2015

Baldwin County, Alabama

Multi-Hazard Mitigation Plan

I. Comprehensive Plan

A multi-jurisdiction 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:

Lehe Planning
URBAN AND ENVIRONMENTAL PLANNING

Funded in Part through the
FEMA Pre-Disaster Mitigation (PDM) Grant Program

March 2, 2016

2015 Baldwin County, Alabama, Multi-Hazard Mitigation Plan

I. Comprehensive Plan

City of Bay Minette, City of Daphne, Town of Elbert, 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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The preparation and publication of this plan was funded in part by a FEMA grant under the Pre-Disaster Mitigation Grant Program awarded to the Baldwin County Commission.

March 2, 2016

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Executive Summary

I. Background

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 in order to remain eligible for mitigation grant funding. The initial plan and the 2010 update were prepared by Lehe Planning, LLC, under the direction of the Baldwin County EMA. The 2004 Baldwin County, Alabama, Natural Hazards Mitigation Plan and the 2010 Baldwin County, Alabama, Multi-Hazard Mitigation Plan were approved by FEMA and subsequently adopted by all Baldwin County jurisdictions.

II. Organization of the Plan

The 2015 Baldwin County Multi-Hazard Mitigation Plan is organized to parallel the 44 CFR Section 201.6 Federal requirements for a local mitigation plan, as interpreted by the Local Mitigation Plan Review Guide, FEMA, October 1, 2011, and the Local Mitigation Planning Handbook, FEMA, March 2013. The organization of this plan is consistent with the organization of the 2013 Alabama Hazard Mitigation Plan, which also parallels the Federal requirements. The main body of the plan, the "Comprehensive Plan" has seven chapters, as follows:

Chapter 1	Introduction
Chapter 2	Prerequisites
Chapter 3	Community Profiles
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This plan update is also organized similar to the 2004 and 2010 Baldwin County plans, which allows for easy cross reference. Each chapter of the 2015 plan update references the requirements of 44 CFR Section 201.6 that it addresses and includes a table that summarizes the updates to the 2010 plan.

A supplemental plan document includes "Community Action Programs" which breaks out the Community Action Programs for each jurisdiction and notes priorities, time frame, implementation responsibilities, cost estimates, if available, and potential funding sources.

The "Appendices" provide evidence and supporting documentation to the Planning Process, Risk Assessment, and Mitigation Strategy chapters of the Comprehensive Plan.

III. Highlights of the Plan

Through a comprehensive planning process and risk assessment, this plan update continues 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. It also evaluates the previous plans and notes successes and shortcomings. The plan update suggests adjustments and introduces new measures to address the identified hazards.

Each hazard that may be viewed as a possible risk to Baldwin County is described in detail; the vulnerability of the County and each jurisdiction to the hazards are addressed: goals, objectives, and mitigation measures are stated; and mitigation action programs that direct each community in the implementation and monitoring of the measures are included in the update.

Chapter 1. Introduction

Chapter 1 of the plan update provides a general introduction to the plan update. It explains the purpose of the plan and which jurisdictions participated in the plan update. The chapter mentions the regulations that require the active participation by local jurisdictions in the mitigation planning process. Also included in this chapter is the explanation of various funding sources that can be applied for if a plan update is submitted to FEMA. Summaries of both the initial plans' and this update's planning processes are also included in this section.

Chapter 2. Prerequisites

Chapter 2 of the plan update addresses the Federal regulations governing the development and updating of the mitigation plan. It addresses 44 CFR §. 201.6 and the

prerequisites required through these regulations. It describes the various mitigation grants and other federal money available for the County's use for mitigation planning.

Chapter 2 also addresses multi-jurisdictional participation and plan adoption. It describes the relationship and responsibilities of the various entities involved in the planning process. It also explains the various means in which they could participate in the planning process. The multi-jurisdictional plan adoption procedure is explained in the last section of the chapter.

Chapter 3. Community Profiles

Chapter 3 profiles the participating jurisdictions. Each jurisdiction within Baldwin County is described in detail. The overall geographic setting and history of Baldwin County and the participating jurisdictions are addressed. Summaries about the jurisdictions' government, demographics, economy, utilities, media, transportation and climate are included.

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Chapter 4. The Planning Process

Chapter 4 explains the planning process in detail. It explains how the public was involved in the planning process, what steps the Baldwin County Hazard Mitigation Planning Committee (HMPC) took in developing the plan update, what documents were consulted in the plan update, and how the plan was prepared, reviewed and updated.

From April 2015 through December 2015, the Baldwin County Hazard Mitigation Committee held five meetings. The Baldwin County EMA staff and the planning consultant team organized the planning process and the HMPC representative membership. The HMPC, comprised of representatives from all the jurisdictions and organizations concerned with hazard mitigation, guided the development of this plan.

At the meetings, each Committee member was asked to participate in a series of exercises designed to solicit input into the planning process. A notice was 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 informing them of the draft plan and requesting their input and cooperation.

Relevant planning and regulatory tools - plans, studies, reports, ordinances, regulations and technical information – were accessed through the Internet by the planning team. The team reviewed the documents for sections that pertained to hazard mitigation. These documents were closely examined to see what mitigation measures were currently being pursued and what new measures could be integrated into future revisions.

The Hazard Mitigation Planning Committee solicited public input into the mitigation plan, primarily its website at baldwin.hazardmitigationplan.com. The public was also invited to attend committee meetings and provide their comments and concerns. The HMPC sponsored a special community meeting for additional public input into the planning process during the drafting stage of the plan. 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 community survey about the risks and threats of hazards.

A public hearing to receive comments was held by each jurisdiction prior to adopting the plan by resolution, as required by State law. The original resolutions and public hearing minutes are kept on file at the administrative offices of each jurisdiction and the Baldwin County EMA office.

The plan review and update process resulted in a comprehensive update of the entire 2010 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;
- An update of the assessment of local capabilities to carry out mitigation measures;
- An evaluation of the status and effectiveness of Community Mitigation Action Programs adopted in the 2010 plan, which is reflected in the 2015 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 complete update of the HAZUS – MH maps and analysis reports for floods, earthquakes, and hurricanes;
- A reexamination of development trends and exposure to risks;
- A review and recommitment to the vision for disaster-resistant communities; the plan goals; and support of the 2013 Alabama 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; and,
- Revisions to the plan maintenance procedures to institute streamlined amendments and better ensure continuous monitoring and implementation of mitigation actions.

Chapter 5. Risk Assessment

Chapter 5 first describes the process used to identify and prioritize the hazard risks to each Baldwin County jurisdiction. It describes the resources used to identify the hazards and provides detailed descriptions of each identified hazard. A hazard profile for each identified hazard includes a general description of the nature of the hazard in Baldwin County, followed by an explanation of the location, extents, previous occurrences, and the probabilities of future occurrences. The hazard profiles rely heavily on maps, charts, tables, and figures to communicate the profile information. The Federal requirements for repetitive loss properties are included in this chapter.

Vulnerability assessments are reported for each identified hazard. The vulnerability assessments include a summary of the impacts of each hazard on each jurisdiction. The estimates of losses are calculated in HAZUS-MH for hurricane winds, floods, and earthquakes. Further, the planning team evaluated land use and development trends.

Chapter 5 concludes with an analysis of how the risks vary among the jurisdictions. This concluding section summarizes the findings of the hazard profiles and vulnerability assessments.

A complete reevaluation of the hazards was performed by the planning team in the plan update process. Hazard profiles and vulnerability assessments were based on current and more complete information since the original plans. The latest release of HAZUS-MH was applied to the risk assessments. .

Chapter 6. Mitigation Strategy

Chapter 6 addresses the full range of mitigation strategies evaluated by the HMPC. It explains the common community vision for disaster resistance and the various goals that the plan is trying to achieve, along with companion objectives that can be used to achieve those goals. It identifies and analyzes mitigation actions and projects. A description of participation and compliance with the National Flood Insurance Program is provided. Implementation of mitigation actions from the 2010 plans and local capabilities for carrying out mitigation measures has been assessed. The final section details the County's overall mitigation strategy. The "Community Action Programs" supplement Chapter 6 by breaking out the action programs for each community.

The goals in the previous plans have been updated based on current conditions, including the completion of mitigation measures over the five-year plan implementation cycle, the 2015 update to the risk assessment in Chapter 5, the update to the risk assessment in the 2013 Alabama Hazard Mitigation Plan, and the update of State goals and mitigation priorities reflected in the state plan.

The goals for this plan update are the same as in 2010, as follows:

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.

The strategic planning approach for identifying and analyzing mitigation actions and projects follows five categories of a comprehensive hazard mitigation program, which also form the basis for the goals of this plan. These program categories were developed by FEMA for managing a successful mitigation program and were used as guidelines for identifying and sorting the alternative mitigation measures. They are prevention, property protection, public education and awareness, natural resources protection, and structural projects.

The Hazard Mitigation Planning Committee (HMPC) and local jurisdictions selected among the available mitigation measures within each of the above categories and prioritized the measures by applying the STAPLEE method. They also evaluated the consistency with the vision, goals, and objectives; weight 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. Mitigation measures that resulted in loss reduction to existing and new buildings and infrastructure were chosen for the final list of considered measures. 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.

A separate action program has been established for each community in the supplemental document, “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. All actions included in these programs are achievable and within the capabilities of each jurisdiction.

Chapter 7. Plan Maintenance Process

Chapter 7 describes the maintenance process for the 2015 Baldwin County Multi-Hazard Mitigation Plan. It explains the monitoring, evaluation and updating procedures and how to incorporate the plan into other planning mechanisms. It also describes the need for continuing public participation in the plan maintenance process.

The plan explains that ongoing monitoring of the plan should occur throughout the next five years until the next scheduled update. Ongoing status reports of each jurisdiction's progress will be reviewed by the HMPC, with the support of the Baldwin County EMA staff, 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.

Plan evaluation should occur 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. A risk assessment should be done and the findings should determine any new mitigation initiatives that should be incorporated into this plan to avoid similar losses from future hazard events.

The HMPC will oversee an annual evaluation of progress towards implementation of the Mitigation Strategy. In its annual review, the HMPC will 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? Why?
- Are there any changes in local capabilities to carry out mitigation measures?
- Have funding levels to support mitigation actions either increased or decreased?

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. 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. Multi-hazard mitigation planning should be integrated 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. 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.

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.

Appendices

The final sections of the plan are included in the “Appendices.” The evidence and supporting documents for this plan update that were able to be included in this plan update have been inserted into the following appendices:

A *Federal Requirements for Local Mitigation Plans* contains the entire 44 CFR Sec. 201.6 requirements for local mitigation plans.

B *Community Mitigation Capabilities* reports on the results of a comprehensive survey and assessment of each jurisdiction’s capabilities to implement mitigation measures.

C 2010 *Plan Implementation Status* reports the evaluation results of implementation of mitigation measures recommended for implementation by each jurisdiction in the 2010 plan.

D *HMPC Hazard Identification and Ratings* reports the results of the Committee exercise for identifying hazards for inclusion in the 2015 plan update and the ratings of the hazards for extents and probability of future occurrences, along with completed descriptions of each identified hazard.

E *Hazard Profile Data* contains detailed hazard records of the National Weather Service, the National Climatic Data Center, and local records.

F *Identification and Analysis of Alternative Mitigation Measures* examines the range of mitigation measures considered for the 2015 Mitigation Strategy.

G *Committee Meeting Documentation* documents the HMPC meetings during the drafting phase of the 2015 plan update and interim meetings over the previous five year planning cycle.

H *Community Involvement Documentation* reports on the full scope of community involvement opportunities during the drafting phase of the 2015 plan update.

I *Multi-Jurisdictional Participation Activities* records the scope of participation of all jurisdictions in the drafting and adoption of the 2015 plan update.

J *Adopting Resolution* presents a model resolution for plan adoption by local governing bodies.

Chapter 1 – Introduction

1.1 Background

The 2015 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 political 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

FEMA awarded the Baldwin County Commission a $30,000 planning grant on September 29, 2014 through the Pre-Disaster Mitigation (PDM) Grant Program to fund 75% of the $40,000 total cost of the five year plan update for all incorporated and unincorporated areas within Baldwin County. The remaining 25% required for the local match has been satisfied through in-kind contributions.

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 is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, U.S. Code (U.S.C.) 5170c. It provides opportunities for communities to undertake mitigation measures to reduce the risk of loss of life and property from future disasters during the reconstruction process following a disaster. Funding becomes following a Presidential major disaster declaration in the areas of the State requested by the Governor. The amount of HMGP funding available is based upon the estimated total of Federal assistance for disaster recovery under the declaration: up to 15 percent of the first $2 billion of the total estimated disaster assistance, up to 10 percent for amounts between $2 billion and $10 billion, and up to 7.5 percent for amounts between $10 billion and $35.333 billion. For States with enhanced hazard mitigation plans, up to 20 percent for estimated amounts of disaster assistance not to exceed $35.333 billion can become available. Following the 2011 tornado outbreak, approximately $70 million became available statewide.

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. For FY 2013, $23.7 million in PDM funding was available nationwide.

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 with the implementation of 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). For FY 2013, $120 million in FMA funding was available nationwide. Two types of FMA grants are available to communities:

    - *Planning Grants* to prepare Flood Mitigation Plans

    - *Project Grants* to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. Priority is given to properties that have incurred repetitive flood insurance losses.

4. The Public Assistance Grant Program (Categories C – G) (PA). The Public Assistance Grant Program provides assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations to quickly respond to and recover from major disasters or emergencies declared by the President. Through categories C – G of the PA Program, FEMA provides supplemental Federal disaster grant assistance for the repair, replacement, or restoration of publicly infrastructure and facilities and the facilities of certain Private Non-Profit (PNP) organizations that were damaged by the declared disaster. The PA Program can also be used to protect these damaged facilities from future events through hazard mitigation measures.

5. The Fire Management Assistance Grant Program. Fire Management Assistance Grant Program (FMAGP) provides grants to States, local and tribal governments. Funds can be used for the “mitigation, management, and control of fires on publicly or privately owned forests or grasslands,” where destruction poses such a threat that could result in a major disaster declaration. The State submits a request for assistance to FEMA at the time a "threat of major disaster" exists. The process is expedited with a FEMA decision made within hours. The FMAG provides a 75 percent Federal cost share with the State for eligible firefighting costs, such as “expenses for field camps; equipment use, repair and replacement; tools, materials and supplies; and mobilization and demobilization activities.”

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 as the 2010 Baldwin County Multi-Hazard Mitigation Plan, which addressed 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 represented 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 created 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.

1.7 The 2015 Baldwin County Multi-Hazard Mitigation Plan Update

The Baldwin County HMPC reconvened in April of 2015 and continued to meet throughout the year to update the 2010 plan. The Baldwin County EMA, led by Danon

Hoagland, Planning and Grants Coordinator, managed the overall effort. The firm of Lehe Planning, LLC, was again selected by the Baldwin County Commission to prepare the plan under the direction of the HMPC with the support of the Baldwin County EMA. The firm's manager, professional urban planner James E. Lehe, again coordinated and guided the update process. The 2015 HMPC continued to represent all incorporated and unincorporated Baldwin County jurisdictions, as well as other stakeholders and interested agencies. The plan update continued the comprehensive planning process and risk assessment through a unified approach among all Baldwin County communities. It continues to guide local governments in their ongoing efforts to reduce community vulnerabilities and mitigate potential harm.

Chapter 2 – Prerequisites

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), Categories C – G of the Public Assistance (PA) Grant Program, and the Fire Management Assistance Grant Program (FMAGP). 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 period since the initial plan was first approved in 2004. Baldwin County, the cities of Bay Minette, Daphne, Fairhope, Foley, Gulf Shores, Orange Beach, Robertsdale, Spanish Fort, as well as the towns of Elberta, Loxley, Magnolia Springs, Perdido Beach, Silverhill, and Summerdale have continued to participate in the 2015 plan update. In addition to the participating jurisdictions, other stakeholders affected by the plan contributed to the drafting of this update, including Federal, State, and regional agencies, the Baldwin County Board of Education, business interests, academia, non-profits, and the general public. (See Chapter 4 – "The Planning Process" for a more detailed explanation of the organization of the HMPC and the participation of local jurisdictions and 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 local mitigation plan to be eligible for project grants under FEMA hazard mitigation assistance programs. A school district may choose to participate as a local government that is independent of the municipal and county governments or demonstrate their participation as a stakeholder in another local government's approved mitigation plan. The Baldwin County Board of Education chose the latter avenue of participation and actively participated as a stakeholder in all of the local jurisdictional plans. The Board of Education demonstrated their commitment and support of the plan by formally adopting the 2015 plan.

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 five HMPC committee meetings beginning on April 24, 2015, during the drafting phase of the plan (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 2010 mitigation actions, 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 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 after the final HMPC committee meeting, at the end of 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 http://baldwin.hazardmitigationplan.com to keep abreast of HMPC activities, review draft sections of the plan, and offer comments and suggestions through a website link.
- Contacting HMPC members and Baldwin County EMA staff.
- Contacting elected officials of each jurisdiction.
- Attending public hearings of the local governing bodies and offering comments.

2.4 Multi-Jurisdictional Plan Adoption

All local jurisdictions in Baldwin County have actively participated in the planning process. Upon completion of the plan, each of the municipalities, along with the Baldwin County Commission, passed a formal resolution accepting, approving, and adopting the 2015 Baldwin County Multi-Hazard Mitigation Plan. The Baldwin County Board of Education likewise adopted this plan. By adopting this multi-jurisdictional hazard mitigation plan, the participating local governments and other eligible entities may apply for mitigation monies through the various Hazard Mitigation Assistance programs offered by FEMA. The model Adopting Resolution can be found in Appendix J.

Chapter 3 – Community Profiles

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 2010 plan as a result of the 2015 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

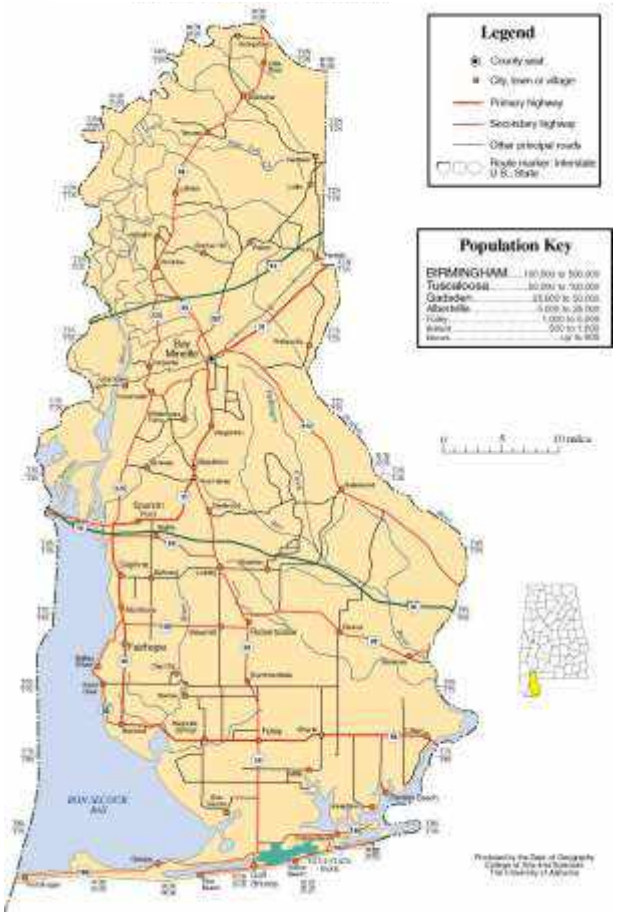


Table 3-2. Driving Distances to Nearby Cities

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 2014 population is 9,049 and it encompasses 8.65 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 2014 population of 24,395 residents, Daphne is the largest municipality in Baldwin County by population. It has an area of approximately 17.49 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 6.87 square miles and a 2014 estimated population of 1,634, the Town of Elberta is the one of the smallest municipalities 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 12.0 miles and an estimated 2014 population of 18,089, 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, 4,000 acres 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 2014 population of 16,243 residents, the City of Foley is Baldwin County's third largest municipality by population. It has an area of 25.88 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 27.9 square miles, of which 23.2 square miles is land, the City of Gulf Shores is the largest municipality in Baldwin County by area. It's estimated 2014 population was 10,963, 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 1,725 residents and an area of 32.22 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 2014 population of 782 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 15.95 square miles, of which 14.7 is land. Like Gulf Shores, Orange Beach has experienced a population increase of more than 80 percent since 2000. Its estimated 2014 population is 5,788.

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 has an estimated population of 624 permanent residents in 2009 and encompasses 1.24 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 2014 population is 5,773, 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 2014 estimated population of 754 and an area of 1.2 square miles, the Town of Silverhill is the smallest municipality in Baldwin County by population. 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 2014 population of 7,806 residents and an area of 33.4 square miles, of which only 28.7 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 9.73 square miles and its estimated 2014 population is 1,005.

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

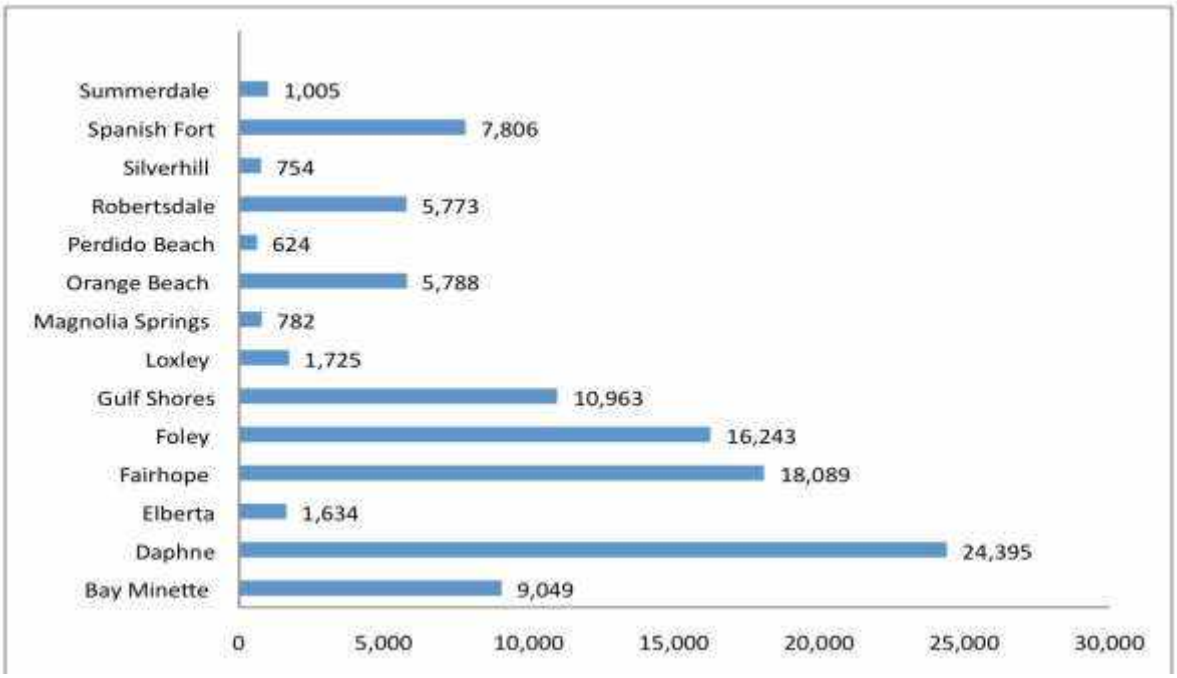
Category	Average
Annual Average Temperature	67.4° F
Avg. January Temperature	51.4° F
Average July Temperature	81.8° F
Average Annual Precipitation (inches)	64.0
Average Annual Snowfall	0 .0
Growing Season Range	230 to 270 Days
Prevailing Wind Direction	South/ Southeast

3.7 Demographics

2014 Population

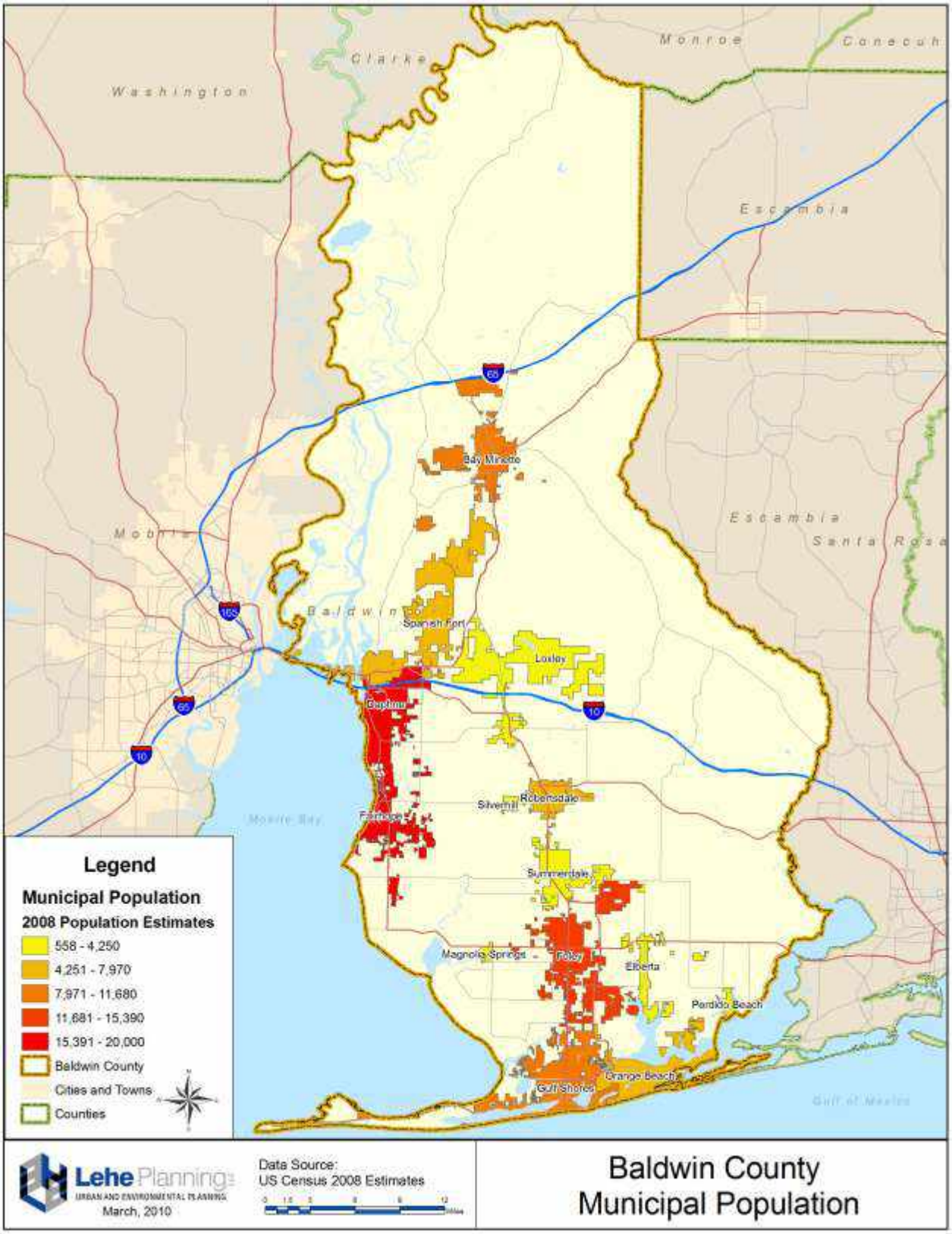
The latest U.S. Census estimates provide the latest population count for Baldwin County and its municipalities in 2014. As shown on Chart 3-1 "2014 Population by Municipality," Foley, Daphne and Fairhope are the only cities in Baldwin County with populations greater than 15,000. A total of 104,630, or just over half of Baldwin County's 182,265 residents, live in incorporated municipalities. The remaining 77,635 persons reside in unincorporated Baldwin County. Map 3-4 shows the population density of the county.

Chart 3-1. 2014 Population by Municipality

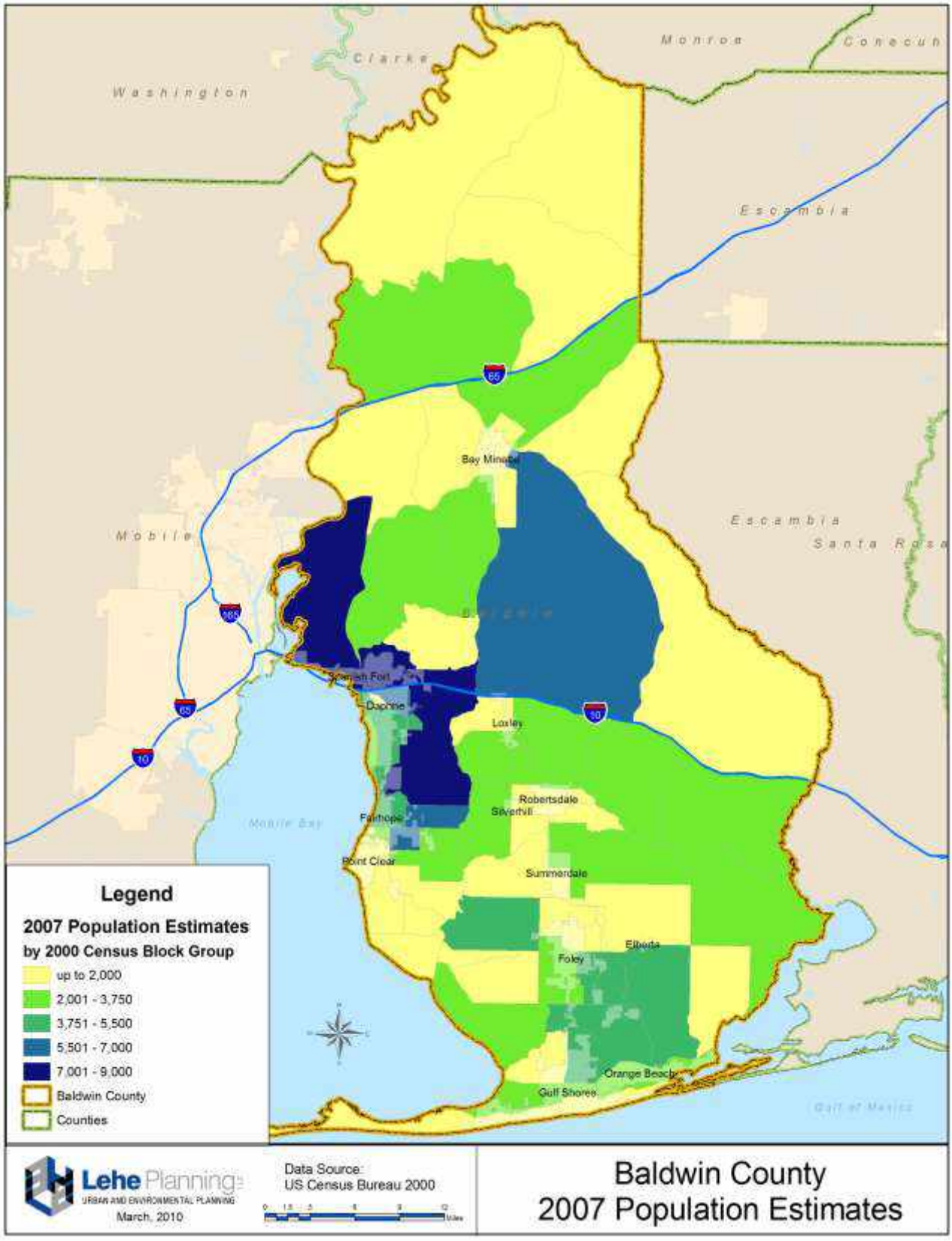


Source: U.S. Census Bureau American Fact Finder, 2014 Population Estimates

Map 3-4. 2008 Baldwin County Municipal Population



Map 3-5. Population Density, Baldwin County



Social Characteristics

The following charts illuminate Baldwin County's demography in 2010 and compare the county with the State of Alabama and the United States when possible. 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

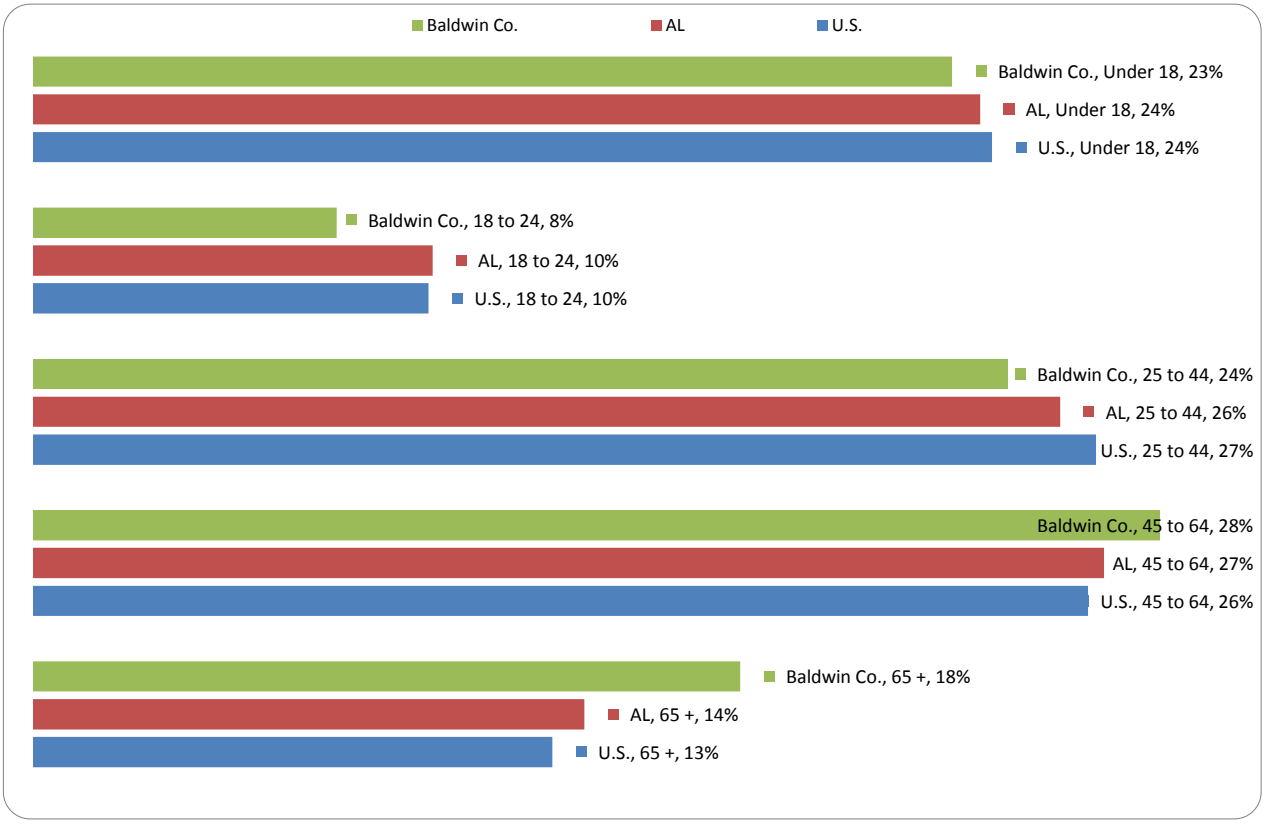
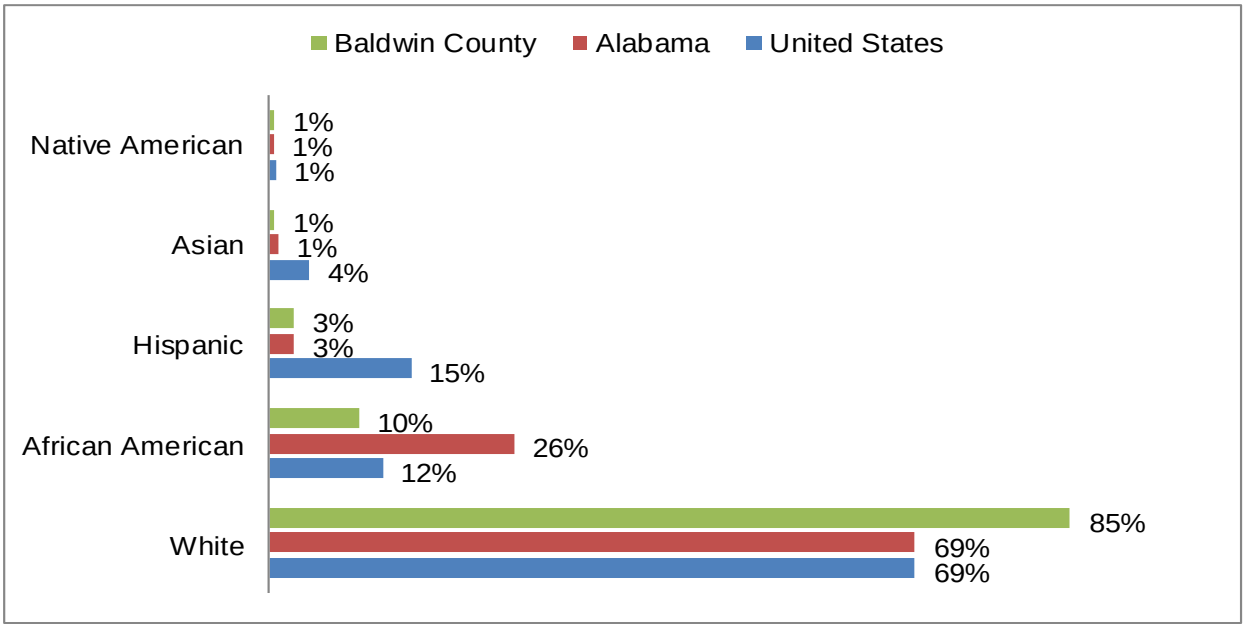


Chart 3-3. Racial Composition of Baldwin County

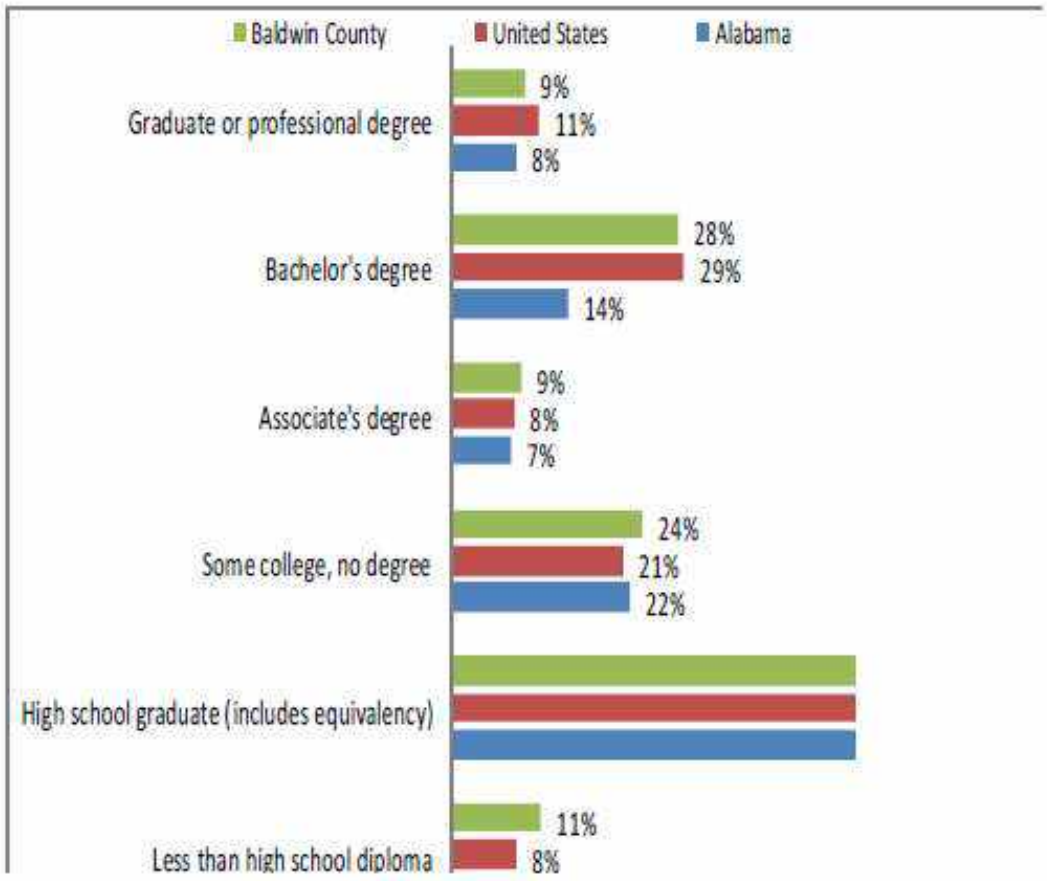


Source: U.S. Census Bureau, 2010-2013 American Community Survey

Educational Attainment

Chart 3-4 "Education Attainment of Baldwin County" illustrates the highest level of education attained by Baldwin County residents. 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

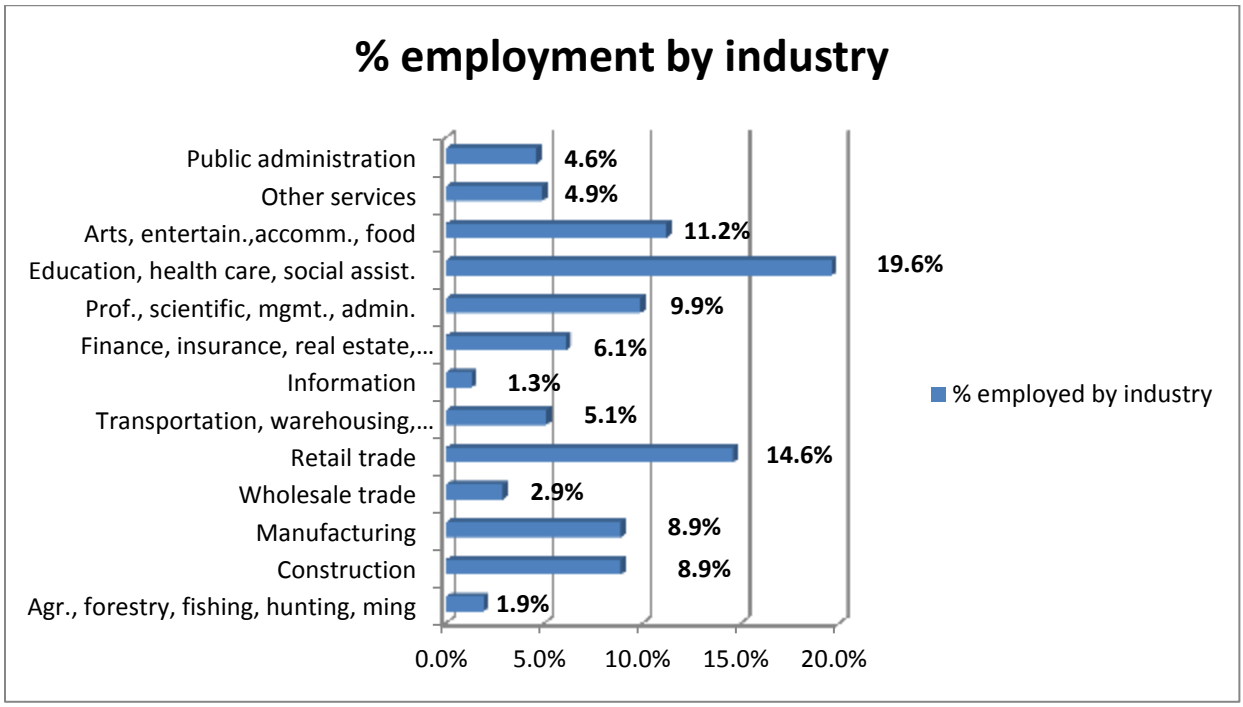


Source: U.S. Census Bureau, 2013 American Community Survey

3.8 Economy

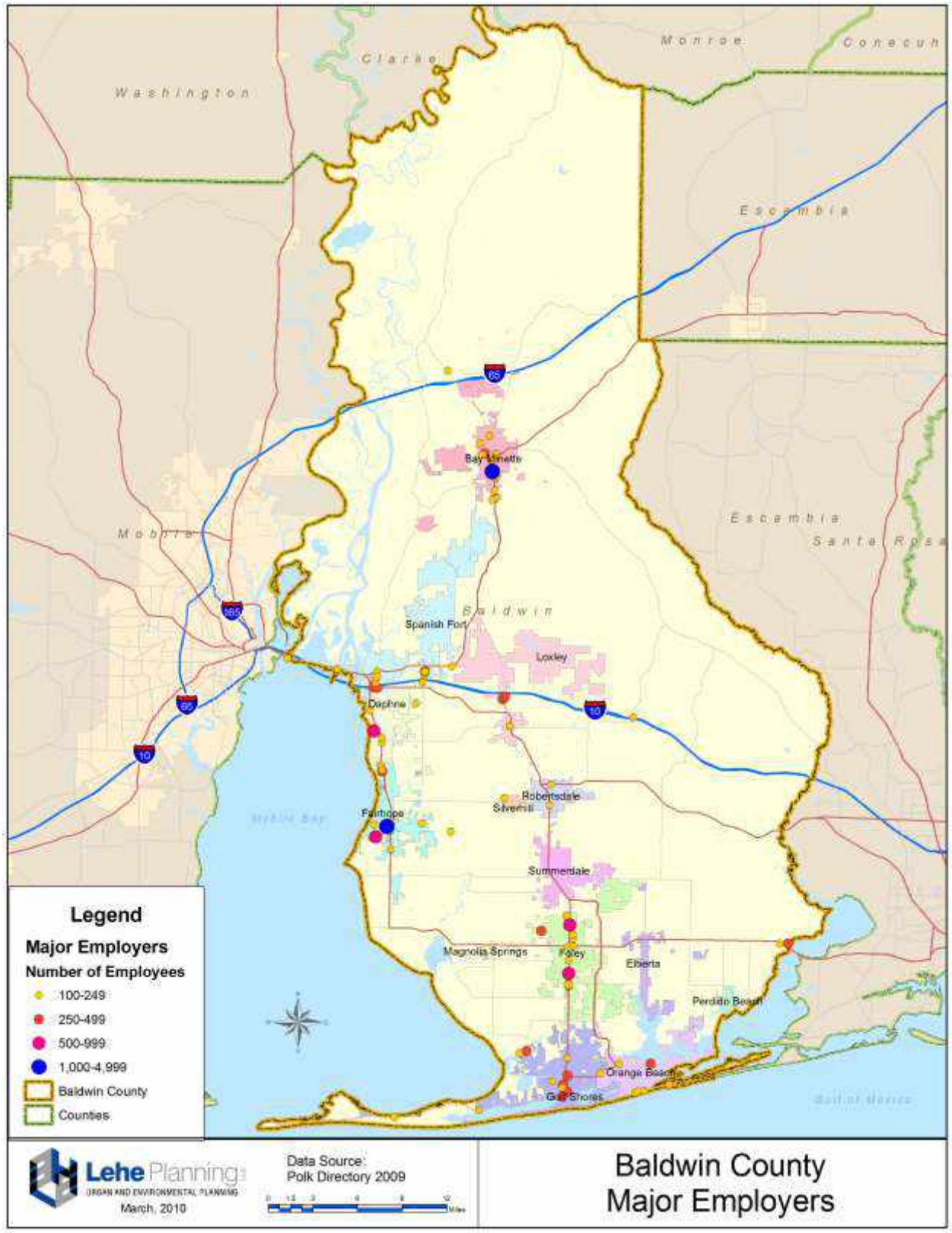
Baldwin County's economy depends heavily on the service sectors. Retail and social services are the largest industries by employment. The Board of Education is the largest employer with 3,150 workers. The Tanger Outlet Mall, which markets itself to the Gulf Coast tourism industry, and Wal-Mart are the second and third largest employers, respectively. In the manufacturing sector, UTC Aerospace employs 820 people and Standard Furniture employees 600. 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



