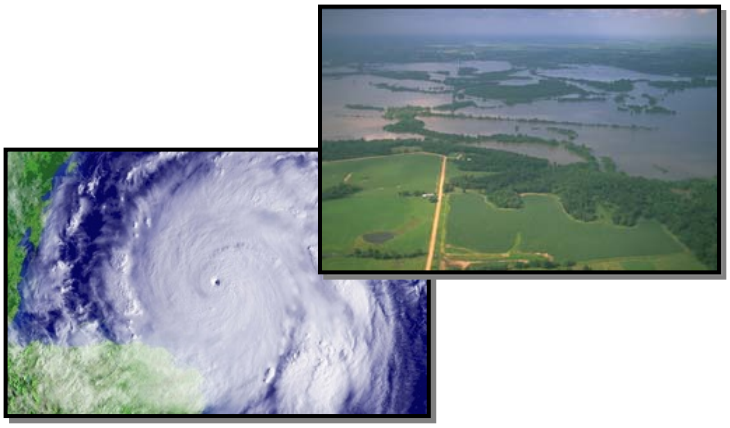
Guadalupe-Blanco River Authority

Hazard Mitigation Plan Update



Protecting the Region

Against all Hazards

2011-2016

For more information, visit our website at:

www.gbra.org

Written comments should be forwarded to:

H2O Partners, Inc

P. O. Box 160130

Austin, Texas 78716

info@h2opartnersusa.com

www.h2opartnersusa.com

TABLE OF CONTENTS

Section 1 - Introduction

Background 1-1
Scope 1-5
Purpose 1-5
Authority 1-6
Summary 1-6

Section 2 – Planning Process

Plan Preparation and Development 2-1
Public/Stakeholder Involvement 2-7

Section 3 – Regional Profile

Overview 3-1
Population 3-4
Demographics 3-14
Future Development 3-15

Section 4 – Risk Overview

Hazard Identification 4-1
Hazard Analysis 4-4
Vulnerability 4-8
Potential Dollar Losses 4-21
Hazard Ranking 4-23

Section 5 – Flood

Hazard Profile 5-1
Location 5-1
Extent 5-11
Historical Occurrences 5-12
Probability of Future Events 5-14
Vulnerability and Impact 5-14
NFIP Participation and Tasks 5-19
Repetitive Loss 5-20

Section 6 – Hurricane

Hazard Description 6-1
Location 6-4
Extent 6-8
Historical Occurrences 6-8
Probability of Future Events 6-9
Impact and Vulnerability 6-10

Section 7 – Thunderstorm

Hazard Description 7-1
Location 7-1
Extent 7-2
Historical Occurrences 7-3
Probability of Future Events 7-4
Impact and Vulnerability 7-4

Section 8 – Hail

Hazard Description 8-1
Location 8-1
Extent 8-1
Historical Occurrences 8-3
Probability of Future Events 8-13
Impact and Vulnerability 8-13

Section 9 – Tornado

Hazard Description 9-1
Location 9-2
Extent 9-2
Historical Occurrences 9-5
Probability of Future Events 9-16
Impact and Vulnerability 9-16

Section 10 – Drought

Hazard Description 10-1

Location 10-2
Extent 10-2
Historical Occurrences 10-3
Probability of Future Events 10-4
Impact and Vulnerability 10-5

Section 11 – Extreme Heat

Hazard Description 11-1
Location 11-1
Extent 11-2
Historical Occurrences 11-4
Probability of Future Events 11-4
Impact and Vulnerability 11-4

Section 12 – Wildfire

Hazard Description 12-1
Location 12-1
Extent 12-30
Historical Occurrences 12-32
Probability of Future Events 12-33
Impact and Vulnerability 12-33

Section 13 – Winter Storm

Hazard Description 13-1
Location 13-1
Extent 13-1
Historical Occurrences 13-3
Probability of Future Events 13-3
Impact and Vulnerability 13-4

Section 14 – Dam Failure

Hazard Description 14-1
Location 14-2
Extent 14-12

Historical Occurrences 14-16
Probability of Future Events 14-16
Impact and Vulnerability 14-16

Section 15 – Pipeline Failure

Hazard Description 15-1
Location 15-1
Extent 15-11
Historical Occurrences 15-11
Probability of Future Events 15-16
Impact and Vulnerability 15-16

Section 16 –Hazardous Materials

Hazard Description 16-1
Location 16-1
Extent 16-21
Historical Occurrences 16-22
Probability of Future Events 16-23
Impact and Vulnerability 16-24

Section 17 – Infectious Disease

Hazard Description 17-1
Location 17-2
Extent 17-3
Historical Occurrences 17-5
Probability of Future Events 17-7
Impact and Vulnerability 17-8

Section 18 – Terrorism

Hazard Description 18-1
Location 18-2
Extent 18-2
Historical Occurrences 18-3
Probability of Future Events 18-3

Impact and Vulnerability 18-4

Section 19 – Mitigation Strategy

Mitigation Goals 19-1
Goal 1 19-1
Goal 2 19-2
Goal 3 19-2
Goal 4 19-3
Goal 5 19-3
Goal 6 19-3

Section 20 – Previous Actions

GBRA 20-2
Caldwell County 20-12
Calhoun County 20-36
DeWitt County 20-47
Gonzales County 20-64
Kendall County 20-71
Refugio County 20-79
Victoria County 20-91

Section 21 – New Actions

GBRA 21-3
Caldwell County 21-26
Calhoun County 21-49
DeWitt County Drainage District 21-75
DeWitt County 21-77
Gonzales County 21-112
Kendall County 21-151
Refugio County 21-163
Woodsboro ISD 21-178
Victoria County 21-182

Section 22 – Plan Maintenance

Plan Maintenance Procedures **22-1**
Monitoring and Evaluation **22-1**
Updating **22-2**
Incorporation **22-3**
Continued Public Involvement **22-5**

Appendix A – Planning Team Members

Appendix B – Public Survey Results

Appendix C – Toxic Sites

Appendix D – Critical Facilities

Appendix E – Workshop Documentation

INTRODUCTION

Background 1
Scope 5
Purpose 5
Authority 6
Summary of Sections 6

Background

The Guadalupe-Blanco River Authority (GBRA) was established by the Texas Legislature and created in 1933 under Section 59, Article 16 of the Constitution of Texas, as a water conservation and reclamation district and a public corporation called the Guadalupe River Authority. In 1935, it was reauthorized by an act of the Texas Legislature (VCS Art. 8280-106) as the Guadalupe-Blanco River Authority. The mission of the GBRA is to: "protect, conserve, reclaim and steward the resources of the ten-county District in order to ensure and promote quality of life for those we serve." One of the goals of the Authority is to ensure (1) a supply of quality water for both immediate and long-term needs of the District by development of all feasible alternatives; and (2) development of flood management measures.

With ongoing water resources planning, the GBRA remains dedicated to preventing damage before a disaster occurs. In 2005 the GBRA facilitated development of a Hazard Mitigation Action Plan (HMAP) approved by the Federal Emergency Management Agency (FEMA) entitled, *"Hazard Mitigation in the Guadalupe River Basin – Protecting the Region Against All Hazards."* This HMAP was formed with technical assistance provided by GBRA and H2O Partners, Inc. of Austin, Texas. Seven counties and nineteen cities participated in the initial HMAP.

GBRA Mission Statement

The Mission of the Guadalupe-Blanco River Authority is to protect, conserve, reclaim and steward the resources of the ten-county District in order to ensure and promote quality of life for those we serve.

The vision statement of the GBRA is to be a widely recognized leader in managing water resources that benefit both people and the environment.

Consistent with this vision, GBRA took the lead in sponsoring the development of a comprehensive Hazard Mitigation Plan Update ("Plan" or "Plan Update") for the cities and counties that participated in the 2005 HMAP as well as any additional communities that wished to join as part of the Plan Update. The mitigation planning regulation of the Disaster Mitigation Act requires that mitigation plans be reviewed and revised within five (5) years of approval to maintain eligibility for mitigation

grant funding[1]. Therefore GBRA began the planning process to renew the HMAP and completely update each section of the original Plan.

Although GBRA's District covers a ten-County area, the City of Cibolo in Guadalupe County is the only additional jurisdiction participating in the Plan Update along with all of the original jurisdictions that participated in the 2005 planning effort. Table 1-1 lists the participating and non-participating communities in the Plan Update, while Figure 1-1 presents an overview of the area and participating jurisdictions.

Table 1-1. Participating and Non-Participating Jurisdictions in the Study Area

PARTICIPATING JURISDICTIONS	NON-PARTICIPATING JURISDICTIONS
Caldwell County	
City of Lockhart	City of Niederwald
City of Luling	City of Uhland
City of Martindale	
Calhoun County	
Point Comfort	
Port Lavaca	
Seadrift	
DeWitt County	
DeWitt County Drainage District[2]	
City of Cuero	
City of Nordheim	
City of Yoakum	
City of Yorktown	
Gonzales County	
City of Gonzales	City of Smiley
City of Nixon	
City of Waelder	
City of Cibolo	**Guadalupe County**

[1] 44 CFR §201.6(d)(3)

[2] The DeWitt County Drainage District is a participating jurisdiction of the Plan Update as they were included into the plan by amendment in 2007. The district fully participated in all workshops and developed mitigation actions, however, as the risks for the district are the same as the County, the district is not listed separately in the hazard sections of the Plan Update.

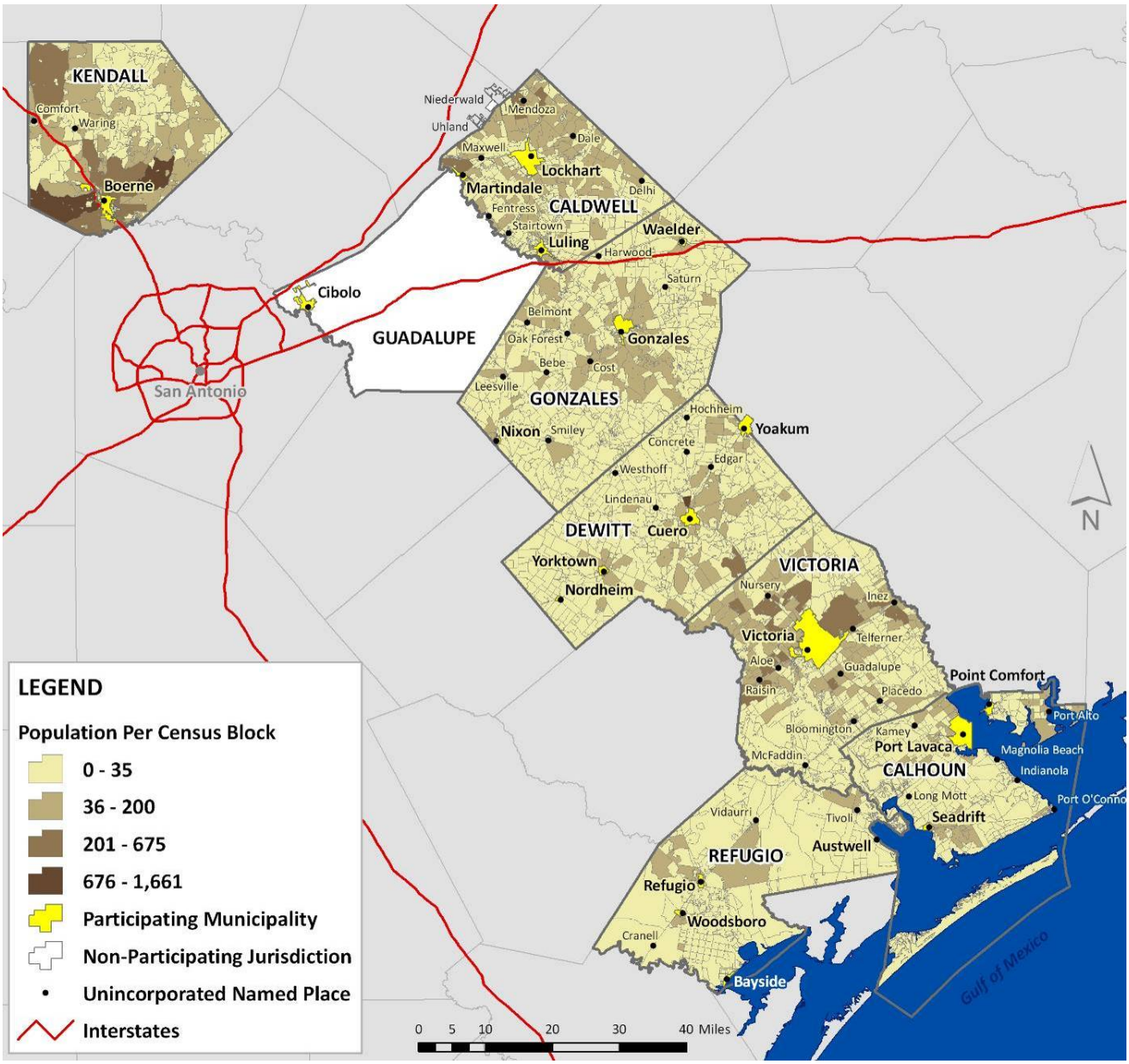
PARTICIPATING JURISDICTIONS	NON-PARTICIPATING JURISDICTIONS
City of Cibolo	
Kendall County	
City of Boerne	
Refugio County	
City of Austwell	
City of Bayside	
Town of Refugio	
City of Woodsboro	
Woodsboro Independent School District[3]	
Victoria County	
City of Victoria	

To give a comprehensive overview of the Guadalupe River Basin in its entirety, some background information is included on counties in the GBRA Region that are not participating in the Plan Update, including Hays, Comal and Guadalupe[4] Counties.

[3] Although Woodsboro ISD is a participating entity, the school district is not listed separately in the hazard sections of the Plan Update as the risks and vulnerabilities are the same as the Town of Woodsboro and critical facilities on campus were factored into the vulnerability assessment for Woodsboro.

[4] The City of Cibolo in Guadalupe County will be participating in the Plan Update, but Guadalupe County will not.

Figure 1-1. Overview of Jurisdictions Participating in the Plan Update



SECTION 1: INTRODUCTION

Scope

The focus of the Plan Update is to mitigate hazards that are classified as "high" or "moderate" risk as determined through a detailed hazard risk assessment conducted for the participating GBRA jurisdictions. Hazards that pose a "low" or "negligible" risk will continue to be evaluated during future updates to the plan, but they may not be fully addressed until they are determined to be of high or moderate risk. This enables the GBRA and its participating jurisdictions and partners to prioritize mitigation actions based on hazards which are understood to present the greatest risk to lives and property.

Purpose

This Plan Update was prepared by the GBRA, H2O Partners, Inc. and subcontractor PBS&J. It is an opportunity for the GBRA and participating jurisdictions to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss.

In developing the Plan, GBRA and Plan participants identified fifteen natural and man-caused hazards (profiled in detail in Sections 5-18) to be addressed as the goal of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. *Mitigation* is defined by FEMA as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects*. Therefore the purpose of the Plan Update is to continue developing successful mitigation projects to bring together cities and counties in order to reduce future risk of loss of life or damage to property in the GBRA Region.

Through this update process, the GBRA and Plan participants seek to:

- Assess previous mitigation projects and develop unique mitigation strategies to meet future development and risks;
- Encourage improvements in floodplain management, participation in the National Flood Insurance Program (NFIP); and qualifying for FEMA's Community Rating System, thereby reducing flood insurance premiums for citizens;
- Devise solutions to strengthen emergency management by addressing moderate and high risk natural and man-caused hazards; and
- Develop and implement a comprehensive Hazard Mitigation Plan Update for the GBRA Region.

The overarching Mission Statement for the Plan Update is, "Protecting resources in order to preserve and promote quality of life in the GBRA Region."

SECTION 1: INTRODUCTION

Authority

The updated plan will comply with all requirements promulgated by the Texas Division of Emergency Management (TDEM) and all applicable provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264). It will also comply with FEMA's February 26, 2002 Interim Final Rule ("the Rule") at 44 CFR Part 201 which specifies the criteria for approval of mitigation plans required in Section 322 of the DMA 2000 and standards found in FEMA's "Local Multi-Hazard Mitigation Planning Guidance" (released July 1,2008). The updated plan will be developed in accordance with FEMA's Community Rating System (CRS) Floodplain Management Plan standards and policies.

Summary of Sections

Sections 1 and 2 of the Plan outline the purpose of the Plan Update and the process of development. Section 3 profiles the region, while Section 4 provides an overview of the people and property at risk and hazards facing the area, including the process of identification and risk assessment methodologies utilized.

Sections 5 through 18 present information on individual hazards. For each hazard, the plan presents a description of the hazard, the hazard extent, a history of historical hazard events, the probability of future occurrences, and the results of the vulnerability and risk assessment process.

Section 19 presents mitigation goals and objectives. Section 20 provides the previous mitigation strategies submitted in the 2005 Plan and a current analysis for each action, while Section 21 contains all of the newly developed mitigation actions for Plan Update. Section 22 identifies plan maintenance procedures including Plan incorporation and implementation.

Appendix A contains a list of the planning team and stakeholders. Public survey results are analyzed in Appendix B. Appendix C lists toxic sites for the area and Appendix D contains a detailed listing of critical facilities. Appendix E contains documentation of meetings in the form of sign-in sheets[5].

[5] For privacy concerns, Appendices C-E will not be made available to the general public.

PLANNING PROCESS

Plan Preparation and Development 1
Overview of the Plan Update 1
Review and Analysis of the 2005 Plan 2
Review and Incorporation of Existing Plans 3
Planning Team 3
Planning Process 4
Kickoff Workshop 4
Hazard Identification 4
Risk Assessment 4
Mitigation Review and Development 5
Public and Stakeholder Involvement 7
Public Participation 7
Public Meetings 7
Public Participation Survey 8
Stakeholder Involvement 8

Plan Preparation and Development

Mitigation planning involves bringing together multiple components and players to create more disaster-resistant communities. This section provides an overview of the planning process, highlighting key steps as well as providing a detailed description of how stakeholders and the public were involved.

Overview of the Plan Update

The Guadalupe Blanco River Authority (GBRA) is sponsoring an update to their 2005 Plan, "*Protecting the Region Against All Hazards"* The purpose of this Plan Update is to meet FEMA's requirement to provide updated hazard mitigation plans every five years.

Although many of the natural and man-caused disasters that affect the Basin are the same for the 2005 Plan, an update is necessary to take into account all modified or revised data from the past five years, including changing demographics and mitigation strategies. This 2011 Multi-Jurisdictional Hazard Mitigation Action Plan Update reflects current local conditions as well as newly established mitigation goals and objectives.

The GBRA prepared the Plan with technical support from the outside consultant team of H2O Partners, Inc. and PBS&J[1]. In developing the plan the consultant team used the FEMA "Mitigation Planning How-To" (Pub 386 series), the "Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000" (Blue Book) and standards found in FEMA's "Local Multi-Hazard Mitigation Planning Guidance"

[1] PBS&J is a subcontractor to H2O Partners for this planning effort.

(released July 1, 2008) to meet the Interim Final Rule for Local Mitigation Planning found in 44 CFR 201.6.

Review and Analysis of the 2005 Plan

According to 44 CFR §201.6(d)(3), the updated plan must contain a description of the process used to revise each section of the plan. The Advisory Committee, composed of GBRA staff, and the consultant team met in August 2009 to review the 2005 Plan.

At this meeting the Committee reviewed, analyzed and commented on every section of the 2005 Plan. Edits and comments were made to the introductory and profile sections. Although Census 2010 data was not available, the Committee decided to use the most current information in updating the demographics and land use of the GBRA for the profile section. Upon review of the introductory and overview sections of the risk assessment, the Committee decided to keep the same hazards in the Plan Update as no new hazards had affected the area that were not considered in 2005. Although occurrence and probability data will be updated, the Advisory Committee decided to maintain the hazards to be profiled. For the vulnerability assessment, critical facilities, building counts and losses were updated to reflect changes over the past five years. The overall goals and objectives of the 2005 Plan were reviewed and it was determined that although the same objectives and goals would remain in the Plan Update, the order of the goals would be rearranged as reflected in Section 19. Plan maintenance procedures were also reviewed and updated to reflect current changes in staff and annual/bi-annual meetings.

In addition to the initial review by the Advisory Committee, all of the participating jurisdictions reviewed the mitigation strategies developed in the 2005 Plan and any amendments thereto and provided an analysis as to whether each action is ongoing, has been completed or should be deleted from the Plan Update.

The following factors were taken into consideration when reviewing the 2005 Plan:

- Whether the goals address current and expected conditions;
- If the nature/magnitude of risks have changed;
- If there are current resources appropriate for implementing the Plan;
- Whether implementation problems, such as technical, political, legal or coordination issues hinder development;
- If outcomes have occurred as expected; and
- How communities, agencies and partners participated in the implementation process.

SECTION 2: PLANNING PROCESS

Review and Incorporation of Existing Plans

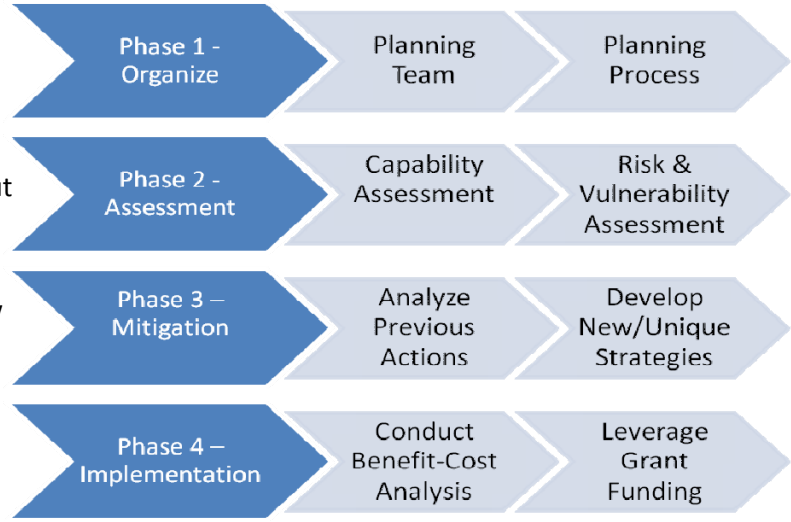
A variety of existing studies, plans, reports, and technical information were reviewed as part of the planning process. Sources of the information included FEMA, the United States Army Corps of Engineers (USACE), the U.S. Fire Administration, NOAA, the Texas Water Development Board, the TCEQ, the State Comptroller, the Texas State Data Center, Texas Forest Service, the Texas Division of Emergency Management (TDEM), and local hazard assessments and plans.

The hazard-specific sections of the Plan (Sections 5-18) summarize the findings from these information sources. Some of these documents, including those from FEMA, provided information on risk, existing mitigation actions currently underway, and ideas for possible future mitigation actions. Other documents, including those from NOAA, provided histories of disasters in the area. The USACE studies were reviewed for their assessment of risk and potential projects in the region. The Water Development Board studies were reviewed for population and other projections and for flood-related grant funding. The State Comptroller materials were reviewed for regional economic projections. State Data Center documents were used to obtain population projections. Materials from FEMA and the Texas Division of Emergency Management were reviewed for guidance on plan development requirements. Communities included actions from other plans, such as Floodplain Management Plans, in developing actions.

Planning Team

The planning team was developed using a Steering or Advisory Committee comprised of executive members of GBRA that were involved in the original 2005 Plan. The Advisory Committee was then supported by one or more representatives from each participating community in the Plan Update. Stakeholders and the public were also included in the planning process as described in this section. The entire planning team consisted of participating stakeholders, GBRA staff and project team members of H2O Partners. A specific listing of representatives can be found in Appendix A.

Figure 2-1. Overview: Mitigation Planning Process



Some of the responsibilities of the planning team included: providing input regarding the identification of hazards, revising mitigation goals to reflect modified conditions and developing new mitigation strategies. Each planning team member is also responsible for ensuring that their jurisdiction formally adopts the plan update pending FEMA approval.

SECTION 2: PLANNING PROCESS

Planning Process

Four milestones were met over the course of approximately 12 months beginning in August 2009. A critical work outcome was produced in each step. After the planning team was established, a series of kickoff workshops were held where capability assessments were distributed. Next, hazards were identified and analyzed, the results of which were presented at the Risk Assessment Workshop. Finally each member community reviewed and developed an analysis for the mitigation actions included in the 2005 Plan and developed new and unique actions at the Mitigation Workshop.

Kickoff Workshop

A series of kickoff workshops were held throughout the region to optimize participation. The first Kickoff Meeting was held on August 11, 2009. This initial meeting was an opportunity to inform participating communities about the planning process with their distinct roles and responsibilities and involve stakeholder groups such as area school districts and businesses. A second Kickoff workshop was held on August 18, 2009.

In addition to the Kickoff presentation, the following information was distributed to planning member attendees:

- background information about the plan update;
- public participation survey for distribution; and
- capability assessment survey for completion

Planning Team Members at a Kickoff Workshop in Victoria, TX August 11, 2009

Hazard Identification

Following the initial kick-off meeting on August 11, 2009, Planning Team members met to conduct preliminary hazard identification. At this meeting, the group reviewed and considered a full range of natural and man-caused hazards, then narrowed the list to significant hazards by reviewing the 2005 Plan, the State of Texas Hazard Mitigation Plan, and initial results from reputable sources such as federal and state agencies[2]. Based on this initial analysis, the team identified a total of 14 natural and man-caused hazards that could affect the Basin region.

A hazard questionnaire was distributed to each member. Participating jurisdictions were asked to provide input on the selection of hazards, concurrence with the selection, variances in risk compared to other communities and the region as a whole.

Risk Assessment

A risk assessment for the Plan Update was completed in January 2010. The results of the assessment were presented at two Risk Assessment workshops. The first workshop was held in the upper Basin in

[2] For detailed information regarding the hazard identification process, please see Section 5.

Buda, TX, the second in Victoria, TX in the lower Basin. A public meeting followed the workshop in Buda, TX. At these workshops, the characteristics and consequences of each hazard were evaluated to determine how much of the area would be affected, in terms of potential danger to property and citizens.

Potential dollar losses from each hazard were estimated, using the Federal Emergency Management Agency's Hazards U.S. (HAZUS) Multi-Hazards (MH) Model (HAZUS-MH) and other HAZUS-like modeling techniques. The assessments examined the impact of various hazards on the built environment, including on general building stock (e.g., residential, commercial, industrial), critical facilities, lifelines, and infrastructure. The resulting risk assessment profiled hazard events, provided information on previous occurrences, estimated probability of future events, and detailed the spatial extent and magnitude of impact on people and property. Each jurisdiction was also given a hazard ranking sheet at the workshops in order to reflect unique and varied risks among jurisdictions. Participants ranked hazards in terms of the probability or frequency of occurrence and the extent or magnitude of impact.

The assessments were also used to set priorities for mitigation based on potential dollar losses and loss of lives. A hazard profile and vulnerability analysis for each of the 14 hazards can be found in sections 5 through 18 in this Plan Update.

Mitigation Review and Development

The mitigation strategy development for the Plan Update involved revising mitigation goals included in the 2005 Plan, providing analyses for past actions, and developing new mitigation actions. Two Mitigation Workshops were held in the Basin; one in Buda on March 23, 2010 and one in Victoria on March 25, 2010. As with the Risk Assessment Workshops, stakeholder groups were invited to the workshops and to the public meeting the evening of the 23rd. A listing of the dates and location for each workshop can be found in Table 2-1 below. Documentation for workshops and meetings is found in Appendix E.

At the Mitigation Workshops, after an initial presentation regarding types and examples of actions and the importance of mitigation planning, participants were asked to review the mitigation goals and objectives from the 2005 Plan and determine what changes, if any, should be made. At each workshop the consensus among participants was not only to retain mitigation goals or objectives, but reorder the primary three goals, so that protecting life and property are the first two goals, followed by increasing public understanding. For a detailed review of the mitigation goals and objectives please see Section 19.

Each participant received a copy of their mitigation actions submitted for the 2005 Plan, and provided an analysis as to whether each action should be deleted, had been completed, or should be deferred for the Plan Update. Following the development of mitigation actions, communities were also asked to review procedures for keeping the plan up to date and devise strategies for plan maintenance.

Table 2-1. Mitigation Strategy Workshops

DATE	LOCATION
March 23, 2010	Buda, TX
March 25, 2010	Victoria, TX

An inclusive and structured process was used to develop and prioritize new mitigation actions for this plan update. It included the following steps:

- Review of the vision statement, mitigation goals, and objectives from the 2005 Plan.
- A "menu" of optional mitigation actions was developed based on plan reviews, studies, and interviews with federal, state and local officials. The participants reviewed the optional mitigation actions and narrowed the list down to those that were most applicable to their area of responsibility, most cost-effective in reducing risk, could be implemented easily, and would be likely to receive institutional and community support.
- Potential Federal and State funding sources to assist implementing proposed actions were inventoried. Information was collected including the program name authority, purpose of the program, types of assistance and eligible projects, conditions on funding, types of hazards covered, matching requirements, application deadlines, and a point of contact.
- Planning team members considered benefits that would result from the mitigation actions versus the cost of those projects. Detailed cost-benefit analyses were beyond the scope of this plan. However, economic evaluation was one factor that helped team members select one mitigation action from competing actions.

Team members then selected and prioritized mitigation actions. Each team member evaluated the mitigation action of their own jurisdiction as well as the Regional Mitigation Actions found in Section 20. The prioritization method was based on FEMA's STAPLE+E criteria and included social, technical, administrative, political, legal, economic and environmental considerations. As a result of this exercise, an overall priority was assigned to each mitigation action by each team member. The overall priority of each action is reflected in the mitigation actions found in Section 21.

Team members developed action plans identifying proposed actions, costs and benefits, the responsible organization(s), effects on new and existing buildings, implementation schedule, priority, and potential funding sources.

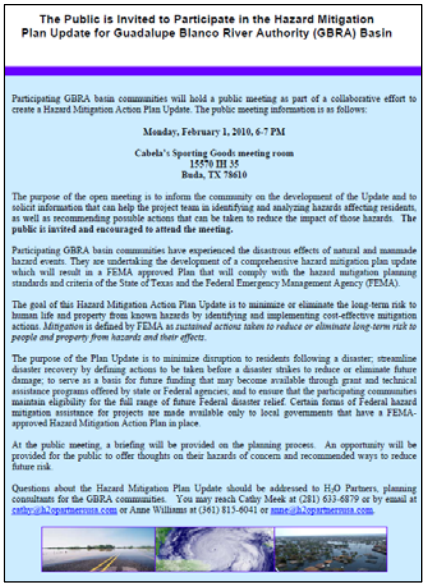
Finally, the draft of the Plan Update was made available on the GBRA website for review and comment at the end of September 2010. A copy of the Plan was made available by Team Members for public inspection, review and comment within each jurisdiction.

Public and Stakeholder Involvement

An important component of mitigation planning is public participation and stakeholder involvement. Input from individual citizens and the community as a whole provides the planning team with a greater understanding of local concerns and increases the likelihood of successfully implemented mitigation actions. If citizens and stakeholders, such as local businesses, non-profits, hospitals and schools, are involved, they are more likely to gain appreciation of the hazards present in their community and take steps to reduce their impact.

Public Participation

Public involvement in the development of the update was sought at separate periods in the planning process: (1) the beginning of the planning process, (2) the drafting stage and (3) between completion of the final draft and plan approval and adoption. Public input was sought using three methods: (1) open public meetings, (2) survey instruments and (3) making copies of draft Plan deliverables available for public review on the GBRA's website as well as government offices and public libraries.



The Public is Invited to Participate in the Hazard Mitigation Plan Update for Guadalupe Blanco River Authority (GBRA) Basin

Participating GBRA basin communities will hold a public meeting as part of a collaborative effort to create a Hazard Mitigation Action Plan Update. The public meeting information is as follows:

Monday, February 1, 2010, 6-7 PM

Cabela's Sporting Goods meeting room
15570 IH 35
Buda, TX 78610

The purpose of the open meeting is to inform the community on the development of the Update and to solicit information that can help the project team in identifying and analyzing hazards affecting residents, as well as recommending possible actions that can be taken to reduce the impact of those hazards. **The public is invited and encouraged to attend the meeting.**

Participating GBRA basin communities have experienced the disastrous effects of natural and manmade hazard events. They are undertaking the development of a comprehensive hazard mitigation plan update which will result in a FEMA approved Plan that will comply with the hazard mitigation planning standards and criteria of the State of Texas and the Federal Emergency Management Agency (FEMA).

The goal of this Hazard Mitigation Action Plan Update is to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. *Mitigation* is defined by FEMA as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.*

The purpose of the Plan Update is to minimize disruption to residents following a disaster; streamline disaster recovery by defining actions to be taken before a disaster strikes to reduce or eliminate future damage; to serve as a basis for future funding that may become available through grant and technical assistance programs offered by state or Federal agencies; and to ensure that the participating communities maintain eligibility for the full range of future Federal disaster relief. Certain forms of Federal hazard mitigation assistance for projects are made available only to local governments that have a FEMA-approved Hazard Mitigation Action Plan in place.

At the public meeting, a briefing will be provided on the planning process. An opportunity will be provided for the public to offer thoughts on their hazards of concern and recommended ways to reduce future risk.

Questions about the Hazard Mitigation Plan Update should be addressed to H_2O Partners, planning consultants for the GBRA communities. You may reach Cathy Meek at (281) 633-6879 or by email at cathy@h2opartnerstxa.com or Anne Williams at (361) 813-6041 or anne@h2opartnerstxa.com.

Public Meetings

Public meetings were held three times in two locations. Sign-in sheets from public meetings and workshops can be found in Appendix E.

The first open public meeting was held after the Kickoff Workshop in August of 2009. The second meeting was held after the Risk Assessment Workshop in February 2010, and the third public meeting was held following the Mitigation Workshop in March 2010. Each meeting was advertised through a variety of means including newspaper ads, radio ads, flyers at meeting locations, notices on the GBRA website, and invitations sent to GBRA's e-mail distribution list of community members.

At each meeting the purpose of the plan was presented along with the latest results on the development of the risk assessment and mitigation strategy. Questions were encouraged to facilitate an open discussion.

Public Participation Survey

In addition to the open public meetings, the GBRA was able to get input from citizens and stakeholders through the use of a public participation survey. This survey was designed to obtain data and information from residents along the Guadalupe Blanco River Basin.

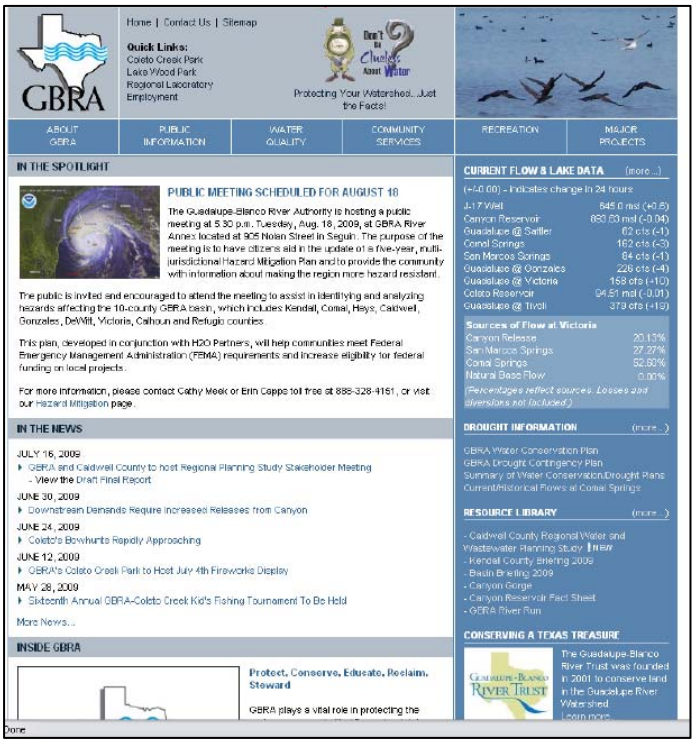
Copies of the Public Participation Survey were distributed by local officials and made available for citizens to download from the GBRA website. A total of 77 responses to the survey were submitted, which provided valuable input for the GBRA to further consider in developing the plan update. A summary of the survey findings is provided in Appendix B.

Stakeholder Involvement

Stakeholders provide an essential service in hazard mitigation planning. Throughout the planning process, members of state and federal agencies, community groups, local businesses, schools, and hospitals were invited to workshops. Specific groups targeted in the development of the plan are listed below.

- Christus Santa Rosa Hospital
- Guadalupe Regional Hospital
- National Oceanic and Atmospheric Administration (NOAA)
- American Red Cross
- Texas Lutheran University
- Victoria College
- Cemex Quarry
- Hunter Industries
- CMC Steel (formerly Structured Metals Inc.)

Stakeholders were notified about meetings and opportunities to participate or provide comments during the Plan development through a variety of mechanisms, including:



Screenshot: www.GBRA.org August 17, 2009 announcing the first Public Meeting.

- Radio spots announcing upcoming meetings

- Flyers at government buildings
- Newspaper ads
- Website postings

In addition to the methods above, stakeholders were also sent direct emails with invites attached providing information about the planning process and any upcoming meetings. Sign in sheets and documentation of meetings can be found in Appendix E.

REGIONAL PROFILE

Overview 1
Population 4
Demographics 15
Future Development 16
Economic Impacts 18
Building Permits 18

Overview

The GBRA authority extends over a ten-county statutory district, which begins near the headwaters of the Guadalupe and Blanco Rivers, ends at San Antonio Bay, and includes Kendall, Comal, Hays, Caldwell, Guadalupe, Gonzales, DeWitt, Victoria, Calhoun and Refugio counties. The GBRA currently operates dams that form seven reservoirs along the Guadalupe River in Texas. The dams are located at Canyon Lake, Lake Dunlap, Lake Gonzales, Lake McQueeney, Meadow Lake, Lake Placid, and Lake Wood. Other reservoirs managed by the GBRA include the Coleto Creek Reservoir. At least six power stations in the middle and lower portions of the river depend on a steady release of water from spring flow. Recreation on the river, which include canoeing and inner-tubing as well as water parks and the facilities available at Canyon Reservoir and Guadalupe River State Park, attract large numbers of people to the vicinity and contribute heavily to the area's economy.

Figure 3-1. Map of Guadalupe-Blanco River Basin

Table 3-1 provides a listing of those jurisdictions along the GBRA basin and status of participation in the Hazard Mitigation Plan Update. It is important to note that in one instance, a participating municipality (the City of Cibolo) is located in a neighboring county (Guadalupe County) that is not participating. It is also important to note that three incorporated municipalities (each of which are located, all or partially, within participating counties) are not participating in this study.

Table 3-1. Participating and Non-Participating Jurisdictions in the Study Area

PARTICIPATING JURISDICTIONS	NON-PARTICIPATING JURISDICTIONS
Caldwell County	
City of Lockhart	City of Niederwald
City of Luling	City of Uhland
City of Martindale	
Calhoun County	
Point Comfort	
Port Lavaca	
Seadrift	
DeWitt County	
DeWitt County Drainage District[1]	
City of Cuero	
City of Nordheim	
City of Yoakum	
City of Yorktown	
Gonzales County	
City of Gonzales	City of Smiley
City of Nixon	
City of Waelder	
—	**Guadalupe County**
City of Cibolo	
Kendall County	
City of Boerne	
Refugio County	
City of Austwell	
City of Bayside	
Town of Refugio	
City of Woodsboro	
Woodsboro Independent School District[2]	

[1] The DeWitt County Drainage District is a participating jurisdiction of the Plan Update as they were included into the plan by amendment in 2007. The district fully participated in all workshops and developed mitigation actions, however, as the risks for the district are the same as the County, the district is not listed separately in the hazard sections of the Plan Update.

PARTICIPATING JURISDICTIONS	NON-PARTICIPATING JURISDICTIONS
Victoria County	
City of Victoria	

Population

The population distribution (based on the United States Census Bureau for 2000) for the basin is depicted in Figure 3-2, which displays the seven counties including unincorporated areas as well as the participating jurisdictions. Census 2000 data was used to determine population distribution, as it was collected at the census block level. Table 3-2 provides a numeric breakdown of population by jurisdiction.

Table 3-2. Population Distribution by Jurisdiction

JURISDICTION	TOTAL ESTIMATED POPULATION	ESTIMATED SPECIAL NEEDS POPULATIONS	
		Elderly (Over 65)	Low Income (</= $20,000)
Uninc. Caldwell County	**14,661**	**709**	**258**
Lockhart	11,591	599	443
Luling	5,025	310	309
Martindale	917	120	27
Uninc. Calhoun County	**6,481**	**472**	**201**
Point Comfort	781	29	4
Port Lavaca	12,035	631	530
Seadrift	1,350	88	71
Uninc. DeWitt County	**8,805**	**679**	**385**
Cuero	6,544	460	458
Nordheim	323	44	13
Yoakum	5,729	400	281
Yorktown	2,204	201	129
Uninc. Gonzales County	**8,343**	**661**	**370**
Gonzales	7,160	434	420
Nixon	2,178	109	122
Waelder	947	66	76
Cibolo (Guadalupe County)	3,035	85	66
Uninc. Kendall County	**17,618**	**1,050**	**400**

[2] Although Woodsboro ISD is a participating entity, the school district is not listed separately in the hazard sections of the Plan Update as the risks and vulnerabilities are the same as the Town of Woodsboro and critical facilities on campus were factored into the vulnerability assessment for Woodsboro.

SECTION 3: REGIONAL PROFILE

JURISDICTION	TOTAL ESTIMATED POPULATION	ESTIMATED SPECIAL NEEDS POPULATIONS	
		Elderly (Over 65)	Low Income (</= $20,000)
Boerne	6,125	362	200
Uninc. Refugio County	**2,670**	**185**	**97**
Austwell	192	18	3
Bayside	360	21	22
Refugio	2,920	216	185
Woodsboro	1,683	106	86
Uninc. Victoria County	**23,482**	**1,173**	**570**
Victoria	60,606	2,852	2,241
TOTALS FOR STUDY AREA	**213,765**	**12,080**	**7,967**

Figure 3-2. Population Distribution by Census Block for Unincorporated Areas

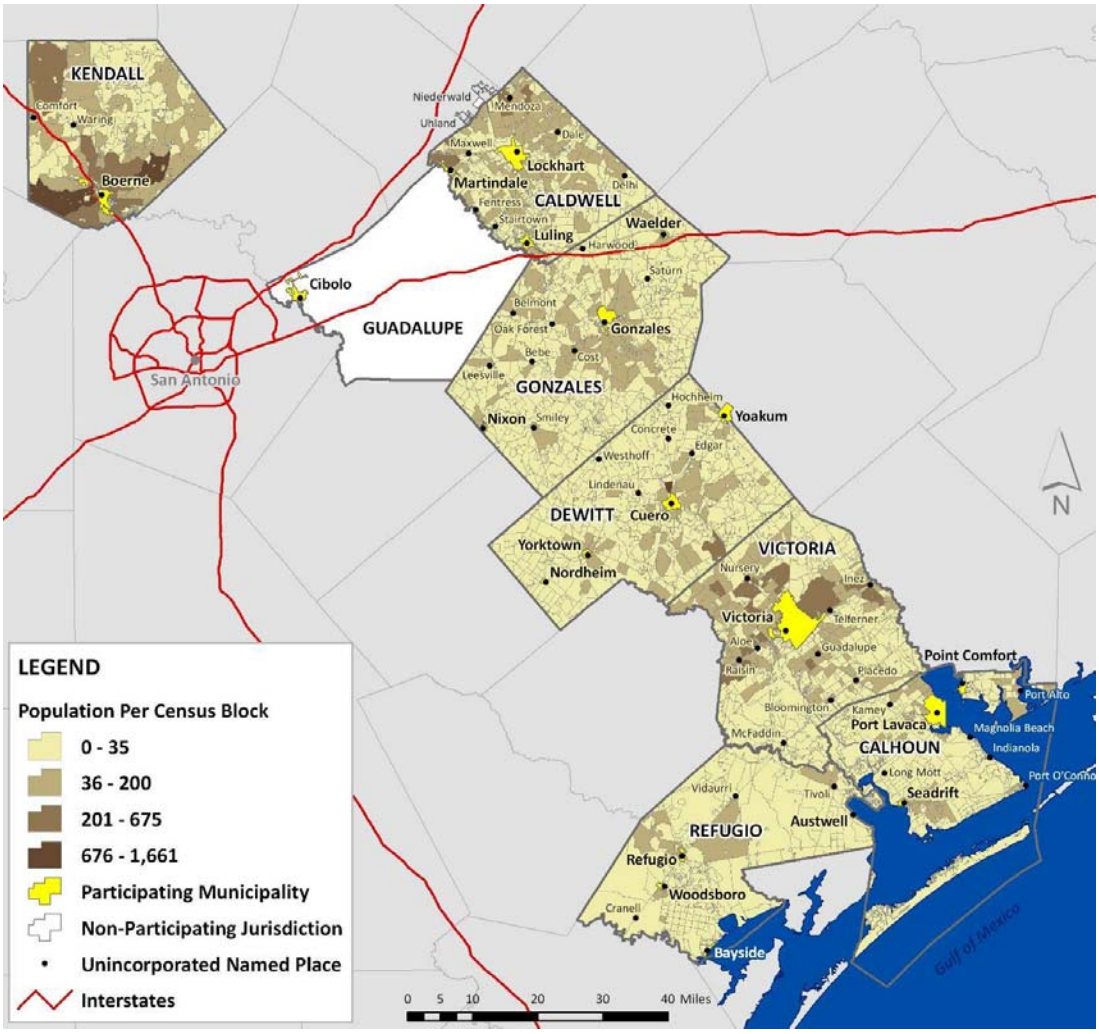


Figure 3-3. Population Distribution by Census Block in Caldwell County

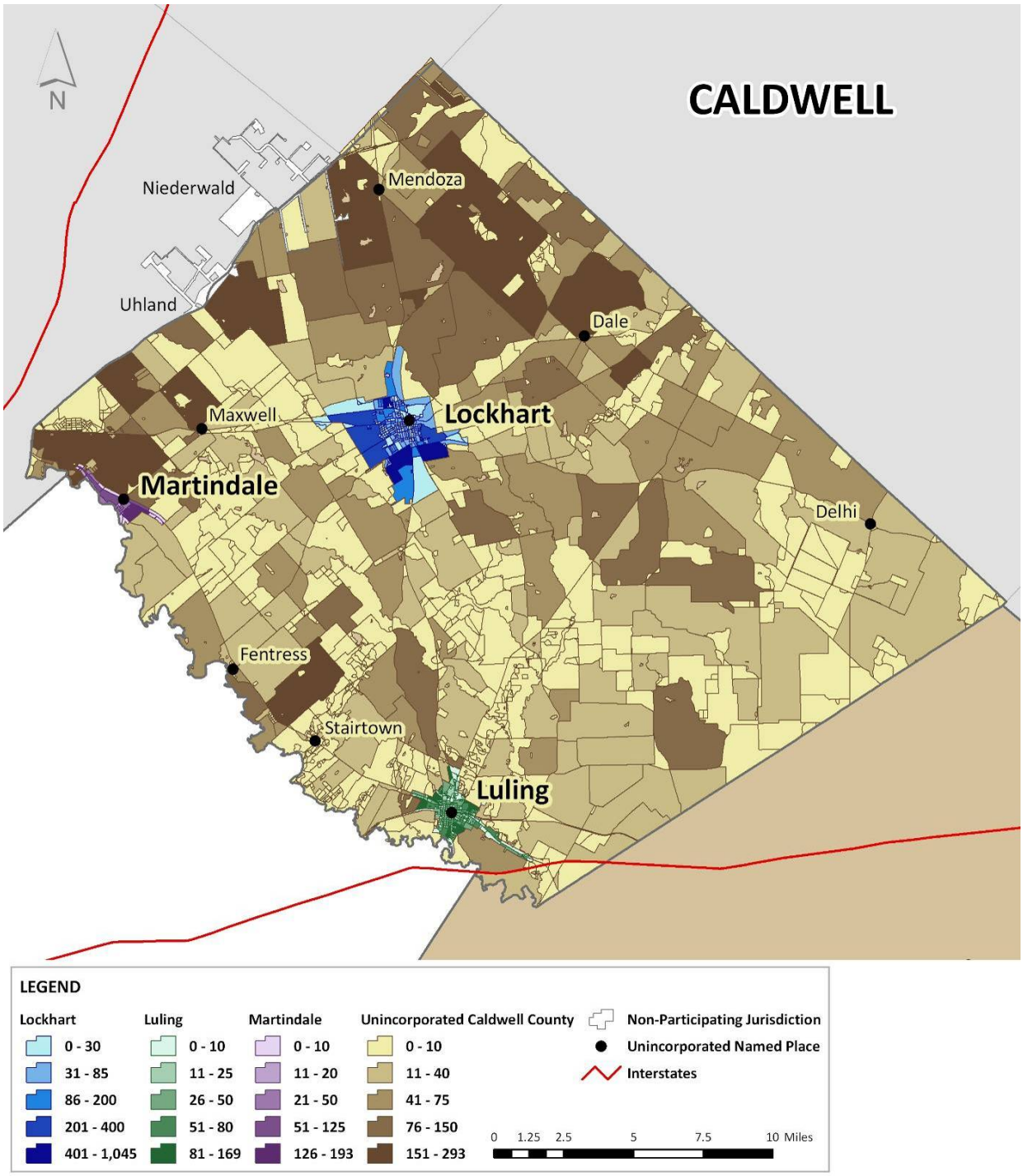


Figure 3-4. Population Distribution by Census Block in Calhoun County

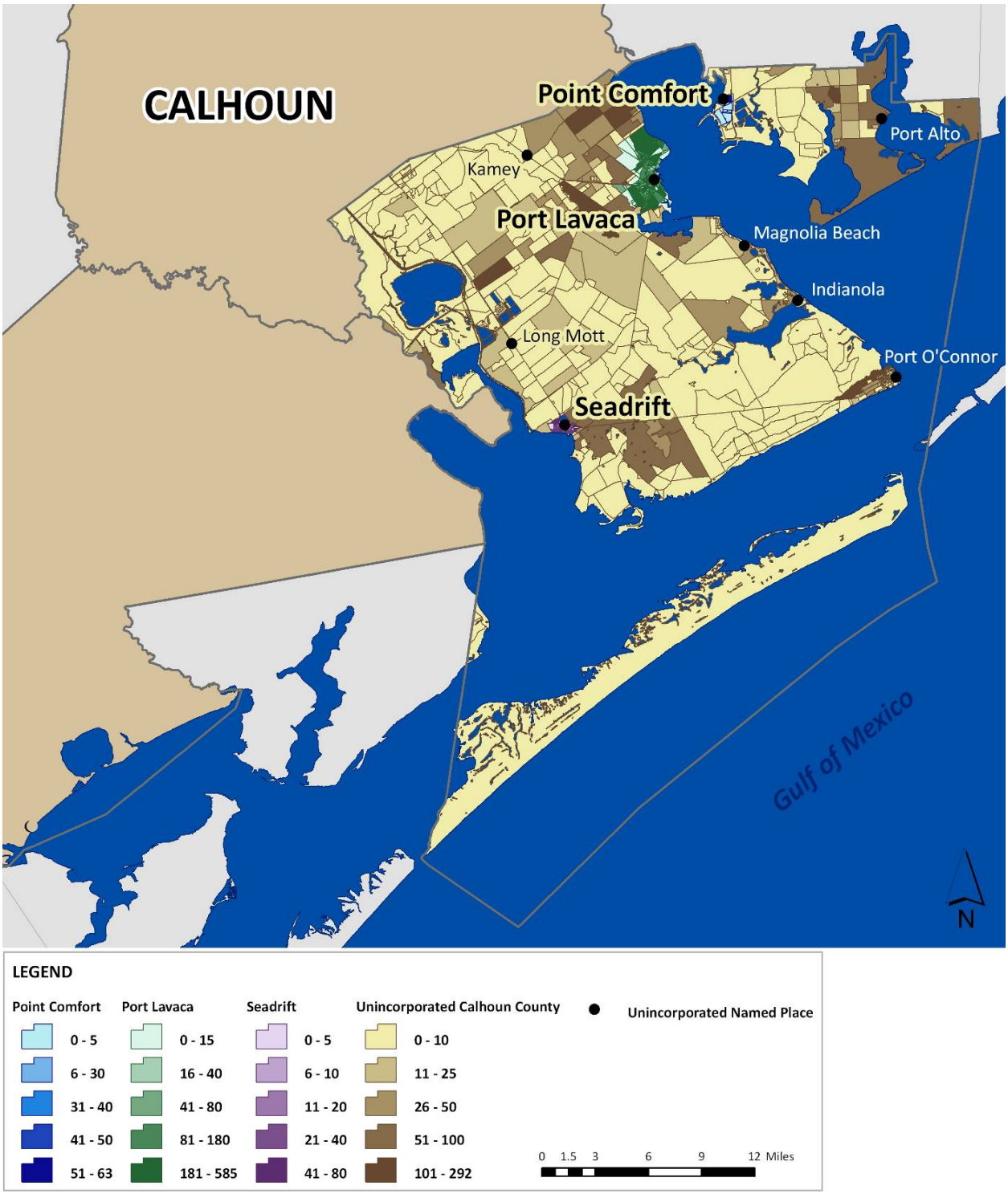


Figure 3-5. Population Distribution by Census Block in DeWitt County

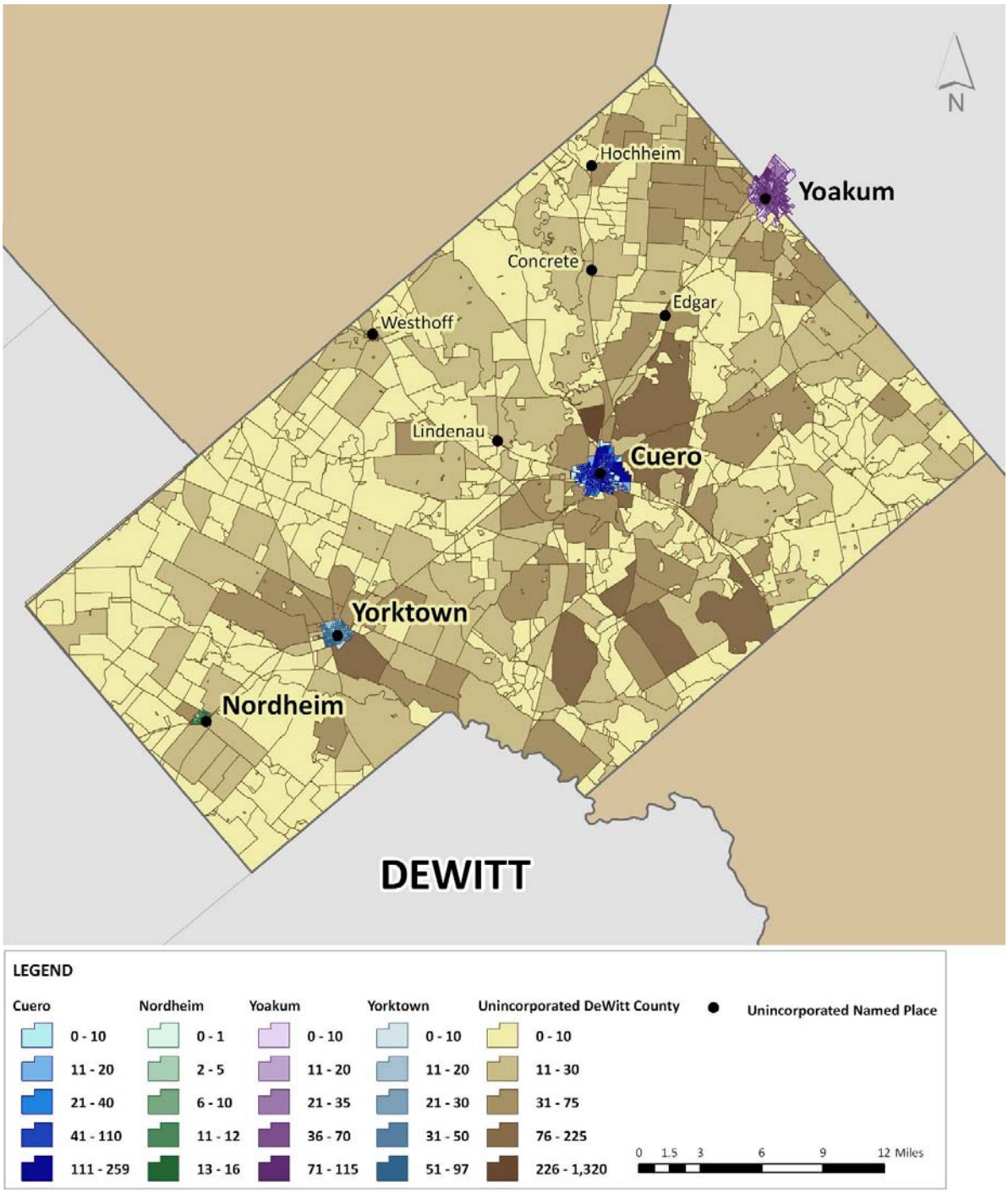


Figure 3-6. Population Distribution by Census Block in Gonzales County

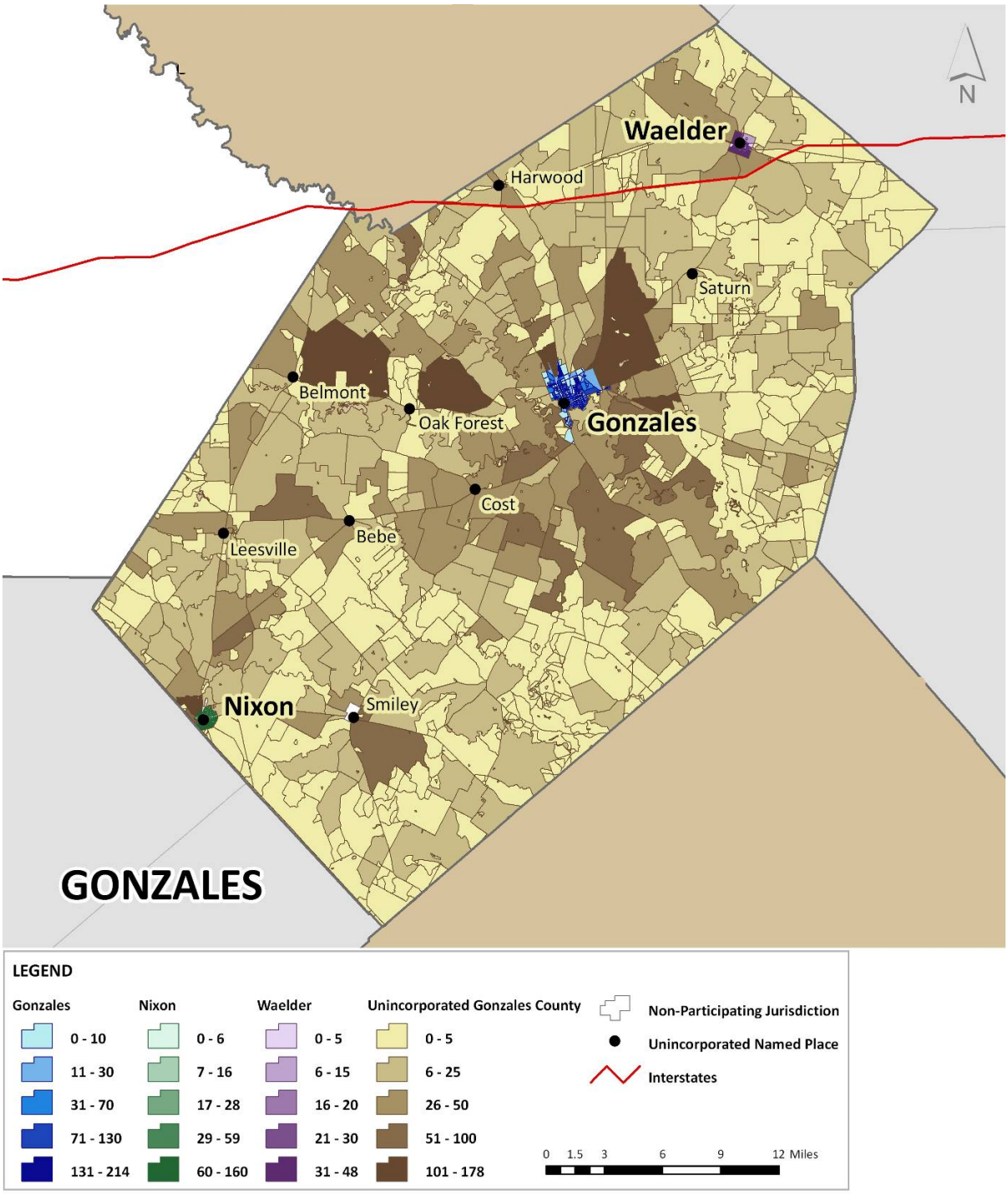


Figure 3-7. Population Distribution by Census Block in Kendall County

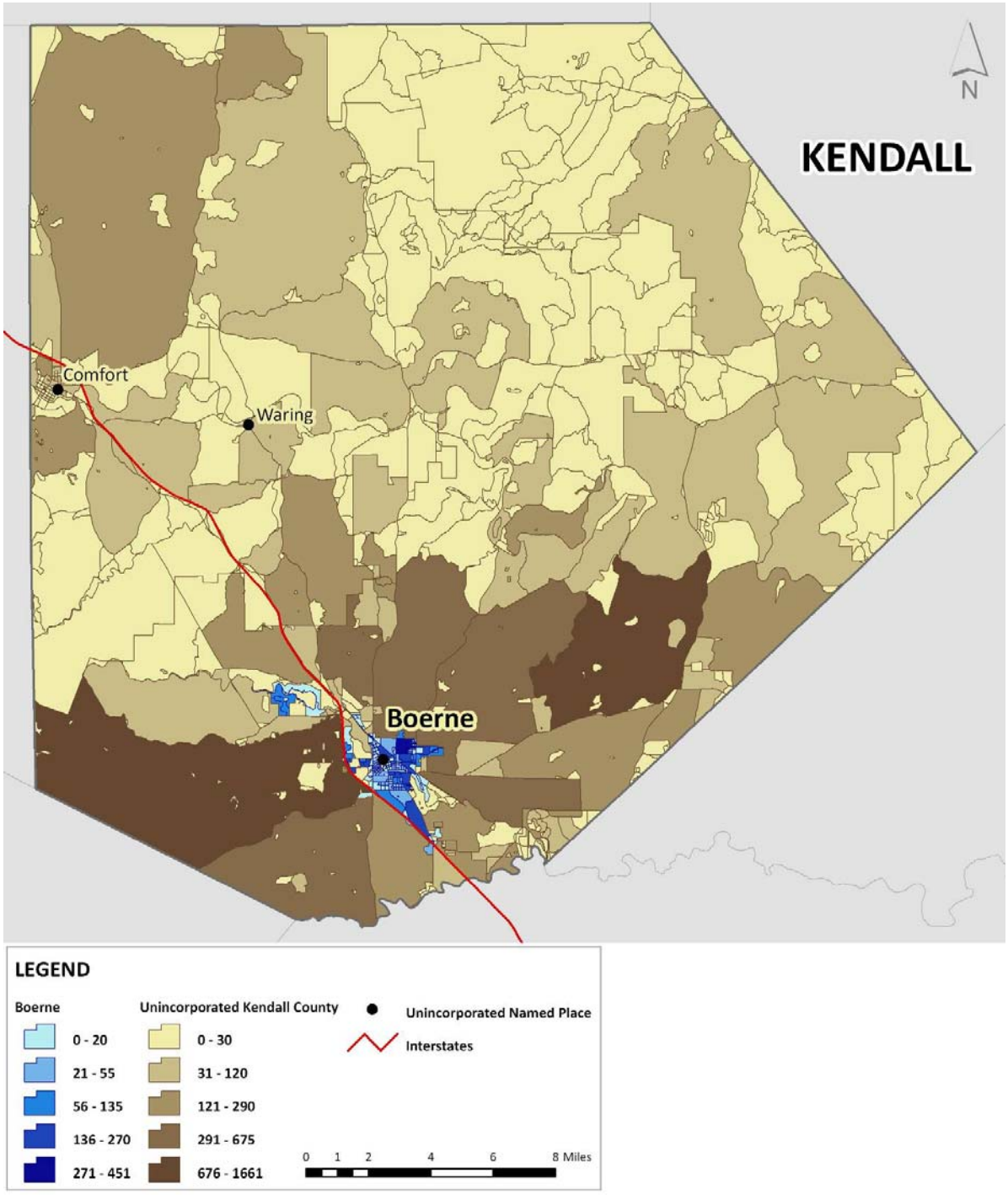


Figure 3-8. Population Distribution by Census Block in Refugio County

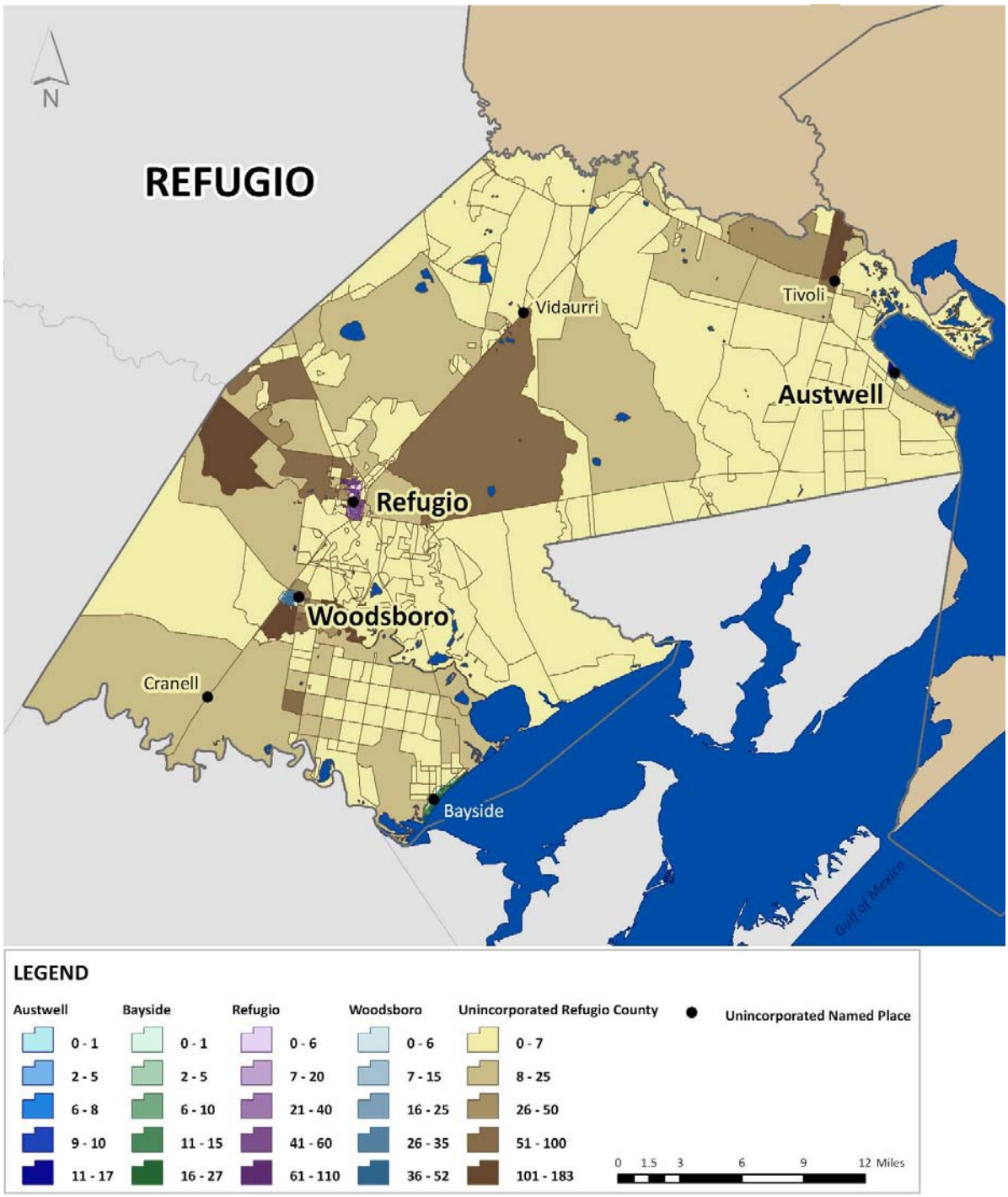


Figure 3-9. Population Distribution by Census Block in Victoria County

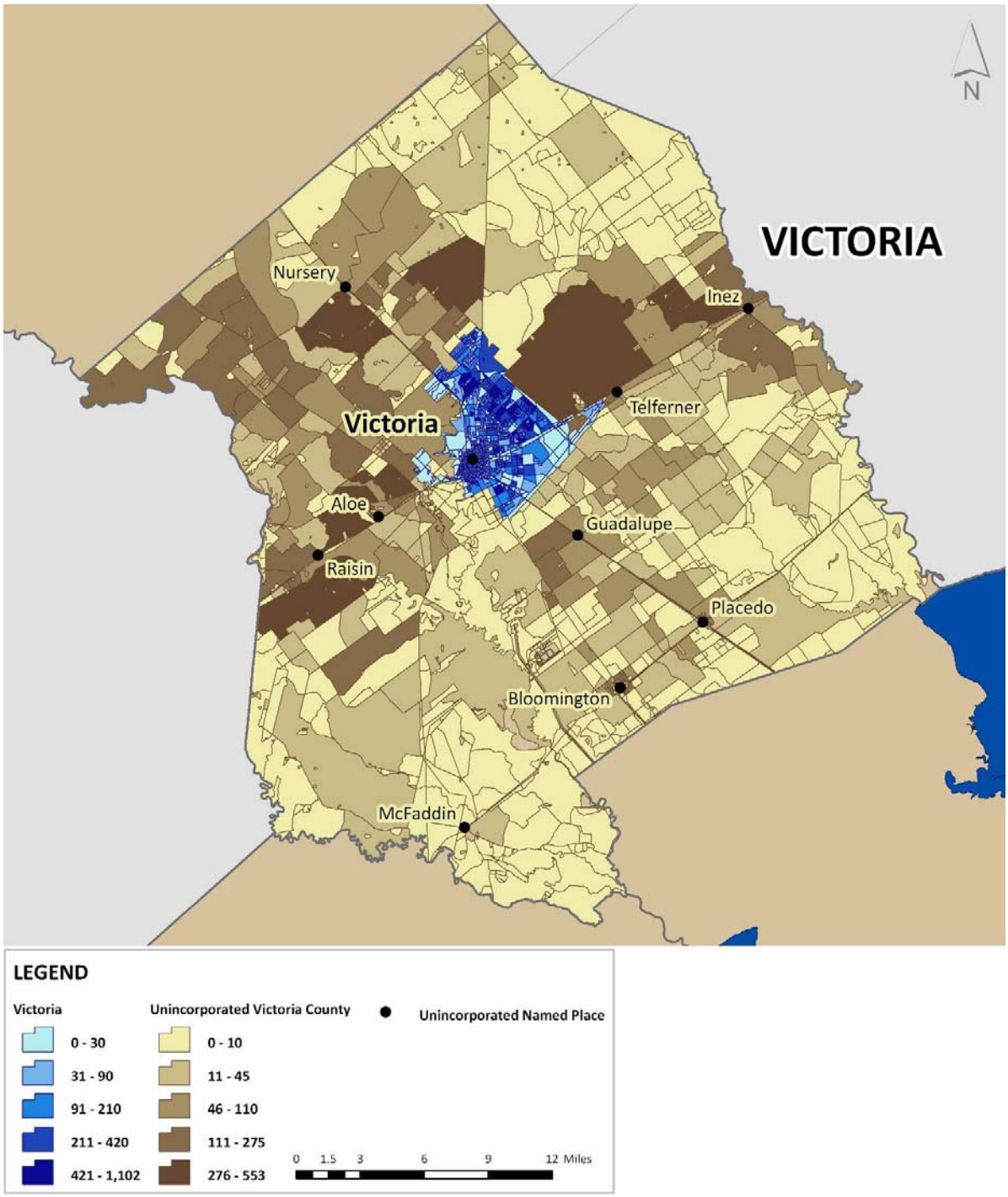
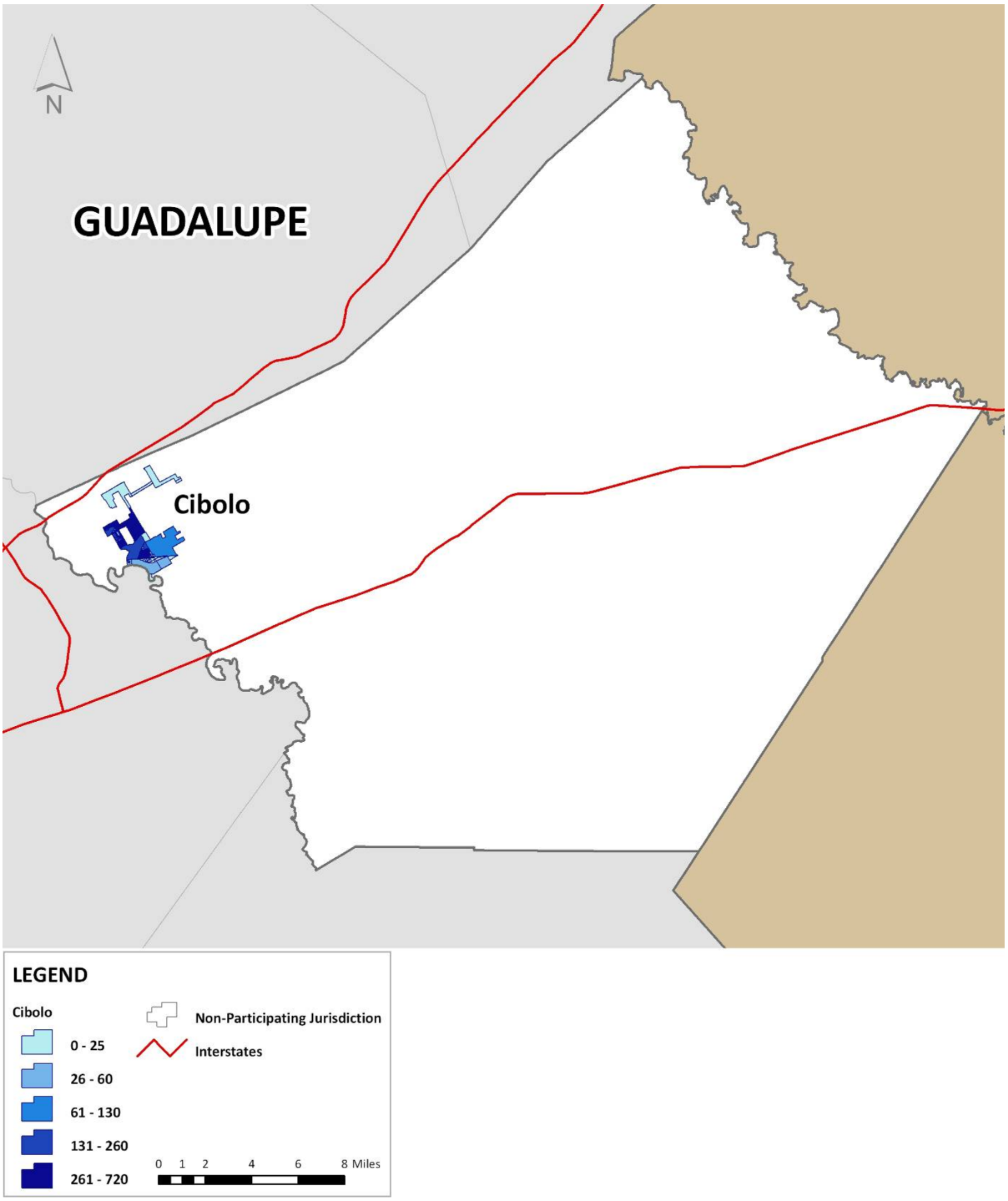


Figure 3-10. Population Distribution by Census Block in Cibolo (in Guadalupe County)



Demographics

Table 3-3 provides the total estimated dollar exposure by key occupancy, and Table 3-4 includes the amount (in kilometers) of oil and gas pipelines, highways and railways, and the number of hazardous materials sites in the study area.[3]

This demographic and building stock data form the basis of large portions of this risk assessment and were derived from HAZUS-MH MR4. Commercial building stock data has been updated to Dun & Bradstreet 2006, Building valuations have been updated to R.S. Means 2006, and building counts are based on census housing unit counts.

