof damage. 3 cars had their windows blown out. Other minor damage occurred in the vicinity.
1982	4	25	530	Baldwin	F1	1	0	0	<b>Elberta</b> Brief tornado touchdown damaged a wheat crop and several outbuildings. Many trees were uprooted.
1981	8	18	1420	Baldwin	F0	0.1	0	0	<b>Spanish Fort</b> Brief tornado touched down causing only tree damage.
1981	3	22	1730	Baldwin	NA	NA	0	0	<b>8 N Loxley</b> Little or no damage occurred with this brief tornado.
1981	2	10	840	Baldwin	F2	1.5	0	62	<b>Bay Minette</b> The tornado struck the middle school where most of the injuries occurred. The school suffered major damage and 7 homes were totally destroyed. 1 business was destroyed.
1980	11	23	1430	Baldwin	NA	NA	0	0	<b>Gulf Shores</b> Tornado touched down along Highway 182 where one motel and a small cottage were damaged. One houseboat was destroyed.
1980	5	17	745	Baldwin	F1	1.2	0	0	<b>Near Gulf Shores</b> No tornado details available.
1980	5	17	245	Baldwin	NA	5	0	0	<b>Hubbard's Landing</b> Many trees were snapped or uprooted. 3 homes were damaged and 2 pecan orchards were heavily damaged.
1980	4	13	1200	Baldwin	NA	0.25	0	0	<b>8 W Bay Minette</b> Brief tornado touchdown at Cliff's Landing. 3 mobile homes were demolished and 9 others were damaged. Several trees were blown down.
1979	6	30	1955	Baldwin	F0	0.25	0	0	<b>6 SE Fairhope</b> Brief tornado touched down near the Fish River and Highway 33. Numerous trees were uprooted. Minor damage occurred to a large chicken house.
1978	6	29	2010	Baldwin	F0	NA	0	0	<b>Near Foley</b> A tornado briefly touched down near Foley with little or no damage.
1977	10	25	700	Baldwin	NA	15	0	0	<b>Foley-Robertsdale-Loxley</b> Several homes sustained minor damage and one mobile home was overturned.

Year	Month	Day	Time (CST)	County	Damage Scale	Path Length (Miles)	Fatalities	Injuries	Location
1975	11	6	1550	Baldwin	NA	NA	0	0	Lillian Several trees were blown down. Barns and outbuildings were damaged.
1975	3	13	1755	Baldwin	NA	NA	0	0	Daphne One mobile home was severely damaged.
1975	2	16	1005	Baldwin	F2	1	0	0	Pine Grove Six chicken houses were destroyed. A feedmill and garage were destroyed. Several homes, a warehouse, and 3 barns were unroofed.
1975	2	16	1015	Baldwin	F1	0.3	0	0	6 SW Bay Minette No tornado details were available.
1975	1	10	1615	Baldwin	F1	0.3	0	0	Near Loxley No tornado details were available.
1974	9	7	1804	Baldwin	F0	0.3	0	0	Daphne No tornado details were available.
1974	3	19	1630	Baldwin	F0	0.25	0	0	Stockton Several trees and power lines were blown down.
1974	2	7	315	Baldwin	F0	NA	0	0	Pine Grove A few trees were blown down and one barn was damaged.
1973	12	31	1050	Baldwin	F1	3	0	0	Near Loxley No tornado details were available.
1972	11	13	1440	Baldwin	F2	1	0	0	Rosinton The Rosinton School was damaged. The roof was removed from the gym. One barn was destroyed and several other buildings were damaged.
1971	9	16	1622	Baldwin	F2	1	0	0	4 E Fairhope At least 2 homes were torn apart. Several additional homes were damaged.
1971	9	16	1525	Baldwin	F2	8	0	0	4 S Stockton At least 2 mobile homes were demolished. At least 10 homes suffered damage. A few barns were destroyed.
1970	6	2	700	Baldwin	NA	NA	0	0	Daphne One trailer was demolished.
1969	8	22	1615	Baldwin	F1	3	0	0	Near Spanish Fort No tornado details were available.
1969	7	8	1730	Baldwin	NA	NA	0	0	5 E Spanish Fort A tornado briefly touched down in a wooded area knocking trees down.
1968	11	3	1755	Mobile, Baldwin, Escambia **(Moved through Escambia Co, Fl)	F2	70	0	18	8 NW Mobile-Saraland-Bay Minette-Canoe- This event may have been more than one tornado. At least 18 homes were destroyed and another 259 homes were damaged. 5 mobile homes were demolished and 10 others were damaged. Many other structures sustained damage along the path.
1967	12	10	1615	Baldwin	F2	14	0	0	Bon Secour-Mifflin-Josephine A waterspout moved inland and unroofed or tore apart several homes. A boat works and a trailer were also damaged.
1967	10	30	930	Baldwin	F2	3	0	1	Near Gulf Shores No tornado damage details available.
1966	11	10	1210	Baldwin	NA	6	0	0	Ranbun-Perdido 2 large poultry houses were destroyed in Ranbun. A church was demolished in Perdido. Several farm buildings were destroyed along the path.
1964	12	24	1935	Baldwin	F2	2	0	3	W Foley 5 planes were destroyed at Wilson Airport. 2 homes were demolished and 12 others were damaged. Several commercial buildings were damaged.
1962	3	31	800	Baldwin	F2	10	0	0	SE Bon Secour-E Mifflin Several summer homes were destroyed and many other buildings were damaged.
1950	4	18	145	Baldwin	F2	2	0	14	Spanish Fort One home was unroofed and 3 other buildings were damaged.

National Weather Service

## Past Occurrences of Tornadoes

**Table E-7. Baldwin County Tornado Events, 1950-2009**

**88 TORNADO(s)** were reported in **Baldwin County, Alabama** between **01/01/1950** and **07/31/2009**.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">BALDWIN</a>	04/18/1950	0145	Tornado	F2	0	0	3K	0
2 <a href="#">BALDWIN</a>	03/31/1962	0800	Tornado	F2	0	0	250K	0
3 <a href="#">BALDWIN</a>	12/24/1964	2115	Tornado	F2	0	3	25K	0
4 <a href="#">BALDWIN</a>	11/10/1966	1210	Tornado	F2	0	0	25K	0
5 <a href="#">BALDWIN</a>	10/30/1967	0930	Tornado	F2	0	1	25K	0
6 <a href="#">BALDWIN</a>	12/10/1967	0410	Tornado	F2	0	0	250K	0
7 <a href="#">BALDWIN</a>	11/03/1968	1815	Tornado	F3	0	4	250K	0
8 <a href="#">BALDWIN</a>	11/03/1968	1914	Tornado	F3	0	0	250K	0
9 <a href="#">BALDWIN</a>	07/08/1969	1730	Tornado	F0	0	0	0K	0
10 <a href="#">BALDWIN</a>	08/22/1969	1615	Tornado	F1	0	0	0K	0
11 <a href="#">BALDWIN</a>	06/02/1970	0730	Tornado	F2	0	0	25K	0
12 <a href="#">BALDWIN</a>	09/16/1971	1525	Tornado	F1	0	0	250K	0
13 <a href="#">BALDWIN</a>	09/16/1971	1622	Tornado	F2	0	0	250K	0
14 <a href="#">BALDWIN</a>	11/13/1972	1440	Tornado	F2	0	0	25K	0
15 <a href="#">BALDWIN</a>	12/31/1973	1050	Tornado	F1	0	0	3K	0
16 <a href="#">BALDWIN</a>	02/06/1974	1530	Tornado	F0	0	0	0K	0
17 <a href="#">BALDWIN</a>	03/19/1974	1630	Tornado	F0	0	0	0K	0
18 <a href="#">BALDWIN</a>	09/07/1974	1805	Tornado	F0	0	0	0K	0
19 <a href="#">BALDWIN</a>	01/10/1975	1615	Tornado	F1	0	0	3K	0
20 <a href="#">BALDWIN</a>	02/16/1975	1015	Tornado	F1	0	0	25K	0
21 <a href="#">BALDWIN</a>	02/16/1975	1030	Tornado	F2	0	0	250K	0
22 <a href="#">BALDWIN</a>	03/13/1975	1755	Tornado	F1	0	0	25K	0
23 <a href="#">BALDWIN</a>	11/06/1975	1550	Tornado	F0	0	0	25K	0
24 <a href="#">BALDWIN</a>	10/25/1977	0700	Tornado	F1	0	0	25K	0
25 <a href="#">BALDWIN</a>	06/29/1978	2010	Tornado	F0	0	0	0K	0
26 <a href="#">BALDWIN</a>	06/30/1979	1855	Tornado	F1	0	0	3K	0
27 <a href="#">BALDWIN</a>	04/13/1980	1200	Tornado	F2	0	0	25K	0
28 <a href="#">BALDWIN</a>	05/17/1980	0245	Tornado	F1	0	0	25K	0
29 <a href="#">BALDWIN</a>	05/17/1980	0745	Tornado	F1	0	0	25K	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
30 <a href="#">BALDWIN</a>	11/23/1980	1430	Tornado	F0	0	0	25K	0
31 <a href="#">BALDWIN</a>	02/10/1981	0840	Tornado	F2	0	62	2.5M	0
32 <a href="#">BALDWIN</a>	03/22/1981	1730	Tornado	F1	0	0	0K	0
33 <a href="#">BALDWIN</a>	08/18/1981	1420	Tornado	F0	0	0	0K	0
34 <a href="#">BALDWIN</a>	04/25/1982	0530	Tornado	F1	0	0	25K	0
35 <a href="#">BALDWIN</a>	05/07/1982	1238	Tornado	F1	0	0	3K	0
36 <a href="#">BALDWIN</a>	04/14/1983	0612	Tornado	F1	0	0	3K	0
37 <a href="#">BALDWIN</a>	07/20/1983	1545	Tornado	F1	0	0	3K	0
38 <a href="#">BALDWIN</a>	11/15/1983	0705	Tornado	F1	0	0	25K	0
39 <a href="#">BALDWIN</a>	02/11/1985	0450	Tornado	F1	0	0	25K	0
40 <a href="#">BALDWIN</a>	05/01/1985	1755	Tornado	F0	0	0	3K	0
41 <a href="#">BALDWIN</a>	07/06/1985	0300	Tornado	F0	0	0	25K	0
42 <a href="#">BALDWIN</a>	09/23/1985	0630	Tornado	F0	0	0	25K	0
43 <a href="#">BALDWIN</a>	10/29/1985	0950	Tornado	F1	0	0	25K	0
44 <a href="#">BALDWIN</a>	05/19/1989	1340	Tornado	F0	0	0	0K	0
45 <a href="#">BALDWIN</a>	06/08/1989	0851	Tornado	F1	0	10	2.5M	0
46 <a href="#">BALDWIN</a>	06/08/1989	0855	Tornado	F0	0	0	0K	0
47 <a href="#">BALDWIN</a>	11/07/1989	0100	Tornado	F0	0	0	3K	0
48 <a href="#">BALDWIN</a>	03/15/1990	1545	Tornado	F0	0	0	0K	0
49 <a href="#">BALDWIN</a>	03/15/1990	1612	Tornado	F0	0	0	0K	0
50 <a href="#">BALDWIN</a>	03/15/1990	1628	Tornado	F0	0	0	0K	0
51 <a href="#">BALDWIN</a>	05/17/1990	1610	Tornado	F0	0	0	0K	0
52 <a href="#">BALDWIN</a>	03/01/1991	1320	Tornado	F0	0	0	0K	0
53 <a href="#">BALDWIN</a>	04/29/1991	1402	Tornado	F0	0	0	0K	0
54 <a href="#">BALDWIN</a>	04/29/1991	1406	Tornado	F0	0	0	250K	0
55 <a href="#">BALDWIN</a>	11/24/1992	0500	Tornado	F1	0	1	25K	0
56 <a href="#">Bay Minette</a>	12/03/1994	2130	Tornado	F0	0	0	50K	0
57 <a href="#">Loxley</a>	04/22/1995	1705	Tornado	F0	0	0	0	0
58 <a href="#">Orange Beach</a>	07/18/1997	05:02 PM	Tornado	F0	0	0	20K	0
59 <a href="#">Gulf Shrs</a>	09/19/1998	01:00 PM	Tornado	F0	0	0	0	0
60 <a href="#">Loxley</a>	09/27/1998	04:55 PM	Tornado	F0	0	0	3K	0
61 <a href="#">Summerdale</a>	02/23/1999	05:45 PM	Tornado	F0	0	0	10K	0
62 <a href="#">Ft Morgan</a>	05/29/1999	07:00 PM	Tornado	F0	0	0	10K	0
63 <a href="#">Gulf Shrs</a>	05/31/1999	02:42 PM	Tornado	F0	0	0	0	0
64 <a href="#">Point Clear</a>	07/12/1999	09:15 AM	Tornado	F0	0	0	0	0
65 <a href="#">Foley</a>	11/08/2000	11:05 AM	Tornado	F1	0	0	150K	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
66 <a href="#">Fairhope</a>	11/08/2000	11:25 AM	Tornado	F0	0	0	10K	0
67 <a href="#">Fairhope</a>	11/08/2000	11:50 AM	Tornado	F1	0	0	200K	0
68 <a href="#">Elsanor</a>	11/08/2000	12:45 PM	Tornado	F0	0	0	0	0
69 <a href="#">Spanish Ft</a>	10/13/2001	01:45 PM	Tornado	F0	0	0	25K	0
70 <a href="#">Fairhope</a>	10/13/2001	06:30 AM	Tornado	F1	0	0	50K	0
71 <a href="#">Montrose</a>	10/13/2001	06:35 AM	Tornado	F0	0	0	10K	0
72 <a href="#">Gulf Shrs</a>	10/13/2001	12:00 PM	Tornado	F0	0	0	20K	0
73 <a href="#">Foley</a>	10/13/2001	12:25 PM	Tornado	F3	0	0	250K	0
74 <a href="#">Foley</a>	10/13/2001	12:40 PM	Tornado	F0	0	0	15K	0
75 <a href="#">Robertsdale</a>	10/13/2001	12:44 PM	Tornado	F2	0	0	200K	0
76 <a href="#">Gulf Shrs</a>	09/25/2002	06:25 PM	Tornado	F0	0	0	25K	0
77 <a href="#">Gulf Shrs</a>	09/25/2002	07:06 PM	Tornado	F0	0	0	15K	0
78 <a href="#">Barnwell</a>	11/05/2002	01:40 PM	Tornado	F0	0	0	10K	0
79 <a href="#">Josephine</a>	09/15/2004	01:02 PM	Tornado	F0	0	0	3K	0
80 <a href="#">Fairhope</a>	11/24/2004	07:55 AM	Tornado	F0	0	0	0	0
81 <a href="#">Robertsdale</a>	11/27/2004	11:35 AM	Tornado	F0	0	0	15K	0
82 <a href="#">Summerdale</a>	11/27/2004	11:35 AM	Tornado	F2	0	4	400K	0
83 <a href="#">Elsanor</a>	11/27/2004	11:45 AM	Tornado	F0	0	0	30K	0
84 <a href="#">Seminole</a>	11/27/2004	11:55 AM	Tornado	F1	0	0	200K	0
85 <a href="#">Ft Morgan</a>	08/28/2005	06:04 PM	Tornado	F0	0	0	4K	0
86 <a href="#">Rabun</a>	11/15/2006	08:48 AM	Tornado	F0	0	0	50K	0K
87 <a href="#">Dyas</a>	11/15/2006	09:09 AM	Tornado	F1	0	0	100K	0K
88 <a href="#">Elberta</a>	09/01/2008	12:05 PM	Tornado	F0	0	0	20K	0K
TOTALS:					0	85	9.418M	0