Source: US Census Bureau, 2013 American Community Survey

Map 3-6. Baldwin County Major Employers



Income

According the American Community Survey's 2010-2013 Three Year Estimates, Baldwin County has a median household income of $50,593. 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

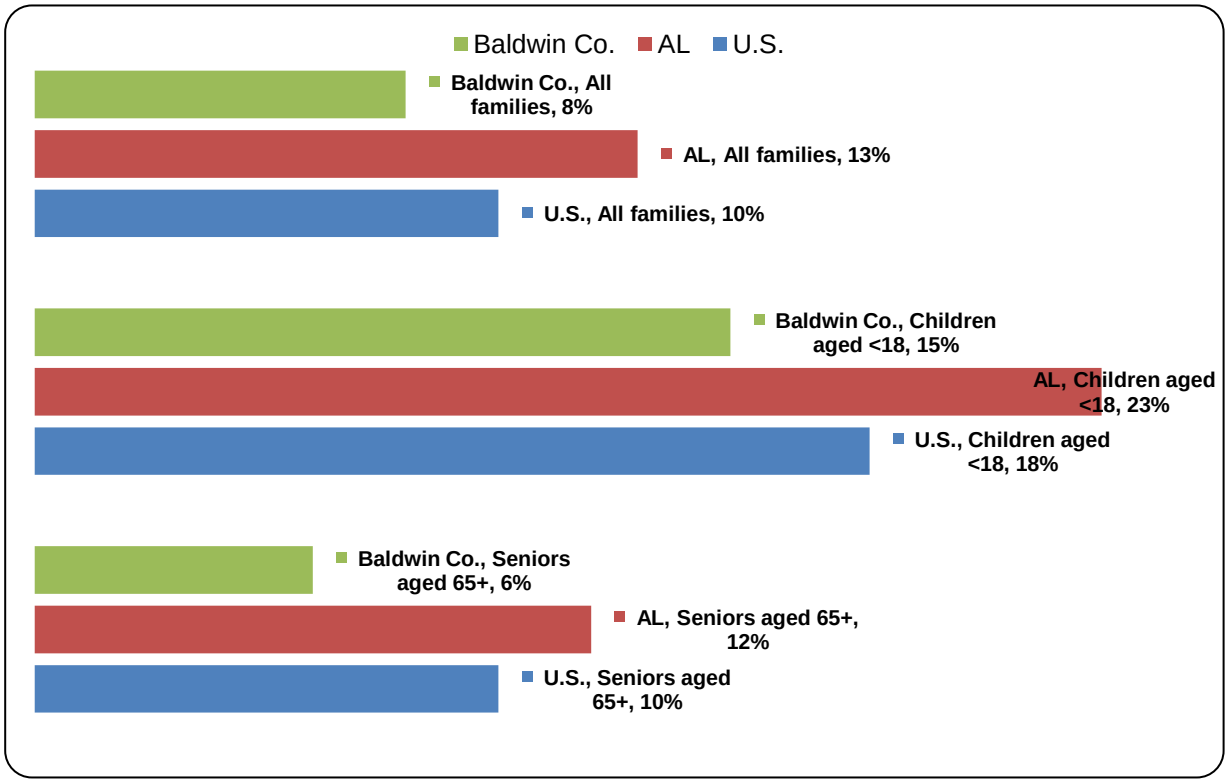
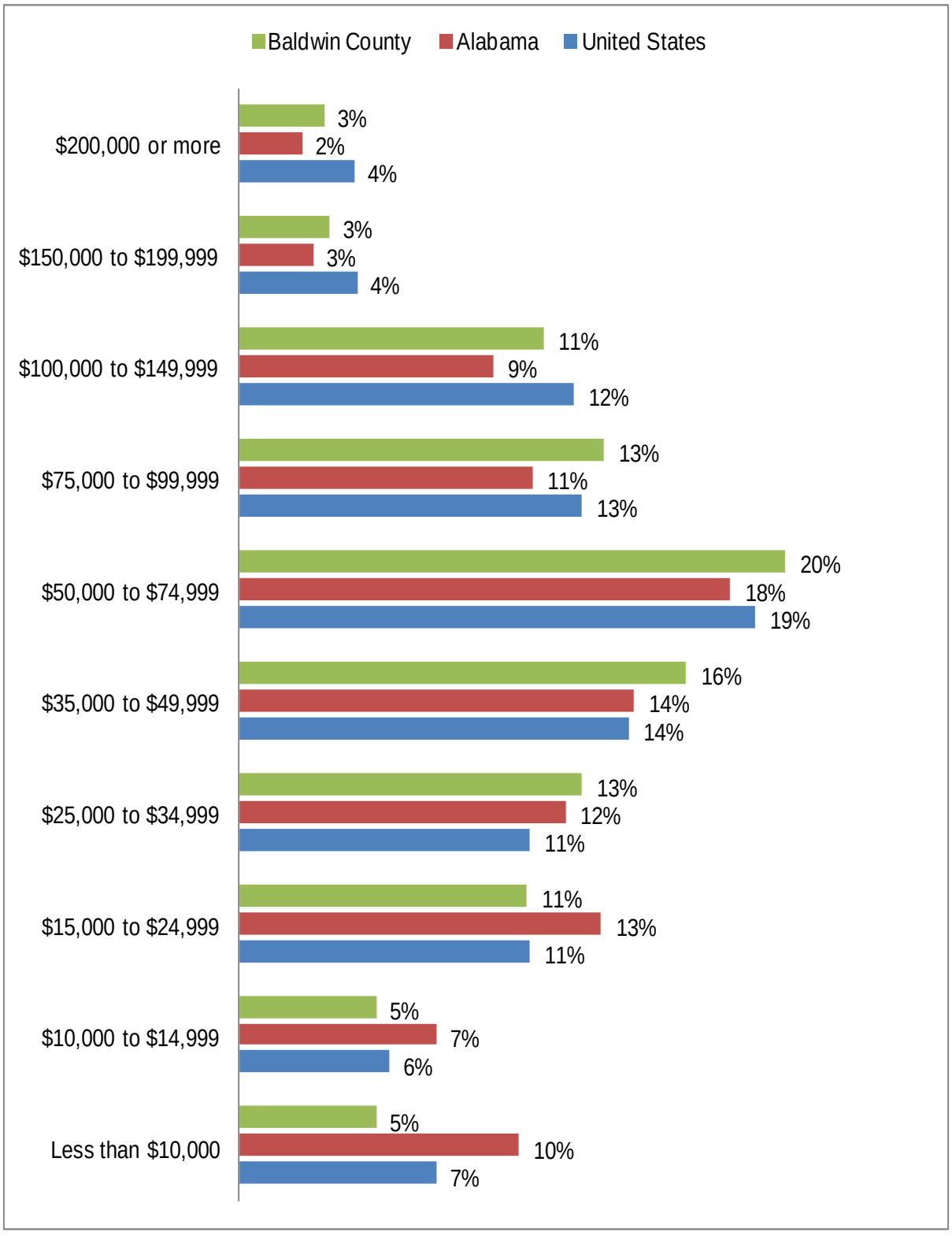


Chart 3-7. Distribution of Income, Baldwin County



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 AT&T 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.

3.10 Media

Five regional and local television stations, five cable providers, and 27 regional and local radio stations serve the area. Baldwin County news is included in the Press-Register and The Baldwin Times.

3.11 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

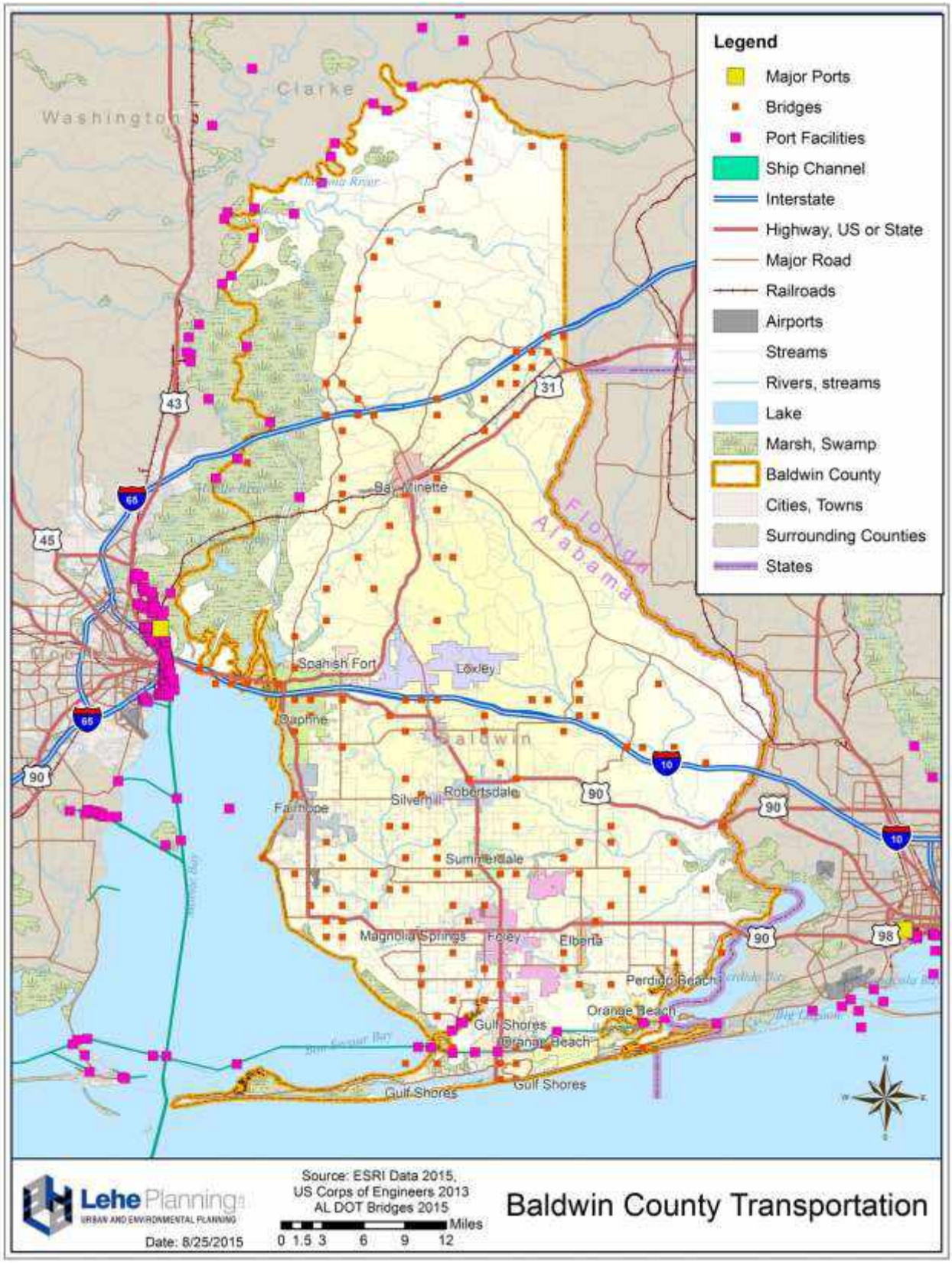
Baldwin County does not have its own port but is located between the Port of Mobile and the Port of Pensacola. The Port of Mobile acts as the hub of the Alabama State Docks, which operates several major cargo-handling facilities. Container cranes, bulk handling facilities, and a main docks complex with 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 American Airlines, Delta, United and US Airways. In Pensacola, carriers include American Airlines, Delta, Silver Airways, Southwest Airlines, United Airlines and US Airways.

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.

Map 3-7. Baldwin County Transportation



Chapter 4 - The Planning Process

4.1 Federal Requirements for the Planning Process

This chapter addresses the Planning Process requirements of 44 CFR Section 201.6 (b) and (c)(1) and the processes 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.*
>
> (1) 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 2010 plan as a result of the 2015 plan update:

Table 4-1. Summary of Plan Updates

Section		Change
4.3	Opportunities for Public Comment on the Plan	Adds new opportunities through Facebook and Twitter and an updated community survey
4.4	Opportunities for Involvement in the Planning Process	Expanded opportunities
4.5	Review and Incorporation of Plans and Documents	Incorporated new plans and documents; 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	Reestablished HMPC and added new members
4.8	How the Public was Involved in the Planning Process	Increased involvement through social media; new community event
4.9	The Plan Review and Update Process	This is the second 5-year review and update of the plan

4.3 Opportunities for Public Comment on the Plan

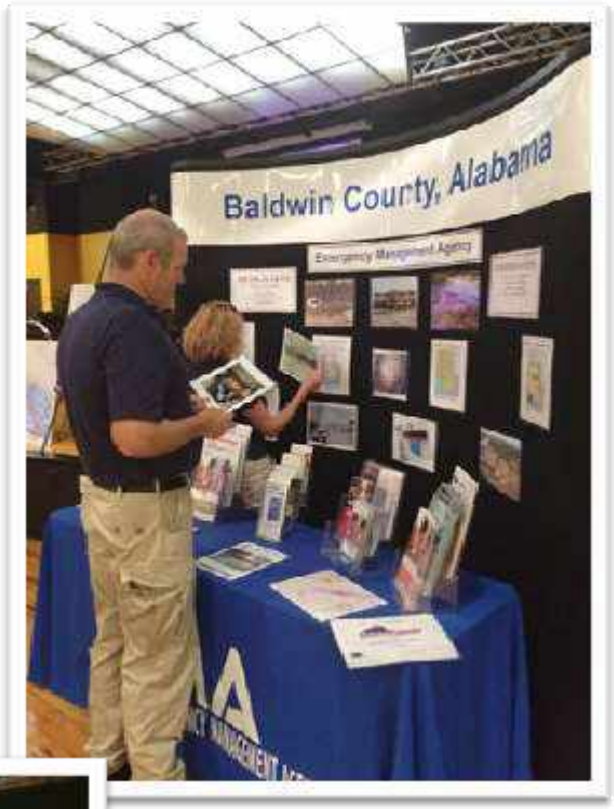
Figure 4-1 Website Image

The Hazard Mitigation Planning Committee (HMPC) solicited public input into the mitigation plan throughout the drafting phase of the plan, primarily through its plan website at baldwin.hazardmitigationplan.com. The website provided opportunities for the public to keep abreast of HMPC meetings, with meeting agendas, slide presentations, and committee exercises and handouts readily available for the public to download. The draft plan sections were continuously posted to the website and available for public review and comment throughout the planning process. The website included a web form to send comments directly to the planning

team, as well as a special email account at baldwin@hazardmitigationplan.com. Residents were further encouraged to provide input through their jurisdiction representative on the HMPC and to attend committee meetings. Baldwin County EMA staff could also be reached by telephone at their offices and by individual meetings by appointment.

During the later drafting phases, the Baldwin County EMA hosted a community meeting to solicit public comments. The meeting on October 22, 2015, was held between 4 PM and 6 PM at the Central Baldwin County Annex in Robertsdale, a recognizable public location. It was conducted in an open house format. A meeting of the HMPC preceded the event.

The community meeting included many exhibits of maps and tables on display and educational handouts. Members of the HMPC and planning team were on hand to answer questions for public attendees. Copies of the draft plan and the 2010 plan, for comparison, were available for public review. A community survey questionnaire, distributed and also posted on the website for download, provided an opportunity for the public to submit their concerns in writing. (Refer to Appendix H "Community Involvement Documentation" for further explanation and documentation of community involvement, including a copy of the survey, the media release, and other supporting documentation).



For 2015, the HMPC added social media for this plan update to expand opportunities for public comment. The community meeting announcements were posted on Facebook and Twitter (search for "Baldwin County Emergency Management Agency"), all of which included a link to the plan website for the public to keep abreast of the progress of the plan update and offer their concerns and suggestions.

Figure 4-2 Social Media Images

Public hearings to receive final comments were held by all jurisdictions prior to adoption of this Plan by resolution, as required by State law.

4.4 Opportunities for Involvement in the Planning Process

The planning team mailed a notice of the draft plan and a survey requesting input from decision makers across Baldwin County, neighboring jurisdictions, and other interested agencies and stakeholders. This effort targeted government agencies with interest in hazard mitigation and/or, with the authority to regulate development, and representatives of businesses, academia and other private and non-profit interests. (A copy of the notice and survey are included in Appendix H "Community Involvement Documentation"). Recipients are listed below:

<u>Federal Agencies</u>

- 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 planning team found that most of the communities' plans and ordinances relevant to hazard mitigation were adopted before the original mitigation plans. Some ordinances address specific natural hazards concerns – flood plain management, storm water detention, erosion and sedimentation control, tree protection, and open space and conservation of land.

The planning team thoroughly reviewed all community plans and regulatory tools as part of the 2010 update. During the 2010 plan update, the participating jurisdictions provided copies of their plans, studies, reports, ordinances, regulations and technical information related to hazard mitigation to the planning team. Since then, no significant changes had occurred, except for the plan updates described below. The documents were closely examined to see which hazard mitigation measures were currently being pursued and what new measures could be included in future revisions of existing documents. Generally, the review included local comprehensive plans, zoning ordinances, subdivision regulations, building and technical codes, floodplain management ordinances, and erosion and sedimentation control ordinances. Select plans and ordinances that addressed special concerns, such as, stormwater management/drainage, tree preservation, open burning, and wildfire mitigation were also reviewed. In addition, the planning team used a variety of data sources for developing the plan, such as, Census Bureau data, NOAA weather data, FEMA disaster reports, and the 2013 Alabama State Hazard Mitigation Plan. To complete its 2015 assessment of planning and regulatory tools, the planning team reviewed the most significant plans and ordinances adopted since 2010. In 2015, most documents were accessible via the Internet.

In 2013, the Baldwin County Commission and the Baldwin County Planning and Zoning Commission adopted the Baldwin County Master Plan. This plan intends to guide growth and development, with an emphasis on land use and public improvements and infrastructure. The "Master Plan Map" includes a future land use designation for a Conservation District, which "is intended to protect environmentally sensitive areas" and provide for large open spaces. The Parks and Recreation element of the plan calls for "resource-based recreation facilities where recreation is driven by the natural landscape, such as river, forest or lake …"

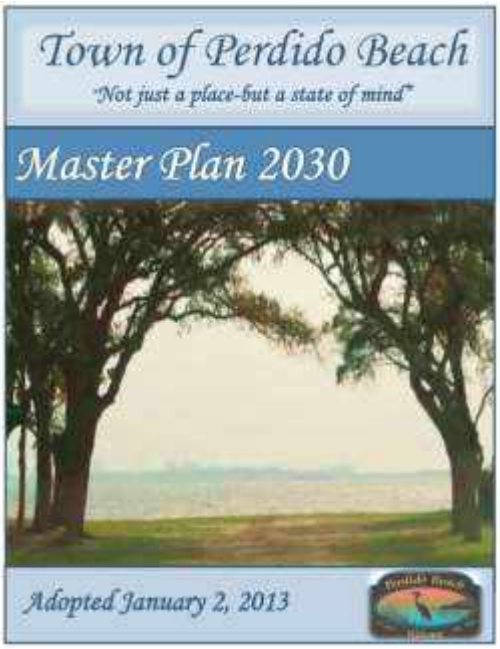
The City of Gulf Shores adopted its 2014 Land Use Plan Update, "a comprehensive strategy to guide planning and design for land development and

resource conservation. One of the four major themes of this plan is "Protect Gulf Shores' Green Infrastructure." As stated in the plan:

> *Gulf Shores is blessed by a beautiful and bountiful coastal natural environment. Gulf Shores intends to protect, preserve and enhance important and fragile ecosystems and wildlife habitats by acquiring land and utilizing conservation tools and environmental regulations to promote a system of accessible publicly owned lands which provide for a broad range of educational, interpretive, and recreational opportunities to meet the needs of the community.*

The Town of Perdido Beach adopted its Master Plan 2030 in January of 2013. The plan's mission statement is:

> *To embrace and enhance the coastal, historic and rural nature of Perdido Beach while ensuring the highest quality of life for each resident; preserving and protecting small town family values and* ***protecting the natural resources*** *(emphasis added), historical environments and scenic beauty.*



Master Plan 2030 recognizes that "conservation and preservation of the unique lands, stream corridors and other significant natural features are important to the viability of Perdido Beach." Further, the plan specifically addresses coastal hazards with a list of hazard mitigation guidelines. These guidelines include participation in the Community Rating System (CRS) Program of the National Flood Insurance Program, development of a hazard mitigation plan through the Baldwin County EMA, continuing drainage system maintenance with assistance from Baldwin County, and identification of hazard mitigation projects eligible for funding under FEMA's HMA grant programs.

Pertinent mitigation strategies developed from this mitigation plan update should 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 April 2015 through December 2015, the Baldwin County Hazard Mitigation Committee (HMPC) held five meetings to participate in the plan drafting process.

Minutes from these meetings are on file in the Baldwin County EMA office, and copies of agendas and sign in sheets are included in Appendix G "Committee Meeting Documentation." All agendas, presentations and exercises were made available on the plan update website at baldwin.hazmitigationplan.com. If a committee member could not attend a meeting, all of the meeting materials were available to download on the website, review, and submit comments to the planning team.

The first planning meeting was held on April 24, 2015. The planning process was discussed and the review of Chapters 1 "Introduction," 2 "Prerequisites," and 7 "Plan Maintenance Process" and Appendices A "Federal Requirements for Local Mitigation Plans" and J "Adopting Resolution" were completed. The members were provided the Hazard Identification and Ratings Exercise to identify hazards they believed affected their jurisdiction and rate the potential impacts and probabilities of future occurrences. (See Appendix D "HMPC Hazard Identification and Ratings" for the results of this exercise).

The second meeting of the HMPC was help on June 19, 2015. The primary topic of this meeting was the first half of Chapter 5 "Risk Assessment," which includes detailed profiles of the hazards affecting each community. Appendices D "Hazard Ratings and Descriptions" and E "Hazard Profile Data" were also presented for review. The HMPC discussed hazard events over the previous five-year period, resulting impacts, and potential future occurrences. Chapter 3 "Community Profiles" was also reviewed for completeness and accuracy of community descriptions.

On August 14, 2015, the third HMPC meeting was conducted. The second part of Chapter 5 "Risk Assessment," covering vulnerabilities, was reviewed. Discussion focused on the types of structures and potential losses. Further, the HMPC reviewed land development trends and the future impacts of hazards on future growth and development. Finally, HMPC members were asked to complete exercises to update their capabilities assessment and plan implementation status as homework.

The meeting held on October 22, 2015 was the fourth for the HMPC. Topics discussed during this meeting included Chapter 6 "Mitigation Strategies" and Appendices B "Community Mitigation Capabilities," C "2010 Plan Implementation Status," and F "Identification and Analysis of Mitigation Measures." During the review of Chapter 6 "Mitigation Strategies", the HMPC discussed goals and objectives and alternative mitigation measures available to each community. The planning team presentation emphasized the value of thoroughly evaluating each measure by applying the STAPLEE method (Social, Technical, Administrative, Political, Legal, Environmental, and Economic considerations). Appendix B, "Community Mitigation Capabilities" was reviewed to determine if any information needed to be updated. Review of Appendix C "Plan Implementation Status 2010" helped the HMPC better understand and grasp the measures from the last plan update. Appendix F "Alternative Mitigation Measures" was also reviewed so that the HMPC would be aware of the various ways to mitigate their

hazards. The HMPC was provided with the Community Action Program exercise to begin developing their action programs for the next five year planning cycle. A copy of this exercise is located in Appendix F.

The final meeting was conducted on December 11, 2015, immediately preceding the community event at the Baldwin County Central Annex auditorium. The HMPC reviewed Volume II, Community Action Programs during this meeting. The planning team discussed the importance of the individual programs and the responsibilities of the HMPC to oversee the progress of their jurisdiction's plan. Chapter 4 "Planning Process" was also discussed, including the process taken during the update period and expectations for FEMA approval and local adoption. The approval process was outlined, from the recommendation for approval from AEMA to FEMA's final approval. It was stressed that each community must adopt the plan in order to be eligible for consideration of future mitigation projects. Finally, the planning team emphasized the need for the HMPC to meet at least annually to review the plan, in accordance with the plan maintenance procedures in Chapter 7.

The planning team assembled the final draft of the plan and submitted it to the Alabama EMA for its recommendation to FEMA. Subsequently, FEMA approved the plan, pending local adoption. The final approved plan was adopted by resolutions of all participating jurisdictions at public hearings of their governing bodies. As an active participant in the planning process and with facilities and services across all local jurisdictions, the Baldwin County Board of Education likewise adopted the plan.

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 political jurisdictions and stakeholder organizations represented are listed below:

Table 4-2. HMPC Membership

Name	Title or Position	Type	Jurisdiction/Organization	Agency/Department
Reggie Chitwood	Director	Jurisdiction	All	Baldwin County EMA
Danon Hoagland	Planning/Grants Coord.	Jurisdiction	All	Baldwin County EMA
Jenni Guerry	Secretary	Jurisdiction	All	LEPC / EMA
Mike Howell	Building Official	Jurisdiction	Baldwin County	Building Inspections
Charlie Jones	Chief Deputy	Jurisdiction	Baldwin County	Sherriff's Dept.
Joey Nunnally	Pre-Const. Manager	Jurisdiction	Baldwin County	Highway Department
Anthony Sampson	Director	Jurisdiction	Baldwin County	Board of Education
David Corley		Jurisdiction	Baldwin County	North Baldwin Utilities
Mike Minchew	Fire Chief	Jurisdiction	City of Bay Minette	Fire and Rescue
Chip Martin	Fire Marshall	Jurisdiction	City of Daphne	Fire and Rescue
Denise Penry	PW Accountant	Jurisdiction	City of Daphne	
Ashley Campbell	Envir. Prgms. Manager	Jurisdiction	City of Daphne	
Erik Cortinas	Building Official	Jurisdiction	City of Fairhope	Building Inspections
John Saraceno	EM Coordinator	Jurisdiction	City of Fairhope	Fire Department
Joe Bouzan		Jurisdiction	City of Foley	
Rachael Keith		Jurisdiction	City of Foley	
Brandan Franklin	Building Official	Jurisdiction	City of Gulf Shores	Building Inspections
Alan Carpenter	Lieutenant	Jurisdiction	City of Gulf Shores	Police
Ken Grimes	City Administrator	Jurisdiction	City of Orange Beach	Office of the Mayor
Lannie Smith	Building Official	Jurisdiction	City of Orange Beach	Building Inspections
Greg Smith	Building Official	Jurisdiction	City of Robertsdale	Building Inspections
Scott Gilbert	Director	Jurisdiction	City of Robertsdale	Public Works
Bruce Renkert	Building Official	Jurisdiction	City of Spanish Fort	Building Inspections
Marvin Williams	Mayor	Jurisdiction	Town of Elberta	Office of the Mayor
Ashley Powers	Town Clerk	Jurisdiction	Town of Elberta	Office of the Town Clerk
Billy Middleton	Mayor	Jurisdiction	Town of Loxley	Office of the Mayor
Richard Rider, II	Superintendent	Jurisdiction	Town of Loxley	Public Works
Kenneth Underwood	Mayor	Jurisdiction	Town of Magnolia Springs	Office of the Mayor
Patsy Parker	Mayor	Jurisdiction	Town of Perdido Beach	Office of the Mayor
Ellen Leslie	Councilwoman	Jurisdiction	Town of Perdido Beach	Town Council
Timothy Wilson	Mayor	Jurisdiction	Town of Silverhill	Office of the Mayor
Jimmy Davis	Chief	Jurisdiction	Town of Summerdale	Police
Tiffany Lynn	Town Clerk	Jurisdiction	Town of Summerdale	Office of the Town Clerk
Kim Frank		Stakeholder	Baldwin County EMC	
Steve Millstead		Stakeholder	Belforest Water System	
Lori Wilson		Stakeholder	Daphne Utilities	
Dan McCrory		Stakeholder	Fairhope Utilities	
Clifford Johnson		Stakeholder	Gulf Shores Utilities	

Name	Title or Position	Type	Jurisdiction/Organization	Agency/Department
Rick Rider		Stakeholder	Loxley Utilities	
Stacey Quates		Stakeholder	Park City Water Authority	
Miles McDaniel		Stakeholder	Riviera Utilities	
Paula Aldrich		Stakeholder	Robertsdale Utilities	
Charles Hall		Stakeholder	Water, Sewer & Fire Protection	E. Central Baldwin
Mark Bohlin		Stakeholder	Water, Sewer & Fire Protection	Perdido Bay
Pete Stritzinger		Stakeholder	Water, Sewer & Fire Protection	Ono Island
Judy Sullivan		Stakeholder	Water, Sewer & Fire Protection	Orange Beach
Rhonda Durant		Stakeholder	White House Fork Water System	
Teresa Porter		Stakeholder	State of Alabama	Ala. Dept 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 HMPC chose to retain the mission statement from the 2010 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,*
> - *Concludes in programmed actions with specific results.*

4.7.3 Preparation of the Plan Update

The 2015 plan update was prepared under the direction of the HMPC with the support of the Baldwin County EMA Planning and Grants Coordinator, Danon Hoagland. The Baldwin County Commission was awarded a FEMA Pre-Disaster Mitigation (PDM) planning grant in the amount of $30,000 to fund the plan update. The Commission retained the consulting firm of Lehe Planning, LLC, the same firm that assisted with the 2004 and 2010 plans, to prepare the 2015 update. A professional urban planner James E. Lehe, AICP, served as Plan Coordinator.

4.8 How the Public was Involved in the Planning Process

As previously mentioned in other sections of this chapter, the public received many opportunities to participate in the plan update. These public involvement opportunities included: (1) active participation in any of the five committee meetings; (2) submitting comments through the internet via the plan website, email, Facebook, and Twitter; (3) attending the two community meeting; (4) completing the community survey; (5) submitting comments by postal mail or email; and, (6) consulting with the planning team by telephone or in-person.

All Hazard Mitigation Planning Committee (HMPC) meetings were publicly announced and open to the public. All meeting dates appeared publicly on the plan website at baldwin.hazardmitigationplan.com. The posting of meeting agendas, slide presentations, committee exercises, meeting handouts, and draft sections of the plan provided the public with full access to the planning process.

The HMPC sponsored a special community meeting on October 22, 2015, during the drafting stages of the plan. At this public meeting, the draft plan was publicly presented, and the hazards and alternative mitigation measures were discussed among participants. Map displays and handouts of FEMA publications regarding various hazards and mitigation measures were made available to the public. Additionally, the public was encouraged to fill out a survey about the risks and threats of hazards and offer any suggestions. The community survey results were compiled and posted on the plan website and distributed to HMPC members.

At the end of the planning process, individuals were afforded one last opportunity for comments on the 2015 plan update. Each governing body held a public hearing prior to adoption. For more detailed documentation and 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 2010 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;
- An update of the assessment of local capabilities to carry out mitigation measures;
- An evaluation of the status and effectiveness of Community Mitigation Action Programs adopted in the 2010 plan, which is reflected in the 2015 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 complete update of the HAZUS – MH maps and analysis reports for floods, earthquakes, and hurricanes;
- A reexamination of development trends and exposure to risks;
- A review and recommitment to the vision for disaster-resistant communities; the plan goals; and support of the 2013 Alabama 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; and,
- Revisions to the plan maintenance procedures to institute streamlined amendments and better ensure continuous monitoring and implementation of mitigation actions.

During the period between approval of the 2010 plan and the drafting of the 2015 plan, the HMPC held nine interim meetings to review plan implementation measures and projects, in accordance with Chapter 7 “Plan Maintenance.” Documentation of those meetings can be found in Appendix G “Committee Meeting Documentation.”

Chapter 5 – Risk Assessment

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 2015 plan:

Table 5-1. Plan Updates

Section		Change
5.3	Identification of Hazards Affecting Each Jurisdiction	Adds Tsunamis to Table 5.2
5.4	Hazard Profiles	Adds Tsunamis to Section 5.4; 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 "Identified Baldwin County Hazards". This table highlights the relationships between hazards. In addition to the natural hazards listed in the 2010 Baldwin County Multi-Hazard Mitigation Plan, this 2015 plan includes tsunamis. Detailed descriptions appear in Appendix D, "Hazard Identification, Ratings and Descriptions."

Table 5-2. Identified Baldwin County Hazards

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

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

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

Hazards	Associated Hazards	Jurisdictions Affected
Dam/Levee Failures	Flooding	Baldwin County
		Bay Minette
		Daphne
		Elberta
		Fairhope
		Foley
		Gulf Shores
		Loxley
		Magnolia Springs
		Orange Beach
		Perdido Beach
		Robertsdale
		Silverhill
		Spanish Fort
		Summerdale
Sinkholes (Land Subsidence)		Baldwin County
		Bay Minette
		Daphne
		Elberta
		Fairhope
		Foley
		Gulf Shores
		Loxley
		Magnolia Springs
		Orange Beach
		Perdido Beach
		Robertsdale
		Silverhill
		Spanish Fort
		Summerdale
Tsunamis		Baldwin County
		Bay Minette
		Daphne
		Elberta
		Fairhope
		Foley
		Gulf Shores
		Loxley
		Magnolia Springs
		Orange Beach
		Perdido Beach
		Robertsdale
		Silverhill
		Spanish Fort
		Summerdale

Hazards	Associated Hazards	Jurisdictions Affected
Manmade/Technological		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 2015 hazard identification process by completing an exercise to evaluate the list of hazards identified in the 2010 plan, which is reported in Appendix D "HMPC Hazard Identification and Ratings."

2. 2013 Alabama State Plan. The 2013 update of the Alabama State Plan served as an additional resource for identifying local hazards. The planning team compared the list of hazards identified in the State Plan with the local list of hazards 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 2013 Alabama State Plan	Equivalent 2015 Baldwin County Identified Hazards	Differences
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.
Floods (storm surge, riverine, flash floods, etc.)	Flooding	Coastal and riverine flooding; Baldwin County plan associates storm surge with hurricanes.
Hail	Severe Storms – Hail	Included as a component of severe storms in Baldwin County plan.
Lightning	Severe Storms – Lightning	Included as a component of severe storms in Baldwin County plan.
Wildfires	Wildfires	Baldwin County plan associates wildfires with droughts/heat waves.

Hazards Identified in 2013 Alabama State Plan	Equivalent 2015 Baldwin County Identified Hazards	Differences
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.
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.
Winter/Ice Storms	Winter Storms/Freezes	Baldwin County plan identifies extreme cold as an associated hazard.
Earthquakes	Earthquakes	Baldwin County plan identifies landslides as an associated natural hazard.
Landslides	Landslides	Baldwin County plan identifies mudslides as an associated natural hazard.
Dam/Levee Failures	Dam/Levee Failures	Baldwin County plan associates floods with dam/levee failures.
Sinkholes & Land Subsidence	Sinkholes (Land Subsidence)	No difference.
Tsunamis	Tsunamis	Newly identified natural hazard in Baldwin County plan.
Sea Level Rise	Tsunamis – Sea Level Rise	Included as a component of Tsunamis in Baldwin County plan.

3. List of Federally-Declared Disasters. Federal disaster declarations were an additional source for hazard identification. Baldwin County was included in 62 federal disaster declarations from 1973-2014. 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. 1973-2014 Federal Disaster Declarations Affecting Baldwin County

Disaster No.	Description	Date of Declaration	Declaration Type
369	Tornado	5/3/1973	IA, PA-ABCDEFG, DH, DUA, IFG, HM
388	Severe Storms, Flooding	5/29/1973	HM
422	Tornadoes	4/4/1974	HM
458	Severe Storms, Flooding	3/14/1975	HM
464	Severe Storms, Flooding	4/23/1975	HM
488	Severe Storms, Tornadoes, Flooding	10/2/1975	HM
532	Severe Storms, Flooding	4/9/1977	HM
3045	Drought	7/20/1977	PA-AB
563	Severe Storms, Flooding	8/9/1978	PA-ABCDEFG, HM

Disaster No.	Description	Date of Declaration	Declaration Type
3074	Flooding	3/17/1979	PA-AB
578	Storms, Wind, Flooding	4/18/1979	HM
598	Hurricane Frederic	9/13/1979	IA, PA-ABCDEFG, DH, DUA, IFG, HM
619	Severe Storms	4/20/1980	HM
638	Severe Storms, Tornadoes, Flooding	4/10/1981	HM
639	Flood	5/14/1981	HM
695	Severe Storms, Flooding, Tornadoes	12/13/1983	HM
742	Hurricane Elena	9/7/1985	IA, PA-ABCDEFG, DH, DUA, IFG, HM
848	Severe Storms, Tornadoes	11/17/1989	HM
856	Flooding, Severe Storm, Tornado	2/17/1990	HM
861	Severe Storms	3/23/1990	IA, PA-ABCDEFG, DH, DUA, IFG, HM
890	Flooding, Severe Storm	1/4/1991	HM
3096	Severe Snowfall, Winter Storm	3/15/1993	PA-AB
1013	Winter Storm, Severe Storm, Freezing, Flooding	3/3/1994	HM
1019	Severe Storm, Flooding, Tornado	3/30/1994	HM
1034	Severe Storm, Flooding, Tropical Storm Alberto	7/8/1994	HM
1047	Severe Storms, Tornadoes, Flooding	4/21/1995	HM
1070	Hurricane Opal	10/10/1995	IA, PA-ABCDEFG, DH, DUA, IFG, HM
1104	Storms, Flooding	2/23/1996	HM
1108	Storms, Tornadoes, Floods	3/20/1996	HM
1185	Severe Storms	7/25/1997	IA, PA-ABCDEFG, DH, DUA, IFG, HM
1208	Severe Storms, Flooding	3/9/1998	HM
1214	Tornadoes, Severe Storms	4/9/1998	HM
3133	Hurricane Georges	9/28/1998	PA-AB, HM
1250	Hurricane Georges	10/6/1998	IA, PA-ABCDEFG, DH, DUA, IFG, HM
1261	Freezing Rain, Ice Storm	1/15/1999	HM
1317	Winter Storm	2/18/2000	HM
1322	Severe Storms, Flooding	3/17/2000	HM
1352	Tornadoes	12/18/2000	HM
1362	Severe Storms, Flooding	3/5/2001	HM
1399	Severe Storms, Tornadoes	12/7/2001	HM
1438	Tropical Storm Isidore	10/9/2002	PA-ABCDEFG, HM
1442	Severe Storms, Tornadoes	11/9/2002	HM
1466	Severe Storms, Tornadoes and Flooding	5/12/2003	IA, PA-ABCDEFG, DH, DUA, IFG, HM
1549	Hurricane Ivan	9/15/2004	IA, PA-ABCDEFG, DH, DUA, IFG, HM

Disaster No.	Description	Date of Declaration	Declaration Type
1593	Hurricane Dennis	7/10/2005	IA, PA-ABCDEFG, DH, DUA, IFG, HM
1605	Hurricane Katrina	8/29/2005	IA, PA-ABCDEFG, DH, DUA, IFG, HM
3237	Hurricane Katrina Evacuation	9/10/2005	PA-B
1687	Severe Storms, Tornadoes	3/3/2007	HM
3214	Hurricane Katrina	8/28/2005	PA-AB
3292	Hurricane Gustav	8/30/2008	PA-B
1789	Hurricane Gustav	9/10/2008	IA, PA-ABCDEFG, DH, DUA, IFG, HM
1797	Hurricane Ike: Severe Storms, Flooding	9/26/2008	PA-AB, HM
1835	Severe Storms, Flooding, Tornadoes	4/28/2009	PA-ABCDEFG, HM
1836	Severe Storms, Flooding, Tornadoes, Straight-line Winds	5/8/2009	HM
1842	Severe Storms, Tornadoes, Flooding, Straight-line Winds	6/3/2009	HM
1866	Tropical Storm Ida	12/22/2009	PA-AB, HM
1870	Severe Storms, Flooding	12/31/2009	HM
1908	Severe Storms, Tornadoes, Straight-line Winds, Flooding	5/3/2010	HM
1971	Severe Storms, Tornadoes, Straight-line Winds, Flooding	4/28/2011	HM
4052	Severe Storms, Tornadoes, Straight-line Winds, Flooding	2/1/2012	HM
4082	Hurricane Isaac	9/21/2012	PA-ABCDEFG, HM
4176	Severe Storms, Tornadoes, Straight-line Winds, Flooding	5/2/2014	IA, PA-ABCDEFG, HM

*** Declaration Type / Description Key:**	
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

- The National Weather Service
- The NOAA Storm Events Database
- Southeast Regional Climate Center
- U.S. Geological Survey
- Southern Wildfire Risk Assessment Portal
- Alabama Forestry Commission
- U.S. Department of Transportation, HAZMAT Intelligence Portal
- 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 County in the Primary Hurricane Risk Area.

Hurricane Isaac declared a State of Emergency on September 21, 2012, made landfall in Louisiana as a Category 1 hurricane on August 28, 2012. Though most of the damage occurred in neighboring states, Baldwin County was inundated by rainfall and experienced minor road flooding in low-lying areas, as well as power outages. The photo to the right shows waves breaking over the road in Orange Beach (credit: CNN). The photo below shows the public fishing pier at Gulf State Park in Gulf Shores before Hurricane Isaac made landfall in Louisiana.