Table 3-3. Estimated Building Distribution by Key Occupancy by Jurisdiction[4]

JURISDICTION	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		ESSENTIAL FACILITIES	
	Num.	Value	Num.	Value	Num.	Value	Num.	Value
Uninc. Caldwell Co.	**6,107**	**$531,566,000**	**218**	**$43,405,000**	**74**	**$13,764,000**	**10**	**$23,277,000**
Lockhart	3,893	$474,538,000	230	$79,459,000	43	$10,551,000	11	$50,987,000
Luling	2,387	$196,890,000	136	$47,944,000	31	$7,738,000	4	$14,041,000
Martindale	411	$34,042,000	9	$6,315,000	2	$81,000	0	$0
Uninc. Calhoun County	**5,242**	**$486,122,000**	**119**	**$43,594,000**	**51**	**$64,267,000**	**3**	**$305,000**
Point Comfort	424	$52,760,000	16	$7,501,000	14	$16,513,000	3	$2,235,000
Port Lavaca	4,958	$499,874,000	271	$91,042,000	62	$27,204,000	18	$74,876,000
Seadrift	918	$54,269,000	21	$5,201,000	5	$432,000	2	$4,893,000
Uninc. DeWitt County	**4,122**	**$408,529,000**	**127**	**$22,314,000**	**62**	**$21,936,000**	**4**	**41,741,000**
Cuero	3,267	$269,738,000	207	$92,793,000	53	$18,496,000	19	$37,547,000
Nordheim	170	$21,023,000	7	$1,571,000	2	$134,000	1	$914,000
Yoakum	3,048	$259,109,000	186	$68,442,000	33	$22,746,000	8	$27,154,000
Yorktown	1,209	$99,614,000	66	$17,240,000	11	$4,916,000	3	$7,500,000
Uninc. Gonzales Co.	**5,419**	**$375,664,000**	**100**	**$46,358,000**	**36**	**$11,628,000**	**5**	**$23,013,000**
Gonzales	3,344	$280,908,000	204	$82,546,000	33	$11,703,000	9	$35,033,000
Nixon	1,269	$75,442,000	42	$11,576,000	3	$3,663,000	5	$11,049,000
Waelder	560	$33,877,000	8	$2,172,000	1	$250,000	0	$0
Cibolo (Guadalupe Co.)	1,242	$165,972,000	68	$27,759,000	19	$17,845,000	0	$0
Uninc. Kendall County	**7,573**	**$953,491,000**	**372**	**$142,677,000**	**146**	**$40,234,000**	**11**	**$41,464,000**

[3] Appendix C provides a more detailed listing of the hazardous materials facilities included in Table 3 (as derived from HAZUS-MH).

[4] Table 3-3 provides information for participating jurisdictions. Refer to Appendix D for a more complete and detailed listing of essential facilities in the GBRA study area.

JURISDICTION	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		ESSENTIAL FACILITIES	
	Num.	Value	Num.	Value	Num.	Value	Num.	Value
Boerne	2,634	$336,372,000	266	$108,149,000	59	$24,059,000	9	$64,348,000
Uninc. Refugio County	**1,304**	**$132,044,000**	**26**	**$5,932,000**	**16**	**$5,446,000**	**4**	**$1,934,000**
Austwell	157	$11,532,000	5	$653,000	2	$521,000	0	$0
Bayside	293	$24,090,000	4	$682,000	2	$179,000	0	$0
Refugio	1,665	$135,815,000	94	$30,309,000	20	$8,009,000	7	$16,050,000
Woodsboro	784	$64,016,000	20	$3,776,000	10	1,402,000	4	$6,283,000
Uninc. Victoria County	**9,063**	**$1,001,520,000**	**366**	**$97,444,000**	**152**	**$38,106,000**	**20**	**$26,055,000**
Victoria	22,221	$2,927,528,000	1,583	$731,433,000	334	$93,264,000	36	$389,250,000

Future Development

GBRA provides stewardship for the water resources in its 10-county statutory district, which begins near the headwaters of the Guadalupe and Blanco Rivers, ends at San Antonio Bay, and includes Kendall, Comal, Hays, Caldwell, Guadalupe, Gonzales, DeWitt, Victoria, Calhoun, and Refugio counties (not all of which are participating in this risk assessment). Planning and resource development efforts are carefully coordinated within the broader consideration of regional and statewide water needs in order to fulfill GBRA's primary responsibilities of developing, conserving and protecting the water resources of the Guadalupe River Basin. A component of this is the basin-wide hazard mitigation plan.

To better understand how future growth and developments in this region might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts.

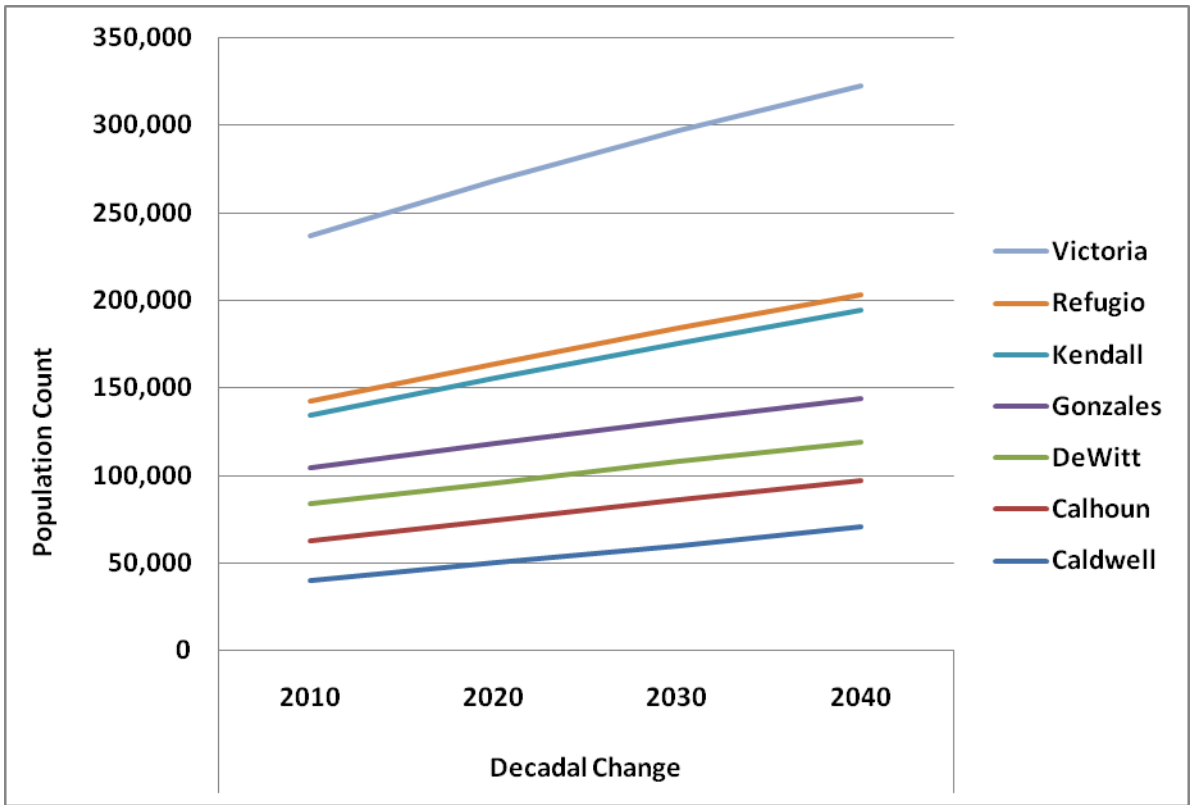
This section includes an analysis of the projected population change, the number of permits that have been issued throughout the region and economic impacts.

Population projections from 2010 to 2040 are listed in Table 3-4 and illustrated in Figure 3-11, as provided by the Office of the State Demographer, Texas State Data Center, Institute for Demographic and Socioeconomic Research. Population projects were based on a 0.5 scenario growth rate, which is 50 percent of the population growth rate that occurred during 1990-2000. Population projects were not available for the City of Cibolo.

Table 3-4. GBRA Study Area Population Projections

JURISDICTION	LAND AREA	2010		2020		2030		2040	
		Population							
		Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)
Caldwell County	545.73	40,289	74	49,975	92	60,127	110	70,593	129
Calhoun County	512.31	22,689	44	24,427	48	25,724	50	26,569	52
DeWitt County	909.18	20,834	23	21,536	24	21,896	24	21,987	24
Gonzales County	1,067.75	20,439	19	22,079	21	23,465	22	24,538	23
Kendall County	662.44	29,939	45	37,307	56	44,411	67	50,744	77
Refugio County	770.21	8,367	11	8,661	11	8,792	11	8,784	11
Victoria County	882.50	94,228	107	104,269	118	112,417	127	119,336	135

Figure 3-11. GBRA Study Area Population Projections



Economic Impacts

The economy is vital to all infrastructures. A major key to the economy of the area is tourism. In some locations, the population can double during the summer months due to the high number of tourists. Each year, tourists are attracted to the vast nature preserves to enjoy the water, trails, and bird watching opportunities to see one of the 400 species of birds identified in the area. If this nature preserve were to be damaged or destroyed, a large portion of the economy would suffer.

Additionally, a critical portion of the economy lies within the industries of Alcoa, Formosa Plastics Corporation, Ineos, Seadrift Coke, and Port of Port Lavaca-Point Comfort. Most notably though is the Port Authority. The Port of Port Lavaca-Point Comfort employs thousands of families both directly and indirectly. A 2004 study by Martin Associates of Lancaster, Pennsylvania, reports that the public and private marine terminals on the Matagorda Ship Channel generate more than 16,000 jobs nationwide. If this terminal was lost or experienced downtime, it would affect the annual business revenue of nearly $2 billion, plus an additional $338 million of indirect revenue generated with local suppliers of goods and services of firms directly dependent upon cargo activity.[5]

Furthermore, the DeWitt Industrial Park located in the City of Cuero, as well as the Business District in the City of Luling are both looking to expand. Depending on what industry these locations draw to their areas and how much they expand, this could have a large financial impact in the community also. These areas need to consider mitigation actions also, should something impact the location and cause the shutdown of any of the facilities for a day or more leading to more widespread impacts.

Also of importance to note, is that the State Highway 130 (SH 130) is being extended through Caldwell and Guadalupe counties to 1-10 near Seguin. Construction began in 2009 and completion is expected in 2012. Although this is part of the larger Central Texas Turnpike System and would not be the responsibility of the counties, this highway segment should be considered as a future mobile hazardous materials transportation corridor. Since this road is still under construction, GIS data is not readily available to include in the hazardous materials assessment. However, a static map that was obtained via the Central Texas Turnpike Authority Web site is included in this report to assist with emergency management decision making.

Building Permits

Building permits indicate what types and uses of buildings are being constructed. Table 3-5 lists the number of residential building permits for each county that have been granted between 1990 and 2009. The data includes all sizes of family homes for reported permits, as well as the construction costs to show the potential increase in vulnerability of structures to the various hazards assessed in this risk assessment. The increase in vulnerability can be attributed to the higher construction costs that would

[5] http://www.calhounport.com/about/impact.php

be factored into repairing or replacing a structure using current market values. Permits are reported annually in September and the data includes that for the years of 2008 and 2009 if available to demonstrate growth.

Table 3-5. County Residential Building Permits[6]

Caldwell County				Gonzales County			
Year	Buildings	Units	Construction Cost	Year	Buildings	Units	Construction Cost
1990	8	8	$375,130	1990	0	0	$0
1995	53	61	$2,870,342	1995	4	4	$371,760
2000	57	57	$2,825,910	2000	3	3	$483,905
2005	37	37	$2,896,744	2005	9	9	$599,500
2008	48	48	$4,578,093	2008	2	2	$293,210
2009	13	108	$5,770,180	2009	no data reported		
Calhoun County				**Kendall County**			
Year	Buildings	Units	Construction Cost	Year	Buildings	Units	Construction Cost
1990	39	39	$1,787,550	1990	78	78	$9,461,033
1995	71	71	$4,422,519	1995	57	58	$5,834,994
2000	65	68	$5,855,995	2000	278	278	$57,800,826
2005	94	96	$11,216,397	2005	214	214	$27,026,445
2008	86	86	$11,655,970	2008	79	79	$13,385,539
2009	No data reported			2009	34	34	$4,750,507
Cibolo (City of)				**Refugio County**			
Year	Buildings	Units	Construction Cost	Year	Buildings	Units	Construction Cost
1990	No data reported			1990	1	1	$30,000
1996	96	96	$9,124,508	1995	1	1	$49,400
2000	94	94	$9,697,814	2000	1	1	$135,000
2005	30	30	$4,196,500	2005	12	12	$1,655,348
2008	445	445	$91,164,621	2008	2	2	$240,000
2009	355	355	$77,837,737	2009	No data reported		
DeWitt County				**Victoria County**			
Year	Buildings	Units	Construction Cost	Year	Buildings	Units	Construction Cost
1990	4	4	$236,284	1990	107	107	$11,640,765
1995	9	9	$468,500	1995	172	172	$15,384,481
2000	10	10	$498,500	2000	167	167	$18,335,495
2005	4	4	$689,930	2005	123	123	$14,933,516

[6] http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl

DeWitt County				Victoria County			
Year	Buildings	Units	Construction Cost	Year	Buildings	Units	Construction Cost
2008	0	0	$0	2008	4	4	$1,011,493
2009	No data reported			2009	No data reported		

RISK OVERVIEW

Hazard Identification 1
Overview of Hazard Analysis 4
HAZUS-MH 5
Statistical Risk Assessment Methodology 5
Loss Estimates 7
Vulnerability- Essential Facilities, Infrastructure and Existing Buildings 8
Potential Dollar Losses 21
Hazard Ranking 23

Hazard Identification

This section begins the risk assessment, which also includes hazard profiles and vulnerability assessments found in Sections 5-18. The purpose of this section is to provide background information for the hazard identification process as well as descriptions for the natural and technological hazards identified.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the GBRA and participating jurisdictions identified 14 hazards that are to be addressed in the Plan Update. These hazards were identified through an extensive process utilizing input from planning team members, research of past disaster declarations, review of the 2005 Plan and a review of the current State of Texas Hazard Mitigation Plan ("State Plan"). Readily available online information from reputable sources such as federal and state agencies was also evaluated to supplement information as needed.

The 14 hazards identified as significant are listed in Table 4-1. These hazards are divided into two main categories: natural and technological. Natural hazards include hazards categorized as atmospheric, hydrologic, and other.

Atmospheric hazards are events or incidents associated with weather generated phenomenon. Atmospheric hazards identified as significant from Table 4-1 include: extreme heat; hail; hurricane wind events; thunderstorms; tornadoes; and winter storms. Hydrologic hazards are events or incidents associated with water related damage and account for over 75 percent of Federal disaster declarations in the United States. Hydrologic hazards identified as significant include drought and flooding. For the purposes of the risk assessment, "other" natural hazards consist of wildfire and infectious disease.

SECTION 4: RISK OVERVIEW

The term "technological hazards" refers to the origins of incidents that can arise from human activities such as the construction and maintenance of dams; the use of gas and oil pipelines; the manufacture, transportation, storage, and use of hazardous materials; and an act of terrorism. These hazards are distinct from natural hazards primarily in that they originate from human activity. While the risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently human-induced.

Table 4-1 provides descriptions for each of the natural and technological hazards included in the Plan Update.

Table 4-1. Hazard Descriptions

HAZARD	DESCRIPTION
ATMOSPHERIC	
Extreme Heat	Extreme heat is the condition whereby temperatures hover ten degrees or more above the average high temperature in a region for an extended period.
Hailstorm	Any storm that produces hailstones that fall to the ground; usually used when the amount or size of the hail is considered significant.
Hurricane	Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) with a diameter averaging 10 to 30 miles across. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves and tidal flooding which can be more destructive than cyclone wind.
Thunderstorm	A thunderstorm occurs when an observer hears thunder. Radar observers use the intensity of the radar echo to distinguish between rain showers and thunderstorms. Lightning detection networks routinely track cloud-to-ground flashes, and therefore thunderstorms.
Tornado	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. The destruction caused by tornadoes ranges from

HAZARD	DESCRIPTION
	light to catastrophic depending on the intensity, size and duration of the storm.
Winter Storm	Severe winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 miles per hour, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
HYDROLOGIC	
Drought	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality.
Flood	The accumulation of water within a water body, which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, or shallow flooding.
OTHER	
Infectious Disease	Illness due to a specific infectious agent or its toxic products that arises through transmission of that agent or its products from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plan or animal host, vector, or the inanimate environment.
Wildfire	An uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
TECHNOLOGICAL	

HAZARD	DESCRIPTION
Dam Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.
Hazardous Materials Release	Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.
Pipeline Failure	An estimated 2.2 million miles of pipelines in the United States carry hazardous materials such as oil and natural gas. Pipelines are out of sight and unnoticed, yet have caused fires and explosions that have killed more than 200 people and injured more than 1,000 people nationwide in the last decade.
Terrorism	Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom. Terrorists often use threats to create fear among the public, to try to convince citizens that their government is powerless to prevent terrorism and to get immediate publicity for their causes.

Overview of Hazard Analysis

This risk assessment was conducted using two distinct methodologies: HAZUS-MH (FEMA's loss estimation software) and a statistical approach. Each approach provides estimates of potential impact by using a common, systematic framework for evaluation.

The HAZUS-MH risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g., wind speed and building types) were modeled using the HAZUS-MH software to determine the impact (e.g., damages and losses) on the built environment. The HAZUS-MH software was used to estimate losses from the flood and hurricane wind hazards.

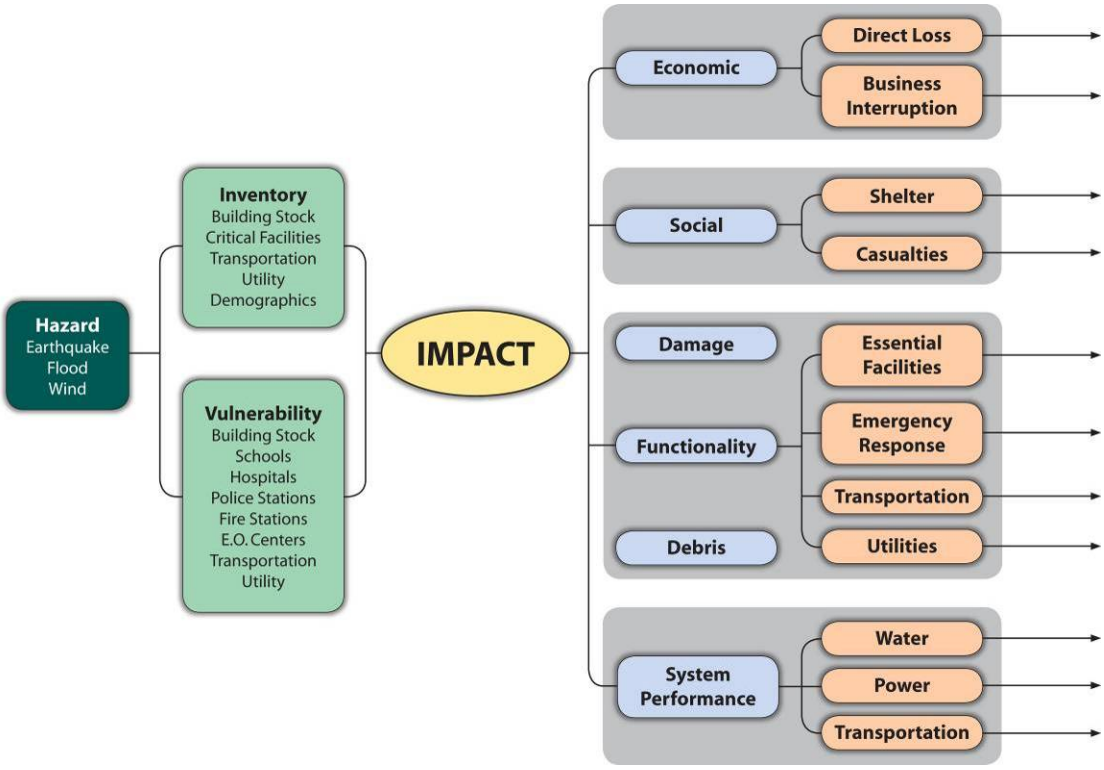
The statistical risk assessment methodology was applied to analyze hazards of concern that were outside the scope of the HAZUS-MH software. Following is a brief description of both approaches.

SECTION 4: RISK OVERVIEW

HAZUS-MH

HAZUS-MH is FEMA's standardized loss estimation software program built upon an integrated geographic information system (GIS) platform (Figure 4-1). This risk assessment applies HAZUS-MH to produce regional profiles and estimate losses for two hazards (flood and hurricane wind). At the time this analysis was completed, HAZUS-MH MR4 Patch 1 was used to estimate potential losses using HAZUS-MH default building stock inventory data.

Figure 4-1. Conceptual Model of HAZUS-MH Methodology



Statistical Risk Assessment Methodology

Risks associated with other natural and anthropogenic[1] hazards were analyzed using a statistical assessment methodology developed and used specifically for this effort. Historical data for each hazard was used and statistical evaluations were performed using manual calculations. The general steps used in the statistical risk assessment methodology are summarized below:

[1] An anthropogenic hazard is one that involves effects, processes, objects or materials that are derived from human activities, as opposed to those occurring in natural environments without human influences.

1. Compile data from the following sources:
   a. Local
   b. National

2. Clean up data:
   a. Remove duplication
   b. Update losses (for inflation)

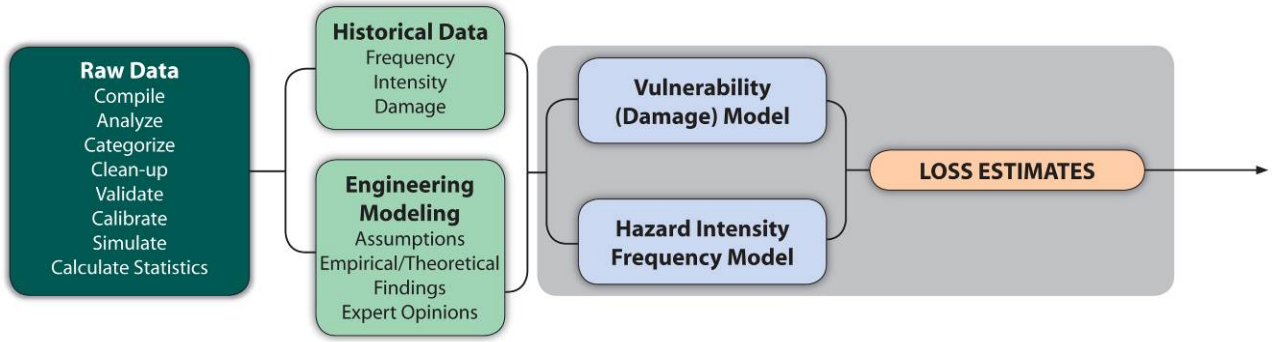
3. Identify patterns in:
   a. Frequency
   b. Intensity
   c. Vulnerability
   d. Loss

4. Statistically and probabilistically extrapolate the patterns

5. Produce meaningful results:
   a. Development of annualized loss estimates

Figure 4-2 illustrates a conceptual model of the statistical risk assessment methodology, as applied to the GBRA study area.

Figure 4-2. Conceptual Model of the Statistical Risk Assessment Methodology



The economic loss results are presented in this assessment follow two interrelated risk indicators:

1) The Annualized Loss (AL), which is the estimated long-term weighted average value of losses to property in any single year in a specified geographic area (e.g., county or municipality).

2) The Annualized Loss Ratio (ALR), which expresses estimated annualized loss normalized by property replacement value.

The AL addresses the key idea of risk: the probability of the loss occurring in the study area (largely a function of building construction type and quality). By annualizing estimated losses, the AL factors in historic patterns of frequent smaller events with infrequent but larger events to provide a balanced presentation of the risk.

The ALR represents the AL as a fraction of the replacement value of the local inventory. This ratio is calculated using the following formula:

ALR = Annualized Losses / Total Exposure

The ALR gauges the relationship between average annualized loss and replacement value. This ratio can be used as a measure of vulnerability in the areas and, since it is normalized by replacement value, it can be directly compared across different geographic units such as metropolitan areas or counties.

Loss Estimates

Loss estimates are presented in terms of annualized losses, where possible. In general, presenting results in the annualized form is highly useful on three fronts:

- Contribution of potential losses from all future disasters is accounted for with this approach;
- Results in this form from different hazards are readily comparable and hence easier to rank; and
- When evaluating mitigation alternatives, use of annualized losses is the most objective approach for this purpose.

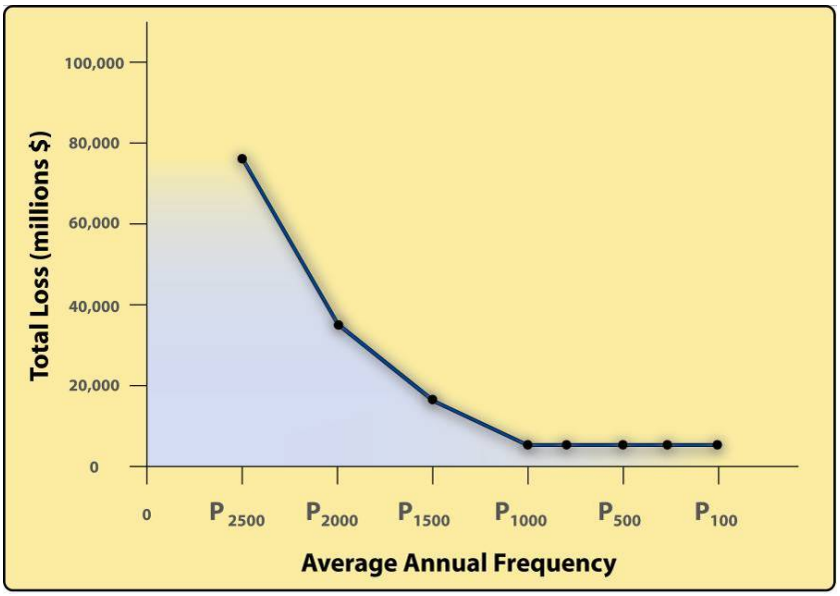
Annualized losses for the hazards where the parametric approach is utilized are computed in a three-step process:

- Compute/estimate losses for a number of scenario events with different return periods (e.g., 10-year, 100-year, 200-year, 500-year, etc.);
- Approximate the Probability versus Loss Curve through curve fitting; and
- Calculate the area under the fitted curve to obtain annualized losses.

This approach is illustrated graphically in Figure 4-3.

For other hazards where the statistical approach was used, the computations are based primarily on the observed historical losses.

Figure 4-3. Graphical Representation of the Annualized Loss Methodology



Vulnerability- Essential Facilities, Infrastructure and Existing Buildings

The following tables present vulnerability in terms of the number and types of existing buildings that are potentially at risk in the GBRA area[2]. Table 4-2 displays the estimated potential vulnerability for buildings for each jurisdiction in the GBRA area while Table 4-3 provides information on the infrastructure and lifelines for each county, including oil and gas pipelines, highways, railroads and hazardous material sites. Figures 4-4 shows approximate locations of critical facilities in the GBRA Region, while Figures 4-5 through 4-12 provide detail by county. Critical facilities are also listed in detail in Appendix D.

[2] Although participating in the planning effort, Woodsboro ISD is not listed separately than the Town of Woodsboro for the purposes of the risk assessment as the school district is located within the jurisdictional limits of Woodsboro and critical facilities for Woodsboro ISD were taken into account in measuring the potential vulnerability of Woodsboro overall.

Table 4-2. Estimated Building Distribution by Key Occupancy by Jurisdiction[3]

JURISDICTION	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		ESSENTIAL FACILITIES	
	Num.	Value	Num.	Value	Num.	Value	Num.	Value
Caldwell Co.	**6,107**	**$531,566,000**	**218**	**$43,405,000**	**74**	**$13,764,000**	**10**	**$23,277,000**
Lockhart	3,893	$474,538,000	230	$79,459,000	43	$10,551,000	11	$50,987,000
Luling	2,387	$196,890,000	136	$47,944,000	31	$7,738,000	4	$14,041,000
Martindale	411	$34,042,000	9	$6,315,000	2	$81,000	0	$0
Calhoun County	**5,242**	**$486,122,000**	**119**	**$43,594,000**	**51**	**$64,267,000**	**3**	**$305,000**
Point Comfort	424	$52,760,000	16	$7,501,000	14	$16,513,000	3	$2,235,000
Port Lavaca	4,958	$499,874,000	271	$91,042,000	62	$27,204,000	18	$74,876,000
Seadrift	918	$54,269,000	21	$5,201,000	5	$432,000	2	$4,893,000
DeWitt County	**4,122**	**$408,529,000**	**127**	**$22,314,000**	**62**	**$21,936,000**	**4**	**41,741,000**
Cuero	3,267	$269,738,000	207	$92,793,000	53	$18,496,000	19	$37,547,000
Nordheim	170	$21,023,000	7	$1,571,000	2	$134,000	1	$914,000
Yoakum	3,048	$259,109,000	186	$68,442,000	33	$22,746,000	8	$27,154,000
Yorktown	1,209	$99,614,000	66	$17,240,000	11	$4,916,000	3	$7,500,000
Gonzales Co.	**5,419**	**$375,664,000**	**100**	**$46,358,000**	**36**	**$11,628,000**	**5**	**$23,013,000**
Gonzales	3,344	$280,908,000	204	$82,546,000	33	$11,703,000	9	$35,033,000
Nixon	1,269	$75,442,000	42	$11,576,000	3	$3,663,000	5	$11,049,000
Waelder	560	$33,877,000	8	$2,172,000	1	$250,000	0	$0
Cibolo (Guadalupe Co.)	1,242	$165,972,000	68	$27,759,000	19	$17,845,000	0	$0

[3] Table 3 provides information for participating jurisdictions. Refer to Appendix D for a more complete and detailed listing of essential facilities in the GBRA study area. Additionally, there are 32 critical facilities in Kendall County that were not included in this risk assessment as they were unavailable in georeferenced format. These facilities are also provided in Appendix D, and it is recommended that they be included in the next plan update following georeferencing.

JURISDICTION	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		ESSENTIAL FACILITIES	
	Num.	Value	Num.	Value	Num.	Value	Num.	Value
Kendall County	**7,573**	**$953,491,000**	**372**	**$142,677,000**	**146**	**$40,234,000**	**11**	**$41,464,000**
Boerne	2,634	$336,372,000	266	$108,149,000	59	$24,059,000	9	$64,348,000
Refugio County	**1,304**	**$132,044,000**	**26**	**$5,932,000**	**16**	**$5,446,000**	**4**	**$1,934,000**
Austwell	157	$11,532,000	5	$653,000	2	$521,000	0	$0
Bayside	293	$24,090,000	4	$682,000	2	$179,000	0	$0
Refugio	1,665	$135,815,000	94	$30,309,000	20	$8,009,000	7	$16,050,000
Woodsboro	784	$64,016,000	20	$3,776,000	10	1,402,000	4	$6,283,000
Victoria County	**9,063**	**$1,001,520,000**	**366**	**$97,444,000**	**152**	**$38,106,000**	**20**	**$26,055,000**
Victoria	22,221	$2,927,528,000	1,583	$731,433,000	334	$93,264,000	36	$389,250,000
TOTALS	**93,684**	**$9,906,345,000**	**4,771**	**$1,818,287,000**	**1276**	**$465,087,000**	**196**	**$899,949,000**

Table 4-3. Infrastructure, Lifelines, and Hazardous Materials by Jurisdiction

JURISDICTION	INFRASTRUCTURE AND LIFELINES				HAZARDOUS MATERIALS FACILITIES
	Oil Pipe (km)	Gas Pipe (km)	Highway[4] (km)	Railroad (km)	Number of Sites
Caldwell County	**188.58**	**397.85**	**55.29**	**45.86**	**20**
Lockhart	0	7.85	8.16	7.35	2
Luling	3.40	4.45	11.47	3.76	6
Martindale	0	0	0	0	0
Calhoun County	**196.98**	**1,192.95**	**12.45**	**42.57**	**61**
Point Comfort	11.12	53.06	0	2.72	1
Port Lavaca	4.19	4.02	3.93	3.46	5
Seadrift	0	0	0	0	0
DeWitt County	**0**	**1,168.84**	**111.97**	**41.28**	**139**
Cuero	0	0.84	7.05	10.50	4
Nordheim	0	0.20	0	0	0
Yoakum	0	3.06	2.46	6.16	1

[4] For the purposes of this risk assessment, highways include Interstates and U.S. highways.

JURISDICTION	INFRASTRUCTURE AND LIFELINES				HAZARDOUS MATERIALS FACILITIES
	Oil Pipe (km)	Gas Pipe (km)	Highway[4] (km)	Railroad (km)	Number of Sites
Yorktown	0	0.73	0	0	1
Gonzales County	**140.96**	**351.17**	**220.81**	**51.55**	**61**
Gonzales	0	19.43	17.35	5.13	10
Nixon	0	0	1.77	0	2
Waelder	0	0	1.83	1.83	2
Cibolo (Guadalupe County)	0	4.93	0	3.50	0
Kendall County	**0**	**58.96**	**78.87**	**0**	**15**
Boerne	0	0	13.49	0	3
Refugio County	**469.52**	**1,681.19**	**123.51**	**55.73**	**53**
Austwell	0	0	0	0	0
Bayside	0.27	0	0	0	0
Refugio	0	1.89	7.76	2.46	2
Woodsboro	0.23	0.85	2.28	1.19	1
Victoria County	**150.73**	**1,739.81**	**233.76**	**139.20**	**55**
Victoria	0	69.21	66.01	27.25	0
TOTALS FOR STUDY AREA	**1,165.98**	**6,761.29**	**980.22**	**451.5**	**444**

Source: Railroad Commission of Texas

Figure 4-3 shows the essential facilities in the seven counties forming the overall GBRA study area generated by HAZUS-MH MR4. Figure 4-4 through Figure 4-12 show these essential facilities in greater detail at the county level.

Figure 4-4. Estimated Essential Facilities Placement in GBRA

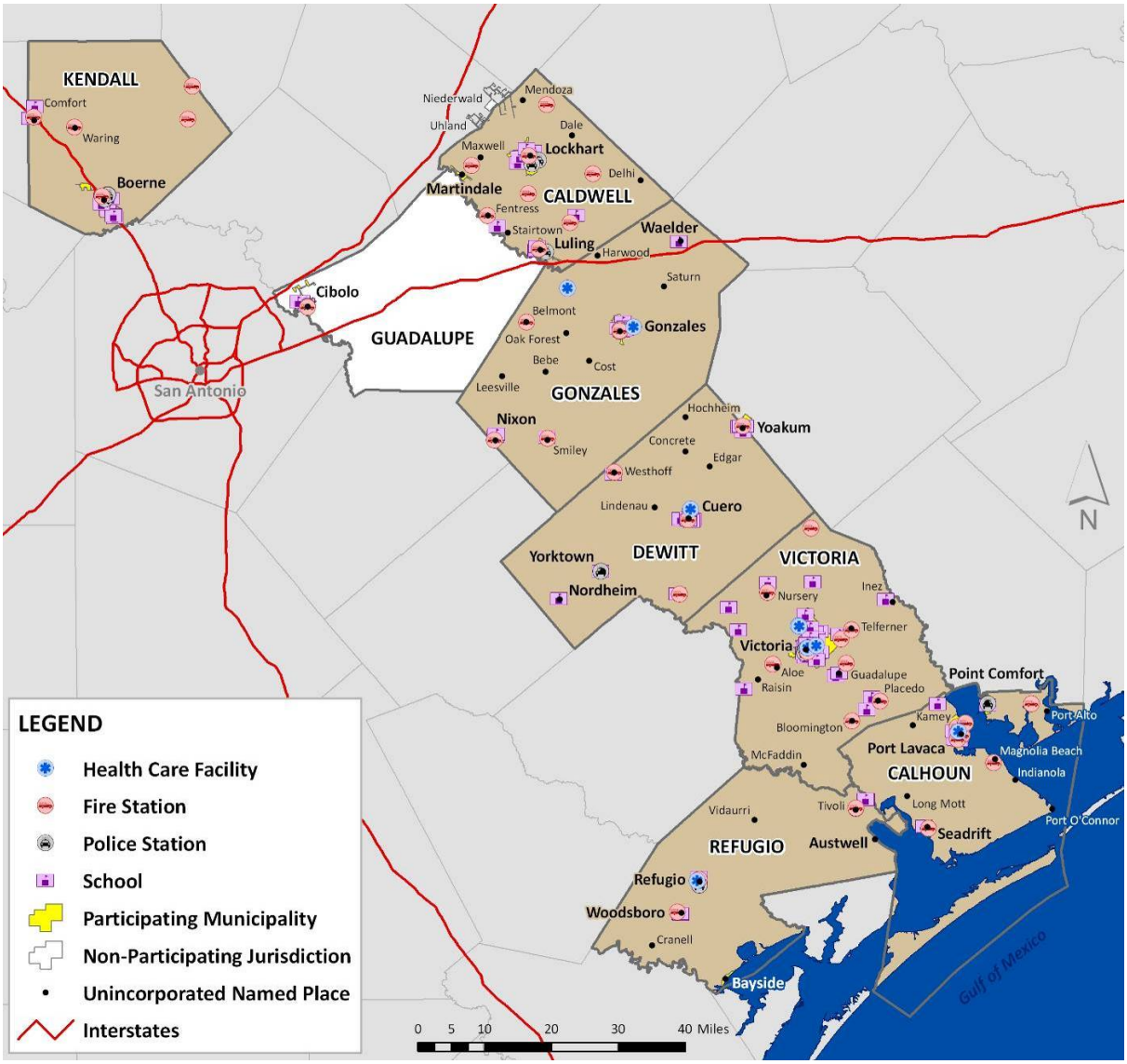


Figure 4-5. Estimated Essential Facilities Placement in Caldwell County

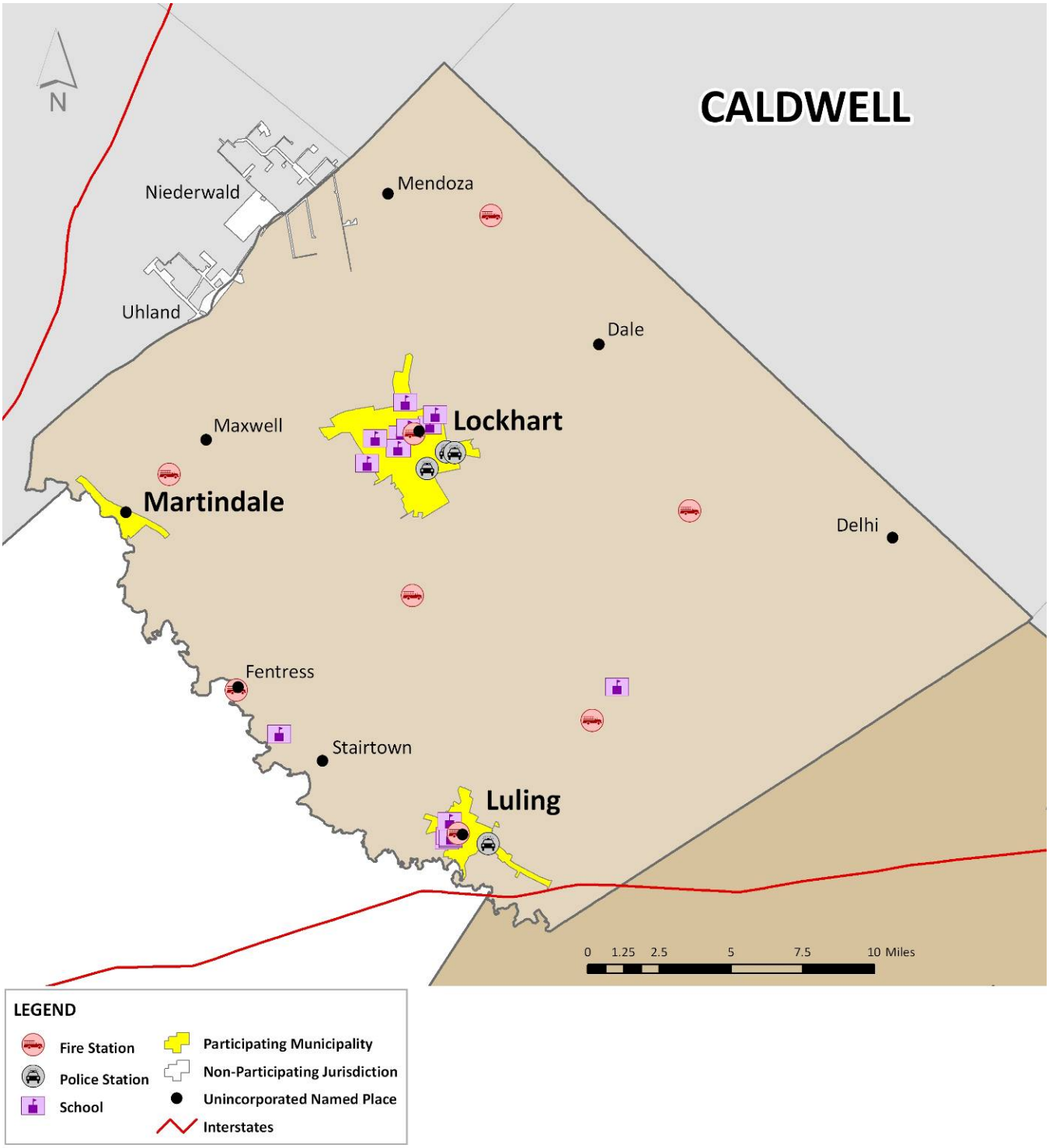


Figure 4-6. Estimated Essential Facilities Placement in Calhoun County

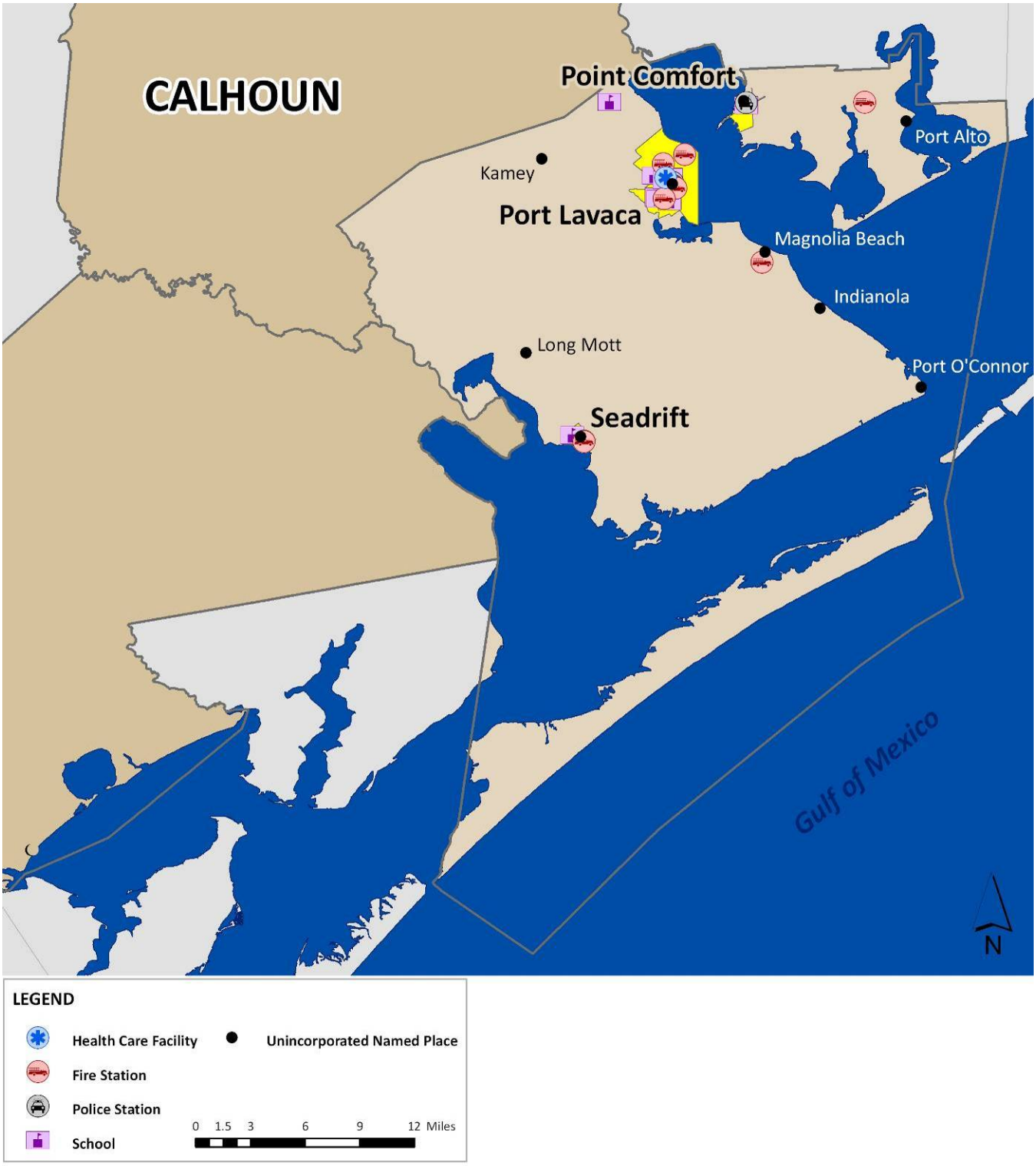


Figure 4-7. Estimated Essential Facilities Placement in DeWitt County

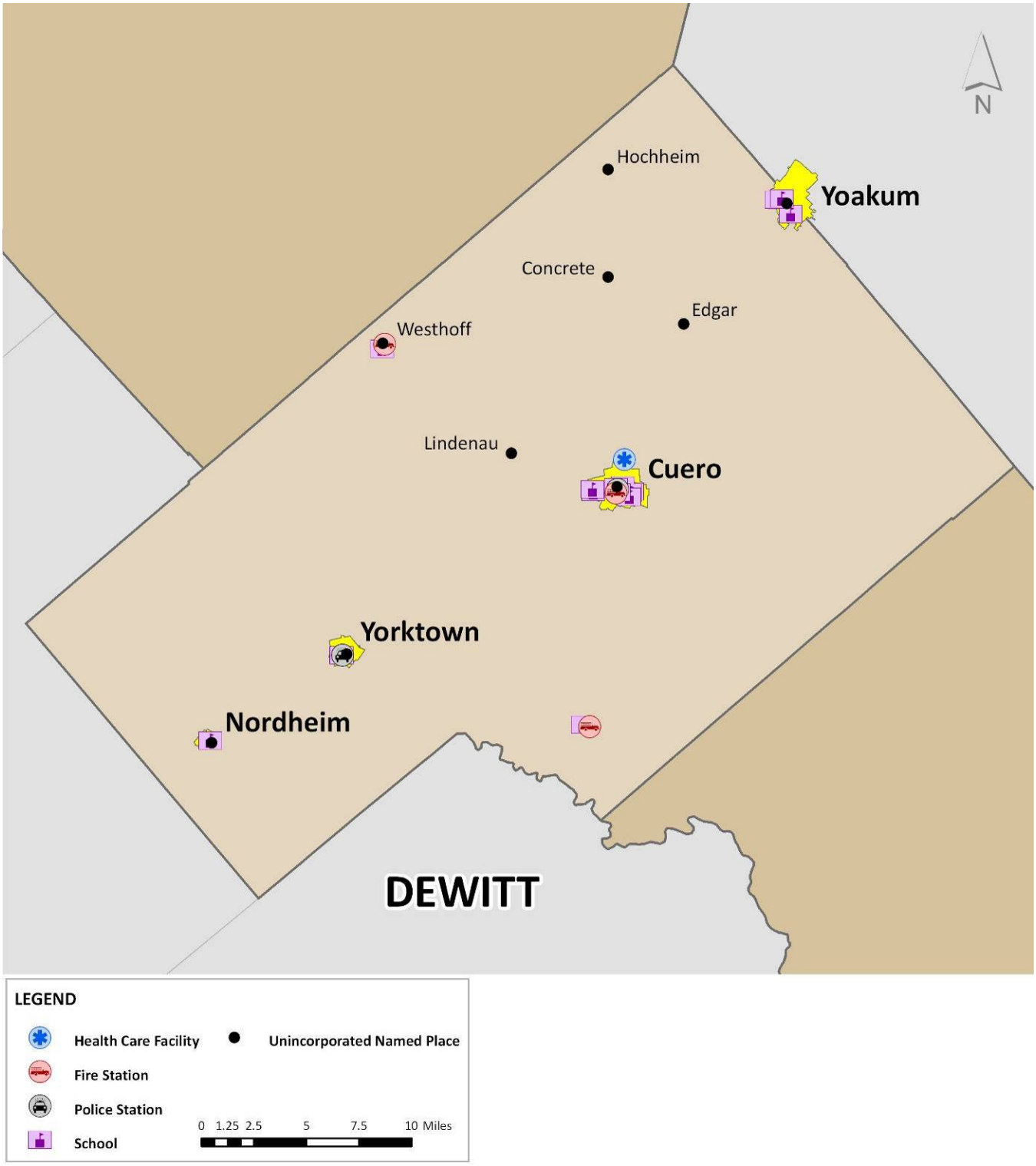


Figure 4-8. Estimated Essential Facilities Placement in Gonzales County

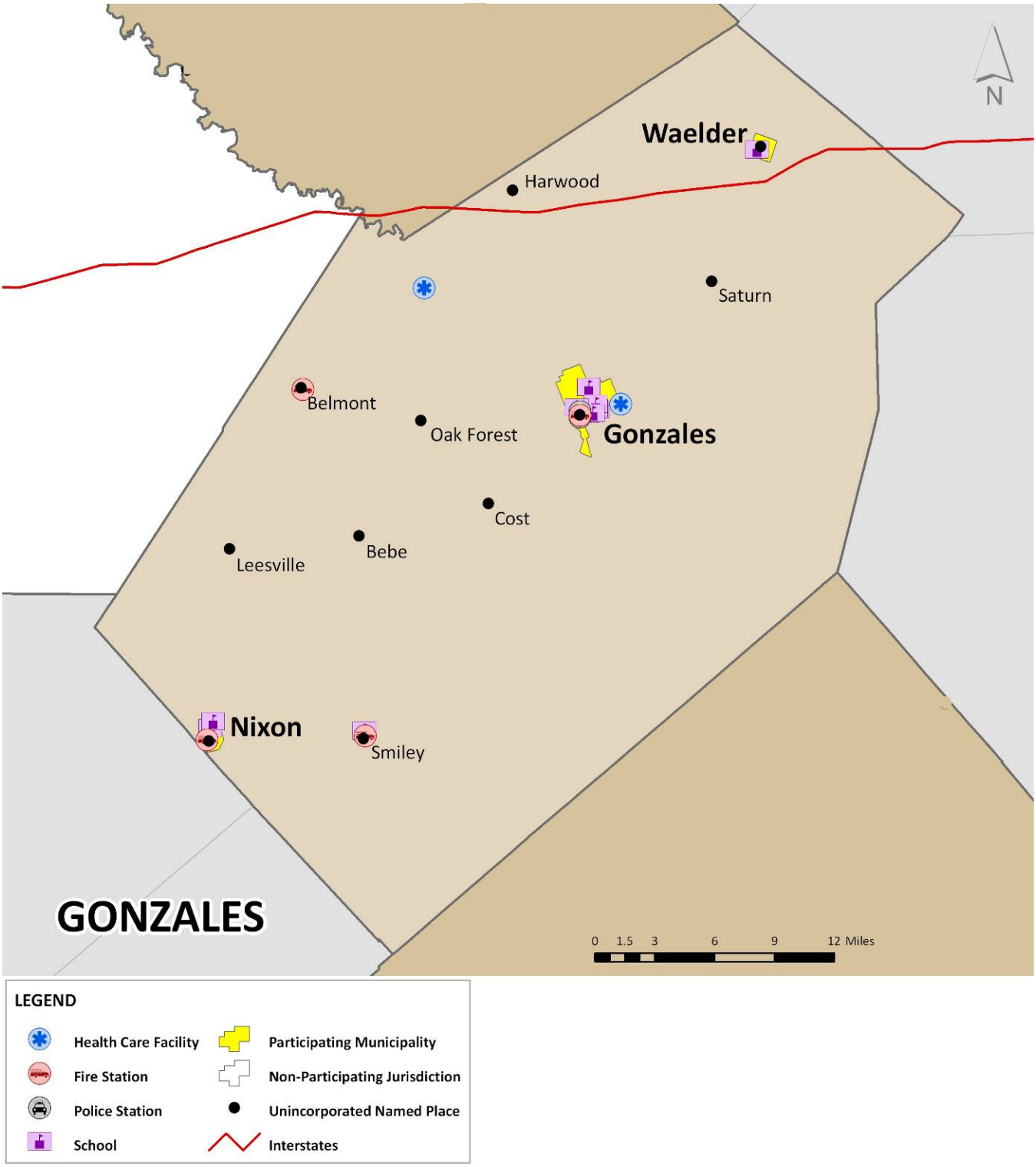


Figure 4-9. Estimated Essential Facilities Placement in Kendall County

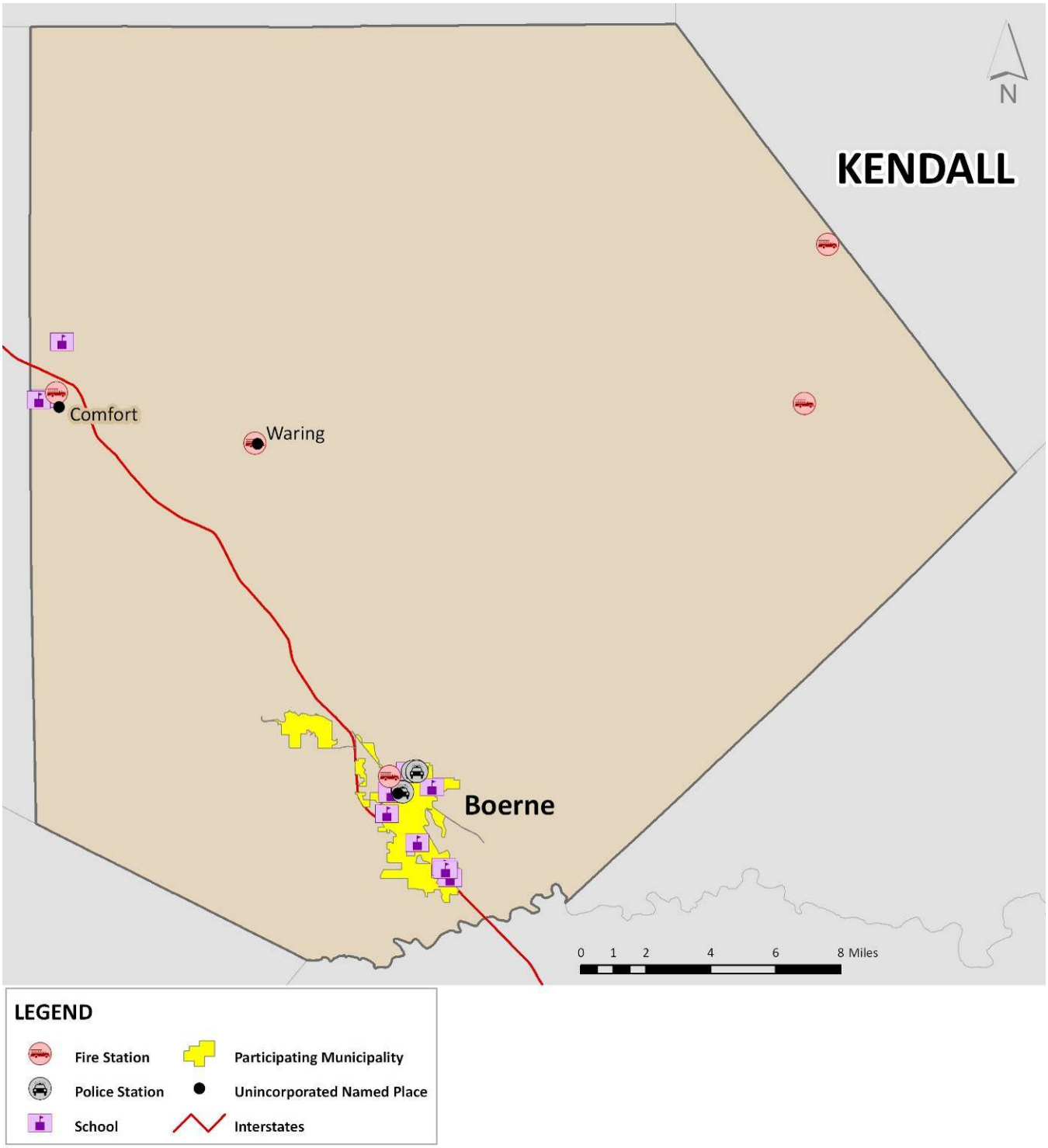


Figure 4-10. Estimated Essential Facilities Placement in Refugio County

Figure 4-11. Estimated Essential Facilities Placement in Victoria County

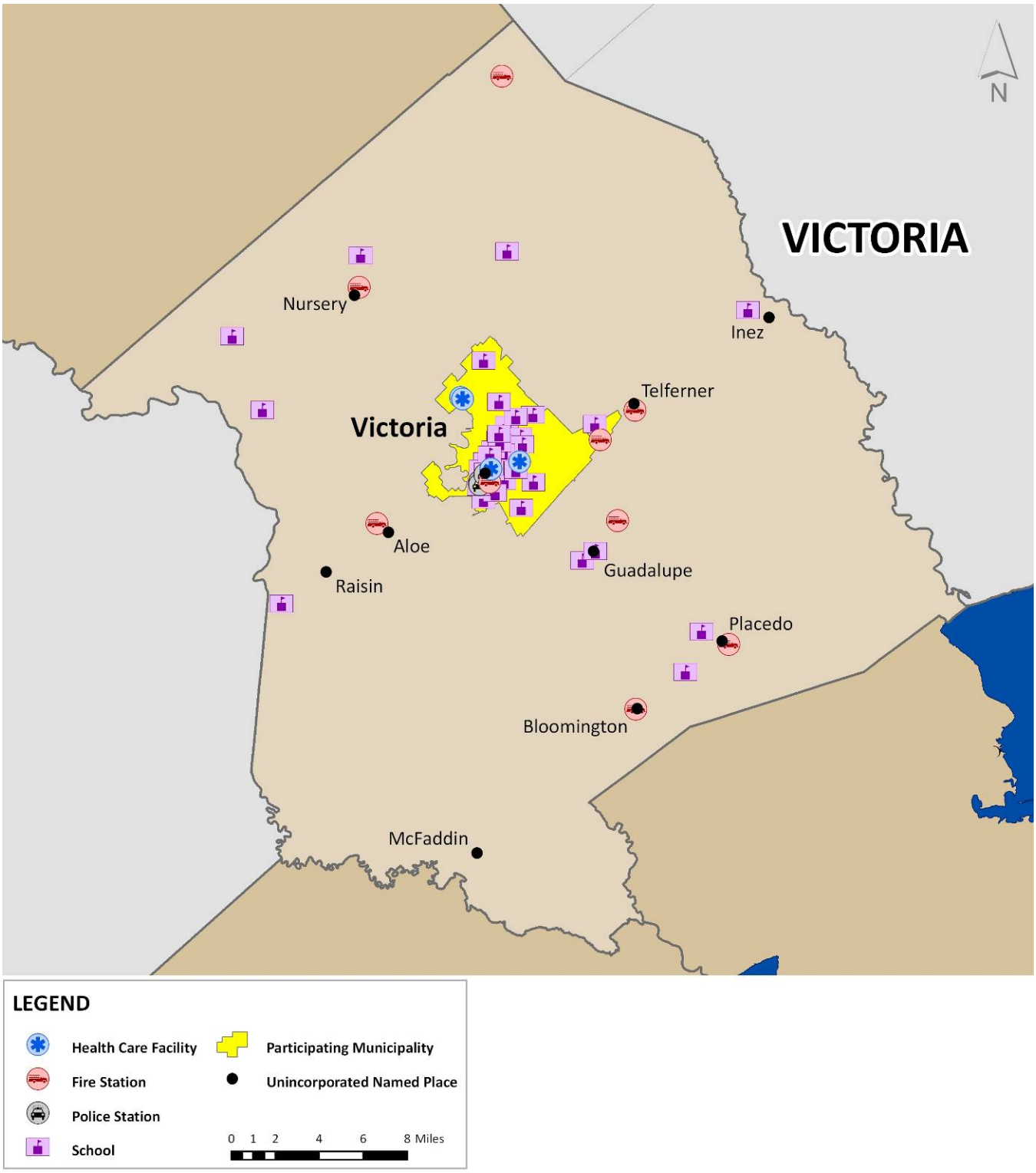
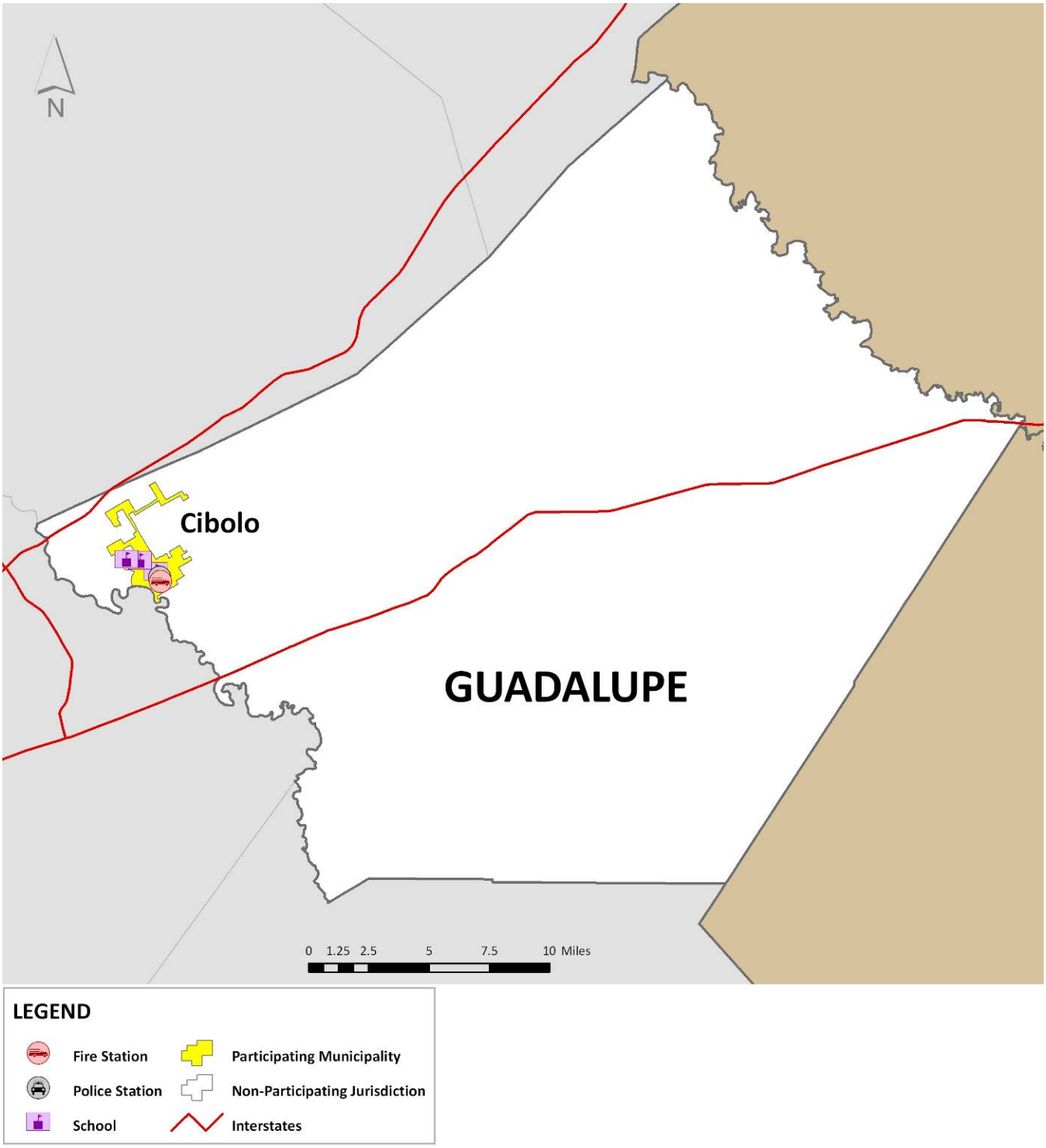


Figure 4-12. Estimated Essential Facilities Placement in Cibolo (in Guadalupe County)



Potential Dollar Losses

Using the statistical risk assessment methodology, loss estimates were obtained for seven of the hazards profiled in the risk assessment[5]. The economic results are summarized in Table 4-4 and Table 4-5. The economic loss results are presented here using Annualized Loss (AL), which is the estimated long-term value of losses to the general building stock in any single year in a specified geographic area (e.g., county or municipality). The estimated AL addresses the two key components of risk: the probability of the hazard occurring in the study area and the consequences of the hazard, largely a function of building construction type and quality, and of the intensity of the hazard event. By annualizing estimated losses, the AL factors in historic patterns of frequent smaller events with infrequent but larger events to provide a balanced presentation of the risk.