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## Past Occurrences of Floods

**Table E-8. Baldwin County Flood Events, 1950-2009**

**56 FLOOD** event(s) were reported in **Baldwin County, Alabama** between **01/01/1950** and **12/31/2009**.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">Gateswood</a>	08/16/1995	2000	Flash Flood	N/A	0	0	0	0
2 <a href="#">Foley And Gulf Shores</a>	11/01/1995	1930	Flash Flooding	N/A	0	0	3K	0
3 <a href="#">Elberta</a>	12/18/1995	1400	Flash Flood	N/A	0	0	10K	0
4 <a href="#">Daphne</a>	04/14/1996	09:00 PM	Flash Flood	N/A	0	0	200K	0
5 <a href="#">Stapleton</a>	08/30/1996	06:30 PM	Flash Flood	N/A	0	0	2K	0
6 <a href="#">Fairhope</a>	07/19/1997	09:00 PM	Flood	N/A	0	0	0	0
7 <a href="#">South Portion</a>	01/07/1998	05:00 PM	Flash Flood	N/A	0	0	10K	0
8 <a href="#">Central Portion</a>	01/07/1998	10:00 AM	Flash Flood	N/A	0	0	20K	0
9 <a href="#">ALZ063&gt;064</a>	02/15/1998	03:00 PM	Flood	N/A	0	0	55K	0
10 <a href="#">ALZ064</a>	02/22/1998	06:30 AM	Flood	N/A	0	0	20K	0
11 <a href="#">ALZ063&gt;064</a>	03/08/1998	02:00 AM	Flood	N/A	0	0	40K	0
12 <a href="#">Countywide</a>	03/08/1998	12:30 AM	Flood	N/A	0	0	1.0M	0
13 <a href="#">ALZ063&gt;064</a>	03/17/1998	10:00 AM	Flood	N/A	0	0	30K	0
14 <a href="#">Countywide</a>	09/28/1998	05:15 AM	Flood	N/A	0	0	0	0
15 <a href="#">Ft Morgan</a>	03/13/1999	12:00 PM	Coastal Flooding	N/A	0	0	5K	0
16 <a href="#">Countywide</a>	03/03/2001	12:00 PM	Flash Flood	N/A	0	0	15K	0
17 <a href="#">ALZ063&gt;064</a>	06/11/2001	10:15 AM	Coastal Flooding	N/A	0	0	3K	0
18 <a href="#">Point Clear</a>	09/14/2002	07:20 AM	Flash Flood	N/A	0	0	0	0
19 <a href="#">Foley</a>	09/25/2002	04:45 AM	Flood	N/A	0	0	0	0
20 <a href="#">South Portion</a>	09/25/2002	09:40 PM	Flood	N/A	0	0	0	0
21 <a href="#">Central Portion</a>	04/07/2003	04:30 PM	Flash Flood	N/A	0	0	0	0
22 <a href="#">Central Portion</a>	05/18/2003	05:50 AM	Flash Flood	N/A	0	0	500K	0
23 <a href="#">Central Portion</a>	05/19/2003	05:00 AM	Flash Flood	N/A	0	0	0	0
24 <a href="#">Central Portion</a>	06/06/2003	01:40 PM	Flash Flood	N/A	0	0	0	0
25 <a href="#">Countywide</a>	06/30/2003	09:00 PM	Flash Flood	N/A	0	0	0	0
26 <a href="#">Countywide</a>	07/01/2003	12:00 AM	Flash Flood	N/A	0	0	0	0
27 <a href="#">Foley</a>	07/22/2003	06:30 PM	Flash Flood	N/A	0	0	0	0
28 <a href="#">Stockton</a>	05/17/2004	02:30 PM	Flash Flood	N/A	0	0	0	0
29 <a href="#">East Portion</a>	09/16/2004	03:00 AM	Flash Flood	N/A	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
30 <a href="#">Central Portion</a>	03/31/2005	07:00 PM	Flash Flood	N/A	0	0	10K	0
31 <a href="#">South Portion</a>	04/01/2005	12:00 AM	Flash Flood	N/A	0	0	100K	0
32 <a href="#">South Portion</a>	04/06/2005	05:30 PM	Flash Flood	N/A	0	0	150K	0
33 <a href="#">Central Portion</a>	04/30/2005	08:15 AM	Flash Flood	N/A	0	0	0	0
34 <a href="#">West Portion</a>	07/06/2005	05:00 AM	Flash Flood	N/A	0	0	0	0
35 <a href="#">Countywide</a>	08/29/2005	12:00 PM	Flash Flood	N/A	0	0	0	0
36 <a href="#">Central Portion</a>	05/29/2006	03:30 PM	Flash Flood	N/A	0	0	0	0
37 <a href="#">East Portion</a>	06/16/2006	02:00 PM	Flash Flood	N/A	0	0	0	0
38 <a href="#">ALZ063 - 064</a>	10/17/2006	04:00 AM	Coastal Flood	N/A	0	0	20K	0K
39 <a href="#">Perdido</a>	11/15/2006	12:00 PM	Flash Flood	N/A	0	0	0K	0K
40 <a href="#">Vaughn</a>	04/01/2007	11:00 AM	Flash Flood	N/A	0	0	0K	0K
41 <a href="#">Lillian</a>	05/30/2007	12:15 PM	Flash Flood	N/A	0	0	0K	0K
42 <a href="#">Fairhope</a>	10/19/2007	07:30 AM	Flash Flood	N/A	0	0	100K	0K
43 <a href="#">Little River</a>	10/23/2007	00:00 AM	Flash Flood	N/A	0	0	0K	0K
44 <a href="#">Stockton</a>	01/31/2008	21:00 PM	Flash Flood	N/A	0	0	0K	0K
45 <a href="#">Fairhope</a>	04/05/2008	02:00 AM	Flash Flood	N/A	0	0	10K	0K
46 <a href="#">Montrose</a>	05/16/2008	08:30 AM	Flash Flood	N/A	0	0	10K	0K
47 <a href="#">Spanish Ft</a>	08/25/2008	01:10 AM	Flash Flood	N/A	0	0	2K	0K
48 <a href="#">Montrose</a>	09/01/2008	15:30 PM	Flash Flood	N/A	0	0	5K	0K
49 <a href="#">Gulf Shrs</a>	10/07/2008	04:45 AM	Flash Flood	N/A	0	0	0K	0K
50 <a href="#">Robertsdale</a>	12/10/2008	07:30 AM	Flash Flood	N/A	0	0	0K	0K
51 <a href="#">Loxley</a>	03/28/2009	04:45 AM	Flash Flood	N/A	0	0	0K	0K
52 <a href="#">Orange Beach</a>	11/09/2009	23:30 PM	Flash Flood	N/A	0	0	0K	0K
53 <a href="#">Bay Minette</a>	12/14/2009	17:42 PM	Flash Flood	N/A	0	0	0K	0K
54 <a href="#">Bay Minette</a>	12/14/2009	19:55 PM	Flash Flood	N/A	0	0	0K	0K
55 <a href="#">Crossroads</a>	12/14/2009	19:55 PM	Flash Flood	N/A	0	0	0K	0K
56 <a href="#">Perdido</a>	12/15/2009	19:55 PM	Flash Flood	N/A	0	0	0K	0K
TOTALS:					0	0	2.320M	0

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**Past Occurrences of Winter Storms/Freeze**

**Table E-9. Baldwin County Extreme Cold and Winter Storm Events, 1950-2009**

**2 SNOW & ICE** event(s) were reported in **Baldwin County, Alabama** between **01/01/1950** and **07/31/2009**.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">ALZ062</a>	02/03/1996	01:00 AM	Freezing Rain	N/A	0	0	10K	0
2 <a href="#">ALZ051&gt;062</a>	01/02/2002	12:00 AM	Winter Storm	N/A	0	0	0	0
TOTALS:					0	0	10K	0

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**Past Occurrences of Drought/Heat Wave Events**

**Table E-10. Baldwin County Drought and Extreme Heat Events, 1950-2009**

**3 TEMPERATURE EXTREMES** event(s) were reported in **Baldwin County, Alabama** between **01/01/1950** and **05/31/2009**.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">ALZ062 - 064</a>	06/25/2000	10:00 AM	Excessive Heat	N/A	1	0	0	0
2 <a href="#">ALZ039 - 051&gt;064</a>	07/01/2000	12:01 AM	Excessive Heat	N/A	0	0	0	0
3 <a href="#">ALZ051&gt;064</a>	08/08/2007	08:00 AM	Heat	N/A	0	0	OK	OK
TOTALS:					1	0	0	0

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**Appendix F**  
**Identification and Analysis**  
**of Mitigation Measures**



## App. F – Identification and Analysis of Mitigation Measures

- 1.0 Alternative Mitigation Measures
- 2.0 Types of Mitigation Measures

### 1.0 Alternative Mitigation Measures

This section documents the range of alternative mitigation measures considered by the Hazard Mitigation Planning Committee (HMPC) in the development of its mitigation strategy and its selection of final action programs for each participating community. This documentation supports the Federal requirement that the plan must identify and analyze “a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure” (44 CFR Section 201.6 (c)(3)(ii)). Included here are the following supporting documents:

1. **Committee Exercise – Alternative Hazard Mitigation Measures.** This is the exercise administered by the planning team to the HMPC used to gather information on the priority issues to be addressed by the mitigation strategy, the recommended mitigation measures, and the recommended projects for potential funding under the FEMA hazard mitigation assistance programs.
2. **Types of Mitigation Measures.** This list describes the comprehensive range of mitigation measures by program area type (Prevention, Protection, Public Outreach and Awareness, Natural Resources Protection, and Structural Projects), which was one resource to the HMPC in completing the exercise listed above.
3. **Table of Alternative Mitigation Measures.** This summary table identifies a measure as an action or project, whether new or existing buildings and infrastructure are affected, and the hazard effects that would be reduced by the measure.

The alternative measures described here are all intended to affect the built environment and thereby reduce loss of life and damages to buildings and infrastructure. Excluded from these alternatives are measures which might propose to establish disaster response procedures. The mitigation plan is not an emergency response, recovery, or preparedness plan. Consequently, all emergency services measures designed to prepare emergency operations plans, train or equip emergency personnel, programs to reduce mobile technological hazards, plans to counter terrorism and the like are not included in the range of alternatives considered for adoption in this plan. Rather, the purpose of these mitigation measures is to decrease the need for response and recovery through long-term mitigation actions and projects; the intent is not to increase capabilities for response to disasters and recovery from the effects.

According to recent FEMA guidance (Local Multi-Hazard Mitigation Planning Guidance, FEMA, July 1, 2008, page 59), “hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects.” All of the mitigation measures presented here have been evaluated for compatibility with this recent FEMA definition.