Location of Potential Hurricanes

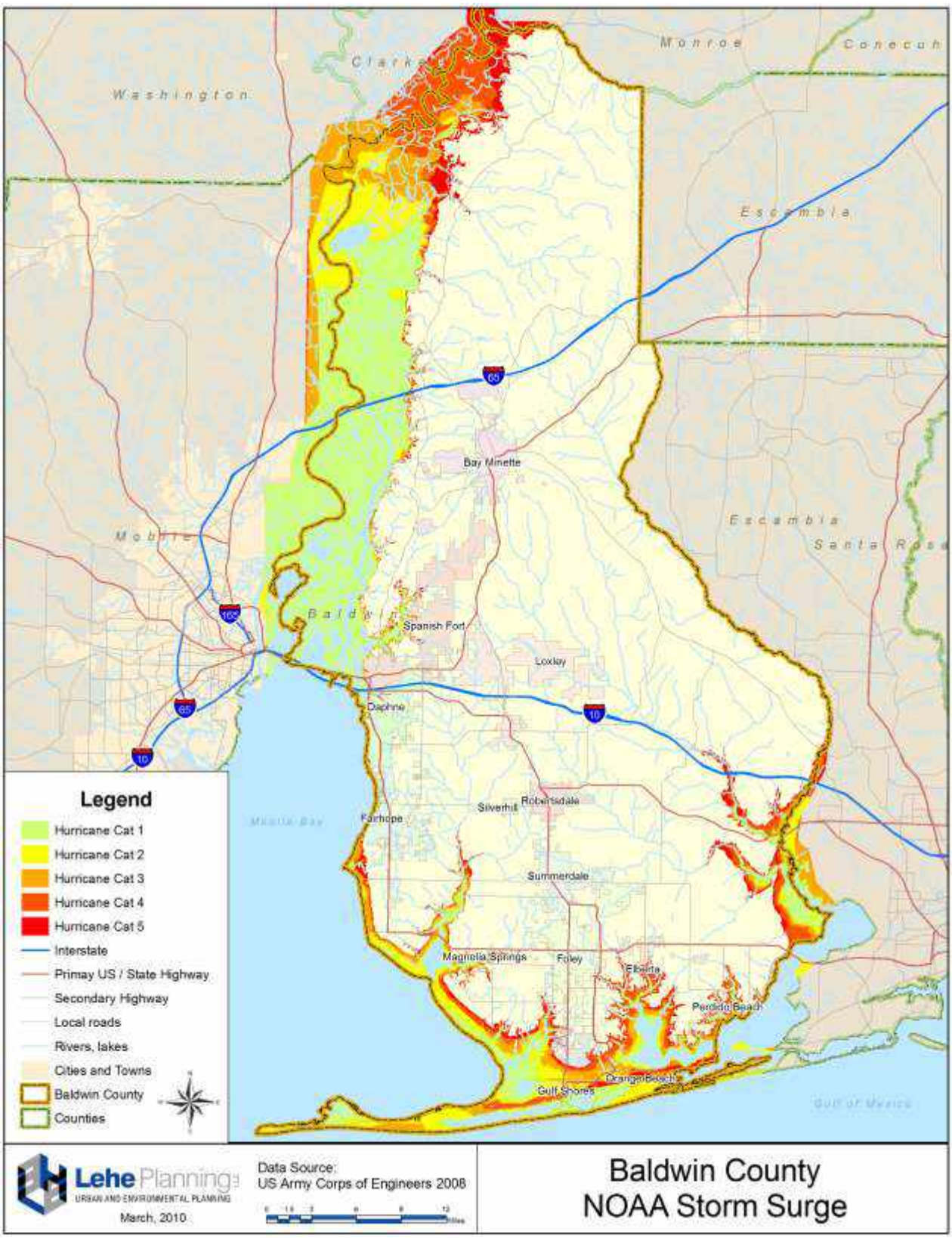
Although all of Baldwin County faces the risk of significant hurricane damage, certain areas are relatively more susceptible to associated hazards.

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 into low-lying coastal areas.

Extent and Intensity of Hurricanes

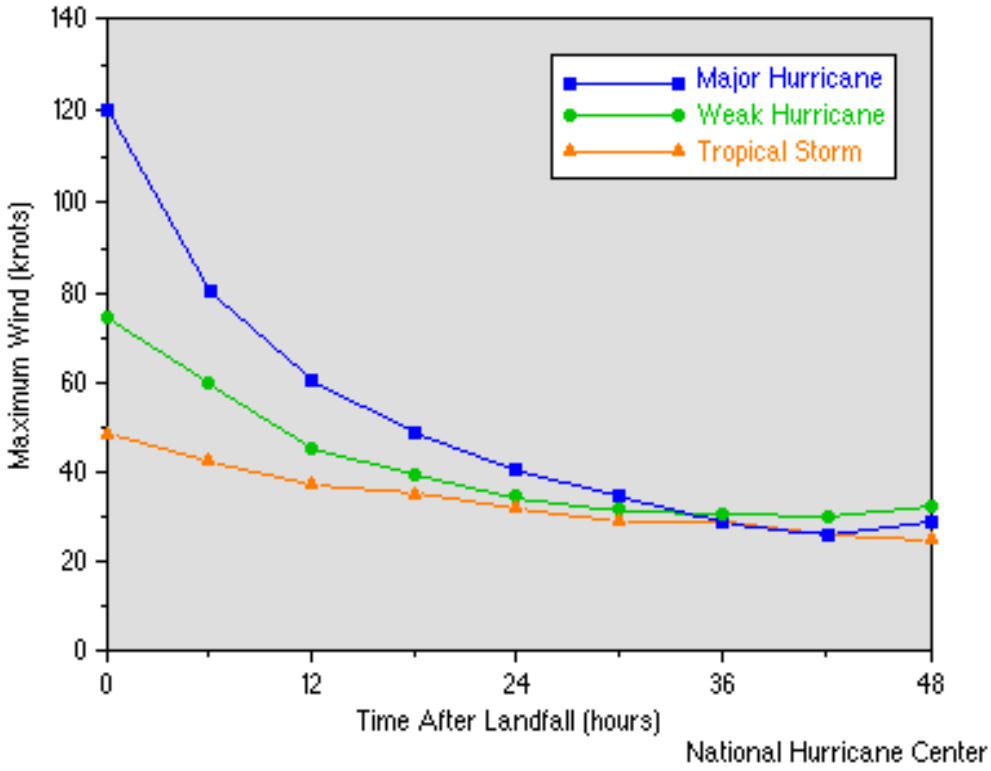
For Baldwin County, storm surge is the most dangerous hazard associated with hurricanes. Storm surge extent depends upon wind speed, the proximity of the affected area to the coast, and underwater geography. Map 5-1 delineates areas subject to storm surge. The communities along the Gulf of Mexico shore and at the inner quadrant of Mobile Bay are subject to storm surges from higher category hurricanes.

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.

Previous Occurrences of Hurricanes

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.

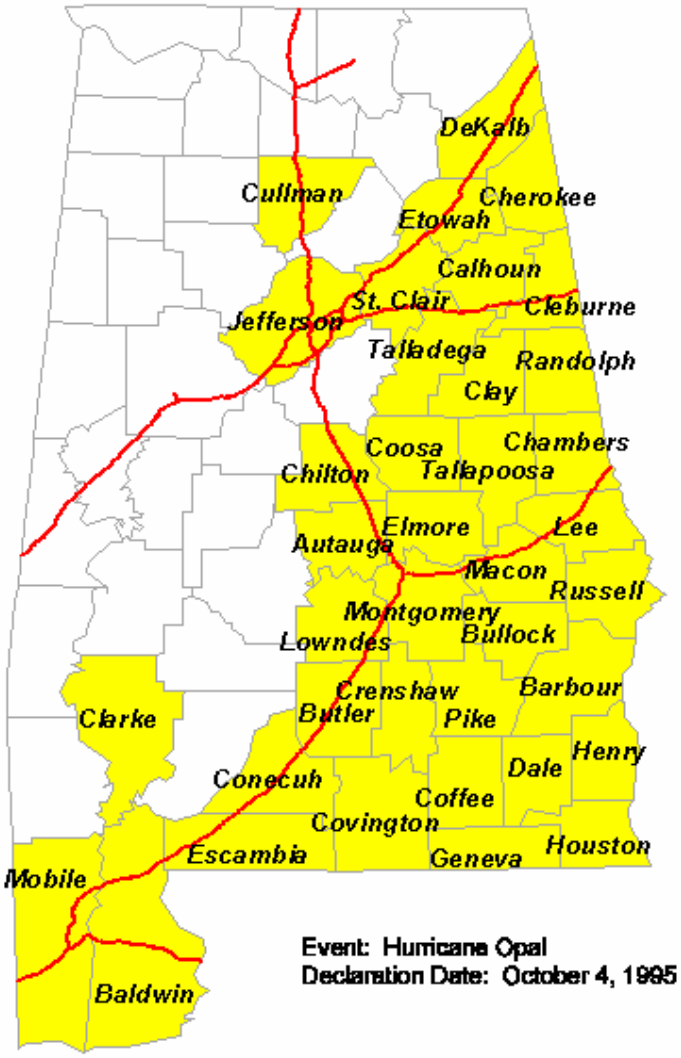
Hurricane Opal, a Category 4 hurricane, made landfall on October 4, 1995, and moved northeast across the state of Alabama. Wind speeds at landfall were 125 miles per hour. In the coastal Alabama communities of Baldwin and Mobile counties, storm surge severely eroded beaches; damaged piers, docks, boats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

Figure 5-1. Hurricane Opal Track

Source: National Hurricane Center

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.

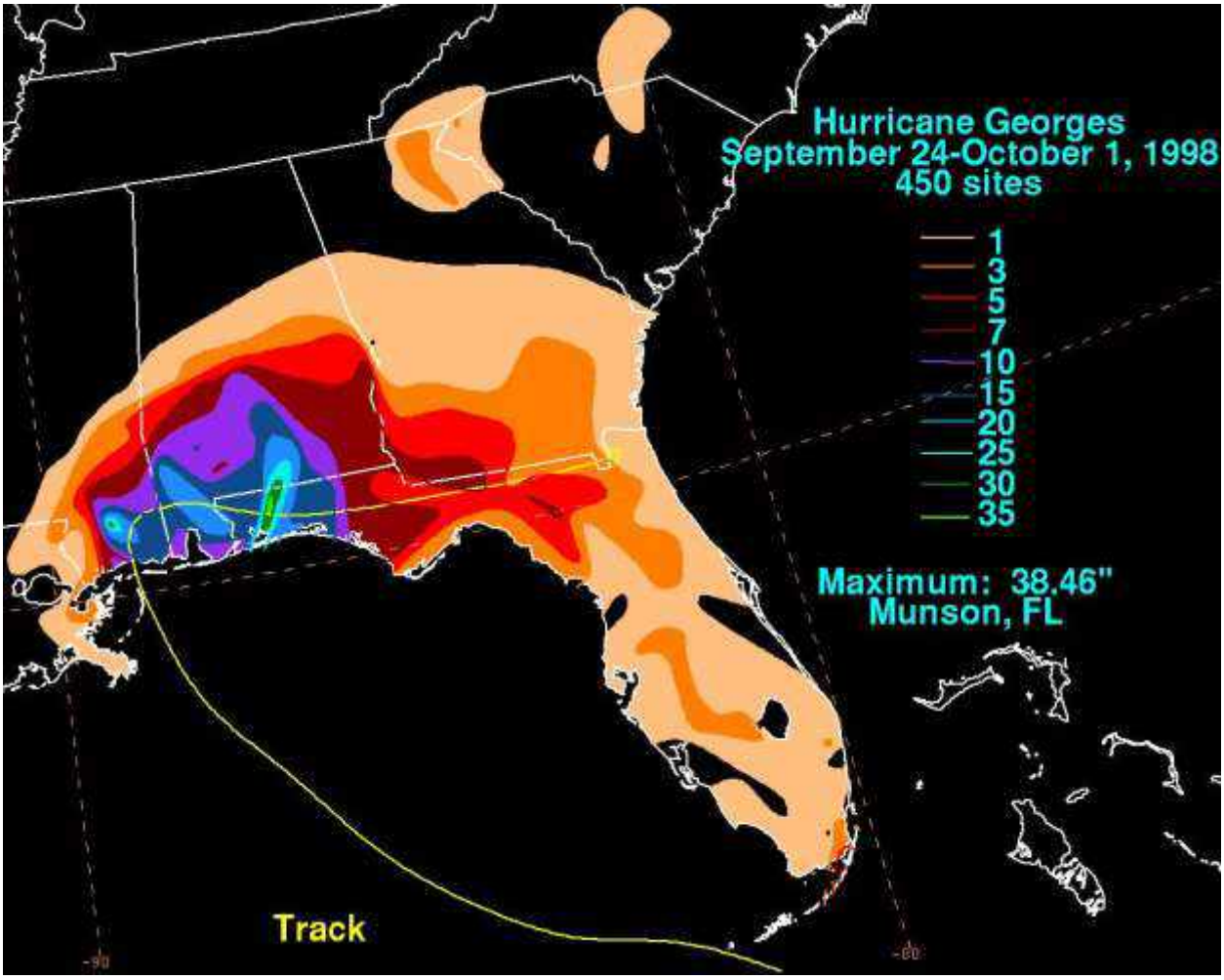
Map 5-2. Alabama Counties affected by Hurricane Opal



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).

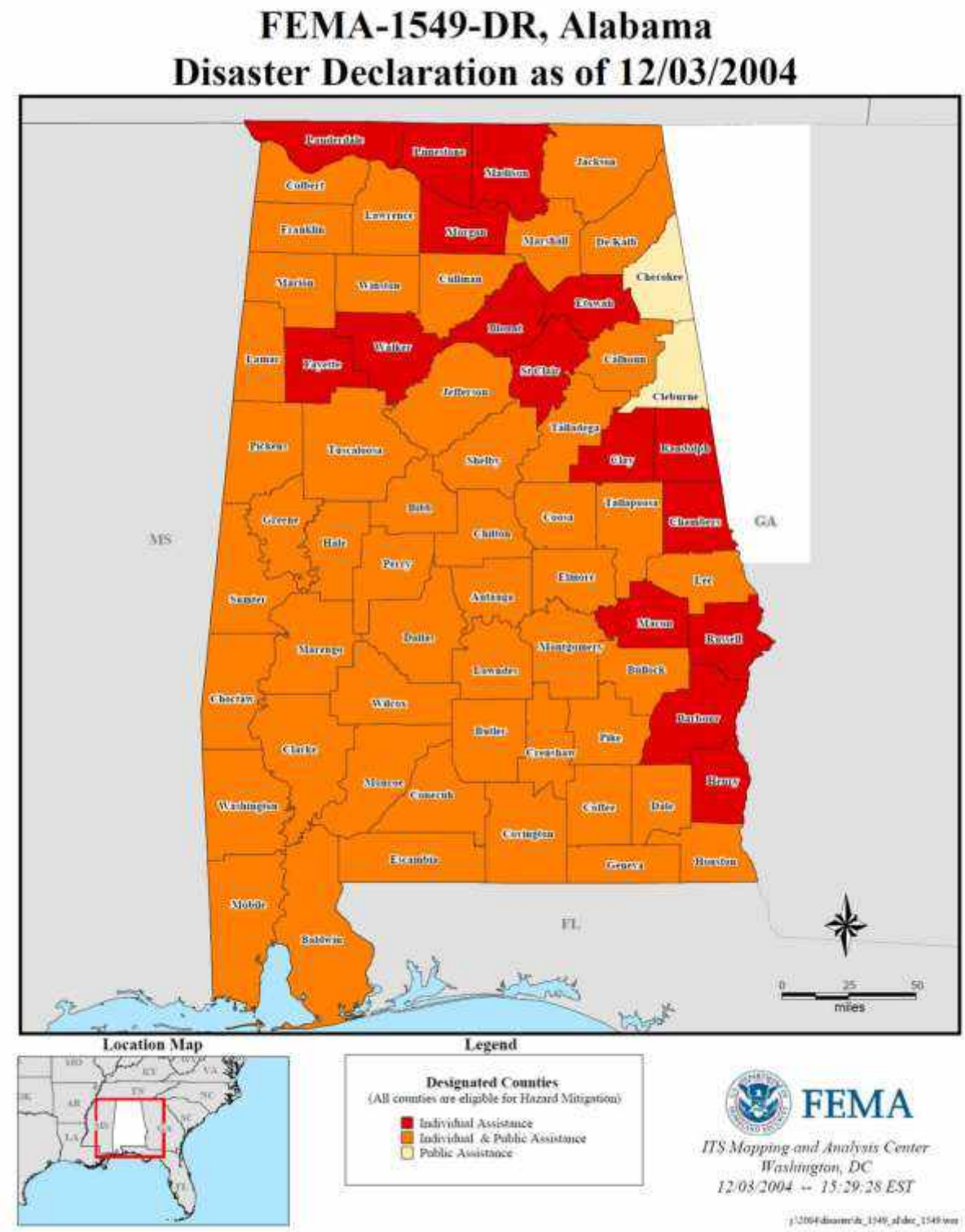
Figure 5-2. Hurricane Georges Rainfall



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.

Map 5-3. Hurricane Ivan Disaster Declaration Area

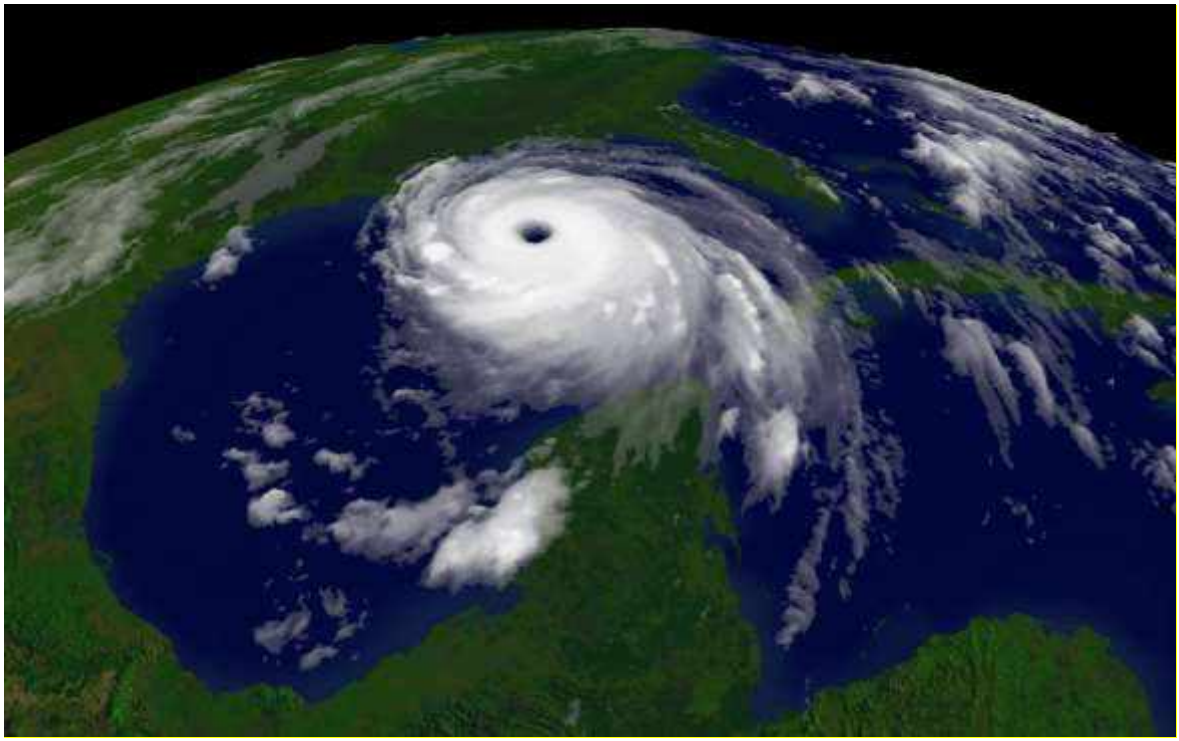


The hurricane season of 2005 produced a record number of named storms in the Atlantic and Gulf Coast regions. There were 27 named storms and several either threatened or impacted the Gulf Coast. Those with the greatest impact to Alabama include tropical storms Arlene and Cindy and hurricanes Dennis and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

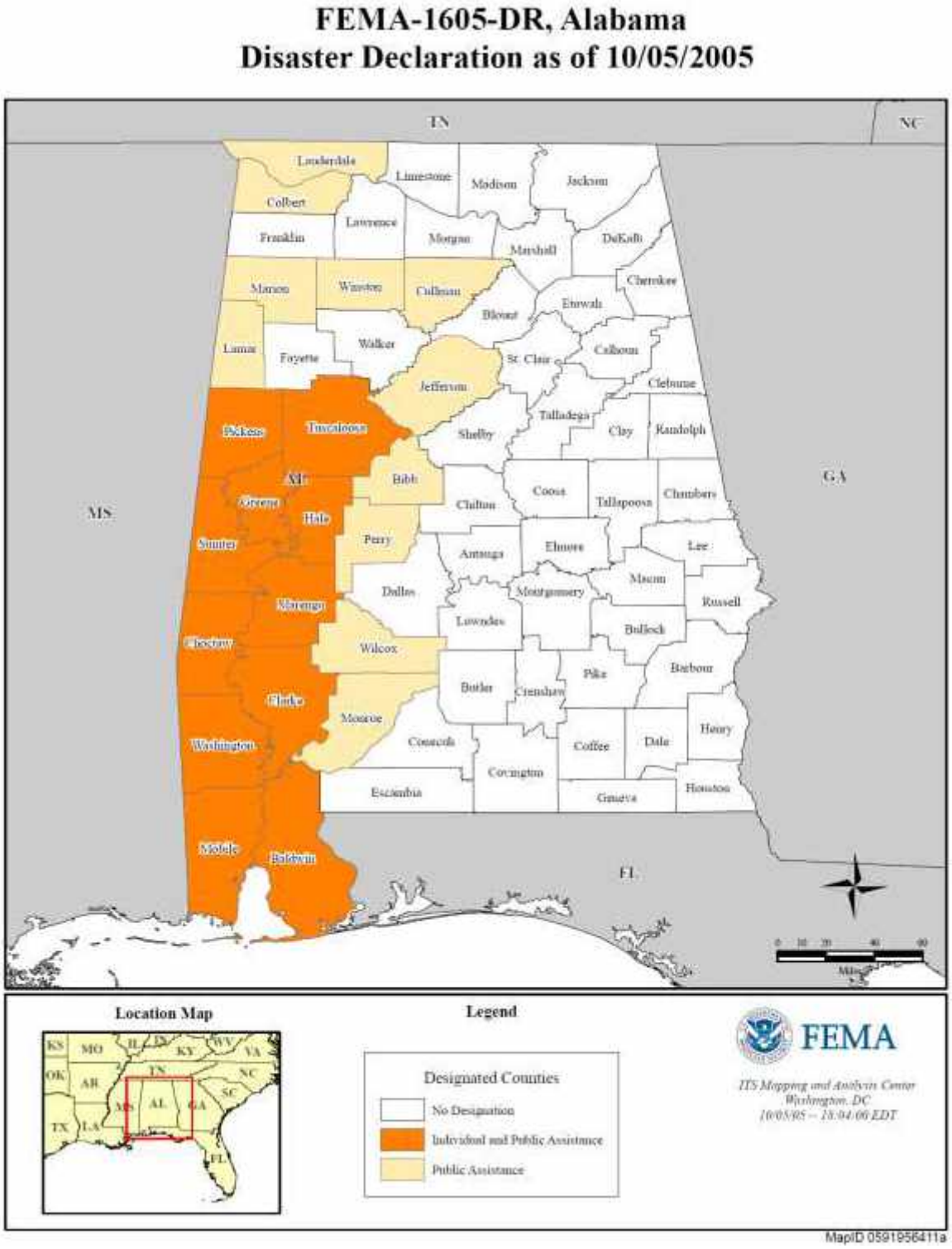
Hurricane Katrina, a Category 3 hurricane at landfall, made landfall in southeastern Louisiana. A storm surge between 12 and 16 feet struck Mobile Bay. Oil rigs collapsed and washed ashore across Alabama's Gulf Coast. Katrina is remembered for its massive size, death toll of 1300, and damage estimate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

Figure 5-3. Hurricane Katrina Approaching the Gulf Coast



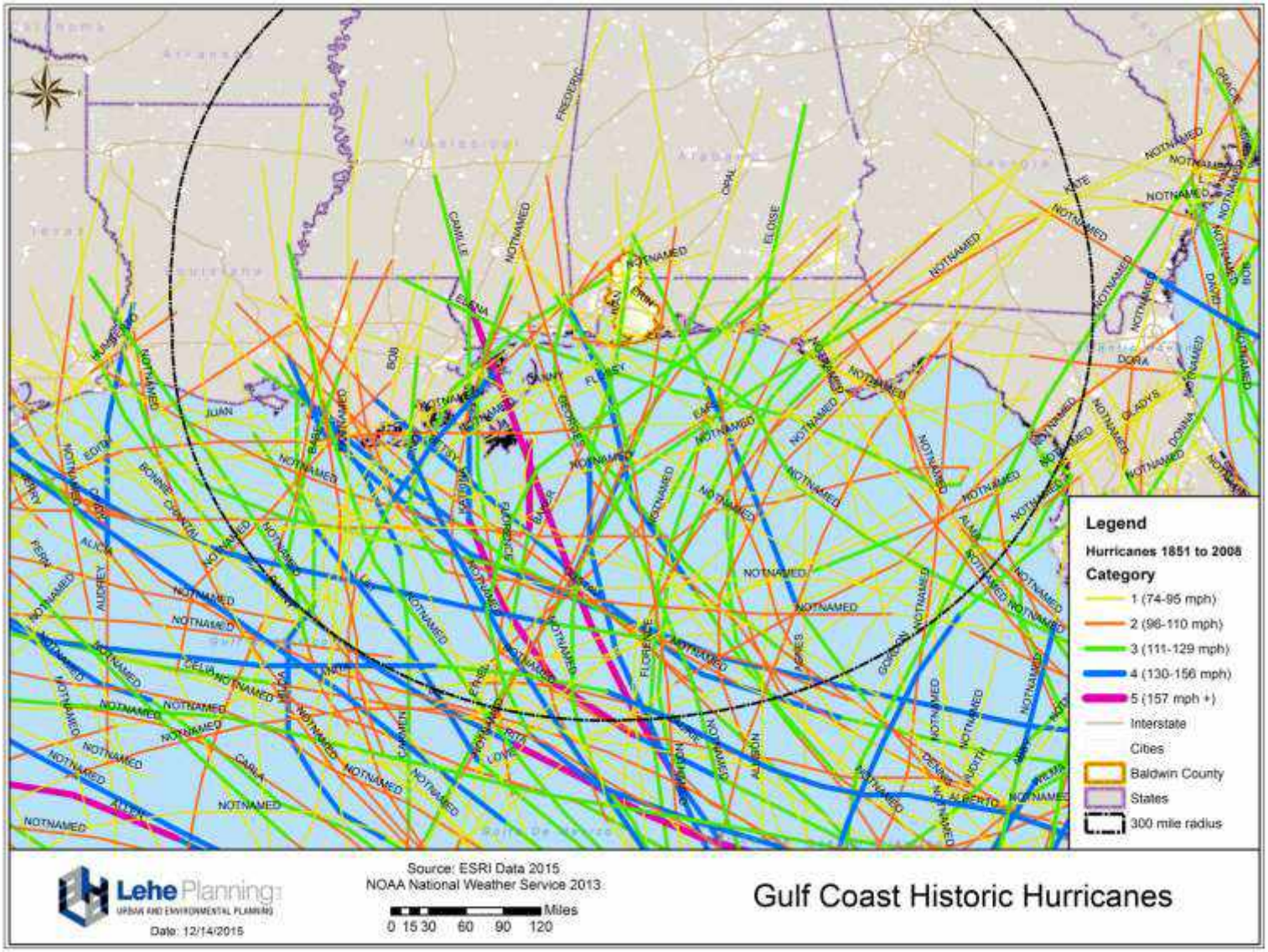
Source: National Oceanic and Atmospheric Administration

Map 5-4. Alabama County Disaster Designations for Hurricane Katrina



Map 5-5 below shows historic Gulf Coast hurricanes between 1851 and 2008. Map 5-6 illustrates hurricane paths impacting Baldwin County, from 1900-2015.

Map 5-5. Gulf Coast Historic Hurricanes 1851-2008



Map 5-6. Hurricane Paths, 1900-2015

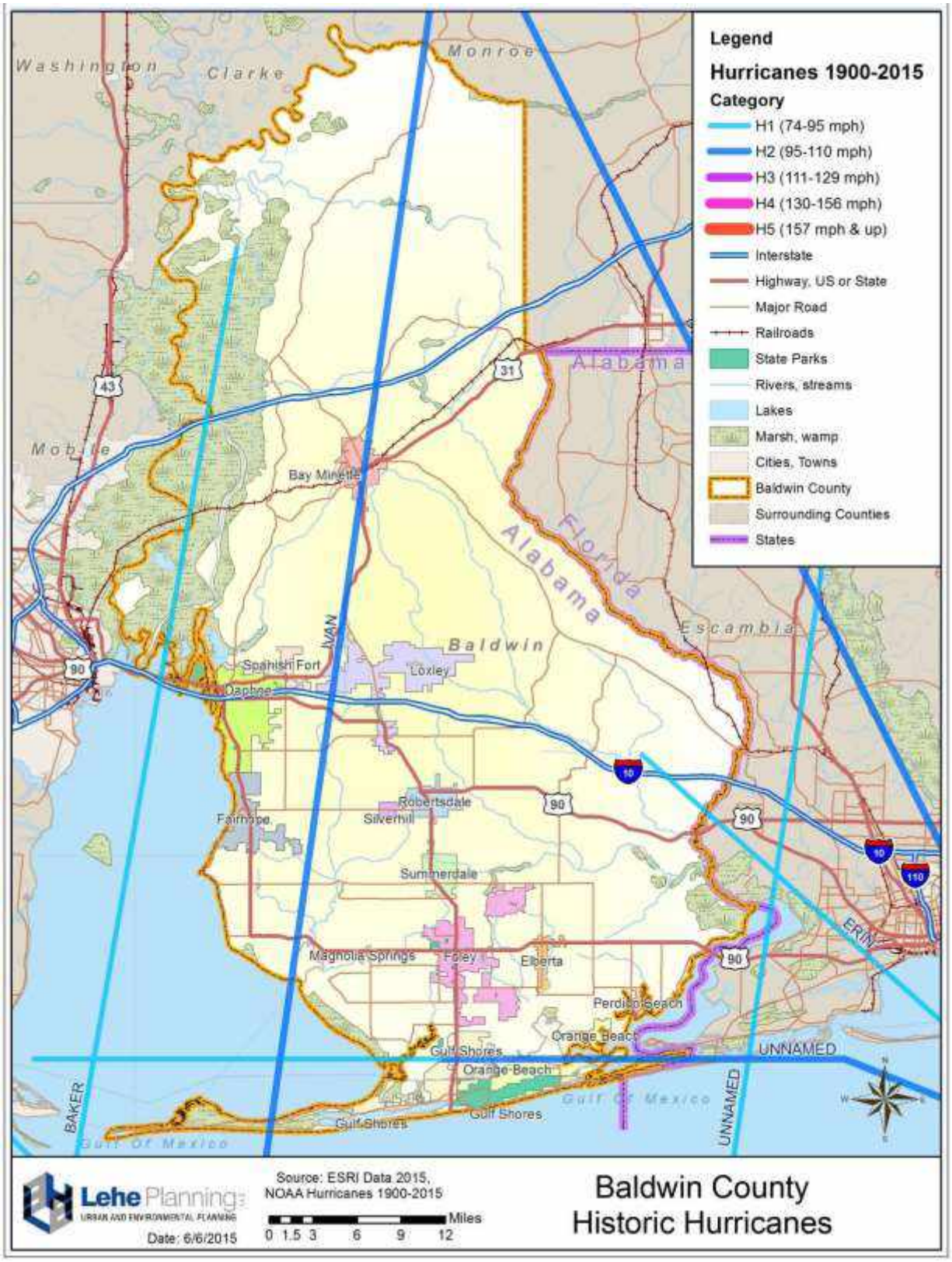


Table 5-5 provides a historical look of hurricanes impacting Baldwin County since 1893. Table 5-6 summarizes hurricane and tropical storms damage estimates over the last twenty years, as recorded by the National Climatic Data Center (NCDC).

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.
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 reached 15.45 inches.

DATE	CATEGORY	NAME	NOTES
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.
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.
9/01/2008	2	Gustav	Gustav moved erratically through the Greater Antilles into the Gulf of Mexico, eventually making landfall on the coast of Louisiana. It briefly became a category 4 hurricane on the Saffir-Simpson Hurricane Scale and caused many deaths and considerable damage in Haiti, Cuba, and Louisiana. In the United States, the Insurances Services Office reports that the hurricane caused an estimated $2.15 billion in damages to insured property, of which $2.045 billion occurred in Louisiana. Gustav is known to have produced 41 tornadoes – 21 in Mississippi, 11 in Louisiana, 6 in Florida, 2 in Arkansas, and 1 in Alabama.
9/13/2008	2	Ike	Ike, with its associated storm surge, caused extensive damage across parts of the northwestern Gulf Coast when it made landfall on September 13, 2008, along the north end of Galveston Island on the Texas coast at the upper end of Category 2 intensity.

DATE	CATEGORY	NAME	NOTES
11/10/2009	2	Ida	Ida was a late season hurricane that had a large impact on the east coast of Nicaragua and the adjacent islands. It was the first November hurricane in the Gulf of Mexico since Kate of 1985. It made landfall as a tropical storm near Dauphin Island, AL, and quickly dissipated over the Florida Panhandle by the next day.
8/28/2012	1	Isaac	Isaac spared Alabama the worst, damaging a few buildings and minor road flooding in low-lying areas of Baldwin County. Scattered blackouts occurred with the greatest impact to Dauphin Island (Mobile County) where about 2,400 residences were without electricity. Isaac made landfall in Louisiana as a Category 1.

Source: National Hurricane Center

Table 5-6. Baldwin County Hurricane/Tropical Storm Events, 1995-2014

Year	Event Type	Deaths	Injuries	Total Damages
1995	Hurricane Opal	*	*	*
1996	-	-	-	-
1997	Hurricane Danny	1	0	$63,000,000
1998	Hurricane Georges (2)	0	0	$82,005,000
1999	-	-	-	-
2000	Tropical Storm	0	0	$0
2001	Tropical Storm (3)	1	0	$41,000
2002	Tropical Storm (2)	0	0	$2,040,000
2002	Hurricane	0	0	$75,000
2003	-	-	-	-
2004	Tropical Storm (2)	0	0	$0
2004	Hurricane Ivan	0	0	$0
2005	Tropical Storm (2)	0	0	$1,500,000
2005	Hurricane Dennis (3)	0	0	$0
2006-2007	-	-	-	-
2008	Tropical Depression	0	0	$0
2008	Tropical Storm Gustav & Ike (2)	0	0	$1,000,000
2009	Tropical Storm Ida	0	0	$8,000,000
2010	Tropical Storm	0	0	$1,000
2012	Tropical Storm Isaac	0	0	$0
2014-2014	-	-	-	-
TOTAL	**25**	**2**	**0**	**$157,662,000**
Annual Average	**1.3**	**0.1**	**0**	**$7,883,100**

Source: National Climatic Data Center
*Data for Hurricane Opal not available

Probability of Future Hurricane Events

Baldwin County is highly susceptible to hurricanes. Based on historical data (Table 5-6), the county can expect more than two hurricanes or tropical storms every two years. Average annual damages are estimated to be $8 million. The HMPC ranked hurricanes as the most likely natural hazard to occur in Baldwin County (refer to Appendix D for results).

Climate changes have been theorized to affect future hurricane events in that the hurricane season has been expanded in recent years. The typical April through November hurricane season is lasting longer. According to Meteorologist Jeff Masters, this is likely due to warmer seawater and an increase of moisture in the atmosphere. Hurricanes most significant damage is cause by high winds and storm surges. While the effect of climate change on winds is debatable, there is a general consensus that sea levels are rising and water temperatures are increasing as a direct result of global warming.

5.4.2 Floods Profile

A massive downpour occurring as a result of storms on April 28-29, 2014 damaged more than 2,000 homes in Baldwin County and took one life. The storms dropped 20 to 26 inches of rain and damaged culverts, roads, and created sinkholes. One man died after the storms by driving around a barricade into a sinkhole. 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. 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 of Potential Floods

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 5-7 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 and Intensity of Potential Floods

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. 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 (e.g., parking lots, paved roadways). Topography and ground cover are additional contributing factors for floods. In areas with steep slopes and little to no vegetative ground cover, water runoff is greater.

A large amount of rainfall occurring over a short time period (and exacerbated by a flat topography) is evidenced by the widespread flooding brought on by the April 29-30, 2014 storms. According to the National Weather Service report the "widespread flooding produced sinkholes (some very large and deep), cut roads in half and necessitated human water rescues (one confirmed fatality). Parts of I-10 were closed. The Fish River at Silver Hill (Baldwin County Alabama) peaked at a record high level of 23.18 feet (previous historical record was 22.78 feet on 20 July 1997). Many folks throughout the area have compared this event to the extreme flooding impacts caused by Hurricane Danny." In 1997, Hurricane Danny dumped an equivalent amount of rainfall on Baldwin County. Flooding in such an event, with rainfall up to 26 inches over a 24 hour period, has a 1 in 1,000 year probability of occurrence per NOAA Atlas 14 Point Precipitation Frequency Estimates. Flooding extended far beyond the 500-year flood zone limits, causing significant damage to buildings, roads, and culverts, at depths up to 10 inches across Baldwin County.

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 5-7. Baldwin County Flood Zones

Previous Occurrences of Floods

The National Climatic Data Center (NCDC) indicates frequent flooding since 1995. There have been 78 floods reported for Baldwin County—3.9 per year—as summarized in Table 5-7. According to NCDC estimates, damage has averaged $1.5 million per year and $380,000 per event.

Table 5-7. Baldwin County Flood Events, 1995-2014

Year	Floods	Deaths	Injuries	Total Damages
1995	-	-	-	-
1996	2	0	0	$202,000
1997	1	0	0	$0
1998	8	0	0	$1,095,000
1999	1	0	0	$5,000
2000	-	-	-	-
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
2010	2	0	0	$0
2011	-	-	-	-
2012	2	0	0	$0
2013	7	0	0	$0
2014	14	0	0	$27,140,000
TOTAL	**78**	**0**	**0**	**$29,442,000**
Annual Average	**3.9**	**0**	**0**	**$1,472,100**

Source: National Climatic Data Center

Probability of Future Flood Events

Historical data (Table 5-7) indicates Baldwin County averages 3.9 floods per year. Because floods are closely associated with hurricanes, expectations for hurricane season should be closely monitored to create expectations for severe flooding. With respect to climate change, an increase in temperature and moisture in the air can lead to heavier precipitation events. However, the causes of flooding are varied, including improper land uses on floodplains, surface paving, quality of flood forecasting, settlement patterns, and warning systems. The HMPC ranked floods as the third most likely natural hazard to affect Baldwin County (refer to Appendix D for results).

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 (refer to Appendix D for results). NOAA records affirm this perception.

Location of Potential Severe Storms

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 and Intensity of Potential Severe Storms

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.

Previous Occurrences of Severe Storms

The Storm Events Database of the National Climatic Data Center (NCDC) indicates frequent annual severe storm occurrences since 1995 (Table 5-8). The database shows 293 severe storm events for Baldwin County—roughly 15 per year. The database also shows $2.5 million in damages since 1995, averaging about 125,000 per year.

Table 5-8. Baldwin County Severe Storm Events, 1995-2014

Year	Type	Number	Deaths	Injuries	Total Damages
1995	Hail	12	0	0	$1,000
	Lightning	0	0	0	$0
	Thunderstorm/High Wind	19	0	0	$97,500
1996	Hail	7	0	0	$0
	Lightning	2	0	0	$25,000
	Thunderstorm/High Wind	9	0	1	$102,000
1997	Hail	15	0	0	$2,000
	Lightning	2	0	0	$93,000
	Thunderstorm/High Wind	7	0	1	$26,500
1998	Hail	10	0	0	$0

Year	Type	Number	Deaths	Injuries	Total Damages
	Lightning	3	0	0	$180,000
	Thunderstorm/High Wind	10	0	0	$199,000
1999	Hail	7	0	0	$0
	Lightning	7	0	0	$21,000
	Thunderstorm/High Wind	9	0	1	$178,000
2000	Hail	5	0	0	$0
	Lightning	1	0	0	$5,000
	Thunderstorm/High Wind	11	0	0	$106,000
2001	Hail	1	0	0	$0
	Lightning	3	0	0	$48,000
	Thunderstorm/High Wind	5	0	0	$118,000
2002	Hail	5	0	0	$0
	Lightning	1	0	0	$30,000
	Thunderstorm/High Wind	8	0	0	$106,000
2003	Hail	18	0	0	$5,000
	Thunderstorm/High Wind	8	0	0	$45,000
2004	Thunderstorm/High Wind	3	0	0	$20,000
2005	Hail	8	0	0	$4,000
	Lightning	2	2	0	$0
	Thunderstorm/High Wind	4	0	0	$50,000
2006	Hail	13	0	0	$0
	Lightning	5	1	2	$145,000
	Thunderstorm/High Wind	8	0	0	$94,000
2007	Hail	3	0	0	$8,000
	Lightning	3	0	1	$310,000
	Thunderstorm/High Wind	7	0	0	$55,000
2008	Hail	3	0	0	$0
	Thunderstorm/High Wind	5	0	0	$140,000
2009	Hail	2	0	0	$0
	Thunderstorm/High Wind	7	0	0	$165,000
2010	Lightning	2	1	2	$0
	Thunderstorm/High Wind	2	0	0	$22,000
2011	Hail	4	0	0	$0
	Lightning	1	0	1	$0
	Thunderstorm/High Wind	5	0	10	$23,000
2012	Hail	2	0	0	$0
	Lightning	1	0	1	$0

Year	Type	Number	Deaths	Injuries	Total Damages
	Thunderstorm/High Wind	8	0	0	$51,000
2013	Hail	1	0	0	$0
	Thunderstorm/High Wind	5	0	0	$25,500
2014	Thunderstorm/High Wind	4	0	0	$8,000
TOTAL		**293**	**4**	**20**	**$2,508,500**
Annual Average		**14.7**	**0.2**	**1.0**	**$125,425**

Source: National Climatic Data Center

Probability of Future Severe Storms

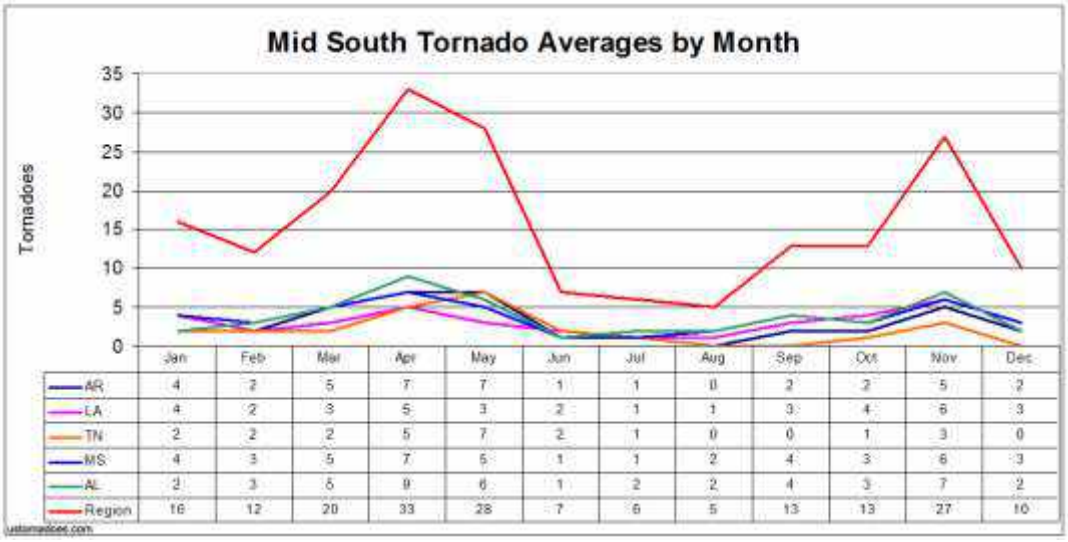
Severe storms will certainly strike Baldwin County every year and in every jurisdiction. Past trends average 15 storms per year. High winds and hail infrequently accompany severe storms in Baldwin County, but can cause significant property damage.

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. Tornadoes can occur in thunderstorms that develop in warm, moist air masses in advance of eastward-moving cold fronts. Tornadoes occasionally accompany tropical storms and hurricanes that move over land.