Table 4-4. Summary of Annualized Loss (AL) Estimates

JURISDICTION	DROUGHT[6]	FLOODING	HAIL	HURRICANE	THUNDER-STORM	TORNADOES	WINTER STORM
Caldwell Co.	**$58,667**	**$3,611,000**	**Negligible**	**Negligible**	**$20,303**	**$1,151,799**	**Negligible**
Lockhart	-	$578,000	Negligible	Negligible	$18,387	Negligible	-
Luling	-	$130,000	Negligible	Negligible	$19,763	Negligible	-
Martindale	-	$872,000	Negligible	Negligible	$262,958	Negligible	-
Calhoun Co.	**Negligible**	**$1,952,000**	**Negligible**	**$244,000**	**Negligible**	**$8,460**	**Negligible**
Point Comfort	-	Negligible	Negligible	$54,000	Negligible	Negligible	-
Port Lavaca	-	$744,000	Negligible	$54,000	Negligible	$15,479	-
Seadrift	-	$292,000	Negligible	Negligible	Negligible	Negligible	-
DeWitt Co.	**$58,667**	**$2,145,000**	**$170,506**	**$12,000**	**$171,599**	**Negligible**	**Negligible**
Cuero	-	$996,000	Negligible	$9,000	$10,695	Negligible	-
Nordheim	-	Negligible	Negligible	Negligible	Negligible	Negligible	-
Yoakum	-	$94,000	Negligible	$10,000	Negligible	Negligible	-
Yorktown	-	$705,000	Negligible	Negligible	Negligible	Negligible	-
Gonzales Co.	**$58,667**	**$4,474,000**	**Negligible**	**Negligible**	**Negligible**	**$142,597**	**Negligible**
Gonzales	-	$275,000	Negligible	Negligible	$19,176	Negligible	-
Nixon	-	Negligible	Negligible	Negligible	Negligible	Negligible	-

[5] Annualized losses were not estimated for man-made/technological hazards. Since the AL is based on losses to building stock rather than land, estimates are not available for wildfire. Loss estimates are not provided for extreme heat as this hazard affects people instead of property.

[6] For drought, the numbers presented are based upon the annualized expected agriculture product market value exposure. Exposure was estimated at the county level due to data limitations.

Note: Negligible is less than $5,000

JURISDICTION	DROUGHT[6]	FLOODING	HAIL	HURRICANE	THUNDER-STORM	TORNADOES	WINTER STORM
Waelder	-	$195,000	Negligible	Negligible	Negligible	Negligible	-
Cibolo (Guadalupe County)	N/A	$391,000	Negligible	Negligible	$13,938	Negligible	-
Kendall Co.	**$139,348**	**$5,775,000**	**Negligible**	**Negligible**	**$6,765**	**$184,205**	**$14,703**
Boerne	-	$5,765,000	Negligible	Negligible	$5,520	Negligible	-
Refugio Co.	**Negligible**	**$1,215,000**	**Negligible**	**$14,000**	**Negligible**	**$5,058**	**Negligible**
Austwell	-	Negligible	Negligible	Negligible	Negligible	Negligible	-
Bayside	-	Negligible	Negligible	Negligible	Negligible	Negligible	-
Refugio	-	$78,000	Negligible	$22,000	Negligible	Negligible	-
Woodsboro	-	Negligible	Negligible	Negligible	Negligible	Negligible	-
Victoria Co.	**Negligible**	**$5,648,000**	**$5,301**	**$64,000**	**Negligible**	**$20,625**	**Negligible**
Victoria	-	$4,075,000	Negligible	$112,000	Negligible	$30,799	-

Table 4-5. Summary of Annualized Loss Ratios (ALRs)
(Calculated as Annualized Losses Divided by Total Exposure[7])

JURISDICTION	DROUGHT[8]	FLOODING	HAIL	HURRICANE WIND	THUNDER-STORM	TORNADOES	WINTER STORM
Caldwell Co.	**1.40%**	**0.61%**	**0.00%**	**0.02%**	**0.00%**	**0.19%**	**0.00%**
Lockhart	-	0.10%	0.00%	0.02%	0.00%	0.00%	-
Luling	-	0.05%	0.00%	0.02%	0.01%	0.00%	-
Martindale	-	2.16%	0.00%	0.02%	0.65%	0.00%	-
Calhoun Co.	**0.00%**	**0.33%**	**0.00%**	**0.60%**	**0.00%**	**0.00%**	**0.00%**
Point Comfort	-	0.00%	0.00%	0.45%	0.00%	0.00%	-
Port Lavaca	-	0.12%	0.00%	0.41%	0.00%	0.00%	-
Seadrift	-	0.49%	0.00%	0.51%	0.00%	0.00%	-
DeWitt Co.	**2.57%**	**0.47%**	**0.00%**	**0.09%**	**0.04%**	**0.00%**	**0.00%**
Cuero	-	0.26%	0.00%	0.08%	0.00%	0.00%	-
Nordheim	-	0.00%	0.00%	0.09%	0.00%	0.00%	-
Yoakum	-	0.03%	0.00%	0.07%	0.00%	0.00%	-
Yorktown	-	0.58%	0.00%	0.09%	0.00%	0.00%	-
Gonzales Co.	**0.27%**	**1.03%**	**0.00%**	**0.04%**	**0.00%**	**0.03%**	**0.00%**
Gonzales	-	0.07%	0.00%	0.02%	0.00%	0.00%	-

[7] The drought and winter storm hazards were analyzed at the county level and the results for these two hazards are shown beside the county's name.

[8] For drought, the numbers presented are based upon the annualized expected agriculture product market value exposure. Exposure was estimated at the county level due to data limitations.

JURISDICTION	DROUGHT[8]	FLOODING	HAIL	HURRICANE WIND	THUNDER-STORM	TORNADOES	WINTER STORM
Nixon	-	0.00%	0.00%	0.03%	0.00%	0.00%	-
Waelder	-	0.54%	0.00%	0.04%	0.00%	0.00%	-
Cibolo (Guadalupe County)	N/A	0.18%	0.00%	0.02%	0.01%	0.00%	-
Kendall Co.	**14.37%**	**0.51%**	**0.00%**	**0.01%**	**0.00%**	**0.02%**	**0.00%**
Boerne	-	1.23%	0.00%	0.01%	0.00%	0.00%	-
Refugio Co.	**0.00%**	**0.85%**	**0.00%**	**0.47%**	**0.00%**	**0.00%**	**0.00%**
Austwell	-	0.00%	0.00%	0.24%	0.00%	0.00%	-
Bayside	-	0.01%	0.00%	0.54%	0.00%	0.00%	-
Refugio	-	0.04%	0.00%	0.35%	0.00%	0.00%	-
Woodsboro	-	0.00%	0.00%	0.48%	0.00%	0.00%	-
Victoria Co.	**0.00%**	**0.50%**	**0.00%**	**0.27%**	**0.00%**	**0.00%**	**0.00%**
Victoria	-	0.11%	0.00%	0.16%	0.00%	0.00%	-

Hazard Ranking

The ability to quantify the risk to all hazards relative to one another helps in a balanced, multi-hazard approach to risk management at each level of governing authority. This ranking provides a systematic framework to compare and prioritize the very disparate natural hazards that are present in the GBRA study area.

Hazard ranking depends on the severity, area of impact and probability of occurrence (return period). Table 4-6 provides the hazard ranking by jurisdiction for each hazard. For each jurisdiction, each hazard was given a rating of high (H), moderate (M), low (L) very low (VL), or not applicable (N/A) based on how vulnerable they are to that hazard or how probable that hazard is to impact the jurisdiction. The rating of N/A was used if the results for loss or potential impacts were zero. The rating is based on a combination of factors such as population and building exposure annualized loss (or ALRs, when available), and in some cases the jurisdiction's location to a known hazard area.

Hazards ranked as high (H) indicate that hazards can occur with little warning time, great frequency and result in multiple deaths or the complete shutdown of critical facilities for over 30 days. Hazards ranked as moderate (M) occur with less frequency and impact than high hazards, but can have warning times up to 12 hours, result in injuries, illness or permanent disability and shut down critical facilities for at least two weeks. Low (l) ranking hazards usually last less than 24 hours, result in injuries, but not permanent disability, occur with typically 12 to 24 hours notice and can shutdown facilities for one week. Very low (VL) hazards usually last less than six hours, but have a warning time of over 24 hours. Although

illnesses and injury can occur, they can be treated with first aid and any shutdown of facilities would last less than one day. If hazards are ranked as not applicable (N/A), no historic occurrences have occurred and no critical facilities are at threat.

The hazard ratings were developed, based on the following criteria:

- Dam Failure: the number of high or significant dams and value of property exposure that could be impacted
- Drought: the ALRs and the value of agricultural product exposure
- Flood: the ALRs
- Hail, thunderstorm, tornado and winter storm hazards: the ALRs
- Hurricane wind: the ALRs, the average wind speeds for the 100-year return period and the jurisdictions proximal location to the coastline
- HAZMAT (fixed and mobile) incidents: the potential population that could be impacted within 500 meters of the incident, as a percent of the total population
- Oil and gas pipeline failures: the potential population that could be impacted within 500 meters of the incident, as a percent of the total population

Table 4-6. Hazard Risk Ranking by Jurisdiction[9]

JURISDICTION	DAM FAILURE	DROUGHT	INLAND FLOODING	HAIL	HAZMAT	HURRICANE	OIL AND GAS PIPELINES	THUNDERSTORM	TORNADOES	WILDFIRE	WINTER STORM
Caldwell Co.	**M**	**L**	**H**	**VL**	**L**	**M**	**L**	**L**	**M**	**M**	**VL**
Lockhart	L	-	M	VL	M	M	L	L	VL	H	VL
Luling	M	-	L	VL	M	M	M	M	VL	L	VL
Martindale	N/A	-	H	VL	N	M	M	M	VL	L	VL
Calhoun Co.	**L**	**L**	**M**	**VL**	**VL**	**H**	**M**	**VL**	**L**	**L**	**VL**
Point Comfort	N/A	-	VL	VL	M	H	M	VL	VL	L	VL
Port Lavaca	N/A	-	M	VL	M	H	L	VL	L	VL	VL
Seadrift	N/A	-	H	VL	VL	H	VL	VL	VL	H	VL
DeWitt Co.	**M**	**M**	**H**	**VL**	**M**	**H**	**M**	**M**	**VL**	**L**	**VL**
Cuero	M	-	M	VL	M	H	L	L	VL	H	VL
Nordheim	N/A	-	VL	VL	N	H	M	VL	VL	H	VL

[9] Risk Ranking through HAZUS is not available for Extreme Heat, Infectious Disease or Terrorism as these hazards have no geographic boundary or annualized losses.

JURISDICTION	DAM FAILURE	DROUGHT	INLAND FLOODING	HAIL	HAZMAT	HURRICANE	OIL AND GAS PIPELINES	THUNDERSTORM	TORNADOES	WILDFIRE	WINTER STORM
Yoakum	M	-	L	VL	M	H	VL	VL	VL	VL	VL
Yorktown	M	-	H	VL	L	H	M	VL	VL	H	VL
Gonzales Co.	**M**	**M**	**H**	**VL**	**M**	**M**	**L**	**VL**	**M**	**L**	**VL**
Gonzales	L	-	L	VL	L	M	M	L	VL	H	VL
Nixon	N/A	-	VL	VL	M	M	N/A	VL	VL	VL	VL
Waelder	N/A	-	H	VL	H	M	M	VL	VL	H	VL
Cibolo (Guadalupe County)	N/A	N/A	M	VL	L	M	M	M	VL	L	VL
Kendall Co.	**M**	**M**	**H**	**VL**	**M**	**M**	**L**	**L**	**M**	**H**	**L**
Boerne	M	-	H	VL	L	M	N/A	L	VL	H	L
Refugio Co.	**L**	**L**	**H**	**VL**	**L**	**H**	**M**	**VL**	**L**	**M**	**VL**
Austwell	N/A	-	VL	VL	N	H	M	VL	VL	N/A	VL
Bayside	N/A	-	VL	VL	N	H	N/A	VL	VL	L	VL
Refugio	N/A	-	VL	VL	M	H	M	VL	VL	H	VL
Woodsboro[10]	N/A	-	VL	VL	M	H	L	VL	VL	H	VL
Victoria Co.	**M**	**L**	**H**	**L**	**M**	**H**	**M**	**VL**	**L**	**M**	**VL**
Victoria	N/A	-	M	VL	M	H	M	VL	L	M	VL

In addition to the hazard ranking based on the ALRs and exposure, each participating jurisdiction in the Guadalupe Basin Plan Update also developed a hazard ranking using the same ratings, high, moderate, low, very low or not applicable. This provided an opportunity for planning participation amongst team members and the ability to compare and contrast the rankings with those provided by the economic loss study. In addition, team members were able to rank each of the 14 hazards included in the Plan using the frequency of occurrence and probable impact as a guide in developing the rating. The results of the rankings are depicted in Table 4-7.

[10] Woodsboro ISD is not listed separately from the Town of Woodsboro, as the rankings are the same for the school district and Woodsboro.

Table 4-7. Individual Ranking per Jurisdiction [11]

JURISDICTION	DAM FAILURE	DROUGHT	FLOODING	EXTREME HEAT	HAIL	HAZMAT	HURRICANE	OIL AND GAS PIPELINES	THUNDERSTORM	TORNADOES	WILDFIRE	WINTER STORM	INFECTIOUS DISEASE	TERRORISM
Caldwell Co.	M	M	M	M	VL	M	M	M	M	VL	M	VL	L	VL
Lockhart	N/A	H	M	H	H	L	H	L	H	H	H	L	L	N/A
Luling	M	M	M	M	VL	M	M	M	M	VL	M	VL	L	VL
Martindale	N/A	M	L	M	L	M	M	M	M	M	M	VL	M	M
Calhoun Co.	**N/A**	**M**	**L**	**H**	**L**	**H**	**H**	**M**	**M**	**L**	**M**	**VL**	**L**	**M**
Point Comfort	N/A	L	L	L	L	M	H	L	M	M	L	L	VL	VL
Port Lavaca	N/A	M	L	M	L	H	H	L	L	VL	VL	VL	L	L
Seadrift	N/A	L	L	L	L	M	H	L	M	M	L	L	VL	VL
DeWitt Co.	**VL**	**M**	**HM**	**M**	**M**	**M**	**H**	**L**	**M**	**L**	**M**	**M**	**M**	**L**
Cuero	N/A	L	H	L	L	VL	L	M	L	H	M	L	L	N/A
Nordheim	N/A	L	N/A	L	L	VL	L	M	L	H	N/A	L	L	N/A
Yoakum	VL	M	M	L	L	M	L	L	L	L	M	VL	L	L
Yorktown	VL	M	M	L	L	M	L	L	L	L	M	VL	L	L
Gonzales Co.	**M**	**H**	**H**	**H**	**M**	**H**	**N/A**	**H**	**H**	**M**	**H**	**M**	**L**	**M**
Gonzales	M	H	H	M	L	L	M	M	H	M	L	L	L	L
Nixon	N/A	H	M	H	H	L	H	L	H	H	H	L	L	N/A
Waelder	N/A	M	H	M	M	H	M	H	L	M	M	VL	VL	L
Cibolo (Guadalupe County)	N/A	M	M	M	M	L	N/A	L	L	M	M	L	VL	VL
Kendall Co.	**N/A**	**M**	**M**	**M**	**L**	**L**	**N/A**	**L**	**L**	**M**	**M**	**L**	**L**	**L**
Boerne	M	M	M	M	L	L	N/A	L	L	L	M	L	L	VL
Refugio Co.	**VL**	**H**	**H**	**H**	**M**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**M**	**L**
Austwell	N/A	M	M	M	VL	L	M	L	L	L	L	L	VL	VL
Bayside	N/A	M	M	VL	VL	VL	N/A	N/A	L	N/A	N/A	N/A	N/A	N/A
Refugio	N/A	M	M	M	VL	L	M	L	L	L	L	L	VL	VL
Woodsboro	N/A	M	M	M	VL	L	M	L	L	L	L	L	VL	VL
Victoria Co.	VL	H	H	M	M	M	H	M	M	M	M	L	M	L
Victoria	VL	H	H	M	M	M	H	M	M	M	M	L	M	L

[11] Table 4-7 includes the additional hazards of Extreme Heat, Infectious Disease and Terrorism as this table reflects ranking selections by each participating jurisdiction.

FLOOD

Hazard Profile 1
Location 1
Extent 30
Historical Occurrences 33
Probability of Future Events 35
Vulnerability and Impact 35
NFIP Participation 40
NFIP Compliance and Maintenance 40
Repetitive Loss 42

Hazard Profile

Floods generally result from excessive precipitation, and the severity of a flooding event is typically determined by a combination of several major factors, including: stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions, and the degree of vegetative clearing and impervious surface. Generally floods are long-term events that may last for several days. The primary types of general flooding include Inland and coastal flooding. Inland flooding is profiled in this section.

Inland or Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. It is natural and inevitable as it is the overbank flooding of rivers and streams, typically resulting from large-scale weather systems that generate prolonged rainfall over a wide geographic area. Some river floods occur seasonally when winter or spring rainfalls fill river basins with too much water, too quickly. Torrential rains from decaying hurricanes or tropical systems can also produce river flooding.

Coastal flooding is a result of storm surge, wind-driven waves and heavy rainfall produced by hurricanes, tropical storms and other large coastal storms. Flooding in the coastal environment can be further exacerbated by tidal influence in the low lying coastal areas. Higher tides will increase stream and river stage heights from the mouth while floodwaters rush in from upland areas. Coastal flooding is therefore covered with storm surge in Section 6 for Hurricane.

Location

Location of flood zones in the GBRA Region is illustrated in Figures 5-1 to 5-28. Digital flood hazard data based on FIRMs is not currently available for Caldwell, DeWitt, Gonzales, and Refugio counties,

therefore HAZUS-estimated flood boundaries are used for these counties for the purposes of these figures.