**Committee Exercise  
Alternative Hazard Mitigation Measures**

Completed by: \_\_\_\_\_ Community: \_\_\_\_\_

**PART I: PRIORITY HAZARD MITIGATION ISSUES.** List or briefly describe the most critical hazard issues within the community. These are the priority issues that the mitigation measures should address. You may describe general hazard conditions or specific problems:

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**PART II: RECOMMENDATIONS FOR MITIGATION MEASURES.** What priority mitigation measures do you prefer for your community? Keep in mind the benefits in reducing economic losses, the priority (low, high), and the potential funding source (e.g., existing funds or FEMA mitigation assistance grants), Please place your recommendations in the spaces provided or continue on a separate sheet or the reverse side.

**1. Prevention measures.** *Adopting and administering ordinances, regulations, and programs that manage the development of land and buildings to minimize risks of loss due to hazards.*

*Types: Comprehensive Plans, Geographic Information Systems (GIS), Technical Studies, Capital Improvements Plans (CIP). Zoning, Open Space Preservation, Floodplain Management Regulations, Subdivision Regulations, Building and Technical Codes, Safe Room/ Shelter Requirements, Landscape Ordinances, Open Fire Regulations, Storm Water Regulations, Public Right-of-Way Maintenance, Dam Safety Management, Community Rating System (CRS) Program.*

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**2. Property Protection Measures.** *Protecting structures and their occupants and contents from the damaging effects of natural hazard occurrences, including retrofitting existing structures to increase their resistance to damage and exposure of occupants to harm; relocating vulnerable structures and occupants from hazard locations; and conversion of developed land to permanent open space through acquisition and demolition of existing structures.*

*Types: Relocation, Acquisition, Building Elevation, Flood Proofing, Building Retrofits*

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**3. Public Education and Awareness.** *Educating and informing the public about the risks of hazards and the techniques available to reduce threats to life and property.*

*Types: Map Information, Outreach Projects, Real Estate Disclosure, Library, Technical Assistance, Environmental Education*

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**4. Natural Resources Protection Measures.** *Preserving and restoring the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.*

*Types: Wetlands Protection, Open Space Easements and Acquisitions, River/Stream Corridor Restoration and Protection, Urban Forestry Programs.*

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**5. Structural Projects Measures.** *Engineering structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of a hazard on a community.*

*Types: Reservoirs, Levees/Floodwalls, Diversions, Channel Modifications, Dredging, Drainage Modifications, Storm Sewers, Dam Modifications, Ground Stabilization*

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## 2.0 Types of Mitigation Measures

1. **Prevention Measures.** Prevention measures involve adopting and administering ordinances, regulations, programs, and plans that can influence the development of land and buildings to minimize risks of loss due to natural and man-made hazards.
  - *Comprehensive Plans and Smart Growth.* Comprehensive plans guide future development over a long-range framework through land use, community facilities, economic development, environmental conservation, public infrastructure, and related planning. Effective comprehensive planning can help create safer and more sustainable communities with improved disaster resistance. By incorporating “Smart Growth” principles in a community’s comprehensive plan, a community can improve the effectiveness and responsiveness of its comprehensive plan to hazards identified in the mitigation planning process. Smart Growth can result in safe growth through these fundamental *principles of sustainable community development*: (a) promote compact infill development vs. urban sprawl, (b) preserve open space and protect the natural and beneficial functions of flood plains, coastal zones, wetlands, hillsides, and other vulnerable locations; and (c) steer growth away from hazardous areas. A comprehensive plan can designate vulnerable lands for open space uses that would not be incompatible with occasional hazard events. For instance, vulnerable areas subject to flooding, dam failure inundation, landslide risk, and land subsidence could be planned for parks, greenways, wildlife refuges, and other open space uses. For a comprehensive plan to be truly effective, the hazard vulnerability of lands and buildings assessed through the mitigation planning process should influence a community’s comprehensive plan for future land use and development patterns, community facilities, and infrastructure. The comprehensive plan should direct growth toward the most suitable land areas and avoid exposure of new buildings and infrastructure to high risk hazard locations assessed in the mitigation plan. Equally important to the effectiveness of a comprehensive plan, is the integration of planning strategies. A community’s mitigation strategy should be carried over into the goals, objectives and policies of its comprehensive plan.
  - *Capital Improvements Plans (CIP).* A CIP can recommend the setting aside of funds for public improvements, including water and sewer service extensions, new community facilities, land acquisitions for open space, emergency service facilities, improvements to retrofit or relocate vulnerable critical facilities, and other capital improvements that can be tied to both the comprehensive plan and the mitigation plan. The CIP is usually programs capital improvements over a five or six-year period, with funding identified. The capital expenditure requirements of high priority projects within a hazard mitigation plan may be included in a CIP. A CIP for public infrastructure improvements, when combined with zoning and land development controls, can establish a growth management

program to direct the location and timing of new development in accordance with a comprehensive plan and smart growth principles to avoid hazard areas.

- *Zoning and Land Development Controls.* The zoning ordinance is the primary tool to regulate development in vulnerable areas by limiting development. Zoning can be combined with a variety of related land development controls and special purpose ordinances. *Growth management controls of density and infrastructure improvements may reduce risks in areas exposed to severe hazards, such as flooding, landslides, sinkholes, and other location specific hazards.* Limited density controls could be applied to certain zones to discourage future development, or vulnerable areas could be zoned for recreation or agricultural uses or other uses that are compatible with the natural restrictions of the location. Landscaping standards can be incorporated into zoning ordinances to set aside minimum areas for tree and vegetation plantings. Planting areas can be used for drainage and help cool urban environments, as well as improve appearances. Tolerant species can be used to mitigate the effects of drought conditions, often referred to as “xeriscapes.” Other special purpose ordinances might address *hillside development by placing limits or setting minimum standards for building construction in steeply-sloped areas that are prone to landslides.* Transfer of development rights (TDR) programs are another tool for growth management by allowing landowners to transfer the right to develop one parcel of land to a different parcel of land. This could benefit the developer if incentives are given for building in suitable land areas and not building in hazardous areas.
- *Subdivision Regulations.* These regulations govern how land can be divided into separate lots or sites. Subdivision plats can be required to show hazard areas, such as flood zones, areas subject to landslides, and potential sinkhole locations. The regulations should establish minimum buildable lot areas that are sufficient to meet property protection objectives. Requiring new subdivisions to space buildings, install fire hydrants, and provide adequate access are some of the measures available to reduce the risks of fires.
- *Building and Technical Codes.* Standards can be incorporated into building and technical codes that address resistance against natural hazard threats for all new and substantially improved or repaired buildings. The International Code Series are the latest available codes. Building codes can prohibit loose masonry, overhangs, etc. that might be affected by earthquakes. Building code standards for roof materials and spark arrestors can mitigate fires. Standards can be set for roof construction to protect against wind damage from hurricanes, tornadoes, and severe storms. *Performance standards for foundation supports, utility protection, also add to building protection. Design standards can mandate that quality building products and construction applications are used. These codes can better assure quality constructed structures, which are more likely to withstand high winds, severe storms, and other natural hazards.* A site plan review process as part of local building permitting can ensure that site elements

are organized and planned to lessen the effects of potential hazards on new development.

- *Flood Plain Management Programs.* Participation in the NFIP (National Floodplain Insurance Program) is based on a community agreement with FEMA to meet minimum program requirements, including the adoption and continuing enforcement of a flood plain management ordinance. Flood Insurance Rate Maps (FIRM) are not only a tool for managing flood plain development, but the maps also create broad-based awareness of flood hazards. Flood Insurance Studies and accompanying FIRMs provide the data needed to administer floodplain management programs and to establish flood insurance rates for new and existing buildings. Often, Flood Insurance Rate Maps need updates to reflect changing developing in a given watershed. This may require comprehensive and detailed hydrologic and hydraulic modeling and improved topographic mapping to modernize existing maps. Updated FIRMs may also be needed in “Approximate” flood zones where no flood elevations or profiles are available. DFIRMS or Digital FIRMS can be created for computer and on-line access to maps and data. The Community Rating System (CRS) Program of the (NFIP) is an option that covers all flood hazard mitigation program elements. The CRS rewards communities for conducting a full range of flood mitigation programs that exceed the minimum NFIP requirements by awarding points to achieve a rating classification. Total points determine the class of a community. The higher the class, the more savings to flood insurance holders and more recognition to the successes of the local flood plain management program. With or without CRS participation, a community can establish “Higher Regulatory Standards” for flood plain management. Floodplain management regulations do not prohibit development in the special flood hazard area; instead, the regulations impose construction standards to minimize damages. Communities may adopt more stringent standards than those set forth by the NFIP, such as additional building elevation requirements, additional limitations on building enclosures, and other standards designed to better mitigate flood damages. Another method to improve the effectiveness of flood plain management programs is to appoint a Certified Floodplain Manager (CFM) who has passed minimum criteria of the Association of State Floodplain Managers to administer the community’s ordinance and program.
- *Storm Water Management Regulations.* Development outside of a floodplain can contribute significantly to flooding by creating impervious surfaces or altering natural drainage management systems, which increase storm water runoff. Storm water management is usually addressed in subdivision regulations or other land development controls. Developers are typically required to build retention or detention basins to minimize any increase in runoff rates caused by new or expanded impervious surfaces, or new drainage systems. Generally, there is a prohibition against storm water leaving the site at a rate higher than it did before the development based on a given design storm. One technique is to

use wet basins as part of the landscaping plan of a development. It might even be possible to site these basins based on a watershed analysis. Since detention only controls the runoff rates and not volumes, other measures may be applied for storm water infiltration, such as, swales, infiltration trenches, vegetative filter strips, and permeable paving blocks for parking areas. Erosion and sedimentation control regulations not only assure improved water quality but help preserve the carrying capacity of drainage ways and reduce localized flooding. These regulations are typically a component of a larger storm water management program or included in a storm water management ordinance.

- *Dam Safety Management.* A comprehensive dam safety program should begin with dam failure inundation maps. These areas should be kept clear of new development and preserved as open space to prevent future damages. Flood plain regulations could establish minimum building elevations based on predicted flood elevation in the event of dam failure. Regular dam safety inspections identify risks of failures.
- *Coastal Zone Management Regulations.* The physical factors that have the greatest influence on coastal land loss are reductions in sediment supply, relative sea level rise, and frequent storms. The most important human activities are sediment excavation, river modification, and coastal construction. As a result of these agents and activities, coastal land loss is manifested most commonly as beach/bluff erosion and coastal submergence. Implementation of Coastal Zone Management Plans helps to alleviate some of these problems.
- *Open Space Requirements.* Preserving open space is the most effective method for preventing damages. Open space preservation for flood control should not, however, be limited to the flood plain, since other areas within the watershed may contribute to runoff that exacerbates flooding. Comprehensive plans can identify areas to be preserved by acquisition. Other means, such as purchasing easements or accepting donations of land are also available. Open space can also be protected through maintenance agreements with the landowners, or by requiring developers to dedicate land for parks, public facilities, and drainage.
- *Open Burning Regulations.* Open burning restrictions can be enforced to prevent the spread of wild fires, especially during times of drought when emergency measures could be enacted.
- *Safe Room/Shelter Requirements.* Some communities have enacted safe room or shelter requirements for new housing construction and require community shelters for manufactured home parks, apartment complexes, and other planned residential communities.
- *Public Right-of-Way Maintenance Regulations.* An effective drainage system maintenance program should also include regulations that prevent dumping and littering in ditches and stream channels and require adjoining property owners to keep these areas clear of fallen trees, limbs, dead brush, and any other debris.

These efforts not only prevent obstructions to drainage but can also help mitigate wild fires.

- *Critical Facilities Assessments.* Assessments of critical facilities (hospitals, schools, fire and police stations, emergency operation centers, special needs housing, and others) can address building and site vulnerabilities to hazards and identify damage control measures in the event of severe weather and other natural hazards. This type of assessment can result in a plan to identify a variety of mitigation retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events.
- *Geographic Information Systems (GIS).* GIS applies computer technology to hazard mitigation planning by linking data to maps. Detailed property information, socioeconomic data, critical facilities inventories, and hazard locations, among other relevant information, can be continuously updated to provide a complete assessment resource for mitigation planning and other planning studies. HAZUS-MH is a risk assessment tool developed by FEMA to apply loss estimation models for earthquakes, hurricane winds, and flooding within a GIS framework.
- *Technology Programs.* Modern technology has created new opportunities for improving planning systems to support hazard mitigation. These systems can serve dual functions - to monitor hazard events as they happen for disaster warning purposes and to forecast and simulate events for advance planning purposes. The U.S. Geologic Survey (USGS) ALERT gage networks for select rivers and streams allow the National Weather Service (NWS) to handle early recognition of flooding. Local gages to cover high risk flood areas can be integrated into these systems with local EMA access. New technology has become available to monitor tornado activities. A comprehensive system can tie a variety of gages into a single automated network to monitor rainfall, river/stream stages, icy bridges and highways, tornadoes, winds, water quality, chemical spills into water ways, and hazardous air emissions. Remote cameras can enhance the monitoring capabilities of the system. These systems when used to simulate events can test a variety of mitigation alternatives, such as flood simulations, evaluation of structural alternatives on flood levels, and damage estimates from simulated events.
- *Planning Studies.* Planning for areas of special consideration might be considered in certain situations. These planning studies might evaluate the feasibility of various mitigation alternatives to address a specific hazard concern, such as a detailed flood hazard mitigation plan for a stream that updates hydrology, generates new flood profiles, and evaluates economic feasibility of structural and non-structural alternatives using sophisticated economic models. Another example would be geologic investigations to identify areas subject to landslides and recommendations for corrective measures.