Tornadoes are accompanied by recorded winds in excess of 300 miles per hour. They are highly localized events, most of which last for a short period of time and have a limited destruction path. In Alabama, the peak tornado season extends from March through early June, with April and May being peak months for tornado activity. Additionally, Alabama experiences a secondary tornado season from September through November. Chart 5-2 depicts the monthly tornado frequency for the mid-south region.

Chart 5-2. Monthly Tornado Frequency, Mid-South Region



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AR	4	2	5	7	7	1	1	0	2	2	5	2
LA	4	2	3	5	3	2	1	1	3	4	6	3
TN	2	2	2	5	7	2	1	0	0	1	3	0
MS	4	3	5	7	5	1	1	2	4	3	6	3
AL	2	3	5	9	6	1	2	2	4	3	7	2
Region	16	12	20	33	28	7	6	5	13	13	27	10

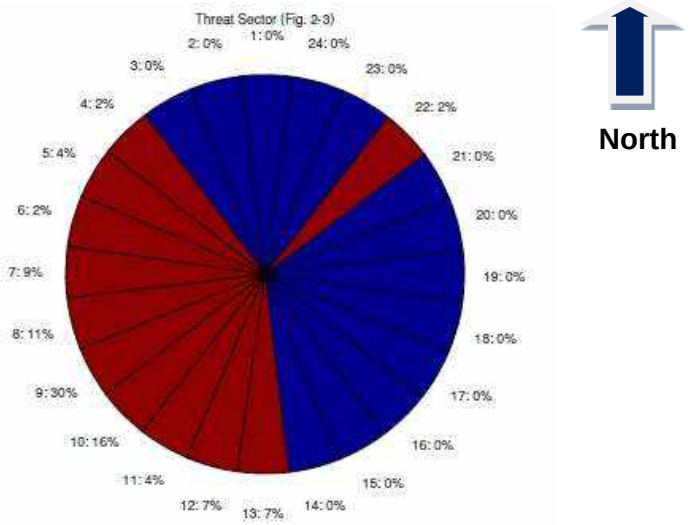
Source: ustornadoes.com, 2013

Location of Potential Tornadoes

Tornadoes are generally not location-specific hazards. Therefore, all Baldwin County locations and jurisdictions bear an equal risk. Map 5-8 shows touchdown locations and paths of tornadoes since 1950. The map affirms tornadoes can occur anywhere.

The direction of tornadoes is shown in Chart 5-3 “Tornado Threat Sectors”. The threat sectors are color coded. Red sectors have had tornadic activity over the 1950-2006 time periods and blue sectors have had zero activity. The chart indicates that most tornadoes travel from a southwesterly direction.

Chart 5-3. Tornado Threat Sectors



Map 5-8. Baldwin County Tornado Locations, 1950-2014

Extent and Intensity of Potential Tornadoes

According to the Hazard Mitigation Planning Committee (HMPC), tornadoes pose a significant threat: hazard exposure, risk severity, and the probability of future events are fourth highest for tornadoes among all identified hazards (refer to Appendix D for results).

Tornadoes are now measured using the enhanced Fujita Tornado Scale by examining the damage caused by the tornado after it passes over manmade structures and vegetation. The new scale was put into use in February 2007. Table 5-9 compares the estimated winds in the original F-scale and the operational EF-scale that is currently in use by the National Weather Service. Like the original scale there are six categories from zero to five that represent damage in increasing degrees.

Table 5-9. Comparison of F-Scale to EF-Scale

EF-Scale	Old F-Scale	Typical Damage
EF-0 (65-85 mph)	F0 (65-73 mph)	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF-1 (86-110 mph)	F1 (73-112 mph)	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF-2 (111-135 mph)	F2 (113-157 mph)	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3 (136-165 mph)	F3 (158-206 mph)	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF-4 (166-200 mph)	F4 (207-260 mph)	Devastating damage. Whole frame houses Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.

EF-Scale	Old F-Scale	Typical Damage
EF-5 (>200 mph)	F5 (261-318 mph)	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.
EF No rating	F6-F12 (319 mph to speed of sound)	Inconceivable damage. Should a tornado with the maximum wind speed in excess of EF-5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water

Previous Occurrences of Tornadoes

On May 2, 2014 an F-2 tornado touched down in Baldwin County, injuring five people and damaging several homes. The tornado hit Summerdale at approximately 11:30 am, destroying a five to six block radius. NOAA National Climatic Data Center (Table 5-10) records indicate that 35 tornadoes have affected Baldwin County since 1995, averaging over 1.75 annually. These tornadoes caused 4 injuries and property damages of $2.1 million. The costliest tornado during this time period occurred in 2004 when an F2 tornado touched down west of Summerdale along County Road 32. Damages were estimated at $648,000.

Table 5-10. Baldwin County Tornado Events, 1995-2014

Year	Number	Deaths	Injuries	Total Damages
1995	1	0	0	$0
1996	0	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
2003	0	0	0	$0
2004	6	0	4	$648,000
2005	1	0	0	$4,000
2006	2	0	0	$150,000

Year	Number	Deaths	Injuries	Total Damages
2007	0	0	0	$0
2008	1	0	0	$20,000
2009	0	0	0	$0
2010	1	0	0	$45,000
2011	2	0	0	$200,000
2012	0	0	0	$0
2013	0	0	0	$0
2014	0	0	0	$0
TOTAL	**35**	**0**	**4**	**$2,090,000**
Annual Average	**1.75**	**0**	**0.2**	**$104,500**

Source: National Climatic Data Center

Probability of Future Tornadoes

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 1.8 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 1995, annual property damage due to tornadoes has averaged over $104,000.

According to climatologists, the effect of climate change on tornadic activity is inconclusive. Jeff Trapp, a professor of atmospheric science at Purdue University indicates that, "while it's unclear how the intensity or frequency of tornadoes will increase, there may be more days featuring conditions ripe for twisters. We would see an increase in the number of days that could be favorable for severe thunderstorm and tornado formation. The tornado season, which varies by region, could be expanded."

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 of Potential Wildfires

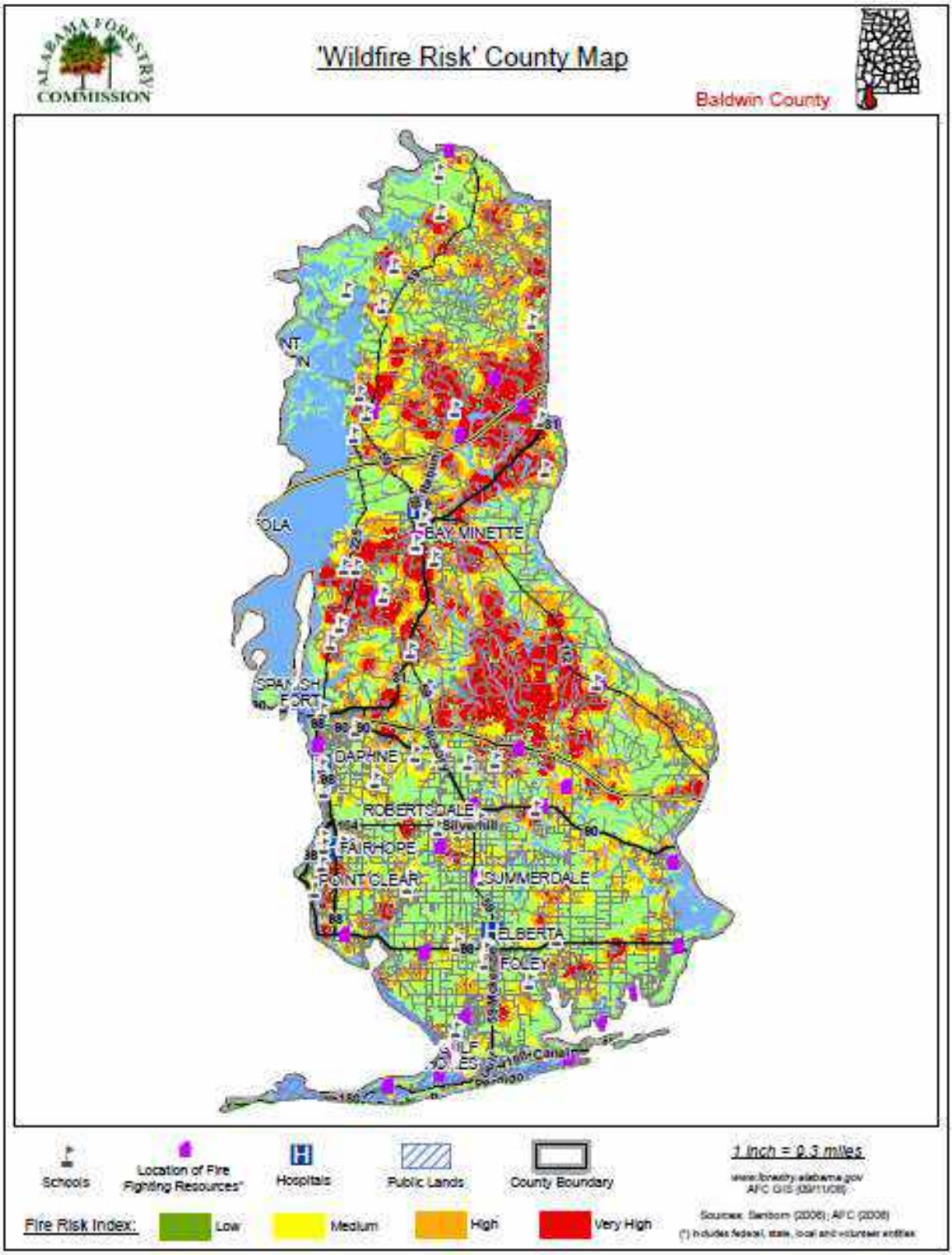
Unincorporated, rural areas of Baldwin County are most susceptible to wildfires, but, due to sparse development, the risks to life and property are lower in these areas. The risks are greatest for sprawl areas where human development coexists with conditions amenable to wildfires. Map 5-9, from the Alabama Forestry Commission, shows risk levels for wildfires by area. The very high risk areas are located predominantly north of Robertsdale, in and around Bay Minette. The Alabama Forestry Commission maps have not changed since the last plan update, due to data unavailability.

Extent and Intensity of Potential Wildfires

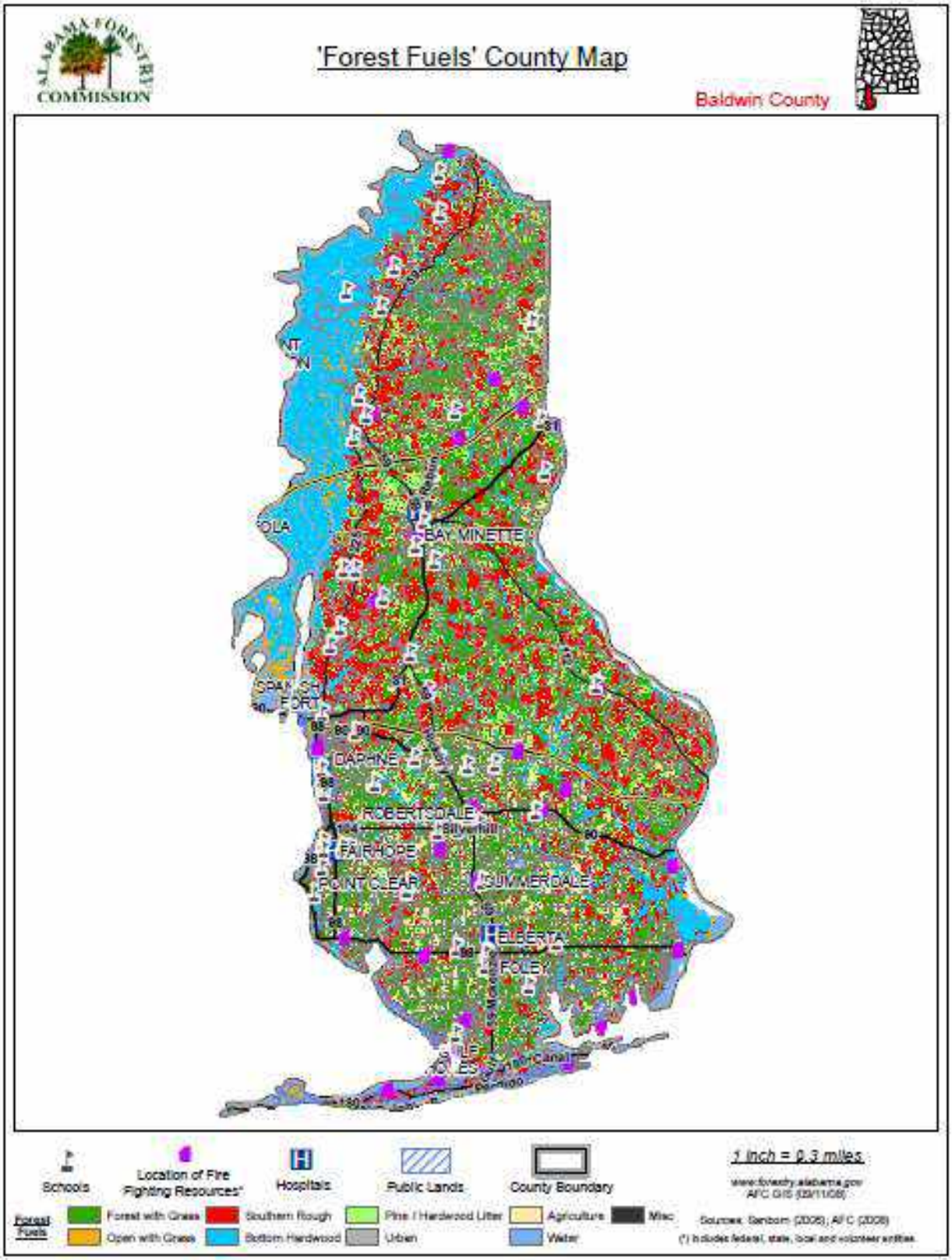
Baldwin County's extensive forest coverage creates an abundant and widespread fuel source for wildfires. Further, the County's weather conditions, drought and lightning from severe storms, can increase risks. The wildland-urban interface, where urban development and humans interact with forested wildlands 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. Map 5-10 "Baldwin County Forest Fuels" (Alabama Forestry Commission) shows the extent of forest fuels and jurisdictions in proximity to those forest fuels. The map indicates that Baldwin County is covered with southern rough, pinewood/hardwood, forest with grass, and bottom hardwood.

According to the Wildfire Risk Assessment Portal (Southern Group of State Foresters), the majority of Baldwin County has a moderate fire intensity risk. This means that flames up to 8 feet in length are possible and trained firefighters will find it difficult to suppress the fires without support from aircraft or engines. 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



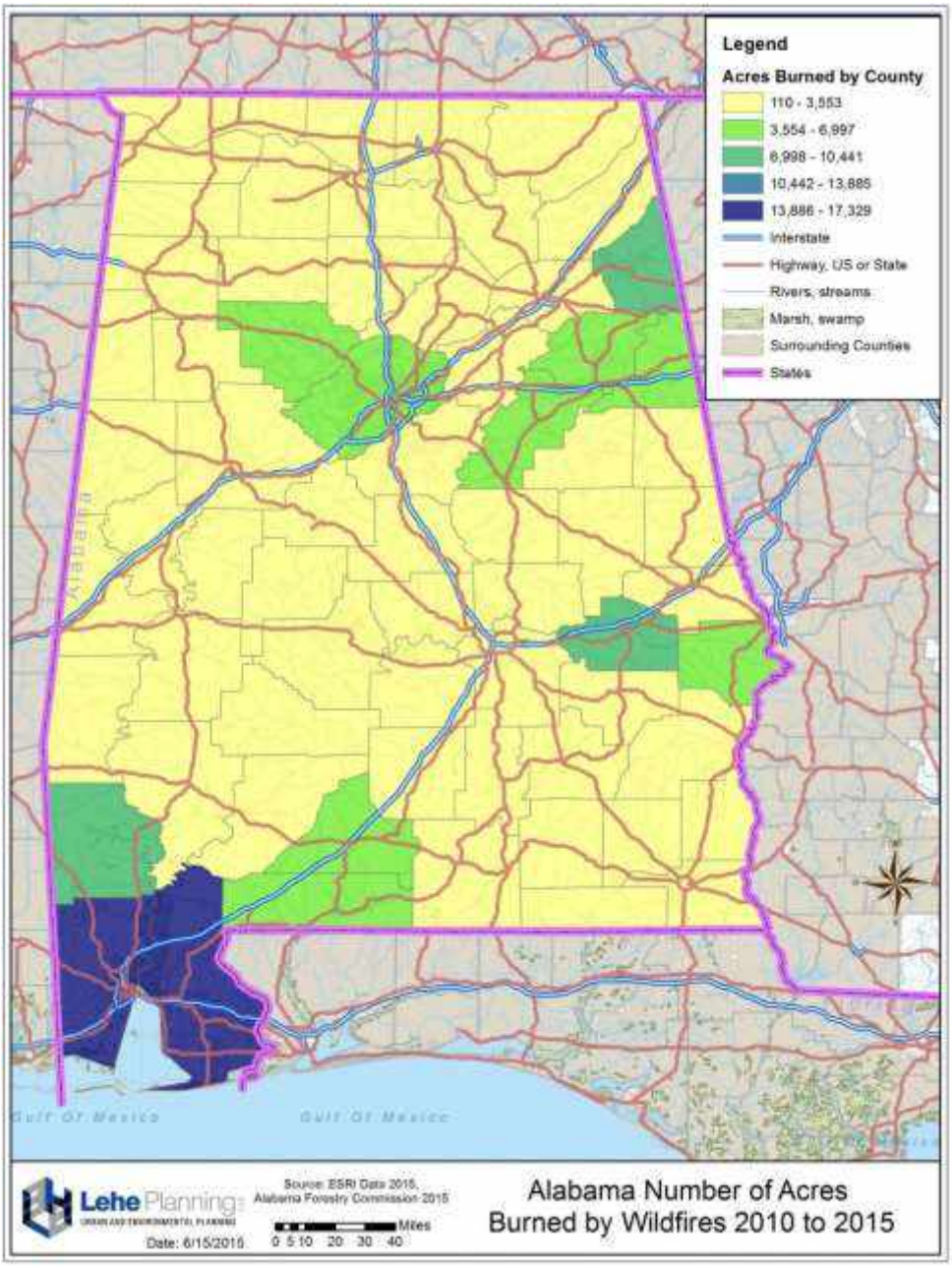
Map 5-10. Baldwin County Forest Fuels



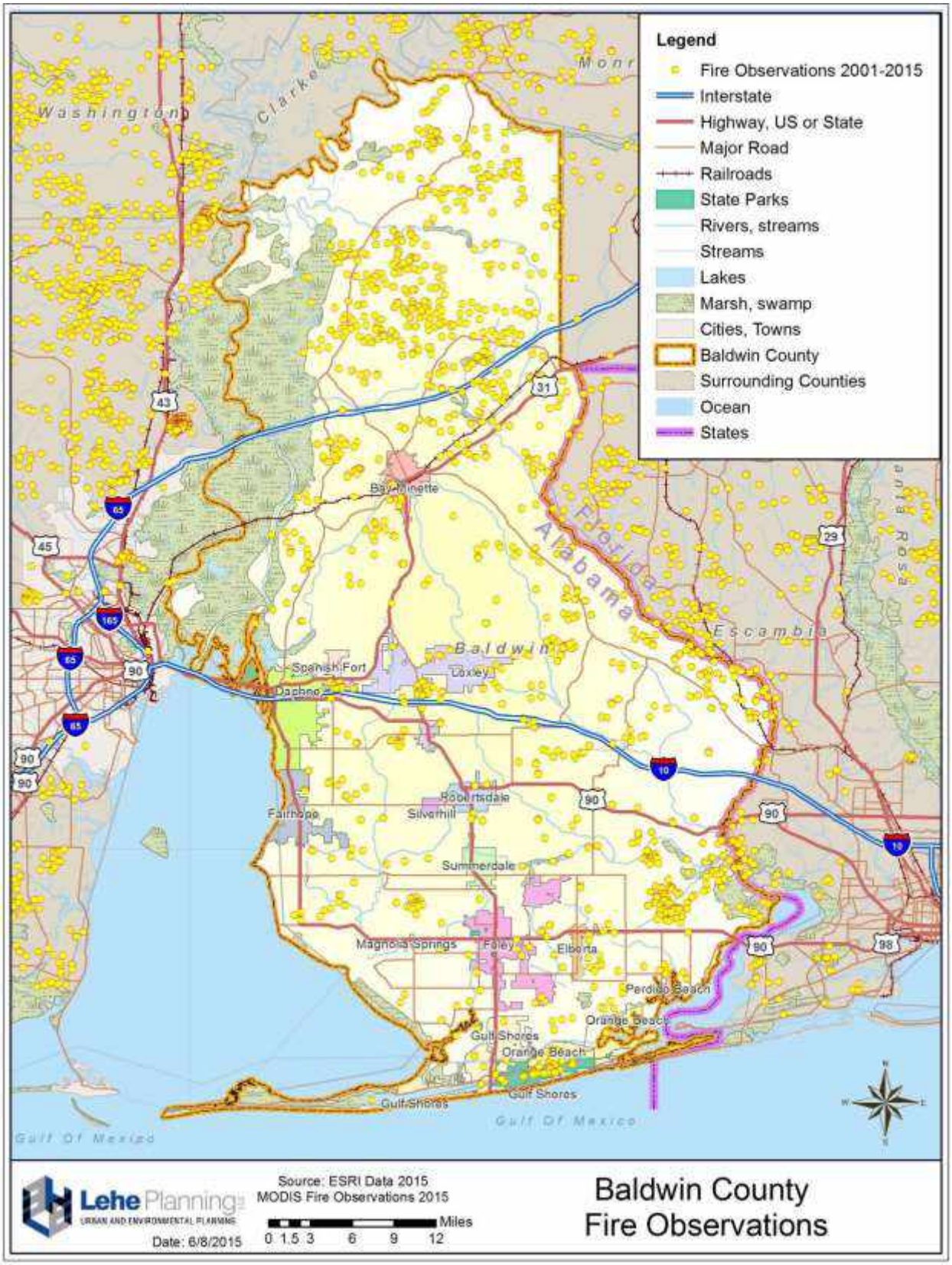
Previous Occurrences of Wildfires

Among Alabama counties, Baldwin County is annually ranked in the top two in number of acres lost to wildfires, from 2010 to 2015 (Map 5-11). Over this 5-year period, Baldwin County incurred 810 wildfires, burning over 17,000 acres. From January 1, 2015 to date (May 24, 2015), Baldwin County has experienced 70 wildfires burning a total of 1,475 acres. Additionally, Map 5-12 "Baldwin County Fire Observations, 2001 – 2015" indicates wildfires can occur anywhere; however they are more concentrated in rural, unincorporated areas of the county.

Map 5-11. Alabama Total Acres Burned 1999-2014



Map 5-12. Baldwin County Fire Observation, 2001-2015



Probability of Future Wildfire Events

The average number of fires over the last five years (2010-2015) is 162. The average number of acres burned annually over the last twenty years is 3,466, with an average of 21.4 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.

5.4.6 Droughts/Heat Waves Profile

Drought occurs when there is a deficiency of precipitation over an extended period of time. Climatic factors, such as high temperature, high winds, and low relative humidity can contribute to the severity of a drought. There are two primary types of drought: meteorological and hydrological droughts. These events can result in agricultural and socioeconomic droughts.

Meteorological droughts are defined as the degree of dryness as compared to the normal precipitation for the area over the duration of the dry season. This type of drought is specific to a given region since atmospheric conditions and precipitation vary from one region to the next.

Hydrological droughts are associated with the effects of precipitation deficiencies on surface or groundwater supplies. Hydrological droughts do not occur as often as meteorological or agricultural droughts. It takes longer for precipitation deficiencies to show up in soil moisture, stream flow, groundwater levels, and reservoir levels. Hydrological droughts have an immediate impact on crop production, but reservoirs may not be affected for several months. Climate, changes in land use, land degradation, and the construction of dams can have adverse effects on the hydrological system, especially in drought conditions.

Agricultural droughts occur when the moisture in the soil no longer meets the needs of the crop.

Socioeconomic droughts occur when physical water shortage begins to affect people and their quality of life.

The National Weather Service uses two indexes to categorize drought. The most accurate index of short-term drought is the Crop Moisture Index (CMI). This index is effective in determining short-term dryness or wetness affecting agriculture. The most accurate index of long-term drought is the Palmer Index (PI). It has become the semi-official index of drought.

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 of Potential Droughts/Heat Waves

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 and Intensity of Potential Droughts/Heat Waves

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.

Previous Occurrences of Droughts/Heat Waves

According to National Climatic Data Center (NCDC), no droughts were recorded in Baldwin County between 1995 and 2014. 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." It should be noted that this 2007 drought record does not show up in the NCDC database.

Table 5-11. Baldwin County Drought/Extreme Heat Events, 1995-2014

Year	Type	Number	Deaths	Injuries	Total Damages
1995-1999	-	0	0	0	$0
2000	Heat	2	1	0	$0
2001-2006	-	0	0	0	$0
2007	Heat	1	0	1	$0
2008-2014	-	0	0	0	$0
Total		**3**	**1**	**1**	**$0**
Annual Average		**0.15**	**0.05**	**0.05**	**$0**

Source: National Climatic Data Center

Probability of Future Droughts/Heat Waves

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. According to the National Climatic Data Center, "scientists know that atmospheric moisture plays an important role in heat waves. They tend to occur more frequently in dry conditions with low humidity, but heat waves in high humidity can take their toll on the population, livestock, and wildlife".

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. Table 5-12 portrays winter weather observations from the Southeast Regional Climate Center, based on data for the City of Robertsdale. Snowfall accumulation is low and winter temperatures are mild.

Table 5-12. Winter Weather Observations, Baldwin County

Category	Observation
Average Winter Temperature	52.4°F
Average Winter Minimum Temperature	40.9°F
Lowest Temperature (January 30, 1957)	3°F
Average Season Snowfall	0.1 in
Largest Snowfall (1973)	3.0 in

Source: SE Regional Climate Center, 2012

Location of Potential Winter Storms/Freezes

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 and Intensity of Potential Winter Storms/Freezes

Typically, winter storms in the Southeastern U.S. include ice storms, crop-killing freezes, and occasional snow. In Baldwin County, winter storms are infrequent and relatively mild when they occur, because the County is located so far to the south. 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. No deaths or injuries have been reported due to winter weather events in the past 20 years (according to the NCDC) and the monetary damages are minimal.

The average winter temperature is 52.4 degrees Fahrenheit, with a minimum of 40.9 degrees Fahrenheit. However, in the event a winter storm or freeze takes place, the risk is commensurately greater, because residents and authorities are not equipped to handle the unfamiliar conditions. The largest snowfall for Baldwin County occurred in 1973 at 3.0 inches. Heavy snow accumulations or extremely icy conditions can cause power interruptions as utility poles and lines are downed by falling trees and limbs.

Winter storms are typically accompanied by strong winds, which can create blinding driving conditions and dangerous wind chills. Because the County is not well-equipped to prepare for icy roadways, motorists can become stranded, emergency services disrupted, and hazardous driving conditions can arise. The most recent ice

storm on January 28, 2014, resulted in major road closures, traffic disruptions, and multiple accidents.

Other impacts of extreme cold temperatures can include risk of hypothermia and frostbite to individuals. Additionally, below freezing temperatures can cause pipes to freeze and burst and kill crops and vegetation.

Previous Occurrences of Winter Storms/Freezes

Baldwin County occasionally experiences winter storms and extreme colds. The National Climatic Data Center (NCDC) reports 8 winter storm events and 2 ice storm events. Table 5-13 summarizes winter storm and extreme cold events and damages associated with those.

Table 5-13. Baldwin County Winter Storm Damages, 1995-2014

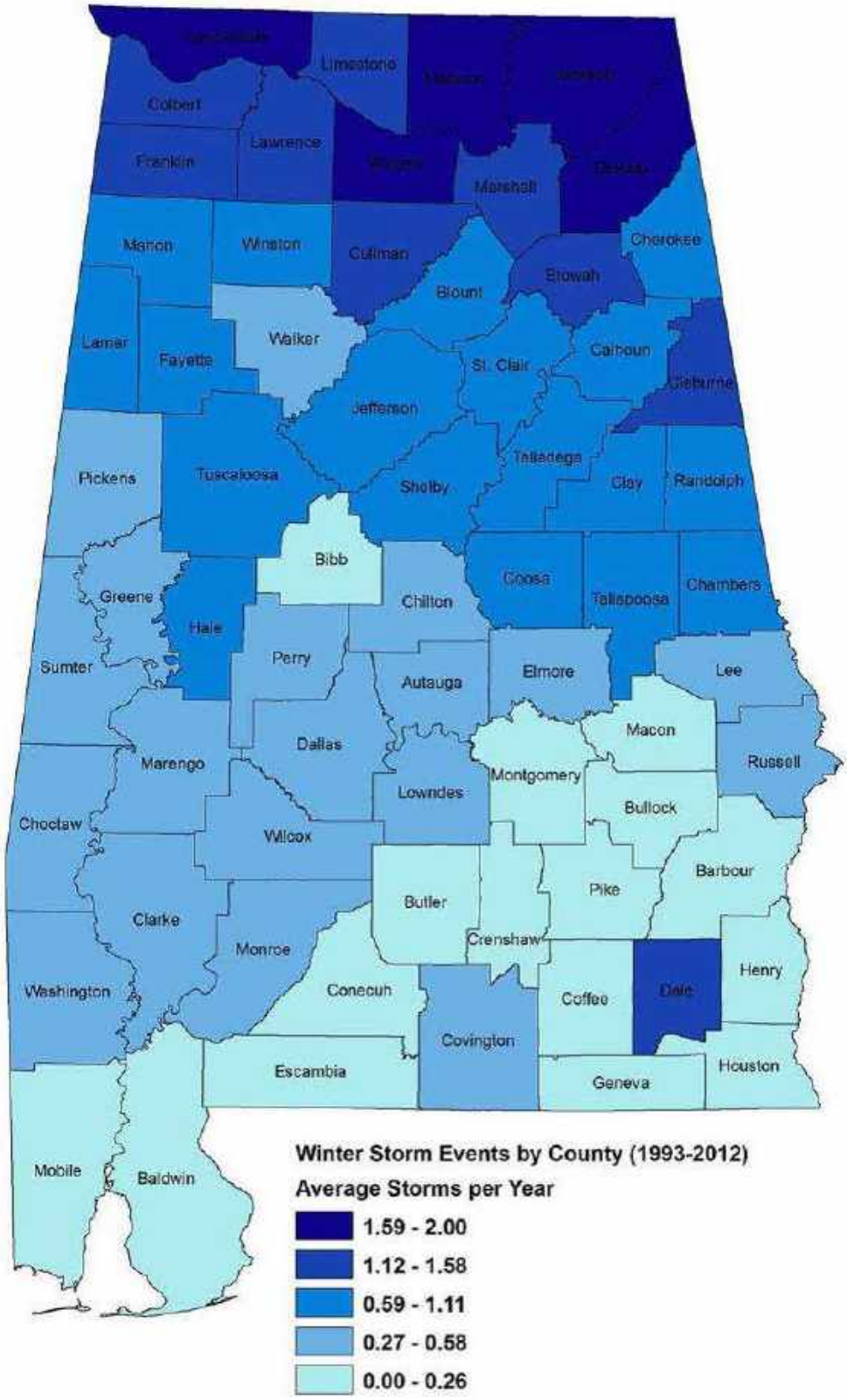
Year	Type	Number	Deaths	Injuries	Total Damages
1995	-	0	0	0	$0
1996	Winter Weather	1	0	0	$10,000
2002	Winter Storm	1	0	0	$0
2003-2009	-	0	0	0	$0
2010	Winter Storm	4	0	0	$0
2011-2013	-	0	0	0	$0
2014	Winter Storm	2	0	0	$0
2014	Ice Storm	2			
Total		**10**	**0**	**0**	**$10,000**
Annual Average		**0.5**	**0**	**0**	**$500**

Source: National Climatic Data Center

Probability of Future Winter Storms/Freezes

As indicated in the committee's hazard identification exercise, Baldwin County is not at significant risk of winter storms. Map 5-13 shows that Baldwin County has experienced fewer winter storms than most Alabama counties, about 2.5 every 10 years. The HMPC ranked winter storms/freezes as having some likelihood of occurring and may have moderate impacts (refer to Appendix D for results).

Map 5-13. Alabama Winter Storm Interval, 1993-2012



Source: State of Alabama Hazard Mitigation Plan, 2013

5.4.8 Earthquakes Profile

An earthquake is a sudden slip on a fault and the resulting ground shaking and radiated seismic energy caused by the slip. The hazards associated with earthquakes include anything that can affect the lives of humans including surface faulting, ground shaking, landslides, liquefaction, tectonic deformation, tsunamis, and seiches. Earthquake risk is defined as the probability of damage and loss that would result if an earthquake caused by a particular fault were to occur.

Losses depend on several factors including the nature of building construction, population density, topography and soil conditions, and distance from the epicenter. Interestingly, an earthquake's magnitude can be a poor indicator of hazard impact because the duration of ground shaking, and resulting increased damages, is not factored into the magnitude concept. While collapse of structures can be a great loss, collapse is caused mainly by large magnitude earthquakes, and earthquakes of this size are rare. For any given earthquake, few structures will actually collapse, but most damage will be associated with contents and nonstructural components. Structures built with more flexible materials, such as steel framing, are preferred. Wood frame construction, which constitutes a high percentage of homes in the United States, also tends to flex rather than crack or crumble, but is more susceptible to fire.

Building codes have historically been utilized to address construction standards to mitigate damages for earthquakes and other hazards. However, older structures, non-compliance, and incomplete knowledge of needed measures remain a problem. In order to reduce losses to lives and property, wider adoption of improved construction methods for both residential and important critical facilities such as hospitals, schools, dams, power, water, and sewer utilities is needed.

Location of Potential Earthquakes

When earthquakes strike a region, it is impossible to predict which area will be affected the most at a sub-county level. The following maps (Map 5-14, 5-15, & 5-16), generated from 2014 GIS data supplied by the Geological Survey of Alabama (GSA), show earthquake locations, locational variations in ground shaking, and soil liquefaction throughout Baldwin County. Map 5-14 portrays earthquake locations from 1886 to 2014, as well as geologic faults in the county. According to this map, only two earthquakes have occurred in or near Baldwin County.

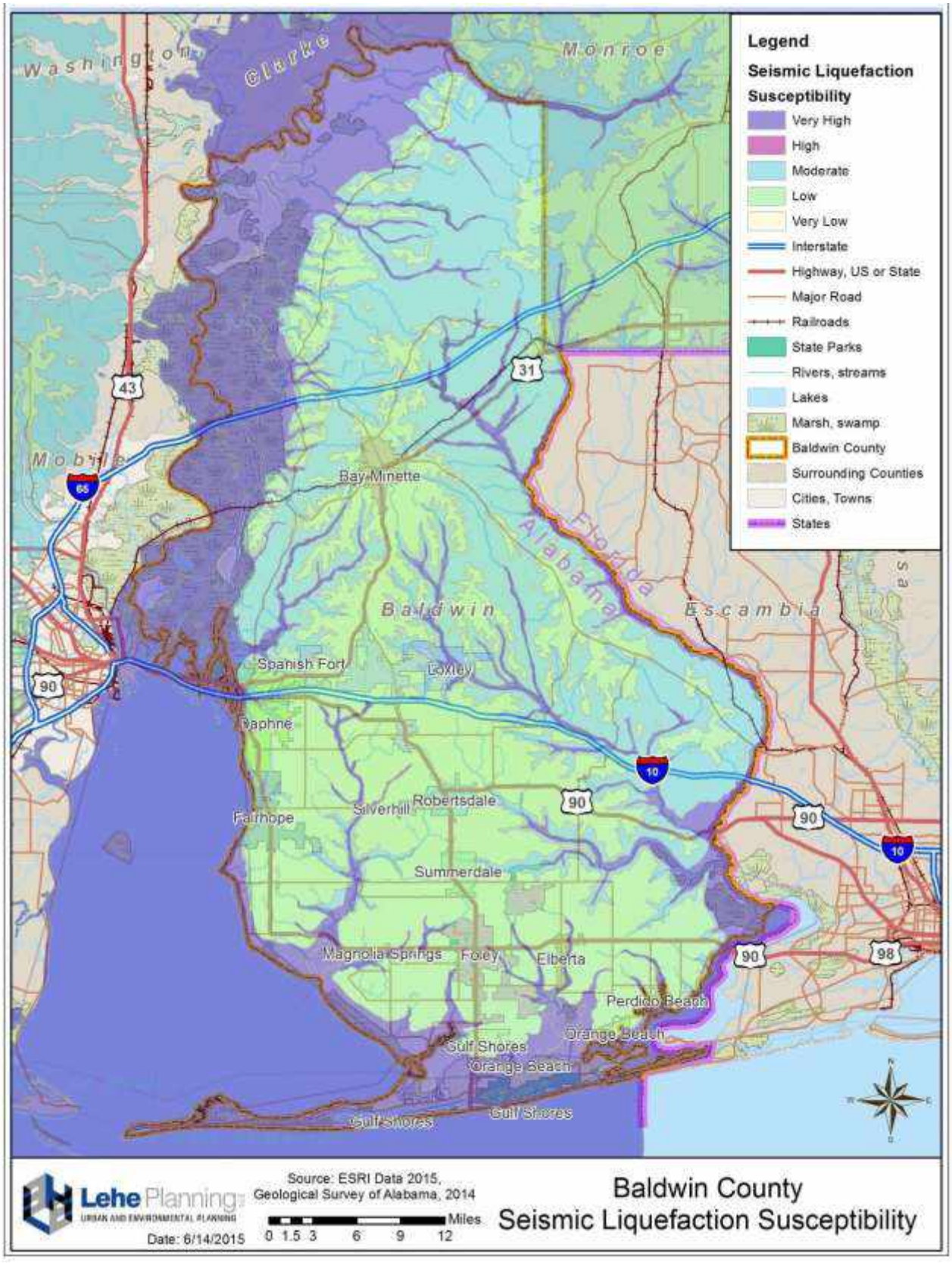
Baldwin County has a low to moderate degree of seismic liquefaction susceptibility to earthquakes (Map 5-15), but the impacts can vary depending on the magnitude and epicenter location. Damages to buildings and infrastructure depend not only on the energy released during an earthquake but also underlying soils and geological characteristics. As shown on Map 5-15, communities located along the Gulf coast and Mobile Bay are more susceptible to seismic liquefaction, indicating a very high susceptibility.

In addition to seismic liquefaction, soil type and site amplification contribute to the velocity at which rock or soil transmits shear waves (USGS). Of the five soil types identified by the National Earthquake Hazards Reduction Program, Baldwin County

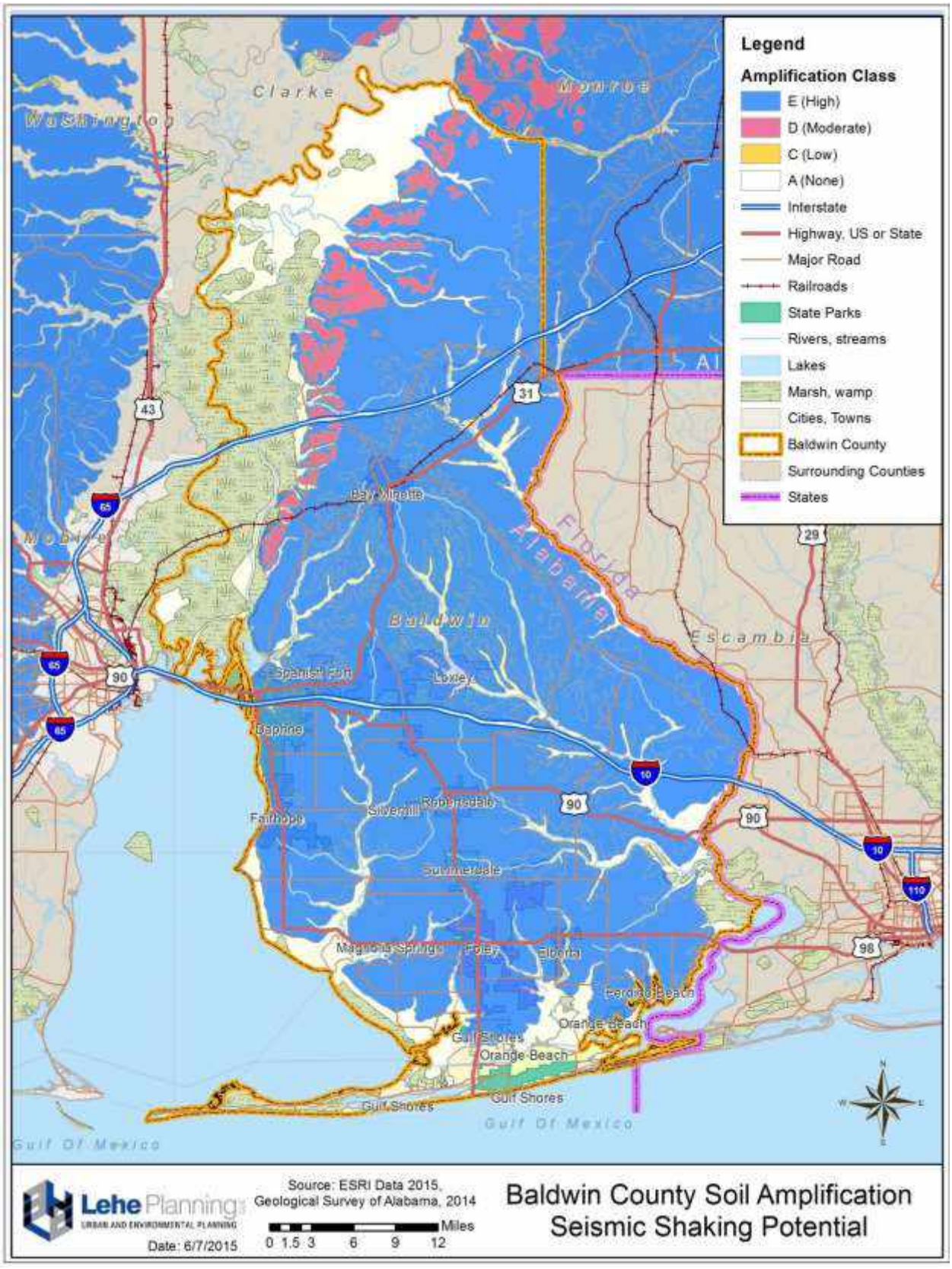
contains two: Soil Type D and Soil Type E (shown on Map 5-16). Soil Type D, which characterizes unincorporated areas along Mobile Bay, includes some quaternary muds, sands, gravels, and silts. Significant amplification of shaking by these soils is generally expected. Soil Type E, which characterizes the rest of Baldwin County, includes water-saturated mud and artificial fill. The strongest amplification of shaking due is expected for this soil type.

Map 5-14. Baldwin County Earthquakes & Geologic Faults

Map 5-15. Baldwin County Earthquake Liquefaction Potential



Map 5-16. Baldwin County Soil Amplification Seismic Shaking Potential



Extent and Intensity of Potential Earthquakes

According to the Geological Survey of Alabama (GSA), recent seismograph records indicate that earthquakes in the state are frequent but not strong enough to be felt on the land surface. Earthquakes can occur anywhere in the state, but are unlikely to cause damage.

As discussed in the "Earthquakes Description" found in Appendix D, the intensity of shaking from an earthquake is measured according to the Modified Mercalli Intensity Scale, for which numbers relate to observed effects of shaking on a scale of 1 to 12 (see Figure 5-4).