Figure 5-1. Flood Zones in GBRA

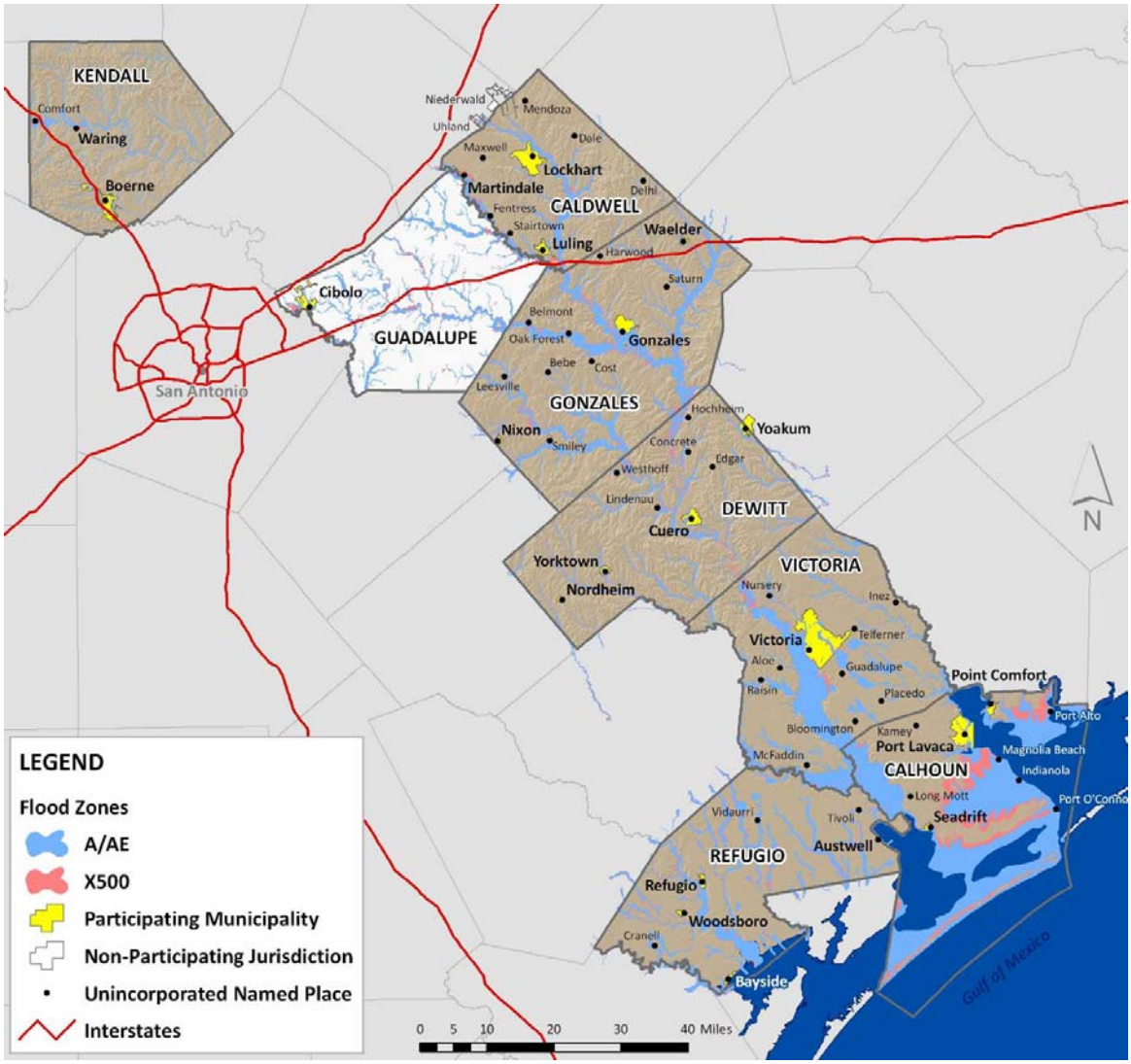


Figure 5-2. Estimated Flood Zones in Caldwell County

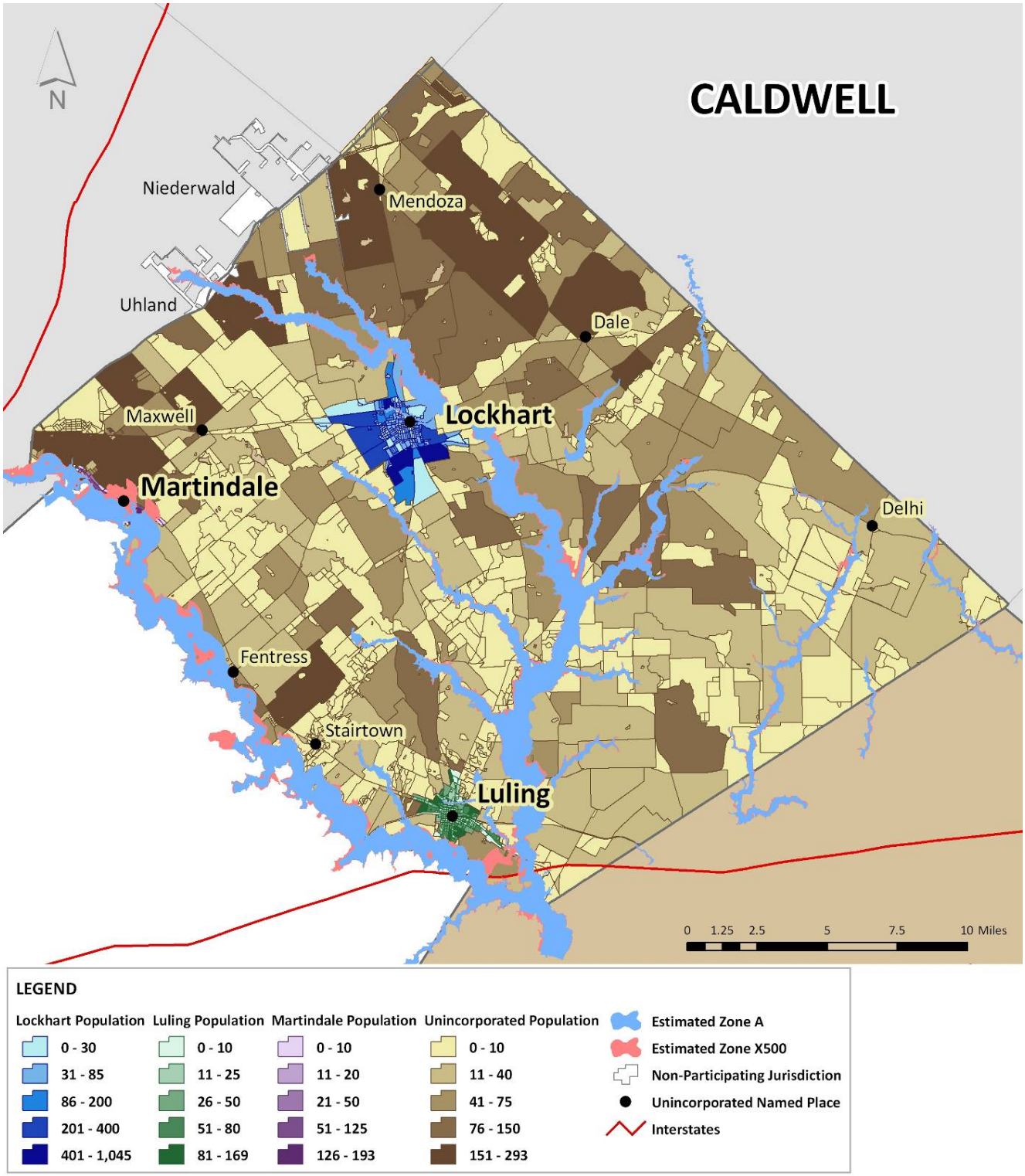


Figure 5-3. Estimated Flood Zones in Lockhart

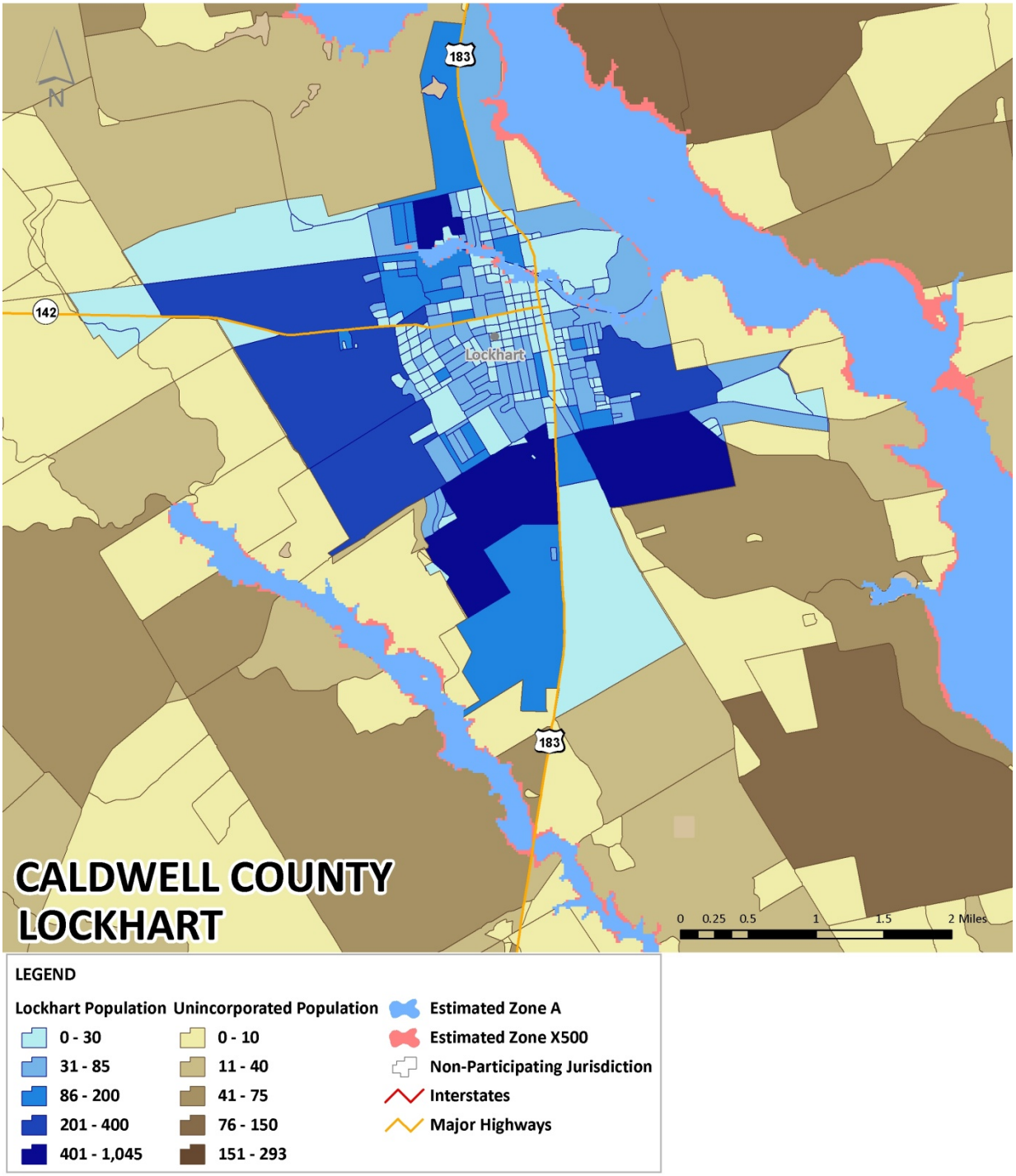


Figure 5-4. Estimated Flood Zones in Luling

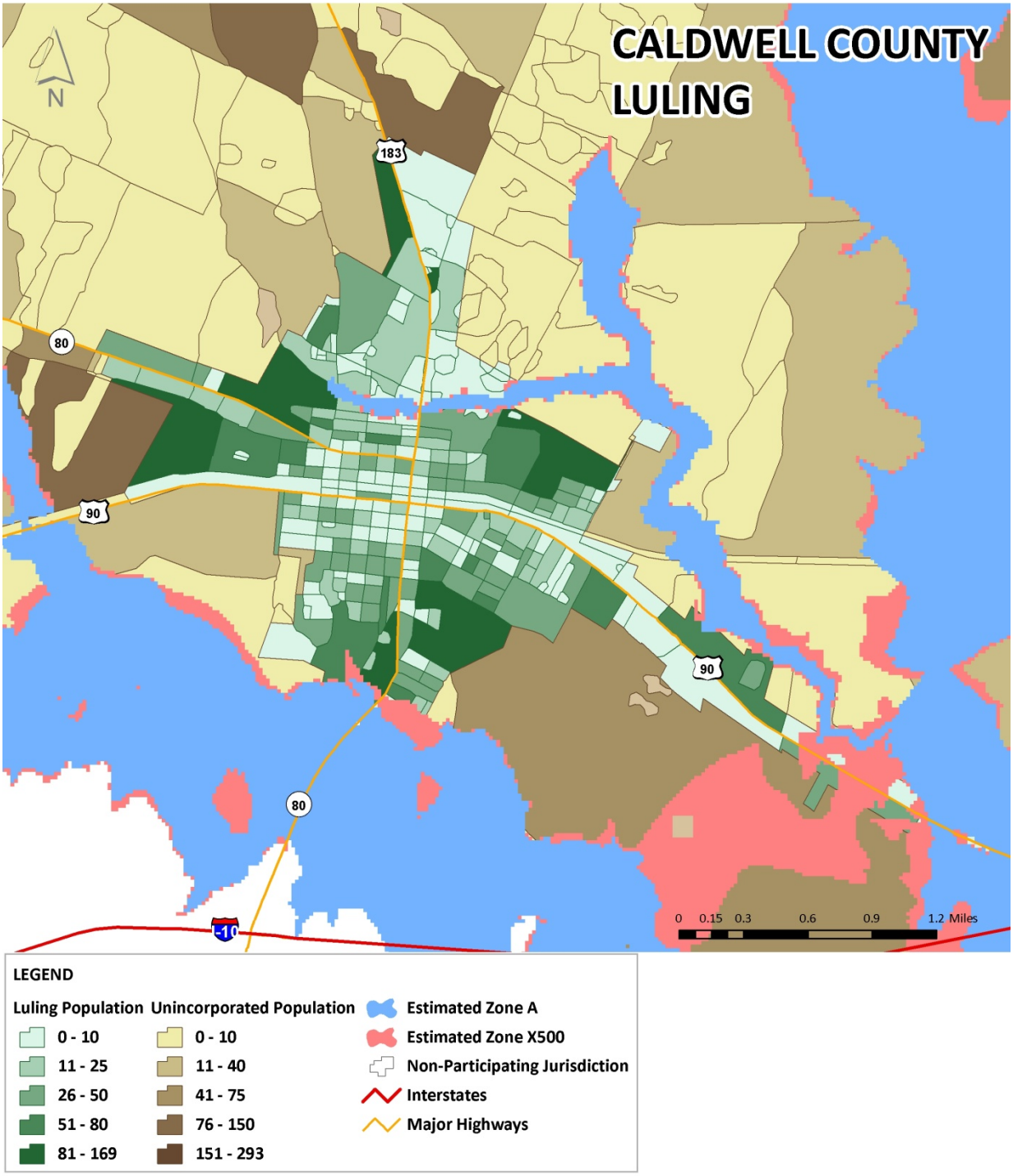


Figure 5-5. Estimated Flood Zones in Martindale

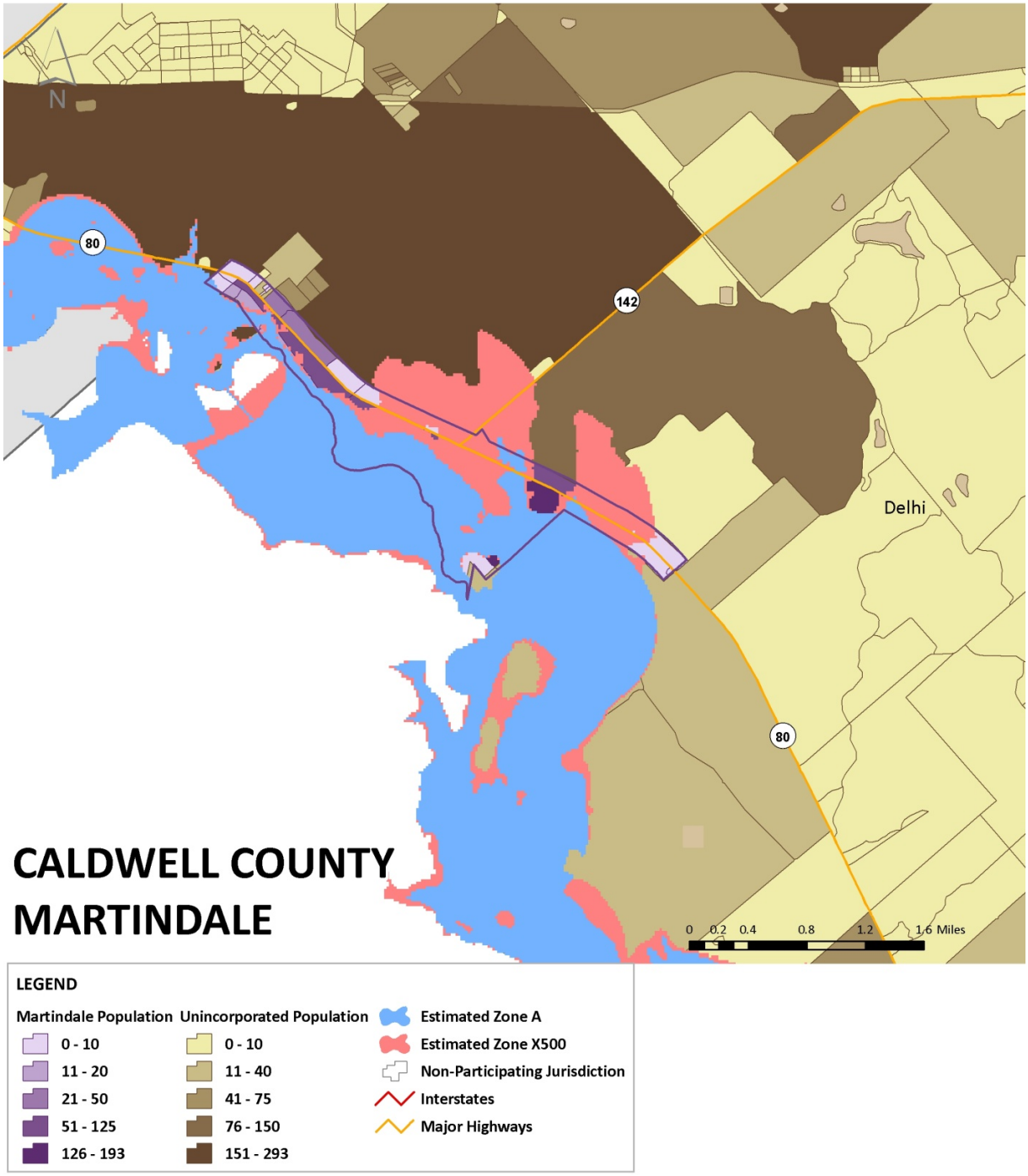


Figure 5-6. Flood Zones in Calhoun County

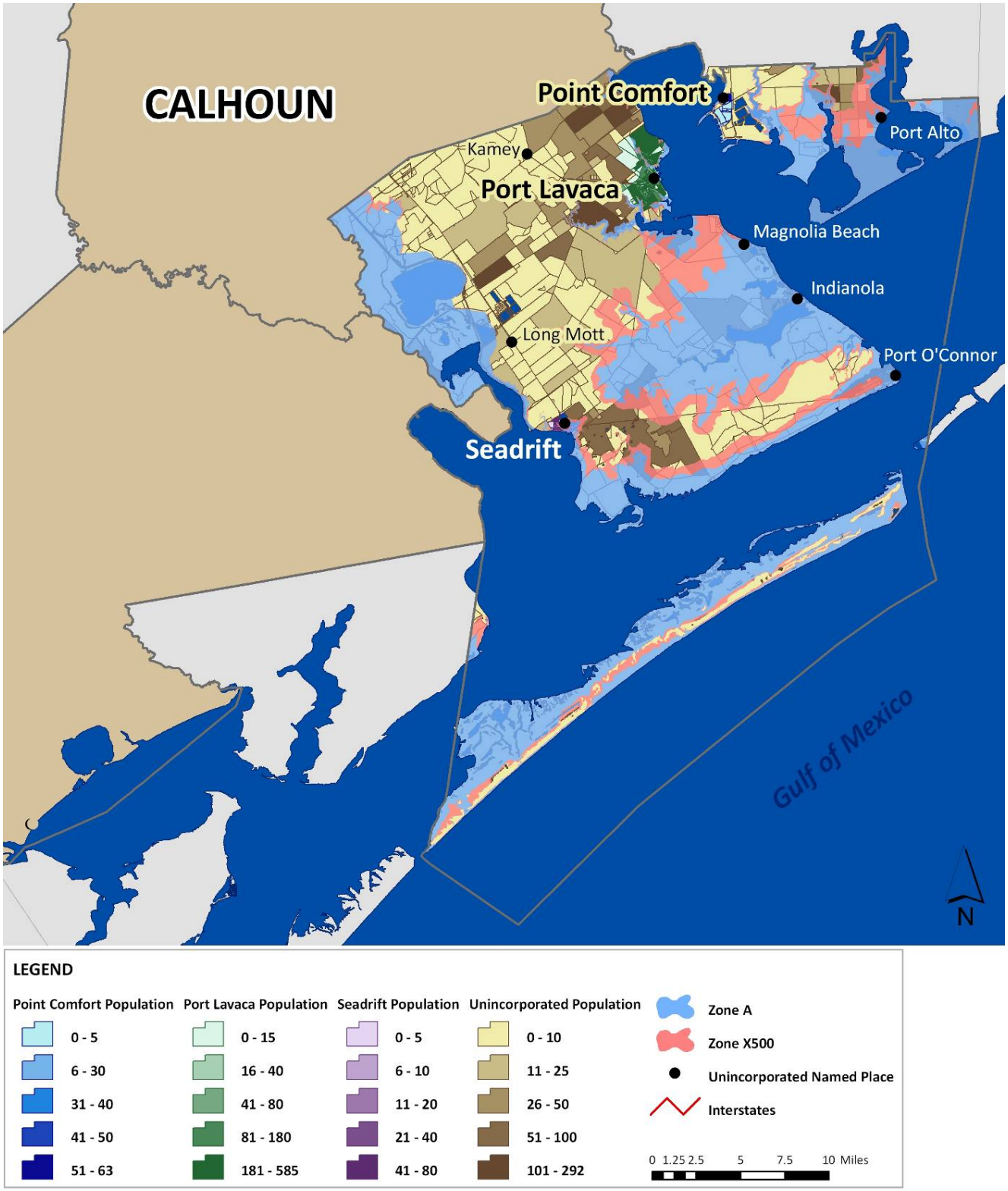


Figure 5-7. Flood Zones in Point Comfort

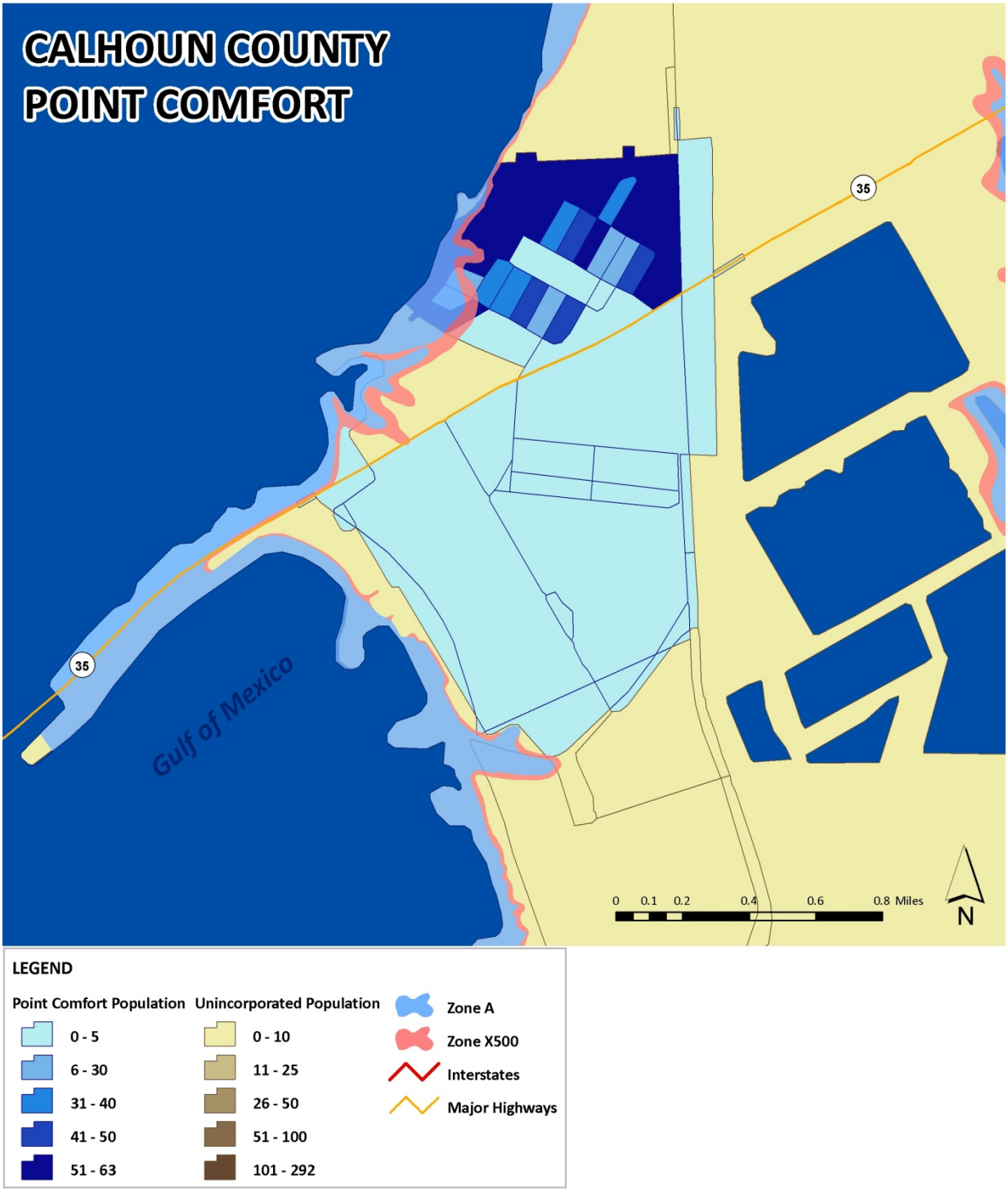


Figure 5-8. Flood Zones in Port Lavaca

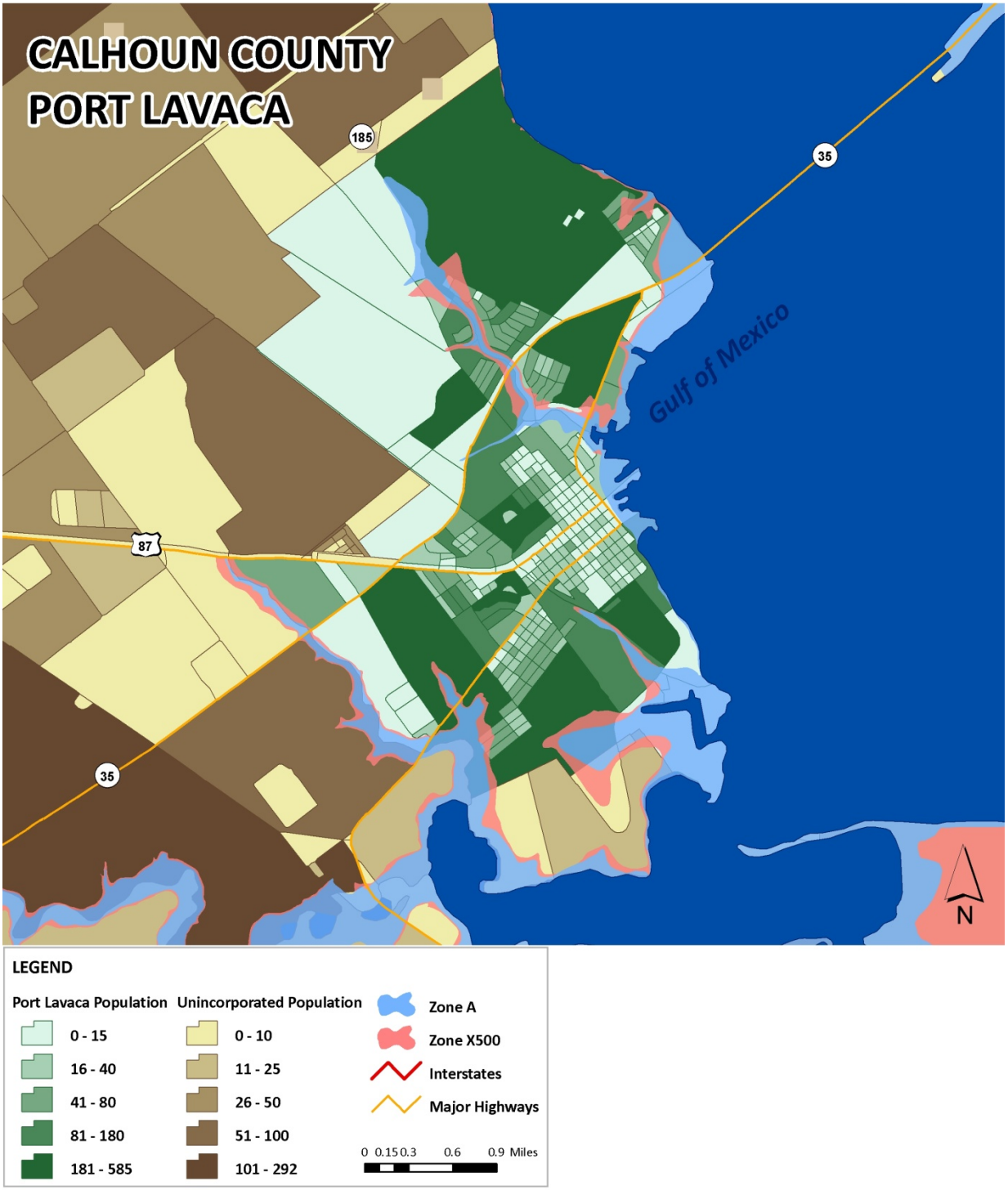


Figure 5-9. Flood Zones in Seadrift

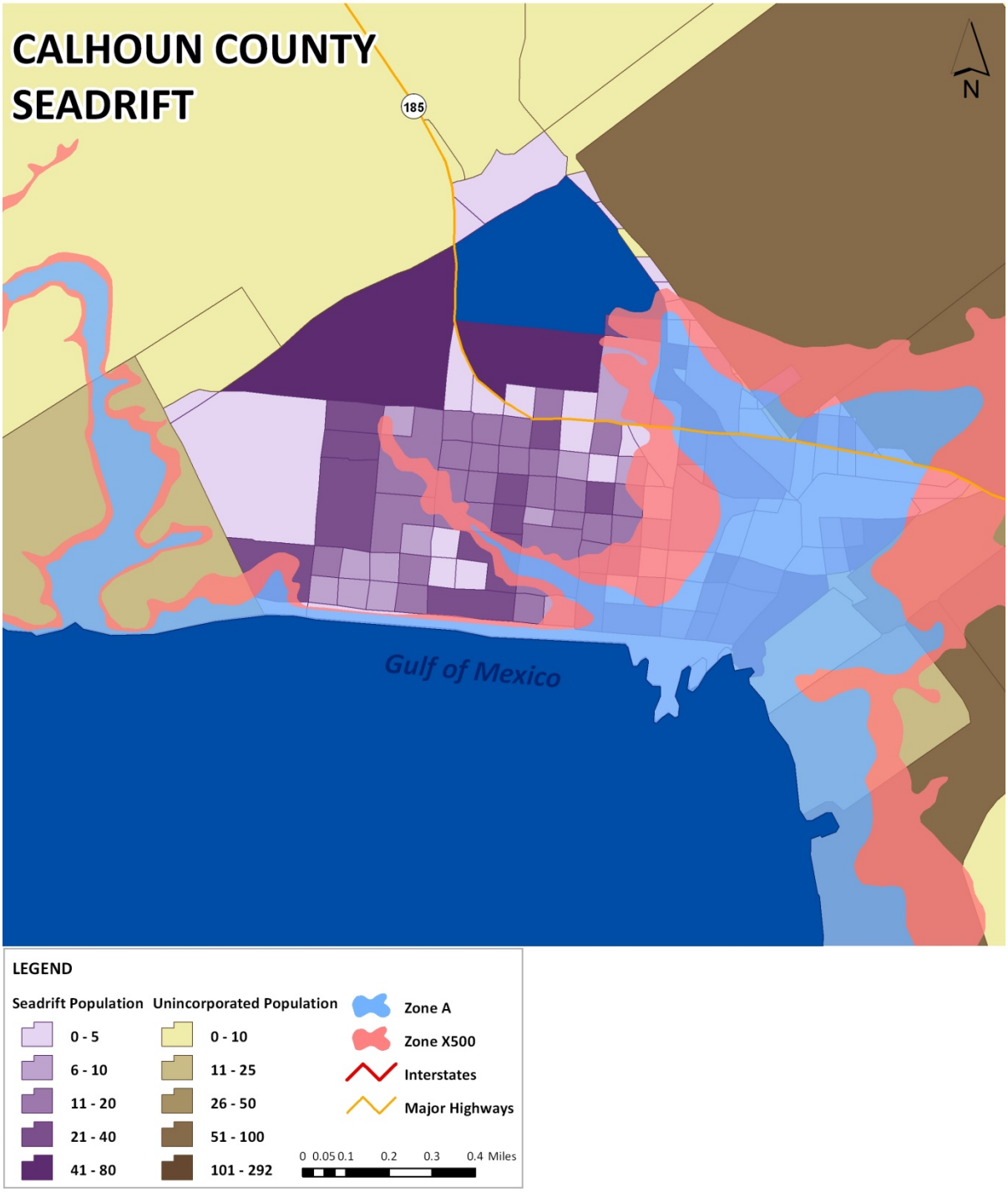


Figure 5-10. Estimated Flood Zones in DeWitt County

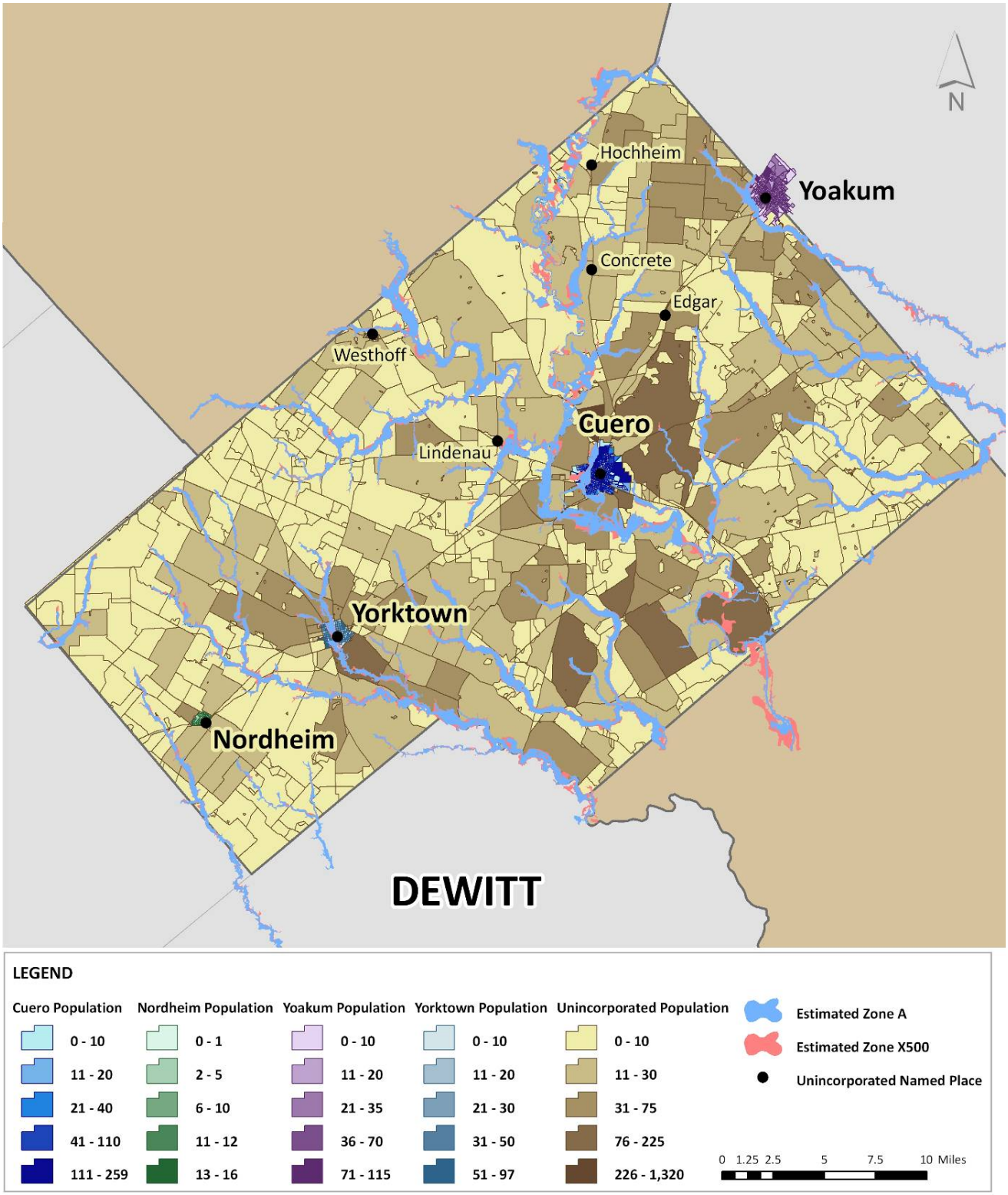


Figure 5-11. Estimated Flood Zones in Cuero

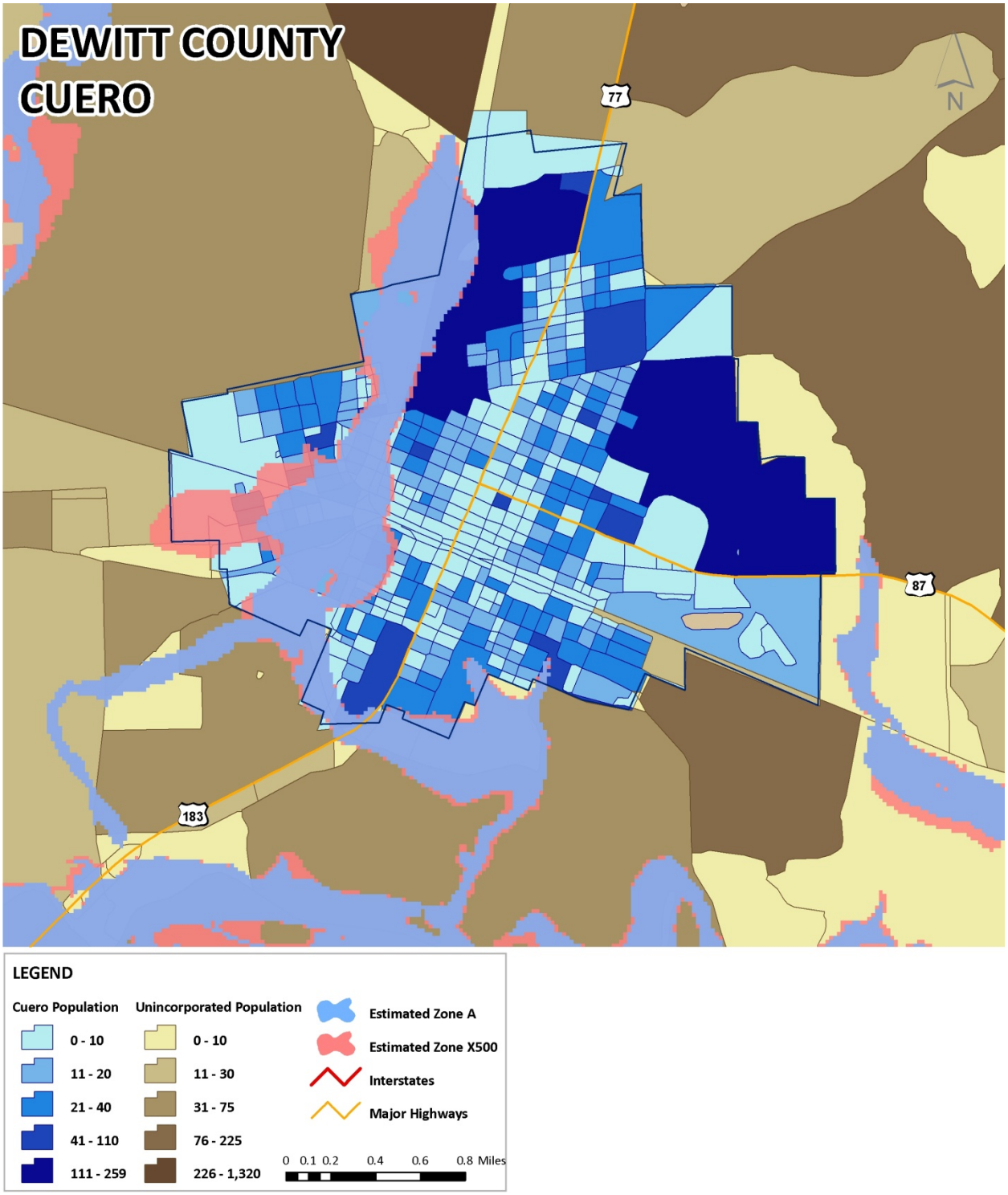


Figure 5-12. Estimated Flood Zones in Nordheim

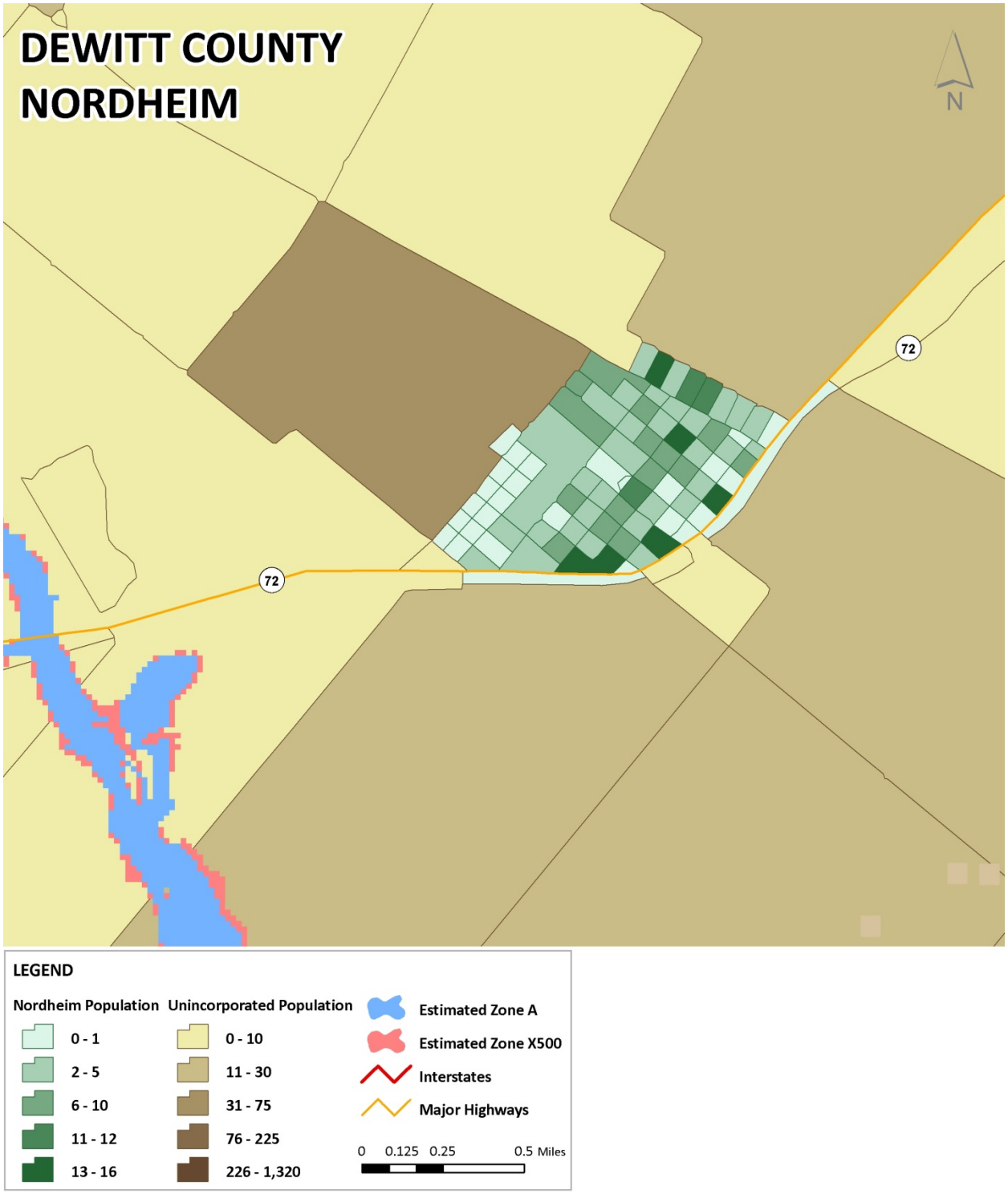


Figure 5-13. Estimated Flood Zones in Yoakum

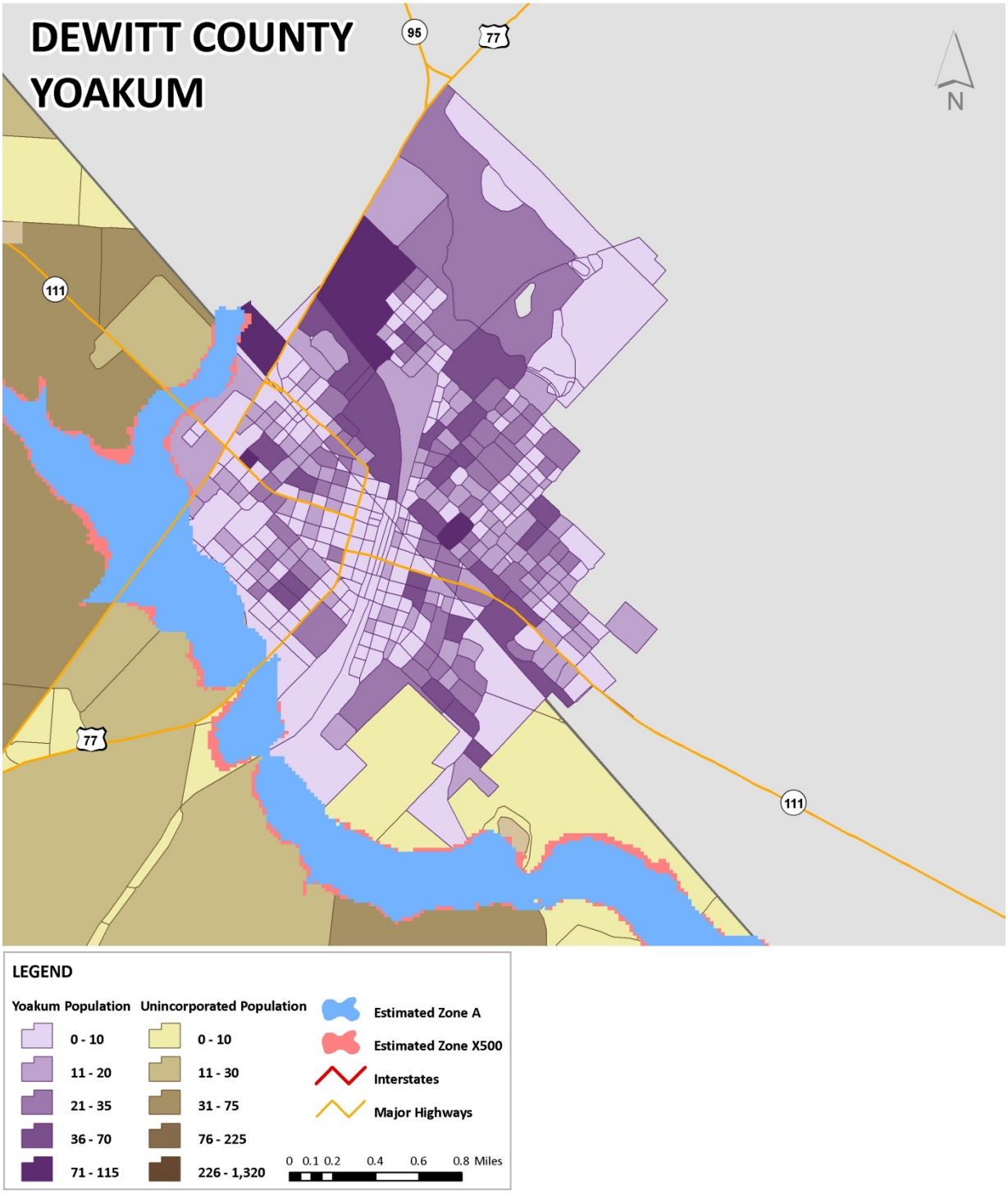


Figure 5-14. Estimated Flood Zones in Yorktown

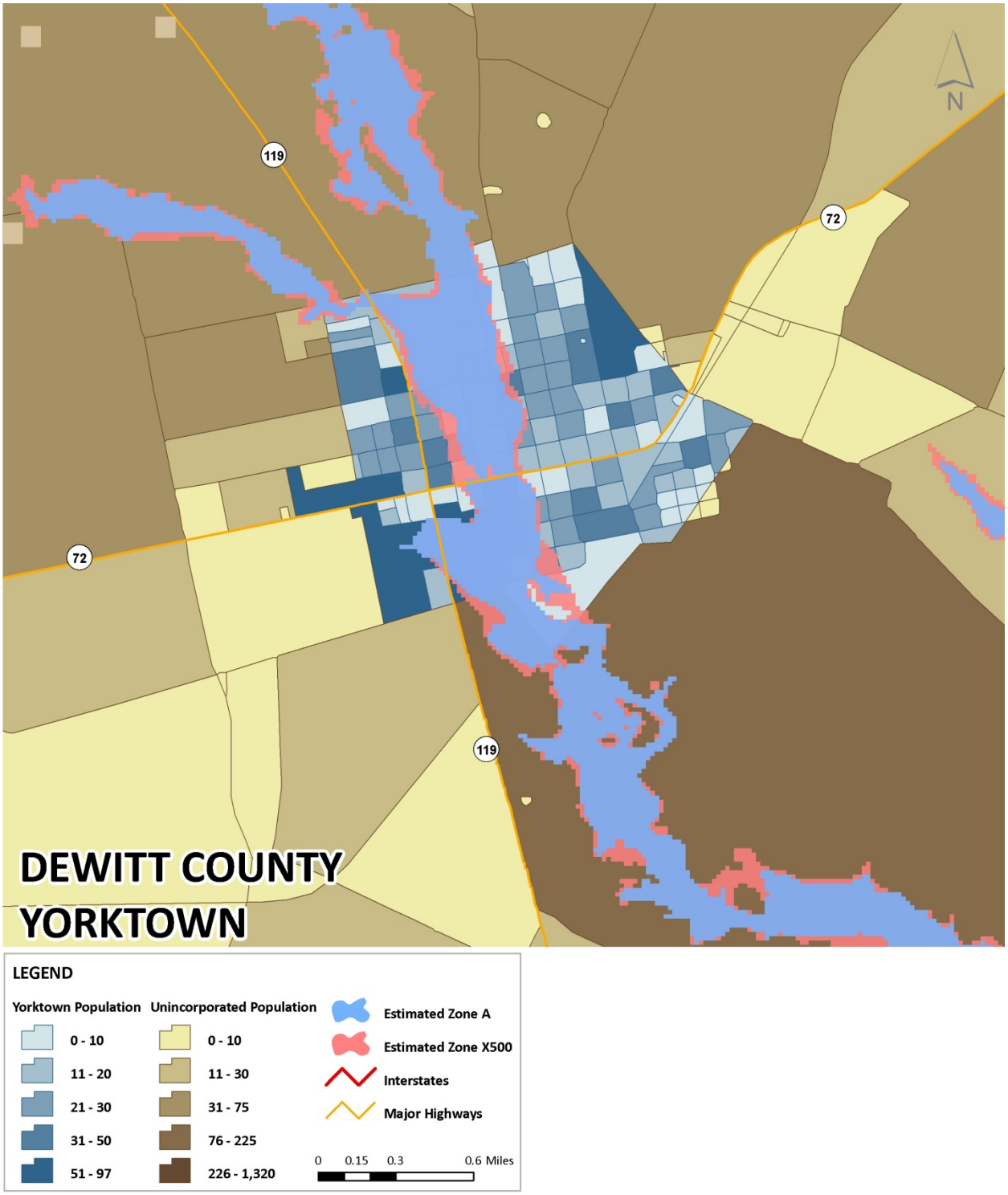


Figure 5-15. Estimated Flood Zones in Gonzales County

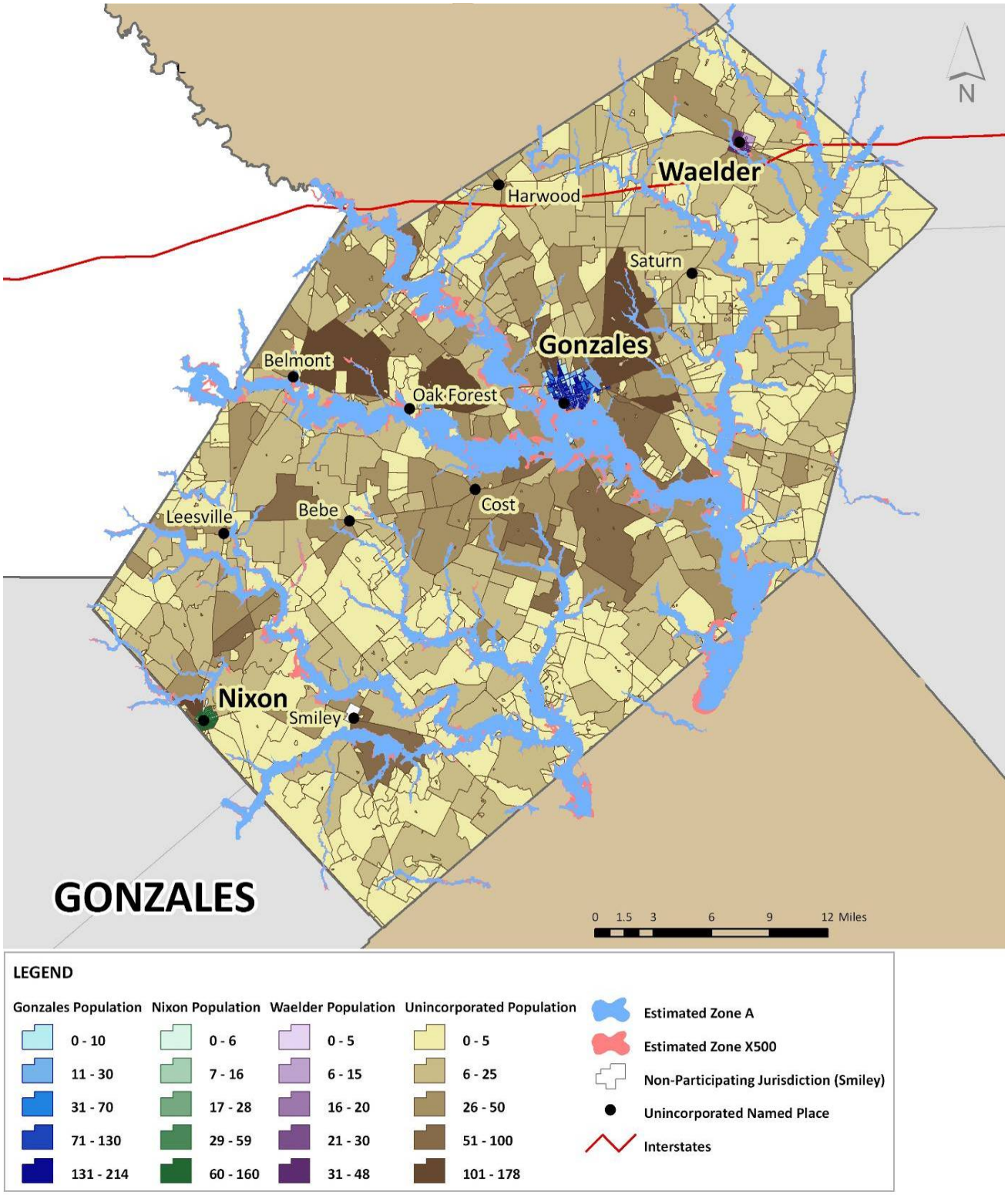


Figure 5-16. Estimated Flood Zones in Gonzales

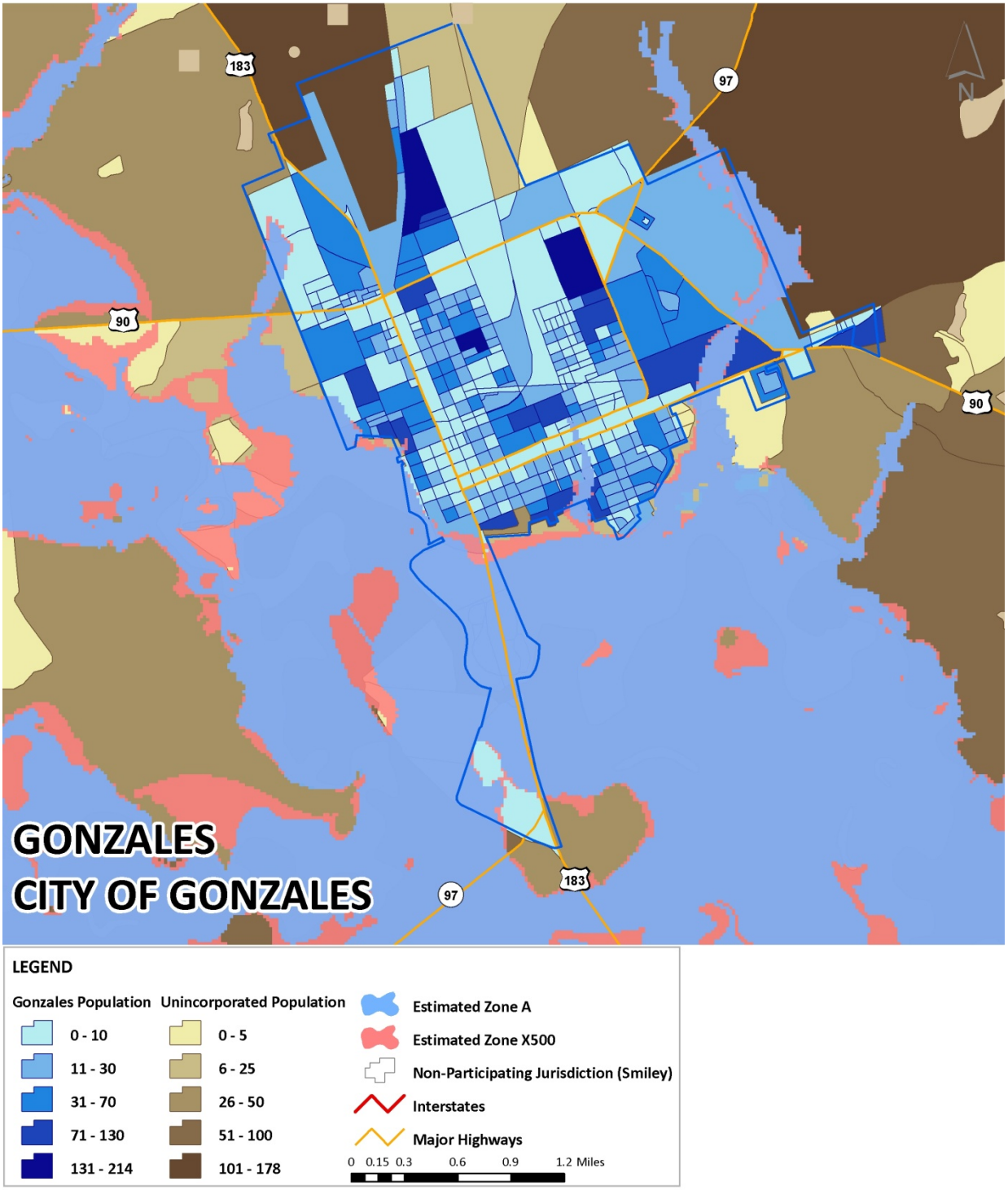


Figure 5-17. Estimated Flood Zones in Nixon

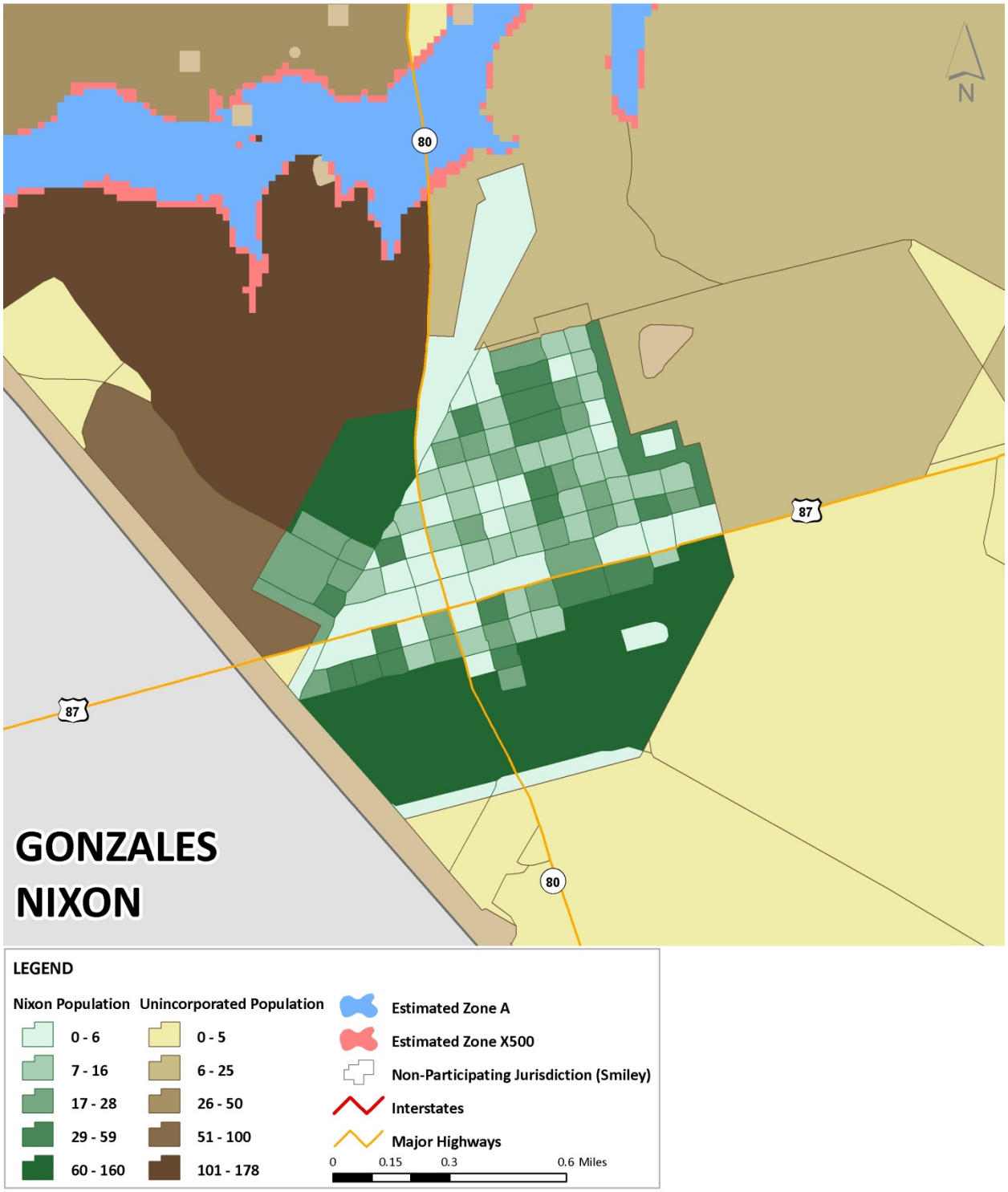


Figure 5-18. Estimated Flood Zones in Waelder

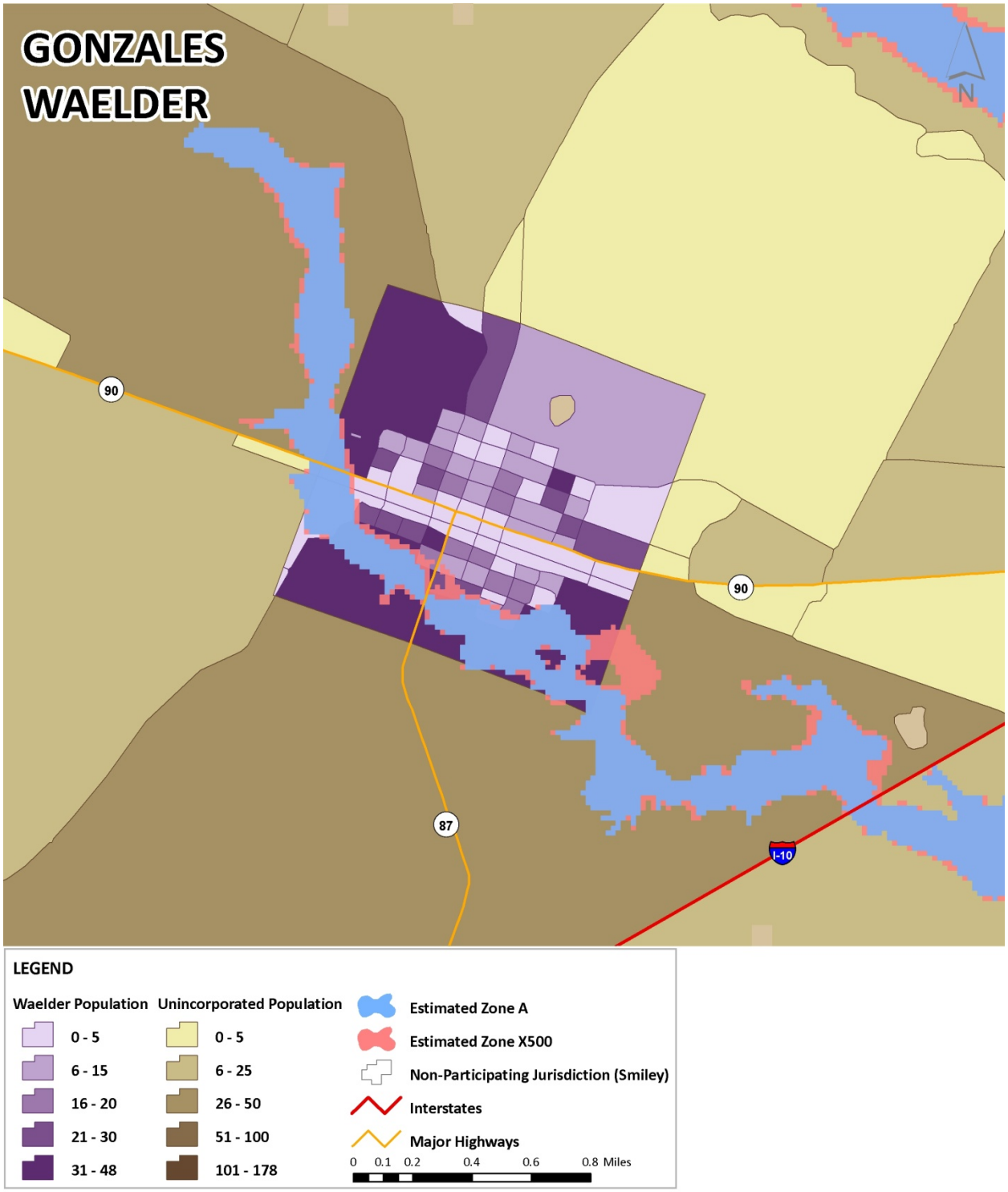


Figure 5-19. Flood Zones in Cibolo (Guadalupe County)

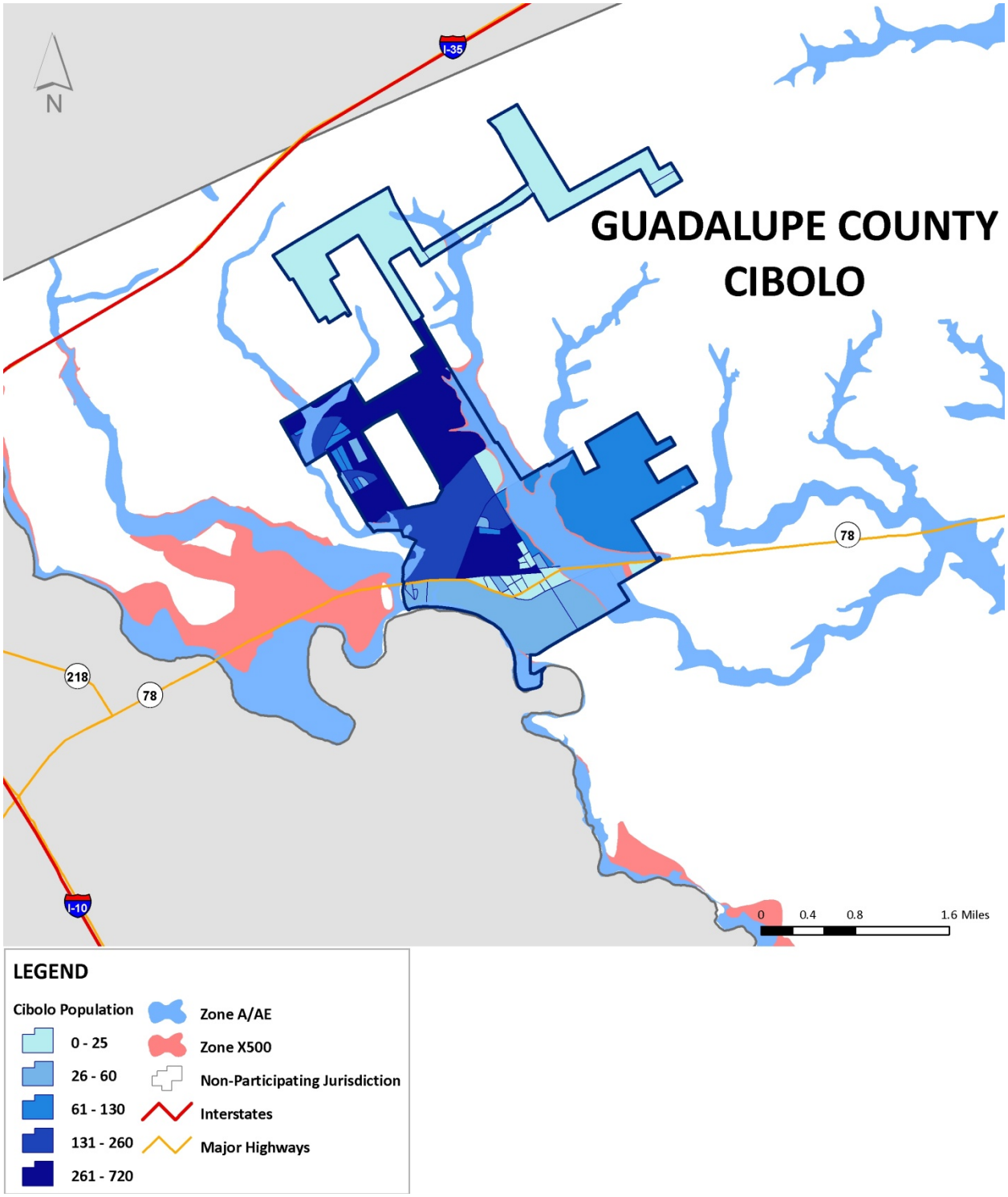


Figure 5-20. Flood Zones in Kendall County

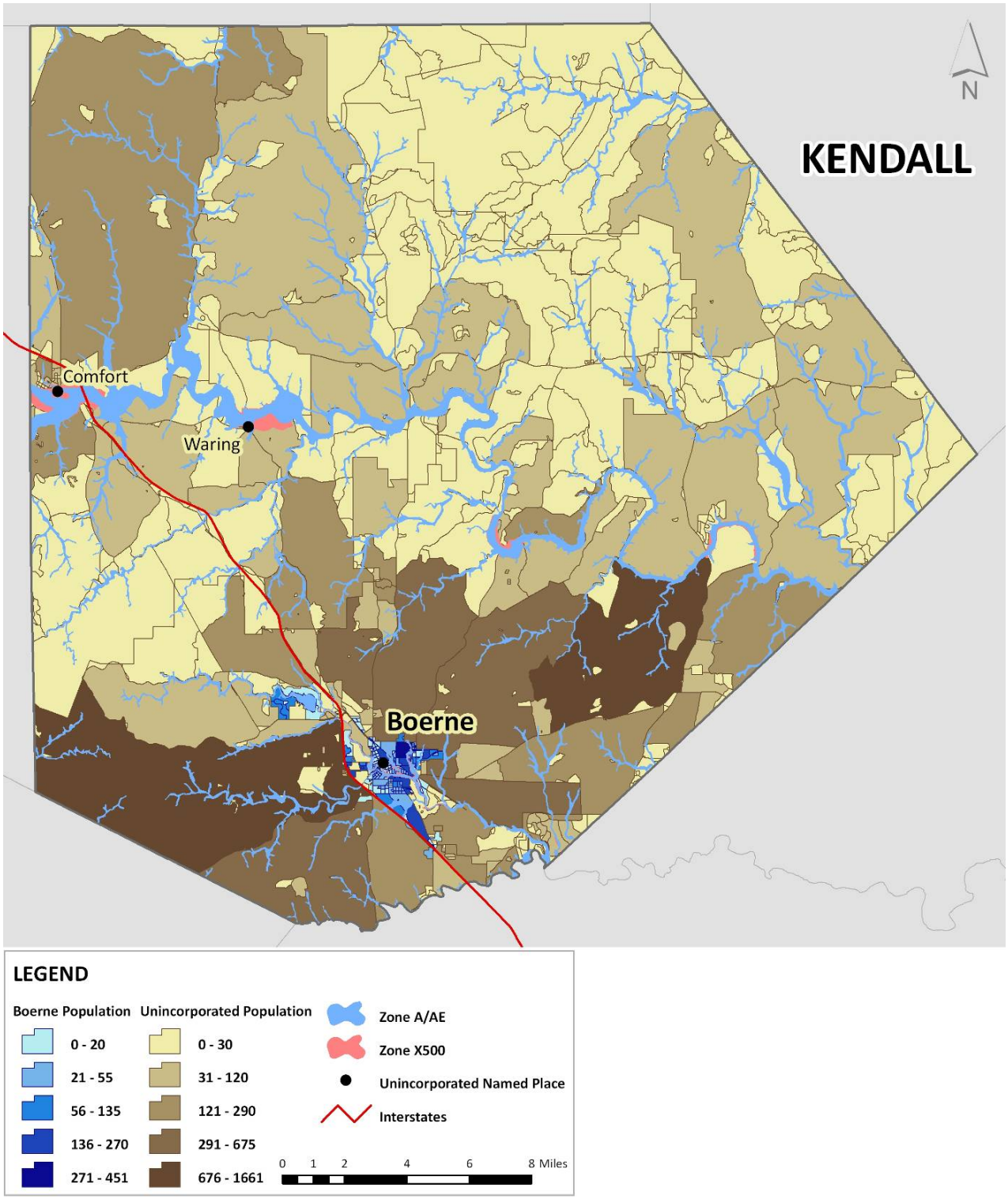


Figure 5-21. Flood Zones in Boerne

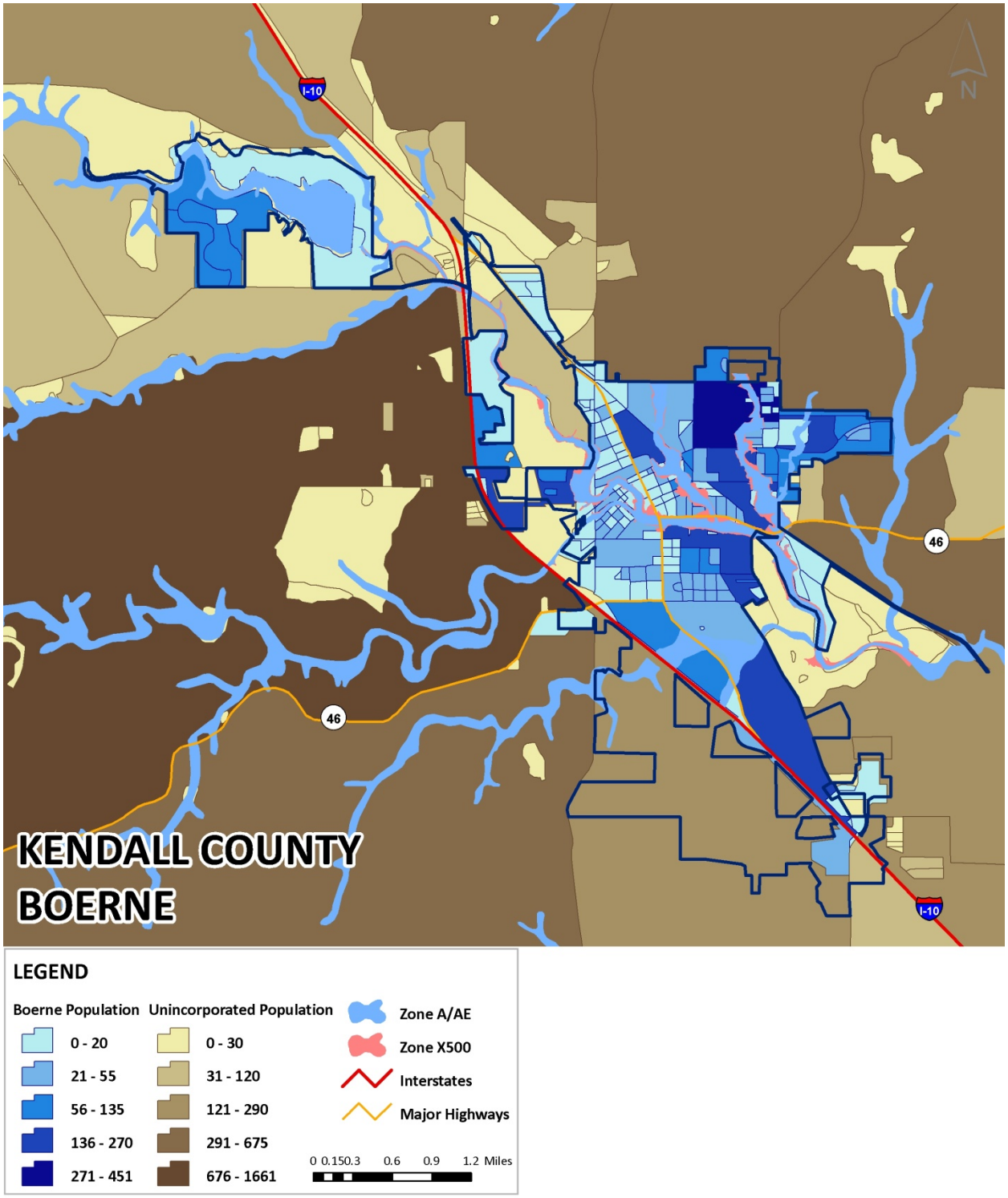


Figure 5-22. Estimated Flood Zones in Refugio County

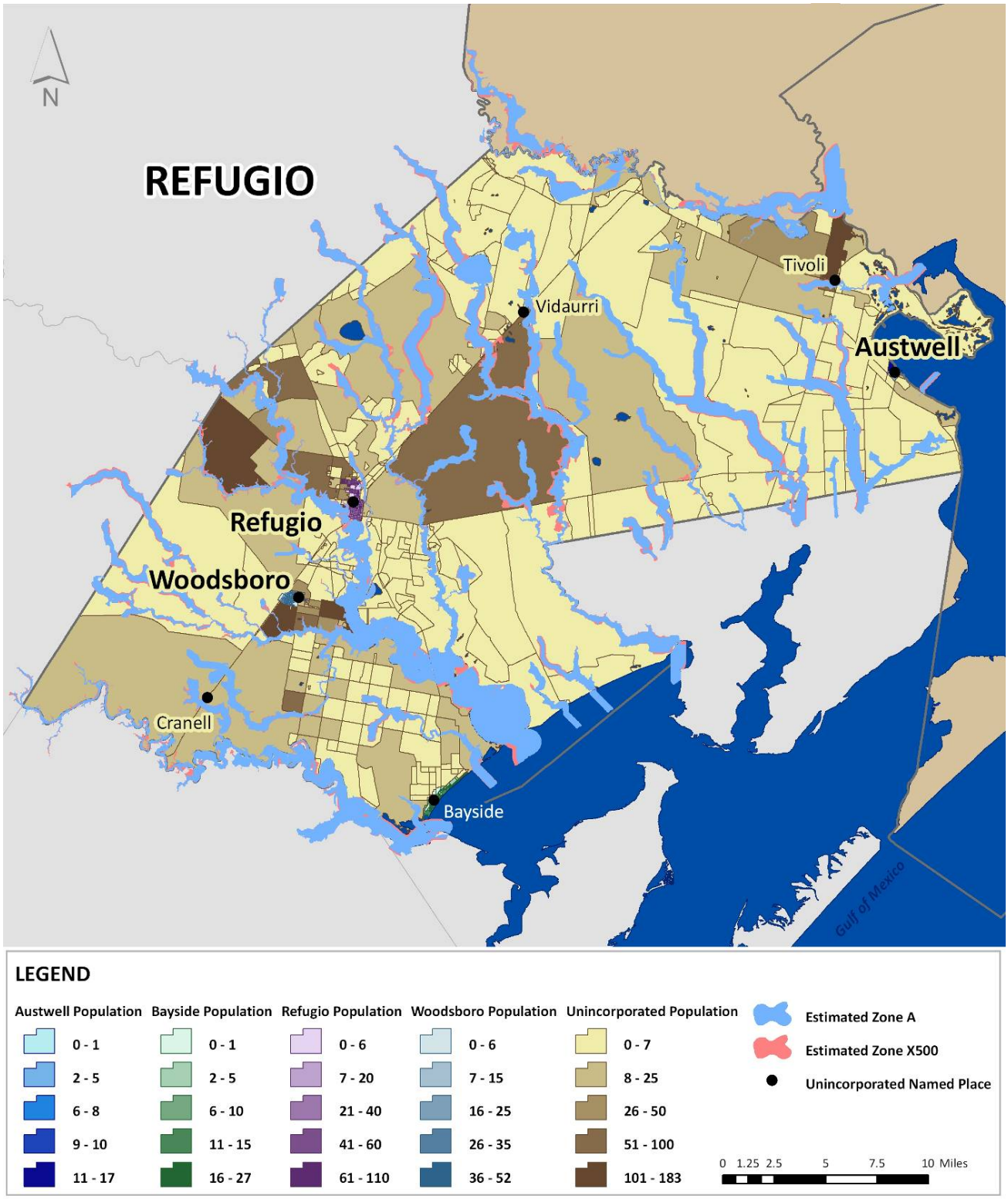


Figure 5-23. Estimated Flood Zones in Austwell

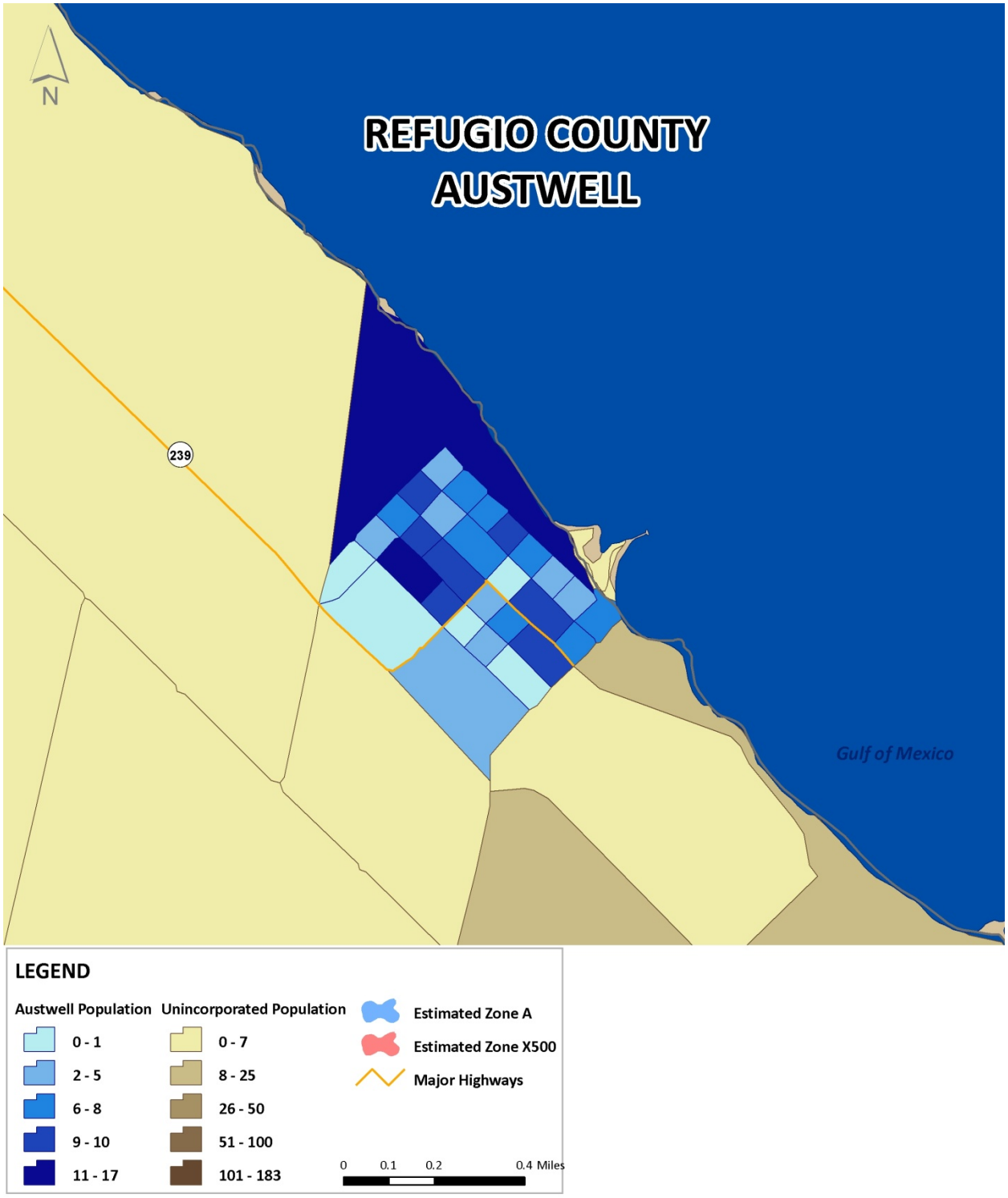


Figure 5-24. Estimated Flood Zones in Bayside

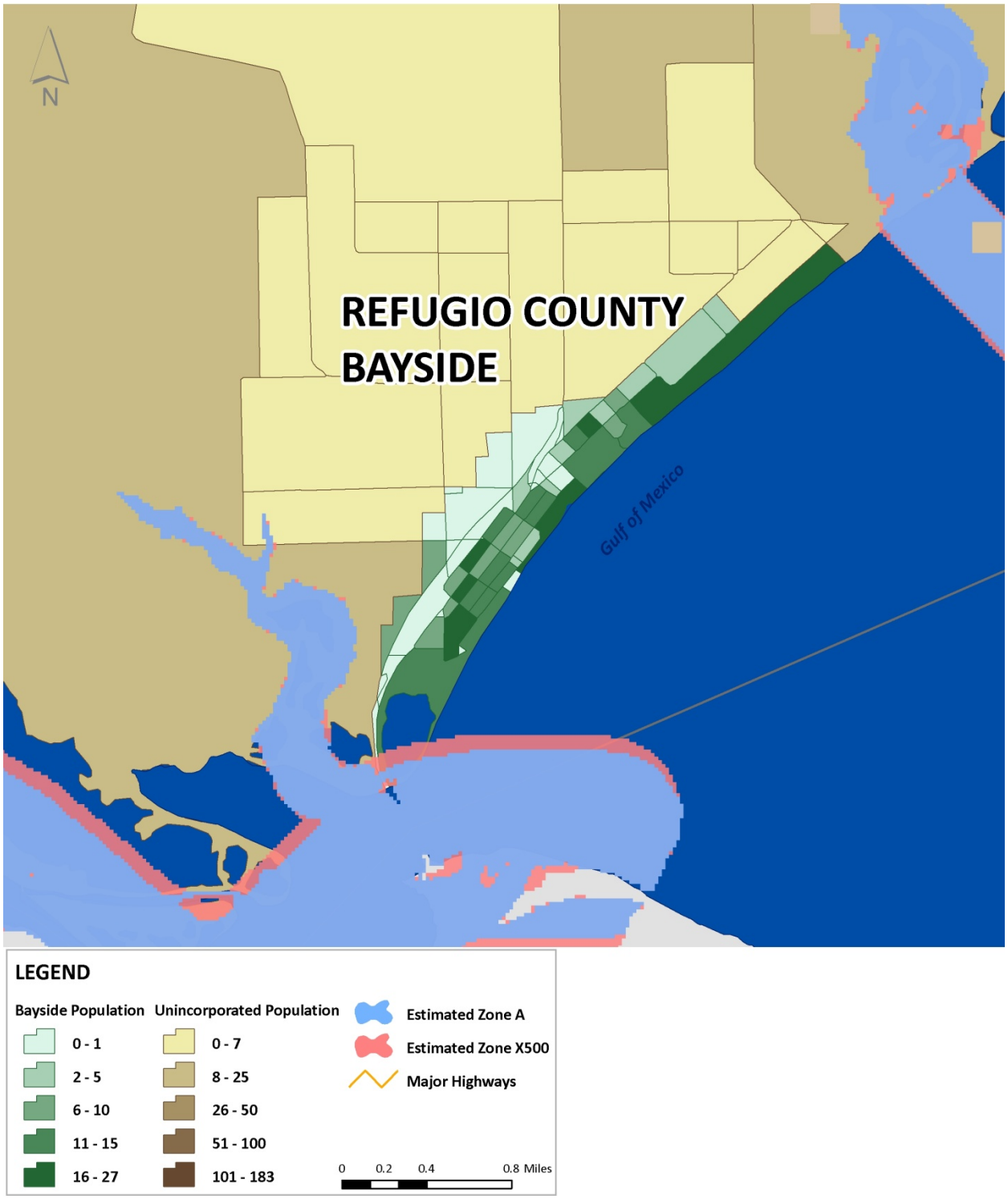


Figure 5-25. Estimated Flood Zones in Refugio

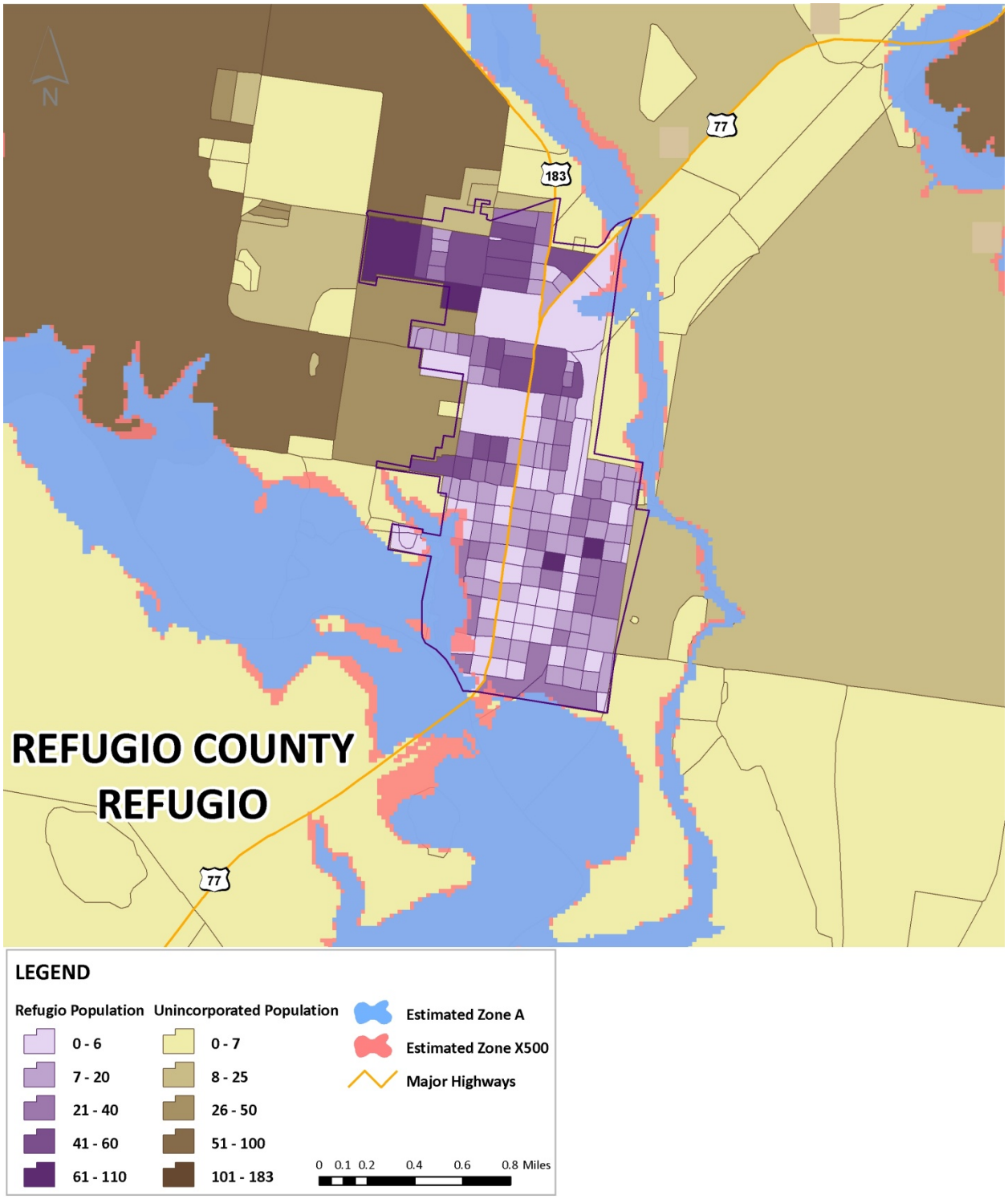


Figure 5-26. Estimated Flood Zones in Woodsboro

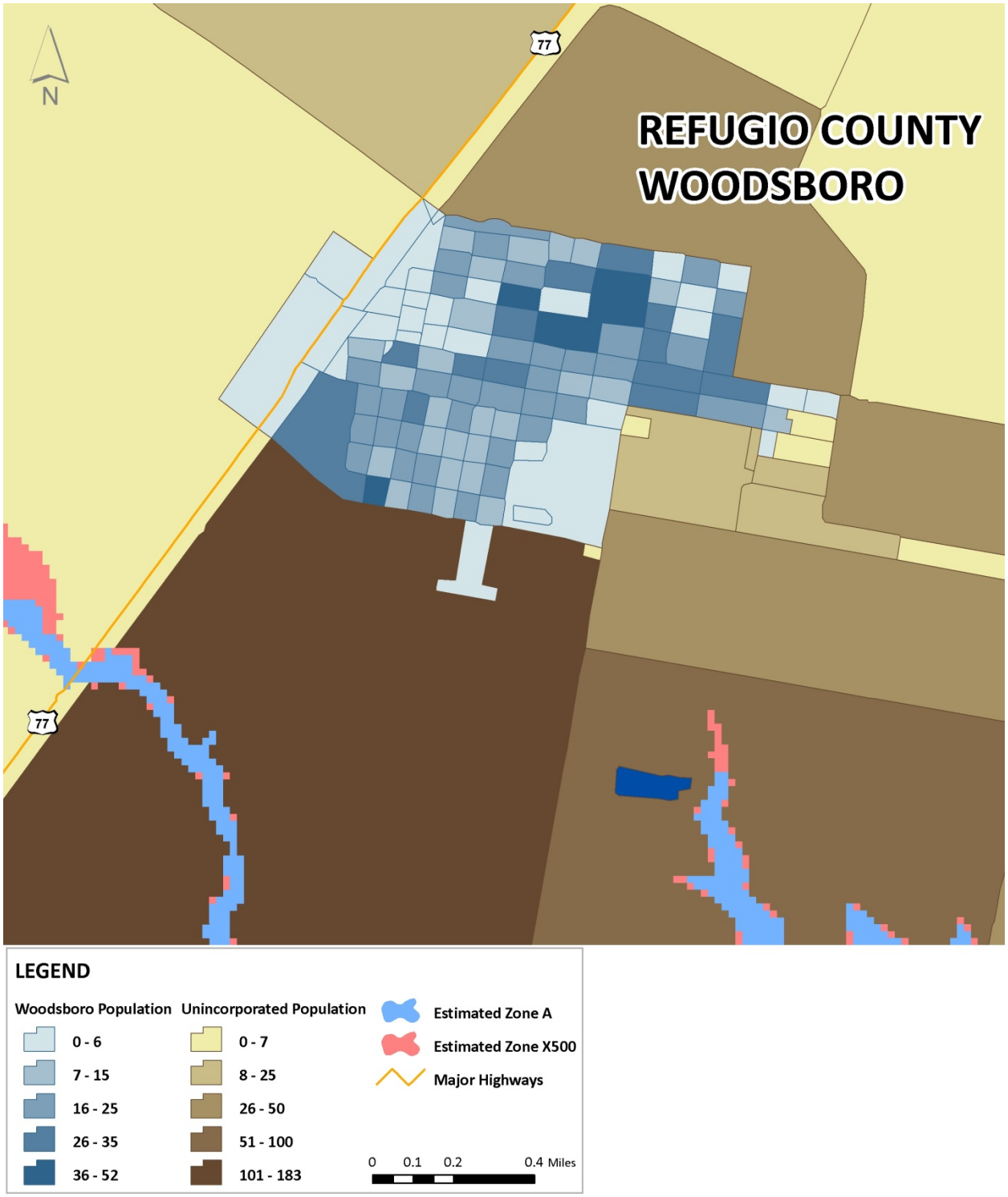


Figure 5-27. Flood Zones in Victoria County

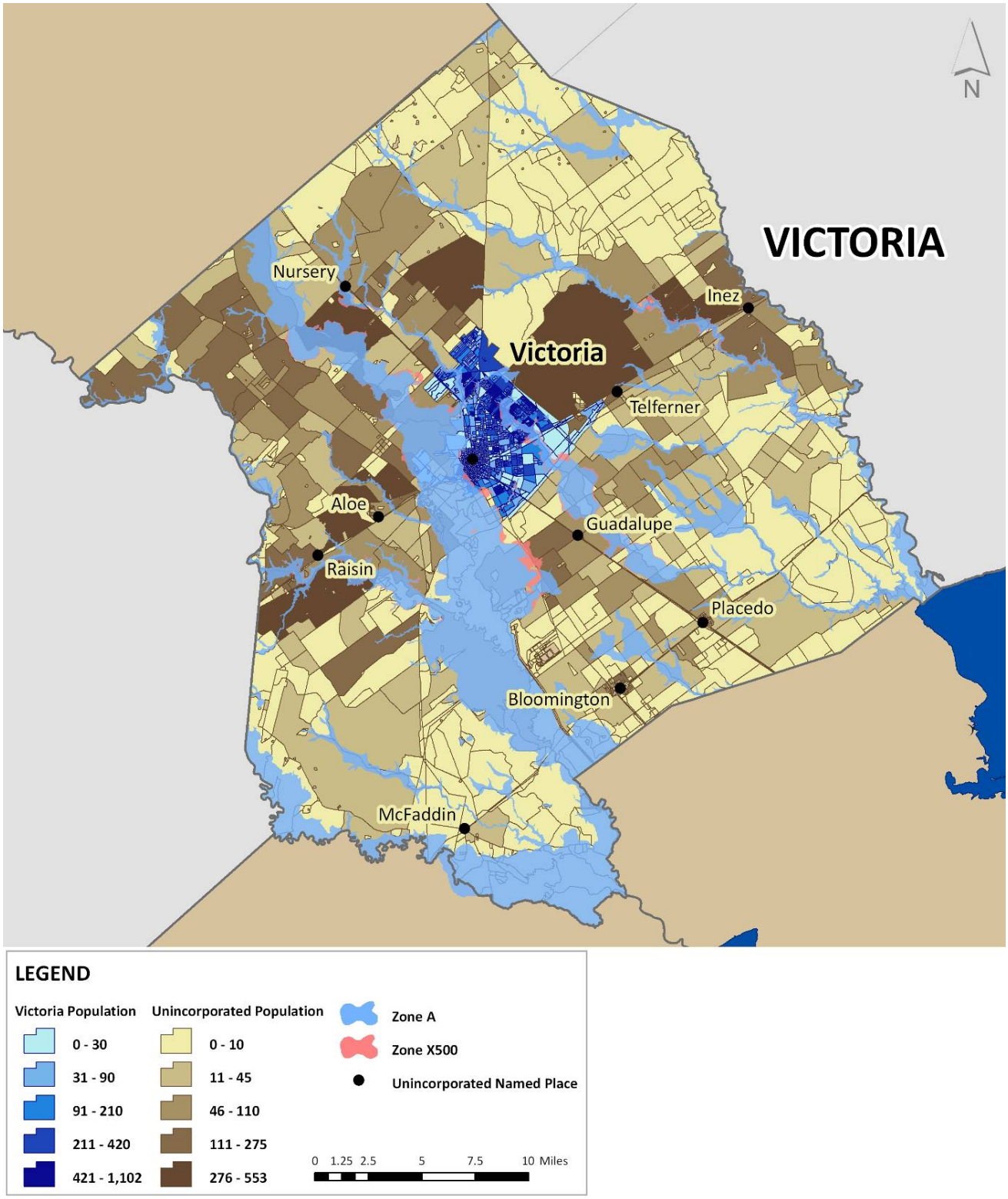
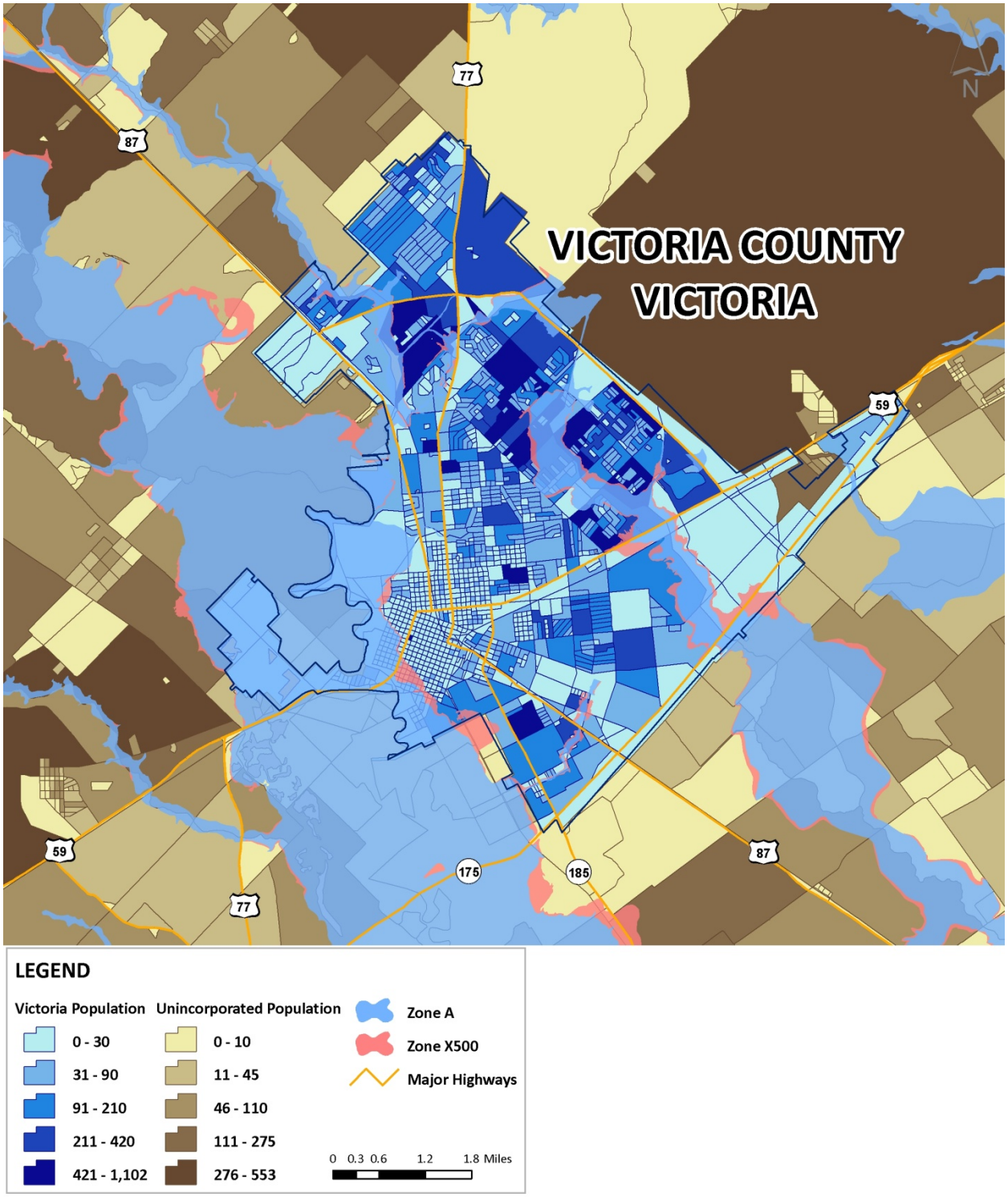


Figure 5-28. Flood Zones in Victoria



Extent

Determining the intensity and magnitude of a flood event is dependent upon the flood zone and location of the flood hazard area in addition to depths of flood waters. Table 5-1 below describes the flood impact in terms of severity or potential harm, while Figures 5-1 through 5-28 depict the flood location and potential magnitude of an event by community. The figures should be read in conjunction with the extent for inland flooding in Tables 5-1, 5-2 and 5-3 to determine the intensity of a potential flooding event.

Table 5-1. Extent Scale: Inland Flooding

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
	ZONE A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
	ZONE AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
	ZONE AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
	ZONE AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
	ZONE A99	Areas with a 1% annual chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
	ZONE AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam).

INTENSITY	ZONE	DESCRIPTION
		Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
MODERATE to LOW	ZONE X 500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

In addition to the flood zones, extent is provided for each county in terms of depth of flood waters. Table 5-2 below describes the category of risk and potential magnitude of an event while Table 5-3 provides by county, the range of intensity.

The water depths depicted in Table 5-2 are an approximation based on elevation data (above sea level rather than above ground) and stream gauge data provided by the National Weather Service. This level of risk is determined by the levels of area streams and rivers.

Table 5-2. Extent Scale – Water Depth (Mean Sea Level, MSL)

SEVERITY	MSL (IN FEET)	DESCRIPTION
BELOW FLOOD STAGE	0 to 15	Water begins to exceed low sections of banks and the lowest sections of the floodplain.
ACTION STAGE	16 to 23	Flow is well into the floodplain, minor lowland flooding reaches low areas of the floodplain. Livestock should be moved from low lying areas.
FLOOD STAGE	24 to 28	Homes are threatened and properties downstream of river flows or in low lying areas begin to flood.
MODERATE FLOOD STAGE	29 to 32	At this stage the lowest homes downstream flood. Roads and bridges in the floodplain flood severely and are dangerous to motorists.
MAJOR FLOOD STAGE	33 and above	Major flooding approaches homes in the

SEVERITY	MSL (IN FEET)	DESCRIPTION
		floodplain. Primary and secondary roads and bridges are severely flooded and very dangerous. Major flooding extends well into the floodplain, destroying property, equipment and livestock.

Source: National Weather Service

Table 5-3. Extent by County

PARTICIPATING COUNTY	ESTIMATED SEVERITY PER FLOOD EVENT[1]	PEAK FLOOD EVENT[2]
Caldwell County	Moderate Flood Stage, 29 to 32 feet	Major Flood Stage – over 40 feet: Floodwaters of the San Marcos River reached 40.4 ft in 1869 in Luling
Calhoun County	Flood Stage, 24 to 28 feet	Action Stage – Floodwaters in the Guadalupe river reached over 14 feet in the October 1998 floods.
DeWitt County	Moderate Flood Stage, 29 to 32 feet	Major Flood Stage – over 44 feet: Guadalupe River floodwaters reached 44.33 ft at Cuero in July of 1936
Gonzales County	Major Flood Stage, 33 feet and above	Major Flood Stage – over 38 feet: Guadalupe River floodwaters reached 38.3 ft at Cuero on May 29, 1929
Cibolo (Guadalupe County)	Action Stage, 16-23 feet	Peak MSL unavailable for Cibolo
Kendall County	Action Stage, 16-23 feet	Major Flood Stage – over 38 feet: Guadalupe River floodwaters reached 38.4 ft near Comfort in July of 1936

[1] Severity estimated by averaging floods at certain stage level over the history of flood events by county.

[2] Severity and peak events are provided from river and stream gauge data collected at U.S. Geological Survey (USGS) and GBRA sites. During some events, for example the 1998 flood, stream gauges were inundated. Therefore peaks may be higher than those recorded. Peaks and averages provided where available.

PARTICIPATING COUNTY	ESTIMATED SEVERITY PER FLOOD EVENT[1]	PEAK FLOOD EVENT[2]
Refugio County	Major Flood Stage, 33 feet and above	Major Flood Stage – over 32 feet: Mission River floodwaters reached 32.3 ft in Refugio on May 17, 1938
Victoria County	Major Flood Stage, 33 feet and above	Major Flood Stage – over 34 feet: Guadalupe River floodwaters reached 34.04 ft in the flood of October 1998 in Victoria

The range of intensity that the GBRA Region can experience is high to low, or Zone A to Zone X500. In terms of a flood event it can vary from an "Action Stage" to a "Major Flood Stage" as shown in Tables 5-2 and 5-3.

Reading the Tables 5-1 through 5-3 together with Figures 5-2 through 5-8 provide estimated and potential magnitude and severity by county. For example Gonzales County, as shown in Figure 5-15, is predominantly Zone A with a few areas designated as Zone X500. Zone X500 is mainly in the unincorporated areas of the county such as Belmont and Oak Forest, with some falling on the outskirts of the City of Gonzales. Reading this figure in conjunction with Table 5-1 means the county is predominantly an area of high risk for flood. Further, Table 5-3 indicates the average flood stage for an event for the county is "Major" with flood levels reaching above 33 feet and above MSL.

Historical Occurrences

Historical evidence shows that most of the area is susceptible to flood hazard, especially in the form of flash flooding. It is important to note that only flood events that have been reported have been factored into this risk assessment, and in most cases NCDC data is limited to flood events that have occurred since 1993. It is likely that additional flood occurrences have gone unreported over the past 50+ years. In some instances, historical flood information, as provided by NCDC, shows flood activity across a multi-county forecast area for a particular event. In such instances, an appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each participating county impacted by the event. In the case of the City of Cibolo, a percentage of countywide events impacting Guadalupe County were used in addition to any events specifically associated with Cibolo.

Table 5-4 shows aggregated historical information by jurisdiction. "Negligible" indicates that the estimated reported losses are less than $5,000.

Table 5-4. Historical Flood Events by Jurisdiction (NCDC, 1993-2009)

JURISDICTION	NUMBER OF REPORTED EVENTS	TYPES OF FLOODING	DEATHS	INJURIES	REPORTED PROPERTY DAMAGE (2009 DOLLARS)	REPORTED CROP DAMAGE (2009 DOLLARS)
Uninc. Caldwell County	**50**	**Flood/Flash Flood**	**6**	**612**	**$97,795,143**	**$634,465**
Lockhart	4	Flash Flood	0	0	Negligible	$530,450
Luling	3	Flash Flood	0	0	Negligible	Negligible
Martindale	0	N/A	0	0	Negligible	Negligible
Uninc. Calhoun County	**17**	**Flood/Flash Flood**	**0**	**0**	**Negligible**	**Negligible**
Point Comfort	1	Flash Flood	0	0	Negligible	Negligible
Port Lavaca	8	Flash Flood	0	0	Negligible	Negligible
Seadrift	1	Flash Flood	0	0	Negligible	Negligible
Uninc. DeWitt County	**79**	**Flood/Flash Flood**	**0**	**808**	**$102,456,024**	**$3,871,189**
Cuero	12	Flood/Flash Flood	0	0	$19,572	Negligible
Nordheim	4	Flash Flood	0	0	Negligible	Negligible
Yoakum	0	N/A	0	0	Negligible	Negligible
Yorktown	3	Flash Flood	0	0	Negligible	Negligible
Uninc. Gonzales County	**65**	**Flood/Flash Flood**	**0**	**760**	**$122,442,892**	**$1,517,941**
Gonzales	8	Flood/Flash Flood	0	0	Negligible	Negligible
Nixon	3	Flash Flood	0	0	Negligible	Negligible
Waelder	2	Flash Flood	0	0	Negligible	Negligible
Cibolo (Guadalupe County)	2	Flash Flood	0	0	$865,141	$8,790
Uninc. Kendall County	**66**	**Flood/Flash Flood**	**3**	**20**	**$7,632,245**	**$1,552,561**
Boerne	6	Flash Flood	2	0	$318,270	Negligible
Uninc. Refugio County	**15**	**Flood/Flash Flood**	**0**	**0**	**Negligible**	**Negligible**
Austwell	**0**	N/A	0	0	Negligible	Negligible
Bayside	**2**	Flash Flood	0	0	Negligible	Negligible
Refugio	**7**	Flash Flood	0	0	Negligible	Negligible
Woodsboro	**5**	Flash Flood	0	0	Negligible	Negligible
Uninc. Victoria County	**23**	**Flood/Flash Flood**	**0**	**0**	**$826,217**	**Negligible**
Victoria	23	Flash Flood	0	0	$1,060,900	Negligible
TOTALS FOR STUDY AREA[3]	**409**		**11**	**2,200**	**$333,416,404**	**$8,115,396**

[3] Totals for the study area may include values less than $5,000 for dollar amounts that are classified as "Negligible" in the table.

Probability of Future Events

Based on historical occurrences and extent, flooding is highly likely meaning an event is probable in the next year. The GBRA Basin is prone to both Inland flood and Coastal flood. As coastal flood is typically a result of storm surge, wind-driven waves and heavy rainfall produced by hurricanes, tropical storms, and other large coastal storms it is addressed in Section 6 for hurricanes. Due to the likelihood of future flood events, flooding was ranked as a primary hazard facing the GBRA Basin, prompting those participating in the Plan Update to develop numerous mitigation actions with flood mitigation in mind.

Vulnerability and Impact

The building vulnerability assessment was conducted using a GIS mapping analysis process in which Category 1 -5 storm surge inundation GIS data were overlaid with local parcel data to determine the number of parcels that intersect these hazard zones. Data from the County's 2008 tax assessment was then used to determine the assessed value of these at-risk properties.

In making vulnerability determinations, it was decided that if any portion of a structure was confirmed to be located within a storm surge inundation zone, then it was determined to be at risk to that flood hazard. While the GIS-based assessment does use specific attribute data tied to each individual property (i.e., year built and building value), it does not take into account certain unknown site-specific factors that may mitigate future flood losses on a building-by-building basis (such as finished floor elevations, surrounding topography, floodproofing measures, drainage, etc.). No further analysis on the potential vulnerability of structures to flooding was completed as part of this assessment.

Table 5-5 shows estimated potential for exposure from the 1 percent annual flood for buildings and population. Table 5-6 reflects potential annualized losses due to exposure from the 1 percent flood per jurisdiction. Table 5-7 shows critical facilities and infrastructure at-risk from the 1 percent annual flood.