2. **Property Protection Measures.** Property protection measures protect structures and their occupants and contents from the damaging effects of natural hazard occurrences, including retrofitting existing structures to increase their resistance to damage and exposure of occupants to harm; relocating vulnerable structures and occupants from hazard locations; and conversion of developed land to permanent open space through acquisition and demolition of existing structures.
- *Acquisition Projects.* Acquisition of land in a highly vulnerable zone protects against damages and casualties and converts problem areas into community assets, with accompanying environmental benefits. Acquisition, followed by demolition and conversion of land to permanent open space, is the most appropriate strategy for those buildings that have experienced recurring flood damages and flood insurance claims. This method might also be considered for older buildings with finish floor elevations several feet below predicted flood elevation. Often buildings are too expensive to move or are dilapidated and not worth saving or protecting. Acquisition, like relocation, can be very expensive. Benefit-cost analysis must be used to be certain the damages avoided outweigh the acquisition costs. Less costly alternatives might also be investigated.
  - *Building Elevations.* Elevating a flood-prone building above the base flood elevation is sometimes the best flood mitigation strategy. The building could be raised above the flood elevation to prevent interior water damage. This approach could be less costly than relocation or acquisition, and if properly designed the elevated buildings could be less disruptive than creating vacant lots as a result of relocations or acquisitions. Elevation is required by local flood plain regulations for new and substantially improved buildings in a floodplain, and is a commonly-practiced flood hazard prevention method.
  - *Flood Proofing.* If a building cannot be elevated, it may be flood proofed. This approach works well in areas of low flood threat and with nonresidential buildings. Flood proofing can be accomplished through barriers to flooding, or by treatment to the structure itself.
    - ✓ *Dry flood proofing* seals a building against the water by coating the walls with waterproofing compounds or plastic sheeting. Openings, such as doors, windows, etc. are closed. Sometimes, manual intervention may be required to implement dry flood proofing, such as installing removable flood shields at doorways.
    - ✓ *Wet flood proofing* is usually considered a last resort measure, since water is intentionally allowed into the building in order to minimize pressure on the structure. This is best applied to unfinished areas, such as warehouses and garages where contents are elevated.
    - ✓ *Barriers*, such as small levees, floodwalls, and berms can keep floodwaters from reaching a building. These are most useful in areas subject to shallow flooding.

- ✓ *Other flood proofing approaches* range from moving valuable items to higher floors to rebuilding the floodable area. An advantage over other approaches is that simply by moving household goods out of the range of floodwaters, thousands of dollars can be saved in damages.
- *Building Retrofits.* Existing buildings can be retrofitted to safeguard against possible damages. In addition to flood proofing or elevating existing buildings in a flood plain, other retrofits could protect buildings against natural hazards. Retrofitting to add braces/ roof straps and remove overhangs protects against high winds. Storm shutters and applying Mylar to windows and glass surfaces protects from shattering glass during hurricanes and severe storms. Tie downs of major appliances and other contents may reduce earthquake damage.
- *Building Relocations.* Moving structures out of vulnerable areas, such as high-risk flood plains, dam inundation areas, landslide zones, and land subsidence areas, is a sure way to protect against damage. Relocation is expensive, however, so this approach should not be used except in extreme circumstances, where there are no practical alternatives.
- *Critical Facilities Protection.* Protecting critical facilities is vital. Efforts should be made to retrofit or relocate existing facilities located in high-risk zones or construct new facilities for maximum protection from hazards. Protection of facilities includes not only buildings but also utilities, bridges, and other critical infrastructure.
- *Emergency Power Generation.* Maintaining power in the event of loss during severe storms and other natural hazards is vital for the continuing operation of critical facilities, especially, emergency services, hospitals, elderly housing, water distribution, sewer treatment, and other facilities. Power shut downs could cause major disruptions and consequential damages. Relatively low cost portable generations can supply temporary power to small critical facilities, households, and small businesses.
- *Sewer Backup Protection.* Storm water overloads can cause backup into basements through sanitary sewer lines. Houses that have any kind of connection to a sanitary sewer system - whether it is downspouts, footing drain tile, and/or sump pumps, can be flooded during a heavy rain event. To prevent this, there should be no such connections to the system, and all rain and ground water should be directed onto the ground, away from the building. Floor drain plugs and floor drain standpipes keep water from flowing out of the lowest opening in the house. Overhead sewer keeps water in the sewer line during a backup. Backup valves allow sewage to flow out while preventing backups from flowing into the house.



3. **Public Education and Awareness.** Public education and awareness methods educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.
- *Community Hazard Mitigation Plan Distribution.* Internet downloads and CDs are some of the means for mass distribution of the mitigation plan to the public. A fold-out, poster-size summary document could be printed for mass mailings or a special summary document could be published in the Sunday edition of the local newspaper.
  - *Flood Map Information.* Flood Insurance Rate Maps (FIRM) developed by FEMA outline the boundaries of the flood hazard areas and provide other valuable information on flooding conditions. These maps can be used by anyone interested in a particular property to determine if it is flood-prone. NFIP communities can provide this information to the real estate agents, builders, developers and homeowners as a public service.
  - *Outreach Projects.* Outreach projects are proactive; they give the public information even if they have not asked for it. Outreach projects are designed to encourage people to seek out more information and take steps to protect themselves and their properties. Outreach programs work, although awareness is not enough. People need to know what they can do about the hazards, so projects should include information on protection measures. Locally designed and run programs are often more effective than national advertising. The following are just a few of the examples of outreach activities:
    - ✓ City or county government newsletters with articles on hazard mitigation.
    - ✓ Notices directed to floodplain residents encouraging the purchase of flood insurance.
    - ✓ Displays in public buildings, malls, festivals, fairs, and other public assembly places, including colorful GIS maps, brochures, and information handouts.
    - ✓ Newspaper articles and special sections addressing hazards.
    - ✓ Radio and TV news releases and interviews shows.
    - ✓ A flood proofing video for cable TV programs and for loan to organizations.
    - ✓ A detailed property owner handbook tailored for local conditions.
    - ✓ Presentations at meetings of neighborhood groups.
  - *Hazard Insurance Awareness.* Above and beyond standard property insurance, coverage may be available to property owners for protection against flood damages, if the property is in a community that participates in the National Flood Insurance Program. Any local insurance agent is able to sell flood insurance policies under rules and rates set by FEMA. Flood insurance may also be advisable for properties located in dam inundation areas. Flood insurance is

also available for areas outside of mapped flood zones. Flood damage may still occur outside of a flood plain as a result of poor drainage or other causes. Property owners may also purchase additional insurance riders for specific hazard coverages, such as insurance riders for earthquake, landslides, or sinkhole damage.

- *Real Estate Disclosure.* Disclosure of information regarding flood-prone properties is important if potential buyers are to be in a position to mitigate damage. Federally regulated lending institutions are required to advise applicants that a property is in the floodplain. However, this requirement needs to be met only days prior to closing, and by that time, the applicant is typically committed to the purchase. State laws and local real estate practice can help by making this information available to prospective buyers early in the process.
- *Library.* Your local library can serve as a repository for pertinent information on hazards and methods of protection. Some libraries also maintain their own public information campaigns, augmenting the activities of the various governmental agencies involved in hazard mitigation.
- *Technical Assistance.* Certain types of technical assistance are available from the local technical and professional staff to advise on various mitigation alternatives to property owners. Community officials can also set up a service delivery program to provide one-on-one sessions with property owners. An example of technical assistance is the hazard audit, in which a specialist visits a property. The specialist advises the owner of alternative protection measures.
- *Education Programs.* Education can be a great mitigation tool. The earlier education begins the better. Education programs for children can be taught in the schools, park and recreation departments, conservation associations, or youth organizations. An activity can be as involved as course curriculum development or as simple as an explanatory sign near a river. Education programs do not have to be limited to children. Adults can benefit from knowledge of hazards and mitigation measures, and local officials, loaded with this knowledge, can make more informed decisions on mitigation actions.
- *Mass Media Relations.* Newspapers, radio, TV, cable access, internet blogs, podcasts, video sharing, and on-line social networking are some of the ever changing mass media tools available for increasing public awareness and distributing public information on hazard mitigation topics. Effective media relations are essential to a comprehensive outreach program.
- *NOAA Weather Radio Programs.* The use of inexpensive weather radios in homes and businesses are another means for advance warning and can be promoted as a public service. Some localities may choose to purchase these radios in bulk and distribute them to residents at little or no cost. A corporate sponsor can bear some or all of the costs.

4. **Natural Resources Protection Measures.** Natural resources protection measures preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.
- *Wetlands Protection.* Wetlands are capable of storing large amounts of floodwaters, slowing and reducing downstream flows, and filtering the water. Any development that is proposed in a wetland is regulated by either federal and/or state agencies. Depending on the location, the project might fall under the jurisdiction of the U.S. Army Corps of Engineers, which in turn, calls upon several other agencies to review the proposal. Communities may also have local wetland ordinances. Generally, the goal is to protect wetlands by preventing development that would adversely affect them. Mitigation techniques are often employed, which might consist of creating a wetland on another site to replace what would be lost through the development.
  - *Open Space Easements and Acquisitions.* Acquiring easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands, assures permanent protection. Acquisitions can be made by a land trust or a public agency to benefit the public welfare. Often, property owners may be willing to dedicate lands and easements for tax advantages.
  - *River/Stream Corridor Restoration and Protection.* Restoration and protection of stream or river banks and riparian zones help restore the natural and beneficial functions to manage floods and filter runoff. Streams should also be protected from dumping. Often, greenways or linear parks along these corridors provide amenities that are compatible with natural functions.
  - *Urban Forestry Programs.* A number of cities nationwide have participated in formal urban forestry programs. Urban forestry programs which follow Tree City USA guidelines for public lands and rights-of-way help maintain healthy tree cover for multiple mitigation purposes. Protection and maintenance of the urban forest is especially helpful for the mitigation of wild fires, hillside erosion and landslides, and restoration of stream and river corridors. Combined with effective landscaping regulations, both private and public spaces can be addressed.
  - *Water Resources Conservation Programs.* Protection of water quantity and quality through water conservation programs can help mitigate the effects of droughts.
  - *Dune and Beach Restoration.* Dune and beach restoration and maintenance can alleviate flooding from hurricanes or severe storms in coastal areas. The dunes provide a natural barrier from the waves and wind which can travel inward causing flooding and major damage to structures.
5. **Structural Projects Measures.** Structural projects measures are engineering structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of a hazard on a community.

- *Reservoirs.* Reservoirs control flooding by holding water behind dams or in storage basins. After a flood peaks, water is released or pumped out slowly at a rate the river downstream can handle. Reservoirs are suitable for protecting existing development, and they may be the only flood control measure that can protect development close to a watercourse. They are most efficient in deeper valleys or on smaller rivers where there is less water to store. Reservoirs might consist of man-made holes dug to hold the approximate amount of floodwaters, or even abandoned quarries. As with other structural projects, reservoirs projects have drawbacks, as follows:
  - ✓ expensive
  - ✓ occupy a lot of land
  - ✓ require periodic maintenance
  - ✓ may fail to prevent damage from floods that exceed design levels
  - ✓ may eliminate the natural and beneficial functions of the floodplain.

Reservoirs should only be used after a thorough watershed analysis that identifies the most appropriate location, and ensures that they would not cause flooding somewhere else. Because they are so expensive and usually involve more than one community, they are typically implemented with the help of state or federal agencies, such as the Army Corps of Engineers.

- *Levees/Floodwalls.* A commonly known structural flood control measure is either a levee (a barrier of earth) or a floodwall made of steel or concrete erected between the watercourse and the land.
- *Diversions.* A diversion is simply a new channel that sends floodwater to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During flood flows, the stream spills over the diversion channel or tunnel, which carries the excess water to the receiving water body.
- *Channel Modifications.* Channel modifications include making a channel wider, deeper, smoother, or straighter. These techniques will result in more water being carried away, but as with other structural techniques, it is important to ensure that the modifications do not create or increase a flooding problem downstream.
- *Dredging.* Dredging involves removal of sediment and other deposits in a river or stream bed to restore flood conveyance. It can be costly because the dredged material must be hauled away and disposed of in another location and the stream or river bed could quickly fill back in with sediment.
- *Drainage Modifications.* These include man-made ditches and storm sewers that help drain areas where the surface drainage system is inadequate or where

underground drainage ways may be safer or more attractive. These approaches are usually designed to carry the runoff from smaller, more frequent storms.