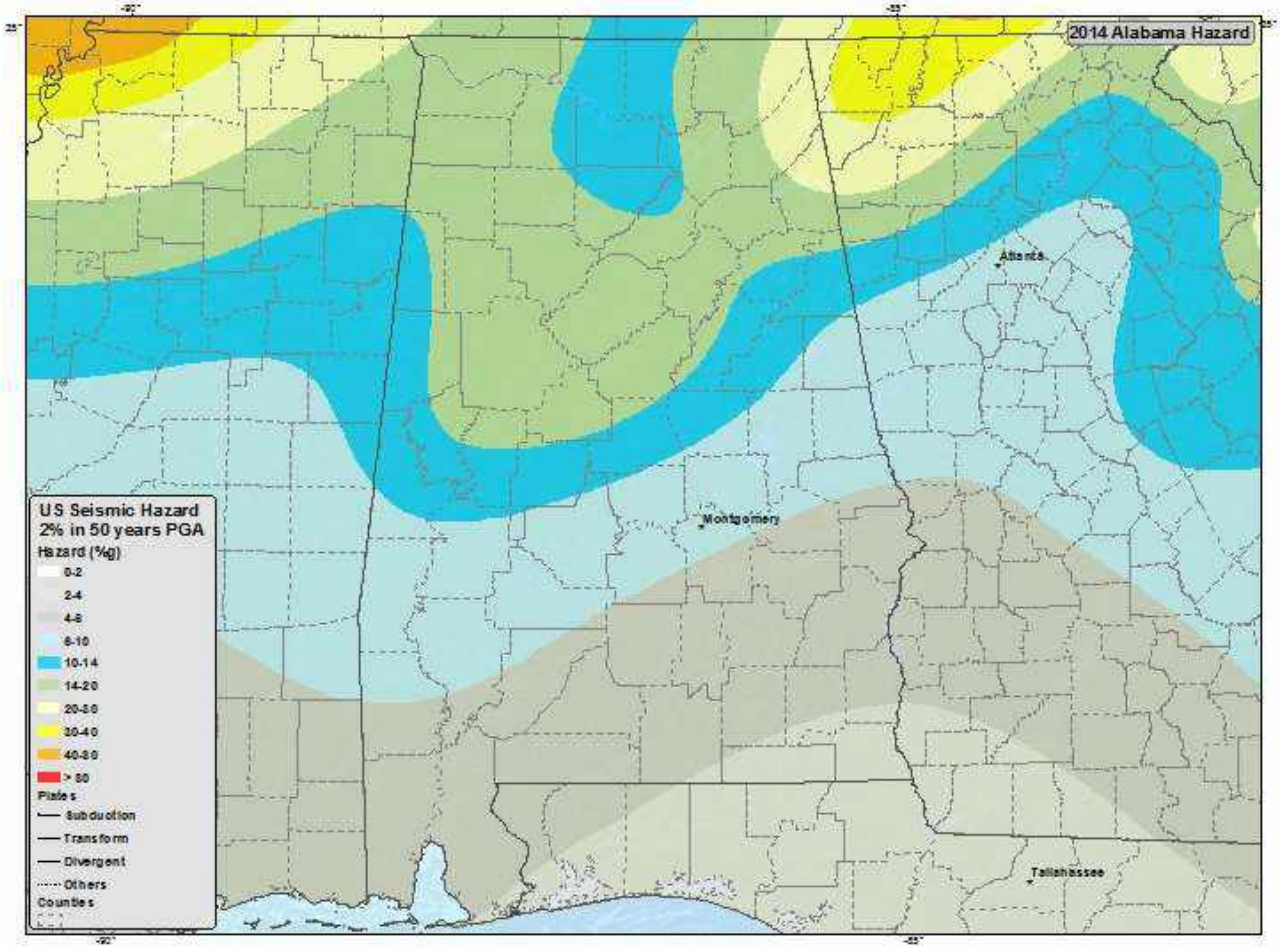
Figure 5-4. Modified Mercalli Intensity Scale

I.	**Not felt.**
II.	**Felt by persons at rest, on upper floors, or favorably placed.**
III.	**Felt indoors. Vibrations like passing of light trucks.**
IV.	**Vibration like passing of heavy trucks.**
V.	**Felt outdoors. Small unstable objects displaced or upset.**
VI.	**Felt by all. Furniture moved. Week plaster/masonry cracks.**
VII.	**Difficult to stand. Damage to masonry and chimneys.**
VIII.	**Partial collapse of masonry. Frame houses moved.**
IX.	**Masonry seriously damaged or destroyed.**
X.	**Many buildings and bridges destroyed.**
XI.	**Rails bent greatly. Pipelines severely damaged.**
XII.	**Damage nearly total.**

Source: Geological Survey of Alabama

The USGS publishes national seismic hazard maps which show likelihood of exceeding a level of earthquake shaking in a given time period. The shaking intensity is measured in peak ground acceleration (PGA) which is acceleration (shaking) of the ground expressed as a percentage of gravity (%g), or as a percentage of 9.8 meters per second squared. Map data from the USGS Earthquake Hazards Program 2014 seismic hazard map (Map 5-17) shows Baldwin County has only a 4-6% chance of exceeding shaking above 16%g in the next 50 years.

Map 5-17. State of Alabama Seismic Hazard Map, 2014

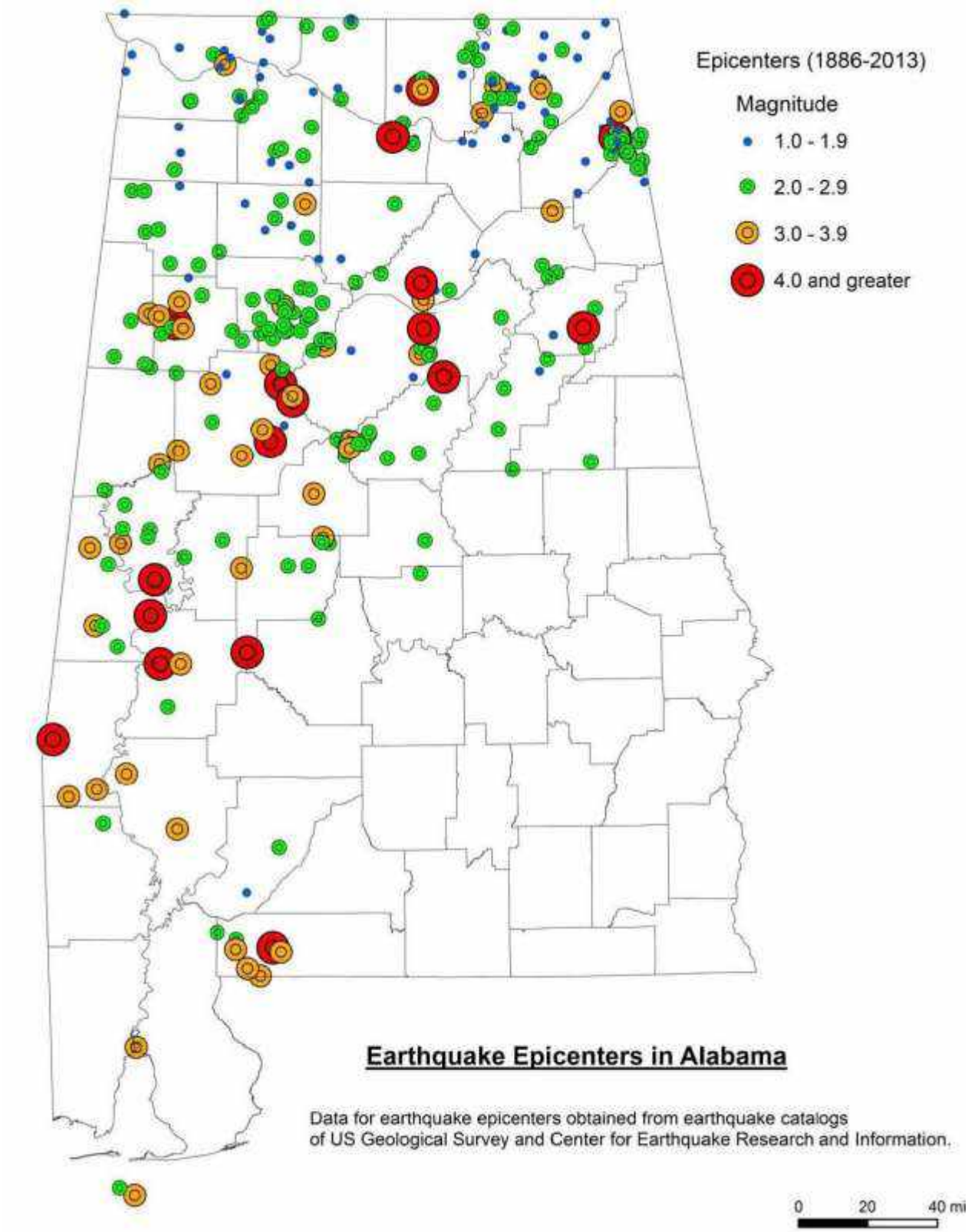


Source: United States Geological Survey, Earthquakes Hazards Program, 2014

Previous Occurrences of Earthquakes

Map 5-18 “Alabama Earthquake Locations” shows the location and magnitude of recorded earthquakes from 1886 through 2013. According to this map, Baldwin County has only experienced one earthquake and sixteen earthquakes with a magnitude greater than 4.0 have been recorded in Alabama.

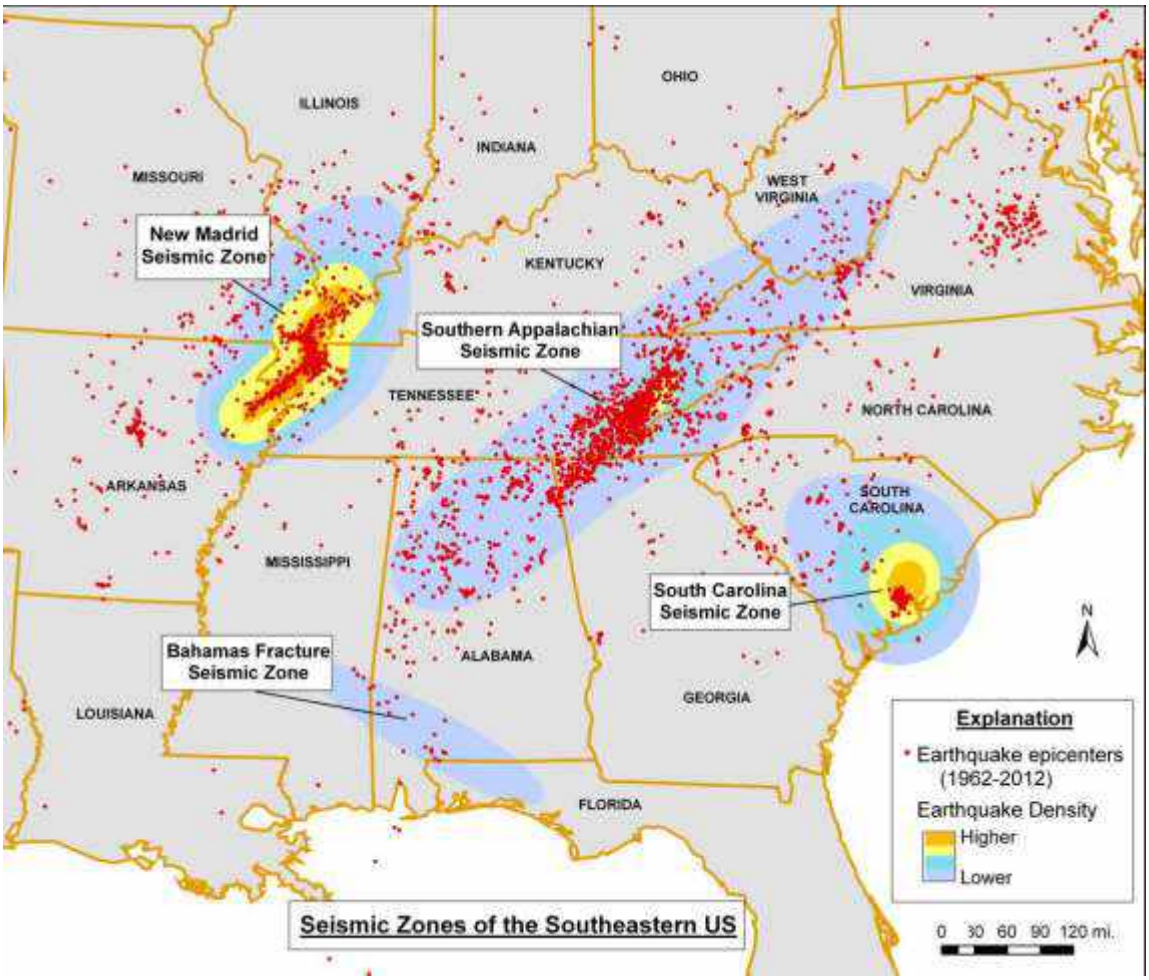
Map 5-18. Alabama Earthquake Locations



Probability of Future Earthquakes

Geologic Survey of Alabama (GSA) records and analysis suggest the likelihood of damaging earthquake is extremely low. Map 5-19 "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 5-19. Seismic Zones in Southeastern United States



Source: Geological Survey of Alabama, Mapping and Hazards Program

5.4.9 Landslides

A landslide is defined by the United States Geological Survey as the movement of rock, debris, or earth down a slope. Various natural and man-induced triggers can cause a landslide. Naturally induced landslides occur as a result of weakened rock composition, heavy rain, changes in groundwater levels, and seismic activity. Geologic formations in a given area are key factors when determining landslide susceptibility. Due to its generally level topography, Baldwin County is not susceptible to landslides.

The Geologic Survey of Alabama (GSA) has studied the potential for landslides throughout Alabama. Geographic Information Systems (GIS) data provided by the GSA for this plan, classifies landslide incident and susceptibility shown on Map 5-20 "Baldwin County Landslide Susceptibility", as follows:

1. Landslide susceptibility. Susceptibility is the probable degree of response to landslide triggers, that is, the response to cutting or excavation, loading of slopes, or to unusually high rainfall. Generally, unusually high rainfall or changes in existing conditions can initiate landslide movement in areas where rocks and soils have experienced numerous landslides in the past. The potential for landslides is classified into one of the following categories:
    - High susceptibility – greater than 15% of a given area is susceptible to land sliding;
    - Medium susceptibility – 1.5% to 15% of a given area is susceptible to land sliding; or
    - Low susceptibility – less than 1.5% of a given area is susceptible to land sliding.
    - No susceptibility indicated – susceptibility is the same as or lower than incidence.
2. Landslide incidence. Landslide incidence is the number of landslides that have occurred. These areas are classified according to the percentage of the area affected by landslides, as follows:
    - High incidence – greater than 15% of a given area has previously experienced land sliding;
    - Medium incidence – 1.5% to 15% of a given area has previously experienced land sliding; or
    - Low incidence – less than 1.5% of a given area has previously experienced land sliding.

Location of Potential Landslides

As shown on Map 5-20, the entire county has at least a low degree of susceptibility to landslides. The hilly regions located primarily in the northern and

western portions of Baldwin County are more susceptible to landslides than other areas, which are uniformly flat.

Extent and Intensity of Potential Landslides

According to GSA data, the majority of Baldwin County has a low degree of landslide susceptibility. Unincorporated areas near Mobile Bay have a high degree of landslide susceptibility (Map 5-20). 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.

Previous Occurrences of Landslides

Heavy rains from Hurricane Danny caused a landslide in Spanish Fort in 1997. Currently, the bluffs alongside the eastern shore of Mobile Bay are susceptible to erosion and future landslides. This affects the homes along the bluff. In an effort to stabilize the bluff and reduce future property damage, the State of Alabama and the City of Spanish Fort applied funding. GSA records show a total of six landslides in Baldwin County.

Probability of Future Landslides

Although the GSA map data locates the general degrees of risk for landslides in Baldwin County, the actual probability varies according to specific site locations and the presence of activities or conditions that might trigger a landslide, such as rock type, slope, excavation, hillside development, deforestation, heavy rainfall, or seismic activity. GSA records of landslides have occurred even in areas mapped as “low incidence”. Qualitative probability for landslides in Baldwin County is low compared to other natural hazards.

Map 5-20. Baldwin County Landslide Susceptibility

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. The National Inventory of Dams lists 23 dams in Baldwin County.

Dam and levee failures are potentially catastrophic flood events and can occur with little warning. A failure is usually the result of neglect, unsound construction, or structural damage attributable to an earthquake or other natural hazard. Severe dam and levee failures are very rare in the United States, but, when they do occur, downstream damages can include devastating human casualties, property damages, and altered natural landscapes.

Location of Potential Dam/Levee Failures

According to the U.S. Corps of Engineers National Inventory of Dams, there are 23 dams in Baldwin County. See Table 5-14 and Map 5-21 for location information.

Table 5-14. Baldwin County Dams

Dam Name	River	Year Completed	NID Height (Ft.)	Max Discharge	Max Storage
Baroco Lake Dam No. One	TR-Soldier Creek	1970	12	500	53
Bob Pace	TR-Blackwater River	1973	17	184	323
Branchland Lake Dam	Cowpen Creek - Offstream	1958	18	700	72
Calvin Childers Lake Dam No. One	TR-Polecat Creek	1968	16	500	70
Calvin Childers Lake Dam No. Two	TR-Polecat Creek	1958	22	370	100
Childress Dam	TR-Blackwater River	1981	15	330	142
Cook Lake Dam	TR-Blackwater River	1955	12	500	100
Cooper Number One	Mill Creek	1968	14	271	233
Corte Dam	Fly Creek	1981	21	580	73

Dam Name	River	Year Completed	NID Height (Ft.)	Max Discharge	Max Storage
Crosby Lumber Co.	TR- McCurtin Creek	1972	17	1,200	200
Deep South Girl Scouts Lake	Aikin Creek	1983	30	-	583
John Q. Kendrick	TR-Styx River	1968	21	105	180
JP Bertolli	TR-Styx River	1955	15	80	93
Lake Bobo	TR-Joes Creek	1974	15	99	160
Lake Muriel	Owens Creek	1967	16	210	512
Laupero Use	TR-Bay Minette Creek	1957	19	127	132
Miles Neuman	TR-Spring Branch	1979	18	384	232
Patterson	Seven Mile Creek	1958	34	800	2,640
Paul Childress Lake Dam	TR-Blackwater River	1951	10	-	80
Raynag UA	Perone Branch	1969	17	550	404
Stacey Lake Dam	TR-Whitehouse Creek	1968	15	700	65
Tennessee Coal & Iron	Roans Creek	1953	24	13,000	2,000
Wynn Brothers Lake Dam	TR-Polecat Creek	1969	35	500	140

Source: Army Corps of Engineers, 2015

Extent and Intensity of Potential Dam/Levee Failures

According to the Army Corps of Engineers, Baldwin County has zero dams in the high hazard category, 1 dam in the significant category, and 22 in the low category (Table 5-15). Significant risk indicates failure or faulty operation would probably not result in loss of life, but would result in economic loss, environmental damage, and disruption of lifeline facilities. Low risk indicates failure/faulty operation would not result in loss of life and only low economic or environmental damage.

Table 5-15. Baldwin County Dams Risk

Hazard Categories	Number of Dams
High	0
Significant	1
Low	22
Undetermined	0
Total	23

Source: Army Corps of Engineers

Map 5-21. Baldwin County Dams

Previous Occurrences of Dam/Levee Failures

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

Probability of Future Dam/Levee Failures

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. Dam/levee failures are perceived as the least likely event to occur by the HMPC.

5.4.11 Sinkholes (Land Subsidence) Profile

Sinkholes occur naturally where limestone, salt, or other rocks below the ground surface are dissolved by circulating groundwater. As the rock dissolves, spaces and caverns develop underground. The land usually stays intact until the underground spaces become too large to support the ground at the surface. When the ground loses its support, it will collapse, forming a sinkhole. Sinkholes can be small or so extreme they consume an automobile or a house. Certain activities can increase the potential for sinkholes in these areas, such as: periods of drought, excessive rainfall, well pump-age, and construction.

Location of Potential Sinkholes

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. Map 5-22 shows Karst Geography across the state and indicates that Baldwin County contains units with minor carbonates. Map 5-23 shows USGS sinkhole distribution, indicating that Baldwin County has a higher density of sinkholes relative to the state. The Hazard Mitigation Planning Committee (HMPC) assigned sinkholes a low threat and risk level, based on research and local perception.

Extent and Intensity of Potential Sinkholes

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

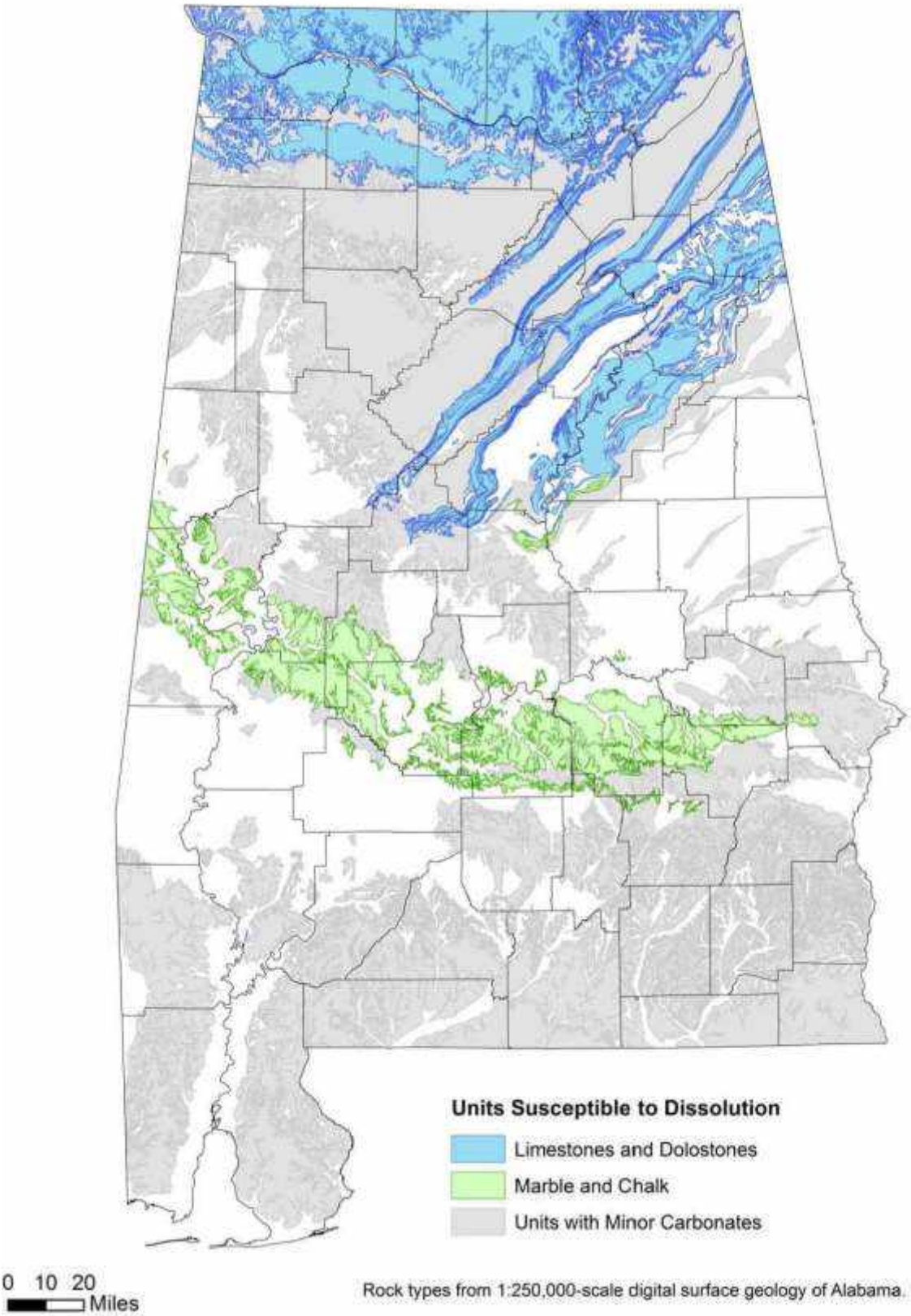
Previous Occurrences of Potential Sinkholes

Data from the Geological Survey of Alabama counts over 6,400 sinkhole events in Alabama and indicates various sinkhole occurrences throughout Baldwin County, predominantly in the southern half of the county (Map 5-24).

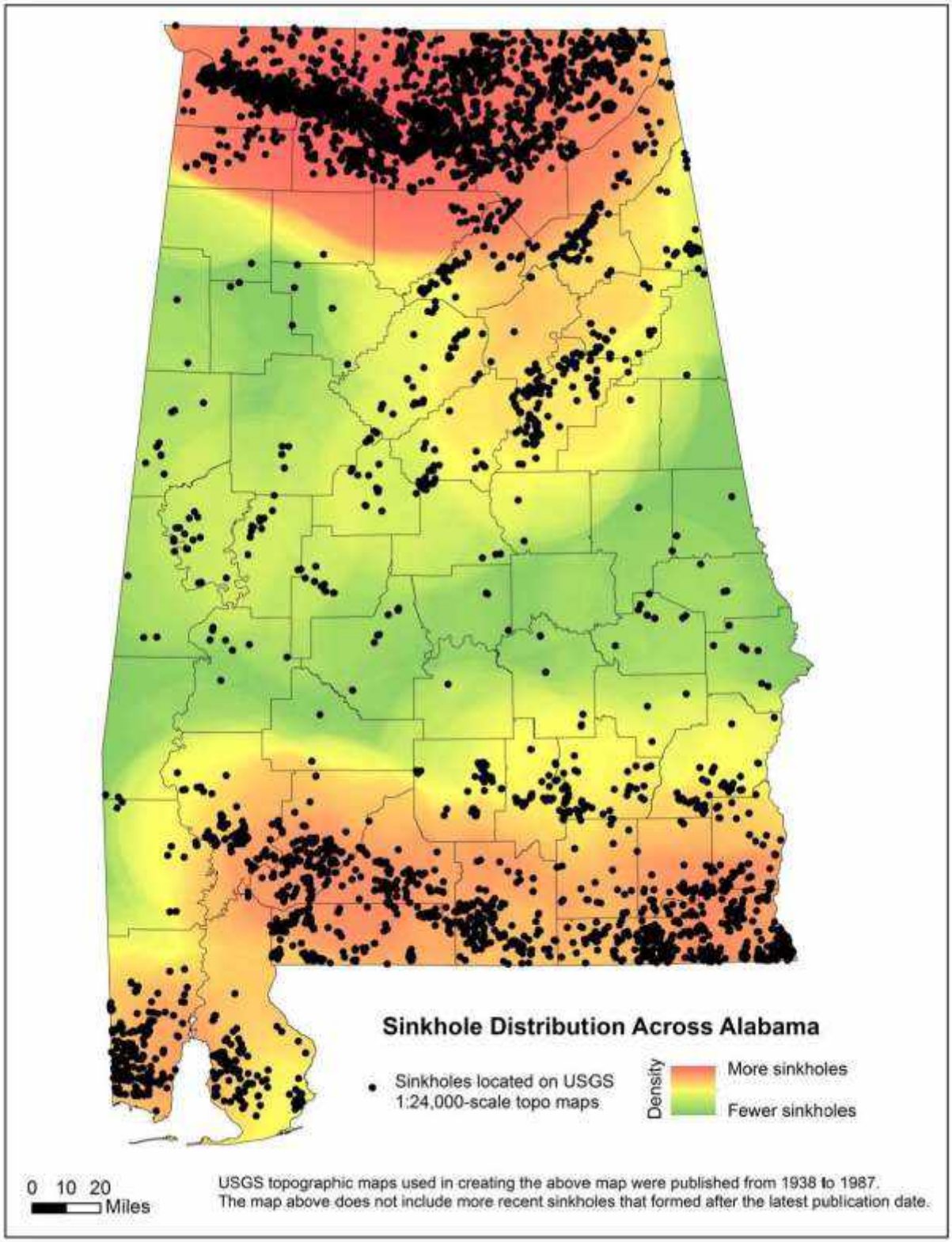
Probability of Future Sinkholes

Map 5-24 “Baldwin County Sinkhole Susceptibility” shows a relative lack of dolostone and limestone rock types, which indicates future probability for sinkholes is low. Ongoing data collection by the Geological Survey of Alabama might reveal unknown conditions that raise the likelihood of sinkholes in Baldwin County.

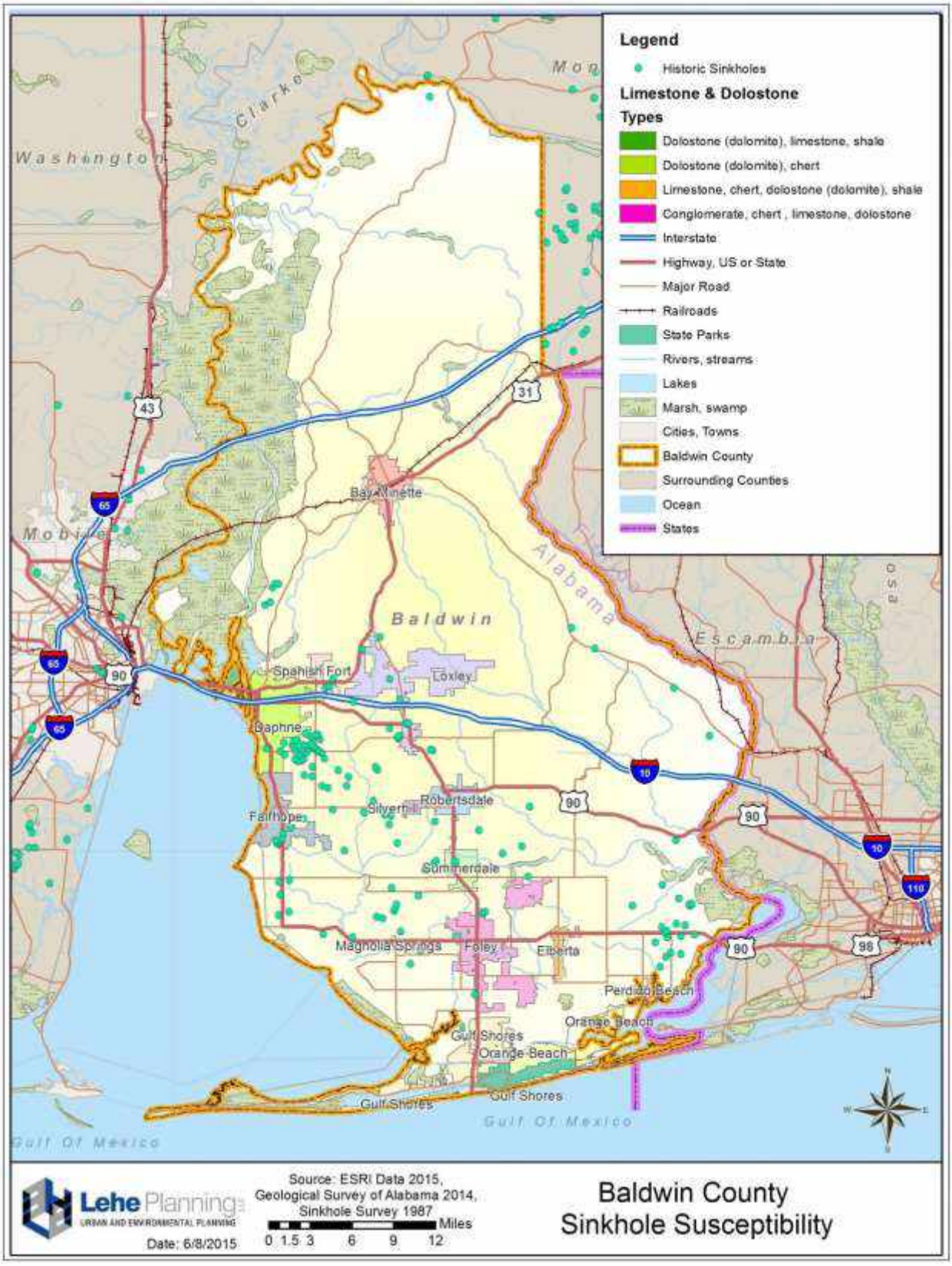
Map 5-22. Karst Geography, Alabama



Map 5-23. Alabama Sinkhole Density



Map 5-24. Baldwin County Sinkhole Susceptibility



5.4.12 Tsunamis

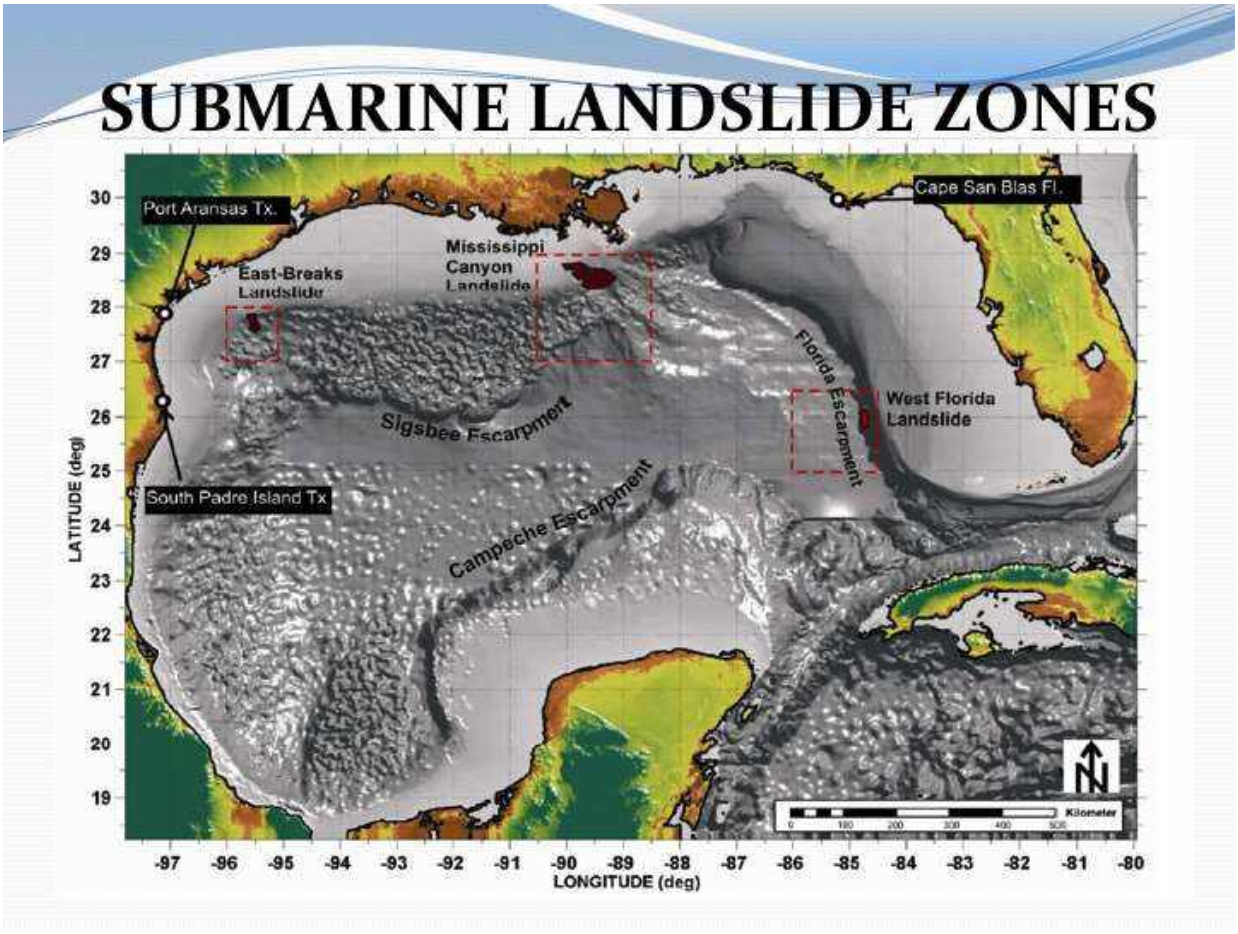
Tsunamis are large ocean waves triggered by earthquakes, volcanic eruptions, submarine landslides, and onshore landslides. However, the tsunami threat to Baldwin County is largely a result of submarine landslides.

There are no records of any tsunamis along the Gulf Coast, but the *Regional Assessment of Tsunami Potential in the Gulf of Mexico* (USGS, 2009) report finds there are some risks, although minimal. The risk is from "submarine landslides", not earthquakes. Submarine landslides are landslides that occur on the marine surface and transport sediment across the continental shelf, into the deep ocean. The report also states that the vulnerability of the Gulf Coast is high due to the concentrations of population, industrial facilities, and infrastructure should a significant landslide trigger a tsunami. Tsunamis caused by earthquakes are not likely within the Gulf of Mexico.

Location of Potential Tsunamis

The three geologic landslide provinces in the Gulf of Mexico are the Northwest Gulf of Mexico, the Mississippi Canyon and fan, and the Florida/Campeche Margin (Map 5-25). Submarine landslides, of sufficient volume, in the Gulf of Mexico are present "along the continental margin of the gulf".

Map 5-25. Submarine Landslide Zones



Extent and Intensity of Potential Tsunamis

Communities in Baldwin County at low-lying elevations are especially vulnerable to tsunami damage, due to the amount of people and industrial activity occurring in these areas.

Previous Occurrences of Tsunamis

There are no previous occurrences of tsunamis affecting Baldwin County.

Probability of Future Tsunamis

Due to the lack of historical evidence for tsunami activity, the probability of future occurrences is low.

5.4.13 Man-made/Technological 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 a primary main type of man-made hazards. These accidents can occur at any stage of a hazardous material's lifecycle, from extraction to manufacturing to storage to delivery.

Location of Potential Man-made/Technological Hazards

Baldwin County has 20 facilities listed by the EPA Toxic Facilities Inventory, which are places where hazardous chemicals are stored. See Map 5-26 for locations of hazardous materials. In addition to the fixed facilities listed by EPA, there are trains and tractor trailers that transport hazardous materials through Baldwin County, particularly on Interstate 10.

Extent and Intensity of Potential Man-made/Technological Hazards

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.

Previous Occurrences of Man-made/Technological Hazards

The most recent significant hazardous materials incident occurred on April 20, 2010 when the Deepwater Horizon oil rig (BP Corporation) exploded and collapsed. The petroleum oil spill has been noted as the worst oil spill in U.S. history, dumping 4.9 million barrels of oil in the Gulf of Mexico between April 20 and July 15, 2010. The coast of Baldwin County was severely affected by the spill with tar balls covering miles of beaches and an oil sheen on the water's surface. Tourism suffered as a result.

Other 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. The U.S. Department of Transportation's HAZMAT Intelligence Portal provides a record of transportation-related hazardous materials incidents and shows that 23 incidents occurred in Baldwin County from 1995 to 2014 (over twenty years). Total amount of damages is $667,804. Refer to Table E-9 in Appendix E. Units of hazardous materials are liquid gallons, unless otherwise noted.

Probability of Future Man-made/Technological Hazards

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. 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.

Map 5-26. 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 software (2015). 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 5-16. 2014 Population Distribution by Jurisdiction

Jurisdiction	2014 Estimate	% of Total
Bay Minette	9,049	4.5%
Daphne	24,395	12.5%
Elberta	1,634	0.8%
Fairhope	18,089	9.0%
Foley	16,243	8.1%
Gulf Shores	10,963	5.5%
Loxley	1,725	0.9%
Magnolia Springs	782	0.4%
Orange Beach	5,788	2.9%
Perdido Beach	624	0.3%
Robertsdale	5,773	2.9%
Silverhill	754	0.4%
Spanish Fort	7,806	3.9%
Summerdale	1,005	0.5%
Unincorporated	94,941	47.4%
Baldwin County	**200,111**	**100%**

Source: U.S. Census 2014 Population Estimates

The plan projects future number of buildings, critical facilities, and infrastructure to the year 2035 using the Alabama State Data Center's projection of Baldwin County population growth. Since no projections existed for individual jurisdictions, the method described here was developed to provide a 2035 projected population for each jurisdiction. To project populations for each jurisdiction, the annual growth rate for each jurisdiction has been calculated based upon population growth between 1990 and 2014. In the case of the overall population of Baldwin County, the Alabama State Data Center 2035 county estimate has been used, and the unincorporated area projection is that countywide population less the total of all municipal populations.

The 2035 populations of Baldwin County and its jurisdictions are used to compute *growth multipliers.* The growth multiplier is equal to 1 + the 2014-2035 percentage increases for each jurisdiction. For example, if 1,000 residential buildings are presently exposed, then a 2035 Growth Multiplier of 1.24 (where a jurisdiction's population is projected to increase 24 percent) would project 1,240 residential buildings will be exposed in 2035. The Growth Multiplier is applied to all present day estimates to project future conditions. This growth projection method is not precise, but it does provide a good indication of how growth might affect future exposure of structures to hazards.

Table 5-17. 2035 County Growth Projection

Projected County Growth 2014-2035				
	2014	2035	Number	Percent
Baldwin County	200,111	283,120	83,009	41.5%

Source: Alabama State Data Center

Table 5-18. Annual Growth Rates by Jurisdiction

Jurisdiction	1990	2010	Est. 2014	1990-2014 Growth*	% Change 1990-2014	Annual Growth Rate
Bay Minette	7,168	8,044	9,049	1,881	26.2%	0.98%
Daphne	11,290	21,570	24,395	13,105	116.1%	3.26%
Elberta	458	1,498	1,634	1,176	256.8%	5.44%
Fairhope	8,485	15,326	18,089	9,604	113.2%	3.20%
Foley	4,937	14,618	16,243	1,625	11.1%	5.09%
Gulf Shores	3,261	9,741	10,963	7,702	236.2%	5.18%
Loxley	1,161	1,632	1,725	564	48.6%	1.66%
Magnolia Springs	n/a	723	782	59	8.2%	1.98%
Orange Beach	2,253	5,441	5,788	347	15.4%	4.01%
Perdido Beach	n/a	581	624	43	7.4%	1.80%
Robertsdale	2,401	5,276	5,773	3,372	140.4%	3.72%
Silverhill	556	706	754	198	35.6%	1.28%
Spanish Fort	3,732	6,798	7,806	4,074	109.2%	3.12%
Summerdale	559	862	1,005	446	79.8%	2.47%
Unincorporated	n/a	89,449	95,481	6,032	6.7%	1.64%
Baldwin Co.	98,280	182,265	200,111	101,831	103.6%	3.01%

Source: U.S. Census, 1990-2014

*Magnolia Springs, Perdido Beach & Unincorporated growth are based on 2010-2014 population changes, due to unavailability of 1990 Census data

Table 5-19. 2035 Growth Projections and Multipliers

Jurisdiction	Est. 2014	Annual Growth Rate	Projected 2035	Projected Change 2014-2035	% Change 2014-2035	2035 Growth Multiplier
Bay Minette	9,049	0.98%	11,105.6	2,057	22.73%	1.23
Daphne	24,395	3.26%	47,849.3	23,454	96.14%	1.96
Elberta	1,634	5.44%	4,970.1	3,336	204.17%	3.04
Fairhope	18,089	3.20%	35,050.0	16,961	93.76%	1.94
Foley	16,243	5.09%	46,074.0	29,831	183.65%	2.84
Gulf Shores	10,963	5.18%	31,661.1	20,698	188.80%	2.89
Loxley	1,725	1.66%	2,437.5	712	41.30%	1.41
Magnolia Springs	782	1.98%	1,180.4	398	50.94%	1.51
Orange Beach	5,788	4.01%	13,216.2	7,428	128.34%	2.28
Perdido Beach	624	1.80%	907.6	284	45.45%	1.45
Robertsdale	5,773	3.72%	12,431.2	6,658	115.33%	2.15
Silverhill	754	1.28%	984.8	231	30.62%	1.31
Spanish Fort	7,806	3.12%	14,880.9	7,075	90.63%	1.91
Summerdale	1,005	2.47%	1,677.6	673	66.93%	1.67
Unincorporated	95,481	1.64%	58,693.7	-36,787	-38.53%	0.61
Baldwin Co	200,111	3.01%	283,120.0	83,009	41.48%	1.41

Source: Derived from AL State Data Center and U.S. Census

Table 5-20. 2035 Population Distribution by Jurisdiction

Jurisdiction	2035 Population	% of Total
Bay Minette	11,106	2.98%
Daphne	47,849	12.83%
Elberta	4,970	1.33%
Fairhope	35,050	9.40%
Foley	46,074	12.35%
Gulf Shores	31,661	8.49%
Loxley	2,438	0.65%
Magnolia Springs	1,180	0.32%
Orange Beach	13,216	3.54%
Perdido Beach	908	0.24%
Robertsdale	12,431	3.33%
Silverhill	985	0.26%
Spanish Fort	14,881	3.99%
Summerdale	1,678	0.45%
Unincorporated	58,694	20.73%
Baldwin Co	283,120	100.00%

Source: Derived from Alabama State Data Center

5.5.3 HAZUS-MH Structure Inventory

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 – flooding, dam/levee failures, sinkholes and landslides – can vary from minimal vulnerability to as much as 100% of a community's total geographic area. In cases where exposure is 1% or less, a 1% exposure rate has been applied. Although this does not yield a precise estimate, it provides a general indication of the number and types of structures exposed to each hazard within each jurisdiction. This data is shown in Table 5-21 below.