Table 5-5. Estimated Potential Exposure for the 1-Percent-Annual-Chance Flood

JURISDICTION	TOTAL NUMBER OF PEOPLE IN JURISDICTION[1]	NUMBER OF PEOPLE EXPOSED TO FLOOD HAZARD[2]	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION[3]	NUMBER OF BUILDINGS EXPOSED TO FLOOD HAZARD[2]	TOTAL ESTIMATED BUILDING LOSS FROM FLOOD[3]
Caldwell County	**14,661**	**4,819**	**$605,797,000**	**2,221**	**$17,976,000**
Lockhart	11,591	1,675	$618,183,000	565	$2,219,000
Luling	5,025	514	$264,373,000	216	$473,000
Martindale	917	785	$40,522,000	341	$6,379,000
Calhoun County	**6,481**	**3,955**	**$609,016,000**	**3,988**	**$9,932,000**
Point Comfort	781	169	$80,897,000	105	$16,000
Port Lavaca	12,035	2,803	$651,340,000	1,204	$2,309,000
Seadrift	1,350	556	$62,036,000	426	$1,122,000
DeWitt County	**8,805**	**5,714**	**$469,085,000**	**2,618**	**$8,413,000**

JURISDICTION	TOTAL NUMBER OF PEOPLE IN JURISDICTION[1]	NUMBER OF PEOPLE EXPOSED TO FLOOD HAZARD[2]	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION[3]	NUMBER OF BUILDINGS EXPOSED TO FLOOD HAZARD[2]	TOTAL ESTIMATED BUILDING LOSS FROM FLOOD[3]
Cuero	6,544	1,333	$412,893,000	708	$4,488,000
Nordheim	323	Negligible	$25,111,000	0	Negligible
Yoakum	5,729	188	$370,136,000	97	$296,000
Yorktown	2,204	542	$127,049,000	351	$3,136,000
Gonzales County	**8,343**	**5,331**	**$457,255,000**	**3,463**	**$21,077,000**
Gonzales	7,160	612	$401,785,000	311	$4,697,000
Nixon	2,178	Negligible	$94,690,000	0	Negligible
Waelder	947	221	$37,972,000	125	$561,000
Cibolo (Guadalupe County)	3,035	1,420	$221,273,000	614	$29,466,000
Kendall County	**17,618**	**13,200**	**$1,181,519,000**	**6,064**	**$41,499,000**
Boerne	6,125	3,596	$494,789,000	1,664	$26,359,000
Refugio County	**2,670**	**1,763**	**$ 149,487,000**	**925**	**$4,080,000**
Austwell	192	Negligible	$28,397,000	0	Negligible
Bayside	360	Negligible	$26,026,000	21	$20,000
Refugio	2,920	70	$186,843,000	47	$304,000
Woodsboro	1,683	Negligible	$78,606,000	0	Negligible
Victoria County	**23,482**	**12,678**	**$1,174,737,000**	**5,230**	**$20,891,000**
Victoria	60,606	15,085	$3,942,383,000	5,753	$16,524,000
TOTALS FOR STUDY AREA[4]	**213,765**	**77,043**	**$12,812,200,000**	**37,057**	**$222,237,000**

[1] Totals for the study area may include values less than $5,000 for dollar amounts and less than 50 for populations that are classified as "Negligible" in the table HAZUS-MH MR4; FEMA Q3

[2] Based on HAZUS-MH MR4

Table 5-6. Potential Annualized Losses by Jurisdiction (Flood)[5]

JURISDICTION	TOTAL VALUE OF RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL BUILDINGS IN JURISDICTION	ESTIMATED ANNUALIZED LOSSES FOR RESIDENTIAL BUILDINGS	ESTIMATED ANNUALIZED LOSSES FOR COMMERCIAL BUILDINGS	ESTIMATED ANNUALIZED LOSSES FOR INDUSTRIAL BUILDINGS	TOTAL ESTIMATED ANNUALIZED LOSSES	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	**$588,735,000**	**$3,341,000**	**$221,000**	**$49,000**	**$3,611,000**	**0.61%**
Lockhart	$564,548,000	$519,000	$56,000	Negligible	$578,000	0.10%
Luling	$252,572,000	$121,000	$9,000	Negligible	$130,000	0.05%
Martindale	$40,438,000	$853,000	$19,000	Negligible	$872,000	2.16%
Calhoun County[6]	**$593,649,000**	**$1,712,000**	**$124,000**	**$116,000**	**$1,952,000**	**0.33%**
Point Comfort	$76,774,000	Negligible	Negligible	Negligible	Negligible	0.00%
Port Lavaca	$618,120,000	$663,000	$73,000	$8,000	$744,000	0.12%
Seadrift	$59,902,000	$287,000	Negligible	Negligible	$292,000	0.49%
DeWitt County	**$452,779,000**	**$1,971,000**	**$103,000**	**$71,000**	**$2,145,000**	**0.47%**
Cuero	$381,027,000	$855,000	$45,000	$96,000	$996,000	0.26%
Nordheim	$22,728,000	Negligible	Negligible	Negligible	Negligible	0.00%
Yoakum	$350,297,000	$58,000	$13,000	$23,000	$94,000	0.03%
Yorktown	$121,770,000	$585,000	$110,000	$10,000	$705,000	0.58%
Gonzales County	**$433,650,000**	**$3,962,000**	**$452,000**	**$60,000**	**$4,474,000**	**1.03%**
Gonzales	$375,157,000	$244,000	$28,000	Negligible	$275,000	0.07%
Nixon	$906,81$,000	Negligible	Negligible	Negligible	Negligible	0.00%
Waelder	$36,299,000	$195,000	Negligible	Negligible	$195,000	0.54%
Cibolo (Guadalupe County)	$211,576,000	$351,000	$40,000	Negligible	$391,000	0.18%
Kendall County	**$1,136,402,000**	**$4,919,000**	**$665,000**	**$191,000**	**$5,775,000**	**0.51%**
Boerne	$468,580,000	$4,070,000	$1,519,000	$176,000	$5,765,000	1.23%

[5] Residential and commercial buildings were selected as the area of focus for annualized loss estimates.

[6] The HAZUS flood model calculated loss estimates for riverine and coastal flooding in Calhoun County. Calhoun County is the only county in the study area recognized by HAZUS-MH as a coastal county.

JURISDICTION	TOTAL VALUE OF RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL BUILDINGS IN JURISDICTION	ESTIMATED ANNUALIZED LOSSES FOR RESIDENTIAL BUILDINGS	ESTIMATED ANNUALIZED LOSSES FOR COMMERCIAL BUILDINGS	ESTIMATED ANNUALIZED LOSSES FOR INDUSTRIAL BUILDINGS	TOTAL ESTIMATED ANNUALIZED LOSSES	ANNUALIZED LOSS RATIO (ALR)
Refugio County	**$143,422,000**	**$1,163,000**	**$23,000**	**$29,000**	**$1,215,000**	**0.85%**
Austwell	$12,706,000	Negligible	Negligible	Negligible	Negligible	0.00%
Bayside	$24,951,000	Negligible	Negligible	Negligible	Negligible	0.01%
Refugio	$174,133,000	$61,000	$17,000	Negligible	$78,000	0.04%
Woodsboro	$69,194,000	Negligible	Negligible	Negligible	Negligible	0.00%
Victoria County	**$1,137,070,000**	**$5,203,000**	**$309,000**	**$136,000**	**$5,648,000**	**0.50%**
Victoria	$3,752,225,000	$3,345,000	$614,000	$116,000	$4,075,000	0.11%
TOTALS FOR STUDY AREA[7]	**$7,166,558,000**	**$34,480,000**	**$4,446,000**	**$1,088,000**	**$40,012,000**	**0.56%**

[7] Totals for the study area may include values less than $5,000 for amounts that are classified as "Negligible" in the table.

Table 5-7. Critical Facilities and Infrastructure Potentially Damaged by Jurisdiction (100-Yr Flood)

JURISDICTION	NUMBER OF POTENTIALLY FLOODED ESSENTIAL FACILITIES	INFRASTRUCTURE AND LIFELINES			
		Oil Pipe (km)	Gas Pipe (km)	Highway (km)	Railroad (km)
Caldwell County	**0**	**23.4**	**46.8**	**4.6**	**3.6**
Lockhart	1	0	0	0.1	1.5
Luling	0	0	0.7	1.1	0
Martindale	0	0	0	0	0
Calhoun County[8]	**0**	**22.0**	**243.0**	**0**	**0**
Point Comfort	0	0	0.8	0	0
Port Lavaca	1	0.1	0.3	0	0
Seadrift	0	0	0	0	0
DeWitt County	**0**	**0**	**88.9**	**7.0**	**1.1**
Cuero	0	0	0	0.1	4.6
Nordheim	0	0	0	0	0
Yoakum	0	0	0	0.3	0
Yorktown	4	0	0	0	0
Gonzales County	**1**	**24.1**	**53.1**	**11.9**	**3.1**
Gonzales	0	0	0.24	2.4	0
Nixon	0	0	0	0	0
Waelder	0	0	0	0.2	0.2
Cibolo (Guadalupe County)	0	0	0.8	0	1.4
Kendall County	**0**	**0**	**4.7**	**3.8**	**0**
Boerne	0	0	0	0.6	0
Refugio County	**0**	**77.5**	**250.8**	**9.6**	**4.8**
Austwell	0	0	0	0	0
Bayside	0	0.2	0	0	0
Refugio	0	0	0.2	0.1	0.1
Woodsboro	0	0	0	0	0
Victoria County	**3**	**27.1**	**313.4**	**25.4**	**16.0**
Victoria	0	0	12.6	4.8	1.9
TOTALS FOR STUDY AREA	**10**	**174.4**	**1,016.3**	**72.0**	**38.3**

Source: HAZUS-MH MR4; FEMA Q3[9]

[8] The HAZUS flood model calculated loss estimates for riverine and coastal flooding in Calhoun County. Calhoun County is the only county in the study area recognized by HAZUS-MH as a coastal county.

SECTION 5: FLOOD

Based on the vulnerability assessment, a flooding or storm surge event will have a substantial impact on the area, which could result in multiple fatalities, a complete shutdown of facilities for 30 or more days, or more than half of all property destroyed or substantially damaged.

NFIP Participation

Flood insurance offered through the National Flood Insurance Program (NFIP) is the best way for home and business owners to protect themselves financially against the flood hazard. Of the 27 jurisdictions in the GBRA Region, all participate in the NFIP with the exception of the City of Nordheim. The City of Nordheim, located in DeWitt County, does not participate due to a lack of funding and available resources to hire a floodplain administrator for the City.

As an additional indicator of floodplain management responsibility, communities may choose to participate in FEMA's Community Rating System (CRS). This is an incentive-based program that allows communities to undertake flood mitigation activities that go beyond NFIP requirements. Currently, no participating GBRA communities participate in CRS.

NFIP Compliance and Maintenance

In continuance of compliance with the NFIP, jurisdictions in the GBRA Region have developed mitigation actions or analyzed previous actions that relate to NFIP maintenance, compliance or public safety. These actions can be found in Section 20, for previous actions and Section 21, for new actions.

Flooding was identified by the majority of GBRA communities as a moderate or high risk hazard (see Section 4, Table 4-6). In addition many of the mitigation actions, both for communities that participated in the 2005 Plan and those participating in the Plan Update, were developed with flood mitigation in mind. A majority of flood actions address public awareness, public safety and flood reduction. These include disseminating NFIP brochures on availability of flood insurance in public libraries, and public meeting places. Some mitigation actions include the purchase of stream monitoring equipment, flood warning and siren systems to enhance public safety and awareness at low-water crossings, which are located throughout the GBRA Basin. Many GBRA communities cite loss of lives or rescues at low-water crossings during past flash flood events, prompting development of mitigation actions such as installing crossing arms and posting signs to prevent driving in swollen rivers and streams. The "Turn Around, Don't Drown" Program is also being embraced by jurisdictions as an important educational tool in NFIP communities. Additional actions related to flood are comprised of a variety of stormwater projects to reduce local flooding and buy out of flood-prone structures.

[9] FEMA digital Q3 flood data was used for Calhoun, Kendall, and Victoria counties, as well as the City of Cibolo in Guadalupe County.

Basin-wide, communities recognize the need and are adopting higher NFIP regulatory standards to further minimize flood risk in their community. Cross-training key floodplain management personnel, including code enforcement and permit officials has been undertaken, and many communities are encouraging Floodplain Managers to seek Certified Floodplain Manager (CFM) Certification through the Texas Floodplain Manager's Association (TFMA).

The prioritization method for implementing actions was based on FEMA's STAPLE+E criteria and included social, technical, administrative, political, legal, economic and environmental considerations. As a result of this exercise, an overall priority was assigned to each mitigation action by each Team member. The overall priority of each action is reflected in the mitigation actions found in Sections 21 for both GBRA and local jurisdictions. In prioritizing actions a community must consider many factors. Of primary consideration is targeting specific mitigation actions for implementation following a major disaster. Other factors that determine prioritization are, in part, ease of implementation by the community, cost of the project vs. perceived benefit, timeframe for implementing the action, and available personnel to oversee and implement the project.

Table 5-8 details compliance and maintenance procedures for each of the GBRA jurisdictions, with the exception of the City of Nordheim, which does not participate in the NFIP.

Table 5-8. Community Participation in the NFIP

JURISDICTION	NFIP COMPLIANCE/MAINTENANCE
Caldwell County	**Require permitting and review to ensure structures are not developed in the floodplain**
Lockhart	Develop and implement public awareness on dangers of flooding; review permitting; maintain inspections and record-keeping process
Luling	Implement public awareness; develop plan to review permitting; inspections and record-keeping process
Martindale	Create plan to reduce impact of storm water and flooding
Calhoun County	**Promote NFIP flood insurance; flood awareness program**
Point Comfort	Add stormwater and detention to reduce flooding; store records above BFE
Port Lavaca	Develop flood awareness program
Seadrift	Improve drainage and reduce flooding of structures, roadways
DeWitt County	**Update flood maps; prohibit dumping in floodplain areas**
Cuero	Update flood maps; improve drainage through stormwater projects
Nordheim (not participating)	N/A; limited resources or staff to participate in NFIP at this time
Yoakum	Reduce urban flooding with channel and stormwater projects;
Yorktown	Clear debris from creeks; update FEMA flood maps as technical partner
Gonzales County	**Cross train inspectors in NFIP requirements; install stream monitors for flooding**
Gonzales	Install stream monitors and rain gauges for flood prevention/awareness

JURISDICTION	NFIP COMPLIANCE/MAINTENANCE
Nixon	Develop flood awareness program; review NFIP Program processes
Waelder	Develop GIS system for tracking high water marks; initiate public awareness
Cibolo (Guadalupe County)	Acquire land to provide flood conveyance; construct drainage improvements
Kendall County	**Develop stormwater improvements; signage to address flash flooding; permit review**
Boerne	Implement public awareness projects at low water crossings
Refugio County	**Implement public awareness; purchase early flood warning system**
Austwell	Implement public awareness and purchase early flood warning system
Bayside	Purchase early warning alert system for flood; promote flood insurance
Refugio	Develop public awareness and purchase voice alert system for flood warning
Woodsboro	Purchase flood early warning system; educate public on flood safety
Victoria County	**Require continuing education for floodplain administrator; implement flood outreach program; reduce flooding through draining improvements**
Victoria	Prohibit dumping in floodprone areas; install flood gauges at low water crossings

Repetitive Loss

The Severe Repetitive Loss (SRL) Grant Program under FEMA provides federal funding to assist states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to severe repetitive loss residential structures insured under the NFIP. The Texas Water Development Board (TWDB) administers the SRL grant program for the State of Texas.

Severe Repetitive Loss properties are defined as residential properties that are:

- covered under the NFIP and have at least four flood related damage claim payments (building and contents) over $5,000.00 each, and the cumulative amount of such claims payments exceed $20,000; or
- for which at least two separate claim payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

In either scenario, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.[10] Table 5-9 shows repetitive loss and severe repetitive loss properties by county.

[10] Source: Texas Water Development Board

Table 5-9. Repetitive Loss and Severe Repetitive Loss Properties

COUNTY	JURISDICTION	REPETITIVE LOSS #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SEVERE REPETITIVE LOSS[11]	COMMENTS
Caldwell	Caldwell County	No repetitive loss properties						
	Lockhart	No repetitive loss properties						
	Luling	No repetitive loss properties						
	Martindale	0118662	Y	Residential	2	39,165.09		
	Martindale	0117338	N	Residential	2	18,365.88		
Calhoun	Calhoun County	0005829	N	Residential	2	4,545.21		
	Calhoun County	0018577	N	Residential	2	3,371.77		
	Calhoun County	0025511	N	Residential	2	23,403.25		
	Calhoun County	0124431	N	Residential	2	2,717.13		
	Calhoun County	0018590	N	Residential	3	12,627.71		
	Calhoun County	0088602	N	Residential	2	21,147.60		
	Calhoun County	0172198	Y	Residential	2	21,491.74		
	Calhoun County	0124375	Y	Commercial	2	31,771.82		
	Calhoun County	0124918	N	Residential	2	25,516.58		
	Calhoun County	0128187	Y	Residential	3	39,185.41		
	Calhoun County	0128206	Y	Residential	3	33,057.88		
	Calhoun County	0111390	N	Commercial	3	26,658.24		
	Calhoun County	0123947	Y	Residential	2	12,197.81		
	Calhoun County	0183697	Y	Residential	2	25,362.38		
	Calhoun County	0068034	N	Residential	2	4,682.73		
	Calhoun County	0127387	Y	Commercial	3	64,814.25		
	Calhoun County	0025507	N	Residential	2	25,836.03		
	Calhoun County	0097020	Y	Residential	4	49,327.99		
	Calhoun County	0123940	N	Residential	2	13,514.94		
	Calhoun County	0125055	N	Residential	2	17,768.63		
	Calhoun County	0126859	N	Residential	2	5,514.27		
	Calhoun County	0026665	N	Residential	5	15,720.36		
	Calhoun County	0012905	N	Residential	3	7,706.86		

[11] In this column: "V" stands for "Validated"; "VN" stands for "Validated Nonresidential"; and "PN" stands for "Pending Nonresidential".

COUNTY	JURISDICTION	REPETITIVE LOSS #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SEVERE REPETITIVE LOSS[11]	COMMENTS
	Calhoun County	0124411	Y	Residential	2	4,808.64		
	Calhoun County	0124417	Y	Commercial	2	3,919.68		
	Calhoun County	0098923	N	Residential	2	18,623.92		
	Point Comfort	No repetitive loss properties						
	Port Lavaca	0039789	N	Residential	2	10,358.77		
	Port Lavaca	0117098	Y	Commercial	2	41,650.04		
	Port Lavaca	0113812	N	Residential	2	36,614.51		
	Port Lavaca	0050607	N	Commercial	2	25,316.46		
	Port Lavaca	0050608	N	Commercial	2	13,844.40		
	Port Lavaca	0050609	N	Commercial	2	15,841.60		
	Port Lavaca	0169574	Y	Commercial	2	15,346.77		
	Seadrift	0125499	Y	Residential	2	65,707.84		
DeWitt	DeWitt County	0005805	N	Residential	6	157,269.15	VU	
	DeWitt County	0003189	N	Residential	3	84,252.35		
	DeWitt County	0004424	N	Residential	2	5,206.95		
	DeWitt County	0068582	N	Residential	2	73,341.14	PU	
	DeWitt County	0068581	Y	Residential	5	89,090.52	V	
	DeWitt County	0118728	SDF	Residential	2	98,436.26	V	
	DeWitt County	0136039	N	Residential	2	49,343.55		
	DeWitt County	0054663	N	Residential	2	23,542.94		
	DeWitt County	0133504	Y	Residential	2	74,588.48		
	DeWitt County	0003921	SDF	Residential	5	45,429.50	V	
	DeWitt County	0099046	N	Residential	2	118,048.92		
	DeWitt County	0008033	SDF	Residential	11	142,382.43	V	
	DeWitt County	0068580	N	Residential	3	195,906.52	PU	
	DeWitt County	0005531	N	Residential	2	23,809.35		
	DeWitt County	0003128	N	Residential	4	100,774.12	VU	
	DeWitt County	0068661	N	Residential	3	63,755.86		
	DeWitt County	0003126	N	Residential	2	16,005.06		
	DeWitt County	0122251	N	Residential	2	19,277.43		
	DeWitt County	0138429	Y	Residential	2	30,374.93		
	DeWitt County	0099079	N	Residential	2	35,881.64		
	DeWitt County	0121280	Y	Residential	3	45,854.81		
	DeWitt County	0003315	N	Residential	3	24,424.57		
	Cuero	0118793	N	Residential	3	67,224.60		

COUNTY	JURISDICTION	REPETITIVE LOSS #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SEVERE REPETITIVE LOSS[11]	COMMENTS
	Cuero	0097076	N	Residential	2	100,571.76		
	Cuero	0098423	Y	Residential	2	19,516.49		
	Nordheim	No repetitive loss properties						
	Yoakum	No repetitive loss properties						
	Yorktown	No repetitive loss properties						
Gonzales	Gonzales County	0118744	N	Residential	4	129,646.95		
	Gonzales County	0101087	N	Residential	2	12,325.03		
	Gonzales County	0013094	Y	Residential	4	38,597.31		
	Gonzales County	0173546	Y	Residential	2	110,564.24		
	Gonzales County	0135505	N	Residential	2	63,756.41	VU	
	Gonzales County	0173393	SDF	Residential	2	384,512.16	V	
	Gonzales County	0118442	Y	Residential	3	79,482.27		
	Gonzales County	0006783	N	Residential	3	35,040.70		
	Gonzales County	0133514	Y	Residential	2	9,673.93		
	Gonzales County	0135405	SDF	Commercial	2	33,205.07	PN	
	Gonzales County	0136249	Y	Residential	2	32,075.36		
	Gonzales County	0123429	SDF	Residential	3	61,538.80	V	
	Gonzales County	0134936	N	Residential	2	60,750.88		
	Gonzales County	0135463	N	Residential	2	146,208.56		
	Gonzales County	0135091	N	Residential	2	7,626.16		
	Gonzales County	0136632	Y	Residential	2	84,382.61		
	Gonzales County	0137573	Y	Residential	2	107,695.62		
	Gonzales County	0134782	N	Residential	2	67,346.19		
	Gonzales County	0134930	SDF	Residential	2	91,900.38	V	
	Gonzales County	0134929	Y	Residential	3	198,768.42		
	Gonzales County	0133518	Y	Residential	2	22,368.85		
	Gonzales	0173226	Y	Residential	2	69,870.68		
	Gonzales	0138221	N	Residential	2	148,219.42		
	Gonzales	0123097	N	Residential	4	31,956.53		
	Gonzales	0166150	Y	Commercial	2	30,286.14		
	Nixon	No repetitive loss properties						
	Waelder	No repetitive loss properties						
	Cibolo (Guadalupe County)	0128718	Y	Residential	2	44186.1		
Kendall	Kendall County	0006610	N	Residential	4	77,877.35	PU	
	Kendall County	0118514	Y	Residential	2	129,276.81		
	Kendall County	0118637	Y	Residential	2	117,241.48		

COUNTY	JURISDICTION	REPETITIVE LOSS #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SEVERE REPETITIVE LOSS[11]	COMMENTS
	Kendall County	0118666	N	Residential	2	48,830.94		
	Kendall County	0173390	Y	Residential	2	82,699.92		
	Kendall County	0118840	Y	Residential	2	152,277.22		
	Kendall County	0173392	Y	Residential	2	92,611.52		
	Kendall County	0068518	Y	Residential	4	47,010.35		
	Kendall County	0173182	Y	Residential	2	13,424.31		
	Kendall County	0173609	Y	Residential	2	46,113.04		
	Kendall County	0173726	Y	Residential	2	83,749.51		
	Kendall County	0055118	N	Residential	2	29,811.67		
	Boerne	0116797	Y	Commercial	4	34,229.66		
	Boerne	0111175	SDF	Residential	4	41,830.55	V	
Refugio	Refugio County	No repetitive loss properties						
	Austwell	No repetitive loss properties						
	Bayside	No repetitive loss properties						
	Refugio	No repetitive loss properties						
	Woodsboro	No repetitive loss properties						
Victoria	Victoria County	0004648	N	Residential	4	32,666.95	PU	
	Victoria County	0135068	N	Commercial	2	12,900.00		
	Victoria County	0136022	Y	Residential	2	122,396.11		
	Victoria County	0072259	N	Residential	2	69,653.47		
	Victoria County	0089410	N	Residential	5	180,309.30	PU	
	Victoria County	0042994	SDF	Residential	6	232,239.49	V	
	Victoria County	0050106	N	Commercial	2	2,317.23		
	Victoria County	0088557	Y	Residential	5	58,255.86		
	Victoria County	0088555	N	Residential	3	27,768.12		
	Victoria County	0043177	N	Residential	2	6,108.09		
	Victoria County	0089900	SDF	Residential	6	65,281.17	V	
	Victoria County	0089952	SDF	Residential	4	254,385.40	V	
	Victoria County	0070087	N	Residential	2	161,000.00		
	Victoria County	0088563	N	Residential	2	28,747.98		
	Victoria County	0134934	Y	Residential	2	53,997.49		
	Victoria County	0044798	Y	Residential	2	5,287.29		
	Victoria County	0069908	N	Residential	4	328,509.00	VU	
	Victoria County	0003330	N	Residential	3	70,372.33	PU	
	Victoria County	0136150	Y	Residential	2	131,173.95		
	Victoria County	0093934	N	Residential	3	76,656.09		

COUNTY	JURISDICTION	REPETITIVE LOSS #	INSURED?	BUILDING TYPE	LOSSES	TOTAL PAID	SEVERE REPETITIVE LOSS[11]	COMMENTS
	Victoria County	0070654	SDF	Residential	4	116,269.75	V	
	Victoria	0136021	N	Residential	2	10,944.80		
	Victoria	0067821	N	Residential	2	24,631.15		
	Victoria	0100168	N	Residential	2	4,934.29		
	Victoria	0136570	N	Residential	2	39,876.91		
	Victoria	0025137	Y	Residential	3	59,989.99		
	Victoria	0118578	N	Residential	3	74,427.98		
	Victoria	0096763	N	Residential	3	54,967.78		
	Victoria	0124430	Y	Residential	3	16,500.00		
	Victoria	0018606	Y	Residential	3	22,929.03		
	Victoria	0070027	SDF	Residential	3	59,226.75	V	
	Victoria	0038101	N	Residential	3	15,420.90		
	Victoria	0118508	SDF	Commercial	2	341,933.07	PN	
	Victoria	0044987	N	Residential	4	24,387.99		
	Victoria	0091007	N	Residential	3	267,616.11		
	Victoria	0071992	SDF	Residential	4	219,968.35	V	
	Victoria	0067823	SDF	Residential	6	363,639.23	V	
	Victoria	0124306	N	Residential	3	8,472.13		
	Victoria	0051395	N	Residential	3	9,970.70		
	Victoria	0135104	Y	Residential	2	20,598.52		
	Victoria	0135105	Y	Residential	2	16,175.98		
	Victoria	0122425	N	Residential	2	14,591.16		
	Victoria	0013005	N	Residential	4	63,894.80		

HURRICANE

Hazard Description 1
Hurricane Wind 2
Storm Surge 3
Location 4
Extent 8
Historical Occurrences 8
Hurricane Claudette 8
Tropical Storm Erin 9
Hurricane Ike 9
Probability of Future Events 9
Impact and Vulnerability 10

Hazard Description

According to the National Oceanic and Atmospheric Administration (NOAA), a hurricane is an intense tropical weather system of strong thunderstorms with well-defined surface circulation and maximum sustained winds of 74 mph or higher. In the Northern Hemisphere circulation of winds near the Earth's surface is counterclockwise.

A tropical depression intensifies into a tropical storm when maximum sustained winds increase to between 35-64 knots (39 – 73 mph). At these wind speeds the storm becomes more organized and circular in shape and it begins to resemble a hurricane. Tropical storms can be equally problematic without even becoming a hurricane. However, most of the problems a tropical storm causes stem from heavy rainfall, high winds and tidal surge in coastal communities. Incipient hurricane development is evident once barometric pressure (measured in millibars or inches) in the center decreases and winds increase. If atmospheric and oceanic conditions are favorable, the disturbance can intensify into a tropical depression.

When maximum sustained winds reach or exceed 39 mph, the system becomes a tropical storm. It is then given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. In 1979, a six-year rotating list of Atlantic storm names was adopted. The list alternates between male and female hurricane names. Storm names are used to facilitate geographic referencing, for

warning services, for legal issues and to reduce confusion when two or more tropical cyclones occur at the same time. Through a vote of the World Meteorological Organization Region IV Subcommittee, Atlantic cyclone names are "retired," when hurricanes result in substantial damage or death.

Hurricane Wind

Hurricanes are categorized according to the strength of their winds using the Saffir-Simpson Hurricane Scale (See Table 6-2). A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest. This scale only ranks wind speed, but lower category storms can inflict greater damage than higher category storms depending on where they strike, other weather they interact with, and how slow they move. As a prime example, Hurricane Ike, which struck GBRA in 2008 and is discussed herein, was ranked as a Category 2 storm, yet was one of the costliest natural disasters in Texas history[1].

The ingredients for a hurricane include a pre-existing weather disturbance, warm tropical oceans, moisture, and relatively light winds aloft. Persistent, favorable conditions can produce violent winds, destructive waves, torrential rains, and powerful floods. Annually, an average of ten tropical storms develop over the Atlantic Ocean, Caribbean Sea and the Gulf of Mexico. Many of these storms remain over the water and never impact the U.S. coastline. In an average year, six of these storms become hurricanes. In an average 3-year period, roughly five hurricanes strike the US coastline, killing approximately 50 to 100 people anywhere from Texas to Maine. Of these, two are typically "major" or "intense" hurricanes (a Category 3 or higher storm on the Saffir-Simpson Hurricane Scale).

Table 6-1 profiles the potential winds speeds in miles per hour (MPH) that could be expected in the study area during a hurricane event for various return periods.

Table 6-1. Average Hurricane Wind Speeds by Jurisdiction

JURISDICTION	WIND SPEED (MPH) PER RETURN PERIOD						
	10-Year	20-Year	50-Year	100-Year	200-Year	500-Year	1,000-Year
Caldwell County	**43**	**56**	**71**	**81**	**89**	**100**	**106**
Lockhart	40	53	68	77	86	97	104
Luling	43	56	70	81	89	99	106
Martindale	40	53	67	77	85	95	103
Calhoun County	**64**	**83**	**107**	**121**	**132**	**144**	**152**
Point Comfort	64	83	107	120	130	143	152
Port Lavaca	64	82	105	119	130	142	151
Seadrift	64	83	107	121	132	144	152

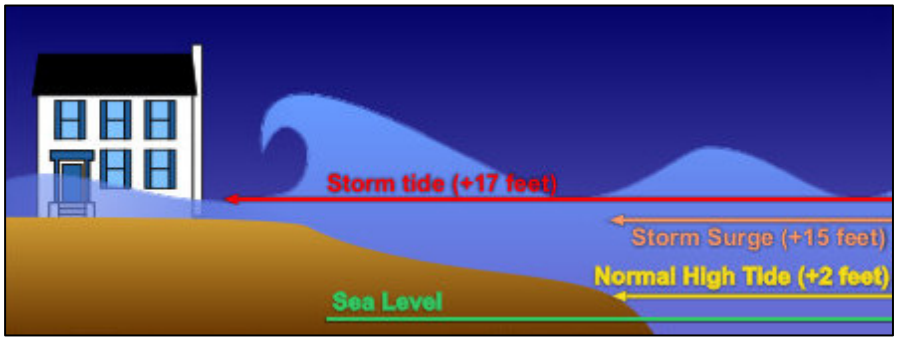
[1] FEMA. 2008. Hurricane Ike Impact Report. Department of Homeland Security, Federal Emergency Management Agency, Mitigation Division. Washington, D.C.

JURISDICTION	WIND SPEED (MPH) PER RETURN PERIOD						
	10-Year	20-Year	50-Year	100-Year	200-Year	500-Year	1,000-Year
DeWitt County	**50**	**65**	**82**	**94**	**103**	**113**	**121**
Cuero	51	66	84	95	105	115	123
Nordheim	49	64	81	93	102	112	120
Yoakum	51	66	83	95	103	114	121
Yorktown	50	65	83	94	104	115	122
Gonzales County	**45**	**59**	**75**	**85**	**94**	**104**	**111**
Gonzales	45	59	74	85	94	104	111
Nixon	44	58	74	84	93	104	110
Waelder	46	60	75	85	95	105	111
Cibolo (Guadalupe County)	38	51	65	75	84	94	101
Kendall County	**30**	**43**	**57**	**67**	**76**	**86**	**94**
Boerne	31	44	59	68	78	87	95
Refugio County	**60**	**78**	**101**	**116**	**127**	**138**	**145**
Austwell	62	80	105	119	130	142	149
Bayside	59	77	100	116	126	137	144
Refugio	59	77	100	115	125	136	144
Woodsboro	59	77	100	116	126	137	144
Victoria County	**58**	**74**	**96**	**108**	**119**	**130**	**138**
Victoria	57	74	95	108	118	130	137

Storm Surge

According to the National Hurricane Center, the greatest potential for loss of life related to a hurricane is from the storm surge. Low pressure and high circular winds “pile” the water into a dome shape that can be 50-100 miles wide. The surge travels with the storm and is most severe on the right side of the storm; relative to the direction the storm travels. Surge can be 15 feet deep, topped by waves and make landfall ahead of the eye. Wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with normal high tides. Because much of the United States' densely populated Atlantic and Gulf Coast coastlines lie less than 10 feet above mean sea level, the danger from storm tides is tremendous. Figure 6-1 on the following page is a diagram from the National Oceanic and Atmospheric Administration (NOAA) that depicts the possible level of storm surge, compared to sea level and a normal high tide

Figure 6-1. Diagram of Storm Surge (NOAA)



Recently researchers have advocated for the development of another scale for hurricanes specifically geared toward storm surge impact. This new scale would show differences in local bathymetry (the shallow Gulf waters off of Texas enhance storm surge while the deep ocean depths off of southeastern Florida inhibit surge). Although this scale presently does not exist, the NOAA is working to enhance the analysis and prediction of storm surge, as storm surge-induced flooding has killed more people in the United States in hurricanes than all other hurricane-related threats (freshwater flooding, winds and tornadoes) combined since 1900[2].

Location

Although the majority of counties in the GBRA region are located inland from the coast, they are still susceptible to the indirect threats of a hurricane, including high winds and flooding. The coastal counties, which include Refugio and Calhoun, can experience high-force winds, storm surge and flooding due to their location.

The effects of a hurricane begin to diminish as it moves inland; although no single area of the county is free of risk. For example, the winds alone from Hurricane Ike covered 120 miles, stretching across the county, but all areas were impacted by high winds and flooding. Figure 6-2 displays the location of hurricane risk by storm category along the Gulf Coast.

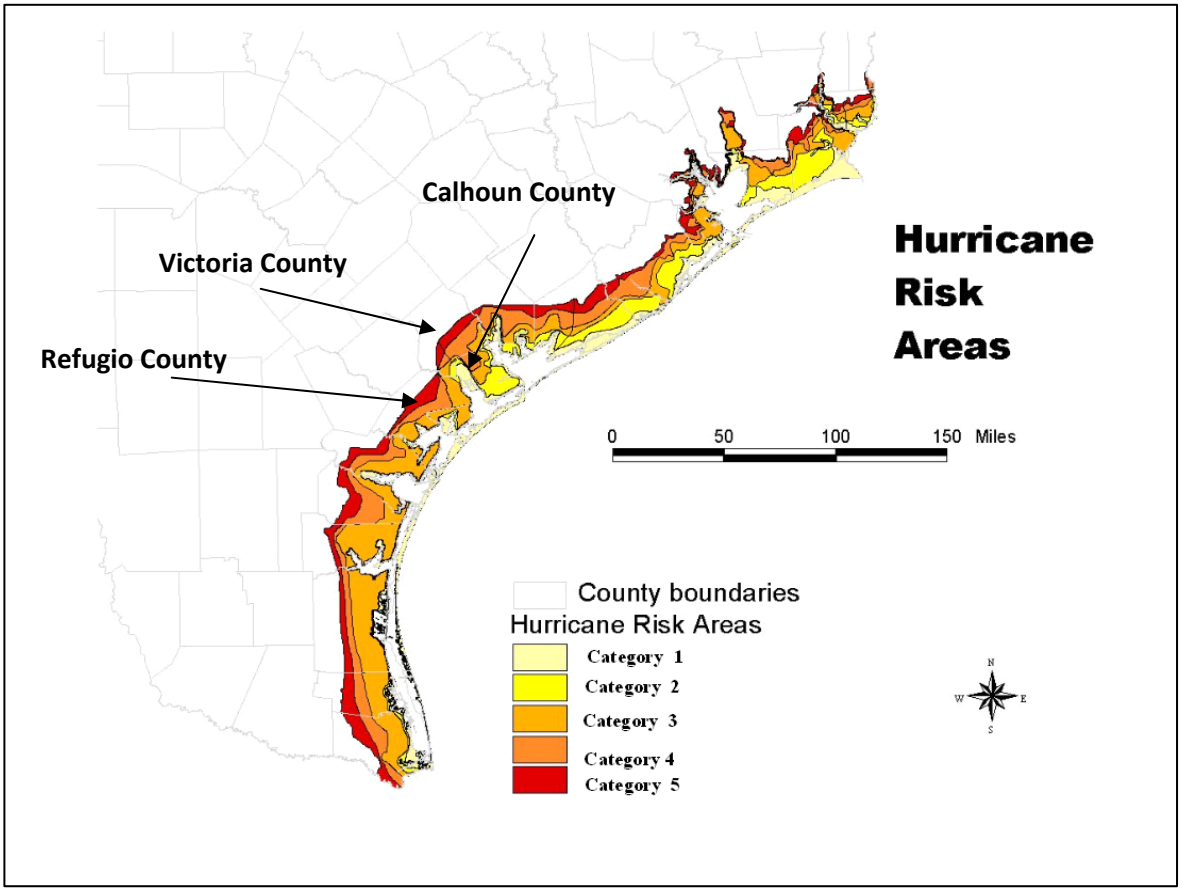
Figures 6-3 and 6-4 depict the coastal flood inundation zones where there is potential for damage to property and loss of life due to storm surge induced high velocity wave action for Calhoun County and Refugio County. Coastal flood inundation zone maps were derived from georeferenced data compiled by the National Weather Service (NWS). Storm surge data was provided from the NWS Sea, Lake and Overland Surges from Hurricanes (SLOSH) data (2009). SLOSH is a modeling tool used to estimate storm surge resulting from historical, hypothetical, or predicted hurricanes.

[2] Source: www.nhc.noaa.gov

SLOSH analysis represents the possible storm surge water level that an area may anticipate for a category of storm. A MOM (Maximum of Maximum) value (a composite measure that expresses the maximum storm surge elevation) for a Category 1 through Category 5 hurricane was used to determine the "surge" or water elevation for a particular area.

For Calhoun and Refugio counties, the Matagorda Bay 2007 (PS2) SLOSH basin was used. In these analyses a shapefile was extracted from the SLOSH Display package. Storm surge inundation areas were then overlaid with census block data, defining the potential maximum surge for coastal locations for each category of hurricane, as well as exposed populations, structures, and critical facilities located in those areas. It should be noted that HAZUS-MH MR4 does not recognize Victoria County as a coastal county. As such, storm surge losses could not be run. However, since the county has a small area of coastline, as illustrated in Figure 6-3, it could be susceptible to storm surge.

Figure 6-2. Hurricane Risk Areas[3]



[3] Source: State of Texas Hazard Mitigation Plan

Figure 6-3. Coastal Flood Inundation Zones in Calhoun County (NWS)

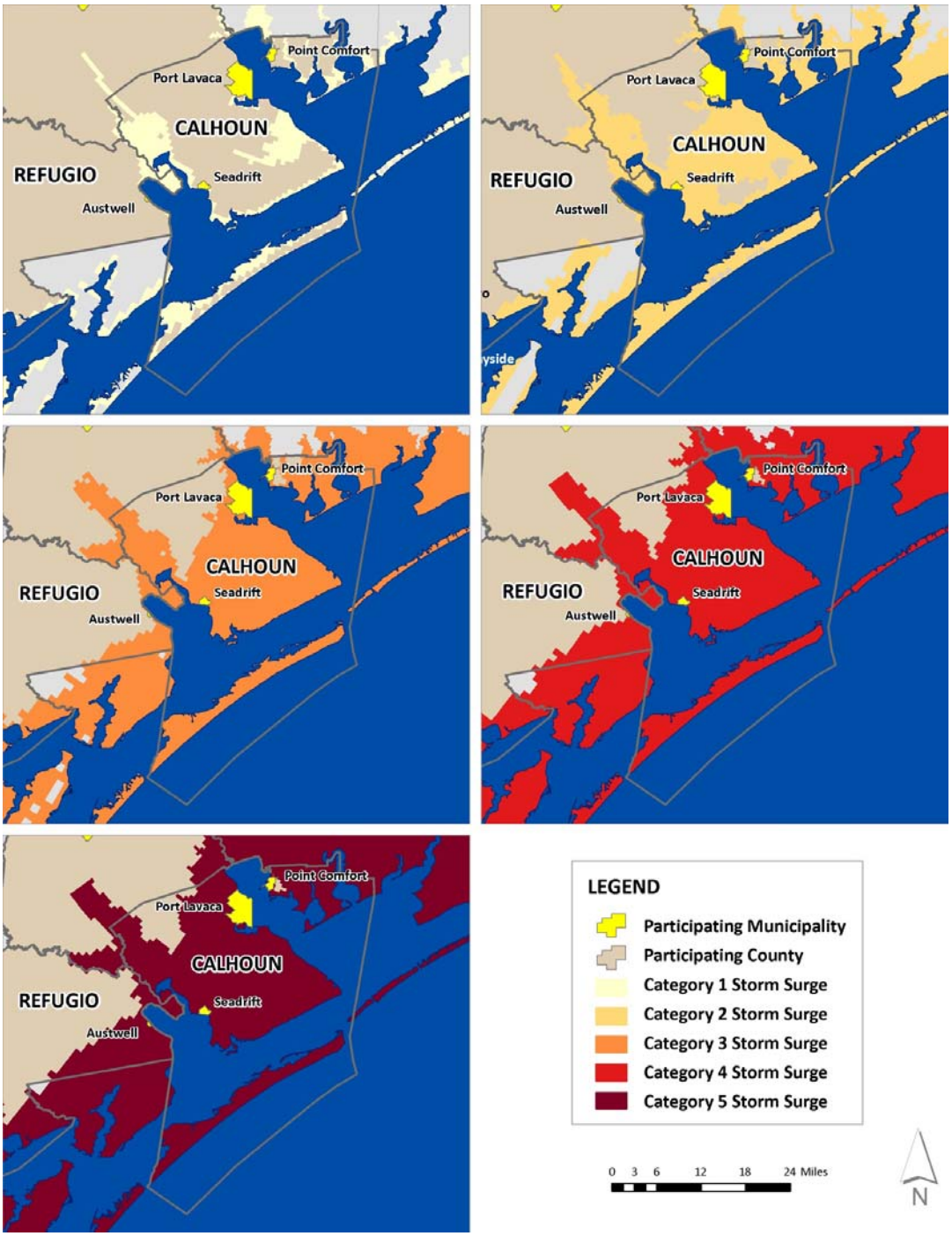
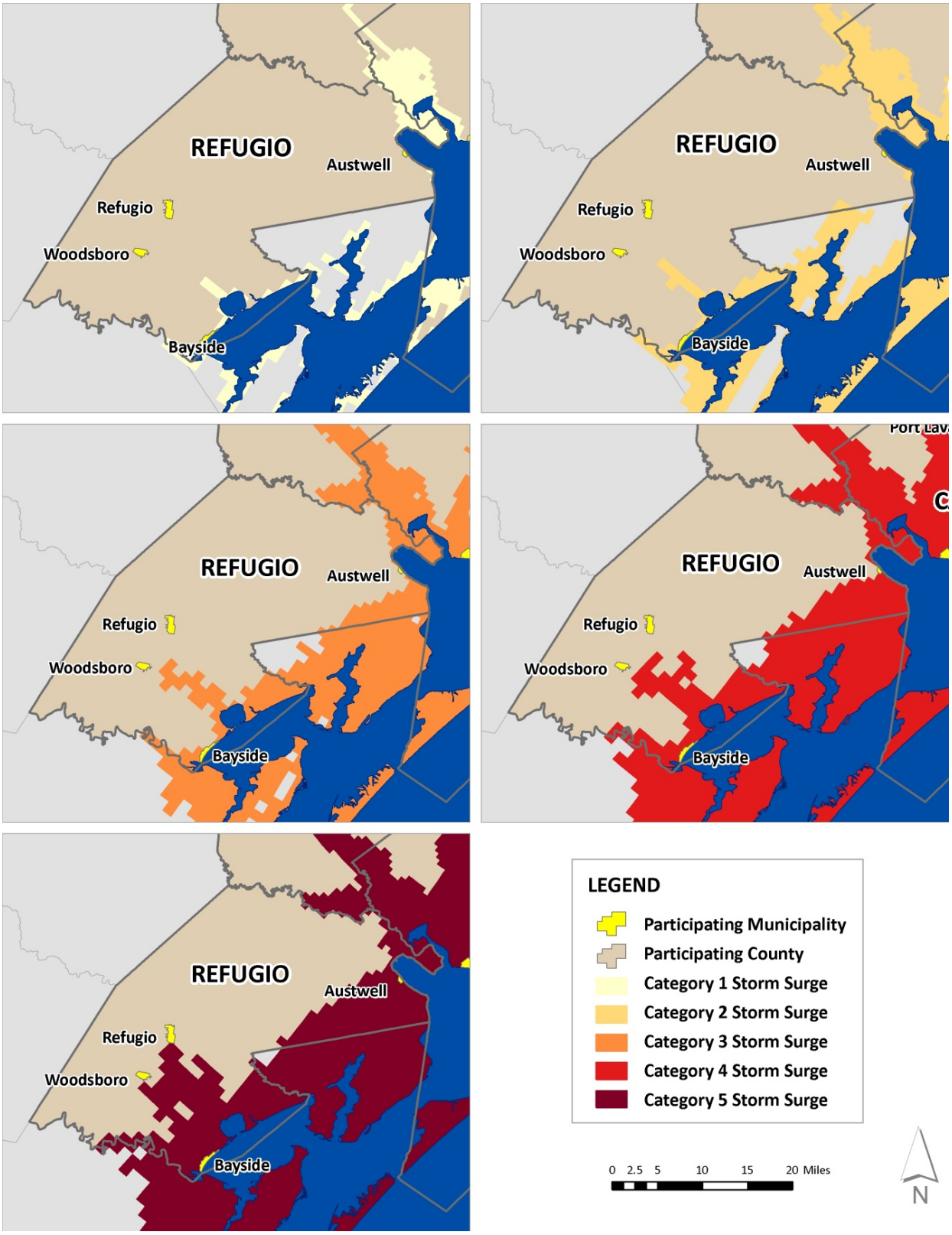


Figure 6-4. Coastal Flood Inundation Zones in Refugio County (NWS)



Extent

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential. Wind, pressure, and surge are combined to estimate potential damage. Categories 3, 4 and 5 are classified as "major" hurricanes. Major hurricanes comprise only 20 percent of total tropical cyclone landfalls but they account for over 70 percent of the damage in the United States. Damage from hurricanes can result from spawned tornadoes, coastal flooding from storm surge, and inland flooding from heavy rainfall. Table 6-2 depicts hurricane magnitude and intensity in terms of storm surge and wind speed.

Table 6-2
Saffir-Simpson Scale

CATEGORY	MAXIMUM SUSTAINED WIND SPEED (MPH)	MINIMUM SURFACE PRESSURE (MILLIBARS)	STORM SURGE (FEET)
1	74–95	Greater than 980	3–5
2	96–110	979–965	6–8
3	111–130	964–945	9–12
4	131–155	944–920	13–18
5	155 +	Less than 920	19+

Source: National Hurricane Center

According to NOAA's 2010 Atlantic Hurricane Season Outlook, there is an 85 percent chance of an above normal season. The outlook reflects an expected set of conditions that is very conducive to increased tropical cyclone activity. Most storms form later in hurricane season from August to October.

Historical Occurrences

Hurricane Claudette

Calhoun and Refugio counties were among those impacted by Hurricane Claudette on July 15, 2003. Tropical Storm Claudette entered the Gulf of Mexico on Friday July 12, 2003. Relaxed steering currents produced tropical storm force winds, heavy rains and wave heights up to 15 feet. As early as Sunday July 13th large swells were reaching the sand dunes on Padre Island. Claudette made landfall as a Category 1 hurricane near Port O'Connor, Texas on July 15, 2003. Just prior to landfall storm surge was 5 feet at Port O'Connor in combination with high astronomical tides. Wind speeds ranged from 65-90 mph with gusts to 100 mph.

Claudette produced a brief tornado in Port Lavaca. Damage was not attributed directly to this tornado, rather to the hurricane winds. Claudette continued inland across Victoria, Goliad and Bee counties weakening to a Tropical Storm.

Damages for all of Texas stood at 45.7 million dollars in uninsured losses and 90.0 million in insured losses. These losses do not include crop damage. In the State of Texas two indirect fatalities were also attributed to Claudette and six indirect injuries. Over twenty thousand homes were damaged across the affected area, most of which was classified as minor damage in Victoria County. Over six hundred homes received major damage, again most of which occurred in Victoria County. Over sixty homes were completely destroyed, mostly in Calhoun County. The heaviest rainfall fell across Bee, Goliad and Refugio Counties with four to six inch amounts.

Tropical Storm Erin

Calhoun and Refugio counties were affected by Tropical Storm Erin as it made landfall near Rockport and Lamar, Texas on August 16, 2007. The highest sustained wind speed over land was 21 knots, gusting at 40 knots. Storm tides exceeded two feet and caused minor beach erosion around Seadrift and Port Lavaca. Rainfall ranged from two to four inches across Calhoun, northern Refugio, northern Aransas, Victoria, Goliad, northern Bee and far northern Live Oak counties.

Hurricane Ike

Even though only a Category 2 Storm at landfall, Hurricane Ike, which made landfall in Galveston on September 13, 2008, is ranked as the third most destructive to ever make landfall in the United States.[4] Maximum sustained winds were 100 mph, with hurricane force winds extending outward up to 120 miles from the center and tropical storm force winds extending outward up to 275 miles. Damages are still being estimated but will total in the tens of billions of dollars. Calhoun County experienced heavy winds and rain and a storm surge of four to five feet. The county was designated for Public Assistance by FEMA.

Probability of Future Events

Hurricanes occur in seasonal patterns between June 1 and November 30. Warning time for hurricanes has lengthened due to modern and early warning technology. Based on historical frequency of significant hurricane wind and surge events, the probability of future events to expect is one every 25 years. The probability of such an event in the coastal counties of Calhoun, Refugio and Victoria is unlikely for an annual frequency. However, an event is highly likely on a 25 year frequency.

4 FEMA. 2008. Hurricane Ike Impact Report. Department of Homeland Security, Federal Emergency Management Agency, Mitigation Division. Washington, D.C.

Impact and Vulnerability

The potential severity of hurricane wind impact in the planning area is indicated by the projected loss of function for each jurisdiction. A 100 year hurricane wind is projected to inflict the greatest loss of function of essential facilities to the populated coastal areas of Refugio, Calhoun and Victoria Counties.

Coastal communities are vulnerable to threats directly and indirectly related to hurricane winds, surge and flooding. While the brunt of the storm may remain for those communities on the coast and 150 miles inland, it is possible for the storm to move further inland. A Gulf Coast storm may produce heavy rainfall and cause severe flooding in areas as far north as Ohio. Winds over flat open terrain will take longer to decrease, which can lead to substantial damage as far inland as the Great Plains, the Mid-West or the Eastern Seaboard, depending on the path and interactions with other terrestrial weather systems. Areas of primary impact in the planning area would include coastlines of Calhoun, Refugio and Victoria counties. Low lying coastal areas will flood. Communities along rivers, bays, and estuaries may flood before higher inland areas. Beach front communities will bear the brunt of the strongest hurricane winds. Inland locations in the GBRA Region will be impacted by hurricane winds that may have picked up potentially threatening objects (projectiles).

Hurricane-force winds can easily destroy poorly constructed buildings and mobile homes. Debris such as signs, roofing material, and small items left outside become extremely hazardous in hurricanes. Extensive damage to trees, towers, water and underground utility lines (from uprooted trees), and fallen poles cause considerable civic disruption. In a tropical storm or hurricane, the potential severity of impact is a measure of storm effects such as injuries, critical facility shut down and property damage. Annually, bands of rain from Gulf of Mexico tropical systems will fall in the area. These impacts are limited. Impacts are substantial where the storm makes landfall. When storms make landfall they can have a substantial impact, resulting in fatalities, a complete shutdown of critical facilities, and more than 50 percent of property destroyed or with major damage. Potential losses due to storm surge and hurricane winds are distinct and presented in Tables 6-3 and 6-4.

Table 6-3. Estimated Potential Exposure for Hurricane Storm Surge in Coastal Jurisdictions

JURISDICTION	TOTAL NUMBER OF PEOPLE IN JURISDICTION	NUMBER OF PEOPLE EXPOSED TO SURGE HAZARD	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION	NUMBER OF BUILDINGS EXPOSED TO STORM SURGE	TOTAL ESTIMATED BUILDING LOSS FROM STORM SURGE
Calhoun County					
Category 1	6,481	3,127	$609,016,000	3,742	$418,250,000
Category 2		4,221		4,504	$489,128,000
Category 3		5,659		5,090	$560,406,000
Category 4		6,480		5,457	$607,975,000

JURISDICTION	TOTAL NUMBER OF PEOPLE IN JURISDICTION	NUMBER OF PEOPLE EXPOSED TO SURGE HAZARD	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION	NUMBER OF BUILDINGS EXPOSED TO STORM SURGE	TOTAL ESTIMATED BUILDING LOSS FROM STORM SURGE
Category 5		**6,481**		**5,458**	**$608,115,000**
Point Comfort					
Category 1	781	169	$80,897,000	105	$25,650,000
Category 2		169		105	$25,650,000
Category 3		733		434	$76,960,000
Category 4		781		462	$80,897,000
Category 5		781		462	$80,897,000
Port Lavaca					
Category 1	12,035	1,943	$651,340,000	800	$119,146,000
Category 2		3,816		1,709	$227,970,000
Category 3		12,035		5,348	$651,340,000
Category 4		12,035		5,348	$651,340,000
Category 5		12,035		5,348	$651,340,000
Seadrift					
Category 1	1,350	627	$62,036,000	446	$29,882,000
Category 2		1,350		948	$62,036,000
Category 3		1,350		948	$62,036,000
Category 4		1,350		948	$62,036,000
Category 5		1,350		948	$62,036,000
Refugio County					
Category 1	**2,670**	**299**	**$149,487,000**	**156**	**$18,778,000**
Category 2		**376**		**202**	**$22,459,000**
Category 3		**642**		**355**	**$38,076,000**
Category 4		**789**		**439**	**$45,833,000**
Category 5		**1,038**		**578**	**$60,047,000**
Austwell					
Category 1	192	16	$28,397,000	12	$956,000
Category 2		16		12	$956,000
Category 3		16		12	$956,000
Category 4		122		132	24,977,000
Category 5		192		176	$28,397,000
Bayside					
Category 1	360	216	$26,026,000	191	$15,891,000
Category 2		216		191	$15,891,000
Category 3		320		273	$23,461,000
Category 4		360		304	$26,026,000

JURISDICTION	TOTAL NUMBER OF PEOPLE IN JURISDICTION	NUMBER OF PEOPLE EXPOSED TO SURGE HAZARD	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION	NUMBER OF BUILDINGS EXPOSED TO STORM SURGE	TOTAL ESTIMATED BUILDING LOSS FROM STORM SURGE
Category 5		360		304	$26,026,000
Refugio					
Category 1		0		0	$0
Category 2		0		0	$0
Category 3	2,920	0	$186,843,000	0	$0
Category 4		0		0	$0
Category 5		0		0	$0
Woodsboro					
Category 1		0		0	$0
Category 2		0		0	$0
Category 3	1,683	0	$78,606,000	0	$0
Category 4		0		0	$0
Category 5		0		0	$0

HAZUS-MH wind speed data, inventory and damage functions, and methodology were used to determine the annual expected loss at the county level. Table 6-4 shows annualized property losses and annualized percent loss ratios by jurisdiction, and Table 6-5 shows the expected damage to critical facilities by jurisdiction.

Table 6-4. Potential Annualized Losses by Jurisdiction (Hurricane Wind)

JURISDICTION	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION	ANNUALIZED LOSS (AL) FOR RESIDENTIAL	ANNUALIZED LOSS (AL) FOR COMMERCIAL	ANNUALIZED LOSS (AL) FOR INDUSTRIAL	TOTAL ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	**$605,797,000**	**$124,000**	**Negligible**	**Negligible**	**$129,000**	**0.02%**
Lockhart	$618,183,000	$95,000	$7,000	Negligible	$103,000	0.02%
Luling	$264,373,000	$53,000	$6,000	Negligible	$60,000	0.02%
Martindale	$40,522,000	$8,000	Negligible	Negligible	$8,600	0.02%
Calhoun County	**$609,016,000**	**$3,270,000**	**$160,000**	**$244,000**	**$3,674,000**	**0.60%**
Point Comfort	$80,897,000	$289,000	$25,000	$54,000	$368,000	0.45%
Port Lavaca	$651,340,000	$2,329,000	$275,000	$54,000	$2,658,000	0.41%
Seadrift	$62,036,000	$294,000	$21,000	Negligible	$317,000	0.51%
DeWitt County	**$469,085,000**	**$409,000**	**$12,000**	**$12,000**	**$433,000**	**0.09%**
Cuero	$412,893,000	$258,000	$44,000	$9,000	$311,000	0.08%
Nordheim	$25,111,000	$21,000	Negligible	Negligible	$21,900	0.09%

JURISDICTION	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION	ANNUALIZED LOSS (AL) FOR RESIDENTIAL	ANNUALIZED LOSS (AL) FOR COMMERCIAL	ANNUALIZED LOSS (AL) FOR INDUSTRIAL	TOTAL ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Yoakum	$370,136,000	$209,000	$32,000	$10,000	$251,000	0.07%
Yorktown	$127,049,000	$103,000	$10,000	Negligible	$116,000	0.09%
Gonzales County	**$457,255,000**	**$191,000**	**$10,000**	**Negligible**	**$204,000**	**0.04%**
Gonzales	$401,785,000	$81,000	$11,000	Negligible	$94,000	0.02%
Nixon	$94,690,000	$30,000	Negligible	Negligible	$32,700	0.03%
Waelder	$37,972,000	$15,000	Negligible	Negligible	$15,400	0.04%
Cibolo (Guadalupe County)	$221,273,000	$46,000	Negligible	Negligible	$51,000	0.02%
Kendall County	**$1,181,519,000**	**$73,000**	**Negligible**	**Negligible**	**$78,000**	**0.01%**
Boerne	$494,789,000	$22,000	Negligible	Negligible	$26,000	0.01%
Refugio County	**$ 149,487,000**	**$674,000**	**$17,000**	**$14,000**	**$705,000**	**0.47%**
Austwell	$28,397,000	$63,000	Negligible	Negligible	$67,000	0.24%
Bayside	$26,026,000	$137,000	Negligible	Negligible	$139,500	0.54%
Refugio	$186,843,000	$546,000	$77,000	$22,000	$645,000	0.35%
Woodsboro	$78,606,000	$365,000	$10,000	Negligible	$379,000	0.48%
Victoria County	**$1,174,737,000**	**$2,956,000**	**$156,000**	**$64,000**	**$3,176,000**	**0.27%**
Victoria	$3,942,383,000	$5,519,000	$791,000	$112,000	$6,422,000	0.16%
TOTALS FOR STUDY AREA[5]	**$12,812,200,000**	**$18,180,000**	**$1,685,800**	**$619,300**	**$20,485,100**	**0.16%**

Table 6-5. Critical Facilities Potentially Damaged by Hurricane Wind

JURISDICTION	TOTAL ESTIMATED NUMBER OF ESSENTIAL FACILITIES	100-YEAR HURRICANE WIND			500-YEAR HURRICANE WIND		
		Loss of Function	Partially Functional	Fully Functional	Loss of Function	Partially Functional	Fully Functional
Caldwell County	**9**	**0**	**0**	**9**	**0**	**0**	**9**
Lockhart	12	0	0	12	0	0	12
Luling	7	2	0	5	7	0	0
Martindale	0	0	0	0	0	0	0
Calhoun County	**3**	**3**	**0**	**0**	**3**	**0**	**0**
Point Comfort	2	2	0	0	2	0	0
Port Lavaca	18	18	0	0	18	0	0

[5] Totals for the study area may include values less than $5,000 for amounts that are classified as "Negligible" in the table.

JURISDICTION	TOTAL ESTIMATED NUMBER OF ESSENTIAL FACILITIES	100-YEAR HURRICANE WIND			500-YEAR HURRICANE WIND		
		Loss of Function	Partially Functional	Fully Functional	Loss of Function	Partially Functional	Fully Functional
Seadrift	3	3	0	0	3	0	0
DeWitt County	**4**	**4**	**0**	**0**	**4**	**0**	**0**
Cuero	12	5	0	7	12	0	0
Nordheim	1	1	0	0	1	0	0
Yoakum	8	3	0	5	8	0	0
Yorktown	4	4	0	0	4	0	0
Gonzales County	**5**	**3**	**0**	**2**	**4**	**0**	**1**
Gonzales	10	3	0	7	10	0	0
Nixon	6	1	0	5	6	0	0
Waelder	2	0	0	2	2	0	0
Cibolo (Guadalupe County)	6	3	0	3	6	0	0
Kendall County	**11**	**0**	**0**	**11**	**0**	**0**	**11**
Boerne	10	0	0	10	0	0	10
Refugio County	**4**	**4**	**0**	**0**	**4**	**0**	**0**
Austwell	0	0	0	0	0	0	0
Bayside	0	0	0	0	0	0	0
Refugio	7	7	0	0	7	0	0
Woodsboro	4	4	0	0	4	0	0
Victoria County	**20**	**20**	**0**	**0**	**20**	**0**	**0**
Victoria	**36**	36	0	0	36	0	0
TOTALS FOR STUDY AREA	**204**	**126**	**0**	**78**	**161**	**0**	**43**

Source: HAZUS-MH

THUNDERSTORM

Hazard Description 1
Location 1
Extent 2
Historical Occurrences 3
Probability of Future Events 4
Impact and Vulnerability 4

Hazard Description

Severe storms are generally considered a common occurrence in the GBRA Basin. Typical thunderstorms are 15 miles in diameter and lasts an average of 30 minutes. Despite the short time span, thunderstorms can be extremely dangerous as they are often strong and fast in their approach and can be accompanied by flash flooding, lightning, hail, tornadoes, and high winds.

Lightning damage can result in electrocution of humans and animals; vaporization of materials along the path of the strike; fire caused by the high temperature produced by the strike; and sudden power surges that can damage electrical and electronic equipment. Millions of dollars of direct and indirect damages result from lightning strikes on electric utility substations and distribution lines. While property damage is the major hazard associated with lightning, it should be noted that lightning strikes kill nearly 100 people each year in the United States[1].

Location

Thunderstorms occur randomly, and therefore it is impossible to predict where they will strike within the City. Thus, it is assumed that the GBRA Basin is uniformly exposed to the threat of thunderstorms.

[1] National Weather Service

Extent

A severe thunderstorm is measured in terms of intensity based on the strength of the wind speeds or significant winds associated with the thunderstorm event. Table 7-1 depicts intensity for thunderstorms according to wind magnitude published by the World Meteorological Organization (WMO).

Table 7-1. Beaufort Wind Scale

FORCE	WIND (KNOTS)	WMO CLASSIFICATION	APPEARANCE OF WIND EFFECTS
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-18	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	19-24	Fresh Breeze	Small trees in leaf begin to sway
6	25-31	Strong Breeze	Larger tree branches moving, whistling in wires
7	32-38	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Whole trees in motion, resistance felt walking against wind
9	47-54	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	64-72	Violent Storm	If experienced on land, widespread damage
12	73+	Hurricane	Violence and destruction

A severe thunderstorm event is typically defined by the NCDC based on the intensity and magnitude of wind events associated with the thunderstorm, which can affect the planning area randomly. Because the magnitude of a severe thunderstorm does not take into account wind speeds from a hurricane or tornado (for specific information on hurricanes and tornado, see Sections 6 and 9, respectively), but specifically significant winds, the extent to which it can affect the planning area is a range from a Force 9 to a Force 12. On average, an intense wind event to be mitigated for each of the jurisdictions could have wind speeds ranging from 50 miles per hour, a Force 9 from the Beaufort Wind Scale. Since the greatest

wind speed recorded for the area is 95 knots (See Table 7-2), in preparation for a severe thunderstorm, the extent to be mitigated is a Force 12.

Historical Occurrences

Table 7-2 lists previous thunderstorm events as compiled by the National Climatic Data Center (NCDC). It is important to note that only thunderstorm events that have been reported have been factored into this risk assessment, and in most cases NCDC data is limited to severe thunderstorm events that are noteworthy for specific reasons (high winds, deaths, injuries, property or crop damages, lightning strikes). It is likely that a high number of thunderstorm occurrences have gone unreported over the past 50+ years.

Table 7-2. Historical Thunderstorm Events by Jurisdiction (NCDC, 1950-2009)

JURISDICTION	NUMBER OF REPORTED EVENTS	MAXIMUM WIND SPEED RECORDED (KNOTS)	DEATHS	INJURIES	REPORTED PROPERTY DAMAGE (2009 DOLLARS)	REPORTED CROP DAMAGE (2009 DOLLARS)
Caldwell County	**26**	**70**	**0**	**0**	**$1,069,849**	**$148,322**
Lockhart	8	80	0	0	$1,027,518	$75,724
Luling	7	60	0	0	$1,105,746	$80,013
Martindale	7	95	0	0	$15,777,482	Negligible
Calhoun County	**30**	**87**	**1**	**0**	**$7,365**	**Negligible**
Point Comfort	0	N/A	0	0	Negligible	Negligible
Port Lavaca	5	53	0	0	Negligible	Negligible
Seadrift	2	61	0	0	$7,572	Negligible
DeWitt County	**30**	**62**	**0**	**0**	**$9,365,893**	**$930,024**
Cuero	13	70	0	0	$612,371	$29,302
Nordheim	1	0	0	0	$98,390	$36,896
Yoakum	0	N/A	0	0	Negligible	Negligible
Yorktown	6	60	0	0	$220,575	$70,487
Gonzales County	**15**	**90**	**0**	**0**	**$288,265**	**Negligible**
Gonzales	10	60	0	0	$1,074,856	$75,724
Nixon	2	50	0	0	$7,148	Negligible
Waelder	0	N/A	0	0	Negligible	Negligible
Cibolo (Guadalupe County)	4	0	0	0	$94,074	Negligible
Kendall County	**15**	**75**	**0**	**1**	**$405,919**	**Negligible**

JURISDICTION	NUMBER OF REPORTED EVENTS	MAXIMUM WIND SPEED RECORDED (KNOTS)	DEATHS	INJURIES	REPORTED PROPERTY DAMAGE (2009 DOLLARS)	REPORTED CROP DAMAGE (2009 DOLLARS)
Boerne	8	60	0	0	$331,224	Negligible
Refugio County	**9**	**60**	**0**	**0**	**Negligible**	**Negligible**
Austwell	0	N/A	0	0	Negligible	Negligible
Bayside	1	50	0	0	Negligible	Negligible
Refugio	7	60	0	0	$7,572	$7,572
Woodsboro	1	N/A	0	0	Negligible	Negligible
Victoria County	**60**	**87**	**0**	**0**	**$7,572**	**$9,126**
Victoria	32	65	0	0	$100,614	$27,576
TOTALS FOR STUDY AREA[2]	**299**	**95**	**1**	**1**	**$31,610,005**	**$1,490,766**

Probability of Future Events

The probability of occurrence for future thunderstorms in the GBRA Basin is highly probable, meaning there is greater than a 75 percent chance of a storm occurring in any given year. According to the NCDC reported historical occurrences, areas within the Basin experiences a severe storm twice a year. Given this regular frequency of occurrence, it can be expected that future thunderstorms will continue to threaten life and cause minor[3] property damages throughout the Basin area.

Impact and Vulnerability

According to the available data for previous occurrences, high winds are common to the GBRA area when accompanied by thunderstorms. If another Beaufort event of 10 or higher were to occur, the Basin would be susceptible to structural damage to structural facilities, especially roofs and windows. Injuries may also occur as a result of debris that is carried by strong gusts or twigs and branches that are broken off from the force of the wind. Traffic disruptions may also occur as traffic lights could be damaged or flying debris could cause accidents on the road. This would hinder the ability of critical services staff to travel to and from work.

[2] Totals for the study area may include values less than $5,000 for dollar amounts that are classified as "Negligible" in the table.

[3] Minor damages mean the potential to destroy or substantially damage more than ten percent of property or shutdown facilities for one week.

To estimate thunderstorm losses, NOAA historical thunderstorm loss data was used to develop a thunderstorm stochastic model. In this model, losses were scaled to account for inflation and expected annualized losses were calculated through a non-linear regression of historical data. Table 7-3 shows potential annualized losses by jurisdiction. "Negligible" indicates that the annualized expected property losses are less than $5,000.

Table 7-3. Potential Annualized Losses by County (Thunderstorm)

JURISDICTION	TOTAL EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	**$605,797,000**	**$20,303**	**0.00%**
Lockhart	$618,183,000	$18,387	0.00%
Luling	$264,373,000	$19,763	0.01%
Martindale	$40,522,000	$262,958	0.65%
Calhoun County	**$609,016,000**	**Negligible**	**0.00%**
Point Comfort	$80,897,000	Negligible	0.00%
Port Lavaca	$651,340,000	Negligible	0.00%
Seadrift	$62,036,000	Negligible	0.00%
DeWitt County	**$469,085,000**	**$171,599**	**0.04%**
Cuero	$412,893,000	$10,695	0.00%
Nordheim	$25,111,000	Negligible	0.00%
Yoakum	$370,136,000	Negligible	0.00%
Yorktown	$127,049,000	Negligible	0.00%
Gonzales County	**$457,255,000**	**Negligible**	**0.00%**
Gonzales	$401,785,000	$19,176	0.00%
Nixon	$94,690,000	Negligible	0.00%
Waelder	$37,972,000	Negligible	0.00%
Cibolo (Guadalupe County)	$221,273,000	$13,938	0.01%
Kendall County	**$1,181,519,000**	**$6,765**	**0.00%**
Boerne	$494,789,000	$5,520	0.00%
Refugio County	**$ 149,487,000**	**Negligible**	**0.00%**
Austwell	$28,397,000	Negligible	0.00%
Bayside	$26,026,000	Negligible	0.00%
Refugio	$186,843,000	Negligible	0.00%

JURISDICTION	TOTAL EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Woodsboro	$78,606,000	Negligible	0.00%
Victoria County	**$1,174,737,000**	**Negligible**	**0.00%**
Victoria	$3,942,383,000	Negligible	0.00%
TOTALS FOR STUDY AREA[4]	**$12,812,200,000**	**$530,717**	**0.06%**

Source: HAZUS-MH MR4 (exposure values) and NCDC (property losses)

[4] Totals for the study area may include values less than $5,000 for amounts that are classified as "Negligible" in the table.