- *Storm Sewers.* Mitigation techniques for storm sewers include installing new sewers, enlarging small pipes, street improvements, and preventing back flow. Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving body of water can absorb the increased flows without increased flooding. In many developments, streets are used as part of the drainage system, to carry or hold water from larger, less frequent storms. The streets collect runoff and convey it to a receiving sewer, ditch, or stream. Allowing water to stand in the streets and then draining it slowly can be a more effective and less expensive measure than enlarging sewers and ditches.
- *Drainage System Maintenance.* Ongoing maintenance of streams and drainage channels is necessary if these facilities are to function effectively and efficiently over time. Maintenance of channel growth within or near stream and river channels is important for bank stabilization and to prevent obstructions of drainage flows. Often sediment buildup can impede stream flow. Regular maintenance is necessary for public drainage systems, including constructed components, such as, ditches, culverts, and bridges and natural components, such as swales, intermittent and perennial streams, and stream and river overbank areas. Maintenance assures adequate conveyance of storm and flood waters. Other maintenance programs to clear dead and dry brush and fallen trees can not only prevent obstructions to drainage but also mitigate wild fires.
- *Dam Modifications.* Unsafe dams can be removed or modified to lessen the risks of dam failure, such as spillway enlargements to lessen hydraulic loads.
- *Ground Stabilization.* Unstable areas susceptible landslides or sinkholes may be stabilized to lessen risk of failure.
- *Community Storm Shelter/Safe Room Construction.* Freestanding, single-purpose community storm shelters or safe rooms within a building used for other purposes can be constructed to provide temporary shelter from hurricanes, tornadoes, and severe storms.

**Table F-1. Alternative Types of Mitigation Measures**

TYPES OF MITIGATION MEASURES	Action or Project	Affects New or Existing Buildings and Infrastructure	Tornadoes	Flooding	Severe Storms	Winter Storms/Freezes	Hurricanes	Droughts/Heat Waves	Earthquakes	Wildfires	Dam/Levee Failures	Landslides	Sinkholes
<b>PREVENTION MEASURES</b>													
<i>Comprehensive Plans and Smart Growth</i>	Action	Both		X			X			X	X	X	X
<i>Capital Improvements Plans</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Zoning and Land Development Controls</i>	Action	Both		X			X			X	X	X	X
<i>Subdivision Regulations</i>	Action	Both		X			X			X	X	X	X
<i>Building &amp; Technical Codes</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Flood Plain Management Programs</i>	Action	Both		X							X		
<i>Storm Water Management Regulations</i>	Action	Both		X	X								
<i>Dam Safety Management</i>	Action	Both		X							X		
<i>Coastal Zone Management Regulations</i>	Action	Both		X	X		X						
<i>Open Space Requirements</i>	Action	Both		X			X			X		X	X
<i>Open Burning Regulations</i>	Action	Both								X			
<i>Safe Room/Shelter Requirements</i>	Action	Both	X		X		X		X				
<i>Public Right-of-Way Maintenance Regulations</i>	Action	Both		X	X					X			
<i>Critical Facilities Assessments</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Geographic Information Systems</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Technology Programs</i>	Action	Both	X	X			X		X				
<i>Planning Studies</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X

TYPES OF MITIGATION MEASURES	Action or Project	Affects New or Existing Buildings and Infrastructure	Tornadoes	Flooding	Severe Storms	Winter Storms/Freezes	Hurricanes	Droughts/Heat Waves	Earthquakes	Wildfires	Dam/Levee Failures	Landslides	Sinkholes
<b>PROPERTY PROTECTION MEASURES</b>													
<i>Acquisitions Projects</i>	Project	Existing		X			X					X	X
<i>Building Elevations</i>	Project	Existing		X									
<i>Flood Proofing</i>	Project	Existing		X									
<i>Building Retrofits</i>	Project	Existing	X	X	X	X	X	X	X	X			
<i>Building Relocations</i>	Project	Existing		X			X					X	X
<i>Critical Facilities Protection</i>	Project	Existing	X	X	X	X	X	X	X	X			
<i>Emergency Power Generation</i>	Project	Both	X		X	X	X		X				
<i>Sewer Backup Protection</i>	Project	Both		X									
<b>PUBLIC EDUCATION AND AWARENESS MEASURES</b>													
<i>Community Hazard Mitigation Plan Distribution</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Flood Map Information</i>	Action	Both		X			X						
<i>Outreach Projects</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Hazard Insurance Awareness</i>	Action	Both	X	X			X		X	X		X	X
<i>Real Estate Disclosure</i>	Action	Both		X									
<i>Library</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Technical Assistance</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Education Programs</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>Mass Media Relations</i>	Action	Both	X	X	X	X	X	X	X	X	X	X	X
<i>NOAA Weather Radio Programs</i>	Action	Existing	X	X	X	X	X	X	X				

TYPES OF MITIGATION MEASURES	Action or Project	Affects New or Existing Buildings and Infrastructure	Tornadoes	Flooding	Severe Storms	Winter Storms/Freezes	Hurricanes	Droughts/Heat Waves	Earthquakes	Wildfires	Dam/Levee Failures	Landslides	Sinkholes
<b>NATURAL RESOURCES PROTECTION MEASURES</b>													
<i>Wetlands Protection</i>	Both	Both		X				X					X
<i>Open Space Easements and Acquisitions</i>	Both	Both		X			X			X		X	X
<i>River/Stream Corridor Restoration and Protection</i>	Both	Both		X									
<i>Urban Forestry Programs</i>	Both	Both								X			
<i>Water Resources Conservation Programs</i>	Action												
<i>Dune and Beach Restoration</i>	Project	Both		X			X						
<b>STRUCTURAL MEASURES</b>													
<i>Reservoirs</i>	Project	Both		X									
<i>Levees/Floodwalls</i>	Project	Both		X							X		
<i>Diversions</i>	Project	Both		X									
<i>Channel Modifications</i>	Project	Both		X									
<i>Dredging</i>	Project	Both		X									
<i>Drainage Modifications</i>	Project	Both		X									
<i>Storm Sewers</i>	Project	Both		X									
<i>Drainage System Maintenance</i>	Project	Both		X						X			
<i>Dam Modifications</i>	Project	Both		X							X		
<i>Ground Stabilization</i>	Project	Both										X	X
<i>Community Shelter/Safe Room Construction</i>	Project	Both	X		X		X						





## **Appendix G**

# **Committee Meeting Documentation**



## **App. G - Committee Meeting Documentation**

- 1.0 Establishment of Hazard Mitigation Planning Committee
- 2.0 Committee Meetings
- 3.0 Meeting Agendas and Sign-in Sheets

### **1.0 Establishment of Hazard Mitigation Planning Committee**

The Hazard Mitigation Planning Committee (HMPC) was first established to oversee the development of the 2004 plan and was reorganized for the plan update. It provides opportunities for direct involvement by participating jurisdictions and interested organizations and agencies in the planning process. The HMPC convened regularly throughout the drafting phase of the 2010 plan update. The HMPC meetings served as open public forums for discussing hazard risks to Baldwin County communities and developing effective strategies to respond to those risks. HMPC membership included representatives from all participating jurisdictions. Membership and meeting participation was expanded to also include other agencies. This enlarged membership created additional opportunities for interagency coordination among other stakeholders in the mitigation planning process. All meetings were open to public participation. Each Baldwin County jurisdiction had direct representation on the HMPC, which was one of many alternatives for their participation in this multi-jurisdictional planning process (see Appendix I Multi-Jurisdictional Participation Activities). This appendix documents the HMPC's meeting activities during the drafting phase of this plan, including who was involved in these meetings. Included here are the meeting agendas and sign-in sheets.

### **2.0 Committee Meetings**

Prior to the plan update period, the HMPC met annually to review the mitigation plan in accordance with the maintenance guidelines established in "Chapter 7 - Plan Maintenance" of the 2004 Baldwin County, Alabama Natural Hazards Mitigation Plan. (Records of these meeting are maintained by the Baldwin County EMA). Following the award of FEMA HMGP planning funds the HMPC initiated a schedule for more frequent meetings to oversee the development of this 2010 update.

The Hazard Mitigation Planning Committee held five meetings from March through October 2010 to complete the updates to the 2004 Baldwin County, Alabama, Natural Hazards Mitigation Plan. During these meetings the attendees were informed about mitigation planning and the various steps required for preparing the plan update. During these interactive meetings, members completed a series of written exercises related to the various components of this plan and discussed a range of issues, among other meeting activities. These activities and discussions addressed identifying hazards, profiling hazards, examining the locations of hazards, rating the probability and extents of each hazard, assessing risk and vulnerabilities of buildings and populations, updating goals, reviewing mitigation action alternatives, and updating

each community's action program. The completed exercises and results of meeting discussions were used in the formation of this plan update. All of the completed exercises are maintained on file in the Baldwin County EMA offices. The agendas and sign-in sheets are included in this appendix. For a more in-depth discussion of the composition and role of the HMPC, see "Chapter 4 - The Planning Process."

### **3.0 Meeting Agendas and Sign-in Sheets**

This section documents the HMPC's meeting activities during the drafting phase of this plan, including who was involved in these meetings. Included here are the meeting agendas and sign-in sheets.

**Baldwin County Hazard Mitigation**

Kick-off Meeting

March 15, 2010

Call to Order

Welcome and Opening Remarks

Introduction to Mitigation Planning

Review of 2004 Plan

Overview of 2010 Planning Process

HMPC Exercises

Completed Draft Chapters for HMPC Review

Other Business

Adjourn

MITIGATION MEETING			
Training Location:	BOSMA	Meeting Dates:	March 15, 2010 @ 2PM
Facilitator:		Phone/Fax:	Up State Training Room

Name:	Phil Bryner Jr.	Email:	pbryner@ci.bay-mineth.ga.us
Company:	City of Baymouth	Phone:	251-580-2552
Name:	Raymond Rushop	Email:	r.rushop@foleyfoley.org
Company:	City of Foley	Phone:	251-952-4015
Name:	Brylgett Wilson	Email:	bwilson@northbaldwinutilities.com
Company:	North Baldwin Utilities	Phone:	251-580-1626
Name:	Bob Halk	Email:	r.c.halk@egufc1.com
Company:	Town of Marietta Springs	Phone:	251-978-6720
Name:	Joseph Bourzan	Email:	jbourzan@cityoffoley.org
Company:	City of Foley	Phone:	251-970-5024
Name:	Rachel Keith	Email:	rkeith@cityoffoley.org
Company:	City of Foley	Phone:	251-970-2418
Name:	J.T. Abbot II	Email:	jt2460@cityoffoley.com
Company:	Paridlo Beach	Phone:	257-561-7759
Name:	Deeg Craydon	Email:	dcraydon@qulitel.com
Company:	Paridlo Beach VFD	Phone:	251-269-3204
Name:	AL Thompson	Email:	lyndithompson@alccs.com
Company:	Town of Paridlo Beach Council	Phone:	961-9860/982/2200

MITIGATION MEETING			
Training Location:	RCMA	Meeting Dates:	March 15, 2010 @ 2PM
Facilitator:		Phone/Room:	Up State Training Room

Name:	JAMES P. DAVIS JR	Email:	James.Davis@co.fairhope.al.gov
Company:	FAIRHOPE FIRE DEPT	Phone:	251-980-3449
Name:	Susan Bowman	Email:	Susan.Bowman@co.fairhope.al.gov
Company:	Fairhope Police	Phone:	251-988-2395
Name:	Steve Kirkpatrick	Email:	elbertafirechief@guilftel.com
Company:	Town Of Elberta	Phone:	251-986-8156
Name:	Tony Darby	Email:	tdarby@cityoffoley.org
Company:	Foley Fire Department	Phone:	251-948-1266
Name:	Keith Martin	Email:	kmartin@guiltsherect.gov
Company:	Gulf Shores Fire Rescue	Phone:	251-968-1168
Name:	Hardy Brokenshaw	Email:	hbrokenshaw@gulfshoresal.gov
Company:	Gulf Shores Fire Rescue	Phone:	251-968-1169
Name:	Arthur Bourne	Email:	abourne@guiltsherect.gov
Company:	CITY OF GULF SHORES	Phone:	251-747-2978
Name:	Barney Fulford	Email:	Barney.Fulford@co.fairhope.al.gov
Company:	CITY OF FAIRHOPE	Phone:	908-0141 (251)
Name:	BRUCE REUKERT	Email:	buildingofficial@cityofspanishfort.com
Company:	CITY OF SPANISH FORT	Phone:	251-626-4993



MITIGATION MEETING			
Training Location:	BCSWA	Meeting Date:	March 15, 2010 @ 2PM
Facilitator:		Phone/Room:	Up Stairs Training Room
Name: <i>Tom Geinger</i>	Company: <i>Hickman, Moore &amp; Fox LLC</i>	Email: <i>tom.geinger@foxgpc.com</i>	Phone: _____
Name: <i>Landon K. Smith</i>	Company: <i>CITY OF DADE</i>	Email: <i>landon.smith@cityofdade.com</i>	Phone: <i>251-981-2410</i>
Name: <i>Richard Carson</i>	Company: <i>ONE ISLAND BOA</i>	Email: <i>rcarson@oneisland.com</i>	Phone: <i>251-980-1536</i>
Name: <i>Denise Perry</i>	Company: <i>CITY OF DAPHNE</i>	Email: <i>denise.perry@cityofdaphne.com</i>	Phone: <i>251-621-3182</i>
Name: <i>Mike Howell</i>	Company: <i>Bald. Co.</i>	Email: <i>mhowell@baldwin.al.us</i>	Phone: <i>972-6837</i>
Name: <i>Marcus D. Flint</i>	Company: <i>RIVERA UTILITIES</i>	Email: <i>mflint@rivera-utilities.com</i>	Phone: <i>251-970-4102</i>
Name: <i>Ed Vaughn Jr</i>	Company: <i>Louis Free Dept</i>	Email: <i>edvaughnjr@yahoo.com</i>	Phone: <i>251-964-6445</i>
Name: <i>Raymond Lovell</i>	Company: <i>Lovley Police Dept.</i>	Email: <i>Raymond.Lovell@ALPD09.gov</i>	Phone: <i>251-964-5029</i>
Name: <i>Dawn Wilson</i>	Company: <i>Town of Summerdale</i>	Email: <i>Summerdale@gaflha.com</i>	Phone: <i>251-989-6802</i>