Table 5-21. Hazard Exposure Rates by Jurisdiction

Jurisdiction	Identified Hazard												
	Hurricanes	Flooding	Severe Storms	Tornadoes	Wildfires	Droughts/Heat Waves	Winter Storms/Freezes	Earthquakes	Landslides	Dam/Levee Failures	Sinkholes/Land Subsidence	Tsunamis	Manmade/ Technological
Bay Minette	100%	25%	100%	100%	5%	100%	100%	5%	<1%	0%	<1%	1%	100%
Daphne	100%	15%	100%	100%	5%	100%	100%	100%	<1%	0%	5%	1%	100%
Elberta	100%	5%	100%	100%	5%	100%	100%	50%	<1%	0%	0%	1%	100%
Fairhope	100%	75%	100%	100%	5%	100%	100%	100%	<1%	1%	5%	1%	100%
Foley	100%	5%	100%	100%	5%	100%	100%	5%	<1%	1%	5%	1%	100%
Gulf Shores	100%	90%	100%	100%	5%	100%	100%	100%	<1%	0%	<1%	1%	100%
Loxley	100%	5%	100%	100%	5%	100%	100%	5%	<1%	1%	5%	1%	100%
Magnolia Springs	100%	25%	100%	100%	5%	100%	100%	100%	<1%	0%	5%	1%	100%
Orange Beach	100%	90%	100%	100%	5%	100%	100%	100%	<1%	0%	0%	1%	100%
Perdido Beach	100%	90%	100%	100%	5%	100%	100%	100%	<1%	1%	<1%	1%	100%
Robertsdale	100%	5%	100%	100%	5%	100%	100%	5%	<1%	0%	<1%	1%	100%
Silverhill	100%	5%	100%	100%	5%	100%	100%	50%	<1%	0%	5%	1%	100%
Spanish Fort	100%	25%	100%	100%	5%	100%	100%	100%	<1%	0%	5%	1%	100%
Summerdale	100%	5%	100%	100%	5%	100%	100%	5%	<1%	0%	5%	1%	100%
Unincorporated	100%	75%	100%	100%	100%	100%	100%	5%	5%	1%	5%	1%	100%
Baldwin County	100%	75%	100%	100%	100%	100%	100%	50%	5%	1%	5%	1%	100%

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 Report for Hurricane Frederic. The Baldwin County region is generally described by HAZUS-MH, as follows:

- The geographical size of the region is 1,626 square miles.
- The region contains 32 census tracts.
- There were over 73,000 households in the region, with a total population of 182,265 persons, according to the 2010 Census.

Table 5-22. HAZUS-MH Population and Building Value Data

State	County Name	2010 Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Alabama	Baldwin	182,265	$18,745	$4,397	$23,143

Building Inventory

- HAZUS estimates that there are 88,540 buildings in the region which have an aggregate total replacement value of 23,143 million (2010 dollars).
- Approximately 92.8% of the buildings (and 81.4% of the building value) are associated with residential housing (Table 5-23).
- In terms of building construction types found in the region, wood frame construction comprises the majority of the building inventory, at 72.8%. Manufactured housing comprises approximately 17% of buildings, a considerable amount (Table 5-24).

Table 5-23. HAZUS-MH Building Inventory by Occupancy

Occupancy	Count	Share
Agriculture	272	0.3%
Commercial	4,154	4.7%
Education	146	0.2%
Government	96	0.1%
Industrial	1,302	1.5%
Religion	385	0.4%
Residential	82,185	92.8%
Total	**88,540**	**100%**

Table 5-24. HAZUS-MH Building Inventory by Construction Type

Construction Type	Count	Share
Concrete	686	0.8%
Masonry	5,795	6.5%
Manufactured Housing	14,713	16.6%
Steel	2,931	3.3%
Wood	64,421	72.8%
Total	**88,546**	**100%**

*Discrepancies in total # of buildings exist due to rounding in HAZUS-MH software

Critical Facilities Inventory

HAZUS-MH results list **essential facilities,** which include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. HAZUS-MH estimates the numbers and types of essential facilities within the region, as follows:

- ✓ 4 hospitals with a total bed capacity of 437 beds;
- ✓ 62 schools;
- ✓ 24 fire stations;
- ✓ 16 police stations; and
- ✓ 1 emergency operations center.

Transportation and Utility Lifeline Inventories

HAZUS-MH breaks lifeline inventories into the two groups described below and estimates the number of each type of facility. HAZUS-MH estimates the total value of the lifeline inventory at $5.3 million. A more detailed breakdown is provided in Tables 5-30 and 5-31.

(1) **Transportation systems,** which include highways, railways, light rail, bus, ports, ferry and airports. HAZUS-MH estimates this information, as follows:

- ✓ 373 miles (600 kilometers) of highways;
- ✓ 224 highway bridges;
- ✓ 1 ferry facility;
- ✓ 4 port facilities;
- ✓ 5 airports with 6 runways.

(2) **Utility systems,** which include potable water, wastewater, natural gas, crude & refined oil, electric power, and communications. HAZUS-MH estimates the length of pipes, as follows:

- ✓ 8,107 miles (13,047 kilometers) of potable water, waste water, and natural gas pipes.

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 4,154 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 81 percent. Commercial building exposure comprises approximately 13 percent (Table 5-25). This ratio should remain constant through the 2035 plan horizon and occupancy ratios are assumed constant for the purposes of this analysis.

Table 5-25. Building Exposure by Occupancy

Occupancy	Existing Exposure ($1,000)	Future Exposure ($1,000)	% of Total (Future)
Agriculture	$74,725	$105,362	0.32%
Commercial	$2,837,089	$4,000,295	12.26%
Education	$166,172	$234,303	0.72%
Government	$83,342	$117,512	0.36%
Industrial	$822,209	$1,159,315	3.55%
Religious	$317,631	$447,860	1.37%
Residential	$18,841,781	$26,566,911	81.41%
Total	**$23,142,949**	**$32,631,558**	**100%**

Building values within each jurisdiction are expected to increase according to (a) growth in Baldwin County's population; and (b) the growth in each jurisdiction's share of the county population. Communities need to be cognizant of the increasing risks and exposure resulting from growth.

Baldwin County is projected to increase in growth approximately 41.5% from 2014 to 2035, with the highest growth rates in Elberta, Foley, Gulf Shores and Orange Beach. The areas with the least projected amount of growth are Bay Minette, Loxley, Silverhill, and Magnolia Springs. Occupancy of buildings by jurisdiction is assumed to generally follow the county-wide distribution, and is projected to change according to each jurisdiction's growth multiplier. See Tables 5-26 to 5-28 for estimated building values by jurisdiction, building count by occupancy and jurisdiction, and building exposure by jurisdiction.

Table 5-26. Building Values by Jurisdiction

Jurisdiction	Building Value					
	Existing Residential	Future Residential	Existing Non-Residential	Future Non-Residential	Existing Total	Future Total
Bay Minette	$847,880	$1,044,968	$193,553	$238,543	$1,041,433	$1,283,512
Daphne	$2,355,223	$4,505,092	$537,646	$1,028,414	$2,892,869	$5,533,507
Elberta	$150,734	$469,169	$34,409	$107,101	$185,144	$576,271
Fairhope	$1,695,760	$3,300,180	$387,105	$753,359	$2,082,865	$4,053,539
Foley	$1,526,184	$4,337,151	$348,395	$990,077	$1,874,579	$5,327,228
Gulf Shores	$1,036,298	$2,980,292	$236,564	$680,336	$1,272,862	$3,660,628
Loxley	$169,576	$229,253	$38,711	$52,334	$208,287	$281,587
Magnolia Springs	$75,367	$111,961	$17,205	$25,558	$92,572	$137,519
Orange Beach	$546,412	$1,244,898	$124,734	$284,183	$671,146	$1,529,081
Perdido Beach	$56,525	$85,304	$12,904	$19,473	$69,429	$104,776
Robertsdale	$546,412	$1,170,258	$124,734	$267,144	$671,146	$1,437,402
Silverhill	$75,367	$93,301	$17,205	$21,299	$92,572	$114,599
Spanish Fort	$734,829	$1,402,177	$167,746	$320,086	$902,575	$1,722,263
Summerdale	$94,209	$157,278	$21,506	$35,903	$115,715	$193,182
Unincorporated	$8,931,004	$5,526,069	$2,038,754	$1,261,481	$10,969,758	$6,787,550
Baldwin County	$18,841,781	$26,657,352	$4,301,168	$6,085,292	$23,142,949	$32,742,644

Note: Totals of all municipalities and unincorporated areas may not equal Baldwin County totals due to rounding.

Table 5-27. Building Count by Occupancy and Jurisdiction

Jurisdiction	Building Count by Occupancy													
	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future
	Agric.		Commercial		Education		Govt.		Industrial		Religion		Residential	
Bay Minette	12	15	187	229	7	8	4	5	59	72	17	21	3698	4535
Daphne	34	65	519	993	18	35	12	23	163	311	48	92	10,273	19,653
Elberta	2	7	33	106	1	4	1	2	10	33	3	10	657	2,093
Fairhope	24	48	374	729	13	26	9	17	117	228	35	68	7,397	14,420
Foley	22	63	336	958	12	34	8	22	105	300	31	89	6,657	18,956
Gulf Shores	15	43	228	658	8	23	5	15	72	206	21	61	4,520	13,025
Loxley	2	3	37	53	1	2	1	1	12	17	3	5	740	1047
Magnolia Springs	1	2	17	24	1	1	0	1	5	7	2	2	329	465
Orange Beach	8	18	120	276	4	10	3	6	38	87	11	26	2,383	5,466
Perdido Beach	1	1	12	18	0	1	0	0	4	6	1	2	247	349
Robertsdale	8	17	120	259	4	9	3	6	38	81	11	24	2,383	5,117
Silverhill	1	2	17	24	1	1	0	1	5	7	2	2	329	465
Spanish Fort	11	20	162	312	6	11	4	7	51	98	15	29	3,205	6,163
Summerdale	1	2	21	35	1	1	0	1	7	11	2	3	411	698
Unincorporated	129	80	1,969	1,218	69	43	46	28	617	382	182	113	38,956	24,107
Baldwin Co	272	385	4,154	5,878	146	207	96	136	1,302	1,842	385	545	82,185	116,292

Note: Totals of all municipalities and unincorporated areas may not equal Baldwin County totals due to rounding.

Table 5-28. Building Exposure by Jurisdiction and Hazard, Part A

Identified Hazard	Building Exposure ($1000s) by Jurisdiction													
	Bay Minette		Daphne		Elberta		Fairhope		Foley		Gulf Shores		Loxley	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future
Hurricanes	$1,041	$1,284	$2,893	$5,534	$185	$576	$2,083	$4,054	$1,875	$5,327	$1,273	$3,661	$208	$282
Flooding	$260	$321	$434	$830	$9	$29	$1,562	$3,040	$94	$266	$1,146	$3,295	$10	$14
Severe Storms	$1,041	$1,284	$2,893	$5,534	$185	$576	$2,083	$4,054	$1,875	$5,327	$1,273	$3,661	$208	$282
Tornadoes	$1,041	$1,284	$2,893	$5,534	$185	$576	$2,083	$4,054	$1,875	$5,327	$1,273	$3,661	$208	$282
Wildfires	$52	$64	$145	$277	$9	$29	$104	$203	$94	$266	$64	$183	$10	$14
Droughts/Heat Waves	$1,041	$1,284	$2,893	$5,534	$185	$576	$2,083	$4,054	$1,875	$5,327	$1,273	$3,661	$208	$282
Winter Storms/ Freezes	$1,041	$1,284	$2,893	$5,534	$185	$576	$2,083	$4,054	$1,875	$5,327	$1,273	$3,661	$208	$282
Earthquakes	$52	$64	$2,893	$5,534	$93	$288	$2,083	$4,054	$94	$266	$1,273	$3,661	$10	$14
Landslides	$10	$13	$29	$55	$2	$6	$21	$41	$19	$53	$13	$37	$2	$3
Dam/Levee Failures	$0	$0	$0	$0	$0	$0	$21	$41	$19	$53	$0	$0	$2	$3
Sinkholes (Land Subsidence)	$10	$13	$145	$277	$0	$0	$104	$203	$94	$266	$13	$37	$10	$14
Tsunamis	$10	$13	$29	$55	$2	$6	$21	$41	$19	$53	$13	$37	$2	$3
Manmade/ Technological	$1,041	$1,284	$2,893	$5,534	$185	$576	$2,083	$4,054	$1,875	$5,327	$1,273	$3,661	$208	$282

Table 5-28. Building Exposure by Jurisdiction and Hazard, Part B

Identified Hazard	Building Exposure ($1000s) by Jurisdiction																	
	Magnolia Springs		Orange Beach		Perdido Beach		Robertsdale		Silverhill		Spanish Fort		Summerdale		Unincorporated		Baldwin Co	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future	Existing	Future
Hurricanes	$93	$138	$671	$1,529	$69	$105	$671	$1,437	$93	$115	$903	$1,722	$116	$193	$10,970	$6,788	$23,143	$32,743
Flooding	$23	$34	$604	$1,376	$62	$94	$34	$72	$5	$6	$226	$431	$6	$10	$8,227	$5,091	$17,357	$24,557
Severe Storms	$93	$138	$671	$1,529	$69	$105	$671	$1,437	$93	$115	$903	$1,722	$116	$193	$10,970	$6,788	$23,143	$32,743
Tornadoes	$93	$138	$671	$1,529	$69	$105	$671	$1,437	$93	$115	$903	$1,722	$116	$193	$10,970	$6,788	$23,143	$32,743
Wildfires	$5	$7	$34	$76	$3	$5	$34	$72	$5	$6	$45	$86	$6	$10	$10,970	$6,788	$23,143	$32,743
Droughts/Heat Waves	$93	$138	$671	$1,529	$69	$105	$671	$1,437	$93	$115	$903	$1,722	$116	$193	$10,970	$6,788	$23,143	$32,743
Winter Storms/ Freezes	$93	$138	$671	$1,529	$69	$105	$671	$1,437	$93	$115	$903	$1,722	$116	$193	$10,970	$6,788	$23,143	$32,743
Earthquakes	$93	$138	$671	$1,529	$69	$105	$34	$72	$46	$57	$903	$1,722	$6	$10	$548	$339	$11,571	$16,371
Landslides	$1	$1	$7	$15	$1	$1	$7	$14	$1	$1	$9	$17	$1	$2	$548	$339	$1,157	$1,637
Dam/Levee Failures	$0	$0	$0	$0	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$110	$68	$231	$327
Sinkholes (Land Subsidence)	$5	$7	$0	$0	$1	$1	$7	$14	$5	$6	$45	$86	$6	$10	$548	$339	$1,157	$1,637
Tsunamis	$1	$1	$7	$15	$1	$1	$7	$14	$1	$1	$9	$17	$1	$2	$110	$68	$231	$327
Manmade/ Technological	$93	$138	$671	$1,529	$69	$105	$671	$1,437	$93	$115	$903	$1,722	$116	$193	$10,970	$6,788	$23,143	$32,743

Critical Facilities

HAZUS-MH estimates there are 107 critical facilities within Baldwin County, classifications listed in Table 5-29. The number of critical facilities will increase to approximately 151, according to future estimates.

Table 5-29. HAZUS-MH Essential Facilities Data

Classification	Existing Estimate	Future Estimate
Hospitals	4 (437 beds)	5.6 (616 beds)
Fire Stations	24	33.8
Police Stations	16	22.6
Schools	62	87.4
EOC	1	1.4

Infrastructure

Infrastructure inventories appear below. Infrastructure expansion is not directly related to population growth; consequently, no projections are given here. Most of the at-risk transportation system components are highway road segments and bridges, which are most vulnerable to flooding (Table 5-30).

Table 5-30. HAZUS-MH Transportation Systems Lifeline Inventory

System	Component	# Locations/Segments	Replacement Value ($ millions)
Highway	Bridges	224	$645.8
	Segments	113	$2,998.4
	Tunnels	0	$0
		Subtotal	***$3,664.2***
Railways	Bridges	0	$0
	Facilities	0	$0
	Segments	8	$45
	Tunnels	0	$0
		Subtotal	***$45.0***
Light Rail	Bridges	0	$0
	Facilities	0	$0
	Segments	0	$0
	Tunnels	0	$0
		Subtotal	***$0***
Bus	Facilities	0	$0
		Subtotal	***$0***
Ferry	Facilities	1	$1.3
		Subtotal	***$1.3***
Port	Facilities	4	$8.0
		Subtotal	***$8.0***

System	Component	# Locations/Segments	Replacement Value ($ millions)
Airport	Facilities	5	$53.5
	Runways	6	$227.8
		Subtotal	***$281.0***
		Total	**$3979.6**

The types of utilities most vulnerable to hazards are wastewater treatment plants, water treatment and distribution facilities, and electric power lines and substations. Hurricanes, severe storms, and flooding pose the greatest threat to these facilities (Table 5-31).

Table 5-31. HAZUS-MH Utilities Systems Lifeline Inventory

System	Component	# Locations / Segments	Replacement value ($ millions)
Potable Water	Distribution Lines	n/a	$130.5
	Facilities	1	$30.0
	Pipelines	0	$0
		Subtotal	***$160.4***
Waste Water	Distribution Lines	n/a	$78.3
	Facilities	19	$1,138.9
	Pipelines	0	$0
		Subtotal	***$1,2717.1***
Natural Gas	Distribution Lines	n/a	$52.2
	Facilities	1	$1.0
	Pipelines	0	$0
		Subtotal	***$53.2***
Oil Systems	Facilities	0	$0
	Pipelines	0	$0
		Subtotal	***$0***
Electrical Power	Facilities	1	$99.0
		Subtotal	***$99.0***
Communication	Facilities	29	$2.6
		Subtotal	***$2.6***
		Total	**$1532.4**

Local Inventories of Critical Facilities and Infrastructure

The following maps and tables show the locations of major critical facilities, including Government Facilities, Public Safety Facilities, Schools, Medical Facilities, Elderly Care Facilities, Utilities, Communication Facilities, Communication Towers, Community Shelters, Dams, and Transportation.

Table 5-32. Baldwin County Government Facilities

Agency	Address	City	Zip
Alabama Dept Transportation	47450 Rabun Rd	Bay Minette	36507
Alabama DOT	19800 State Highway 59	Summerdale	36580
Alabama Marine Police	27559 Perdido Beach Blvd	Orange Beach	36561
Baldwin County Court House	1 Courthouse Sq	Bay Minette	36507
Baldwin County Health Dept	257 Hand Ave	Bay Minette	36507
Baldwin County Health Dept	23280 Gilbert Dr	Robertsdale	36567
Baldwin County Highway Dept	22220 West Blvd	Silverhill	36576
Baldwin County Jail	200 Hand Ave	Bay Minette	36507
Baldwin County Transportation	18100 County Road 54	Robertsdale	36567
Baldwin County Welfare	1705 S Us Highway 31	Bay Minette	36507
Bay Minette City Hall	301 Dolive St	Bay Minette	36507
Daphne City Hall	1705 Main St	Daphne	36526
Daphne City Jail	1502 Us Highway 98	Daphne	36526
Elberta Town Hall	13052 Main St	Elberta	36530
Fairhope City Hall	555 s Section St	Fairhope	36532
Foley City Hall	407 East Laurel Ave	Foley	36535
Foley Municipal Court	200 E Section Ave	Foley	36535
Gulf Shores City Hall	2149 W 1st St	Gulf Shores	36542
Gulf Shores Court Clerk	1905 W 1st St	Gulf Shores	36542
Loxley Town Hall	1089 S Hickory St	Loxley	36551
Loxley Town Municipal Court	2131 E Relham Ave	Loxley	36551
Magnolia Springs Town Hall	12191 Magnolia Springs Hwy	Magnolia Springs	36555
Orange Beach City Hall	4099 Orange beach Blvd	Orange Beach	36561
Perdido Beach Town Hall	9212 County Rd 97	Perdido Beach	36562
Robertsdale Town Hall	22647 Racine St	Robertsdale	36567
Silverhill Municipal Court	16150 Silverhill Ave	Silverhill	36576
Silverhill Town Hall	15965 Silverhill Ave	Silverhill	36576

Agency	Address	City	Zip
Spanish Fort City Hall	7581 Spanish Fort Blvd	Spanish Fort	36527
Summerdale Town Hall	502 W Lee Ave	Summerdale	36580
Unemployment Tax Svc	200 W Michigan Ave	Foley	36535
US Post Office	601 McMeans Ave	Bay Minette	36507
US Post Office	808 Daphne Ave	Daphne	36526
US Post Office	6419 Bon Secour Hwy	Bon Secour	36511
US Post Office	6450 US Highway 90	Spanish Fort	36527
US Post Office	509 Fairhope Ave	Fairhope	36532
US Post Office	150 E Laurel Ave	Foley	36535
US Post Office	1059 S Holley St	Loxley	36551
US Post Office	70715 State Highway 59	Little River	36550
US Post Office	23336 County Road 47	Perdido	36562
US Post Office	17008 Scenic Hwy 98	Point Clear	36564
US Post Office	52925 Hodgson Rd	Stockton	36579
US Social Security Administration	368 Commercial Park Dr	Fairhope	36532

Source: Derived from US Company Database, 2013

Map 5-27. Government Facilities

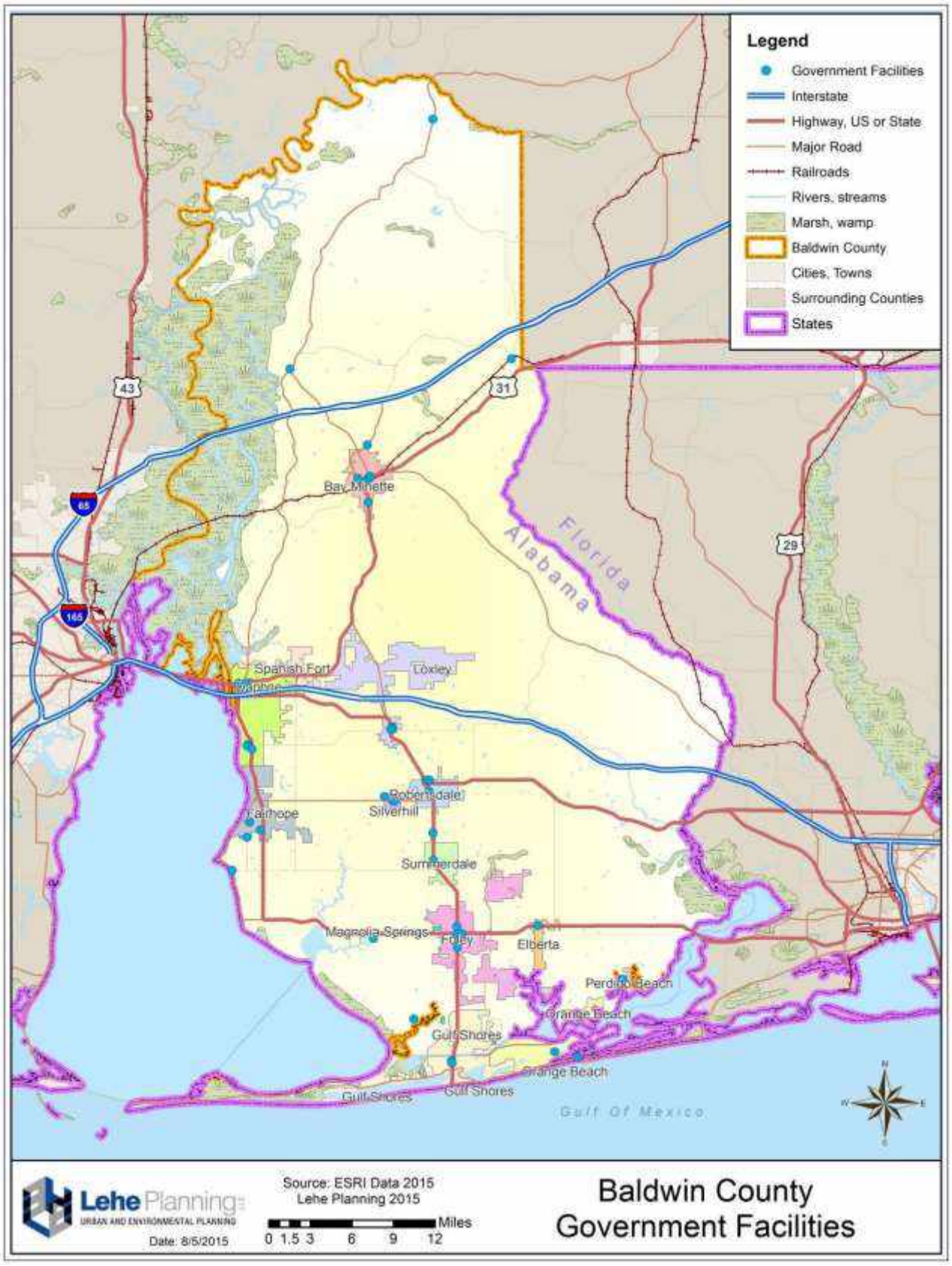


Table 5-33. Baldwin County Public Safety Facilities

Name	Address	City	Zip
Fairhope Volunteer Fire Dept	198 S Ingleside Ave	Fairhope	36533
Huggerlanding/Oyster Bay Volunteer Fire	4590 CR 6	Gulf Shores	36542
Gateswood Volunteer Fire Dept	33014 St Hwy 112	Robertsdale	36567
Styx River Volunteer Fire Dept	23350 Dunbar Rd	Robertsdale	36567
Stapleton Fire Dept	36276 State Highway 59	Stapleton	36578
Bay Minette Fire - Rescue	300 N Hoyle Ave	Bay Minette	36507
Belforest Volunteer Fire Search & Rescue	25490 Hwy 54 W	Daphne	36526
Robertsdale Volunteer Fire Dept	22575 St. Paul St	Robertsdale	36567
Silverhill Volunteer Fire Dept	22031 Sixth St	Silverhill	36576
Spanish Fort Fire Rescue	7580 Spanish Fort Blvd	Spanish Fort	36527
Summerdale Fire Dept	105 W Broadway Ave	Summerdale	36580
Fish River Marlow Fire & Rescue Dept	13355 CR 32	Summerdale	36580
Fort Morgan Volunteer Fire Dept	12105 Hwy 180 W	Gulf Shores	36542
Daphne Fire Dept	28280 N Main St	Daphne	36526
City of Foley Fire Dept	120 W Verbena Ave	Foley	36535
Bon Secour Volunteer Fire Dept	7392 Hwy 65	Bon Secour	36511
Elberta Volunteer Fire Dept	13120 Illinois St	Elberta	36530
Josephine Volunteer Fire Dept	6824 CR 95	Josephine	36530
Lillian Volunteer Fire Dept	34180 Widell Ave	Lillian	36549
Rabun Volunteer Fire Dept	47860 Rabun Rd	Bay Minette	36507
Barnwell Volunteer Fire & Rescue Dept	13319 CR 13	Fairhope	36532
Gulf Shores Fire Rescue	1921 W First St	Gulf Shore	36547
Orange Beach Fire & Rescue	25853 John Snook Dr	Orange Beach	36561
Magnolia Springs Fire Dept	14809 Gates Ave	Magnolia Springs	36555
Summerdale Police Dept	105 W Broadway St	Summerdale	36580
Daphne Police Dept	1502 Highway 98	Daphne	36526
Foley Police Dept	200 E Section Ave	Foley	36535

Name	Address	City	Zip
Loxley Police Dept	2139 E Relham Ave	Loxley	36551
Police Dept Records Div	220 Clubhouse Dr	Gulf Shores	36542
Silverhill Police Dept	22030 Sixth St	Silverhill	36576
Robertsdale Police Dept	22647 Racine St	Robertsdale	36567
Fairhope Police Dept	24 N Section St	Fairhope	36532
Orange Beach Police Dept	25855 John Snook Ave	Orange Beach	36561
Bay Minette Police Dept	300 N Hoyle Ave	Bay Minette	36507
Spanish Fort Police Chief	7581 Spanish Fort Blvd	Spanish Fort	36527
Sheriff-Civil Div Chief	1 Courthouse Sq	Bay Minette	36507
Baldwin County Sheriff	1100 Fairhope Ave	Fairhope	36532
Baldwin County Sheriff	201 E Section Ave	Foley	36535
Baldwin County Sheriff	18126 CR 54	Robertsdale	36567
Baldwin Sheriff	310 Hand Ave	Bay Minette	36507

Source: Info USA, 2001

Map 5-28. Baldwin County Public Safety Facilities

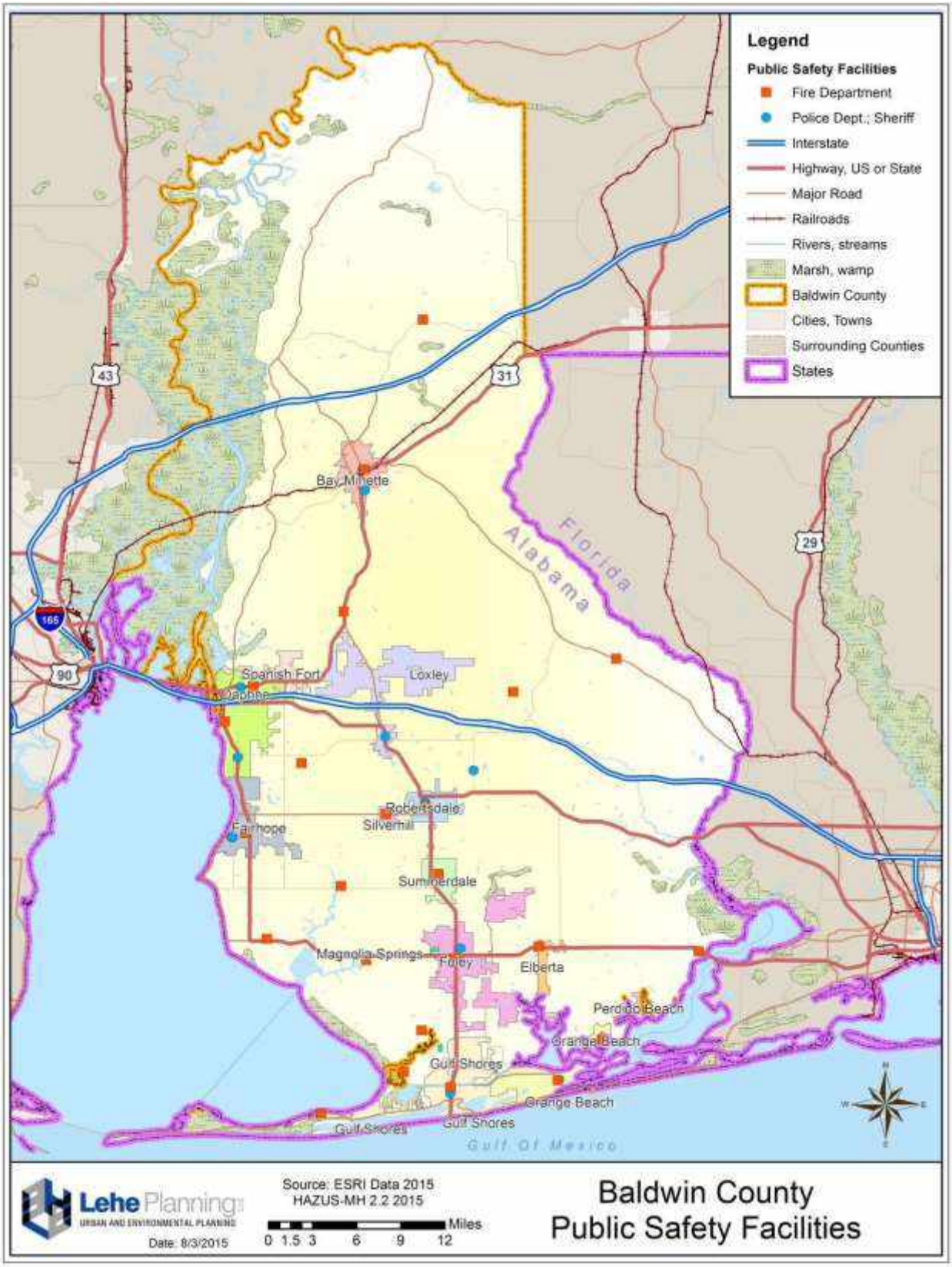


Table 5-34. Baldwin County Schools

Name	Students	Address	City	Zip
E J Carroll Intermediate School	306	1000 Main St	Daphne	36526
Fairhope Intermediate School	469	1101 Fairhope Ave	Fairhope	36532
Bay Minette Intermediate School	830	600 Blackburn Ave	Bay Minette	36507
Elberta Middle School	613	13355 Main St	Elberta	36530
Foley Intermediate School	267	2000 S Cedar St	Foley	36535
Spanish Fort Middle School	835	33899 Jimmy Faulkner Dr	Spanish Fort	36527
Fairhope Middle School	685	408 N Section	Fairhope	36532
Baldwin County Alternative School	332	6925 Twin Beech Rd	Fairhope	36532
Gulf Shores Middle School	573	450 E 15th Ave	Gulf Shores	36542
New Bay Minette Middle School	558	1131 W 13th St	Bay Minette	36507
Foley Middle School	725	201 N Pine St	Foley	36535
Central Baldwin Middle School	784	24545 State Hwy 59	Robertsdale	36576
Daphne Middle School	773	1 Jody Davis Cir	Daphne	36526
Robertsdale High School	1231	1 Golden Bear Dr	Robertsdale	36567
Foley High School	1374	1 Pride Pl	Foley	36535
Fairhope High School	1235	18800 Greeno Rd	Fairhope	36532
Gulf Shores High School	708	600 E 15th Ave	Gulf Shores	36542
Daphne High School	1416	9300 E Lawson Rd	Daphne	36526
Spanish Fort High School	711	1 Plaza Del Toros	Spanish Fort	36527
Baldwin County High School	1170	1 Tiger Dr	Bay Minette	36507
South Baldwin Center for Technology	514	19200 Anderson Ln	Robertsdale	36567
North Baldwin Center for Technology	514	505 W Hurricane Rd	Bay Minette	36507
Bayshore Christian School	165	23050 US Hwy 98	Fairhope	36532
Berean Baptist Christian School	37	24070 US Hwy 98	Elberta	36530
Daphne Elementary North	599	2307 Main St	Daphne	36526
Elberta Elementary School	478	25820 US Hwy 98	Elberta	36530
Foley Elementary School	673	200 N Cedar St	Foley	36535

Name	Students	Address	City	Zip
Rockwell Elementary	662	10183 US Hwy 31	Spanish Fort	36527
Spanish Fort Elementary	696	30900 State Hwy 225	Spanish Fort	36527
Gulf Shores Elementary	616	1600 E 3rd St	Gulf Shores	36542
Daphne East Elementary	513	26651 CR 13	Daphne	36526
Orange Beach Elementary	357	4900 Wilson Blvd	Orange Beach	36561
Christ the King Elementary	492	1503 Main St	Daphne	36526
Marietta Johnson School of Org.	30	8 Marietta Dr	Fairhope	36532
Open Door Christian School	117	20774 CR 12 S	Foley	36535
Fairhope K-1 Center	498	100 S Church St	Fairhope	36532
Eastern Shore Early Childhood	100	1090 Fairhope Ave	Fairhope	36532
Central Christian School	312	17395 Highway 104 W	Robertsdale	36567
Faith Presbyterian School	90	18632 Berner Rd	Robertsdale	36567
AL Gulf Coast Christian Academy	128	18930 CR 28	Foley	36535
Calvary Christian Learning Center	64	25550 Canal Rd	Orange Beach	36561
Bayside Academy PK-12	758	303 Dryer Ave	Daphne	36526
Cornerstone Preparatory School (PK-12)	162	6389 Spanish Fort Blvd	Spanish Fort	36527
Fairhope Primary School	444	2 N Bishop Rd	Fairhope	36532
Bay Minette Elementary	561	800 Blackburn Ave	Bay Minette	36507
Magnolia School	536	1 Jaguar Loop	Foley	36535
Delta Elementary	279	10251 White House Fork Rd	Bay Minette	36507
Silverhill Middle	342	15800 4th Ave	Silverhill	36576
Robertsdale Elementary	779	19150 Wilters St	Robertsdale	36567
Rosinton Elementary	283	19757 CR 64	Robertsdale	36567
Elsanor Elementary	250	23440 US Hwy 90	Robertsdale	36567
Stapleton Elementary	201	35500 Baldwin Ave	Stapleton	36578
Pine Grove Elementary	353	43980 Pine Grove Rd	Bay Minette	36507
Loxley Elementary	367	4999 S Magnolia St	Loxley	36551
Swift Consolidated Elementary	183	6330 Bon Secour Hwy	Bon Secour	36511
The Academy of Arts & Sciences	42	6900 Hwy 59	Gulf Shores	36542

Name	Students	Address	City	Zip
Eastern Shore Christian Academy	133	9078 Lawson Rd	Daphne	36526
J. Larry Newton Elementary	799	9761 CR 32	Fairhope	36532
Faith Christian Academy	75	18109 US HWY 98	Foley	36535
Grace Christian Academy	123	19470 Oak Rd W	Gulf Shores	36542
Victory Christian Academy	13	20511 CR 12 S	Foley	36535
St. Benedict Catholic School	169	12786 S Illinois St	Elberta	36530
St. Patrick Catholic School	198	23070 State Highway 59	Robertsdale	36567
Perdido Elementary	505	23589 CR 47	Perdido	36562
Summerdale School	543	400 E Broadway	Summerdale	36580
Good Shepherd Lutheran School	16	24933 Oak St	Elberta	36530
University of South Alabama - Baldwin Co	-	10 N Summit St	Fairhope	36532
University of South Alabama - Nursing Dept.	-	161 N Section St	Fairhope	36532
Faulkner State Community College	4094	1900 US Hwy 31 S	Bay Minette	36507
Huntingdon College	-	1903 Main St	Daphne	36526
Auburn University	-	8301 State Highway 104	Fairhope	36532

Source: US Department of Education, 2001

Map 5-29. Baldwin County Schools

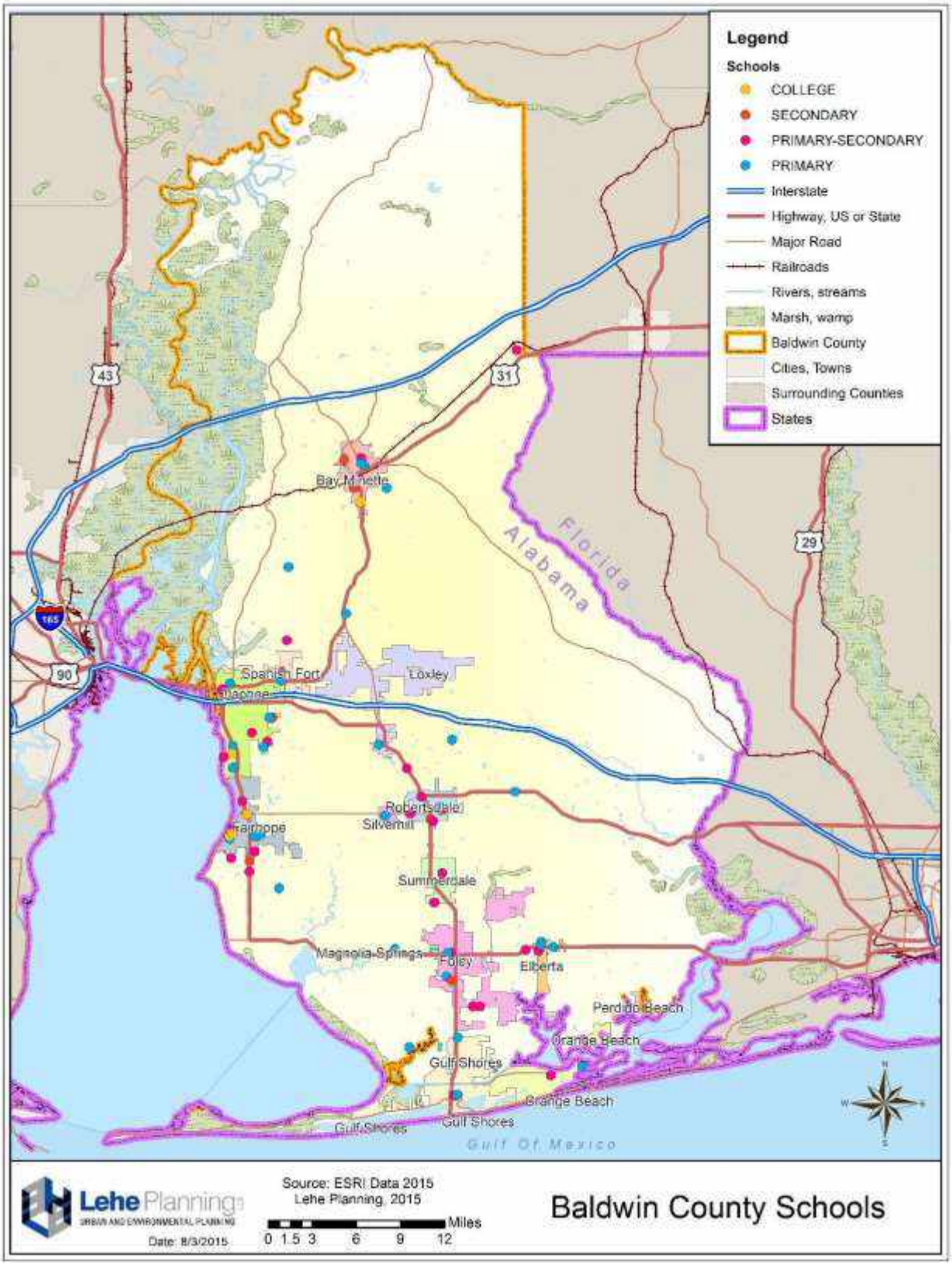


Table 5-35. Baldwin County Medical Facilities

Name	# Beds	Address	City	Zip
Mercy Medical	162	101 Villa Dr	Daphne	36526
North Baldwin Infirmary	43	1815 Hand Ave	Bay Minette	36507
South Baldwin Regional Medical Center	82	1613 N Mackenzie St	Foley	36535
Thomas Hospital	150	750 Morphy Ave	Fairhope	36532

Source: American Hospital Association, 2000

Map 5-30. Baldwin County Medical Facilities

Table 5-36. Baldwin County Elderly Care Facilities

Name	Address	City	Zip
Age Well At Home, Inc.	620 E 21st Ave	Gulf Shores	36542
Azalea Place Assisted Living	2411 S Highway 31	Bay Minette	36507
Bay Minette Rotary Village	2211 McMillan Ave	Bay Minette	36507
Beverly Healthcare	108 S Church St	Fairhope	36532
Community Health Care Systems	25819 Canal Rd	Orange Beach	36561
Community Hospice	2770 S McKenzie St	Foley	36535
Community Hospice Of Baldwin	311 Dolive St	Bay Minette	36507
Covenant Hospice	6475 Van Buren St	Daphne	36526
Crossroad Assisted Living	42020 Snowden Ln	Bay Minette	36507
Foley Nursing Home	1701 N Alston St	Foley	36535
Garden of Daphne	1307 Daphne Ave	Daphne	36526
Hamlet Retirement Home	214 Windsor Dr N	Fairhope	36532
Homestead Village Of Fairhope	924 Plantation Blvd	Fairhope	36532
Hospice South	1113 N McKenzie St	Foley	36535
Magnolia House, Inc.	10171 Papageorge St	Daphne	36526
Magnolia Manors of Bay Minette	709 W 14th St	Bay Minette	36507
Mid Delta Hospice	300 S Greeno Rd	Fairhope	36532
Montrose Bay Health Care Center	22670 Main St	Montrose	36559
Nursing Advantage, Inc.	22913 CR 62 N	Robertsdale	36567
Oakwood	2010 Medical Center Dr	Bay Minette	36507
Robertsdale Healthcare Center	18000 US Hwy 90	Robertsdale	36567
Skilled Nursing At Westminster	500 Spanish Fort Blvd	Spanish Fort	36527
William F Green St Vet Home	300 Faulkner Dr	Bay Minette	36507
Wiregrass Hospice, Inc.	23210 US 98	Fairhope	36532