HAIL

Hazard Description 1
Location 1
Extent 1
Historical Occurrences 3
Probability of Future Events 13
Impact and Vulnerability 13

Hazard Description

Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass. Frozen droplets gradually accumulate into ice crystals until they fall as precipitation that is round or irregularly shaped masses of ice greater than 0.75 inches in diameter. The size of hailstones is a direct result of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a byproduct of heating on the Earth's surface. Higher temperature gradients above Earth's surface result in increased suspension time and hailstone size.

Location

Hailstorms vary tremendously in terms of size, location, intensity and duration but are considered frequent occurrences throughout the GBRA Basin. It is assumed that all of the jurisdictions are uniformly exposed to hail events just as they are exposed to the thunderstorms that produce the hail events.

Extent

The severity of hail events range based on size of hail, winds, and structures in the path of a hail storm. Storms that produce high winds in addition to hail are most damaging and can result in numerous broken windows and damaged siding. Hailstorms can cause extensive property damage affecting both

urban and rural landscapes. Fortunately, most hailstorms produce marble-size or smaller hailstones. These can cause damage to crops, but they normally do not damage buildings or automobiles. Larger hailstones can destroy crops, livestock and wildlife and can cause extensive damage to buildings, including roofs, windows and outside walls. Vehicles can be total losses. When hail breaks windows, water damage from accompanying rains can also be significant. A major hailstorm can easily cause damage running into the millions of dollars. Nationwide hail is responsible for over $1 billion in property and crop damages per year. A scale showing intensity categories was developed by the National Climatic Data Center (NCDC) and is included at Table 8-1.

Table 8-1. Hail Intensity and Magnitude

SIZE CODE	INTENSITY CATEGORY	SIZE (DIAMETER INCHES)	DESCRIPTIVE TERM	TYPICAL DAMAGE
H0	Hard Hail	up to 0.33	pea	no damage
H1	Potentially Damaging	0.33-0.60	marble	slight damage to plants and crops
H2	Potentially Damaging	0.60-0.80	dime	significant damage to plants and crops
H3	Severe	0.80-1.20	nickel	severe damage to plants and crops
H4	Severe	1.2-1.6	quarter	widespread glass and auto damage
H5	Destructive	1.6-2.0	half dollar	widespread destruction of glass, roofs, and risk of injuries
H6	Destructive	2.0-2.4	ping pong ball	aircraft bodywork dented and brick walls pitted
H7	Very Destructive	2.4-3.0	golf ball	severe roof damage and risk of serious injuries
H8	Very Destructive	3.0-3.5	hen egg	severe damage to all structures
H9	Super Hailstorms	3.5-4.0	tennis ball	extensive structural damage could cause fatal injuries
H10	Super Hailstorms	4.0 +	baseball	extensive structural damage could cause fatal injuries

The range of intensity for a hailstorm event for GBRA jurisdictions is anywhere from and H0 to an H8 on the Hail Intensity Scale at Table 8-1. Based on the historical occurrences, the area has not experienced a hail event greater than an H8 event or over 3.0 inches in diameter.

Historical Occurrences

Figure 8-1 shows the historical hail events that have impacted the GBRA study area from 1950 to 2009 (according to NCDC records), and Figure 8-2 through Figure 8-9 show at the county level the historical hail events that have impacted each jurisdiction. All buildings and facilities are considered to be exposed to this hazard and could potentially be impacted because it cannot be predicted where hail may fall. As such, estimated annualized losses cannot be broken down into further categories (residential, commercial, etc.). It is important to note that only hail occurrences that have been reported have been factored into this risk assessment. However, it is likely that a high number of instances have gone unreported.

Figure 8-1. Spatial Historical Hail Events in GBRA (NOAA Data 1950–2007)

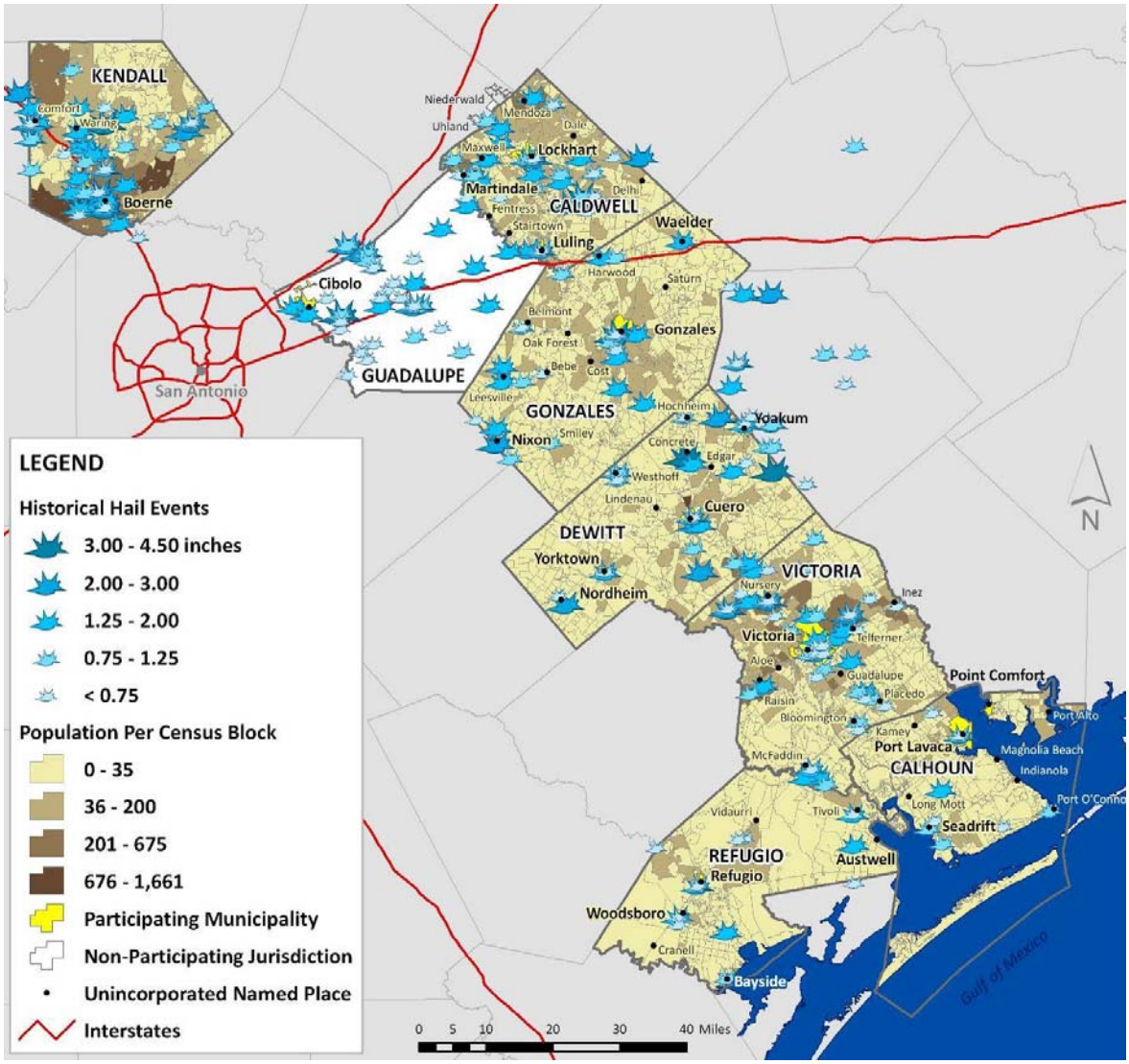


Figure 8-2. Historical Hail Events in Caldwell County

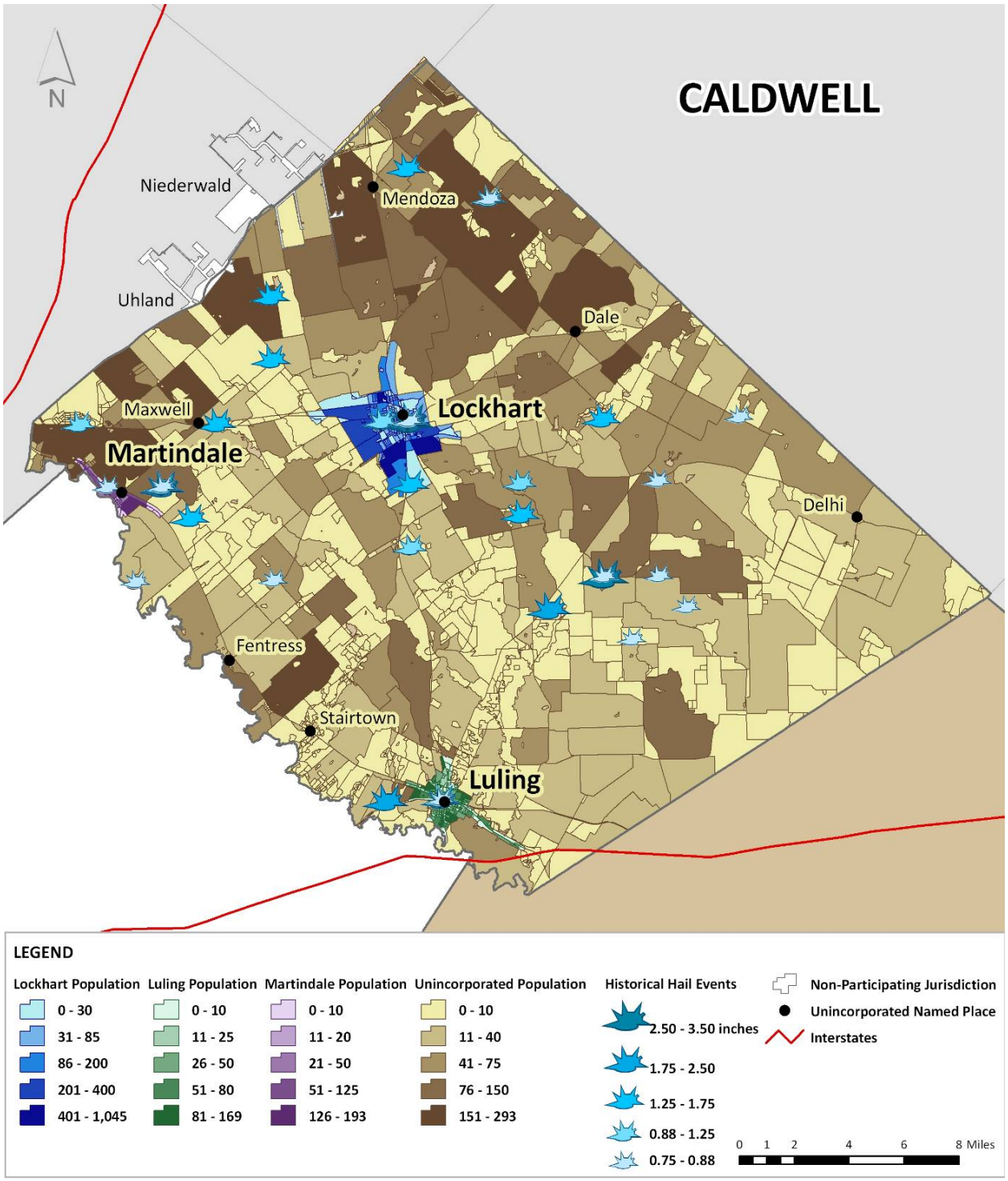


Figure 8-3. Historical Hail Events in Calhoun County

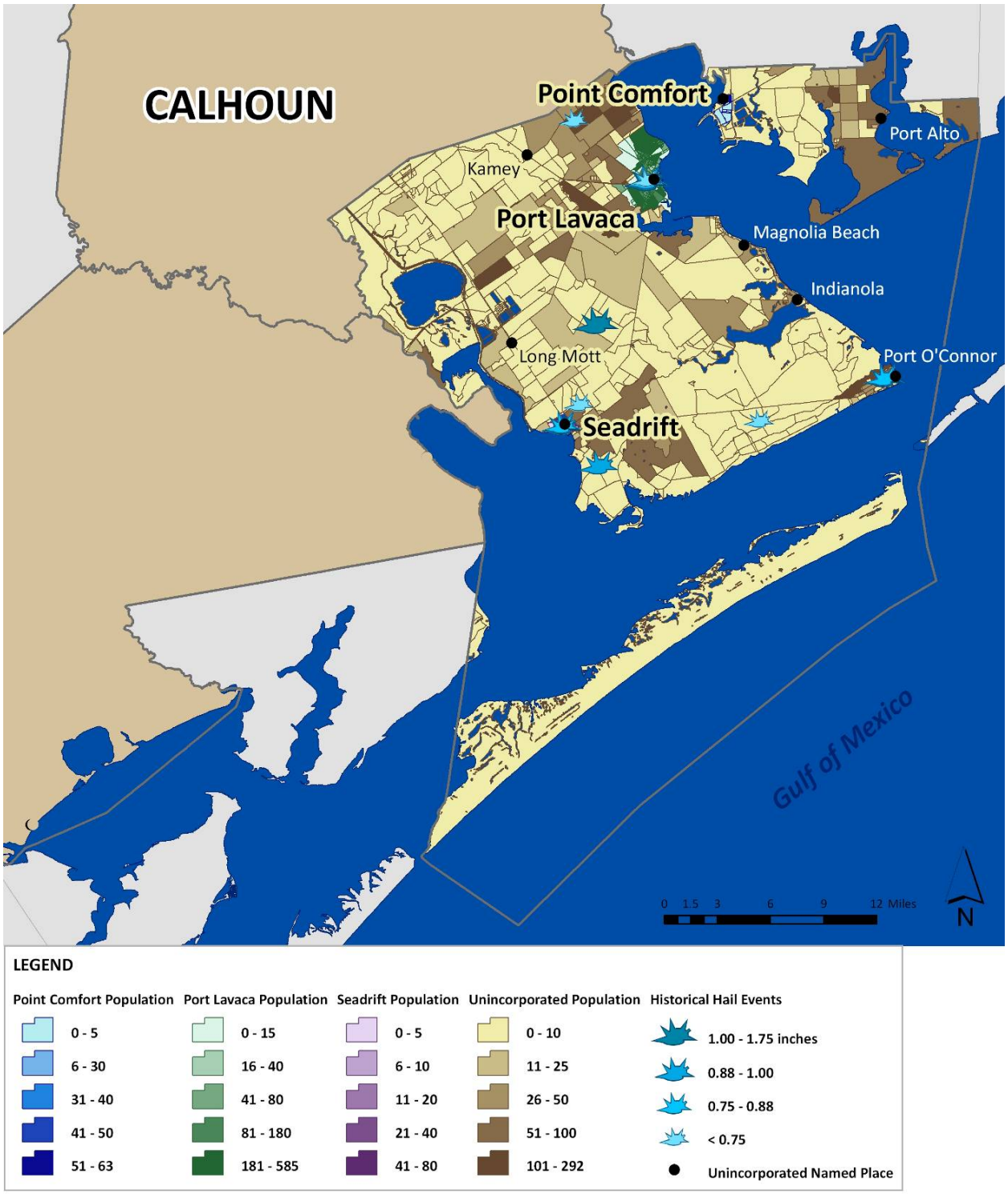


Figure 8-4. Historical Hail Events in DeWitt County

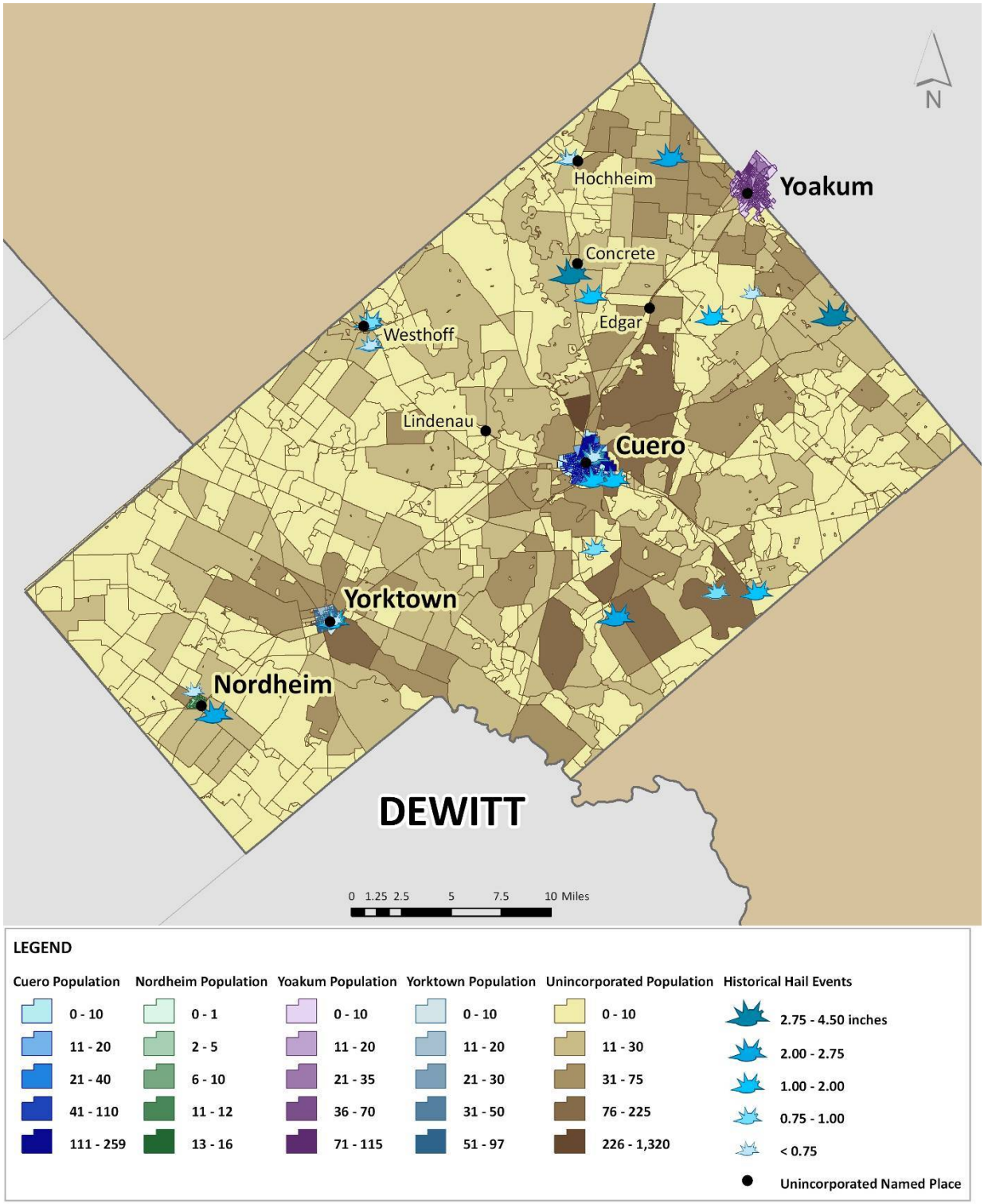


Figure 8-5. Historical Hail Events in Gonzales County

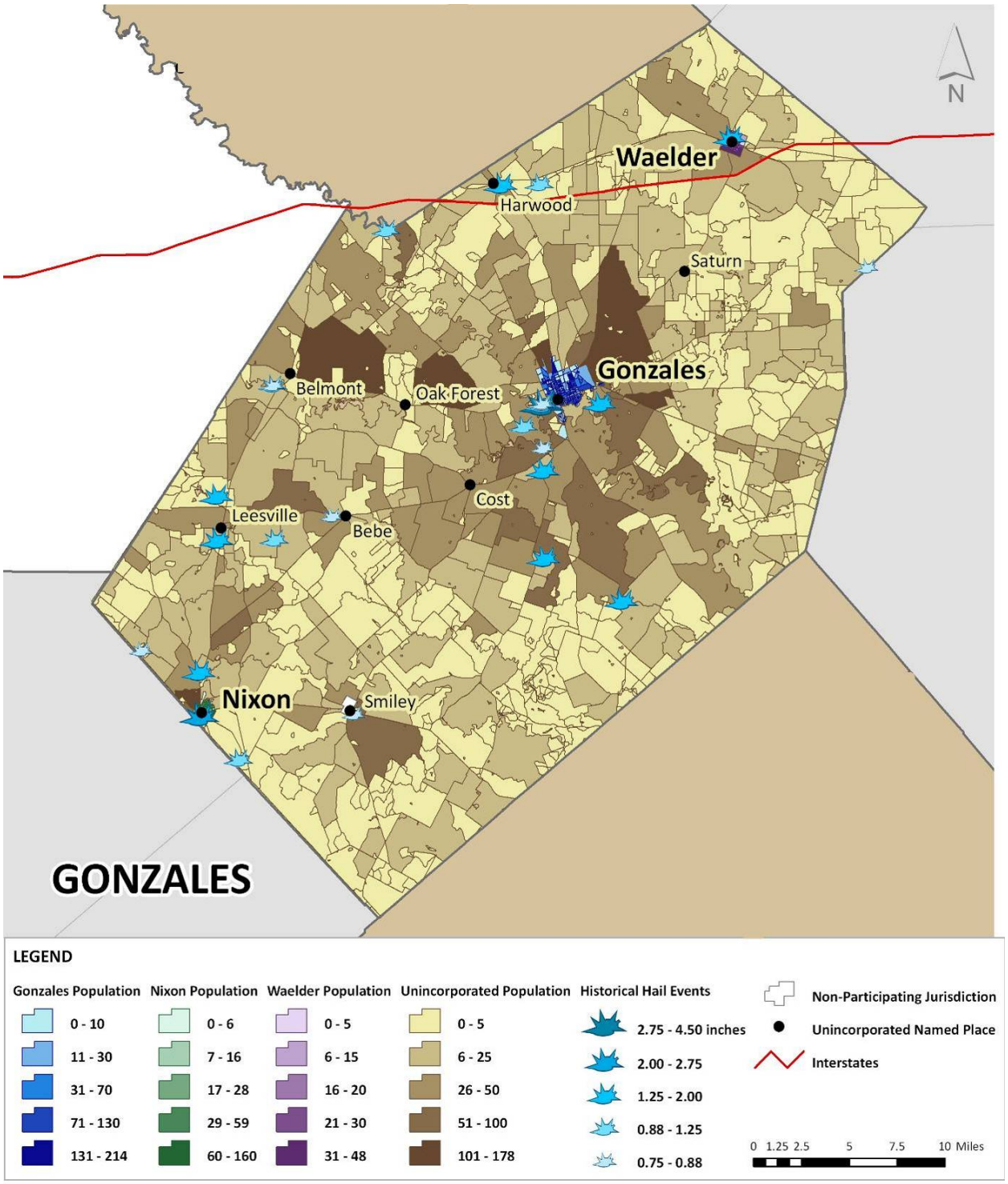


Figure 8-6. Historical Hail Events in Kendall County

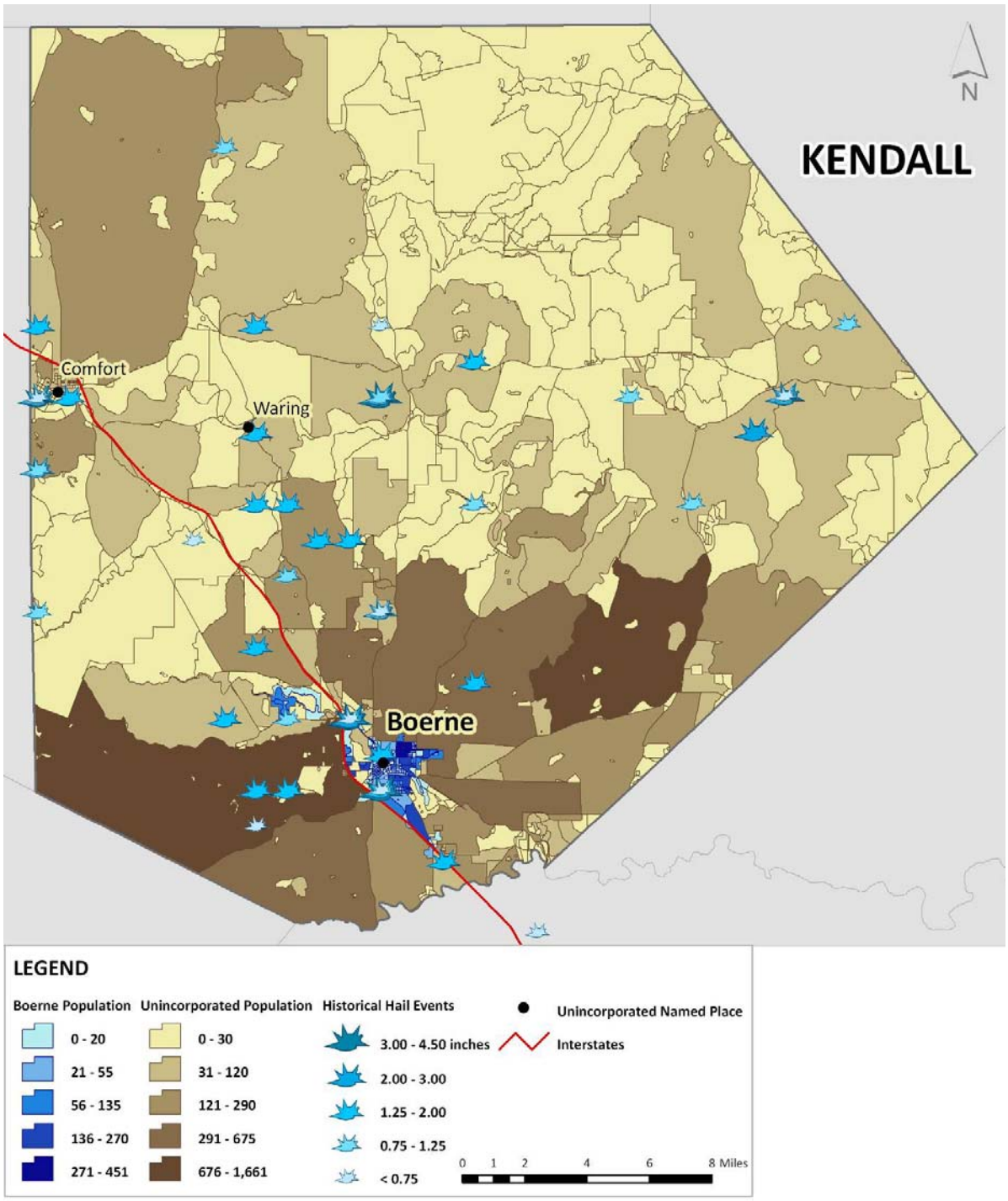


Figure 8-7. Historical Hail Events in Refugio County

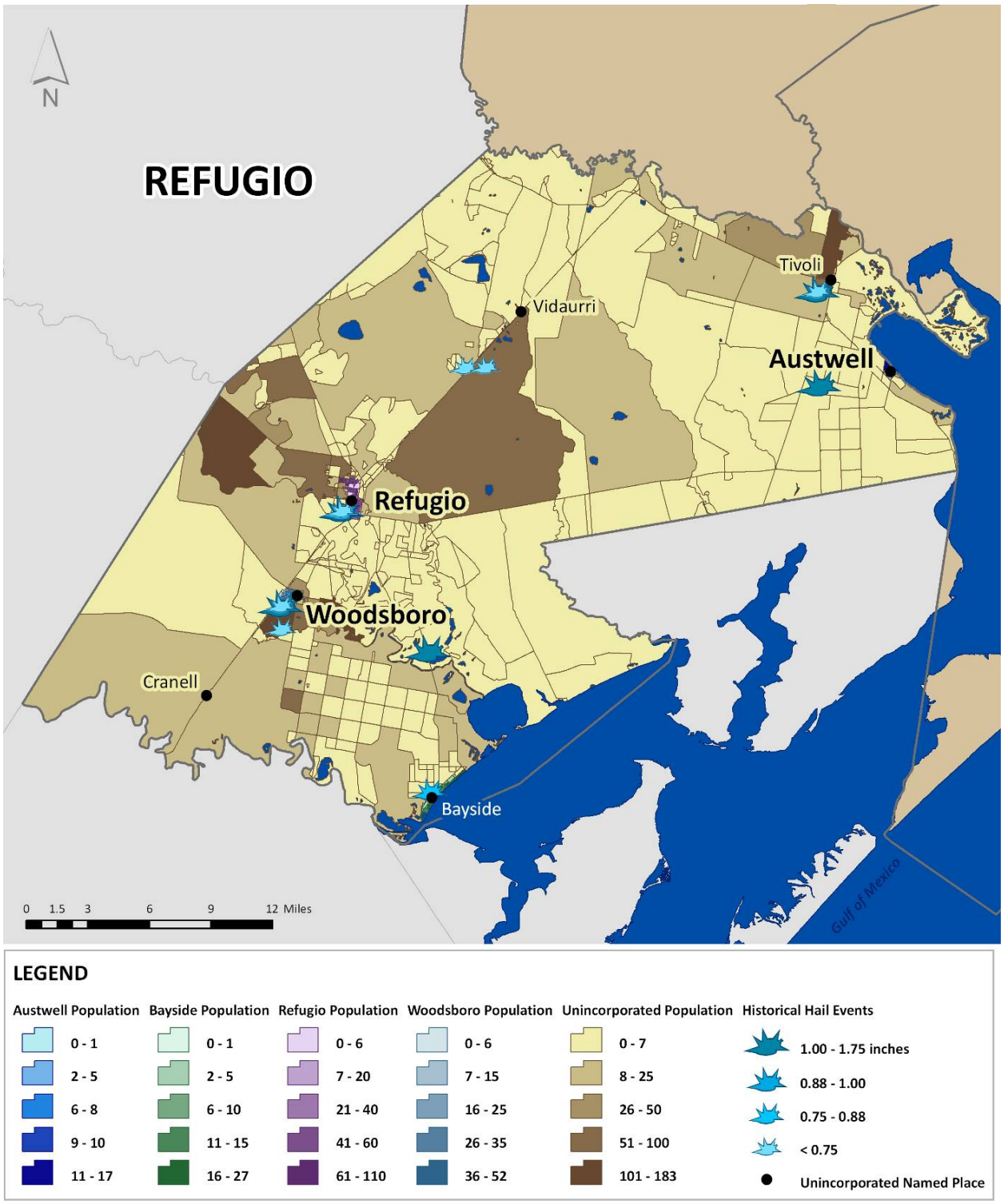


Figure 8-8. Historical Hail Events in Victoria County

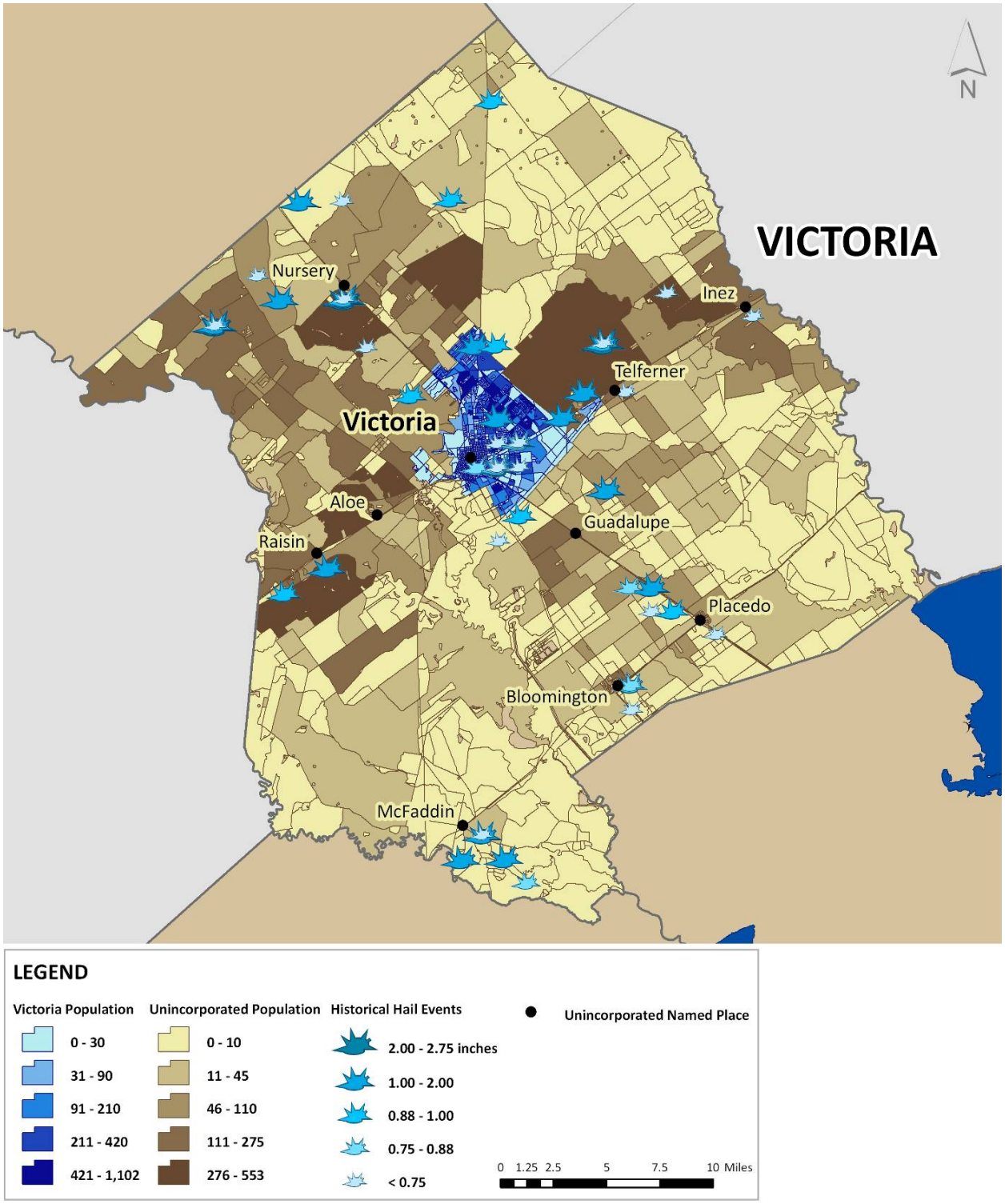


Figure 8-9. Historical Hail Events in Cibolo (in Guadalupe County)

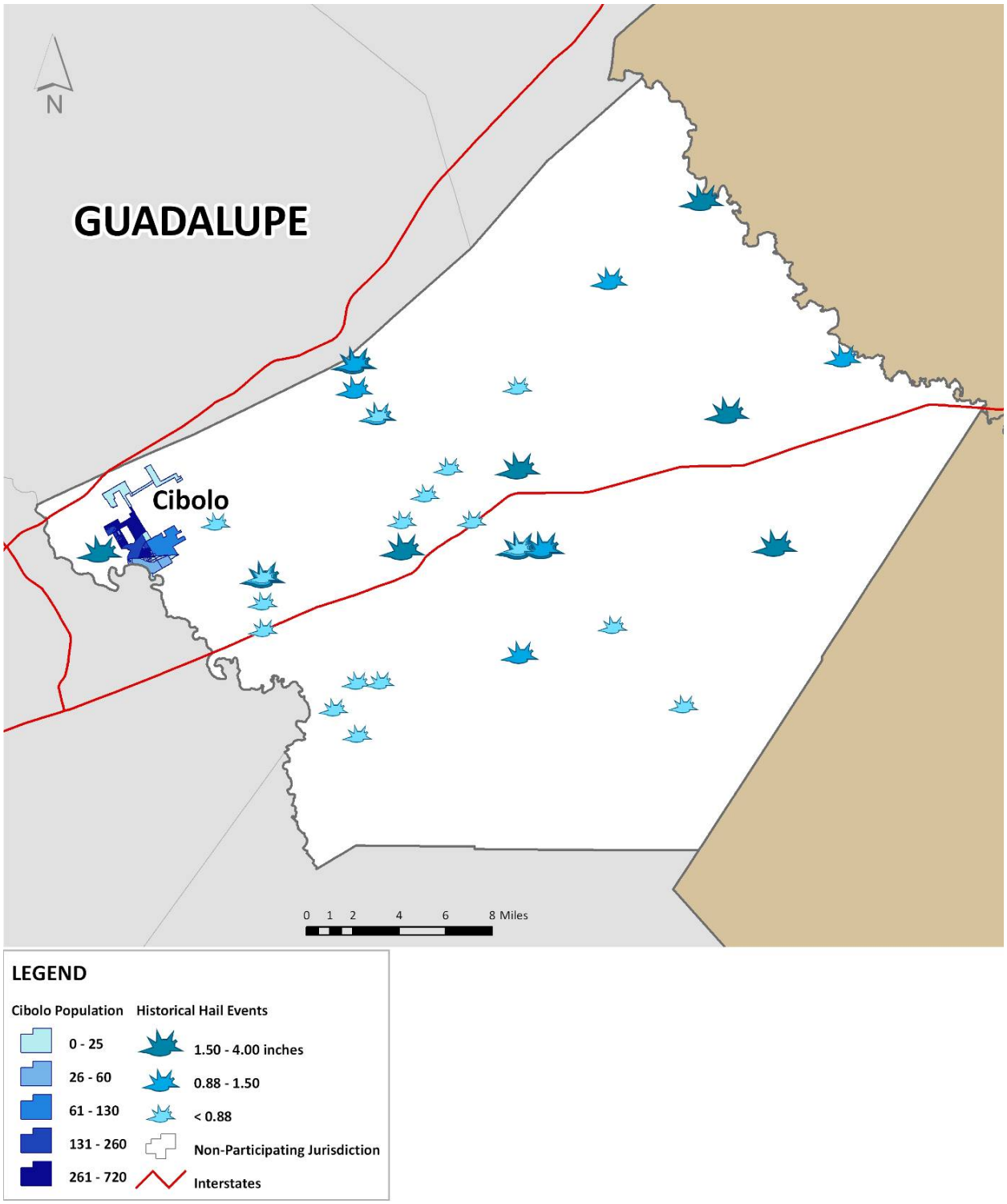


Table 8-2 provides a breakdown of historical hail impact by jurisdiction consisting of the number of reported events (based on NCDC records) and the maximum recorded size of the hail in each area.

Table 8-2. Historical Hail Impact by Jurisdiction

JURISDICTION	NUMBER OF REPORTED EVENTS	MAXIMUM HAIL SIZE (INCHES)
Caldwell County	**30**	**3.50**
Lockhart	14	2.75
Luling	9	1.75
Martindale	1	0.75
Calhoun County	**7**	**1.75**
Point Comfort	0	N/A
Port Lavaca	4	1.75
Seadrift	3	1.00
DeWitt County	**19**	**4.50**
Cuero	10	2.00
Nordheim	0	N/A
Yoakum	2	1.50
Yorktown	2	1.75
Gonzales County	**27**	**4.50**
Gonzales	0	N/A
Nixon	2	2.75
Waelder	1	1.50
Cibolo (Guadalupe County)	0	N/A
Kendall County	**52**	**4.25**
Boerne	9	4.00
Refugio County	**16**	**1.75**
Austwell	0	N/A
Bayside	0	N/A
Refugio	0	N/A
Woodsboro	0	N/A
Victoria County	49	2.75
Victoria	34	2.00
TOTALS FOR STUDY AREA	**291**	**4.50**

Probability of Future Events

Based on the past history for the area, hail events are highly likely, meaning that an event is probable within the next year. Most hailstorms occur during the spring (March, April and May) and in the fall during the month of September. Warning time for a hailstorm is generally minimal or there is no warning. The National Weather Service classifies a storm as severe if hail of ¾ of an inch in diameter (approximately the size of a penny) or greater is imminent based on radar intensity or seen by observers.

Impact and Vulnerability

The severity of a hailstorm impact is considered to be limited since they generally result in injuries treatable with first aid, shut down critical facilities and services for 24 hours or less, and less than ten percent of affected properties are destroyed or suffer major damage. Phenomena in nature cross jurisdictional boundaries. All existing and future buildings, facilities, and populations are considered to be exposed to this hazard and could potentially be impacted. It is important to note that only reported hail events with georeferenced point data have been factored into this vulnerability assessment[1].

Table 8-3 shows potential annualized losses by jurisdiction. "Negligible" indicates that the annualized expected property losses are less than $5,000.

Table 8-3. Potential Annualized Losses by Jurisdiction (Hail)

JURISDICTION	TOTAL EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	**$605,797,000**	**Negligible**	**0.00%**
Lockhart	$618,183,000	Negligible	0.00%
Luling	$264,373,000	Negligible	0.00%
Martindale	$40,522,000	Negligible	0.00%
Calhoun County	**$609,016,000**	**Negligible**	**0.00%**
Point Comfort	$80,897,000	Negligible	0.00%
Port Lavaca	$651,340,000	Negligible	0.00%
Seadrift	$62,036,000	Negligible	0.00%
DeWitt County	**$469,085,000**	$170,506	0.00%
Cuero	$412,893,000	Negligible	0.00%

[1] It is possible that additional hail events may have occurred since 1950 that were not reported to NCDC and are not accounted for in this analysis.

JURISDICTION	TOTAL EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Nordheim	$25,111,000	Negligible	0.00%
Yoakum	$370,136,000	Negligible	0.00%
Yorktown	$127,049,000	Negligible	0.00%
Gonzales County	**$457,255,000**	**Negligible**	0.00%
Gonzales	$401,785,000	Negligible	0.00%
Nixon	$94,690,000	Negligible	0.00%
Waelder	$37,972,000	Negligible	0.00%
Cibolo (Guadalupe County) [2]	$221,273,000	Negligible	0.00%
Kendall County	**$1,181,519,000**	**Negligible**	0.00%
Boerne	$494,789,000	Negligible	0.00%
Refugio County	**$ 149,487,000**	**Negligible**	0.00%
Austwell	$28,397,000	Negligible	0.00%
Bayside	$26,026,000	Negligible	0.00%
Refugio	$186,843,000	Negligible	0.00%
Woodsboro	$78,606,000	Negligible	0.00%
Victoria County	**$1,174,737,000**	$5,301	0.00%
Victoria	$3,942,383,000	Negligible	0.00%
TOTALS FOR STUDY AREA[3]	**$12,812,200,000**	**$175,807**	**-**

Sources: HAZUS-MH MR4 (exposure values) and NCDC (property losses)

[2] On March 27, 1994, a hailstorm caused $7,351,867 in property damage and $73,519 in crop damage near Cibolo (in 2009 dollars). However, the NCDC data is insufficient to determine the exact coordinates of the damage to appropriately assign a percentage of the loss to Cibolo versus other communities and portions of Guadalupe County and the surrounding area.

[3] Totals for the study area may include values less than $5,000 for amounts that are classified as "negligible" in the table.

TORNADO

Hazard Description 1
Location 2
Extent 2
Historical Occurrences 5
Probability of Future Events 16
Impact and Vulnerability 16

Hazard Description

Tornadoes are among the most violent storms on the planet. A tornado is a violently rotating column of air extending between, and in contact with, a cloud and the surface of the earth. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 miles per hour or more. In extreme cases, winds may approach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long.

The most powerful tornadoes are produced by "super-cell thunderstorms." These storms are affected by horizontal wind shears (winds moving in different directions at different altitudes) that begin to rotate the storm. This horizontal rotation can be tilted vertically by violent updrafts, and the rotation radius can shrink, forming a vertical column of very quickly swirling air. This rotating air can eventually reach the ground, forming a tornado.

Severe thunderstorms can produce tornadoes, high winds, and hail—any of which can cause extensive property damage and loss of life. Thunderstorms form when warm, moist air collides with cooler, drier air. Since these masses tend to come together during the transition from summer to winter, most thunderstorms occur during the spring and fall months.

Tornadoes occasionally accompany tropical storms and hurricanes that move over land. Tornadoes are the most common to the right and front of the storm center path as it comes ashore. Tornadoes vary in terms of duration, wind speed and the toll that they take, as shown in Table 9-1.

Table 9-1. Variations Among Tornadoes

WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
• 69% of all tornadoes • Less than 5% of tornado deaths • Lifetime 1-10+ minutes • Winds less than 110 mph	• 29% of all tornadoes • Nearly 30% of all tornado deaths • May last 20 minutes or longer • Winds 110 – 205 mph	• 2% of all tornadoes • 70% of all tornado deaths • Lifetime can exceed one hour • Winds greater than 205 mph

Location

While historical tornado events total 144 from 1950 to 2009, locations of these incidents are completely random and unpredictable. Any area is as vulnerable as another. More vulnerable areas may be in unincorporated areas of counties where construction codes are not enforceable.

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities and populations are considered to be exposed to this hazard and could potentially be impacted. It is important to note that only reported tornadoes with georeferenced point data have been factored into this vulnerability assessment.

Extent

A tornado is given a Fujita rating of 0-5, based on the most intense damage along its path. Wind velocities necessary to produce center damage are often associated with the Fujita category, but that practice is often misleading. The Fujita wind estimates are intended to be based upon the expected damage to a well-built residential structure. Poorly built structures can suffer significant structural damage under lesser winds than the Fujita Scale might suggest. Commercial properties may or may not experience the same failures under high wind speeds as a residence. Thus, the Fujita scale is largely a residential scale, with much more care required in assessment after wind damage to a commercial structure. A wider range of construction techniques and materials can be found in a building section classified as commercial. For example, a concrete/steel reinforced building is much more durable than a typical community convenience store, yet both may be considered commercial in city land use/appraisal data sets.

Table 9-2. The Fujita Tornado Scale

F-SCALE NUMBER	INTENSITY	WIND SPEED (MPH)	TYPE OF DAMAGE DONE	PERCENT OF APPRAISED STRUCTURE VALUE LOST DUE TO DAMAGE
F0	Gale tornado	40-72	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	None Estimated
F1	Moderate tornado	73-112	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads; attached garages may be destroyed.	0% - 20%
F2	Significant tornado	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	50% - 100%
F3	Severe tornado	158-206	Roof and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted.	100%
F4	Devastating tornado	207-260	Well-constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	100%
F5	Incredible tornado	261-318	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles flying through the air in excess of 330 yards; trees debarked; steel reinforced concrete badly damaged.	100%

Source: http://www.tornadoproject.com/fscale/fscale.htm

Since February 2007, the Fujita scale has been replaced by the Enhanced Fujita scale which retains the same basic design as its predecessor with six strength categories. The newer scale reflects more refined assessments of tornado damage surveys, standardization, and damage consideration to a wider range of structures. Tornadoes occasionally accompany tropical storms and hurricanes that move over land.

Table 9-3. Enhanced Fujita Scale for Tornadoes

STORM CATEGORY	DAMAGE LEVEL	3 SECOND GUST (MPH)	DESCRIPTION OF DAMAGES	PHOTO EXAMPLE
EF0	GALE	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.	
EF1	WEAK	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages might be destroyed.	
EF2	STRONG	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	
EF3	SEVERE	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	
EF4	DEVASTATING	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	
EF5	INCREDIBLE	200+	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.	

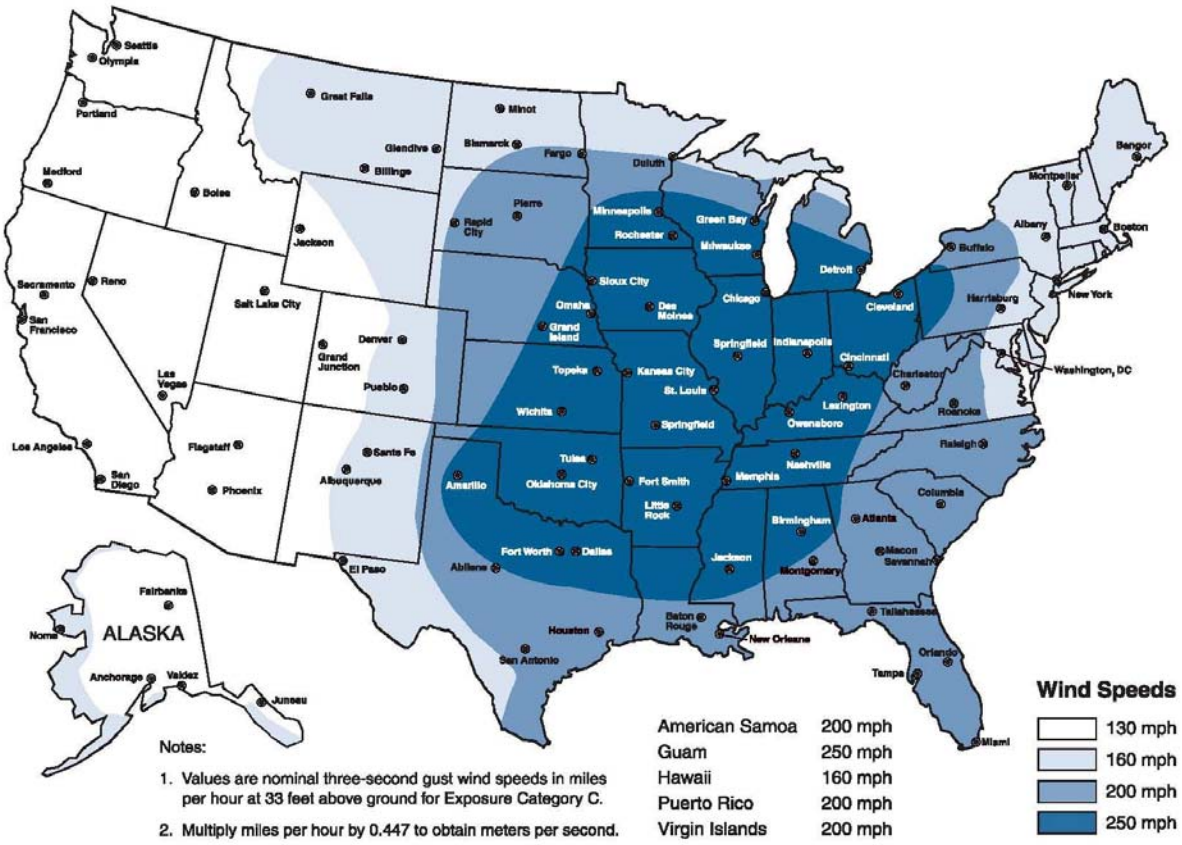
Both the Fujita Scale and Enhanced Fujita Scale should be referenced in reviewing previous occurrences as tornado events prior to 2007 will follow the original Fujita Scale.

The range of intensity for a tornado for GBRA jurisdictions can be anywhere from as low as an EF0, with gusts up to 85 miles per hour, to an EF5, which is an incredible storm with winds at over 200 miles per hour.

The jurisdictions in the planning area experience a uniform range of intensity for a tornado as evidenced by the location and historical occurrences. For all historical occurrences, magnitude is depicted in Figures 9-3 to 9-10 and Table 9-3 for each county. In addition, Figure 9-1 below shows the average wind

speeds for the area. All of the GBRA participating jurisdictions are uniformly exposed to wind speeds up to 165 miles per hour or an EF3 as depicted in Figure 9-2 below.

Figure 9-1. Extent - Average Wind Speeds[1]



Historical Occurrences

Historical evidence shows that most of the area is vulnerable to tornadic activity. This hazard can result from severe thunderstorm activity basin wide or may occur in coastal counties during a major tropical storm or hurricane. Figure 9-2 presents a map of historical tornadoes that hit the study region and

[1] Source: Federal Emergency Management Agency (FEMA). *Design and Construction Guidance for Safe Rooms*, FEMA 361, 2008.

Figures 9-3 to 9-10 provide an illustration of occurrences per county. Table 9-4 shows aggregated historical information by jurisdiction.

Figure 9-2. Spatial Historical Tornado Events (NOAA Data 1950–2008)