MITIGATION MEETING				
Training Location:	RCBM	Meeting Dates:	March 15, 2010 @ 2PM	
Facilitator:		Priority/Recess:	Up State Training Room	
Name: <i>Tiffany Lynn</i>	Company: <i>Town of Summerdale</i>	Email: <i>Summerdale1@alltel.com</i>	Phone: <i>251-989-1093</i>	Job: <i>Town Clerk</i>
Name: <i>Nancy Mackey</i>	Company: <i>BC Planning &amp; Zoning Dept</i>	Email: <i>nmackey@co.baldwin.al.us</i>	Phone: <i>251-972-8523</i>	Job: <i>Planner</i>
Name: <i>Les McIlwain</i>	Company: <i>Baldwin County Commission</i>	Email: <i>lmcilwain@co.baldwin.al.us</i>	Phone: <i>251-500-2535</i>	Job: <i>GIS Manager</i>
Name: <i>Tyler Stuart</i>	Company: <i>Baldwin County Commission</i>	Email: <i>tstuart@co.baldwin.al.us</i>	Phone: <i>251-972-6528</i>	Job: <i>Asst. Maint. Engineer</i>
Name: <i>Andy Bauer</i>	Company: <i>Atty. Gen. Steve</i>	Email: <i>abauer@attyservices.al.us</i>	Phone: <i>251-968-1151</i>	Job: <i>Director Planning &amp; zoning</i>
Name: <i>Franklin Franklin</i>	Company: <i>Carver Sewer</i>	Email: <i>franklin@carveral.us</i>	Phone: <i>251-968-1150</i>	Job: <i>Business Office</i>
Name: <i>Jerry R. Givarty</i>	Company: <i>ADPH</i>	Email: <i>jerry.givarty@adph.state.al.us</i>	Phone: <i>251-947-6206</i>	Job: <i>Emergency Prep Enviro</i>
Name: <i>TERESA PASTER</i>	Company: <i>AL Dept of Public Health - Area 9</i>	Email: <i>teresa.paster@adph.state.al.us</i>	Phone: <i>251-947-6206</i>	Job: <i>EP Coordinator</i>
Name: <i>Teddy King</i>	Company: <i>ADPH</i>	Email: <i>teddy.king@adph.state.al.us</i>	Phone: <i>251-947-3616</i>	Job: <i>Environmental Supervisor</i>

<b>MITIGATION MEETINGS</b>			
Training Location:	BCEMA	Meeting Dates:	March 15, 2010 @ 2PM
Facilitator:		Phone/Fax:	Up State Training Room
Name:	Leigh Anne Ryals	Email:	LRyals@CO.BALDWIN.AL.US
Company:	Baldwin Co. EMA	Phone:	251-977-6801
Name:	Scott Walker	Email:	swalker@co.baldwin.al.us
Company:	BC EMA	Phone:	251-977-8517
Name:		Email:	
Company:		Phone:	
Name:		Email:	
Company:		Phone:	
Name:		Email:	
Company:		Phone:	
Name:		Email:	
Company:		Phone:	
Name:		Email:	
Company:		Phone:	
Name:		Email:	
Company:		Phone:	

**Baldwin County Hazard Mitigation**

HMPC Meeting

April 5, 2010

Call to Order

Welcome and Opening Remarks

HMPC Hazard Identification Results

Hazard Profiles

Other Business

Adjourn

**MITIGATION MEETING**

<b>Training Location:</b>	BCEMA	<b>Meeting Date:</b>	April 5, 2010
<b>Facilitator:</b>		<b>Place/Room:</b>	

Name: Thomas Hudson	Email: LOYLEY.pud@guilford.com
Company: Town of Lyley	Phone: 251-969-7644 Job: Superintendent of Public works
Name: Steve Williams	Email: scwilliams@gulftele.com
Company: Town of Silverhill	Phone: 251-945-3253 Job: SUPERINTENDENT
Name: Bob Holt	Email: r.c.holt@guilford.com
Company: T.C. Matanzas Springs	Phone: 251-978-6920 Job: council person
Name: Richard Carsons	Email: radcar@guilford.com
Company: One Island P.O.A.	Phone: 251-980-1536 Job: EMA
Name: Denise Perry	Email: Accountantpw@bellsouth.net
Company: City of Daphne	Phone: 251-621-3182 Job: PW Accountant
Name: Ashley Campbell	Email: aycampbell@bellsouth.net
Company: City of Daphne	Phone: 251-621-3080 Job: Environmental Programs Manager
Name: Bruce Reneker	Email: buildingofficial@cityofspanishfort.com
Company: City of Spanish Fort	Phone: 251-626-4993 Job: BUILDING OFFICIAL
Name: Mike Howell	Email: Mhowell@Co.Baldwin.AL.US
Company: Baldwin County	Phone: 251-943-5061 Job: Building Official
Name: Laurus R. Smith	Email: lsmith@cityofspanishfort.com
Company: City of Orange Beach	Phone: 251-781-2610 Job: Building Official

Training Location:		Meeting Date:	
Facilitator:		Place/Room:	
10	Name: <i>Jenni R. Querry</i> Company: <i>ADPH</i>	Email: <i>jenni.querry@adph.state.al.us</i> Phone: <i>251-947-6204</i>	Job: <i>Emergency Preparedness</i>
11	Name: <i>Teddy King</i> Company: <i>ADPH</i>	Email: <i>teddy.king@adph.state.al.us</i> Phone: <i>251-947-3618</i>	Job: <i>Environmental Supervisor</i>
12	Name: <i>Collette Boehm</i> Company: <i>AL Gulf Coast CVB</i>	Email: <i>CBoehm@gulfshores.com</i> Phone: <i>251-974-4632</i>	Job: <i>Public Information / Special Projects</i>
13	Name: <i>Tucker Stuart</i> Company: <i>BCC</i>	Email: <i>tstuart@co.baldwin.al.us</i> Phone: <i>478-6528</i>	Job: <i>Asst. Mgr. Engineer</i>
14	Name: <i>Bert Campbell</i> Company: <i>City of Robertsdale</i>	Email: <i>bertcampbell@robertsdale.org</i> Phone: <i>251-947-1002</i>	Job: <i>Permitting Agent</i>
15	Name: <i>Greg Smith</i> Company: <i>City of Robertsdale</i>	Email: <i>gregsmith@robertsdale.org</i> Phone: <i>(251) 947-8955</i>	Job: <i>City Engineer</i>
16	Name: <i>Leigh Anne Ryals</i> Company: <i>Baldwin Co. EMA</i>	Email: <i>L.Ryals@co.baldwin.al.us</i> Phone: <i>251 972-6801</i>	Job: <i>Director EMA</i>
17	Name: <i>Ken McElvain</i> Company: <i>Baldwin Co. Commission</i>	Email: <i>ken@co.baldwin.al.us</i> Phone: <i>251.580.2535</i>	Job: <i>GIS Manager</i>
18	Name: <i>Don McElvain</i> Company: <i>Seawatch</i>	Email: Phone: <i>989-7777</i>	Job: <i>Police</i>

MITIGATION MEETING

Training Location:	BCEMA	Meeting Date:	April 5, 2010
Facilitator:		Place/Room:	

Name:	Tiffany Kyrn	Email:	Summerdale@gulfTel.com
Company:	Team of Summerdale	Phone:	251-989-4935
Name:	David Wilber	Email:	dawidw.12@gulfTel.com
Company:	Team of Summerdale	Phone:	251-228-0473
Name:	STEVE KIRKPATRICK	Email:	elbertafirechief@gulfTel.com
Company:	TOWN OF ELBERTA	Phone:	251-747-0576
Name:	Barney Fulford	Email:	barney.fulford@co.fairhope.com
Company:	CITY OF FAIRHOPE	Phone:	251-990-0141
Name:	James P. Davis Jr	Email:	Jimmy.Davis@co.fairhope.com
Company:	CITY OF FAIRHOPE	Phone:	251-929-0936
Name:	Arthur Bourne	Email:	abourne@gulfshores91.gov
Company:	CITY OF GULF SHORES	Phone:	251-747-2978
Name:	Keith Mathis	Email:	kmathis@gulfshores91.gov
Company:	GULF SHORES	Phone:	251-968-1168
Name:	Phil Bryers	Email:	pbryers@ci.bay-minn.tx.us
Company:	Bayminn	Phone:	251-580-2352
Name:	Tim Hoegs	Email:	Thoegs@baldwinenc.com
Company:	Baldwin Enc	Phone:	251-978-4455

**MITIGATION MEETING**

Training Location:	BCEMA	Meeting Date:	April 5, 2010
Facilitator:		Place/Room:	

Name:	JAMES SHORTS	Email:	JSHORTS@BCBE.ORG
Company:	BCBE	Phone:	970-4415
Name:	AL Thompson	Email:	AL@PERILDOBEACH.ORG
Company:	Town of Perido Beach	Phone:	962-2200
Name:	Wayne Dyess	Email:	wdyess@co.halibut.ak.us
Company:	BC Planning Zoning	Phone:	580-1655
Name:	Joe Bouzan	Email:	jbouzan@cityoffoley.org
Company:	City of Foley	Phone:	251-970-5024
Name:	Rachel Keith	Email:	rkeith@cityoffoley.org
Company:	City of Foley	Phone:	251-970-2418
Name:	Randy Fisher	Email:	rfisher@foleyfire.org
Company:	Long Foley Fire Dept	Phone:	251-954-4010
Name:	Jaey Darby	Email:	jdarby@cityoffoley.org
Company:	City of Foley - Fire Dept	Phone:	251-943-1266
Name:	STEVEN IRVEN	Email:	SIRVEN@BAKOWENEC.COM
Company:	BAKOWEN EMC	Phone:	251-988-4840
Name:	Tom Granger	Email:	tgranger@hweengineering.com
Company:	HWE	Phone:	(251) 626-2222



**Baldwin County Hazard Mitigation**

HMPC Meeting

April 21, 2010

Call to Order

Welcome and Opening Remarks

Summary of Community Impacts

Summary of Risk Variations Among Jurisdictions

Man-Made Hazards

Introduction to Mitigation Strategies

Other Business

Adjourn

MITIGATION PLANNING COMMITTEE

Training Location:	BCEMA	Meeting Date:	April 22, 2010
Facilitator:		Place/Room:	Up-stairs conference room

Name: AL Thompson	Company: Town of Panama Beach	Email: Thompson@panamabeach.org	Phone: 251-962-2200	Job: Emergency
Name: Richard Cassell	Company: Okeechobee SHOCKERS	Email: rccassell@shockers.com	Phone: 251-580-1536	Job: chair
Name: Dave Byrnes	Company: BCSC	Email: dbyrnes@co.baldwin.al.us	Phone: 937-0247	Job: Co. Jail w/NOSE
Name: Dawn Washin	Company: BCSC	Email: cwashin@co.baldwin.al.us	Phone: 580-3529	Job: TRAIN, DON'T SAIL
Name: Doug Crivellin	Company: Perryville Beach VFD	Email: pcrivellin@perryville.com	Phone: 251-961-5116	Job: President
Name: Landon R. Smith	Company: CITY OF ORANGE BEACH	Email: lsmith@cityoforangebeach.com	Phone: 251-981-2600	Job: Bureau Dir./Resource Admin.
Name: John Byrd	Company: Baldwin County Commission	Email: jbyrd@co.baldwin.al.us	Phone: 1-580-1653	Job: GIS Analyst
Name: Chad R. Thomas	Company: Baldwin EMC	Email: cthomas@co.baldwin.al.us	Phone: 251-989-6247	Job: Power System Control Coordinator
Name: Scott Gilheart	Company: City of Panama Beach	Email: sgilheart@cityofpanamabeach.org	Phone: (251) 947-8151	Job: Public Works Director