Source: Derived from US Company Database, 2013

Map 5-31. Baldwin County Elderly Care Facilities

Table 5-37. Baldwin County Utilities

Name	City	Zip	Latitude	Longitude
ADOT I-10 Welcome Center Lagoon	Loxley	36551	30.57767	-87.41919
Baldwin County Electric Cooperation	Gulf Shores	36547	30.24875	-87.81328
Bay Minette Martin Br Lagoon	Bay Minette	36507	30.89947	-87.79936
Fairhope Sewage Treatment Plant	Fairhope	36532	30.529969	-87.904249
Foley Waste Water Treatment Plant	Foley	36535	30.4025	-87.66172
Gulf Shores Waste Water Treatment Plant	Gulf Shores	36542	30.27664	-87.66661
Harry Still Sr Waste Water Treatment Plant	Bay Minette	36507	30.88558	-87.764059
Lake Forest Waste Water Treatment Plant	Daphne	36526	30.6525	-87.924999
Landing Incorporation Wastewater Treatment Plant	Stockton	36579	30.97858	-87.87017
Lillian Sewer Co LLC WWTP	Lillian	36549	30.39314	-87.46053
Loxley Town Of Lagoon	Loxley	36551	30.612279	-87.760829
Orange Beach City Of	Orange Beach	36561	30.289919	-87.61758
Pollution Contl. Sys Ft Morgan	Fort Morgan	36542	30.237499	-87.924999
Riverdocs, Inc.	Daphne	36526	30.675499	-87.96764
Riviera Utilities	Foley	36535	30.394169	-87.704719
Robertsdale WWTP	Robertsdale	36567	30.55328	-87.677999
South Ala Sewer Services WWTP	Fort Morgan	36542	30.25503	-87.73744
Spanish Fort Water System, Inc.	Spanish Fort	36527	30.724	-87.91819
Steelwood Limited WWTP	Loxley	36551	30.69614	-87.72083
Tensaw Island Land Shores WWTP	Bay Minette	36507	30.840969	-87.90883

Source: Environmental Protection Agency, 2001

Map 5-32. Baldwin County Utilities

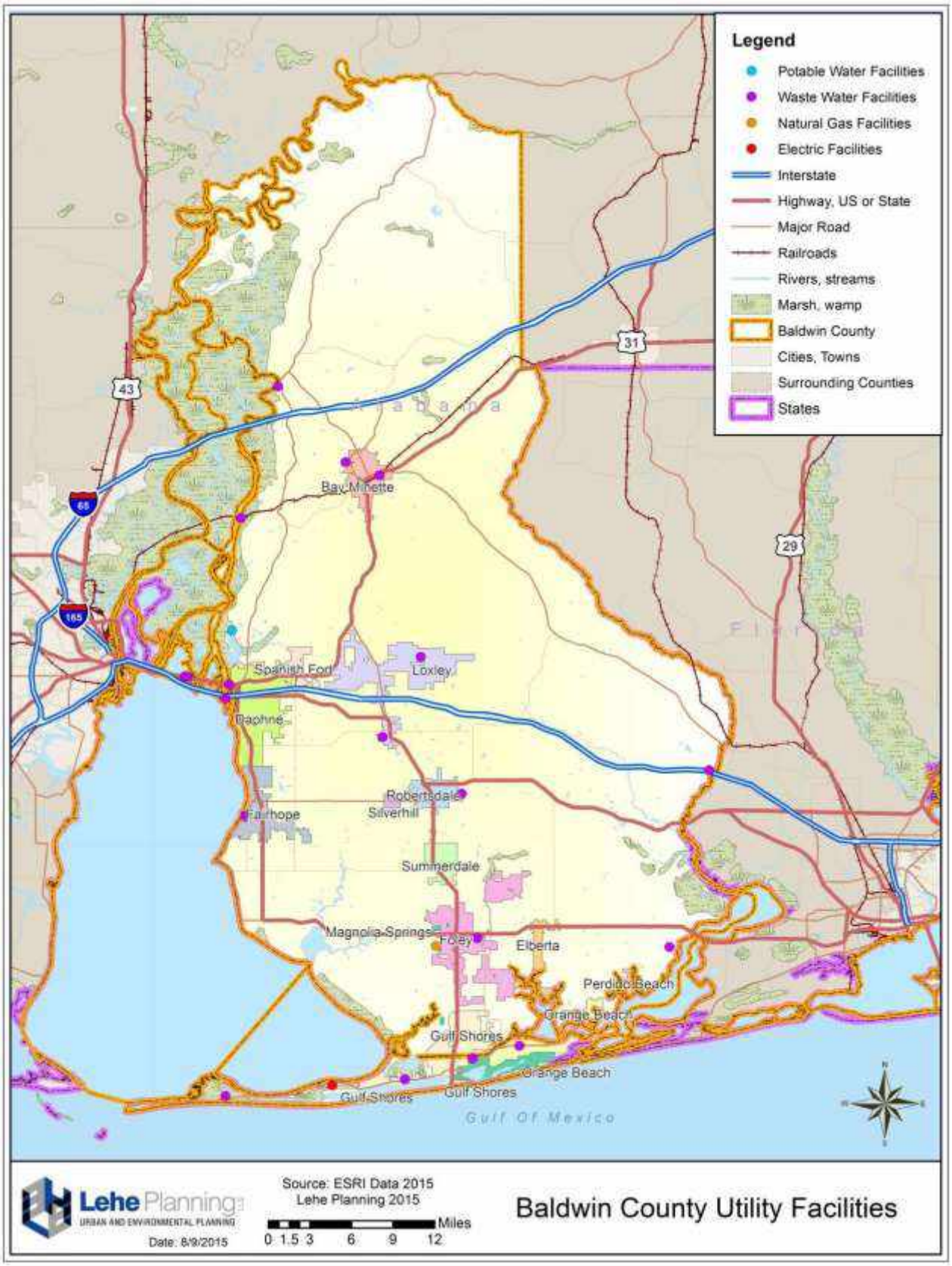


Table 5-38. Baldwin County Communication Facilities

Name	Owner	City
WEIQ CH 42	Alabama Educational TV Co.	Mobile
WPMI CH 15	Clear Channel Broadcasting	Mobile
WALA-TV CH 10	Emmis Television License	Mobile
WEAR-TV CH 3	Wear Licensee, LLC	Pensacola
WMPV-TV CH 21	Trinity Broadcasting Network	Mobile
WHBR CH 33	Christian Television of Pensacola	Pensacola
WKRG-TV CH 5	Media General Broadcasting	Mobile
WJTC CH 44	Clear Channel Broadcasting	Mobile
WBPG CH 55	WBPG License Corp.	Gulf Shores
WLVV 1410	WLVV, Inc.	Mobile
WDLT 660	Cumulus Licensing Corp.	Fairhope
WBCA 1110	Southern Media Communications	Bay Minette
WABF 1220	Gulf Coast Broadcasting Co.	Fairhope
WDXZ 1000	Great American Radio Network	Robertsdale
WBLX-FM CH 225	Cumulus Licensing Corp.	Mobile
WYOK CH 281	Cumulus Licensing Corp.	Atmore
WMXC CH 260	Clear Channel Broadcasting	Mobile
WJLQ CH 264	Cumulus Licensing Corp.	Pensacola
WNSP CH 288	Com+, LLC	Bay Minette
WBHY-FM CH 203	Goforth Media, Inc.	Mobile
WXBM-FM CH 274	6 Johnson Rd Licenses	Milton
WPCS CH 208	Pensacola Christian College	Pensacola
WCSN-FM CH 289	Gulf Coast Broadcasting Co.	Orange Beach
WRKH CH 241	Clear Channel Broadcasting	Mobile
WKSJ-FM CH 235	Clear Channel Broadcasting	Mobile
WTKX-FM CH 268	Clear Channel Broadcasting	Pensacola
WHIL-FM CH 217	Spring Hill College	Mobile

Name	Owner	City
WABB-FM CH 248	WABB-FM, Inc.	Mobile
WMEZ CH 231	6 Johnson Rd Licenses	Pensacola

Source: Federal Communication Commission, 2001

Map 5-33. Baldwin County Communication Facilities

Map 5-34. Baldwin County Communication Towers

Table 5-39. Baldwin County Emergency Shelters

Name	Capacity	Address	City	Zip
Baldwin County High School	1733	1 Tiger Dr	Bay Minette	36507
Bay Minette Middle School	700	600 Blackburn Ave	Bay Minette	36507
Central Baldwin Middle School	813	24545 State Hwy 59	Robertsdale	36576
Daphne East Elementary School	388	26651 CR 13	Daphne	36526
Fairhope High School	1357	18800 Greeno Rd	Fairhope	36532
Foley High School	1377	1 Pride Pl	Foley	36535
Robertsdale High School	858	1 Golden Bear Dr	Robertsdale	36567
Baldwin County Coliseum	1900	19477 Fairground Rd	Robertsdale	36567
Fairhope Satellite Courthouse	40	1100 Fairhope Ave	Fairhope	36532
Foley Satellite Courthouse	40	201 East Section St	Foley	36535
Baldwin Co (Level 2) Community Shelter	50	207 N White Ave	Bay Minette	36507

Source: Baldwin County Emergency Management Agency, 2015

Map 5-35. Baldwin County Emergency Shelters

Table 5-40. Baldwin County Dams

Dam Name	River	Year Completed	NID Height (Ft.)	Max Discharge	Max Storage
Baroco Lake Dam No. One	TR-Soldier Creek	1970	12	500	53
Bob Pace	TR-Blackwater River	1973	17	184	323
Branchland Lake Dam	Cowpen Creek - Offstream	1958	18	700	72
Calvin Childers Lake Dam No. One	TR-Polecat Creek	1968	16	500	70
Calvin Childers Lake Dam No. Two	TR-Polecat Creek	1958	22	370	100
Childress Dam	TR-Blackwater River	1981	15	330	142
Cook Lake Dam	TR-Blackwater River	1955	12	500	100
Cooper Number One	Mill Creek	1968	14	271	233
Corte Dam	Fly Creek	1981	21	580	73
Crosby Lumber Co.	TR- McCurtin Creek	1972	17	1,200	200
Deep South Girl Scouts Lake	Aikin Creek	1983	30	-	583
John Q. Kendrick	TR-Styx River	1968	21	105	180
JP Bertolli	TR-Styx River	1955	15	80	93
Lake Bobo	TR-Joes Creek	1974	15	99	160
Lake Muriel	Owens Creek	1967	16	210	512
Laupero Use	TR-Bay Minette Creek	1957	19	127	132
Miles Neuman	TR-Spring Branch	1979	18	384	232
Patterson	Seven Mile Creek	1958	34	800	2,640
Paul Childress Lake Dam	TR-Blackwater River	1951	10	-	80
Raynag UA	Perone Branch	1969	17	550	404
Stacey Lake Dam	TR-Whitehouse Creek	1968	15	700	65
Tennessee Coal & Iron	Roans Creek	1953	24	13,000	2,000
Wynn Brothers Lake Dam	TR-Polecat Creek	1969	35	500	140

Source: Army Corps of Engineers, National Inventory of Dams, 1999

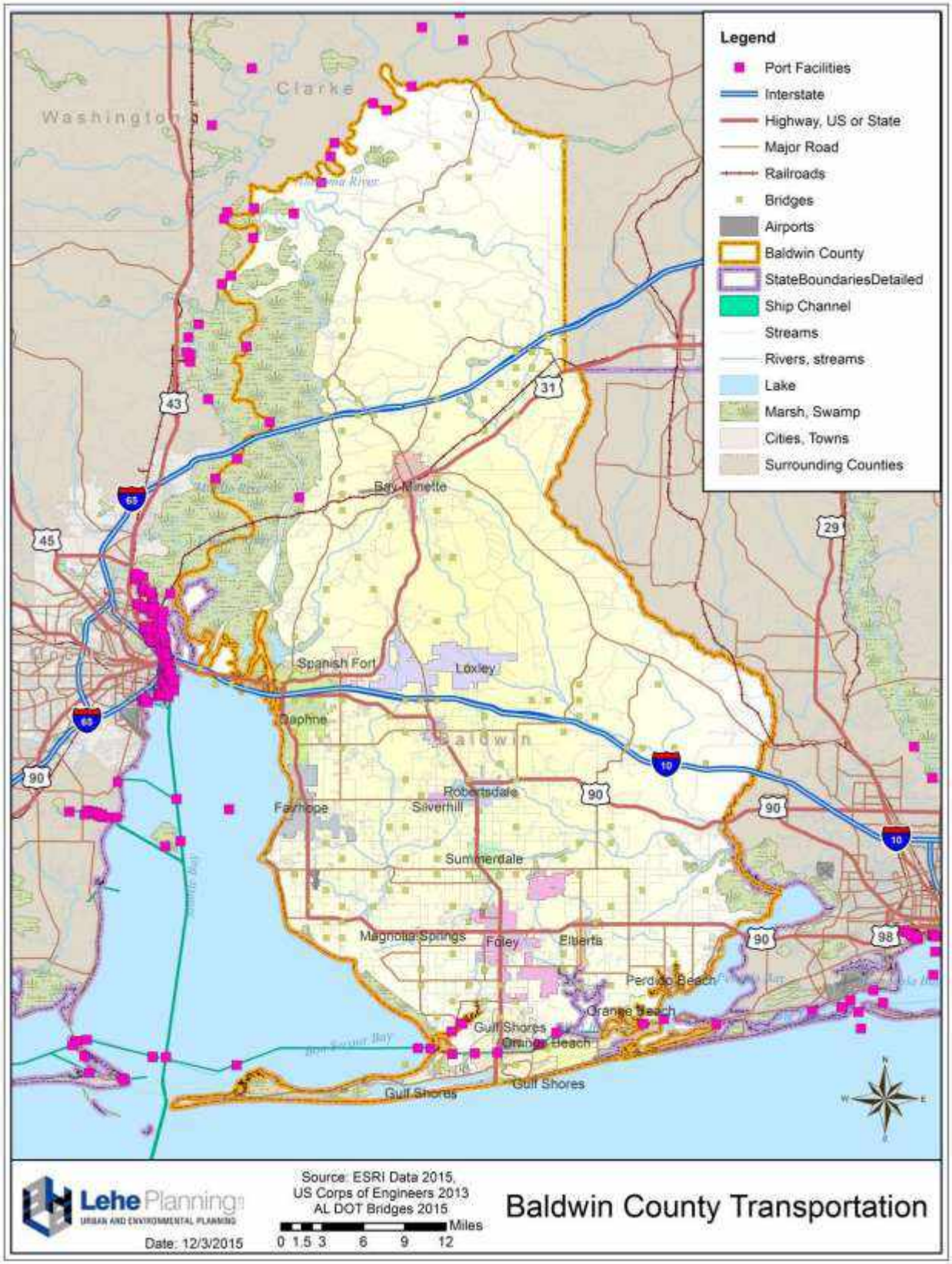
Map 5-36. Baldwin County Dams

Table 5-41. Baldwin County Port Facilities

Port Facility	City	Waterway
Alabama River Cut-off	Stockton	Alabama-Coosa Rivers, AL and GA
Andrew G Inc.	Gulf Shores	Bon Secour River, AL
C&H Towing, Inc.	Gulf Shores	Bon Secour River, AL
Dredge Area	Orange Beach	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Ewin Seafood Co.	Gulf Shores	Bon Secour River, AL
Gulf Coast Bagged Products	Gulf Shores	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Miflin and Wolf Creek	Orange Beach	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Mile 162 GIWE Bank Unloading	Orange Beach	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Mt. Vernon Landing (Pulpwood)	Stockton	Mobile River Channel
Orange Beach, AL	Orange Beach	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Portage Creek	Gulf Shores	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Reynold (Sand)	Gulf Shores	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Tensaw River Docks & Storage Yard Wharf	Bay Minette	Mobile River Channel
Vulcan Materials	Gulf Shores	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL
Wilken Bend Landing	Stockton	Alabama-Coosa Rivers, AL and GA
Zekes Landing	Orange Beach	Gulf Intracoastal Waterway, Pensacola Bay, FL to Mobile Bay, AL

Source: US Army Corps of Engineers, 2000 (*Port facilities are portrayed on Map 5-37)

Map 5-37. Baldwin County Transportation Infrastructure



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 above in Section 5.5. Lost estimates are calculated using the structure, contents, and function of each asset. The following definitions are used:

- ✓ *Structure loss* – (% damage) X ($ replacement value of the structure)
- ✓ *Content loss* – (% damage) X ($ replacement value of the contents)
- ✓ *Functional Loss* - indirect effects of the hazard, such as the days of interruptions in operations that an asset incurs during an event.

For hazards with damage records, loss estimates count damages from the most probable severity. For location-specific events, loss estimates evaluate the affected parts of each jurisdiction. 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 tornadoes, severe storms, winter storms/freezes, droughts/heat waves, wildfires, and earthquakes. In contrast, exposure to location-specific hazards—including flooding, dam/levee failures, sinkholes and landslides—varies widely among jurisdictions.

5.6.2 Loss Estimate Methodology

Method 1: HAZUS-MH Loss Estimates

This plan estimates losses using HAZUS-MH, which was used as a basis for the vulnerable structures inventory of Section 5.5. HAZUS-MH uses approximations and algorithms to estimate losses, 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. These 2015 HAZUS-MH loss estimates are updates of the 2010 plan estimates.

HAZUS-MH offers three levels of analysis. Level 1 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 on 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 5.4 "Hazard Profiles" and Appendix E "Hazard Profile Data");
3. National Weather Service Alabama Tornado database; and
4. Alabama State Hazard Mitigation Plan, 2013 update, section 5.4 "Vulnerability Assessment and Loss Estimation."

Jurisdictional Estimates

To derive jurisdictional estimates, the planning team used existing (2014) and future (2035) population estimates to distribute losses among Baldwin County's 15 jurisdictions. Population distribution appears in Table 5-42 below. (See Section 5.5.2 "Inventory Methodology"). The damage estimates in this section, however, only apply to existing conditions.

Table 5-42. Population Distribution by Jurisdiction, 2014 & 2035

Jurisdiction	Estimated 2014	% of 2014	Projected 2035	% of 2035 Projection
Bay Minette	9,049	4.5%	11,105	3.92%
Daphne	24,395	12.5%	47,849	16.90%
Elberta	1,634	0.8%	4,970	1.76%
Fairhope	18,089	9.0%	35,050	12.38%
Foley	16,243	8.1%	46,074	16.27%
Gulf Shores	10,963	5.5%	31,661	11.18%
Loxley	1,725	0.9%	2,437	0.86%
Magnolia Springs	782	0.4%	1,180	0.42%
Orange Beach	5,788	2.9%	13,216	4.67%
Perdido Beach	624	0.3%	907	0.32%
Robertsdale	5,773	2.9%	12,431	4.39%
Silverhill	754	0.4%	984	0.35%
Spanish Fort	7,806	3.9%	14,880	5.26%
Summerdale	1,005	0.5%	1,677	0.59%
Unincorporated	95,481	47.4%	58,693	20.73%
Baldwin Co	200,111	100%	283,120	100.00%

Source: US Census, AL State Data Center

5.6.3 HAZUS-MH Loss Estimates

The planning team utilized HAZUS-MH 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 July 29, 2015.
2. HAZUS-MH Hurricane Frederic Global Summary and Quick Assessment Reports, dated July 29, 2015.
3. HAZUS-MH 500 Year Earthquake Event Global Summary and Quick Assessment Reports, dated August 10, 2015

Hurricane Loss Estimates

The planning team used HAZUS-MH to assess two hurricane events: a 100-year scenario and the 1979 Frederic historical event. Hurricane Frederic unleashed high winds and flooding and spawned tornadoes across Alabama, but HAZUS only assesses the hurricane wind effects. The following Tables 5-43 and 5-44 show the loss estimates generated by HAZUS-MH for each of these events, followed by Maps 5-38 through 5-42, which show the geographic distribution of economic losses, debris volume, and wind speeds (for Frederic only).

Probabilistic Hurricane Scenario. The HAZUS model estimates that a 100-year hurricane event would cause $5.4 billion of damage and cause at least moderate damage to 23% 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 $14.5 billion. Almost 17% of all buildings would be destroyed in a 500-year hurricane event.

Maps 5-38 and 5-39 show direct economic losses and debris volume generated, by census tract, as a result of a 100-year hurricane. 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, which show the locations of estimated economic losses in relation to each municipality.

Table 5-43. 100 Year Hurricane Event Loss Estimates

General Building Stock

Occupancy	Building Count	Dollar Exposure ($ K)
Residential	82,185	18,841,781
Commercial	4,154	2,837,089
Other	2,203	1,464,079
Total	88,542	23,142,949

Number of Residential Buildings Damaged

Return Period	Minor	Moderate	Severe	Destruction	Total
10	974	129	3	0	1,106
20	9,130	1,900	76	56	11,163
50	25,886	11,247	1,722	1,021	39,876
100	27,460	18,843	5,668	3,417	55,388
200	9,284	10,324	10,117	9,129	38,854
500	17,122	24,367	17,686	14,552	73,728
1000	12,326	22,718	21,563	21,079	77,686

Number of Buildings Damaged

Return Period	Minor	Moderate	Severe	Destruction	Total
10	1,054	135	3	0	1,192
20	9,690	2,093	105	57	11,945
50	27,338	12,459	2,181	1,038	43,017
100	28,893	20,578	6,846	3,469	59,786
200	9,766	11,061	11,573	9,259	41,658
500	17,949	26,201	20,569	14,750	79,468
1000	12,911	24,332	25,067	21,365	83,675

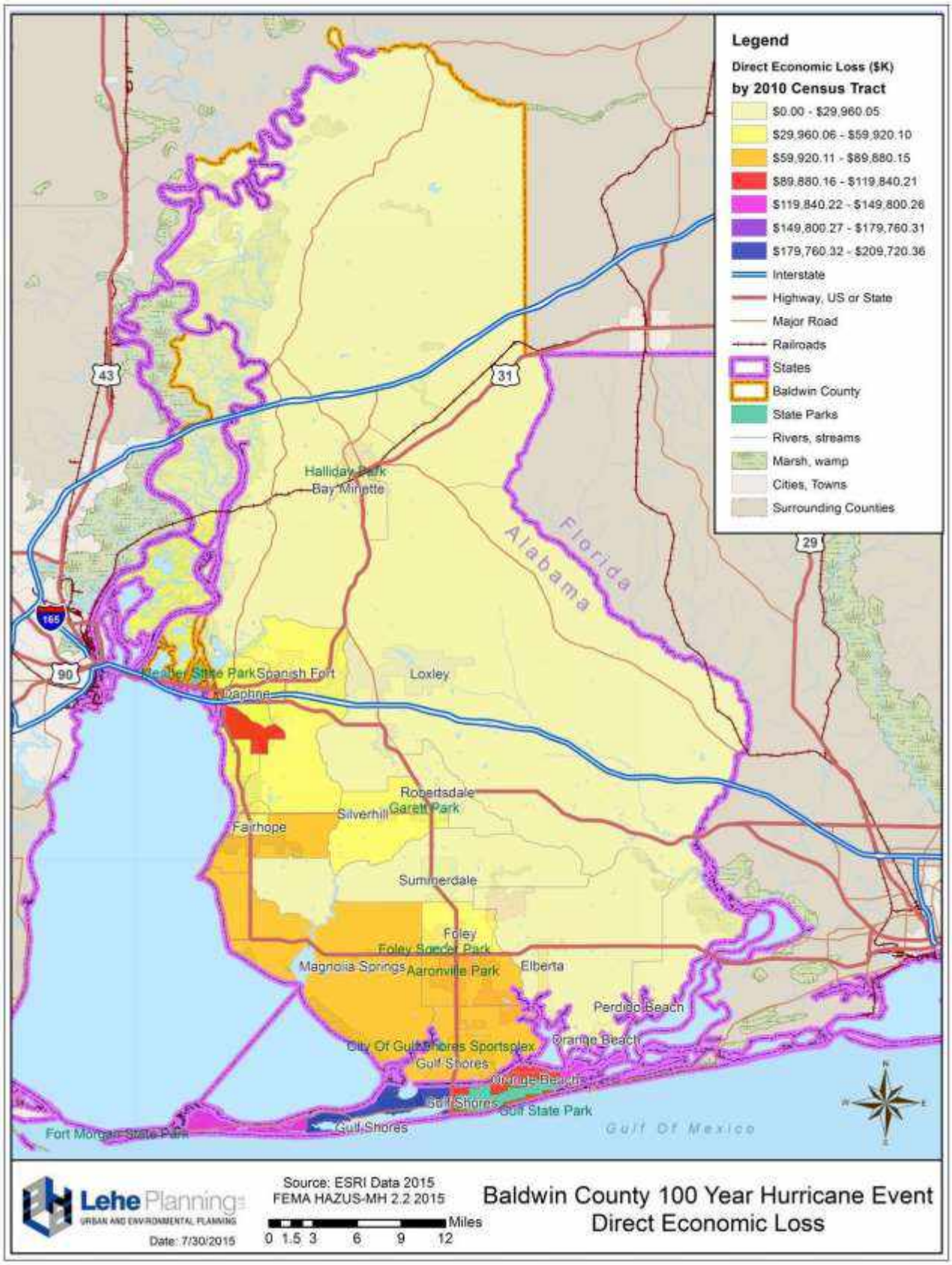
Shelter Requirements

Return Period	Displaced Households (#Households)	Short Term Shelter (#People)
10	24	5
20	316	69
50	2,475	566
100	7,663	1,759
200	15,843	3,733
500	30,494	7,044
1000	40,650	9,367

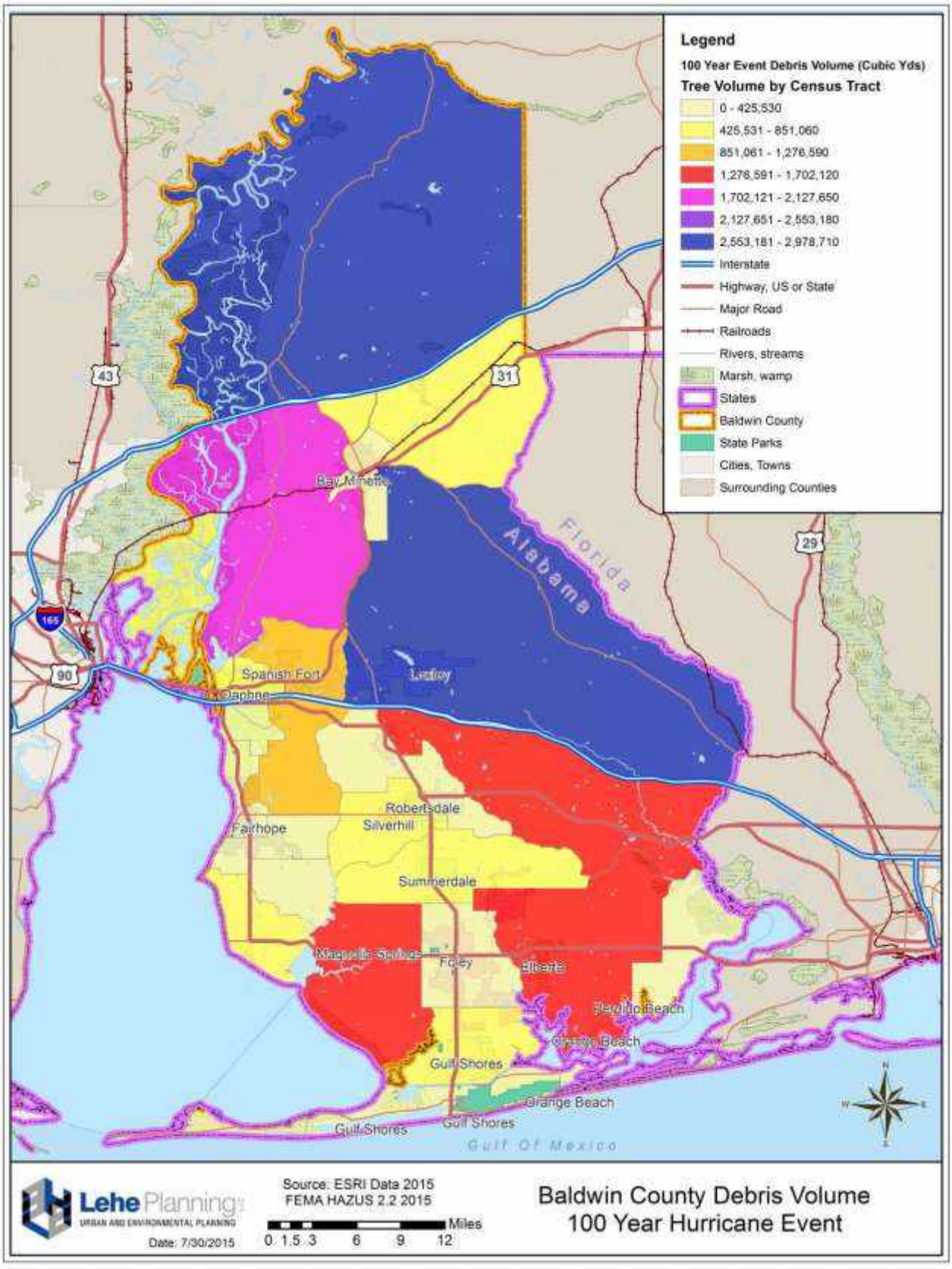
Economic Loss (x 1000)

	Property Damage (Capital Stock) Losses		Business Interruption (Income) Losses
ReturnPeriod	Residential	Total	
10	73,503	74,925	4,502
20	375,709	400,520	40,658
50	1,807,276	2,075,051	315,164
100	3,997,114	4,681,585	741,581
200	6,886,683	8,046,853	1,097,339
500	10,641,653	12,687,122	1,792,568
1000	13,445,075	16,141,322	2,213,954
Annualized	145,468	168,835	23,263

Map 5-38. 100 Year Hurricane Event Direct Economic Loss



Map 5-39. 100 Year Hurricane Event Debris Volume



Hurricane Frederic Scenario. The HAZUS-MH assessment reports major building damage resulting from peak wind gusts of as high as 124 mph for Hurricane Frederic. Over 36 percent (32,000) of all buildings in Baldwin County would receive some damage and 500 of those damaged buildings would be destroyed. HAZUS reports over $1,526 million in building and related damage. Map 5-40 shows direct economic loss by census tract, as a result of a hurricane similar to Frederic. Areas along the Gulf Coast, such as Gulf Shores, Orange Beach, and Daphne would experience the greatest economic loss. Map 5-41 shows the volume of debris accumulated as a result of a hurricane of this magnitude. Most of the debris generation lies in areas north of I-10 and I-65. Map 5-42 portrays Hurricane Frederic wind speeds; communities along the Gulf Coast experience the highest wind speeds.

Table 5-44. Hurricane Frederic Loss Estimates

General Building Stock

Occupancy	*Building Count*	*Dollar Exposure ($ M)*
Residential	82,185	18,842
Commercial	4,154	2,837
Other	2,203	1,464
Total	88,542	23,143

Number of Buildings Damaged

Damage State	*Residential*	*Commercial*	*Other*	*Total*
Minor	21,000	800	400	22,000
Moderate	7,400	600	200	8,200
Severe	900	200	80	1,100
Destruction	500	<10	<10	500
Total	30,000	1,600	800	32,000

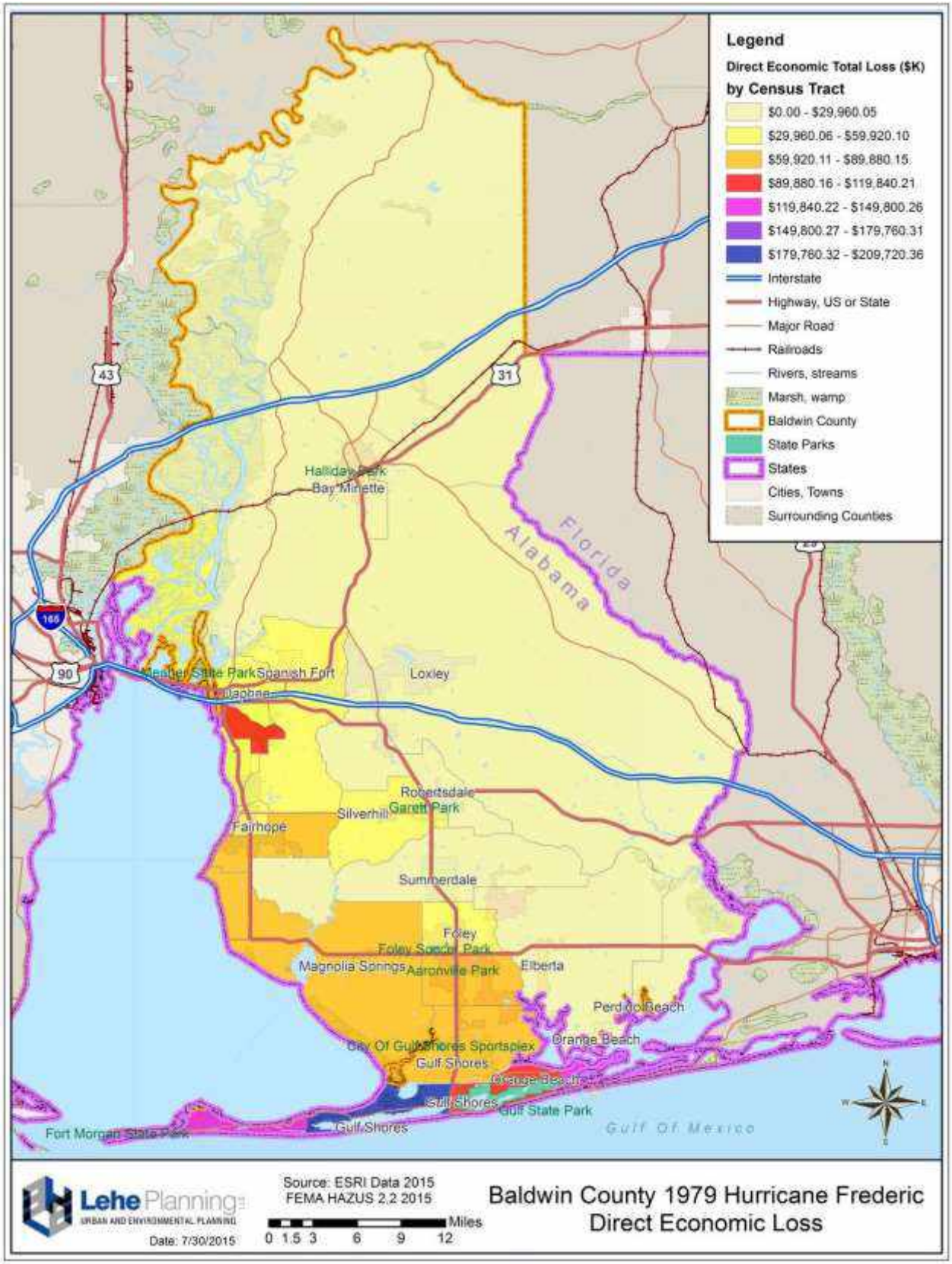
Shelter Requirements

Displaced Households (# Households)	1,400
Short Term Shelter (# People)	300

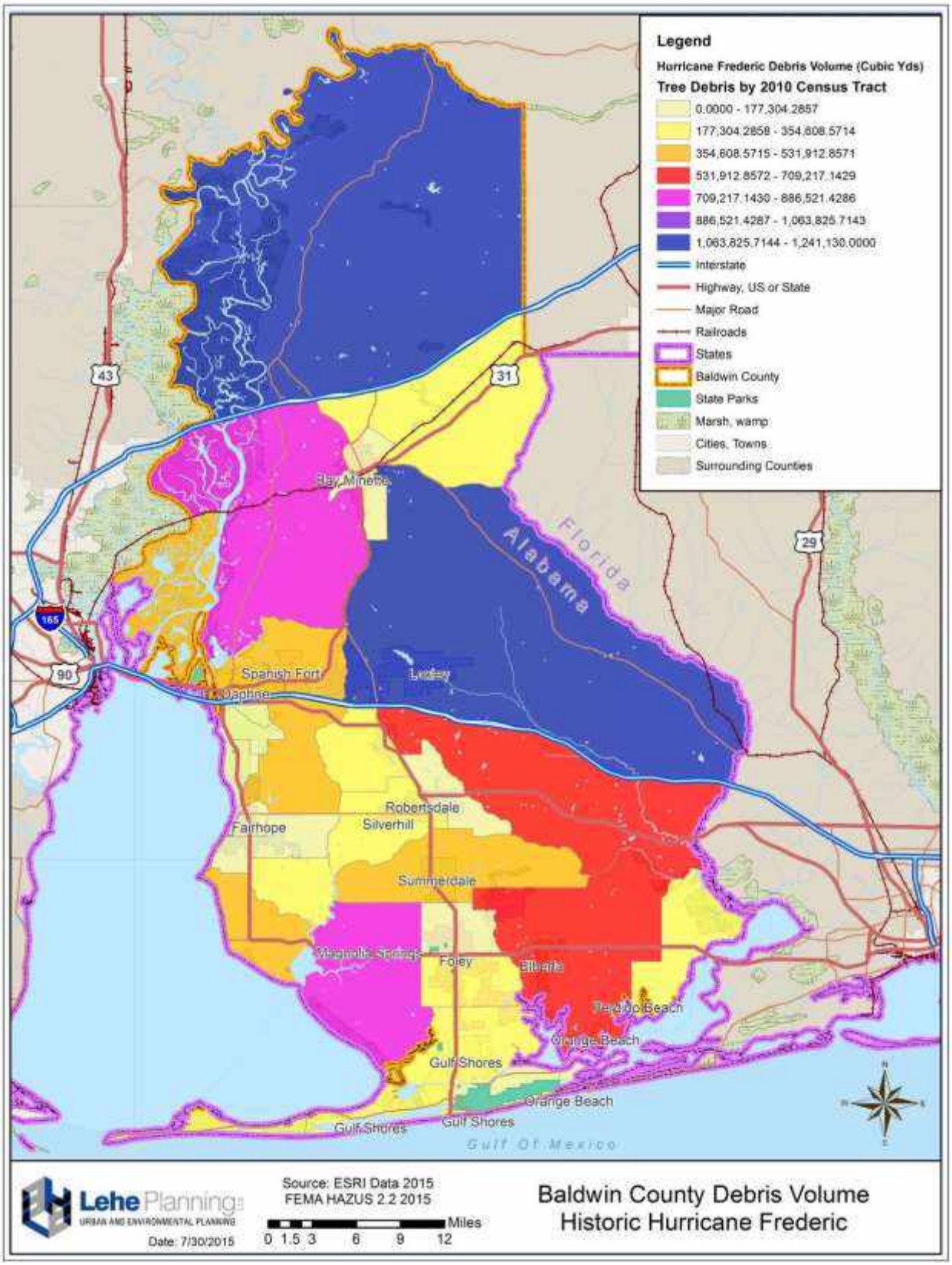
Economic Loss ($ Millions)

Capital Stock		1,339
Residential Property	1,192	
Commercial Property	105	
Other Property	42	
Business Interruption (Income)		187
Total Direct Economic Loss		1,526

Map 5-40. Hurricane Frederic Direct Economic Loss



Map 5-41. Hurricane Frederic Debris Volume



Map 5-42. Hurricane Frederic Wind Speeds

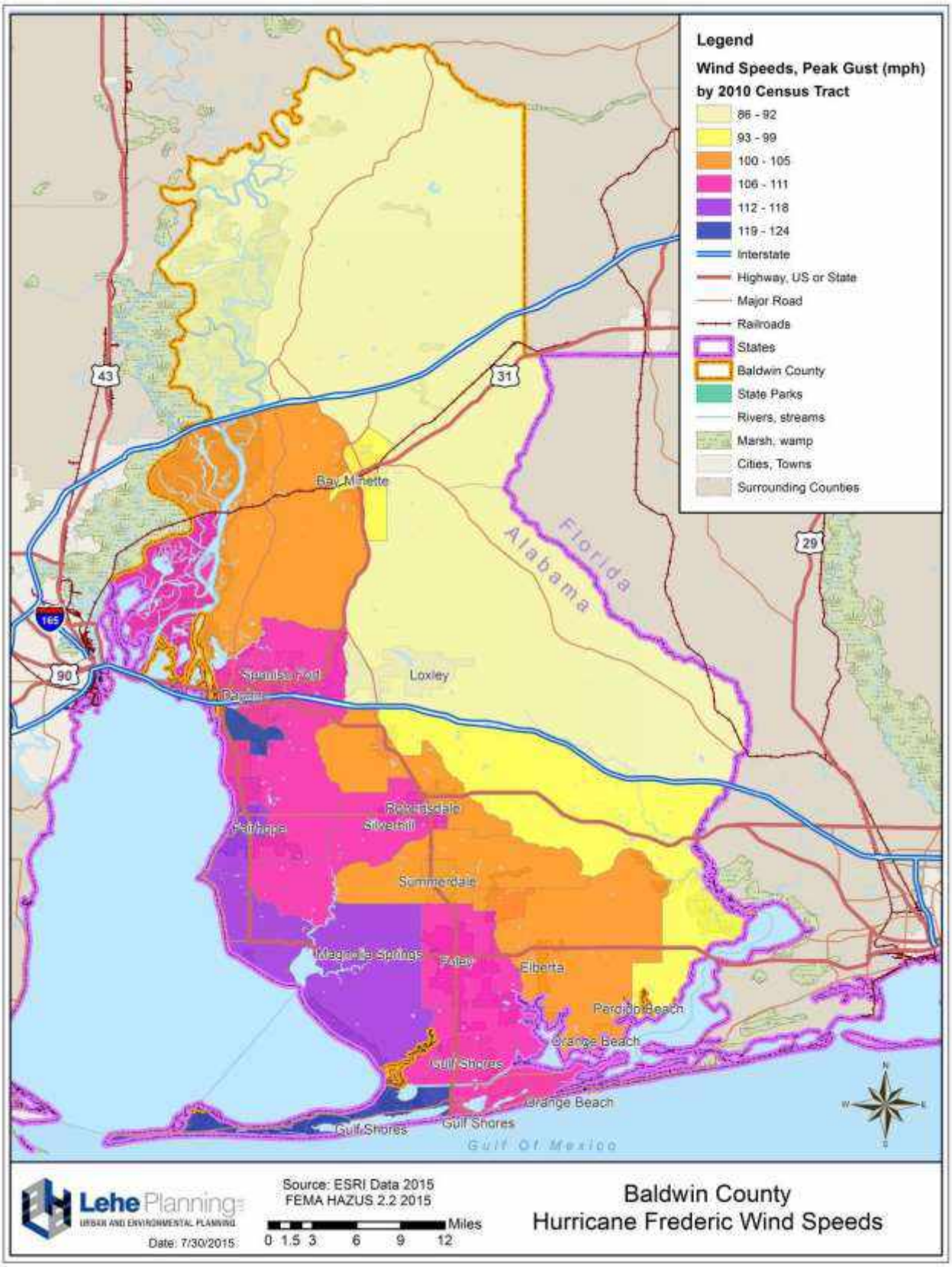


Table 5-45. Comparative Hurricane Scenarios Economic Losses

Hurricane Scenario	Total Bldg.	Res. Bldg. Damaged	Total Bldg. Damaged	% of Total Bldg.	Res. Damage ($1,000)	Total Bldg. Damage ($1,000)	Business Interruption Losses ($1,000)	Total Economic Losses ($1,000)
Hurricane Frederic	88,000	29,670	31,983	81.4%	$18,841,781	$1,338,642	$187,433	$1,526,074
10 Yr.	88,000	1,106	1,192	92.8%	$73,503	$74,925	$4,502	$79,427
50 Yr.	88,000	39,876	43,017	92.7%	$1,807,276	$2,075,051	$315,164	$2,390,215
100 Yr.	88,000	55,388	59,786	92.6%	$3,997,114	$4,681,585	$741,581	$5,423,166
500 Yr.	88,000	73,728	79,468	92.8%	$10,641,653	$12,687,122	$1,792,568	$14,479,690

Flood Loss Estimates

The planning team attempted to run the HAZUS-MH flood module to assess the 100-year flood event scenario. However, due to a lack of stream elevation, the module could not be run.

Earthquake Loss Estimates

The planning team used HAZUS-MH to estimate the losses as a result of a 500 year earthquake event. Map 5-43 portrays peak ground acceleration (PGA) by census tract. Areas north of I-65 experience the highest PGAs; it decelerates from north to south, with southern communities experiencing lower PGAs.

Approximately 142 buildings are at least moderately damaged and zero buildings are damaged beyond repair. Tables 5-46 and 5-47 shows expected building damage by occupancy and building type. Table 5-48 shows building related economic loss estimates, with a total of $5.9 million loss.