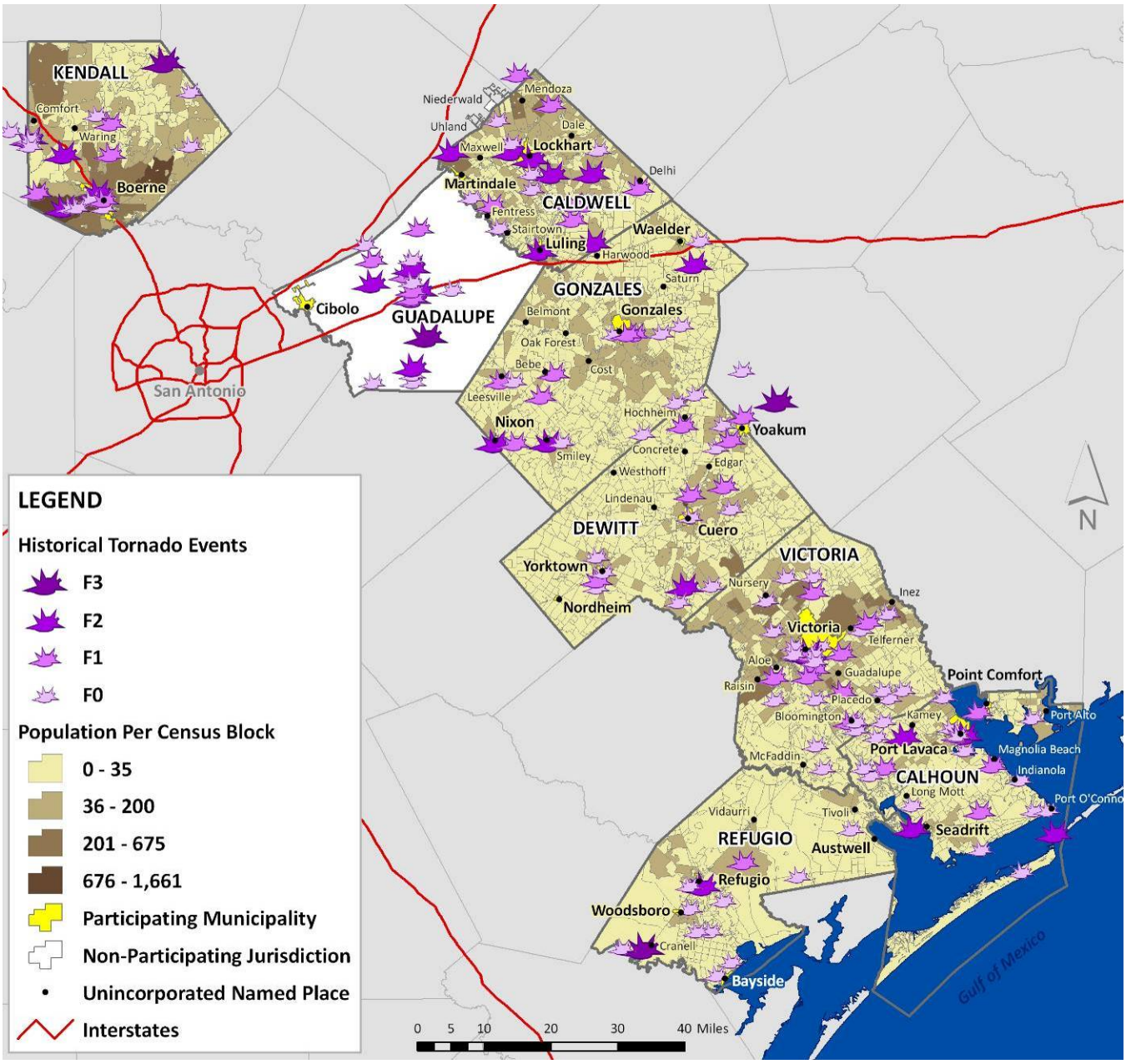


Figure 9-3. Historical Tornado Events in Caldwell County

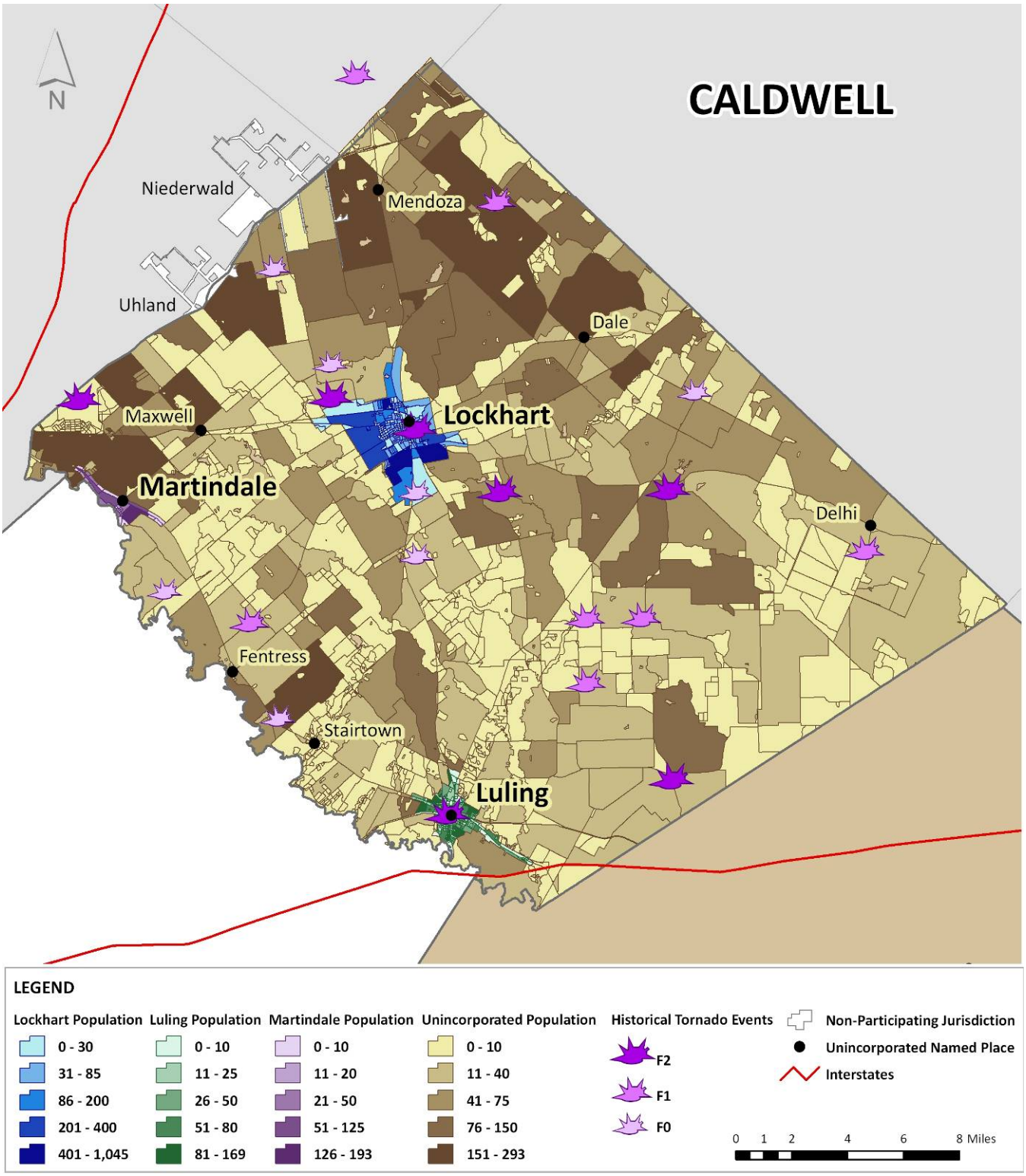


Figure 9-4. Historical Tornado Events in Calhoun County

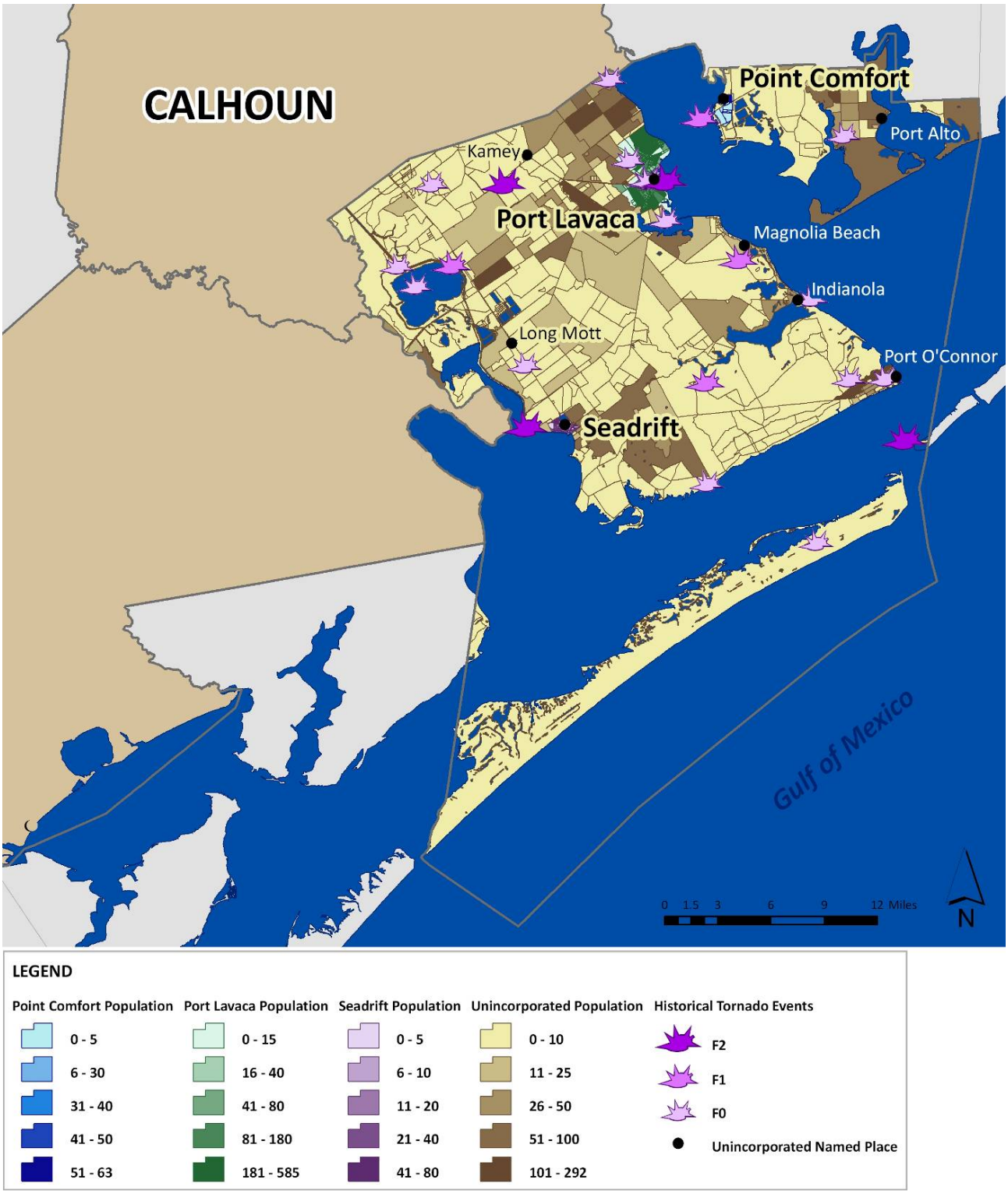


Figure 9-5. Historical Tornado Events in DeWitt County

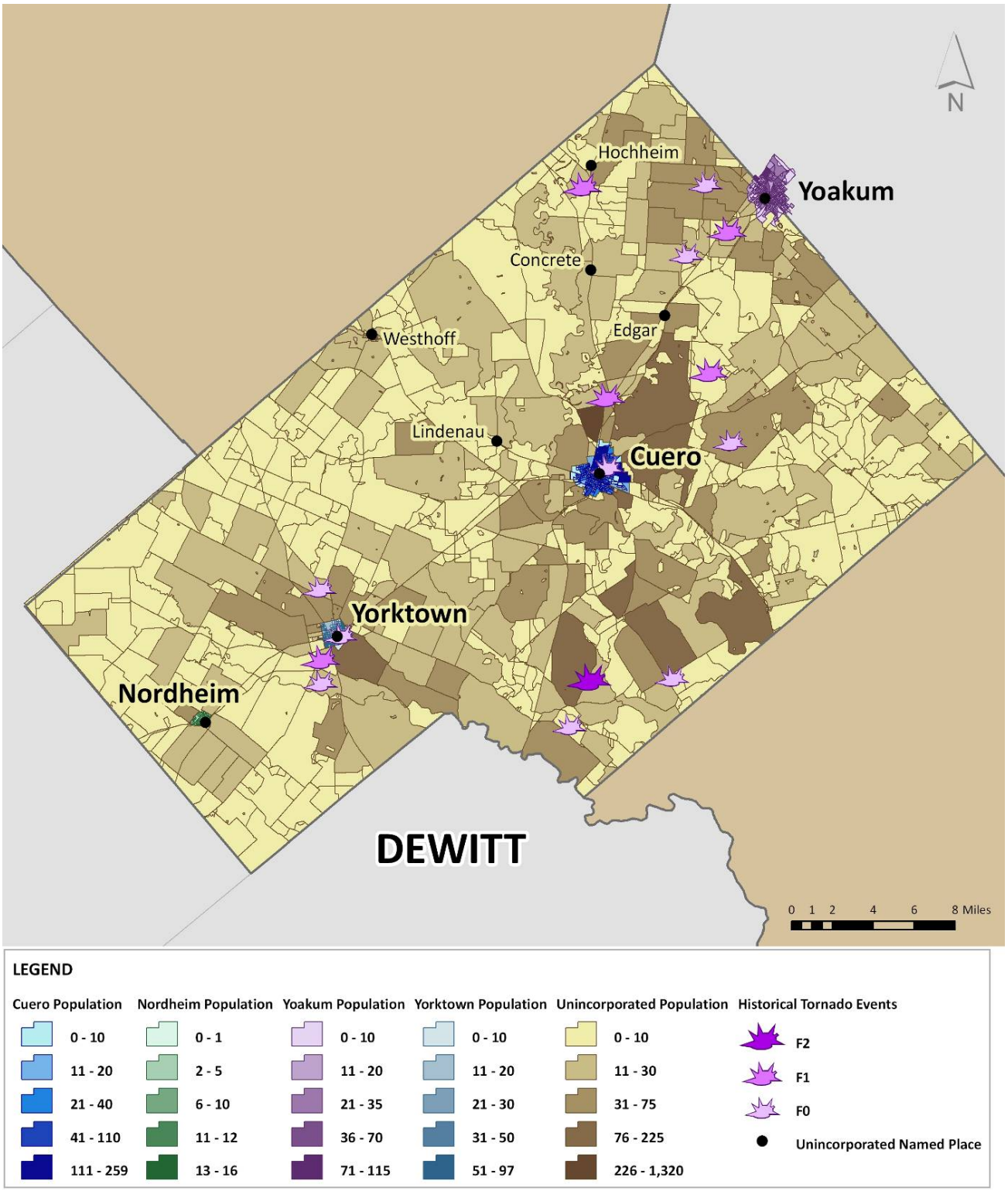


Figure 9-6. Historical Tornado Events in Gonzales County

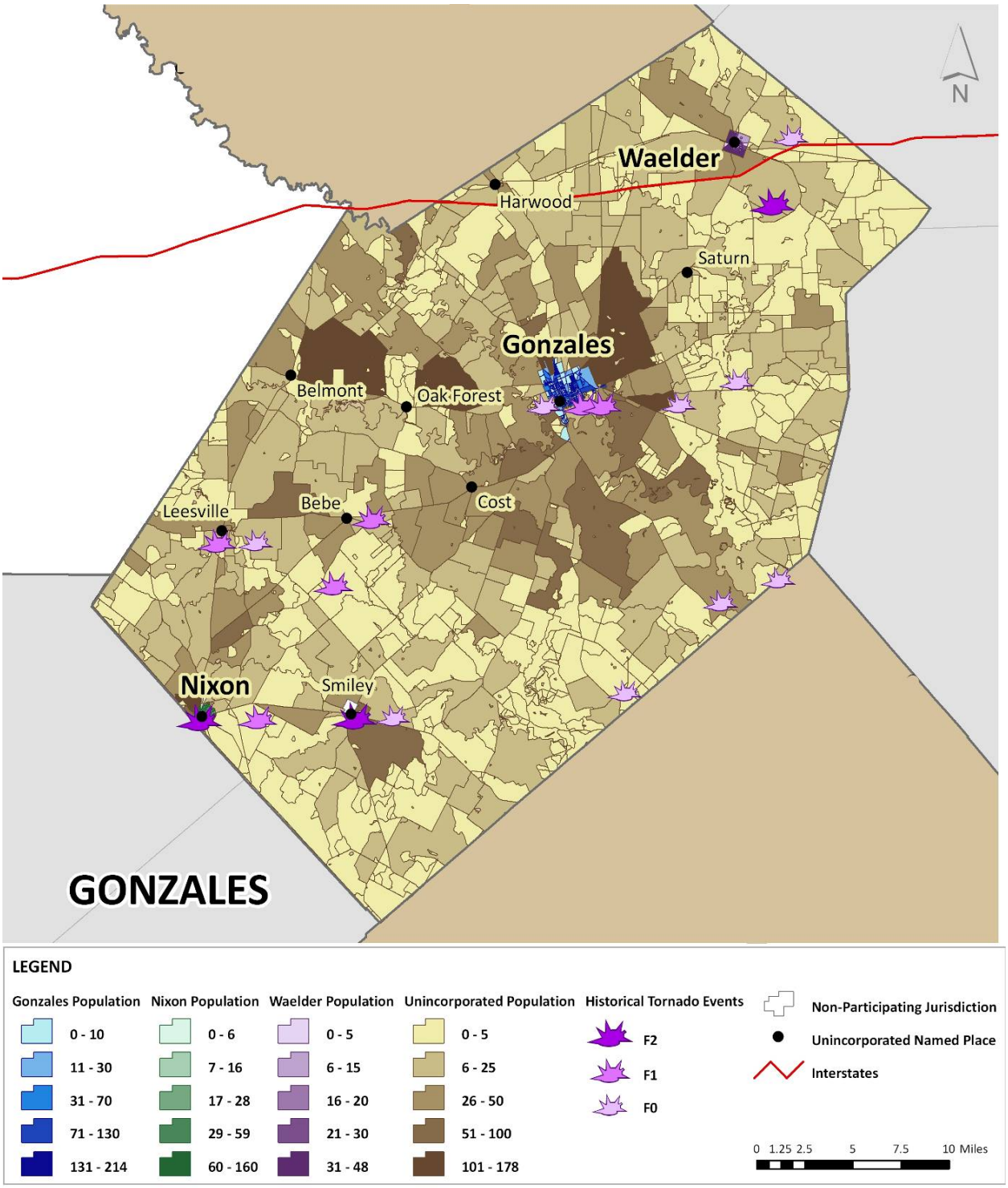


Figure 9-7. Historical Tornado Events in Kendall County

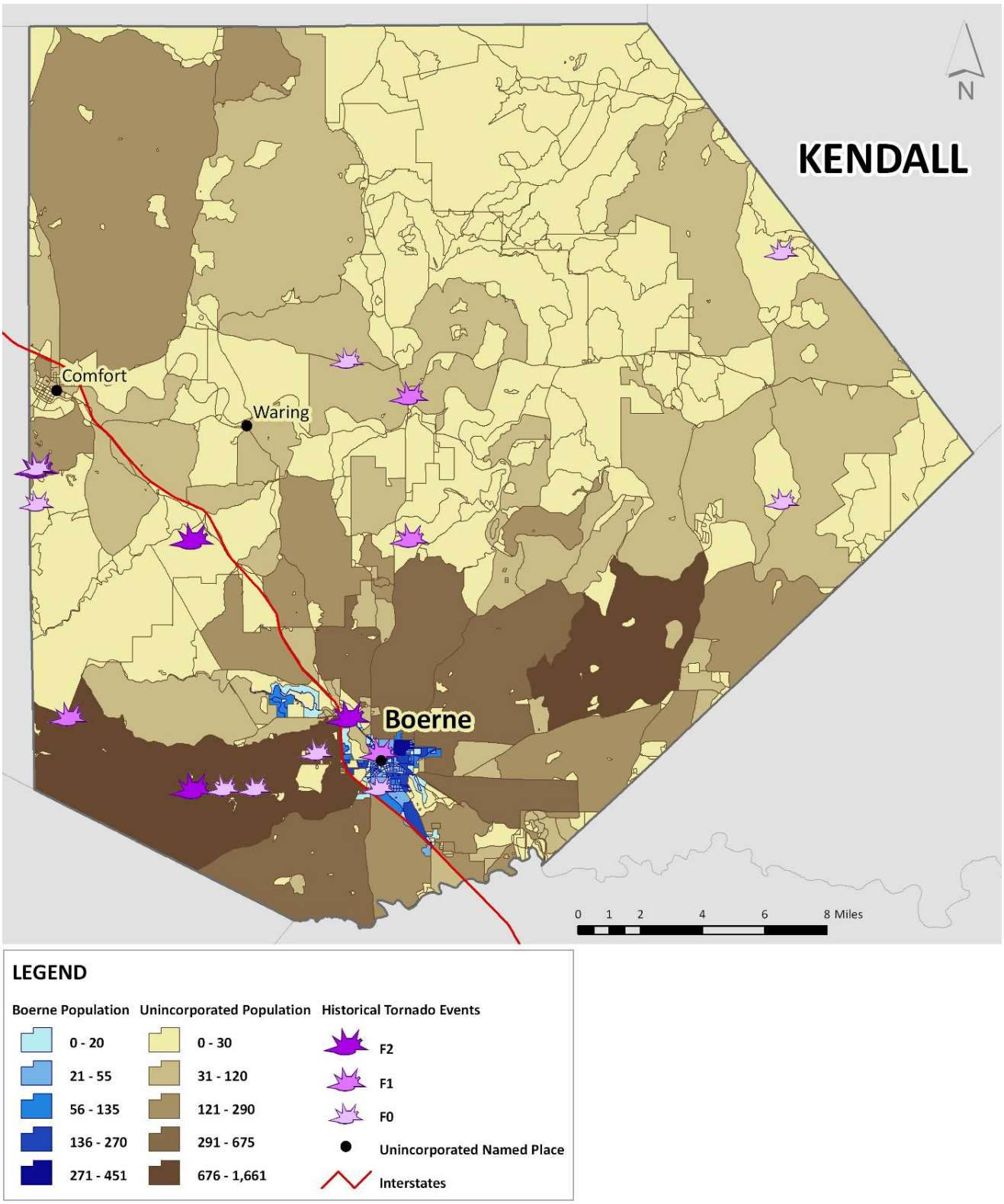


Figure 9-8. Historical Tornado Events in Refugio County

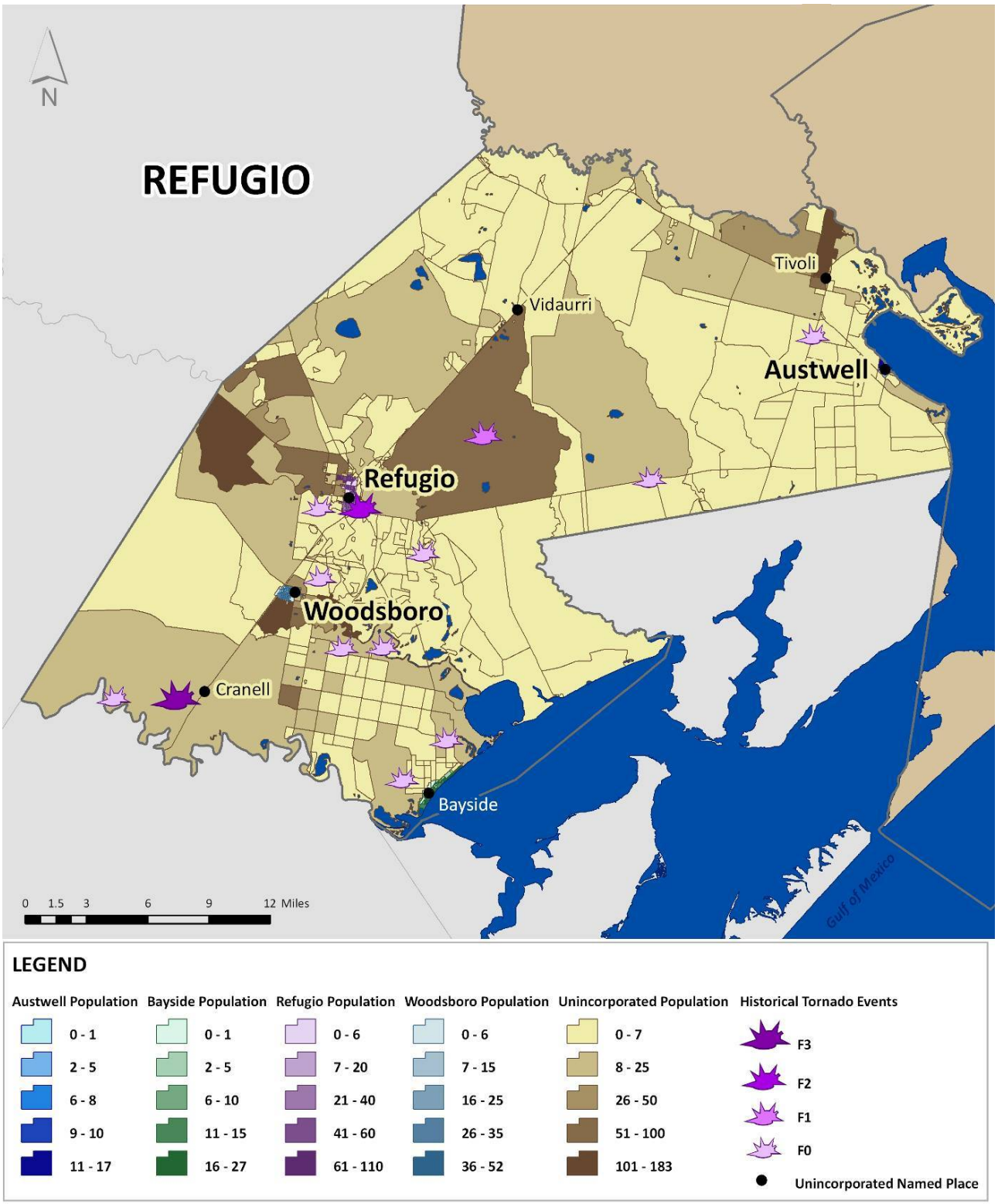


Figure 9-9. Historical Tornado Events in Victoria County

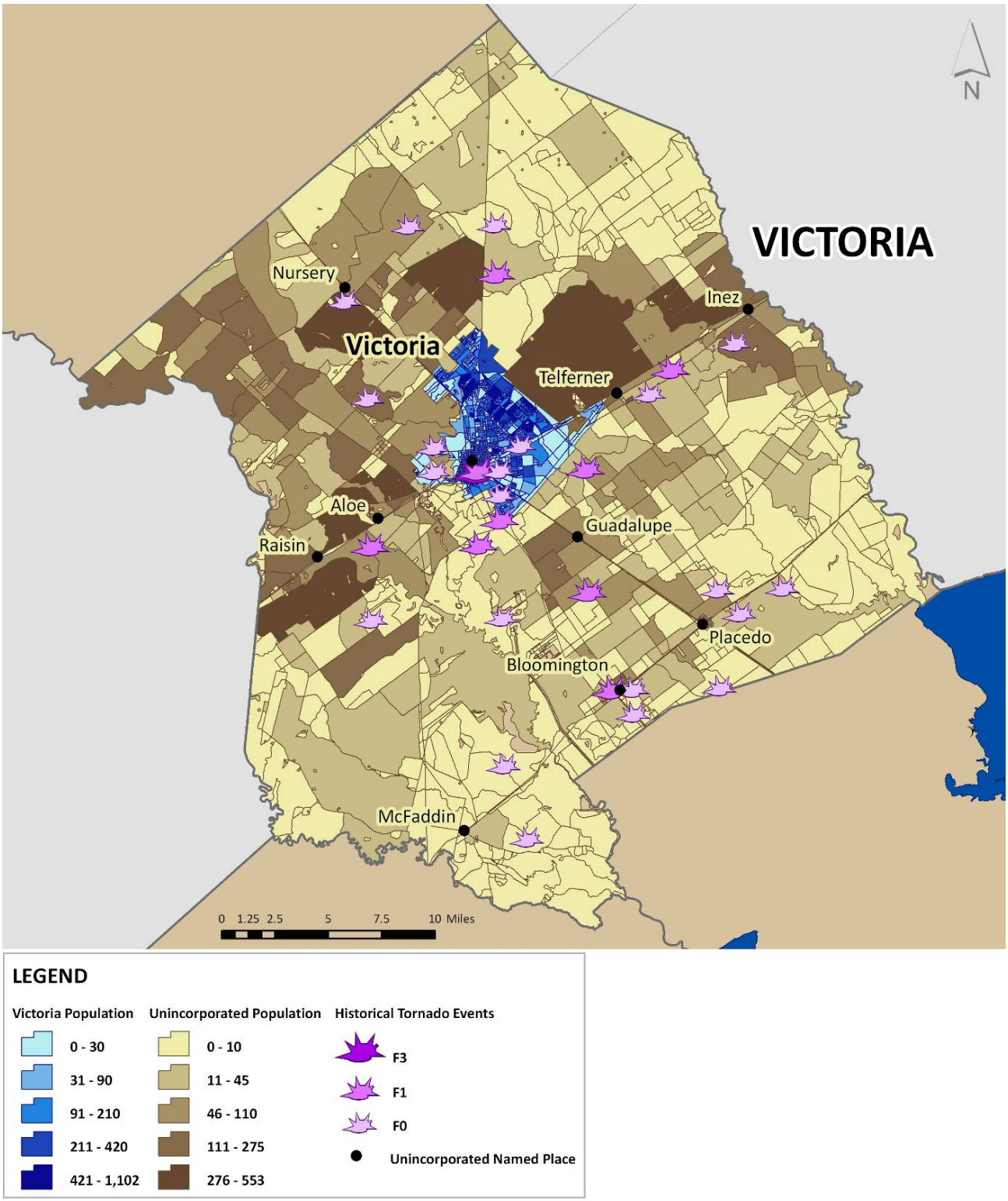


Figure 9-10. Historical Tornado Events in Cibolo (in Guadalupe County)

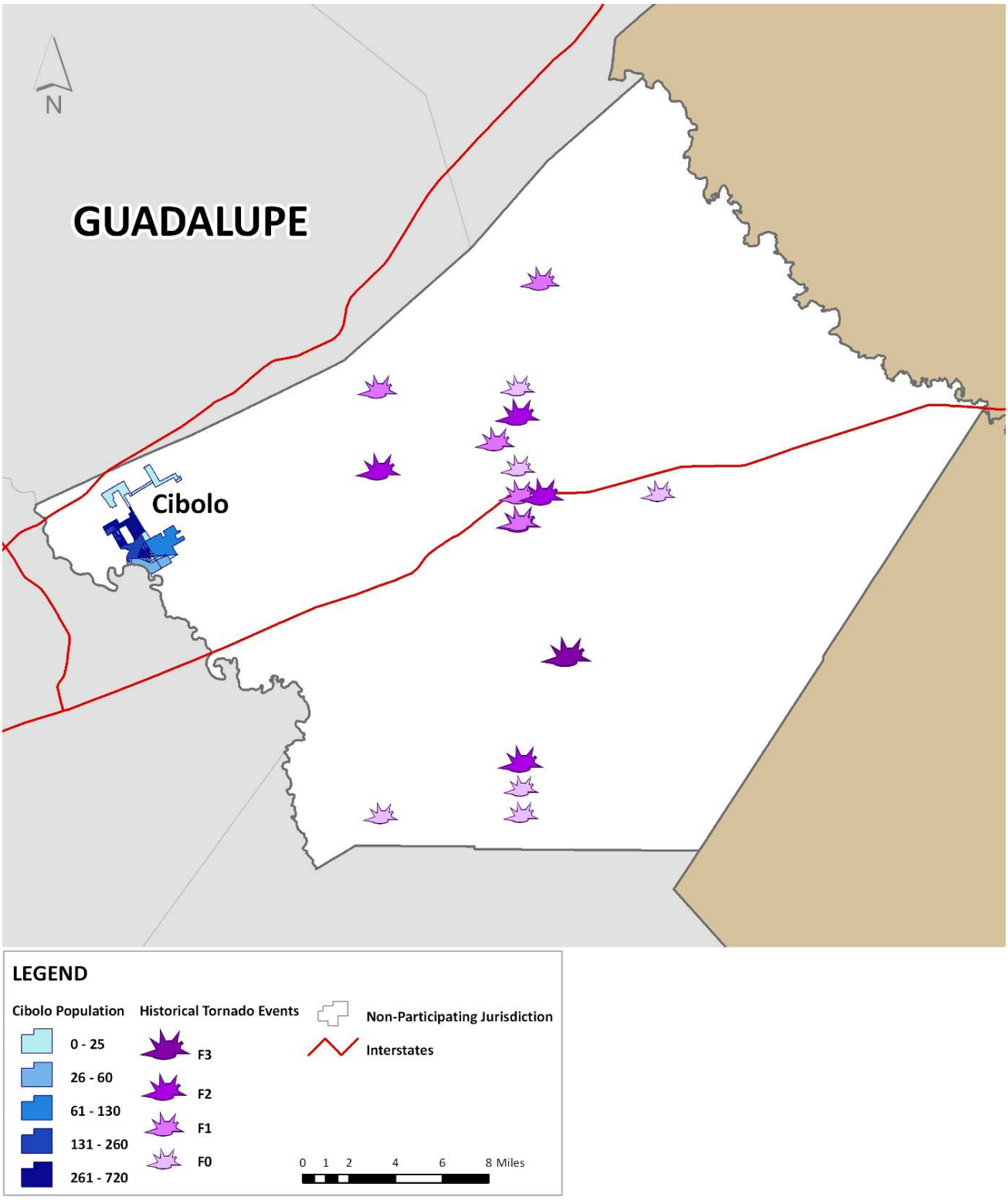


Table 9-4 shows the aggregated historical information as depicted in Figures 9-3 to 9-10.

Table 9-4. Overall Historical Tornado Impact by Jurisdiction

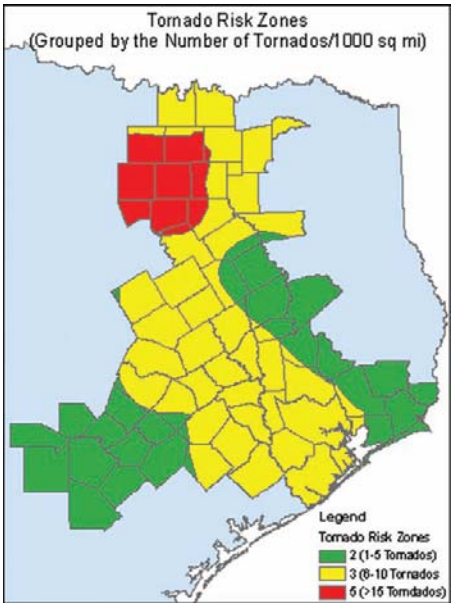
JURISDICTION	NUMBER OF EVENTS	MAGNITUDE (FUJITA SCALE)						MAXIMUM F SCALE
		F0	F1	F2	F3	F4	F5	
Caldwell County	**18**	**6**	**7**	**5**	**0**	**0**	**0**	**F2**
Lockhart	2	1	0	1	0	0	0	F2
Luling	1	0	0	1	0	0	0	F1
Martindale	0	0	0	0	0	0	0	N/A
Calhoun County	**14**	**10**	**2**	**2**	**0**	**0**	**0**	**F2**
Point Comfort	1	0	1	0	0	0	0	F1
Port Lavaca	7	3	2	2	0	0	0	F2
Seadrift	0	0	0	0	0	0	0	N/A
DeWitt County	**13**	**7**	**5**	**1**	**0**	**0**	**0**	**F2**
Cuero	1	1	0	0	0	0	0	F0
Nordheim	0	0	0	0	0	0	0	N/A
Yoakum	0	0	0	0	0	0	0	N/A
Yorktown	1	1	0	0	0	0	0	F0
Gonzales County	**18**	**10**	**6**	**2**	**0**	**0**	**0**	**F2**
Gonzales	0	0	0	0	0	0	0	N/A
Nixon	2	1	0	1	0	0	0	F2
Waelder	0	0	0	0	0	0	0	N/A
Cibolo (Guadalupe County)	0	0	0	0	0	0	0	N/A
Kendall County	**17**	**9**	**4**	**4**	**1**	**0**	**0**	**F3**
Boerne	3	1	1	1	0	0	0	F2
Refugio County	**13**	**10**	**1**	**1**	**1**	**0**	**0**	**F3**
Austwell	0	0	0	0	0	0	0	N/A
Bayside	0	0	0	0	0	0	0	N/A
Refugio	0	0	0	0	0	0	0	N/A
Woodsboro	0	0	0	0	0	0	0	N/A
Victoria County	**28**	**20**	**8**	**0**	**0**	**0**	**0**	**F1**
Victoria	5	3	1	0	1	0	0	N/A
TOTALS FOR STUDY AREA	**144**	**83**	**38**	**21**	**3**	**0**	**0**	**F3**

Source: National Climatic Data Center

Probability of Future Events

Although at a lower risk than other Texas counties, it is expected that there will be one to six tornadoes in the GBRA area annually. It is highly likely that the planning area can expect a tornado event at least once annually.

Figure 9-10. Tornado Risk Zones[2]



Seasonal patterns are relevant to tornadoes. Thunderstorms form when warm, moist air collides with cooler, drier air. Since these masses tend to come together during the transition from summer to winter, most thunderstorms and resulting tornadoes occur during the spring (April through June) and fall (October through December). Warning time for tornadoes is minimal and ranges from no warning time to 30 minutes.

Impact and Vulnerability

Impact describes potential severity of damages. While 144 tornado events of magnitudes F0 through F3 have impacted the planning area from 1950 to 2009, no fatalities in the planning area have been reported and less than 10 percent of property was destroyed or suffered major damage. Therefore, potential severity of tornado impact is limited.

[2] From the Texas Hazard Mitigation Package, thmp.info

Vulnerability is the risk of future occurrences; it describes what is exposed to the hazard. It is an evaluation of historical incident data, inventory and damage functions and statistical methodology was used to determine the annual expected loss at the county level. Table 9-5 shows annualized property losses and annualized percent loss ratios by jurisdiction.

Table 9-5. Potential Annualized Losses by Jurisdiction (Tornado)

JURISDICTION	TOTAL ESTIMATED EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	**$605,797,000**	**$1,151,799**	**0.19%**
Lockhart	$618,183,000	Negligible	0.00%
Luling	$264,373,000	Negligible	0.00%
Martindale	$40,522,000	Negligible	0.00%
Calhoun County	**$609,016,000**	**$8,460**	**0.00%**
Point Comfort	$80,897,000	Negligible	0.00%
Port Lavaca	$651,340,000	$15,479	0.00%
Seadrift	$62,036,000	Negligible	0.00%
DeWitt County	**$469,085,000**	**Negligible**	**0.00%**
Cuero	$412,893,000	Negligible	0.00%
Nordheim	$25,111,000	Negligible	0.00%
Yoakum	$370,136,000	Negligible	0.00%
Yorktown	$127,049,000	Negligible	0.00%
Gonzales County	**$457,255,000**	**$142,597**	**0.03%**
Gonzales	$401,785,000	Negligible	0.00%
Nixon	$94,690,000	Negligible	0.00%
Waelder	$37,972,000	Negligible	0.00%
Cibolo (Guadalupe County)[3]	$221,273,000	Negligible	0.00%
Kendall County	**$1,181,519,000**	**$184,205**	**0.02%**
Boerne	$494,789,000	Negligible	0.00%
Refugio County	**$ 149,487,000**	**$5,058**	**0.00%**
Austwell	$28,397,000	Negligible	0.00%
Bayside	$26,026,000	Negligible	0.00%
Refugio	$186,843,000	Negligible	0.00%
Woodsboro	$78,606,000	Negligible	0.00%
Victoria County	**$1,174,737,000**	**$20,625**	**0.00%**

[3] Tornadoes have resulted in more than $500,000 in property damages near Cibolo since 1950. However, the NCDC data is insufficient to determine the exact coordinates of the hazard occurrences in order to appropriately assign losses specifically to Cibolo.

JURISDICTION	TOTAL ESTIMATED EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Victoria	$3,942,383,000	$30,799	0.00%
TOTALS FOR STUDY AREA[4]	**$12,812,200,000**	**$1,559,022**	**0.24%**

Sources: HAZUS-MH MR4 (total exposure) and NCDC (annualized losses)

[4] Totals for the study area may include values less than $5,000 for amounts that are classified as "Negligible" in the table.

DROUGHT

Hazard Description 1
Location 2
Extent 2
Historical Occurrences 3
Probability of Future Events 4
Impact and Vulnerability 5

Hazard Description

Drought is a period of time without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 1 presents definitions for these different types of drought.

Droughts are one of the most complex of all natural hazards as it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and area farming is enormous, often killing crops, grazing land, edible plants and even in severe cases, trees. A secondary hazard to drought is wildfire because dying vegetation serves as a prime ignition source. Therefore, a heat wave combined with a drought is a very dangerous situation.

Table 10-1. Drought Classification Definitions[1]

Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops.

[1] Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

Socioeconomic Drought	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

Location

Droughts occur regularly throughout Texas and the GBRA Basin and are a normal condition. However, they can vary greatly in their intensity and duration. There is no distinct geographic boundary to drought; therefore, it can occur throughout the GBRA Basin area equally.

Extent

The Palmer Drought Index is used to measure the extent of drought by measuring the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought is cumulative, with the intensity of drought during the current month dependent upon the current weather patterns plus the cumulative patterns of previous months. The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop. Table 10-2 depicts magnitude of drought while the Table 10-3 is describes the classification descriptions.

Table 10-2. Palmer Drought Index

Drought Index	Drought Condition Classifications						
	Extreme	Severe	Moderate	Normal	Moderately moist	Very moist	Extremely moist
Z index	-2.75 and below	-2.00 to -2.74	-125 to -1.99	-1.24 to +.99	+1.00 to +2.49	+2.50 to +3.49	n/a
Meteorological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.00	+3.00 to +3.00	+4.00 and above
Hydrological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.00	+3.00 to +3.00	+4.00 and above

Table 10-3. Palmer Drought Category Descriptions[2]

Category	Description	Possible Impacts	Palmer Drought Index
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies	-5.0 or less

Drought is monitored nationwide by the National Drought Mitigation Center (NDMC). Indicators are used to describe broad scale drought conditions across the U.S. Indicators correspond to the intensity of drought.

Based on the historical occurrences for drought and the location of the Guadalupe-Blanco River Basin to the coast, the area can anticipate a range of drought from abnormally dry to extreme or D0 to D3 based on the Palmer Drought Category.

Historical Occurrences

Although the GBRA Basin does not typically experience severe or extreme drought due to its proximity to the coast. It has been affected by key historic events. Figure 10-1 depicts key historic occurrences in the Gulf region overall, while Table 10-4 provides specific events by county as reported in the National Climatic Data Center (NCDC).

[2] Source: National Drought Mitigation Center

Figure 10-1. Drought in the Texas Gulf Basin

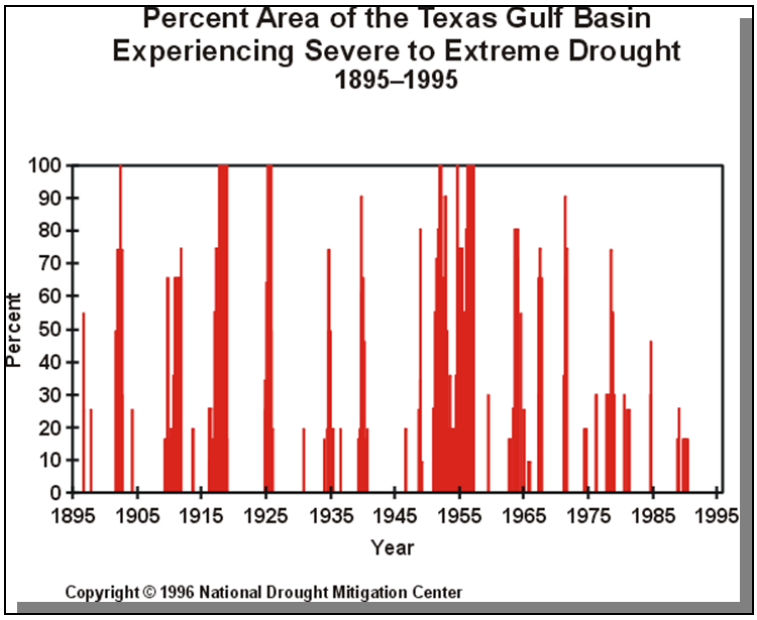


Table 10-4. Historical Drought Instances by Jurisdiction (NCDC, 1996-2009)

JURISDICTION	TOTAL EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	$1,528,875,000	Negligible	0.00%
Calhoun County	$1,403,343,000	Negligible	0.00%
DeWitt County	$1,404,274,000	Negligible	0.00%
Gonzales County	$991,702,000	Negligible	0.00%
Kendall County	$1,676,308,000	$14,703	0.00%
Refugio County	$469,041,000	Negligible	0.00%
Victoria County	$5,117,120,000	Negligible	0.00%
City of Cibolo (Guadalupe County)	$221,273,000	Negligible	0.00%
TOTALS FOR STUDY AREA[2]	**$12,811,936,000**	**$19,301**	**0.00%**

Probability of Future Events

Based on historical drought in Texas and the GBRA region, the probability of a future drought occurrence is likely, with an event probable in the next three years, and a major drought every 20 years.

Impact and Vulnerability

In order to analyze the risk of the GBRA study area to drought and estimate potential losses, 13 years of statistical data from the NCDC and 2002 United States Department of Agriculture (USDA) agriculture data was used. A drought event frequency-impact was then developed to determine an impact profile on agriculture products and estimate potential losses due to drought in the area. Table 10-5 shows annualized exposure by county.

Table 10-5. Estimated Annualized Agricultural Market Losses to Drought by County

JURISDICTION	TOTAL AGRICULTURAL PRODUCTS EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	$4,193,000	$58,667	1.40%
Calhoun County	$9,183,000	Negligible	0.00%
DeWitt County	$2,286,000	$58,667	2.57%
Gonzales County	$21,669,000	$58,667	0.27%
Kendall County	$970,000	$139,348	14.37%
Refugio County	$12,547,000	Negligible	0.00%
Victoria County	$13,958,000	Negligible	0.00%
City of Cibolo[3] (Guadalupe County)	N/A	N/A	N/A
TOTALS FOR STUDY AREA[4]	**$64,806,000**	**$315,349**	**18.61%**

Drought impacts large areas and crosses jurisdictional boundaries. All existing and future buildings, facilities and populations are exposed to this hazard and could potentially be impacted. However, drought impacts are mostly experienced in water shortages and crop/livestock losses on agricultural lands and typically have no impact on buildings.

The economic impact of droughts can be significant as they produce a complex web of impacts that spans many sectors of the economy and reach well beyond the area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services. If droughts extend over a number of years, the direct and indirect economic impact can be significant.

[3] Given the relatively urban nature of the City of Cibolo, and the inability (based on available data) to statistically determine an exact percentage of exposure and historical loss for this one area of Guadalupe County, information for Cibolo is not included in this table at this time. Future plan updates may be able to revisit this portion of the planning area based on future data and/or methodologies that may be available at that time. From the broader planning perspective and for the purposes of this risk assessment, an alternative could be to assume that historical loss, exposure, annualized loss, and annualized loss ratio would all be negligible for Cibolo.

[4] Totals for the study area may include values less than $5,000 for dollar amounts that are classified as "Negligible" in the table.

SECTION 10: DROUGHT

Based on the previous occurrences and potential exposure for the hazard, the potential severity of impact of droughts is substantial, especially taking into consideration the economic losses that may result.

EXTREME HEAT

Hazard Description 1
Location 1
Extent 2
Historical Occurrences 4
Probability of Future Events 4
Impact and Vulnerability 4

Hazard Description

Severe, excessive summer heat is characterized by a combination of exceptionally high temperatures and humidity. When these conditions persist over a period of time, it is called a heat wave.

Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with severe summer heat include: heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and even heat stroke. The most vulnerable population to heat casualties are children and the elderly or infirmed, who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well being.

Severe summer heat is an invisible killer. Although a heat wave does not happen with the spectacle of other hazards such as tornadoes and floods, the National Center for Environmental Health reports that from 1979 to 1999, excessive heat exposure caused 8,015 deaths in the United States. In other words, during this period, more people in the U.S. died from severe summer heat than from hurricanes, lightning, tornadoes, and floods combined.

Location

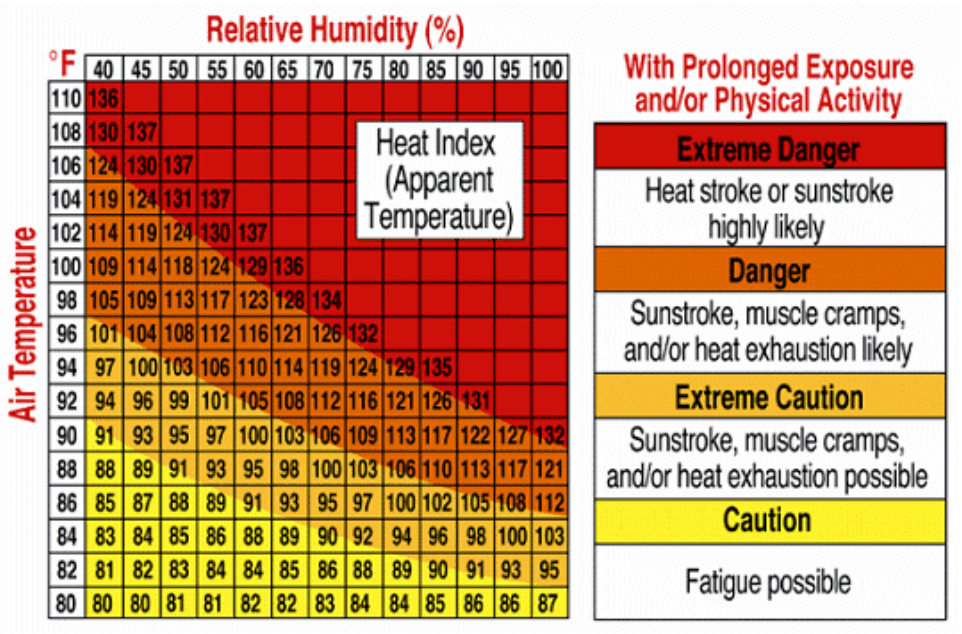
Though injuries or deaths from extreme heat have been recorded at different locations throughout the region, there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere in the planning area.

Extent

Higher than normal humidity and temperatures can cause an extreme heat event or heat wave to occur. A heat wave is a prolonged period of excessive heat most often in very humid conditions.

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the "Heat Index," and is depicted in Figure 11-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

Figure 11-1. Extent Scales for Extreme Summer Heat



°F	40	45	50	55	60	65	70	75	80	85	90	95	100
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	103	106	110	114	119	124	129	135			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	93	95	97	100	102	105	108	112
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87

The extent scale in Figure 11-1 displays varying degrees of caution depending on the relative humidity combined with the temperature. For example, when the temperature is at 90 degrees Fahrenheit or lower, caution should be exercised if the humidity level is at or above 40 percent.

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. "Caution" is the first level of intensity where fatigue due to heat exposure is possible. "Extreme Caution" indicates that sunstroke, muscle cramps or heat exhaustion are possible, whereas a "Danger" level means that these symptoms are likely. "Extreme Danger" indicates that heat stroke is likely.

The National Weather Service (NWS) initiates alerts based on the Heat Index as shown Table 11-1.

Table 11-1. Extreme Summer Heat Warnings

INTENSITY	DETAILED DESCRIPTION
Heat Advisory	Extreme heat index making it feel hot, typically between 105 °F to 110 °F (41 °C to 43 °C) for 3 hours or more during the day and at or above 75 °F (24 °C) at night.
Excessive Heat Warning	Extreme heat index making it feel very hot, typically above 105 °F (41 °C) for 3 hours or more during the day and at or above 80 °F (27 °C) at night.

Source: National Weather Service

Based on the extent scale in Figure 11-1 an extreme summer heat event could occur with an air temperature as low as 80°F if the percentage of humidity was equal to or greater than 40 percent. Even though this temperature seems relatively low, given the high humidity, fatigue is possible. Citizens, especially children and the elderly should exercise caution by staying out of the heat for prolonged periods at this temperature and relative humidity. As the chart indicates fatigue is only possible, but can occur with prolonged exposure or physical activity. Citizens who work outdoors should exercise caution even at the lower temperature if the humidity is at a high degree. With prolonged exposure or physical activity fatigue could set in, causing dizziness, headaches or nausea.

All communities the GBRA planning area are equally susceptible to extreme heat events; however coastal counties and those near the coast, including Victoria, Refugio and Calhoun, may experience higher humidity along with heat resulting in a higher heat index. Therefore among the GBRA communities, those closest to the coast can expect to mitigate an extent where sunstroke, muscle cramps and heat exhaustion or an extent of “Extreme Caution”. Although all areas in the GBRA planning area may experience extreme heat, due to their location on or near the coast, Victoria, Refugio and Calhoun counties can expect to mitigate for heat exhaustion or sunstroke. This also coincides with previous occurrence data, as record heat waves have been recorded for Victoria and Refugio. All other communities within the planning are should mitigate to an extent of “Caution” as fatigue is possible during summer months.

Because the GBRA region is affected seasonally by extreme summer heat, the extent scales provide a means for better targeting mitigation actions to protect lives. For example, it is important to note that fatigue, sunstroke and even heat stroke are possible even when the temperature is not at peak high. Using the extent scale in Figure 11-1 to combine heat and humidity allows officials to better predict events and more accurately warn citizens of danger.

SECTION 11: EXTREME HEAT

Historical Occurrences

In other parts of the country and the world, severe summer heat hazards have had devastating consequences. For instance, in 1995 a two-week-long heat wave hit Chicago and the heat index peaked at 119 degrees Fahrenheit. There were 465 deaths directly attributable to the heat wave and more than half of the victims were 75 years of age or older.

According to the National Climatic Data Center, from 1999 to 2009 two heat events affected counties in the planning area: Victoria and Refugio. In September of 2000 a stagnant high pressure light winds and below normal rainfall allowed temperatures to remain above 100 °F; Victoria County remained above 109°F in the first 5 days of September. No deaths or property damage was reported. In May of 2006 very hot and humid conditions developed in South Texas including Victoria and Refugio Counties. On May 10, 2006 heat indices reached 115 to 125°F. No deaths or property damage was reported. While no deaths were reported for these two events, such devastation is possible and has occurred state wide. Table 11-2 below summarizes heat event related deaths in Texas for the last 10 years.

Table 11-2. Extreme Heat related deaths in Texas

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Texas	11	32	21	1	none reported	4	1	6	3	5	13

Source: NCDC

Probability of Future Events

The likelihood or future probability of occurrence of excessive summer heat in the GBRA region is occasional, with an event possible in the next five years. Extreme drought conditions and above-average temperatures for 2009 have affected all of the participating jurisdictions' probability of experiencing an extreme heat event; secondary impacts as well. In the past, multiple counties throughout the region have issued burn bans to prevent the occurrence of wildfires due to extreme heat and dry conditions.

Impact and Vulnerability

The potential impact of excessive summer heat is minor, resulting in few, if any, injuries. There is only minor property damage and minimal disruption to the quality of life. Any shutdown of facilities is temporary.

There is no defined geographic boundary for excessive summer heat events. While all of the planning area is exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not

considered vulnerable to significant damage caused by extreme heat events. Therefore, any estimated property losses associated with these hazards are anticipated to be minimal across the area. However, extreme temperatures do present significant life and safety threats to the population of the GBRA region. As a result, excessive summer heat deserves mitigation consideration by the participating jurisdictions.

WILDFIRE

Hazard Description 1
Location 1
Extent 30
Historical Occurrences 32
Probability of Future Events 33
Impact and Vulnerability 33

Hazard Description

A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.

Texas has seen a huge increase in the number of wildfires in the past 30 years. Years of fire suppression have significantly disturbed natural fire occurrences—nature's renewal process. The result has been the gradual accumulation of understory and canopy fuels to levels of density that can feed high-energy, intense wildfires and further increase the hazards from and exposure to interface problems.

Location

GIS data depicting the Federal Register definition of the wildland-urban interface in Texas based on the integration of U.S. Census and USGS National Land Cover Data was used to identify the following areas of possible concern:

- High Density Interface
- Medium Density Interface
- Low Density Interface
- Intermix

Figures 12-1 through 12-28 graphically illustrate the potential wildfire hazard areas and provide an indication of where there is potential for damage to property and loss of life in the GBRA Region. Known historical wildfire occurrences, in and around the city, are also shown.

Figure 12-1. Potential Wildfire Hazard Areas and Historical Wildfire Occurrences in GBRA (TFS, 2003-2009)