MITIGATION PLANNING COMMITTEE			
Training Location:	BCEMA	Meeting Date:	April 22, 2010
Facilitator:		Place/Room:	Up-stairs conference room
Name:	Ally Byron	Email:	palbyro@cityof-milledge.com
Company:	City of Milledgeville	Phone:	251-580-2552
Name:	ST. Abbott	Email:	stabbott@stabbott.com
Company:	Town of Paducah	Phone:	251-561-7759
Name:	Arthur Bourne	Email:	abourne@cityof-sharon.com
Company:	City of Gulf Shores	Phone:	251-747-2972
Name:	D.R. Rebelius	Email:	drrebelius@rebelius.com
Company:	Town of Summerville	Phone:	251-899-7777
Name:	Denise Perry	Email:	denise.perry@cityof-southport.com
Company:	City of Daphne	Phone:	251-621-3182
Name:	Melvin Mark	Email:	markm@cityof-daphne.com
Company:	City of Daphne	Phone:	251-621-3182
Name:	Rachel Keith	Email:	rkeith@cityof-foley.org
Company:	City of Foley	Phone:	251-970-2418
Name:	Frank Bishop	Email:	fbishop@cityof-foley.org
Company:	City of Foley	Phone:	251-952-4010
Name:	Barry Fulford	Email:	barry.fulford@cityof-fairhope.com
Company:	City of Fairhope	Phone:	251-990-0141

MITIGATION PLANNING COMMITTEE	
Training Location:	BCEMA
Meeting Date:	April 22, 2010
Facilitator:	Up-stairs conference room

Name:	Tommy Henderson	Email:	Tommy.henderson@goldenliving.com
Company:	Golden Living Center - Foley	Phone:	943-2781
Job:	Executive Director		
Name:	Money Mackey	Email:	mmackey@co.baldwin.al.us
Company:	BC Planning Dept	Phone:	972-8523
Job:	Planner		
Name:	Steve Kierpatrick	Email:	elbertafirechief@gmail.com
Company:	TOWNS OF ELBERTA	Phone:	986-8456
Job:	Council Member		
Name:	Barry Werner	Email:	elbertazoning@gmail.com
Company:	Town of Elberta	Phone:	986-6174
Job:	Planning/ zoning Admin.		
Name:	Leigh A. Ryals	Email:	LRyals@co. Baldwin
Company:	BEEMA	Phone:	972-6807
Job:	Director EMEA		
Name:	Jimmie Davis	Email:	Jimmie.Davis@co.fairhope.com
Company:	Fairhope Police Dept.	Phone:	251-929-0549
Job:			
Name:	Tiffany Lyon	Email:	Summerdase@gmail.com
Company:	Town of Summerdale	Phone:	251-929-1239
Job:			
Name:	David Wilson	Email:	davidwilson@aol.com
Company:	Town of Summerdale	Phone:	251-228-0473
Job:			
Name:		Email:	
Company:		Phone:	
Job:			

**Baldwin County Hazard Mitigation**

HMPC Meeting

June 9, 2010

Call to order

Mitigation Strategy

5 Goals of Mitigation Actions

Possible Mitigation Measures

STAPLEE

Community Action Programs

Other business

Adjourn

**BALDWIN COUNTY  
HAZARD MITIGATION PLANNING COMMITTEE MEETING  
June 9, 2010**

Name	Jurisdiction/Organization	Email Address	Phone Number
Joseph F. Rouzou	City of Foley	Jrouzou@cityoffoley.org	251-970-5024
Rachel Smith	City of Foley	rsmith@cityoffoley.org	251-970-2418
Joseph W. Dandy	City of Foley	jwandy@cityoffoley.org	251-948-1266
Arthur Bourne	City of Gulf Shores	abourne@gulfshoresai.gov	251-767-2928
Lindsay R. Swart	City of Orange Beach	lswart@cityoforangebeach.com	251-981-2610
Dr. Thompson	Town of Perdido Beach	thompson@townofperdidobeach.org	251-962-2300
Ray Bourne	Shore of Paradise Beach	mayor@townofperdidobeach.org	251-962-2221
Melany Mercer	Baldwin County Planning	Mercer@BCCO Baldwin.az.us	251-972-8523
Barney Foreard	City of Enterprise	barneyforeard@cafairnet.com	251-990-0141
Mildred Howell	Bald. Co.	mhowell@ca.baldwin.AL.us	251-972-6832
Bruce Reinker	City of Spanish Fort	buildingofficial@cityofspanisfort.com	251-626-4993
Bridget Wilson	North Baldwin Utilities	bridgew@northbaldwinutilities.com	251-580-1624
Denise Perry	City of Daphne	accountant@bellsouth.net	251-621-3182
Tyler Street	Baldwin County	tstreet@co.baldwin.al.us	251-937-0371
Tiffany Lynn	Town of Summerdale	Summerdale@gulfholer.com	251-989-6935

BALDWIN COUNTY  
 HAZARD MITIGATION PLANNING COMMITTEE MEETING  
 June 9, 2010

Name	Jurisdiction/Organization	Email Address	Phone Number
SON GILBERT	City of Robertsdale	Scott.Gilbert@robertsdale.org	(251) 947-8951
Greg Smith	City of Robertsdale	greg.smith@robertsdale.org	(251) 947-8955
Ava Soper	EMC	asoper@baldwin.com	251-946-0112
Tim Horras	Barrow EMC	THorras@barrow-emc.com	251-989-0294
STEVEN IRVIN	BALDWIN EMC	STEVEN@BALDWIN-EMC.COM	251-989-0873
Richard CARSON	OUC GRAND CENTRAL	rcarson@grandcentral.com	251-760-1536

**Baldwin County Hazard Mitigation**

Final HMPC Meeting

October 18, 2010

Call to Order

Welcome and Opening Remarks

Request for comments

Executive Summary

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 7

Appendix A

Appendix B \*

Appendix C \*

Appendix D

Appendix E

Appendix F

Appendix G

Appendix H

Appendix I \*

Appendix J

Work Session

Chapter 6

Community Action Programs

Other Business

Adjourn



**MITIGATION COMMITTEE MEETING**

<b>Training Location:</b>	BCEMA	<b>Meeting Date:</b>	October 18, 2010
<b>Facilitator:</b>		<b>Place/Room:</b>	OPS ROOM

Name:	Denise Perry	Email:	Accountant pwr@bellsouth.net
Company:	City of Daphne	Phone:	251-621-3182
Name:	Ashley Campbell	Email:	agcampbell@bellsouth.net
Company:	City of Daphne	Phone:	251 621 3080
Name:	Joseph A. Bruzzano	Email:	jbruzzano@cityoffoley.org
Company:	City of Foley	Phone:	251-970-5024
Name:	Rachel Keith	Email:	rkeith@cityoffoley.org
Company:	City of Foley	Phone:	251-970-2418
Name:	Joey Darby	Email:	jdarby@cityoffoley.org
Company:	City of Foley	Phone:	251-943-1266
Name:	W. Stacy Lynn	Email:	Summerdale@gulfTel.com
Company:	Town of Summerdale	Phone:	251-989-6935
Name:	Richard Garrison	Email:	rgarrison@gulfTel.com
Company:	ONS ISLAND POA	Phone:	251 980 1536
Name:	Arthur Bourne	Email:	abourne@gulfTel.com
Company:	City of Gulf Shores	Phone:	251-233-7218
Name:	Phil Byrnes	Email:	pbyrnes@cityofgulfshores.com
Company:	City of Gulf Shores	Phone:	251-580-2552

Page 1 of 3  
 Tim Hobbs  
 BALDWIN EMC

Thobbs@baldwinemc.com  
 251-978-4455

# **Appendix H**

## **Community Involvement Documentation**



## App. H - Community Involvement Documentation

- 1.0 Community Involvement Opportunities
- 2.0 Documentation

### 1.0 Community Involvement Opportunities

This Appendix includes additional documentation of the community involvement opportunities in the planning process for the Baldwin County 2010 plan update, which are summarized as follows (see Section 4 Planning Process for a complete discussion of community involvement in the planning process):

1. The Baldwin County Hazard Mitigation Planning Committee (HMPC). This Committee, which was first established in 2004 to oversee the original plan, was reorganized in March 2010 to prepare for the 2010 update. Its primary purposes are to oversee all hazard mitigation planning activities and ensure the plan's ongoing monitoring and implementation. The HMPC represents all Baldwin County jurisdictions, as well as interested stakeholder organizations, and meets at least annually. (For complete documentation of HMPC meetings, refer to Appendix G – "Committee Meeting Documentation", and for a more detailed discussion of the HMPC, refer to Chapter 4 – "Planning Process").
2. The 2010 Baldwin County Multi-Hazard Mitigation Plan Web Site. This Web site – [baldwin.hazardmitigationplan.com](http://baldwin.hazardmitigationplan.com) - was active during the drafting phase of the 2010 update. Its purpose, as presented on the Web site, was "to encourage the public, government agencies, colleges and universities, neighboring jurisdictions, businesses and industries, and others concerned with hazard mitigation to become involved in the process of updating the 2010 Baldwin County Hazard Mitigation Plan." This Web site maintained the most recent draft sections of the plan and encouraged public comments through a dedicated email account at [Baldwin@hazardmitigationplan.com](mailto:Baldwin@hazardmitigationplan.com). The Web site provided background information to the public and interested agencies on mitigation planning and the Federal requirements. It also provide public information on the HMPC membership, meeting announcements, and contact information for the Baldwin County EMA and the consulting team, including a toll-free hotline at 1-866-978-3633, for calling in comments and suggestions. The most recently adopted plan is maintained on the Baldwin County EMA Web site at [www.co.baldwin.al.us](http://www.co.baldwin.al.us).
3. Community Meeting. A general community meeting was held in Baldwin County in October 2010 during the drafting stage of this plan. The community meeting included various displays of the different hazards that had been identified in the planning process. Each display showed the different threats that exist and what could be done to help prevent or at least lessen the impact of that hazard. There were also documents and materials provided to educate the public on what to do in the case of such a hazard event occurring. Many of the materials were made available for the public to take with them.

4. Public Outreach Survey. A survey was available during the community meeting, alongside the exhibit displays. The survey asked the participants to rate the possibility and extent (severity) to their community on a list of identified hazards, according to the following scale:

1 = very low/none

2 = low/minimal

3 = moderate/moderate

4 = high/high

5 = very high/extensive

Respondents could express any specific concerns for any of the hazards and make recommendations on how to mitigate one or more of the hazards. All tabulated responses are maintained in the offices of the Baldwin County EMA. A blank public survey form is included in this Appendix.

5. Interagency Involvement. Invitations were delivered to agencies and organizations representing neighboring counties, Federal and State governmental agencies, businesses, educational institutions and school boards, and other interested private and non-profit stakeholders in the hazard mitigation planning process. A survey form to report written comments on the plan accompanied each invitation. A copy of the invitation and survey are included in this Appendix.
6. Public Hearings Prior to Adoption. A final opportunity for public comment was afforded immediately before adoption by each local governing body as required by Alabama public hearing and notice laws.

## 2.0 Documentation

This Appendix includes the following documentation of community involvement activities and opportunities:

- An image of the 2010 plan update Web site at [baldwin.hazardmitigationplan.com](http://baldwin.hazardmitigationplan.com).
- The public invitation by the Baldwin County EMA to attend the October 2010 community meeting.
- A news report on the community meeting.
- Sign in sheets documenting attendance at the community meetings.
- The public outreach survey form.
- Photos of the Community Meeting.
- The invitation to interested agencies, organizations, and stakeholders, including the survey form.

Figure H-1. Portion of website at [baldwin.hazardmitigationplan.com](http://baldwin.hazardmitigationplan.com)



**Figure H-2. Public Invitation from Baldwin County EMA to Attend Community Meeting**

# NOTICE

The Baldwin County Emergency Management Agency will hold an open house public meeting from 4:00 – 6:00 p.m. on October 13, 2010, at the Baldwin County Central Annex located at 22251 Palmer Street, Robertsdale, Alabama to receive public input on the County's draft **Natural Hazard Mitigation Plan**.

Natural hazard mitigation planning is the process of determining how to eliminate or reduce the loss of life and property damage resulting from natural occurrences such as floods, tornadoes, winter freezes, droughts, severe thunderstorms and earthquakes. New Federal legislation requires each county file a plan with the Federal Emergency Management Agency (FEMA) to be eligible for future federal disaster assistance programs. A Planning Committee composed of local residents is responsible for obtaining your input and putting the plan together.

Members of the Planning Committee will be present at the meeting to explain the planning process, answer your questions and listen to your concerns and ideas for mitigation. Information on natural hazards and mitigation measures will also be available. Please make plans to attend. Your input will ensure that Baldwin County is best prepared for the natural hazards which affect all of us. For additional information, please contact Leigh Anne Ryals at the Baldwin County County Emergency Management Agency, phone 251-972-6807 or email [Lryals@Baldwincountyal.gov](mailto:Lryals@Baldwincountyal.gov).