Table 5-46. Expected Building Damage by Occupancy, 500 Year Earthquake Event

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	269	0.31	3	0.48	1	0.47	0	1.07	0	0.88
Commercial	4,091	4.66	49	8.12	13	9.44	1	21.72	0	22.98
Education	144	0.16	2	0.27	0	0.30	0	0.68	0	0.83
Government	96	0.11	1	0.18	0	0.19	0	0.41	0	0.35
Industrial	1,284	1.46	14	2.37	4	2.70	0	5.82	0	4.93
Other Residential	16,845	19.19	349	58.37	88	64.72	2	32.03	0	11.44
Religion	379	0.43	4	0.74	1	0.99	0	2.47	0	3.50
Single Family	64,694	73.68	176	29.48	29	21.18	2	35.80	0	55.08
Total	87,803		597		136		6		0	

Table 5-47. Expected Building Damage by Type, 500 Year Earthquake Event

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	64,286	73.22	127	21.20	11	7.77	0	0.00	0	0.00
Steel	2,902	3.30	27	4.44	6	4.22	0	6.97	0	0.00
Concrete	488	0.56	4	0.63	1	0.49	0	0.33	0	0.00
Precast	188	0.21	3	0.53	1	1.10	0	3.19	0	0.00
RM	710	0.81	6	1.04	2	1.63	0	3.88	0	0.00
URM	4,937	5.62	99	16.63	32	23.50	4	61.53	0	100.00
MH	14,292	16.28	332	55.52	83	61.30	1	24.09	0	0.00
Total	87,803		597		136		6		0	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

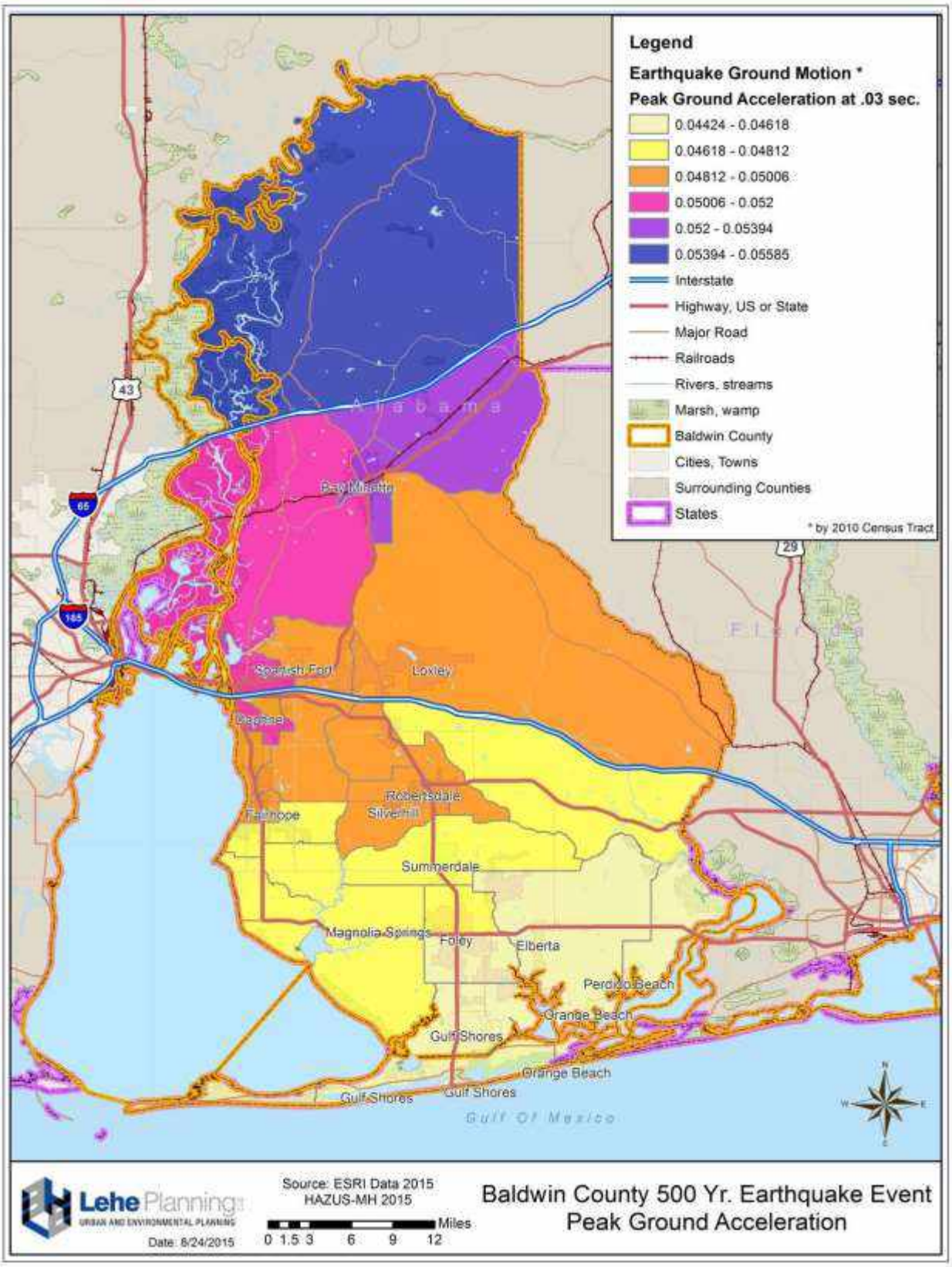
Table 5-48. Building Related Economic Loss Estimates, 500 Year Earthquake Event

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.03	0.33	0.01	0.03	0.41
	Capital-Related	0.00	0.01	0.27	0.01	0.01	0.30
	Rental	0.04	0.15	0.22	0.01	0.01	0.43
	Relocation	0.15	0.20	0.26	0.03	0.07	0.73
	Subtotal	0.19	0.39	1.10	0.06	0.12	1.86
Capital Stock Losses							
	Structural	0.42	0.35	0.39	0.10	0.09	1.35
	Non_Structural	1.12	0.62	0.44	0.09	0.11	2.38
	Content	0.15	0.04	0.09	0.04	0.02	0.34
	Inventory	0.00	0.00	0.00	0.01	0.00	0.01
	Subtotal	1.69	1.02	0.93	0.23	0.23	4.09
	Total	1.88	1.41	2.02	0.28	0.35	5.95

With regard to essential facilities, 410 (94%) hospital beds are available for use on the day of the earthquake, with 98% of the beds available after one week and 100% of beds available after one month. No casualties are expected; although six Level 1 injuries (requires medical attention, but not hospitalization) are predicted by the model. Three households are expected to be displaced from the earthquake, one of which will seek temporary shelter.

Additionally, the event report predicts that all components of the transportation system will maintain at least 50 percent functionality, because no component will suffer damage. And the transportation system economic losses are negligible. Likewise, HAZUS predicts no disabling damage to the utility infrastructure; however, minor leaks and breaks are anticipated.

Map 5-43. 500 Year Earthquake Event Ground Motion



5.6.4 Loss Estimates Based on Historical Records

Flood Loss Estimates

The National Climatic Data Center (NCDC) Storm Events Database shows frequent flooding since 1995 (Section 5.4.2). There have been 78 floods reported for Baldwin County—four per year—for the 1995-2014 period with damages averaging $1.5 million per year and $380K per event.

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 1995. The database shows nearly 293 severe storm events for Baldwin County—roughly 15 per year—including 144 reports of damage from thunderstorms, 33 from lightning, and 116 from hail. The database also shows $2.5 million in damages since 1995.

Tornado Loss Estimates

According to the NOAA National Climatic Data Center and National Weather Service (NWS) records (Section 5.4.4), Baldwin County has been the site of 35 tornadoes since 1995, averaging $104,500 annually. These tornadoes caused 4 injuries and property damages of $2.1 million.

Loss Estimates for Remaining Hazards

Damages from the 10 winter storms, from 1995-2014, amount to $10,000 in Baldwin County. 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 droughts/heat waves, earthquakes, landslides, sinkholes/land subsidence, and tsunamis. For wildfires, although Baldwin County is ranked in the top two in number of acres lost to wildfires, estimated losses are not available.

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

5.7.1 Impacts of Development Trends on Vulnerability

Development trends demand consideration in any plan for hazard mitigation. This section examines development trends affecting vulnerability to natural hazards. Development can raise vulnerability in several ways, including:

- Competing uses for land can push new development into areas prone to flooding, landslides and other location-specific hazards.
- Development along the coast places communities at risk from hurricanes, surge, and high-winds.
- New roads, parking lots, and other impervious surfaces can increase urban runoff and thereby exacerbate flooding.
- New residential, commercial and industrial development in previously rural areas can boost the community's vulnerability to wildfires.
- Increased population can stretch scarce water resources in times of drought.
- Development on slopes and geologically unstable terrain can increase exposure to and even cause sinkholes and landslides.

5.7.2 Past Trends

Baldwin County has experienced rapid growth in the past twenty years, increasing by 86% from 1990 to 2010. In fact, Baldwin County represents one of the state's top ten fastest growing counties since the 2010 Census and the number one fastest growing county in Alabama from 2013 to 2014 (at a rate of 2.4%). Additionally, the 2.4% rate of growth landed Baldwin County as the 12th fastest growing metro area in the country.

Table 5-49 shows the population figures for Alabama, Baldwin County, and its 14 jurisdictions. Top contributors to Baldwin County's major growth, from 2000 to 2010, include Elberta (171.4%), Gulf Shores (93.1%), and Foley (92.6%). All of the jurisdictions experienced some growth, with Bay Minette experiencing the least at 2.9%. Map 5-44 shows population density (persons per square mile) for Baldwin County using 2013 U.S. Census block groups. The densest areas are predominately located in Daphne, Spanish Fort, Fairhope, and Foley.

Table 5-49. Baldwin County Historic Growth Trends

Jurisdiction	1990	2000	Number Change (1990-2000)	Percent Change (1990-2000)	2010	Number Change (2000-2010)	Percent Change (2000–2010)
Alabama	4,040,389	4,447,100	406,711	10.1%	4,779,736	332,636	7.5%
Baldwin Co	98,280	140,415	42,135	42.9%	182,265	41,850	29.8%
Bay Minette	7,168	7,820	652	9.1%	8,044	224	2.9%
Daphne	11,290	16,581	5,291	46.9%	21,570	4,989	30.1%
Elberta	458	552	94	20.5%	1,498	946	171.4%
Fairhope	8,485	12,480	3,995	47.1%	15,326	2,846	22.8%
Foley	4937	7,590	2,653	53.7%	14,618	7,028	92.6%
Gulf Shores	3,261	5,044	1,783	54.7%	9,741	4,697	93.1%
Loxley	1,161	1,348	187	16.1%	1,632	284	21.1%
Magnolia Springs	n/a	n/a	n/a	n/a	723	n/a	n/a
Orange Beach	2,253	3,784	1,531	68.0%	5,441	1,657	43.8%
Perdido Beach	n/a	n/a	n/a	n/a	581	n/a	n/a
Robertsdale	2,401	3,782	1,381	57.5%	5,276	1,494	39.5%
Silverhill	556	616	60	10.8%	706	90	14.6%
Spanish Fort	3,732	5,423	1,691	45.3%	6,798	1,375	25.4%
Summerdale	559	655	96	17.2%	862	207	31.6%

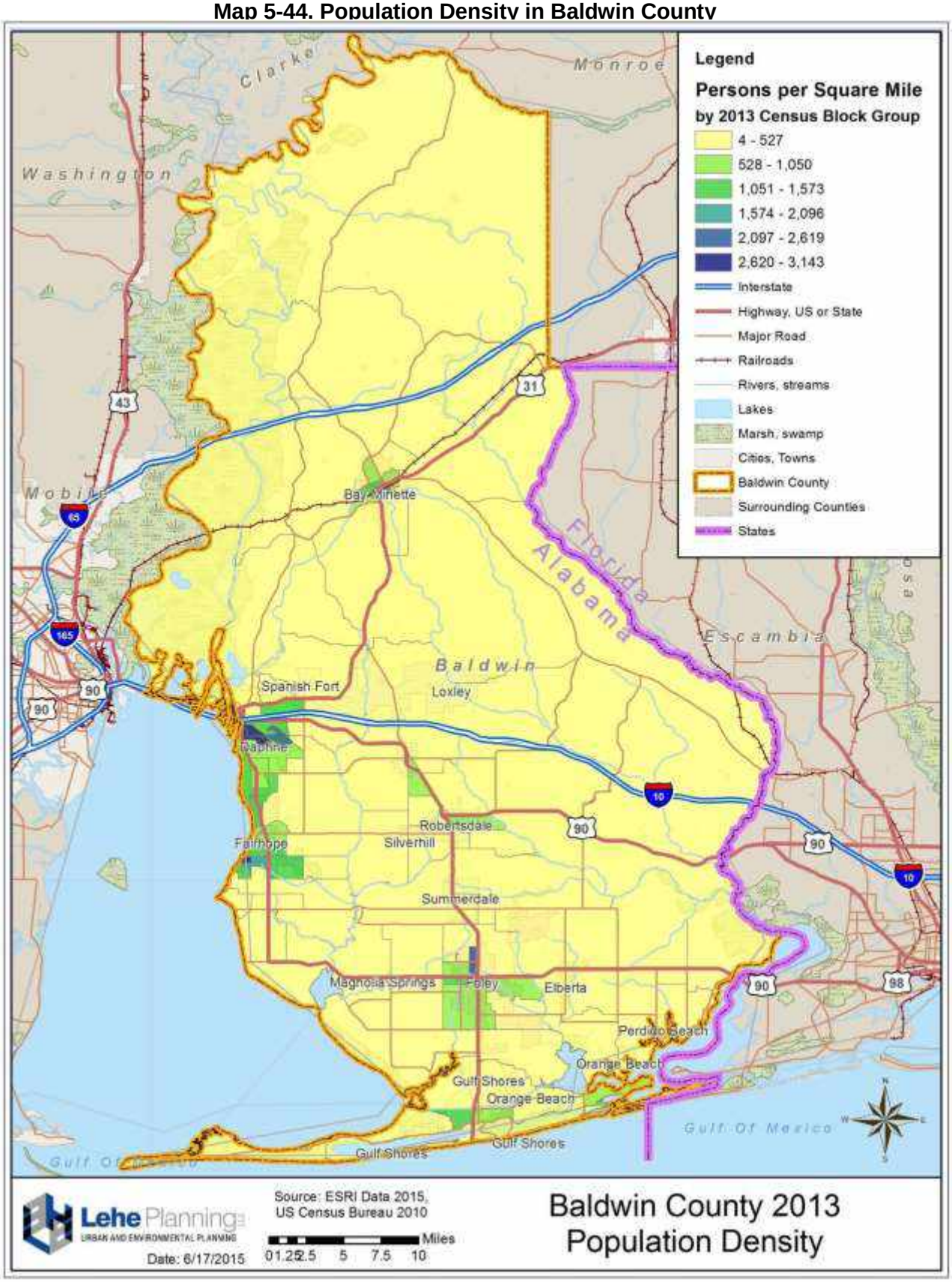
Source: US Census

Land Use

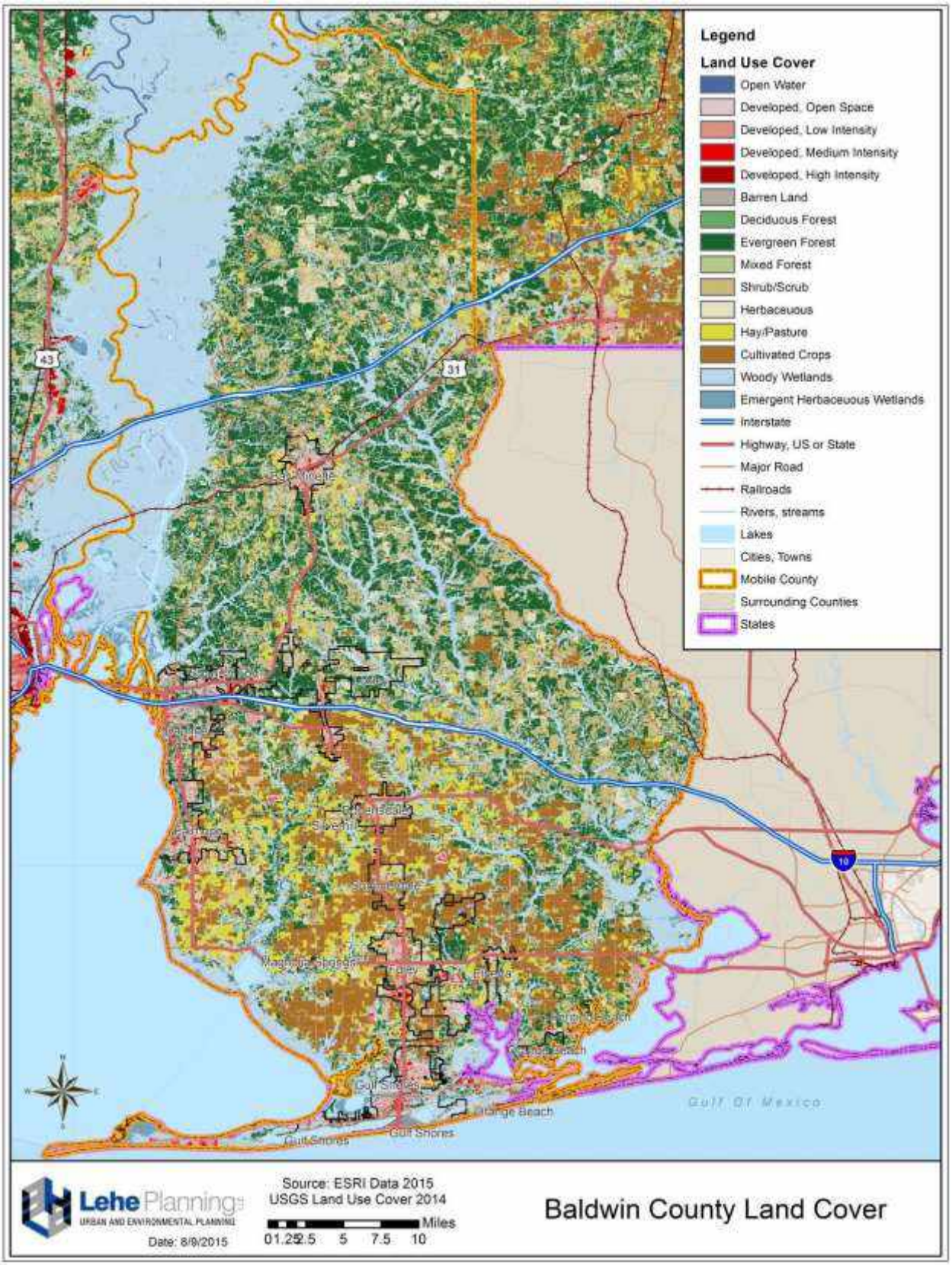
Baldwin County has an area of approximately 1,590 square miles, marking it Alabama's largest county. The county is located in south Alabama, on the Gulf Coast and Mobile Bay. It is bounded on the north by Clarke and Monroe Counties, on the east by Escambia County (AL & FL), and on the west by Mobile County.

Map 5-45 "Baldwin County Land Cover" shows additional information about growth and development within the county. Most of the developed areas are located in Baldwin County's jurisdictions. The northern portion of the county is largely evergreen forest, while the southern portion includes land available for farming.

Map 5-44. Population Density in Baldwin County



Map 5-45. Baldwin County Land Cover



5.7.3 Future Trends

Strong growth will likely continue in the future. For 2035, Baldwin County's population is expected to be 283,120, up 100,855 from the 2010 population. Most of this growth will occur in the southwestern portion of the county. Table 5-50 presents projected growth in Baldwin County and the State of Alabama, between 2010 and 2035 according to projections compiled by the Center for Business and Economic Research at the University of Alabama. Alabama's population growth between 2010 and 2035 nears 15%, compared to a growth of 55% for Baldwin County. These projections are based on historical data and do not reflect current economic development efforts in Baldwin County or throughout the State. Table 5-51 shows the estimated 2014 population and the projected 2035 population by jurisdiction. Unincorporated areas account for most of the projected 2035 growth at 21%, followed by 17% growth in Daphne, 16% growth in Foley, and 12% growth in Fairhope.

Table 5-50. Population 2000-2010 and Projections 2015-2035

	Population Estimate/Projection						Change 2000-2035	
	2010 [a]	2015 [b]	2020 [b]	2025 [b]	2030 [b]	2035 [b]	Number	Percent
Alabama	4,779,736	4,943,866	5,096,521	5,242,423	5,365,245	5,486,147	706,411	14.8%
Baldwin	182,265	204,543	225,564	245,841	264,992	283,120	100,855	55.3%

[a] US Census Bureau. 2010 Census [b] Center for Business and Economic Research, U. of Alabama

Table 5-51. Population Projections by Jurisdiction

Jurisdiction	Estimated 2014	Projected 2035	Projected Change 2014-2035	Percent Change 2014-2035	% of Total 2035
Bay Minette	9,049	11,105	2,057	22.73%	3.9%
Daphne	24,395	47,849	23,454	96.14%	16.9%
Elberta	1,634	4,970	3,336	204.17%	1.8%
Fairhope	18,089	35,050	16,961	93.76%	12.4%
Foley	16,243	46,074	29,831	183.65%	16.3%
Gulf Shores	10,963	31,661	20,698	188.80%	11.2%
Loxley	1,725	2,437	712	41.30%	0.9%
Magnolia Springs	782	1,180	398	50.94%	0.4%
Orange Beach	5,788	13,216	7,428	128.34%	4.7%
Perdido Beach	624	907	284	45.45%	0.3%
Robertsdale	5,773	12,431	6,658	115.33%	4.4%
Silverhill	754	984	231	30.62%	0.3%
Spanish Fort	7,806	14,880	7,075	90.63%	5.3%
Summerdale	1,005	1,677	673	66.93%	0.6%
Unincorporated	95,481	58,693	-36,787	-38.53%	20.7%
Baldwin Co	200,111	283,120	83,009	41.48%	100.1%

Source: Derived from the Alabama State Data Center & U.S. Census
Baldwin County total does not equal 100% due to rounding

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 2,335 NFIP repetitive loss structures within Baldwin County and the NFIP participating jurisdictions as of August 2015. The table below describes the number of policies in force and includes the number of repetitive loss properties by jurisdiction.

Table 5-52. Repetitive Loss Properties by Jurisdiction

Community Name	NFIP Policies in Force	Total Insurance in Force ($)	Repetitive Loss Structures	Total RL Claims	Total RL Losses ($)
Baldwin County	10,589	$2,338,349,400	563	1,534	$58,595,677
Bay Minette	12	$2,987,000	1	2	$21,871
Daphne	406	$86,121,500	12	29	$892,640
Elberta	5	$686,000	2	6	$557,125
Fairhope	336	$84,116,000	78	227	$13,519,960
Foley	146	$35,528,800	9	19	$1,128,672
Gulf Shores	7,524	$1,427,685,000	1,382	4,068	$128,206,078
Loxley	21	$3,075,000	3	10	$177,811
Orange Beach	8,635	$1,770,903,300	272	744	$79,721,751
Robertsdale	34	$7,594,000	2	5	$334,230
Silverhill	8	$1,770,000	-	-	-
Spanish Fort	38	$12,424,600	11	30	$2,262,337
Summerdale	5	$1,078,000	-	-	-
Total	27,759	$5,772,318,600	2,335	6,674	$285,418,152

Source: NFIP State Coordinator, 08/04/2015 & FEMA Policy Statistics
*Silverhill & Summerdale data included in Baldwin County figures

The repetitive loss claims (to date) originate from all of the jurisdictions in Baldwin County; however the majority of claims come from Gulf Shores (4,068) and Baldwin County (1,534). The majority of the properties that have experienced repetitive losses are single family homes. The remaining properties are classified as other residential, multi-family homes, non-residential and condominiums. Of the repetitive loss properties identified above, the following table (Table 5-53) provides a breakdown of severe repetitive loss properties, which is defined by FEMA's NFIP as properties with a high frequency of losses or a high value of claims. Specifically, a severe repetitive loss property must meet one of two criteria: 1) four or more separate claim payments of more than $5,000 each (building and/or contents); or 2) two or more separate claim payments

(building payments only) where the total of the payments exceeds the current market value of the property.

Table 5-53. Severe Repetitive Loss Properties by Jurisdiction

Community Name	Severe Repetitive Loss Structures	Total SRL Claims	Total SRL Losses ($)
Baldwin County	26	132	$5,671,415
Elberta	1	3	$467,662
Fairhope	4	23	$2,778,438
Gulf Shores	93	493	$22,632,501
Orange Beach	16	75	$8,817,263
Total	**140**	**726**	**$40,367,279**

As previously discussed in Section 5.4.2 “Floods Profile”, Gulf Shores and Orange Beach are at greatest risk for coastal flooding and Fairhope, Elberta, and unincorporated areas of the county are susceptible to flooding from Fish River and Styx River. Furthermore, Table 6-3 “2015-2020 Baldwin County Multi-Jurisdictional Mitigation Action Program” lists the specific goals, objectives, and mitigation measures related to flooding.

5.9 Summary of Hazards and Community Impacts

Table 5-55 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 5-54. 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
Hurricanes	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
Severe Storms	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
Winter Storms/Freezes	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
Earthquakes	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
Tsunamis	Bay Minette	Minimal	Very Low	Slight	Low	Medium
	Daphne	Partial	Very Low	Moderate	Low	Medium
	Elberta	Partial	Very Low	Moderate	Low	Medium
	Fairhope	Partial	Very Low	Moderate	Low	Medium
	Foley	Minimal	Very Low	Slight	Low	Medium
	Gulf Shores	Partial	Very Low	Devastating	High	High
	Loxley	Minimal	Very Low	Slight	Low	Medium
	Magnolia Springs	Partial	Very Low	Moderate	Low	Medium
	Orange Beach	Partial	Very Low	Devastating	High	High
	Perdido Beach	Partial	Very Low	Devastating	High	High
	Robertsdale	Minimal	Very Low	Slight	Low	Medium
	Silverhill	Minimal	Very Low	Slight	Low	Medium
	Spanish Fort	Partial	Very Low	Moderate	Low	Medium
	Summerdale	Minimal	Very Low	Slight	Low	Medium
	Unincorporated	Minimal	Very Low	Slight	Low	Medium
Manmade/Technological	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

Hazard	Jurisdiction	Community Impacts			Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
		Location	Probability	Extent	Exposure	Damage Potential
	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 5-54 "Summary of Hazards and Community Impacts" summarizes how hazards impact each jurisdiction.

Risk may vary among jurisdictions, as described in Table 5-55 "Jurisdictional Risk Variations." Table 5-55 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 (if the location of a hazard is not unique, then it follows that the probability and the extent will also be marked not unique).

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 5-55. 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	Not Unique	Not Unique
		Daphne	Not Unique	Not Unique	Not Unique
		Elberta	Not Unique	Not Unique	Not Unique
		Fairhope	Not Unique	Not Unique	Not Unique
		Foley	Not Unique	Not Unique	Not Unique
		Gulf Shores	Not Unique	Not Unique	Not Unique
		Loxley	Not Unique	Not Unique	Not Unique
		Magnolia Springs	Not Unique	Not Unique	Not Unique
		Orange Beach	Not Unique	Not Unique	Not Unique
		Perdido Beach	Not Unique	Not Unique	Not Unique

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Robertsdale	Not Unique	Not Unique	Not Unique
		Silverhill	Not Unique	Not Unique	Not Unique
		Spanish Fort	Not Unique	Not Unique	Not Unique
		Summerdale	Not Unique	Not Unique	Not Unique
		Unincorporated	Not Unique	Not Unique	Not Unique
Tornadoes	Common Risks	Bay Minette	Not Unique	Not Unique	Not Unique
		Daphne	Not Unique	Not Unique	Not Unique
		Elberta	Not Unique	Not Unique	Not Unique
		Fairhope	Not Unique	Not Unique	Not Unique
		Foley	Not Unique	Not Unique	Not Unique
		Gulf Shores	Not Unique	Not Unique	Not Unique
		Loxley	Not Unique	Not Unique	Not Unique
		Magnolia Springs	Not Unique	Not Unique	Not Unique
		Orange Beach	Not Unique	Not Unique	Not Unique
		Perdido Beach	Not Unique	Not Unique	Not Unique
		Robertsdale	Not Unique	Not Unique	Not Unique
		Silverhill	Not Unique	Not Unique	Not Unique
		Spanish Fort	Not Unique	Not Unique	Not Unique
		Summerdale	Not Unique	Not Unique	Not Unique
		Unincorporated	Not Unique	Not Unique	Not Unique
Floods	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
Wildfires	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
Drought/Heat Waves	Common Risks	Bay Minette	Not Unique	Not Unique	Not Unique
		Daphne	Not Unique	Not Unique	Not Unique
		Elberta	Not Unique	Not Unique	Not Unique
		Fairhope	Not Unique	Not Unique	Not Unique

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

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Daphne	Not Unique	Not Unique	Not Unique
		Elberta	Not Unique	Not Unique	Not Unique
		Fairhope	Not Unique	Not Unique	Not Unique
		Foley	Not Unique	Not Unique	Not Unique
		Gulf Shores	Not Unique	Not Unique	Not Unique
		Loxley	Not Unique	Not Unique	Not Unique
		Magnolia Springs	Not Unique	Not Unique	Not Unique
		Orange Beach	Not Unique	Not Unique	Not Unique
		Perdido Beach	Not Unique	Not Unique	Not Unique
		Robertsdale	Not Unique	Not Unique	Not Unique
		Silverhill	Not Unique	Not Unique	Not Unique
		Spanish Fort	Not Unique	Not Unique	Not Unique
		Summerdale	Not Unique	Not Unique	Not Unique
		Unincorporated	Not Unique	Not Unique	Not Unique
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
Landslides	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
Sinkholes (Land Subsidence)	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
Tsunamis	Unique Risk	Bay Minette	Specific Locations	Very Low	Slight
		Daphne	Specific Locations	Very Low	Significant
		Elberta	Specific Locations	Very Low	Moderate
		Fairhope	Specific Locations	Very Low	Significant
		Foley	Specific Locations	Very Low	Significant
		Gulf Shores	Specific Locations	Very Low	Devastating
		Loxley	Specific Locations	Very Low	Slight
		Magnolia Springs	Specific Locations	Very Low	Significant
		Orange Beach	Specific Locations	Very Low	Devastating
		Perdido Beach	Specific Locations	Very Low	Devastating
		Robertsdale	Specific Locations	Very Low	Slight
		Silverhill	Specific Locations	Very Low	Slight
		Spanish Fort	Specific Locations	Very Low	Moderate
		Summerdale	Specific Locations	Very Low	Slight
		Unincorporated	Specific Locations	Very Low	Slight
Manmade/Technological Hazards	Common Risk	Bay Minette	Not Unique	Not Unique	Not Unique
		Daphne	Not Unique	Not Unique	Not Unique
		Elberta	Not Unique	Not Unique	Not Unique
		Fairhope	Not Unique	Not Unique	Not Unique
		Foley	Not Unique	Not Unique	Not Unique
		Gulf Shores	Not Unique	Not Unique	Not Unique
		Loxley	Not Unique	Not Unique	Not Unique

Hazard	Variation of Risks	Jurisdiction	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
		Magnolia Springs	Not Unique	Not Unique	Not Unique
		Orange Beach	Not Unique	Not Unique	Not Unique
		Perdido Beach	Not Unique	Not Unique	Not Unique
		Robertsdale	Not Unique	Not Unique	Not Unique
		Silverhill	Not Unique	Not Unique	Not Unique
		Spanish Fort	Not Unique	Not Unique	Not Unique
		Summerdale	Not Unique	Not Unique	Not Unique
		Unincorporated	Not Unique	Not Unique	Not Unique

Chapter 6 – Mitigation Strategy

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 2015 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.
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 Hazard Mitigation Planning Committee (HMPC) evaluated the validity and effectiveness of the goals from the previous 2010 plan and determined that the goals statements should be retained in the 2015 plan update. The HMPC determination of the goals is based on current conditions and also considers the following factors, among others:

- The completion of mitigation measures over the five-year plan implementation cycle (see Appendix C “2010 Plan Implementation Status”);
- The 2015 update to the risk assessment in Chapter 5;
- The update to the risk assessment in the Alabama State Hazard Mitigation Plan; and
- The update of State goals and mitigation priorities reflected in the State Plan.

The previously approved plan 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 in the next paragraph (see Appendix F “Identification and Analysis of Mitigation Measures”). The 2010 implementation status report in Appendix C “2010 Plan Implementation Status” documents which objectives have been met.

Among the considerations reviewed by the planning team during the process of updating this goals section of the mitigation strategy, were the following concerns:

- Whether the 2010 goals and objectives reflected the updates to the local risk assessment and the update to the State risk assessment;
- Whether the 2010 goals and objectives effectively directed mitigation actions and projects that helped reduce vulnerability to property and infrastructure;
- Whether the 2010 goals and objectives support the changed 2015 mitigation priorities established by the HMPC; and
- Whether the 2010 goals reflect the adopted goals in the Alabama State Hazard Mitigation Plan.

The updated goals are presented in Section 6.3.3 “Community Goals” and have also been incorporated into Table 6-3 “2015-2020 Mobile County Multi-Jurisdictional Action Program” and the “Community Action Programs” in Volume II.

A strategic planning approach has been applied 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 2015 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 "2015-2020 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:

- hurricanes,
- flooding,
- severe storms,
- tornadoes,
- wildfires,
- drought/heat waves,
- winter storms/freezes,
- earthquakes,
- landslides,
- dam/levee failures,
- sinkholes,
- tsunamis, and
- manmade/technological.

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 2013 Alabama State Plan Goals

The 2015 Baldwin County vision, goals, and objectives are reflective of the goals adopted in the 2013 Alabama State Hazard Mitigation Plan. The State plan includes the following five goals for statewide hazard mitigation:

1. Establish a comprehensive statewide hazard mitigation system.
2. Reduce the State of Alabama's vulnerability to natural hazards.
3. Reduce vulnerability of new and future development.
4. Foster public support and acceptance of hazard mitigation.
5. Expand and promote 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 2015 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 jurisdictions are in good standing with the NFIP. Since the 2010 plan update, both Elberta and Magnolia Springs have entered the NFIP; they were unmapped at the last update. 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
010212	Elberta	NSFHA*	Participating
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
010524	Magnolia Springs	08/01/2011	Participating
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

*No Special Flood Hazard Areas (NSFHA) mapped.

Source: NFIP Community Status Book, 09/22/2015

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 "2015-2020 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 2015. As such, the status of measures proposed in the last 2010 plan have been reported in Appendix C - "Plan Implementation Status," which identifies each measure as completed, ongoing, not completed but deferred to the 2015 plan, or not completed and deleted from the 2015 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 2013 Alabama State Plan update and measures recommended by the Hazard Mitigation Planning Committee (HMPC) and planning team in the 2015 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 2010 implementation status report.

Table 6-3 “2015-2020 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. 2015-2020 Baldwin County Multi-Jurisdictional Mitigation Action Program

	Goals, Objectives and Mitigation Measures	Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1	**Goal for Prevention. Manage the development of land and buildings to minimize risks of loss due to natural hazards.**					
1.1	**Comprehensive Plans and Smart Growth. 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, 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, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	All	Both	Action	Existing

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1.1.4	Prepare a floodplain management plan.	Baldwin County	Flooding	`Both	Action	
1.2	**<u>Geographic Information Systems (GIS)</u>. 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, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	All	Both	Action	HMA
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.	Bay Minette, Daphne, Elberta, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	All	Both	Action	HMA
1.2.3	Mark depths of flooding and storm surge immediately after each event. Enter and maintain these historical records in GIS.	Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
1.3	**<u>Planning Studies</u>. Conduct special studies, as needed, to identify hazard risks and mitigation measures.**					
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.	Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	HMA

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	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	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, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	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, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	HMA
1.4	**<u>Zoning</u>. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.**					
1.4.1	Consider large lot size restrictions on flood prone areas designated on Flood Insurance Rate Maps.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
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, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
1.4.4	Enact local ordinance that requires community storm shelters within sizeable mobile home parks and subdivisions.	Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Silverhill, Spanish Fort	Tornadoes, Hurricanes, and Severe Storms	New	Action	Existing
1.5	**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.**					
1.5.1	Examine regulatory options and feasibility of requiring open space areas for recreation, landscaping, and drainage control.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	New	Action	Existing
1.6	**Flood Plain Management Regulations. 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.	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, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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, Orange Beach	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
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, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Existing	Project	Other
1.6.6	Improve flood risk assessment by documenting high water marks post event, verification of FEMA's repetitive loss inventory and revising and updating regulatory floodplain maps.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Project	HMA
1.7	**Building and Technical Codes. 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.	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

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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	Tornadoes, Severe Storms, Tsunamis, Winter Storms/Freezes, and 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, Perdido Beach, Silverhill, Spanish Fort	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, Perdido 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, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Silverhill, Spanish Fort	Tornadoes, Hurricanes, and Severe Storms	New	Project	HMA
1.7.7	Require wind load design by a registered engineer for all new residential construction.	Orange Beach	Hurricanes and Severe Storms	New	Action	
1.8	**<u>Landscape Ordinances.</u> Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.**					
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, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Action	Action	Existing

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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, Bay Minette, Daphne, Elberta, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	Wildfires	Both	Action	Existing
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.	Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	Wildfires	Both	Actions	Existing
1.9	**Storm Water Management. Manage the impacts of land development on storm water runoff rates and to natural drainage systems.**					
1.9.1	Promote the adoption/enforcement of storm water management regulations that maintain pre-development runoff rates.	Baldwin County, 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, 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, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	TBD
1.10	**Dam Safety Management. Establish a comprehensive dam safety program.**					

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
1.10.1	Support legislation to establish a State dam safety program.	Daphne, Elberta, Foley, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Dam/Levee Failures	Both	Action	Existing
1.11	**Community Rating System Program (CRS). Increase participation of NFIP member communities in the CRS Program.**					
1.11.1	Apply for/maintain membership in the CRS Program; continue to upgrade rating.	Baldwin County, Bay Minette, Daphne, Elberta, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
1.12	**Critical Facilities Assessments. 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.	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, Tsunamis, and Earthquakes	Existing	Action	HMA
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, Daphne, Elberta, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	Wildfires	Both	Project	HMA
2	**Goal for Property Protection: Protect structures and their occupants and contents from the damaging effects of natural hazards.**					
2.1	**Building Relocation. Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.**					

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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	**Acquisition. 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.	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, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Existing	Project	HMA
2.3	**Building Elevation. 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.	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

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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
2.4	**Flood Proofing. 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.	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
2.5	**Flood Control Measures. Small flood control measures built to reduce/prevent flood damage**					
2.5.1	Examine use of minor structural projects (small berm or floodwalls) in areas that cannot be mitigated through non-structural mitigation techniques.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Project	HMA
2.6	**Building Retrofits. Retrofit vulnerable buildings to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.**					
2.6.1	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, Tsunamis, and Earthquakes	Existing	Action	HMA

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
2.6.2	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, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding, Tornadoes, Hurricanes, Severe Storms, Tsunamis, and Earthquakes	Existing	Action	Existing
2.6.3	Promote and assist homeowners to apply for funding for building retrofits through the Alabama Department of Insurance "Strengthen Alabama Homes Grant Program."	Orange Beach	Hurricanes and Severe Storms	Existing	Action	Existing
2.7	**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.**					
2.7.1	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, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Existing	Action	Existing
2.7.2	Promote the purchase of crop insurance to cover potential losses due to drought.	Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Drought	Existing	Action	Existing
2.7.3	Participate in education efforts to encourage citizens to research rates and carriers for wind coverage.	Orange Beach	Hurricanes and Severe Storms	Both	Action	Existing
2.8	**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.**					

	Goals, Objectives and Mitigation Measures	Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
2.8.1	Install lightning and/or surge protection on existing critical facilities.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Severe storms	Existing	Project	TBD
2.9	**Back Up Power: Assure uninterrupted power supplies during emergency events.**					
2.9.1	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, and Severe Storms	Existing	Project	HMA
3	**Goal for Public Education and Outreach. Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.**					
3.1	**Map Information. 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, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	All	Both	Action	Existing
3.2	**Outreach Projects. 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, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, 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, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	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, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Both	Action	Existing
3.3	**Real Estate Disclosure. 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 location disclosure when a property is listed for sale.	Baldwin County, Bay Minette, Daphne, Elberta, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Existing	Action	Existing
3.4	**Library. 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, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
3.5	**Education Programs. Use schools and other community education resources to conduct programs on topics related to hazard risks and mitigation measures.**					

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
3.5.1	Distribute hazard mitigation brochures to students through area schools.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
3.5.2	Educate homeowners about structural and non-structural retrofitting of vulnerable homes.	Baldwin County, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Earthquake	Both	Action	Existing
3.6	**Community Hazard Mitigation Plan Distribution. 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 2015 plan to local officials, stakeholders, and interested individuals through internet download.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
3.6.2	Distribute the 2015 plan summary to the public through local jurisdictions, via the internet and other media.	Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	All	Both	Action	Existing
3.7	**Technical Assistance. 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, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Action	Existing
3.8	**Mass Media Relations. 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.**					

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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	**Weather Radios. Improve public access to weather alerts.**					
3.9.1	Promote the use of weather radios in households and businesses.	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
3.9.2	Require the installation of weather radios in all public buildings and places of public assembly.	Baldwin County, Bay Minette, Daphne, Elberta, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort,	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, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Action	Existing
3.10	**Disaster Warning. 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.	Baldwin County, Daphne, Elberta, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	Flooding	Both	Project	HMA

	Goals, Objectives and Mitigation Measures	Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
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, Bay Minette, Daphne, Elberta, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	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, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Project	HMA
3.10.4	Upgrade siren-warning systems to provide complete coverage to all jurisdictions.	Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Project	HMA
3.10.5	Upgrade critical communications infrastructure.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	All	Both	Project	HMA
4	**Goal for Natural Resources Protection. 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	**Open Space Easements and Acquisitions. 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.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Existing	Project	HMA

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
4.2	**River/Stream Corridor Restoration and Protection. 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.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	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, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding	Existing	Action	Existing
4.3	**Urban Forestry Programs. Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.**					
4.3.1	Utilize technical assistance available from the Alabama Cooperative Extension System with Best Management Practices (BMP).	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	Flooding	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, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Wildfires	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, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	Wildfires	Both	Action	Existing

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
4.4	**<u>Beach and Dune Protection/Renourishment.</u> Protect beaches and dunes from coastal and man-made erosion and renourish.**					
4.4.1	Restore and protect wetlands to enhance storm water drainage.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Flooding, Hurricanes	Existing	Action	Other
4.4.2	Develop a coastal renourishment program.	Baldwin County, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Silverhill, Spanish Fort	Flooding, Hurricanes	Existing	Action	Other
4.5	**<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.**					
4.5.1	Enforce water use restrictions during periods of drought to conserve existing water supplies.	Baldwin County, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Silverhill, Spanish Fort	Droughts/Heat Waves and Wildfires	Both	Action	Existing
5	**<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.**					
5.1	**<u>Drainage System Maintenance.</u> Improve maintenance programs for streams and drainage ways.**					
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

Goals, Objectives and Mitigation Measures		Communities	Hazards Addressed	Affects New or Existing Buildings or Infrastructure	Action or Project	Funding Source
5.2	**<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.**					
5.2.1	Construct drainage improvements to reduce or eliminate localized flooding in identified problem drainage areas.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Flooding	Both	Project	HMA
5.2.2	Improve and retrofit water supply systems to save water during drought events and to eliminate breaks and leaks.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Drought	Both	Project	HMA
5.3	**<u>Community Shelters and Safe Rooms</u>: 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.	Baldwin County, Bay Minette, Daphne, Elberta, Fairhope, Gulf Shores, Loxley, Magnolia Springs, Perdido Beach, Robertsdale, Silverhill, Spanish Fort	Hurricanes, Tornadoes, and 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, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Tornadoes, Hurricanes, and Severe Storms	Existing	Project	HMA
5.3.3	Encourage the construction of safe rooms in new and existing homes and buildings.	Baldwin County, Daphne, Elberta, Fairhope, Foley, Gulf Shores, Loxley, Magnolia Springs, Orange Beach, Perdido Beach, Robertsdale, Silverhill, Spanish Fort, Summerdale	Tornadoes, Hurricanes, and Severe Storms	Both	Project	HMA

Chapter 7 – 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

This Chapter continues an active monitoring and streamlined plan amendment process; guidance for annual evaluation of plan status; refined and updated process; ongoing integration of local planning mechanisms; and 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

During the previous five years, between adoption of the 2010 Baldwin County Multi-Hazard Mitigation Plan and initiation of the 2015 Baldwin County Multi-Hazard Mitigation Plan, the Hazard Mitigation Planning Committee (HMPC) reconvened

beginning August 14, 2013. They reorganized their membership at a September 11, 2013 meeting and met six additional times reviewing topics such as the HMPG meeting schedule, THIRA, and the plan revision process. Despite the lack of efforts to actively maintain the 2010 plan over the previous five-year planning cycle, the Hazard Mitigation Planning Committee (HMPC) is committed to following the procedures presented in this 2015 plan update.

The 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 Baldwin County 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 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 that are not included in the 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 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 2015 Baldwin County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan, the mechanisms 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 2015 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 2015 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 www.baldwincountyal.gov contains a link to download an online 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 may be periodically administered by the Baldwin County EMA.

Extensive public involvement activities initiated by the 2015 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.