Figure H-3. Sign-in Sheets for Community Meeting

BALDWIN COUNTY COMMUNITY MITIGATION MEETING			
Training Location:	Central Annex	Meeting Date:	October 13, 2010
Facilitator:		Place/Room:	Conference Room
Name:	Richard CARSON	Email:	rackeyr@gefed.com
Company:	DMO CERT	Phone:	251 980 1536
Name:	Mrs. Russ	Email:	
Company:		Phone:	988 - 9549
Name:	Mark Howell	Email:	mhowell@baldwin.AL.US
Company:	Bald Co.	Phone:	972-6837
Name:	Jim Ransom	Email:	TRANSOM@co.Baldwin.AL.US
Company:	Bald Co. Solid Waste	Phone:	251 972 6878
Name:	VERA L ANDON	Email:	VERALANDON@YAHOO.COM
Company:		Phone:	959.707-9089
Name:	Tom Grogan	Email:	
Company:	MWR, LLC	Phone:	
Name:	Celeste Boydston	Email:	cboydston@leheplanning.com
Company:	Lehe Planning	Phone:	205 821 1024
Name:		Email:	
Company:		Phone:	
Name:		Email:	
Company:		Phone:	
Name:		Email:	
Company:		Phone:	



**Figure H-4. Public Outreach Survey Form**

Your Community: \_\_\_\_\_

**Baldwin County Hazard Mitigation Planning Program**

1. Please enter the value that you feel best represents the probability of a hazard affecting your community: 5 = very high, 4 = high, 3 = moderate, 2 = low, 1= very low.
2. Please enter the value that you feel best represents the extent of damage to your community if a hazard occurred: 5 = extensive, 4 = high, 3 = moderate, 2 = minimal, 1= none. (Please consider hazard events that would be consider normal strength for your area.)

Hazard	Probability	Extent	Hazard	Probability	Extent
Tornadoes	_____	_____	Hurricanes	_____	_____
Severe Storms	_____	_____	Droughts/Heat Waves	_____	_____
Floods	_____	_____	Dam Failure	_____	_____
Wildfires	_____	_____	Earthquakes	_____	_____
Sinkholes	_____	_____	Landslides	_____	_____
Other (please specify)	_____			_____	_____

Do you have any specific concerns for any of the above hazards?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Do you have any recommendations on how to mitigate (lessen the effects of) one or more of the above hazards?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Thank you for your comments.**

**Figure H-5. Photo of the Community Meeting**



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**Figure H-6. The Invitation to Interested Agencies, Organizations, and Stakeholders, Including the Survey Form****Baldwin County, Alabama, 2010 Multi-Hazard Mitigation Plan Update**

Baldwin County and all of its cities and towns are in the process of completing a five-year update to its multi-hazard mitigation plan. The original plans were approved by FEMA in 2005 and expired earlier this year. The 2010 Baldwin County, Alabama, Multi-Hazard Mitigation Plan, funded in part through a FEMA planning grant, will become a strategic planning guide in fulfillment of requirements of the Federal Disaster Mitigation Act of 2000 (DMA 2000), as administered by FEMA. The 2010 plan provides the framework for Baldwin County communities and agencies to assess the local risks of natural hazards and develop a coordinated strategy to mitigate potential losses to property and lives. FEMA requires all jurisdictions to have an approved plan adopted by the governing bodies as a condition to receiving future FEMA hazard mitigation assistance grants. The planning consulting firm of Lehe Planning, LLC, has been retained by the Baldwin County Commission to work with the Baldwin County Emergency Management Agency to prepare the plan under the direction of its Hazard Mitigation Planning Committee, which represents all localities. This is the same firm that helped develop the 2005 plan for Baldwin County cities and towns.

Essential to developing an effective plan is “open public involvement” in the planning process, according to the DMA 2000 requirements. In order to “develop a more comprehensive approach to reducing the effects of ... disasters, the planning process shall include: ***An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.***”

The Baldwin County Hazard Mitigation Planning Committee has created a number of public participation and coordination alternatives for interested stakeholders, such as your organization. These alternative opportunities not only increase public involvement but also facilitate improved interagency and inter-jurisdictional coordination. Among the range of alternatives, is this personal invitation for your direct involvement in the planning process. Please take the time to review the draft plan on the Web at: <http://baldwin.hazardmitigationplan.com/> and submit your comments and suggestions. The Web site provides some additional background information on the plan and presents the ongoing activities of the Planning Committee. A link allows you to e-mail comments directly to the planning team, and a toll-free number at 1-866-978-3633 has been set up for you to discuss your ideas with the planning consultants. Finally, you can make an appointment to stop by the Baldwin County EMA offices located at 23100 McAuliffe Drive, Robertsedale, AL 36567 to meet with Leigh Ann Ryals, the EMA Director. The website will be maintained throughout the drafting phase of the plan and for a period after local adoption. These public involvement opportunities have been established to inform the general public and interested parties of the planning process and to allow a convenient means to comment on the plan as it is drafted. You may forward this message to any other agency or individual that might have an interest in the mitigation plan. Please complete the attached survey and return it to us.

On behalf of the Baldwin County Hazard Mitigation Planning Committee, your participation is greatly appreciated. Your involvement will certainly make the 2010 plan a more effective guide to mitigating the potential damages associated with natural hazards.



**2010 Baldwin County, Alabama Multi-Hazard Mitigation Plan  
ORGANIZATION INVOLVEMENT SURVEY**

*This survey provides an opportunity for your organization to become involved in the planning process for the 2010 Baldwin County, Alabama, Multi-Hazard Mitigation Plan, a five year update to the 2005 plan. Here you can express your comments and help coordinate mitigation activities. Before completing this survey, however, please take the time to first visit our website at <http://baldwin.hazardmitigationplan.com>, where you will find information on the scope and purposes of the plan, the 2010 draft plan for download, and contact information for the planning team. Your participation is important to a successful 2010 plan update.*

1. Organization/agency: \_\_\_\_\_

2. Interest(s) represented:  Neighboring County or Municipality  Federal or State Government  
 Regional or Local Public Agency  Business  Private Interest: \_\_\_\_\_

Non-Profit Interest: \_\_\_\_\_  Other: \_\_\_\_\_

3. Is your organization involved in hazard mitigation activities?  
 Yes  No If yes, please explain: \_\_\_\_\_

4. Does your organization have authority to regulate land development in Baldwin County?  
 Yes  No If yes, please explain: \_\_\_\_\_

5. Have you reviewed the plan documents available at <http://baldwin.hazardmitigationplan.com>?  
 Yes  No

6. Are any of the following sections and related appendices draft plan of particular concern to your organization?  
The Planning Process?  Yes  No If yes, please explain: \_\_\_\_\_  
\_\_\_\_\_

Risk Assessment?  Yes  No If yes, please explain: \_\_\_\_\_  
\_\_\_\_\_

Mitigation Strategy?  Yes  No If yes, please explain: \_\_\_\_\_  
\_\_\_\_\_

Plan Maintenance?  Yes  No If yes, please explain: \_\_\_\_\_

7. Which hazards are of most concern to your organization?

- Tornadoes Severe Storms Floods  Winter Storms/Freezes  Hurricanes
- Droughts/Heat Wave Wildfires Dam/Levee Failures Landslides  Earthquakes
- Sinkholes Other: \_\_\_\_\_

8. After review of the draft plan sections, do you have any suggested improvements? Yes No

If yes, please explain: \_\_\_\_\_

9. Is your agency prepared for the probable impacts from the natural hazards identified by the plan?

- Yes No If no, please explain: \_\_\_\_\_

10. Does your organization have any mitigation actions or projects that should be included in the plan?

- Yes No If yes, please describe: \_\_\_\_\_

11. Additional comments: \_\_\_\_\_

12. Name/title of person completing this form: \_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_

*Thank you for your organization's involvement in the*

**2010 Baldwin County Multi-Hazard Mitigation Planning Process**

*Please send your completed survey form by*

*Email to: [Baldwin@hazardmitigationplan.com](mailto:Baldwin@hazardmitigationplan.com) or*

*Fax to: 205-978-3634 or*

*Mail to: Baldwin Plan, Lehe Planning, LLC, 300 Century Park South, Suite 216, Birmingham, AL 35226*

# **Appendix I**

## **Multi-Jurisdictional Participation Activities**



## **App. I - Multi-Jurisdictional Participation Activities**

- 1.0 Participation Requirements
- 2.0 Participation Documentation

### **1.0 Participation Requirements**

According to 44 CFR Section 201.6(a)4, “Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process...” The table in this Appendix illustrates each jurisdiction’s participation within Baldwin County in the plan update; qualifying it as a Multi-Jurisdictional Plan.

Each jurisdiction was given the opportunity to participate in every step of the plan update, from the kick-off meeting on March 15, 2010 to the signing and adoption of the resolutions in October 2010. Whenever a jurisdiction’s representative was unable to attend a meeting, meeting materials were forwarded to that representative so they would have every opportunity to participate.

### **2.0 Participation Documentation**

Table I-1 included in this Appendix lists each jurisdiction within Baldwin County and the various meetings and activities that each jurisdiction could participate in. An X indicates the events in which the jurisdiction chose to participate. Examples and conclusions of the activities are shown in Appendices B through F, and information on the meetings is included in Appendices G and H.



**Table I-1. Multi-Jurisdictional Participation Activities**

Baldwin County 2010 Plan Update	Baldwin Co.	Bay Minette	Daphne	Elberta	Fairhope	Foley	Gulf Shores	Loxley	Magnolia Springs	Orange Beach	Perdido Beach	Robertsdale	Silverhill	Spanish Fort	Summerdale
<b>HMPC Meeting 1 - March 15, 2010</b>	X	X	X	X	X	X	X		X	X	X			X	X
Community Mitigation Capabilities		X	X	X	X	X			X	X	X	X			X
Natural Hazard Identification and Rating	X	X	X	X	X	X	X	X	X	X	X	X		X	X
<b>HMPC Meeting 2 - April 5, 2010</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2004 Plan Implementation Status		X	X			X	X					X			
<b>HMPC Meeting 3 - April 22, 2010</b>	X	X	X	X	X	X	X			X	X	X			X
Human-made Hazard Identification and Rating	X	X	X	X	X	X				X	X	X			X
Review of Goals and Alternative Mitigation Measures	X	X	X				X			X		X			X
<b>HMPC Meeting 4 - June 9, 2010</b>	X		X		X	X	X			X	X	X		X	X
Community Action Programs	X	X				X				X	X	X			X
Community Meeting and Exhibits - October 13, 2010	X									X					
<b>HMPC Meeting 5 - October 18, 2010</b>	X	X	X			X	X								X
Final Plan Approval by HMPC	X	X	X			X	X								X
Presentation of Plan to Governing Body for Review (1)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Public Hearing Prior to Adoption	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X Denotes participation in activity

(1) All jurisdictions are expected to review the plan prior to the EMA submitting it to AEMA for approval.

## **Appendix J Adopting Resolution**



## **App. J – Adopting Resolution**

- 1.0 Purpose
- 2.0 Sample Adopting Resolution

### **1.0 Purpose**

The sample resolution presented here serves as a model for the governing bodies of the participating jurisdictions to adopt the 2010 plan update following a public hearing. Each jurisdiction may modify the sample to fit their particular legal form.

### **2.0 Sample Adopting Resolution**

**RESOLUTION OF THE (insert name of governing body)****A RESOLUTION ADOPTING THE 2010 BALDWIN COUNTY MULTI-HAZARD MITIGATION PLAN, IN FULFILLMENT OF THE FEDERAL DISASTER MITIGATION ACT OF 2000 AND THE LOCAL MITIGATION PLAN REQUIREMENTS OF 44 C.F.R. SECTION 201.6 AND FEMA LOCAL MULTI-HAZARD MITIGATION PLANNING GUIDANCE**

**WHEREAS**, The Federal Disaster Mitigation Act of 2000 (DMA 2000), as administered by the Alabama Emergency Management Agency (AEMA) and the Federal Emergency Management Agency (FEMA) provides Federal assistance to local governments to alleviate suffering and damage from disasters, and broadens existing relief programs to encourage disaster preparedness plans and programs, coordination and responsiveness, insurance coverage, and hazard mitigation measures; and,

**WHEREAS**, the DMA 2000 requirements for local mitigation plans are set forth in 44 C.F.R. Section 201.6 and the Local Multi-Hazard Mitigation Planning Guidance, FEMA, July 1, 2008 (Federal planning criteria); and,

**WHEREAS**, as a prerequisite for each Baldwin County jurisdiction to continue to qualify for FEMA mitigation grant assistance programs, the DMA 2000 requires the five year update of the Baldwin County, Alabama, Natural Hazards Mitigation Plan, which was approved by FEMA on February 2, 2005; and,

**WHEREAS**, the AEMA had awarded a planning grant funded through the FEMA Hazard Mitigation Grant Program (HMGP) to the Baldwin County EMA to fund 75% of the total cost of the five year plan update for all jurisdictions within Baldwin County; and,

**WHEREAS**, the 2010 Baldwin County Multi-Hazard Mitigation Plan has been prepared in accordance with DMA 2000 requirements under the direction of the Baldwin County Hazard Mitigation Planning Committee with the support of the Baldwin County EMA, on behalf of all of the jurisdictions within Baldwin County; and,

**WHEREAS**, said mitigation plan addresses all natural hazards deemed to threaten property and persons within the unincorporated and incorporated areas of Baldwin County; and,

**WHEREAS**, the Federal planning criteria require formal adoption of the FEMA-approved plan update by each participating jurisdiction.

**NOW THEREFORE, BE IT RESOLVED** that the 2010 Baldwin County Multi-Hazard Mitigation Plan is hereby adopted and immediately made effective.

**ADOPTED** this the \_\_\_\_\_ day of \_\_\_\_\_, 2010.

**APPROVED:** \_\_\_\_\_

ITS: \_\_\_\_\_

**ATTEST:** \_\_\_\_\_

ITS: \_\_\_\_\_