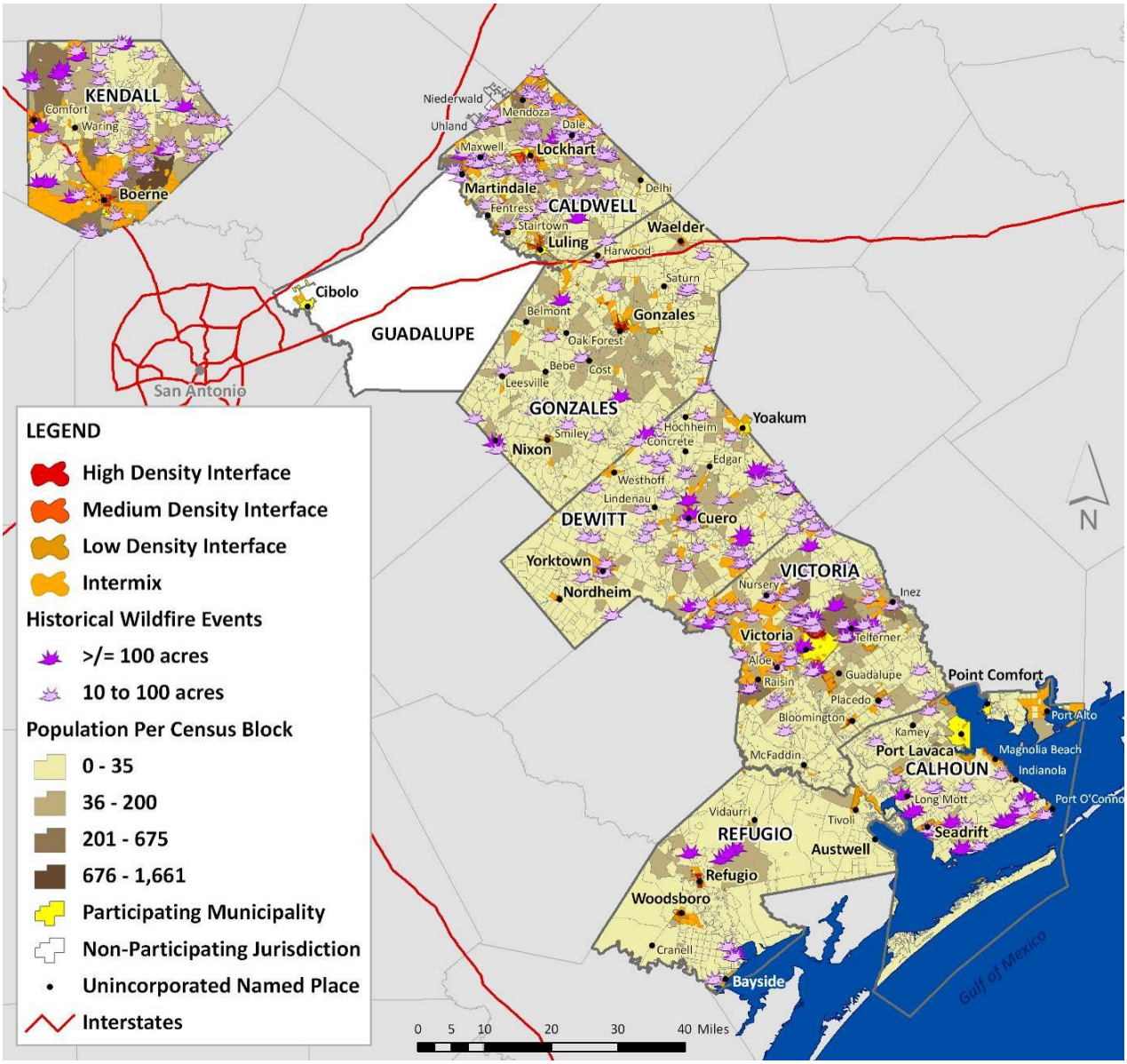


Figure 12-2. Potential Wildfire Hazard Areas in Caldwell County

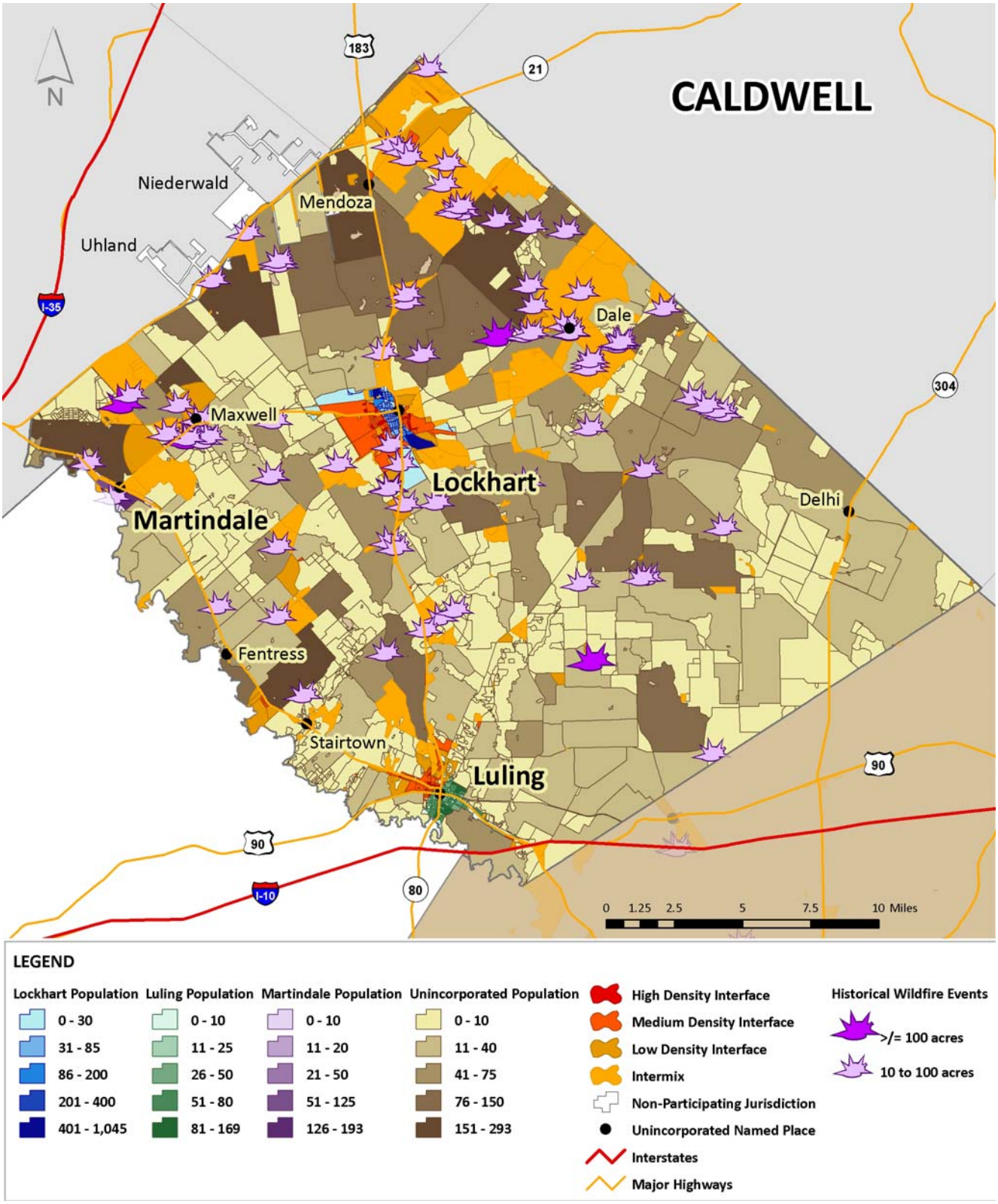


Figure 12-3. Potential Wildfire Hazard Areas in Lockhart

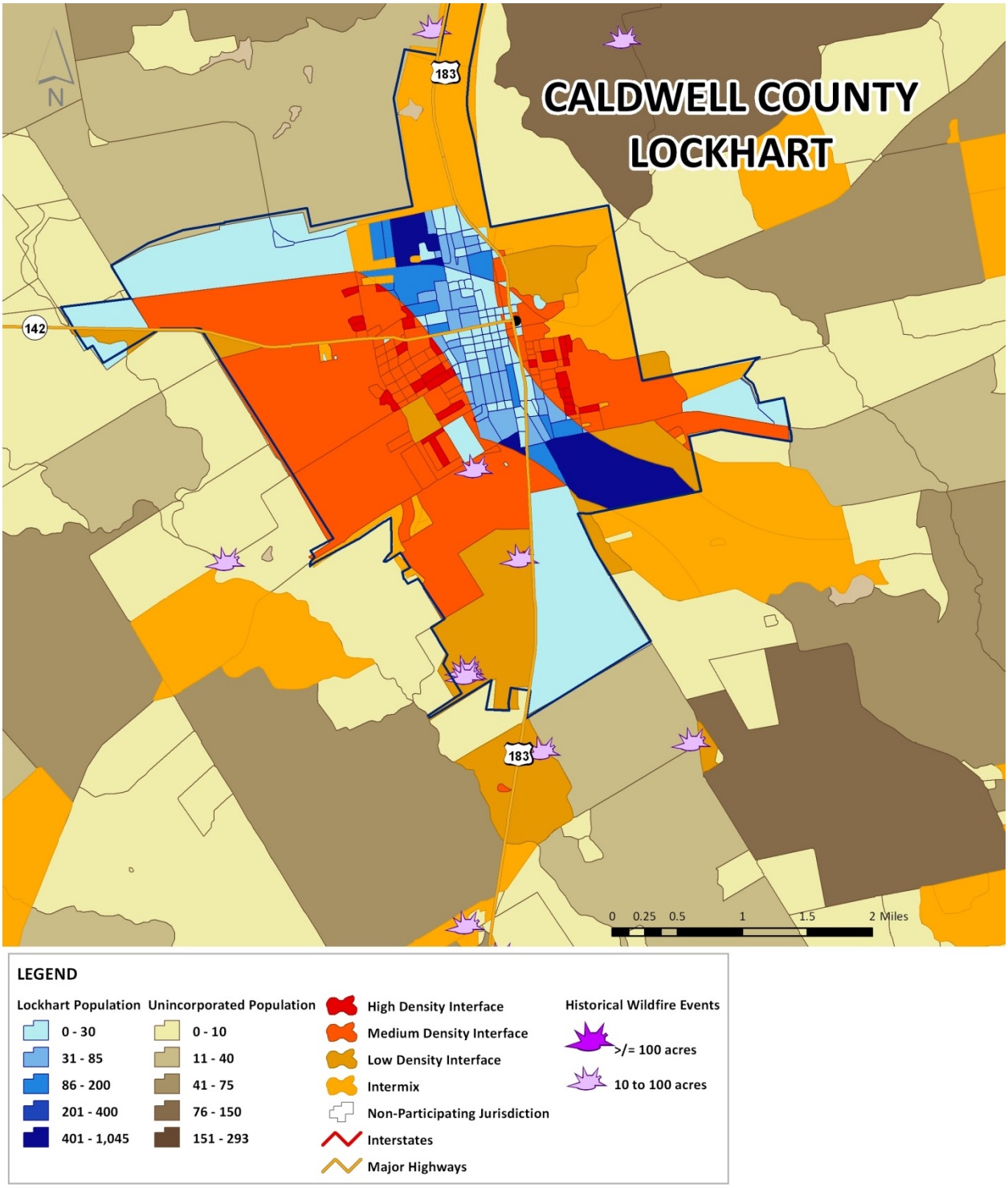


Figure 12-4. Potential Wildfire Hazard Areas in Luling

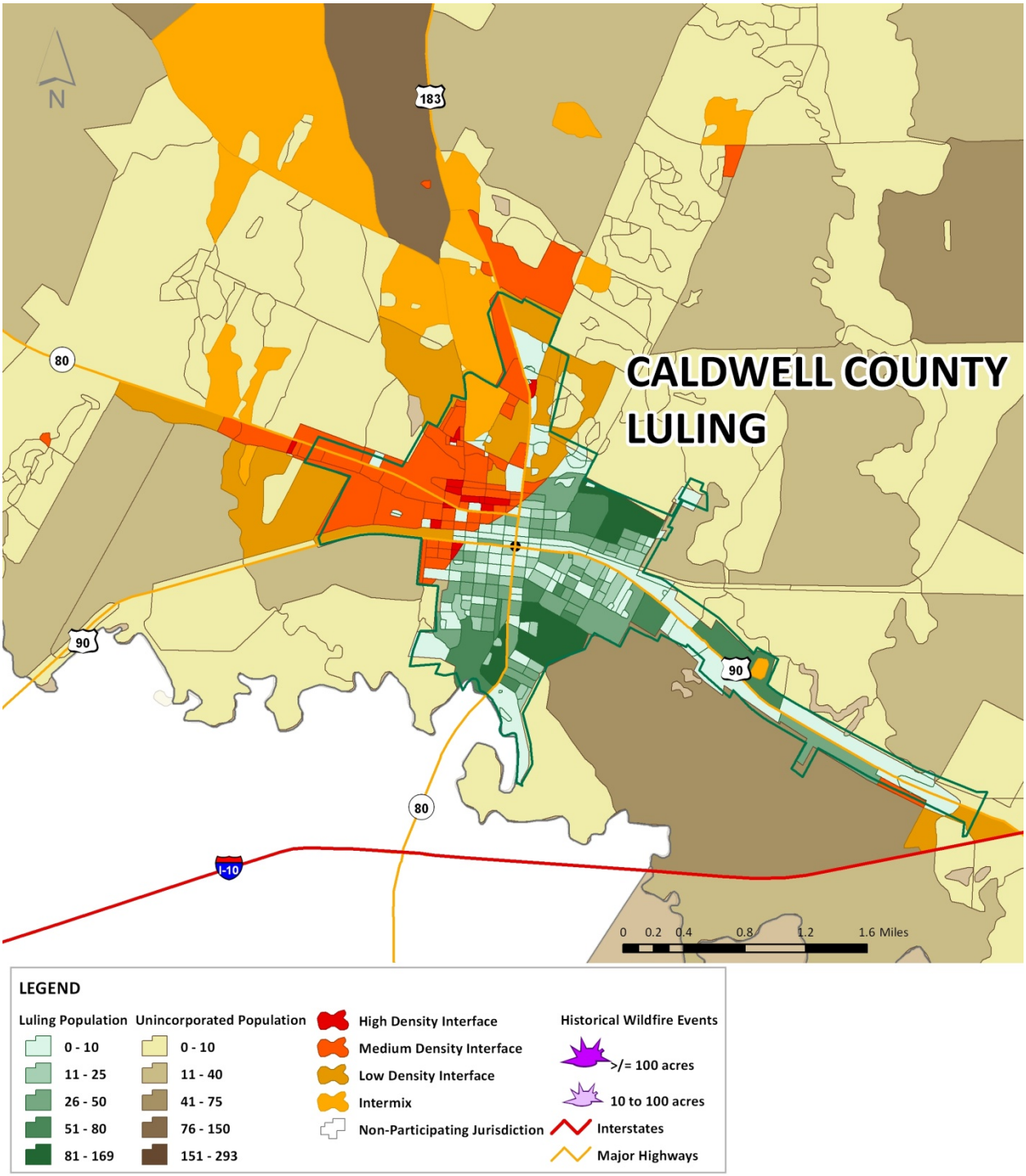


Figure 12-5. Potential Wildfire Hazard Areas in Martindale

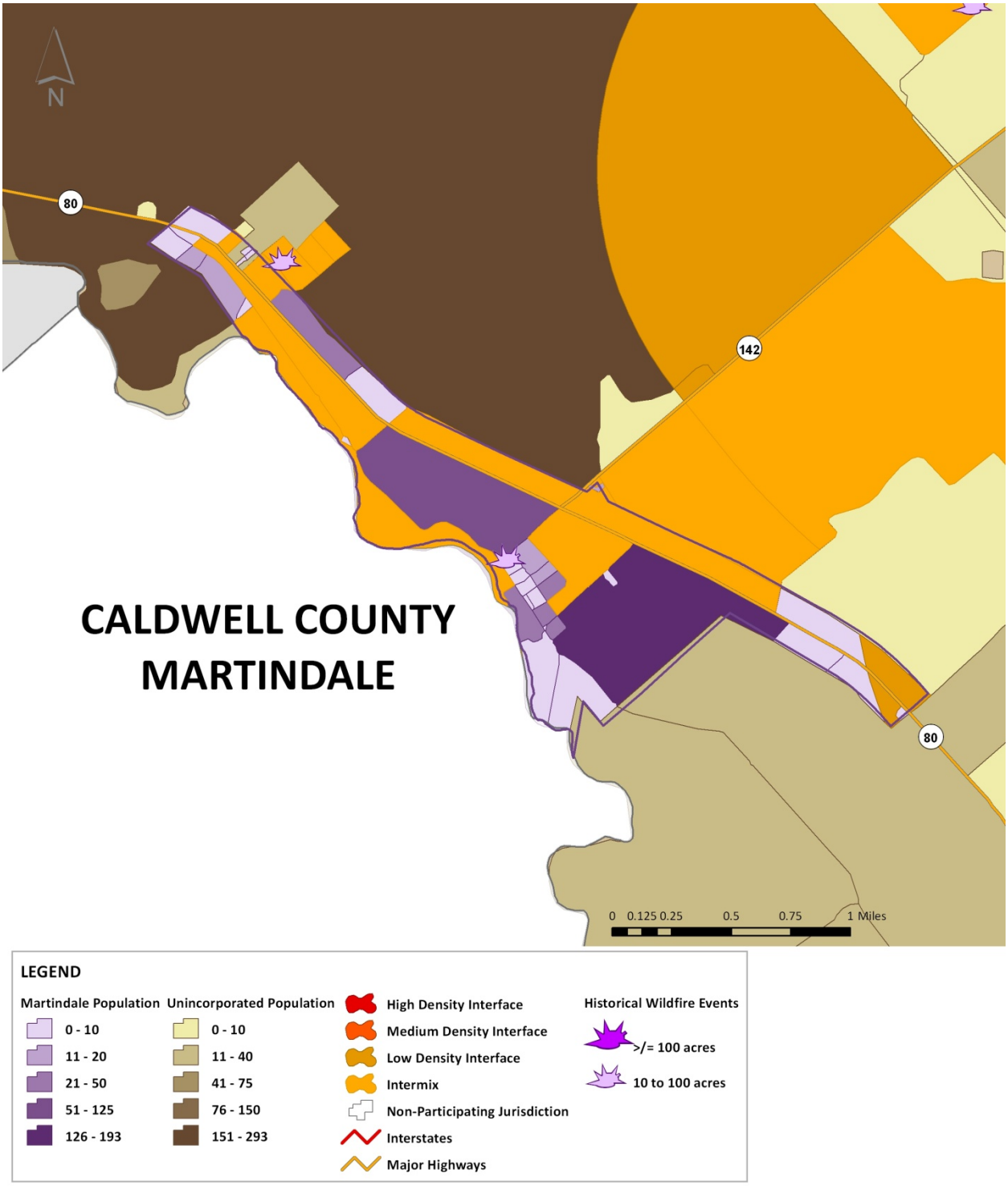


Figure 12-6. Potential Wildfire Hazard Areas in Calhoun County

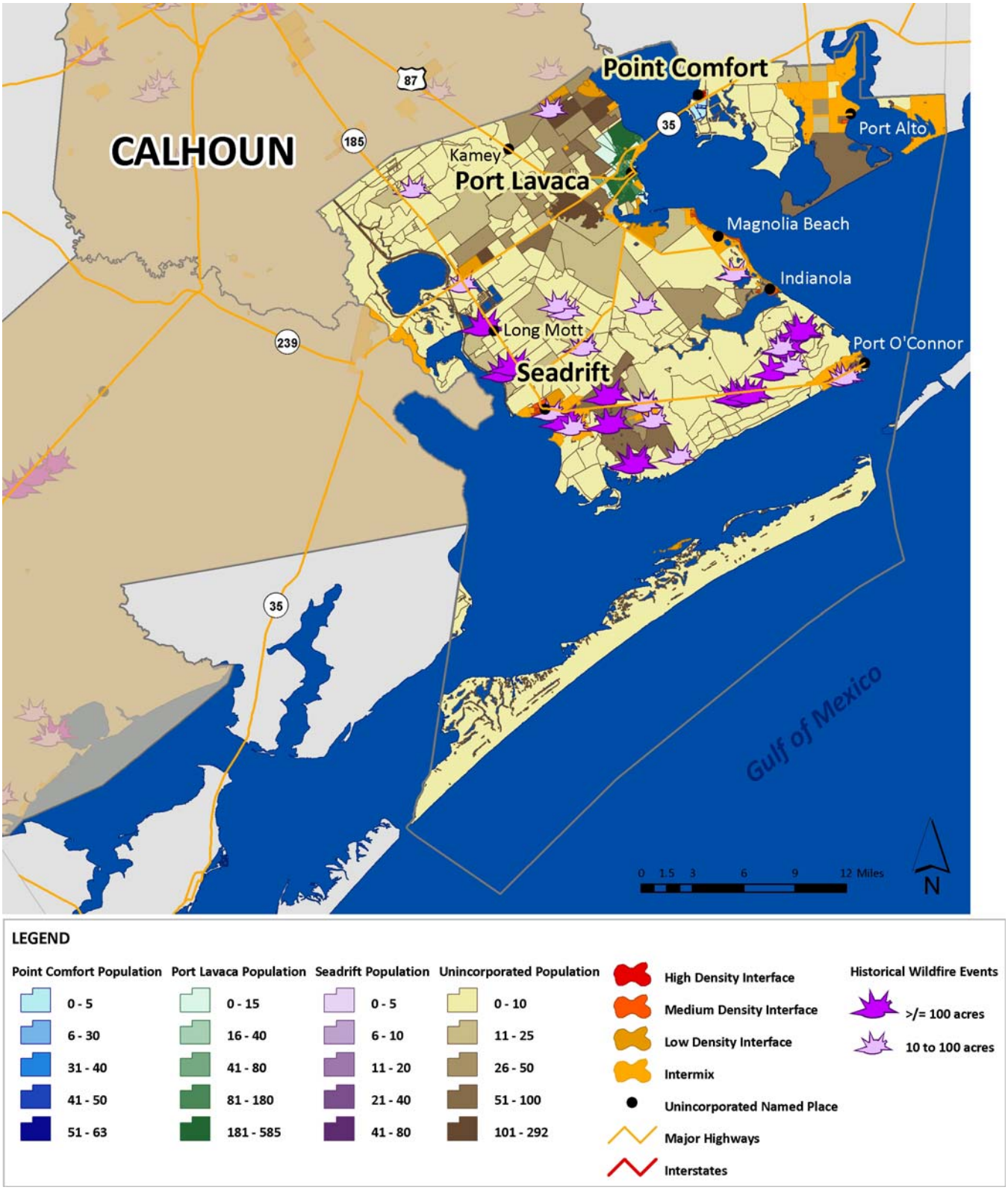


Figure 12-7. Potential Wildfire Hazard Areas in Point Comfort

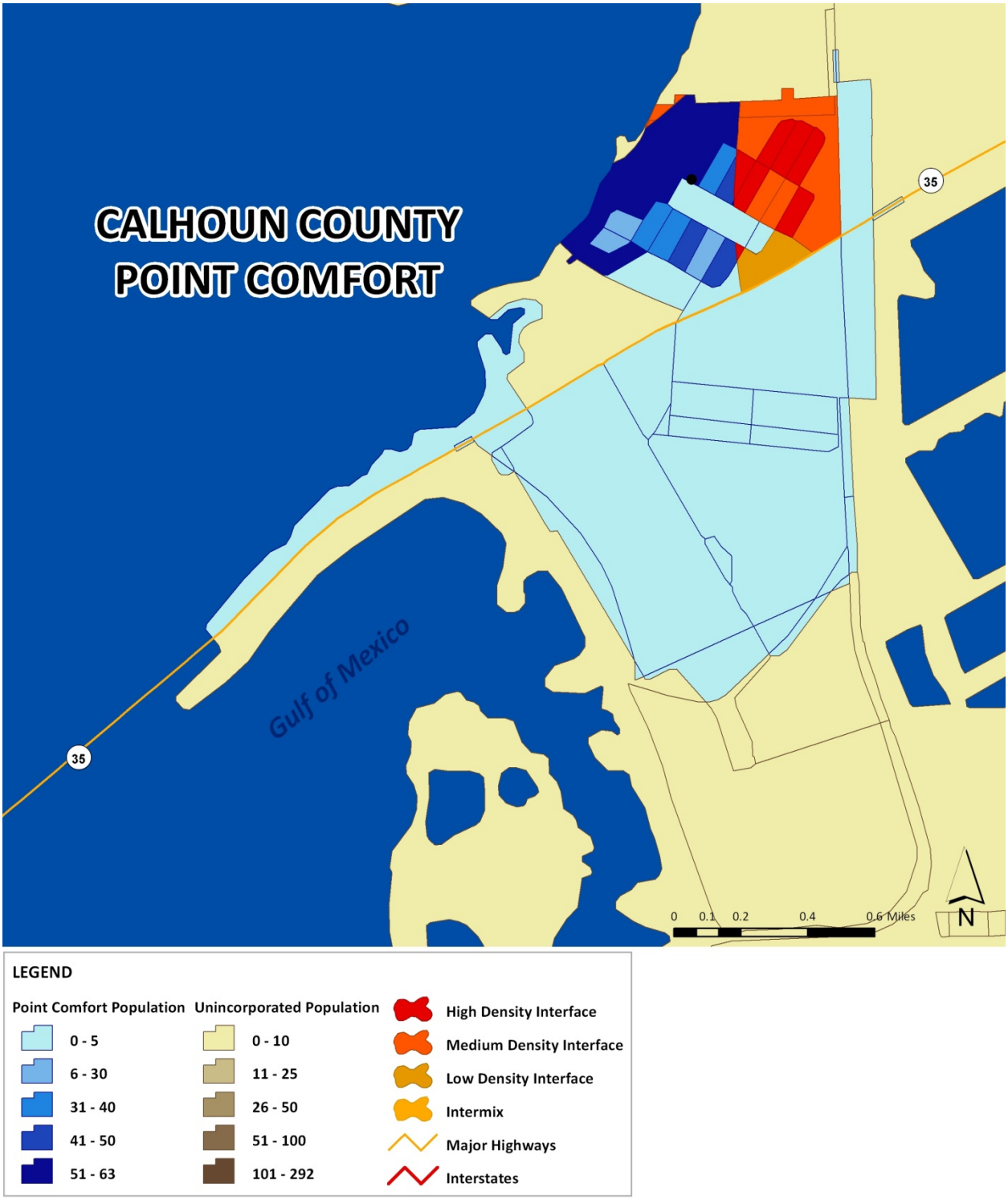


Figure 12-8. Potential Wildfire Hazard Areas in Port Lavaca

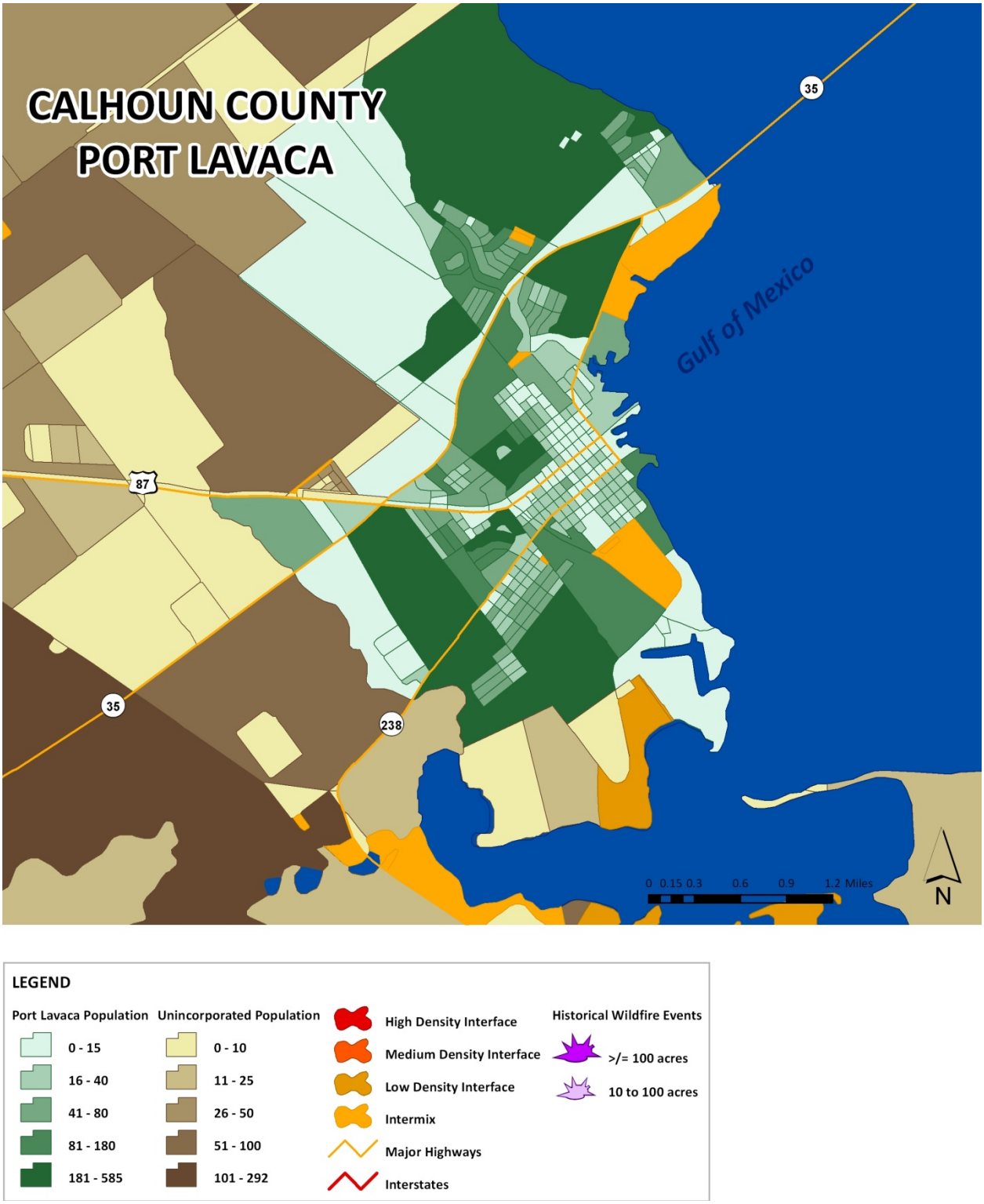


Figure 12-9. Potential Wildfire Hazard Areas in Seadrift

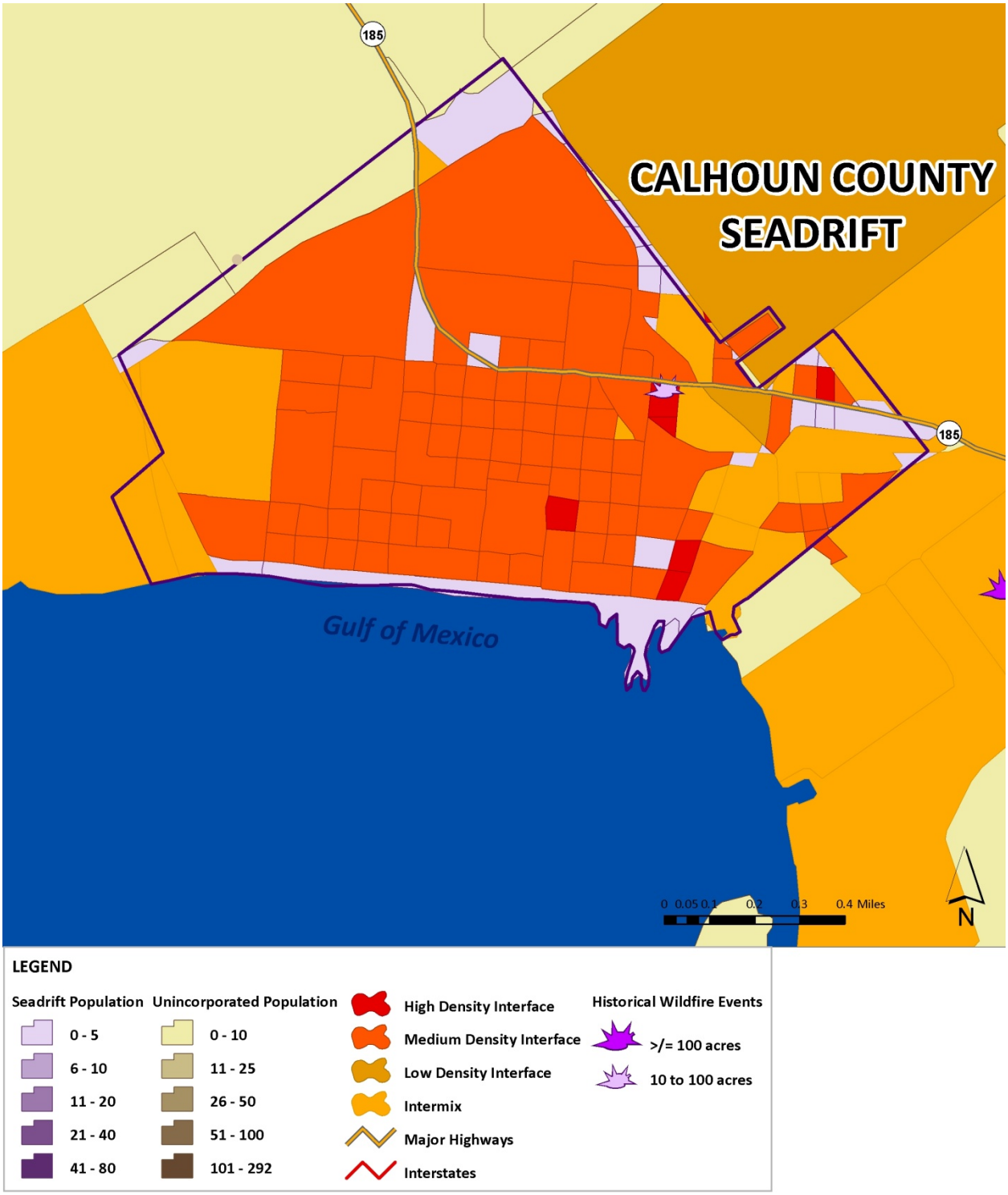


Figure 12-10. Potential Wildfire Hazard Areas in DeWitt County

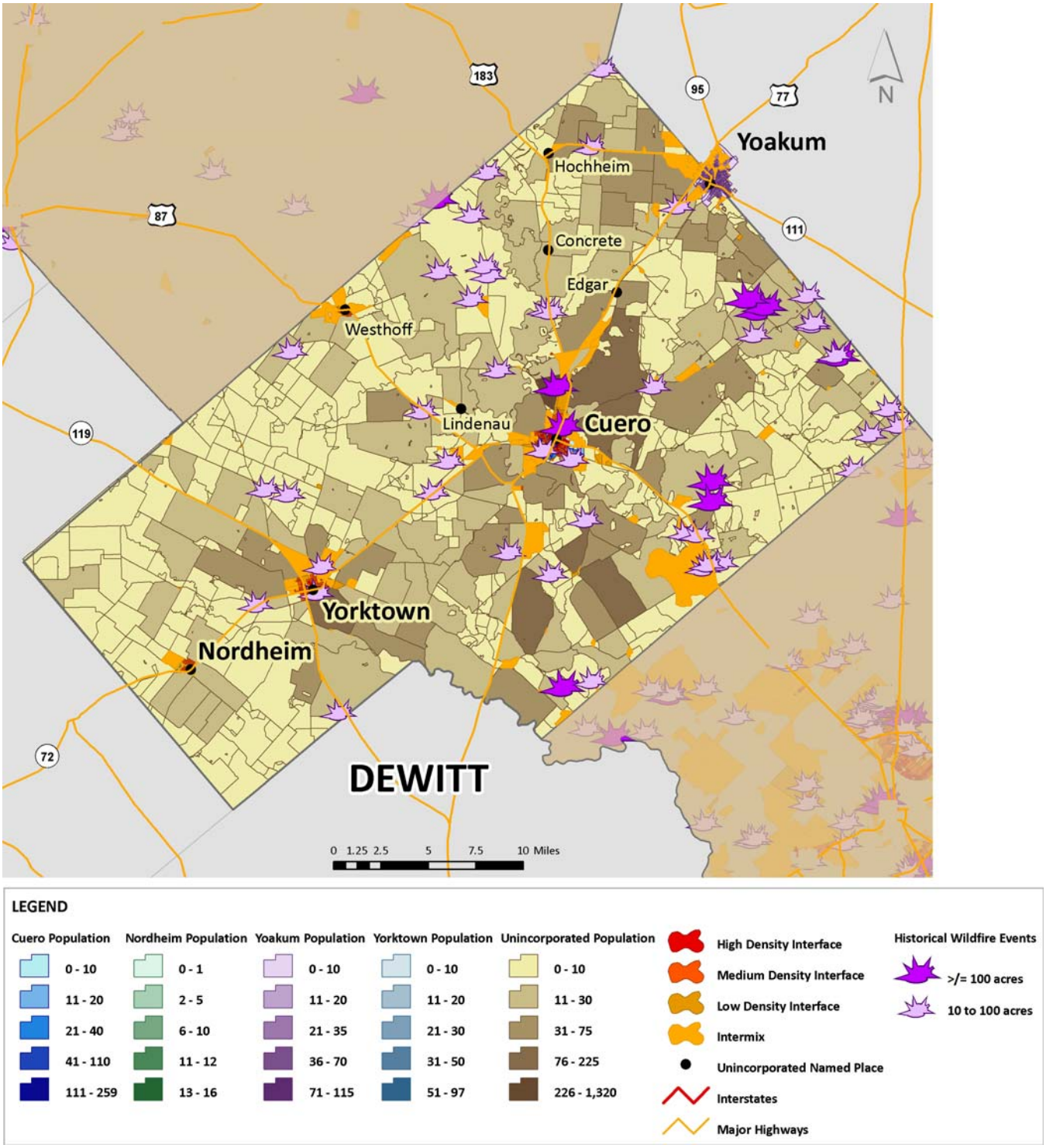


Figure 12-11. Potential Wildfire Hazard Areas in Cuero

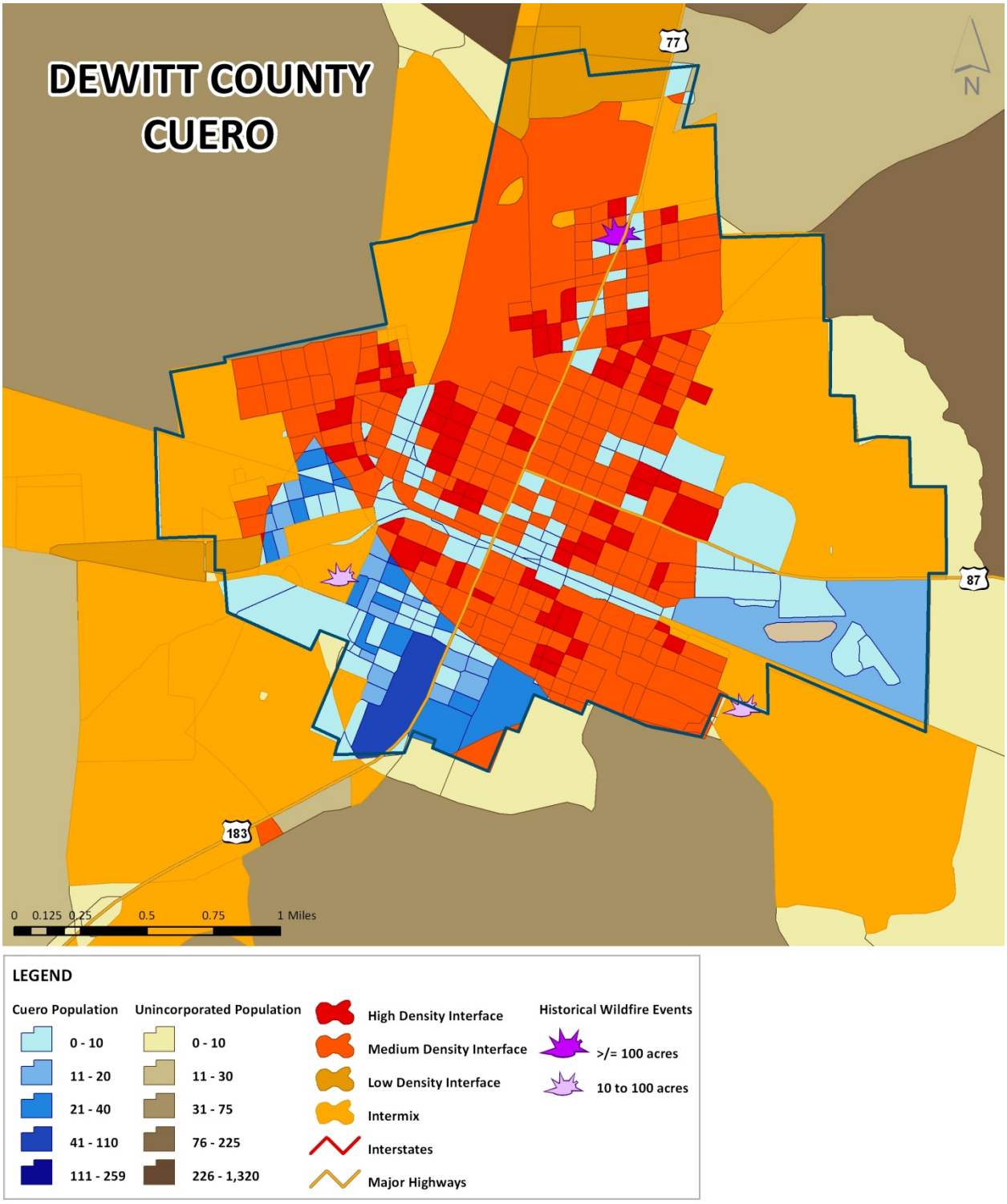


Figure 12-12. Potential Wildfire Hazard Areas in Nordheim

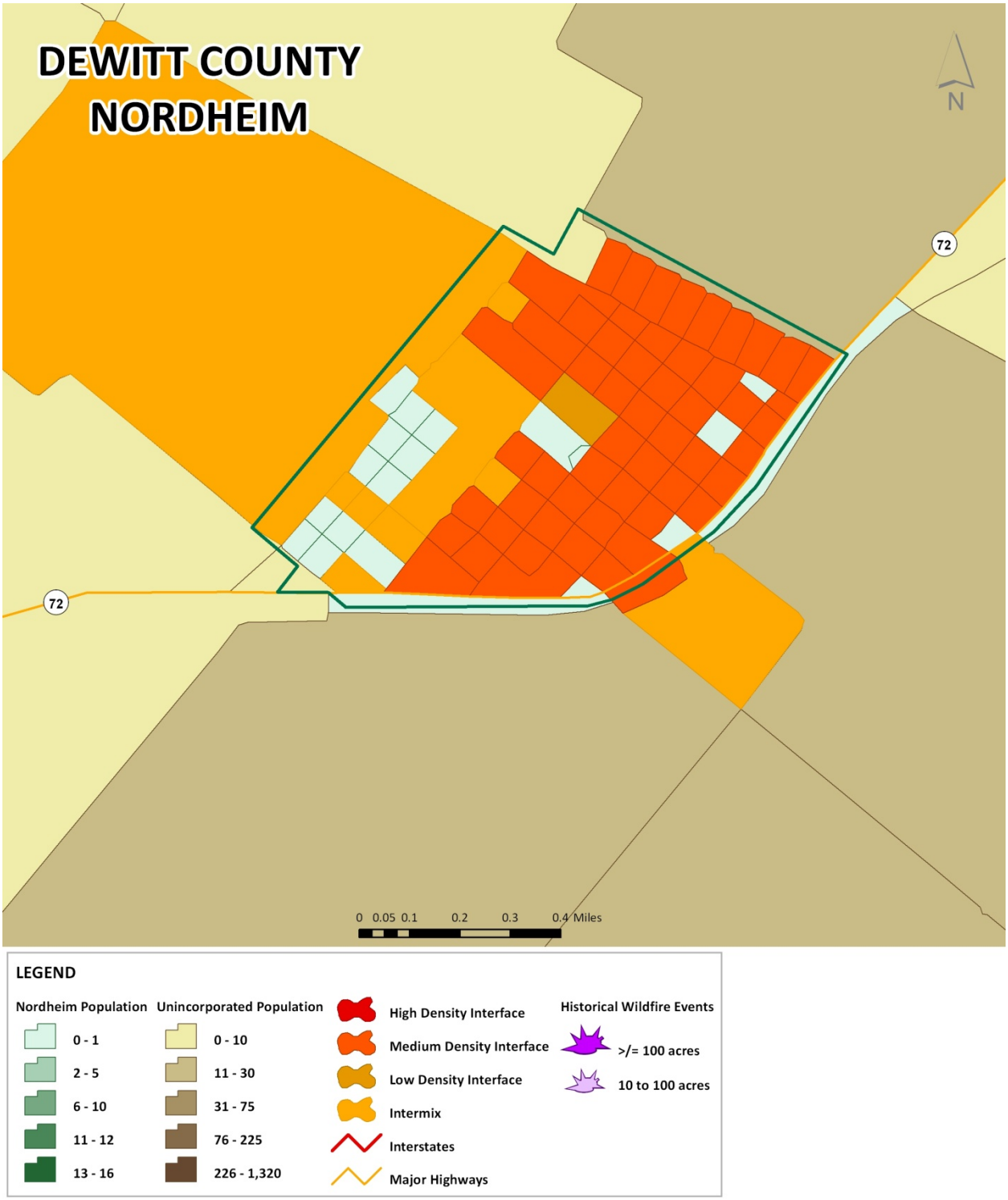


Figure 12-13. Potential Wildfire Hazard Areas in Yoakum

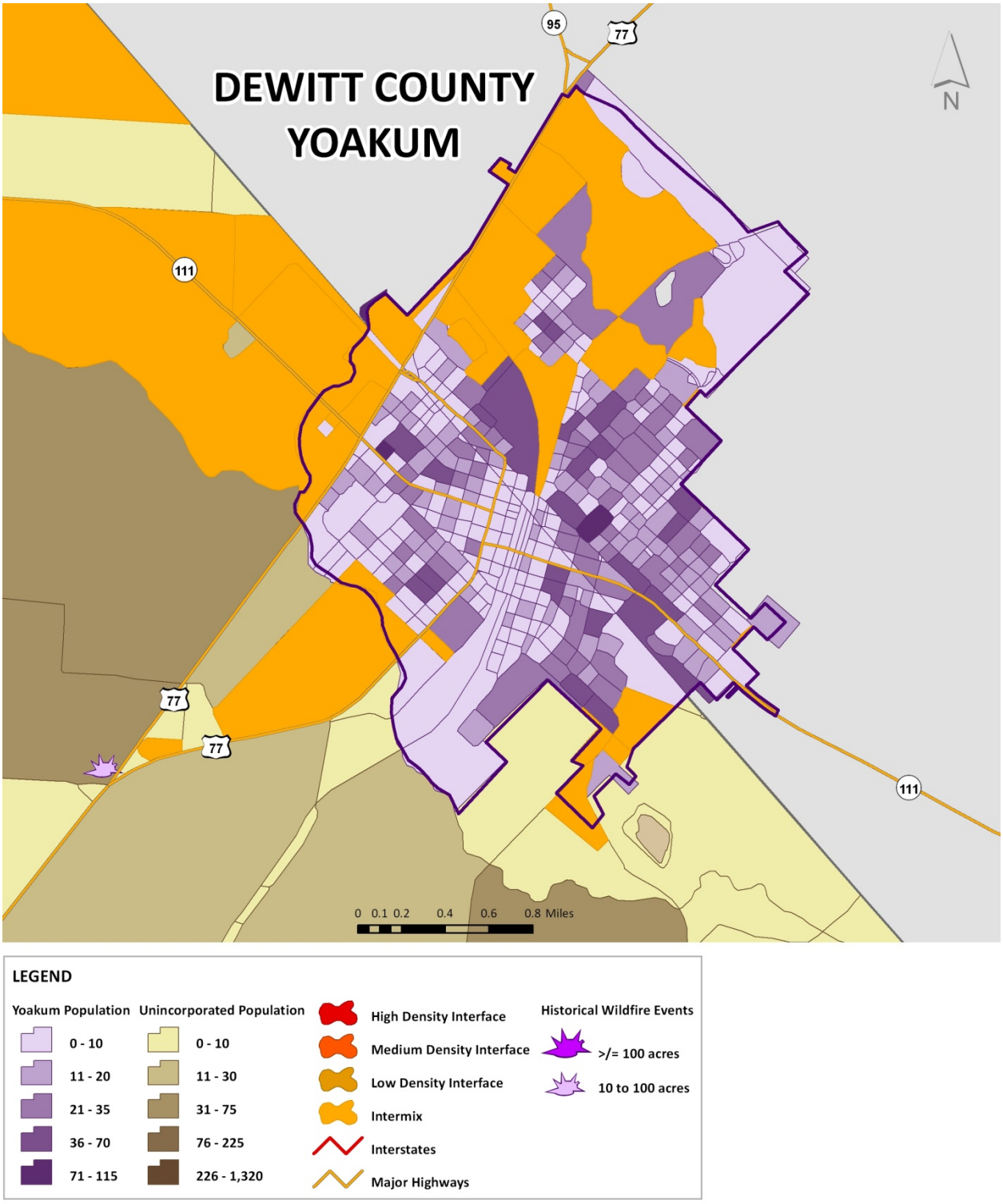


Figure 12-14. Potential Wildfire Hazard Areas in Yorktown

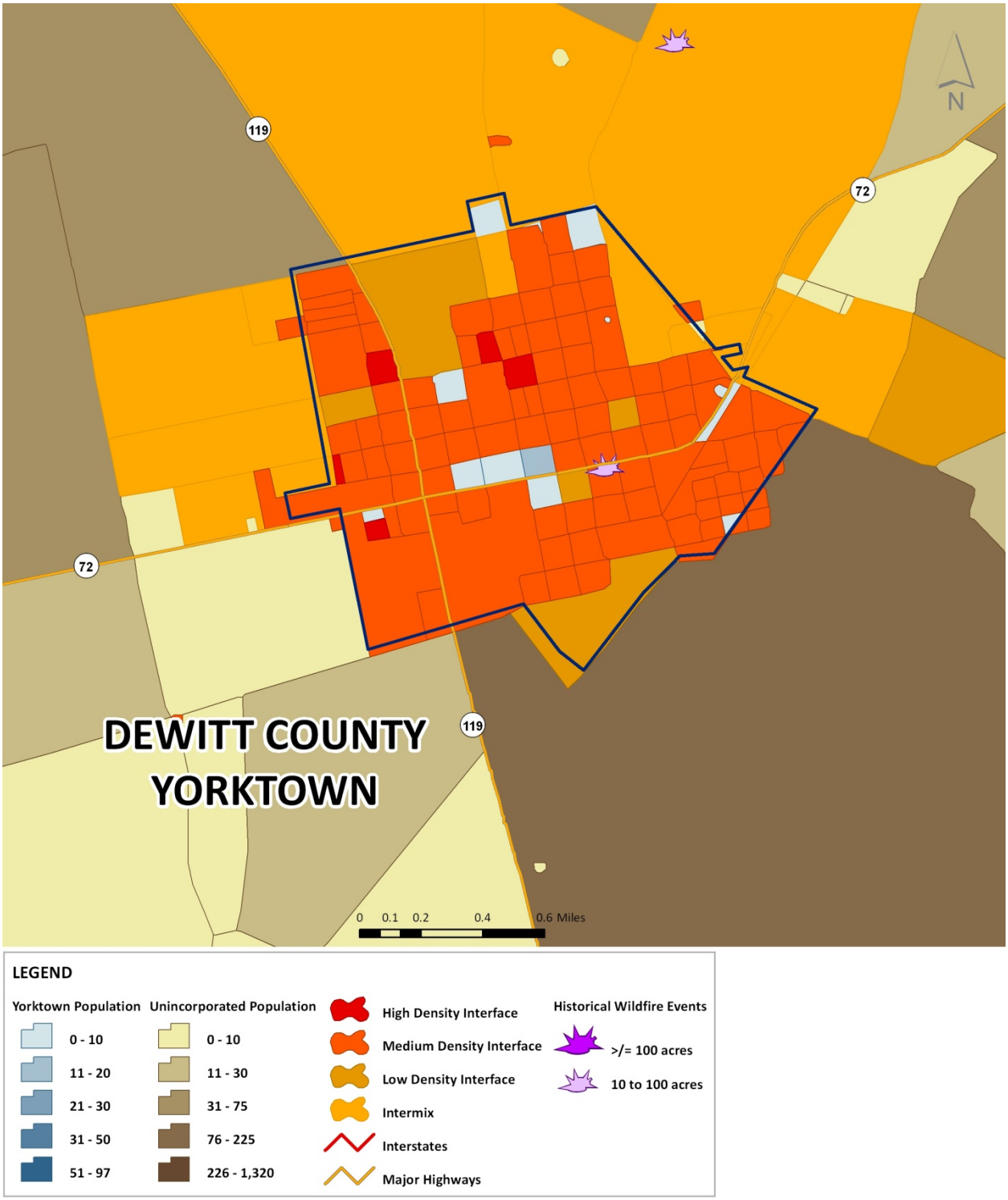


Figure 12-15. Potential Wildfire Hazard Areas in Gonzales County

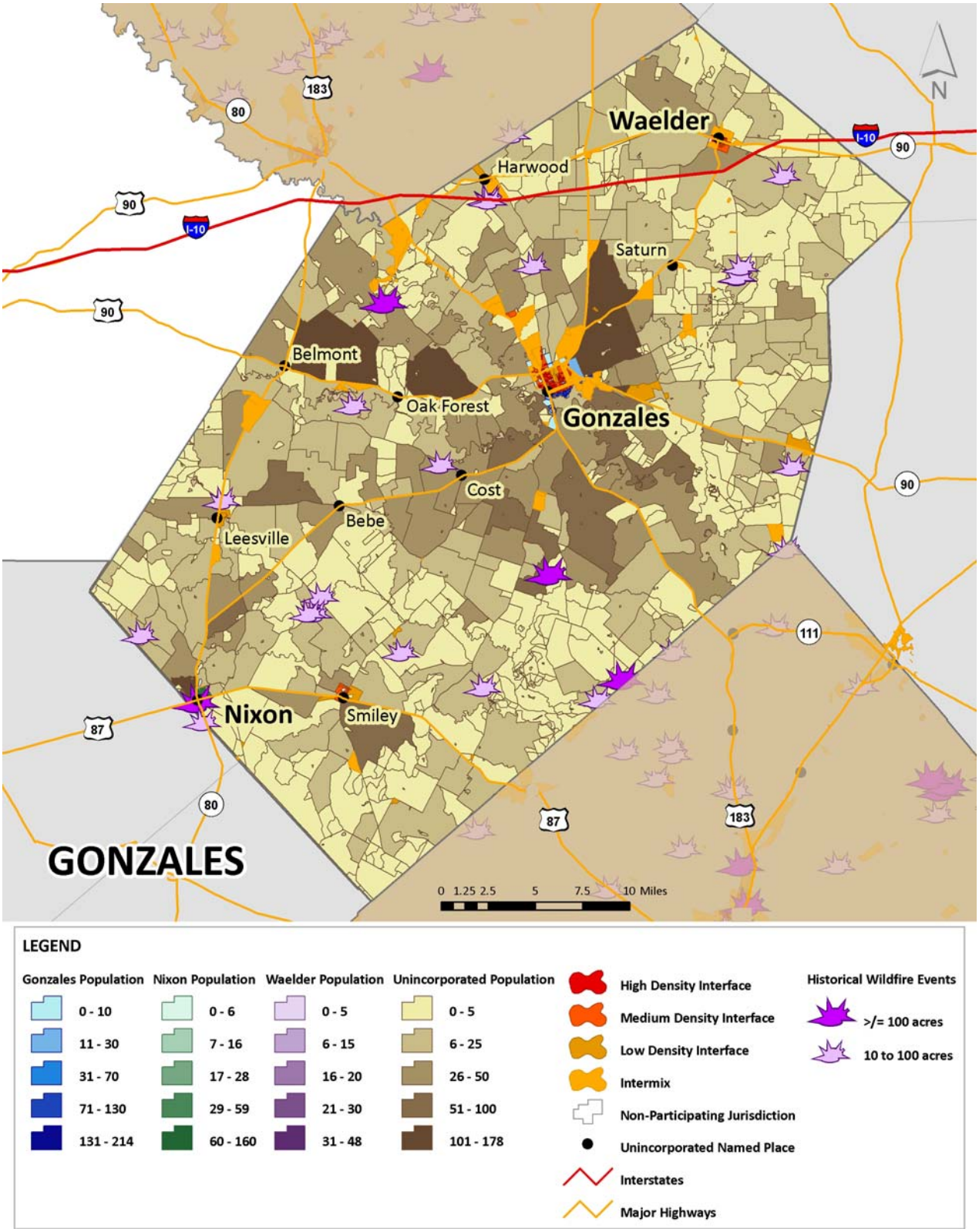


Figure 12-16. Potential Wildfire Hazard Areas in Gonzales

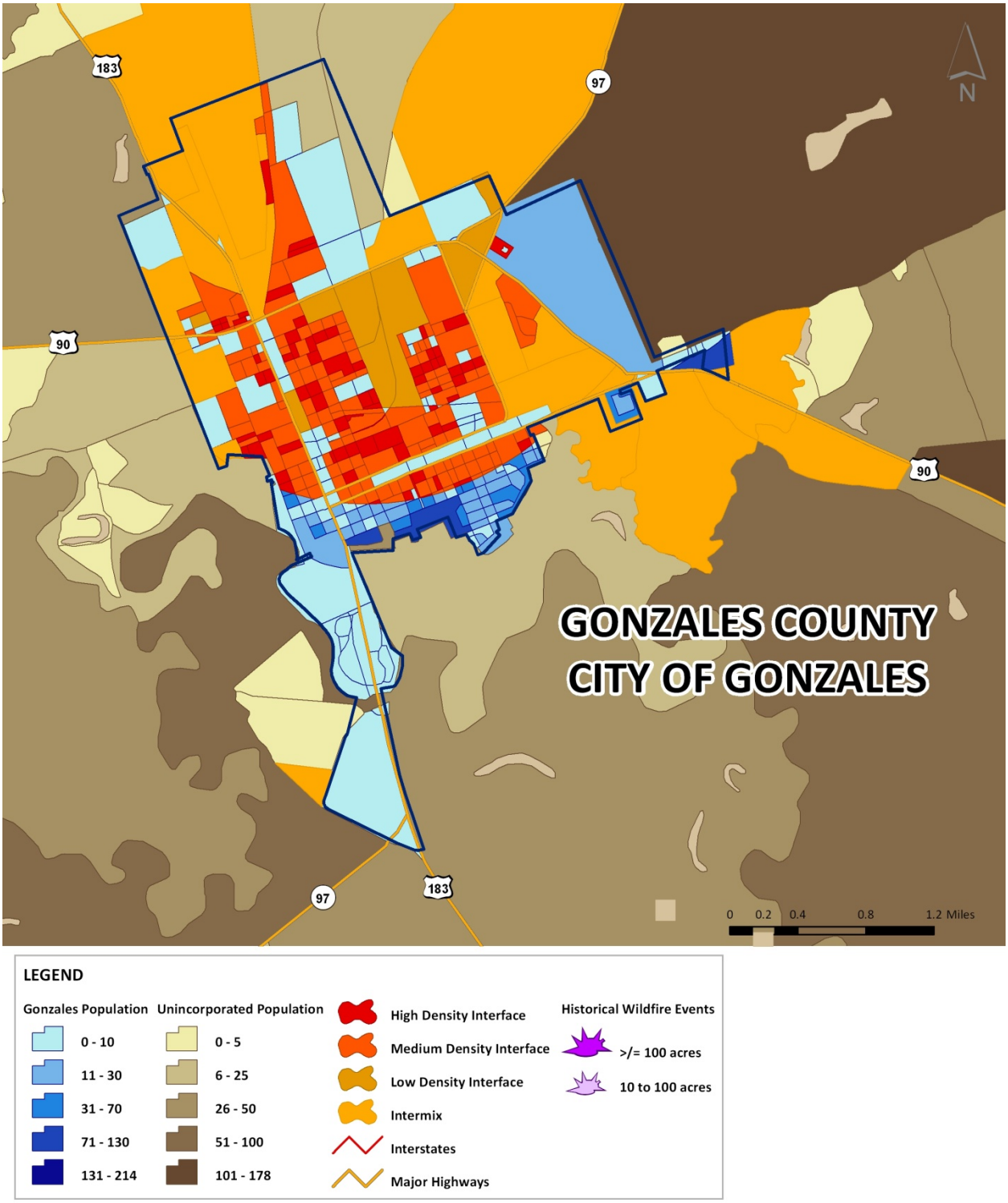


Figure 12-17. Potential Wildfire Hazard Areas in Nixon

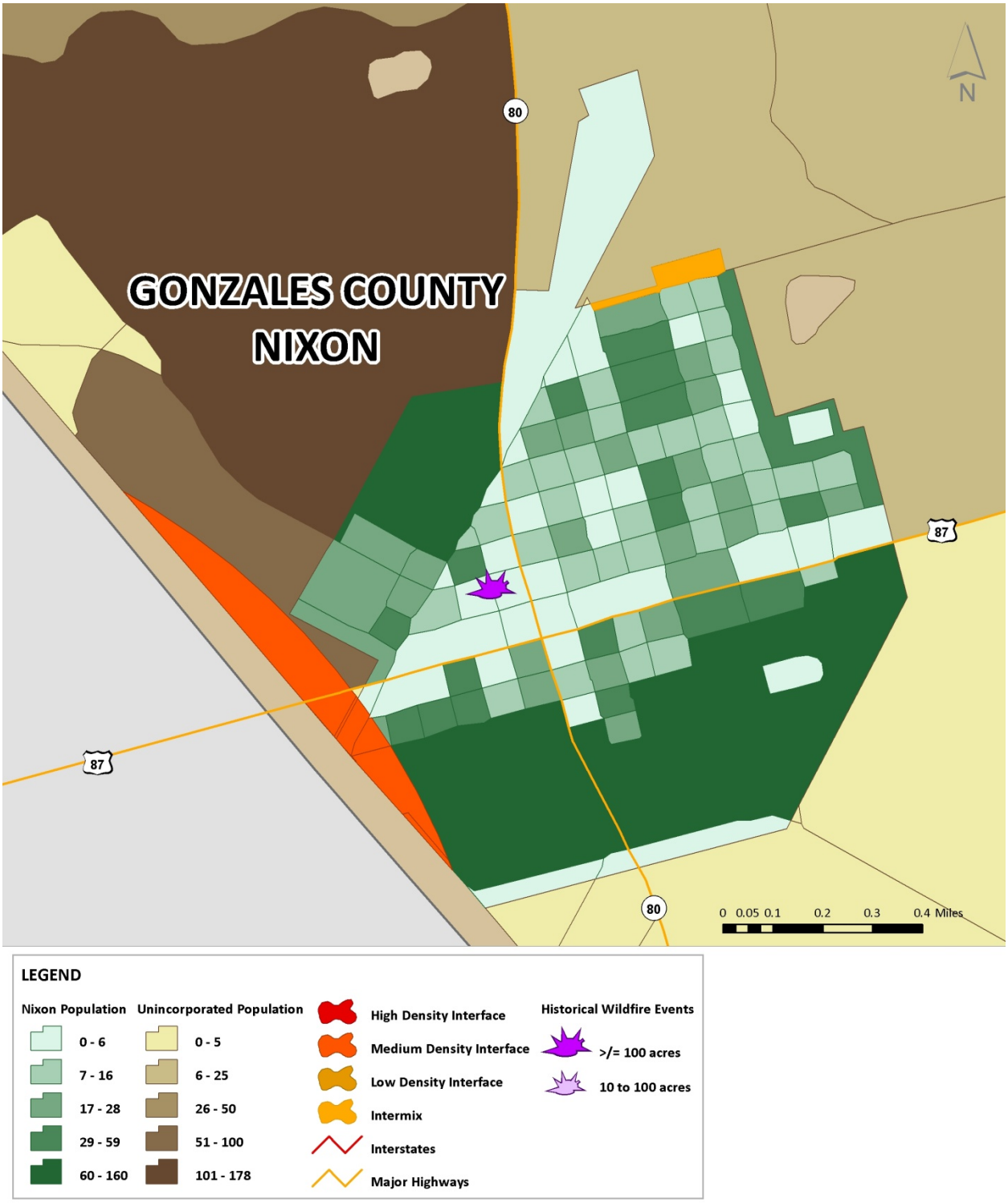


Figure 12-18. Potential Wildfire Hazard Areas in Waelder

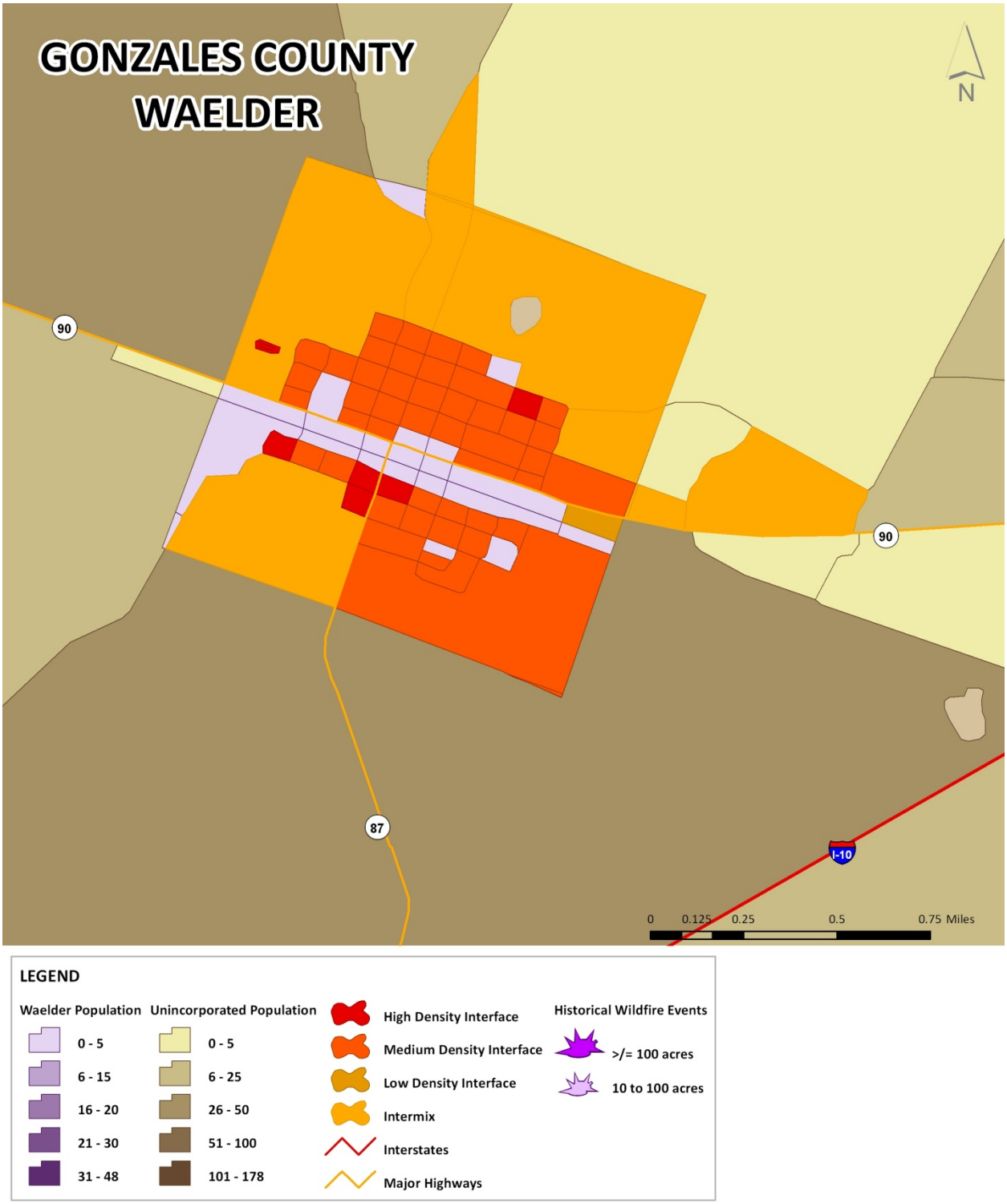


Figure 12-19. Potential Wildfire Hazard Areas in Cibolo (Guadalupe County)

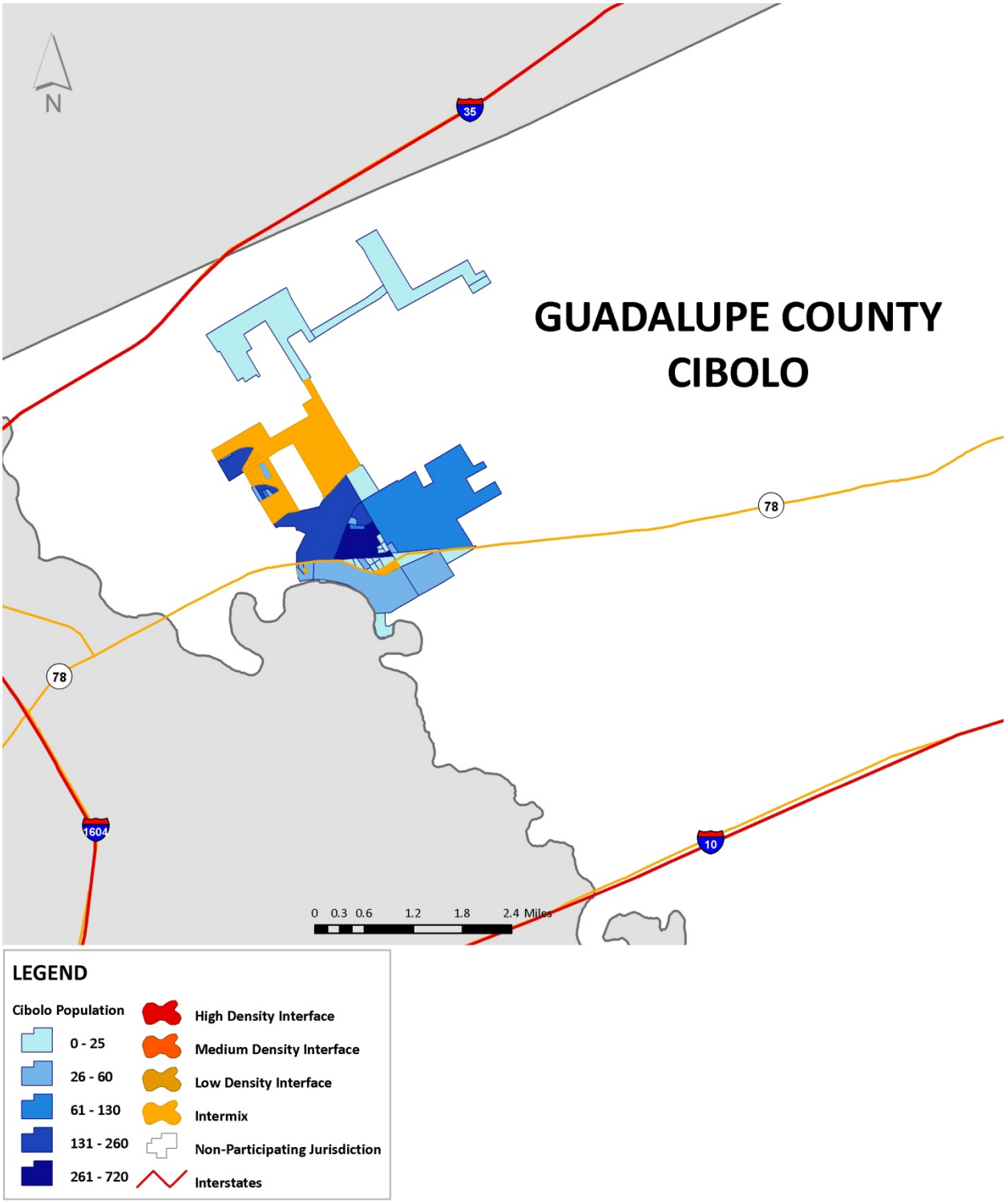


Figure 12-20. Potential Wildfire Hazard Areas in Kendall County

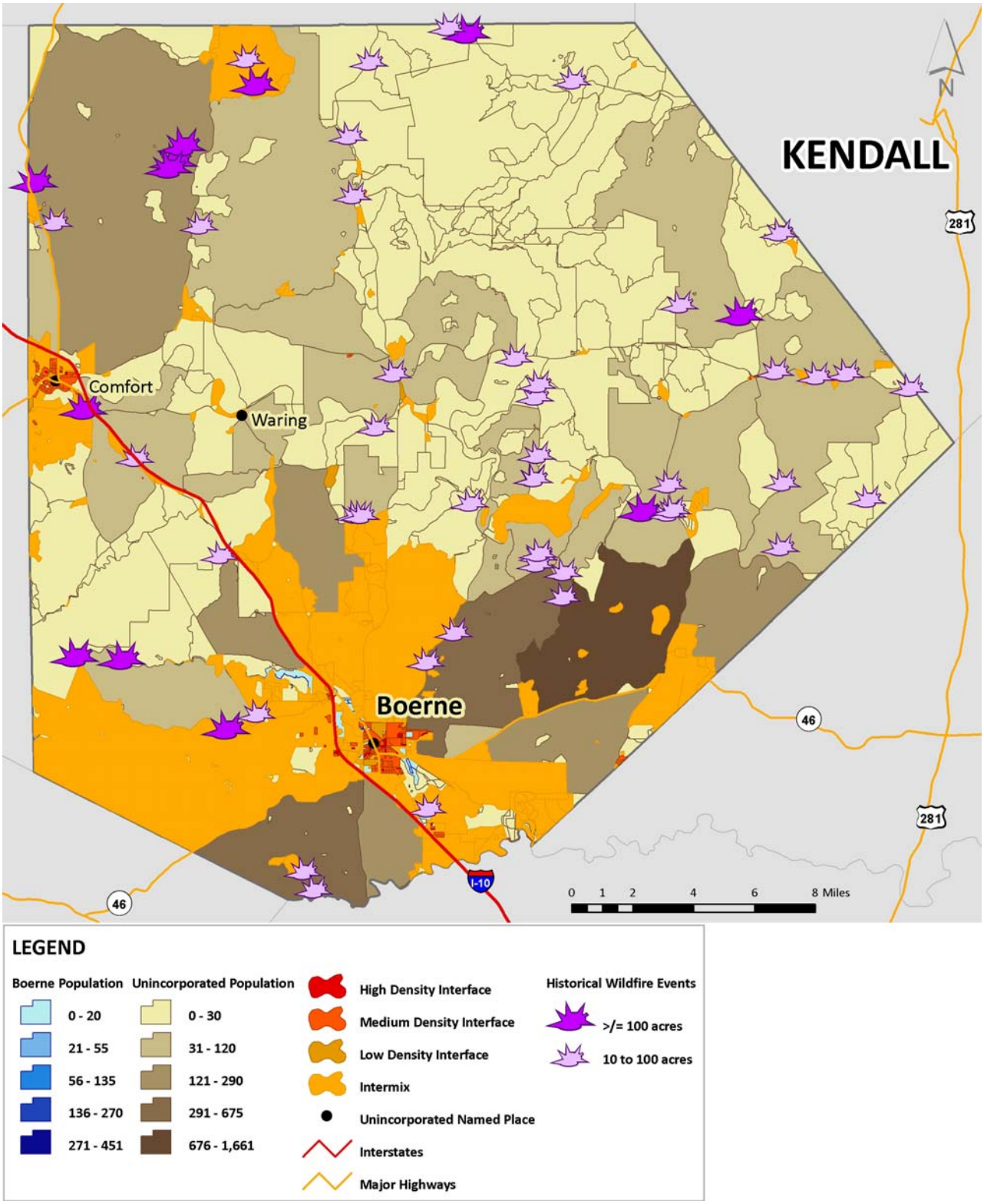


Figure 12-21. Potential Wildfire Hazard Areas in Boerne

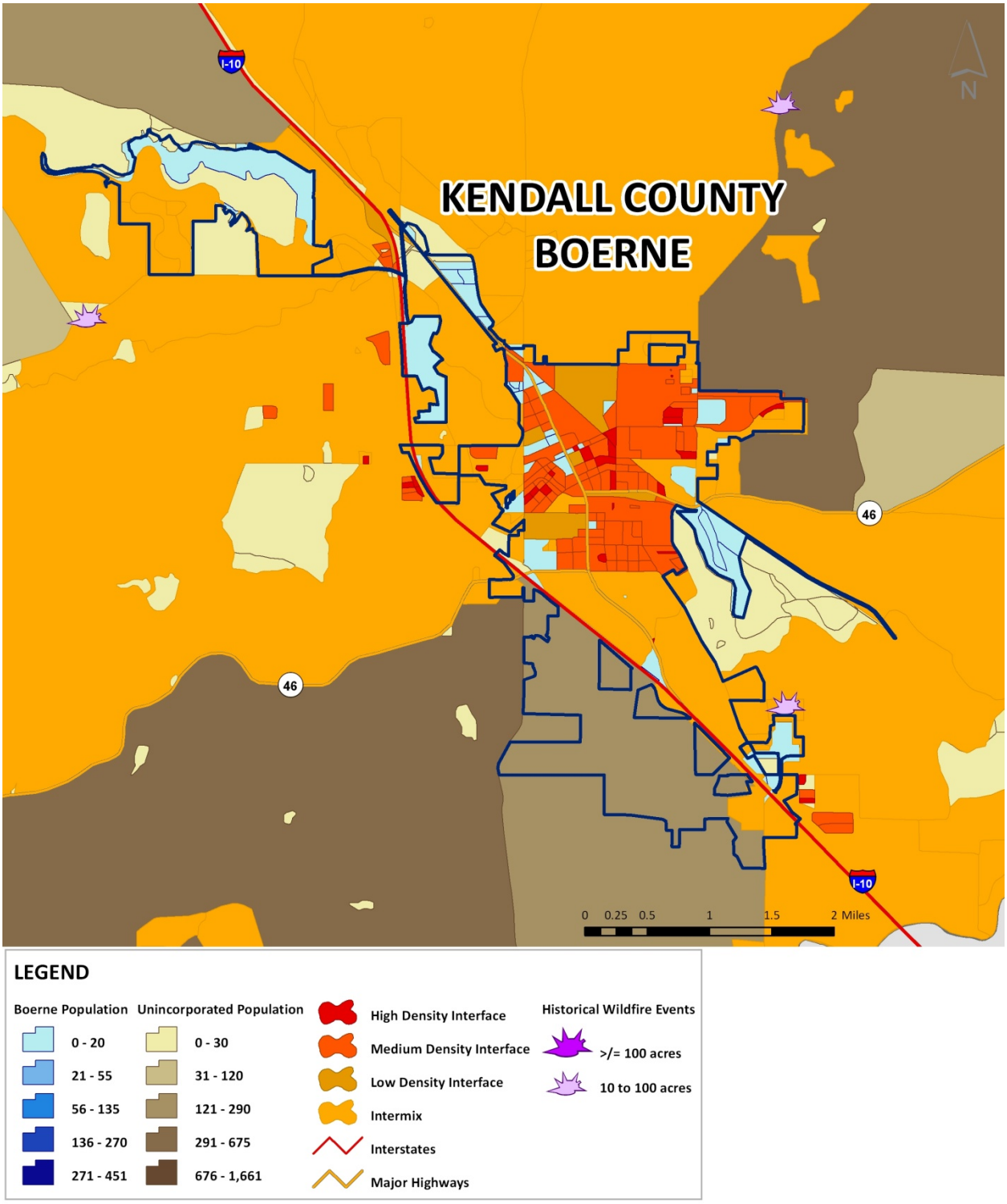


Figure 12-22. Potential Wildfire Hazard Areas in Refugio County

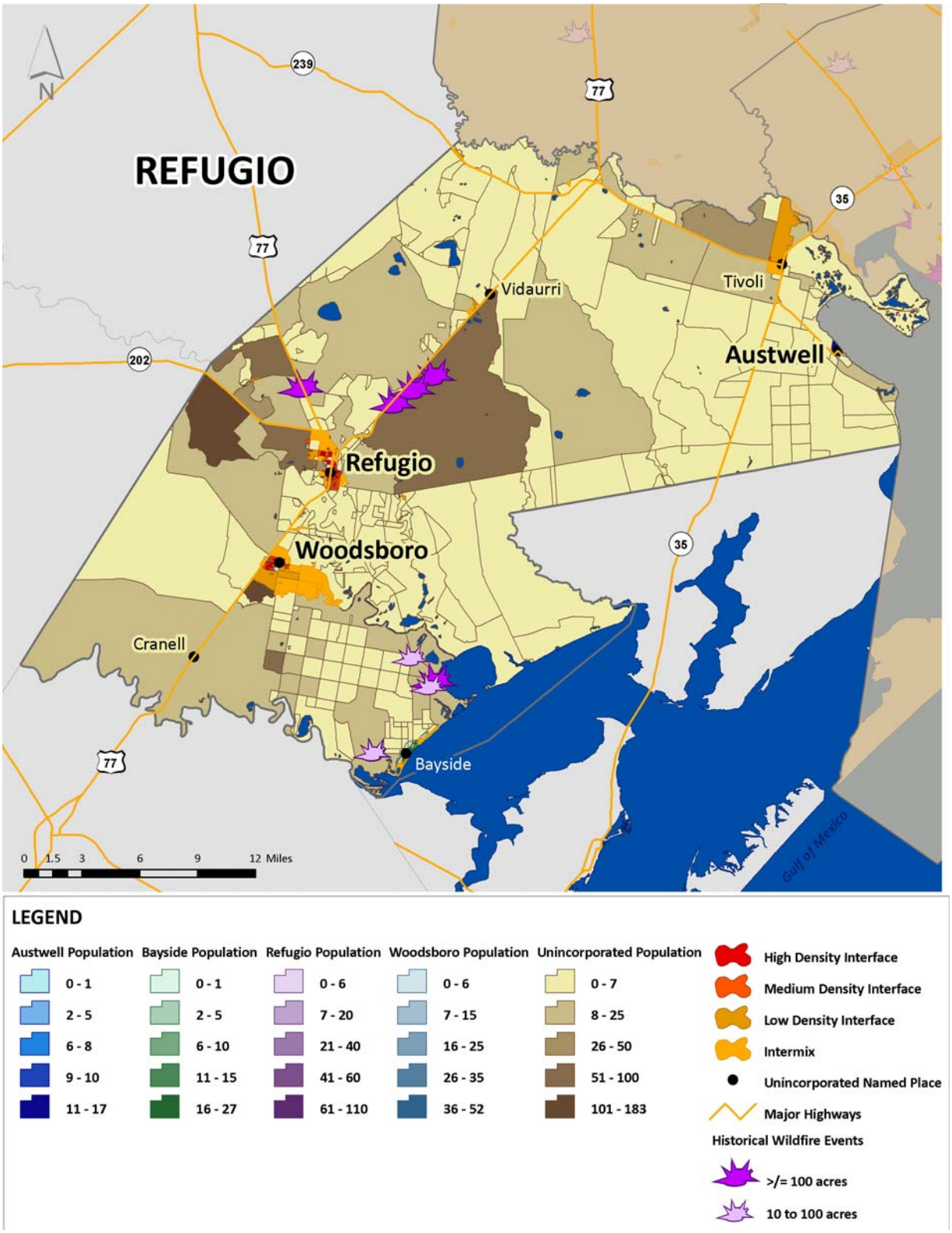


Figure 12-23. Potential Wildfire Hazard Areas in Austwell

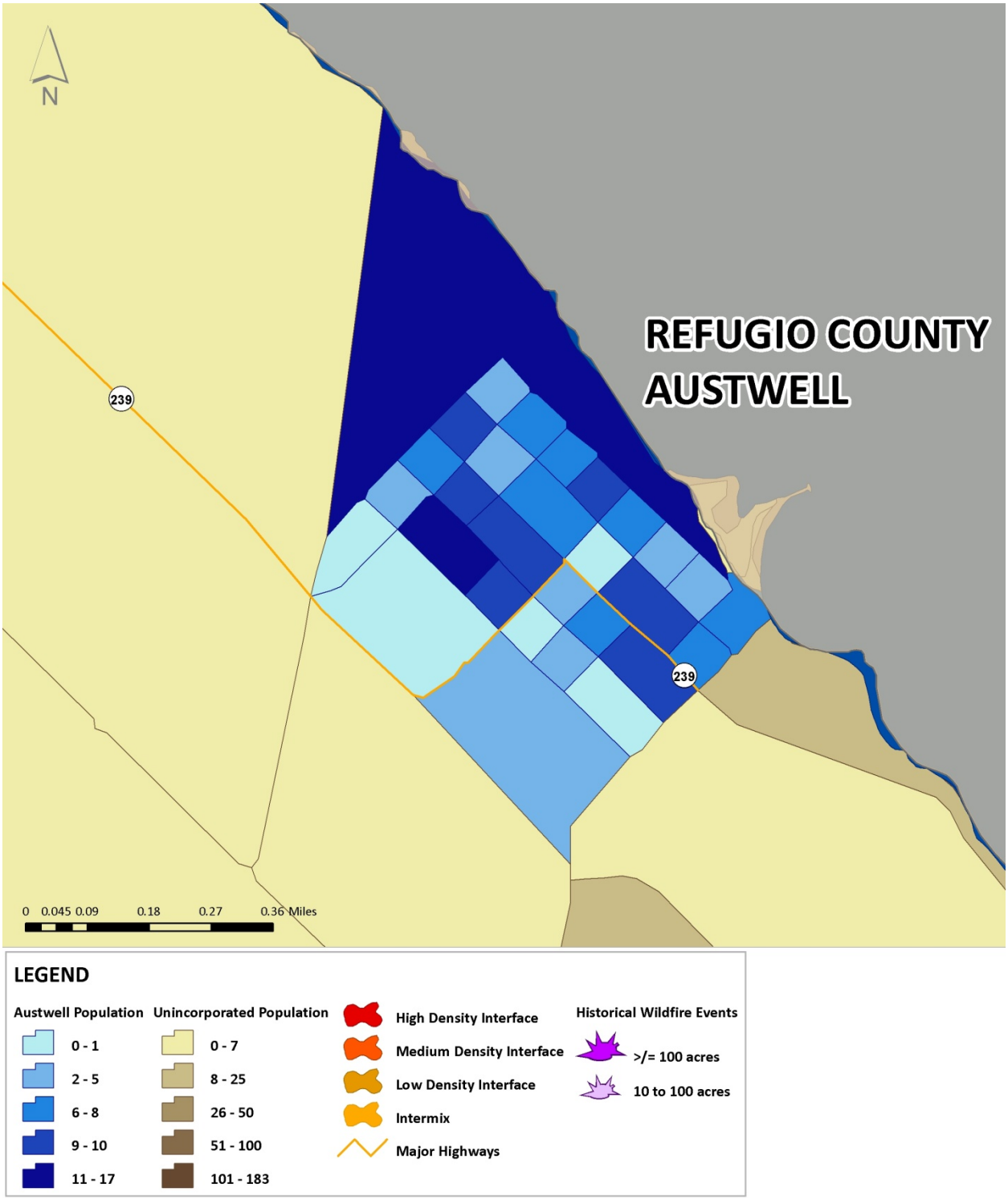


Figure 12-24. Potential Wildfire Hazard Areas in Bayside

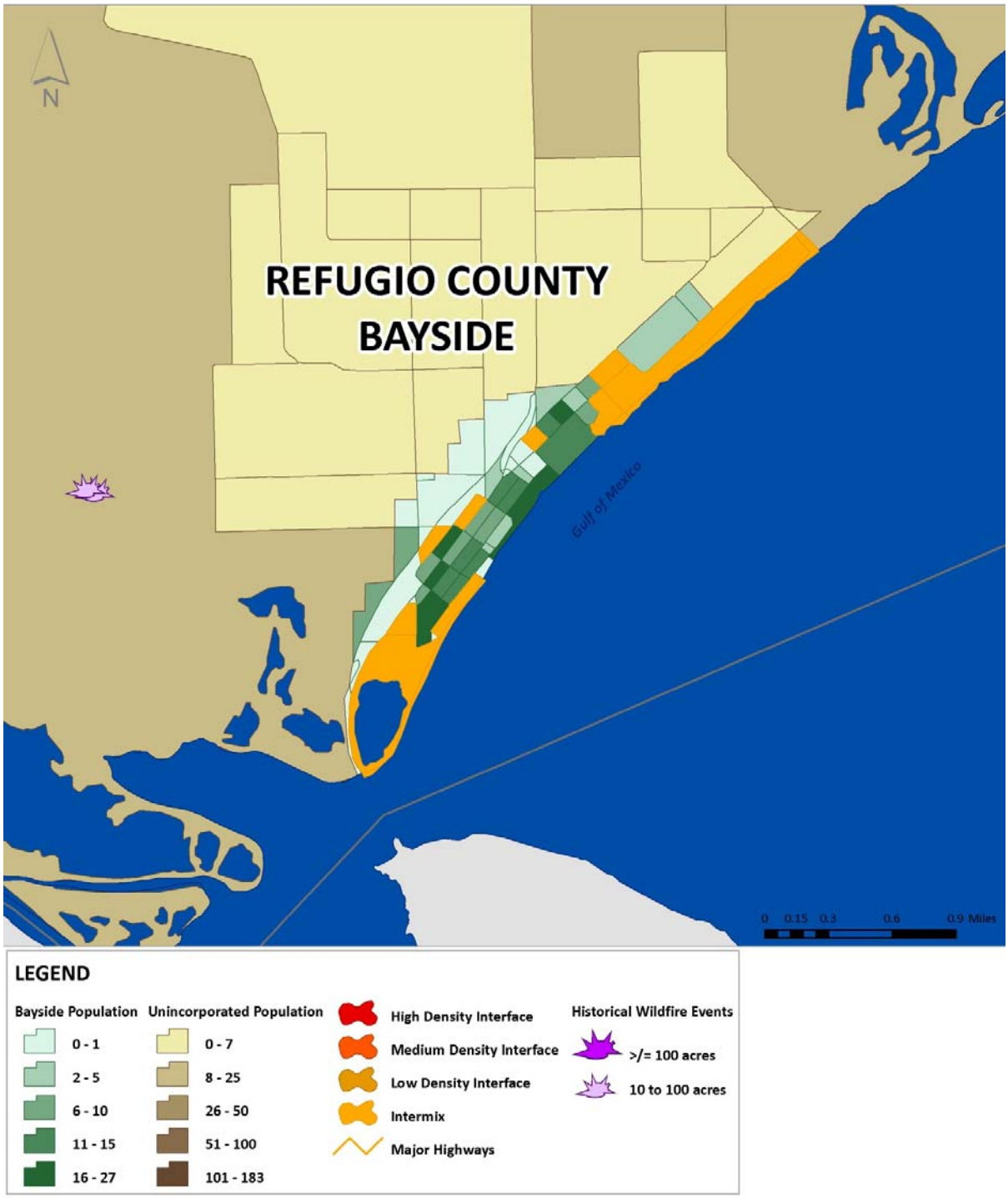


Figure 12-25. Potential Wildfire Hazard Areas in Refugio

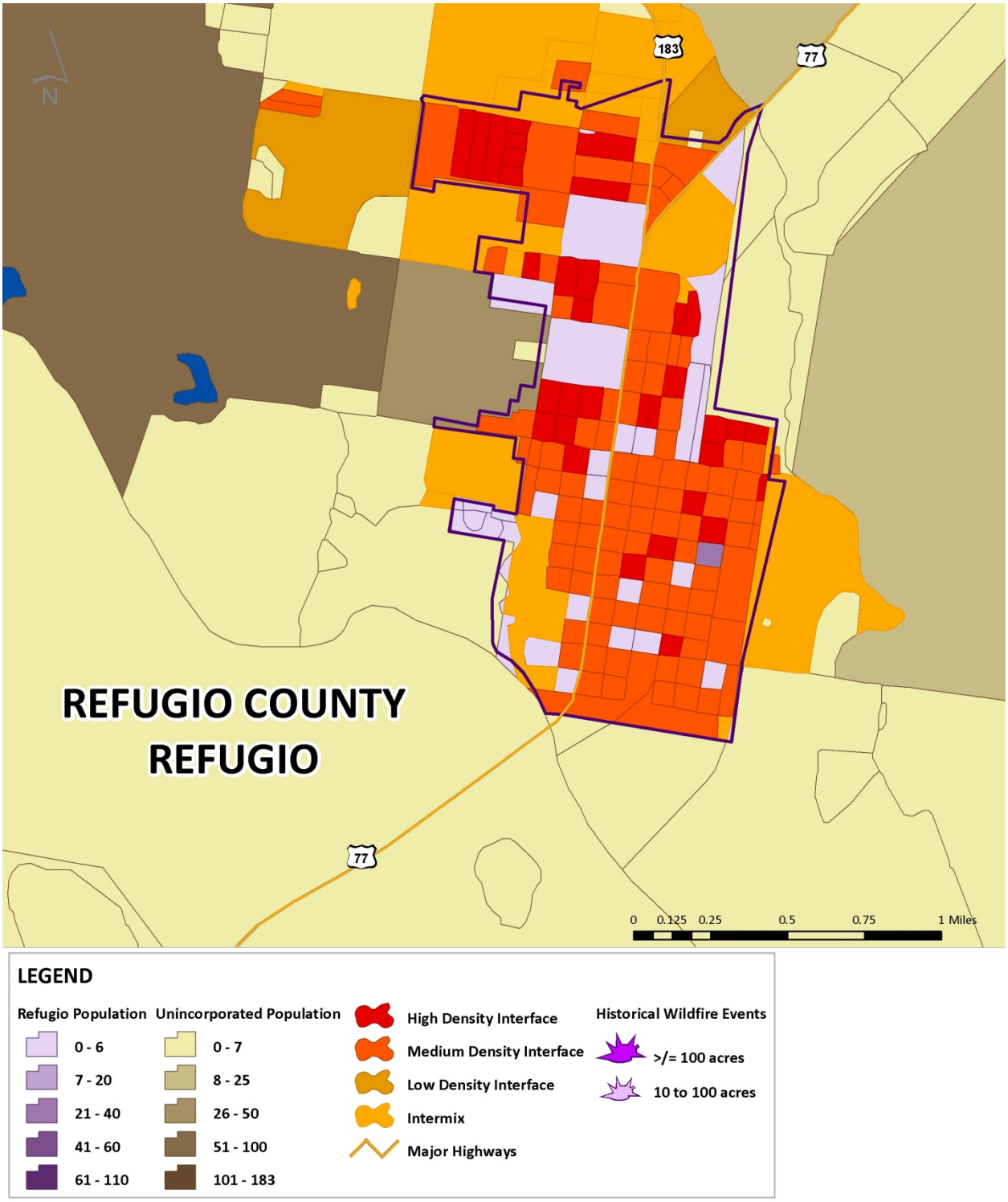


Figure 12-26. Potential Wildfire Hazard Areas in Woodsboro

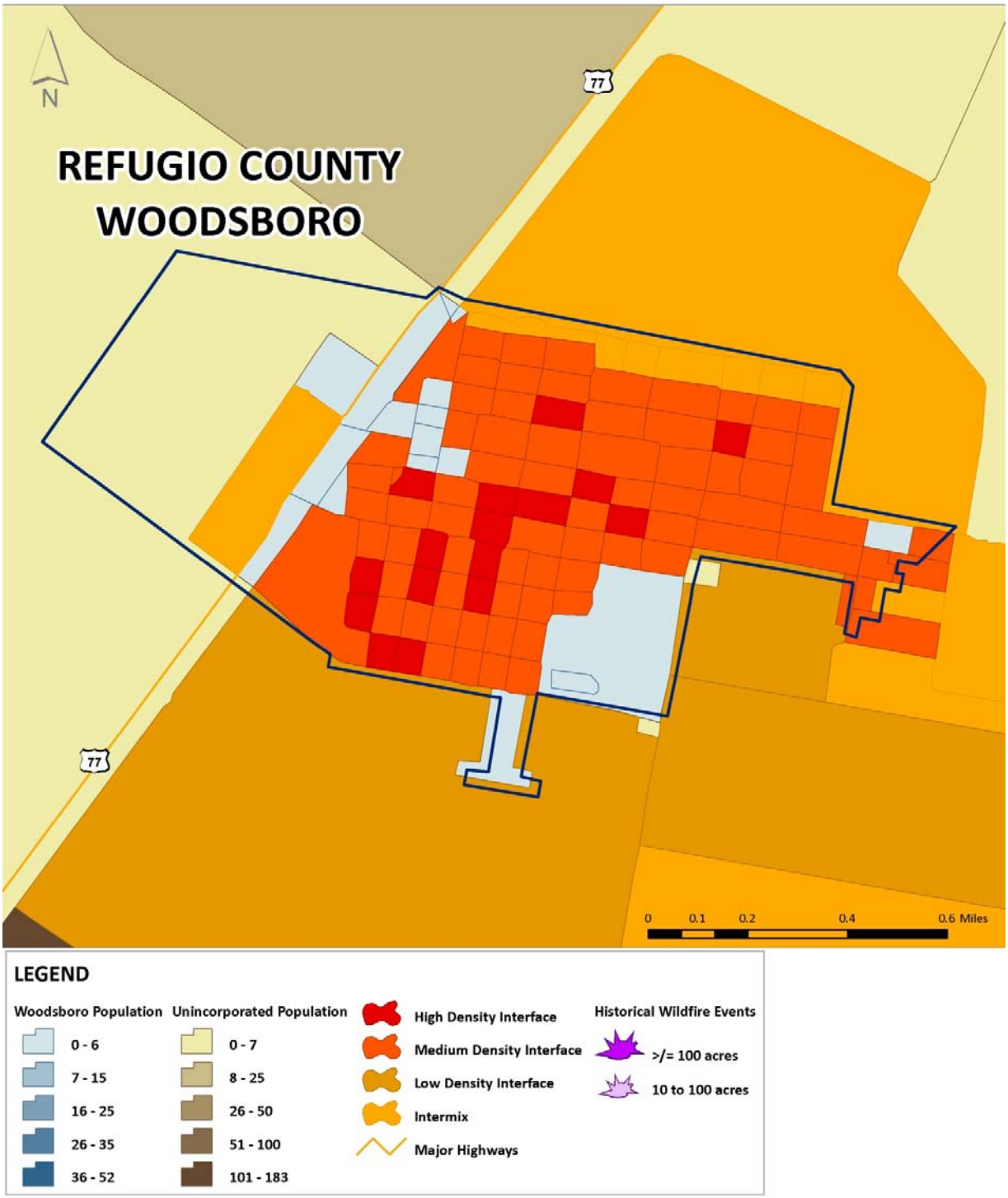
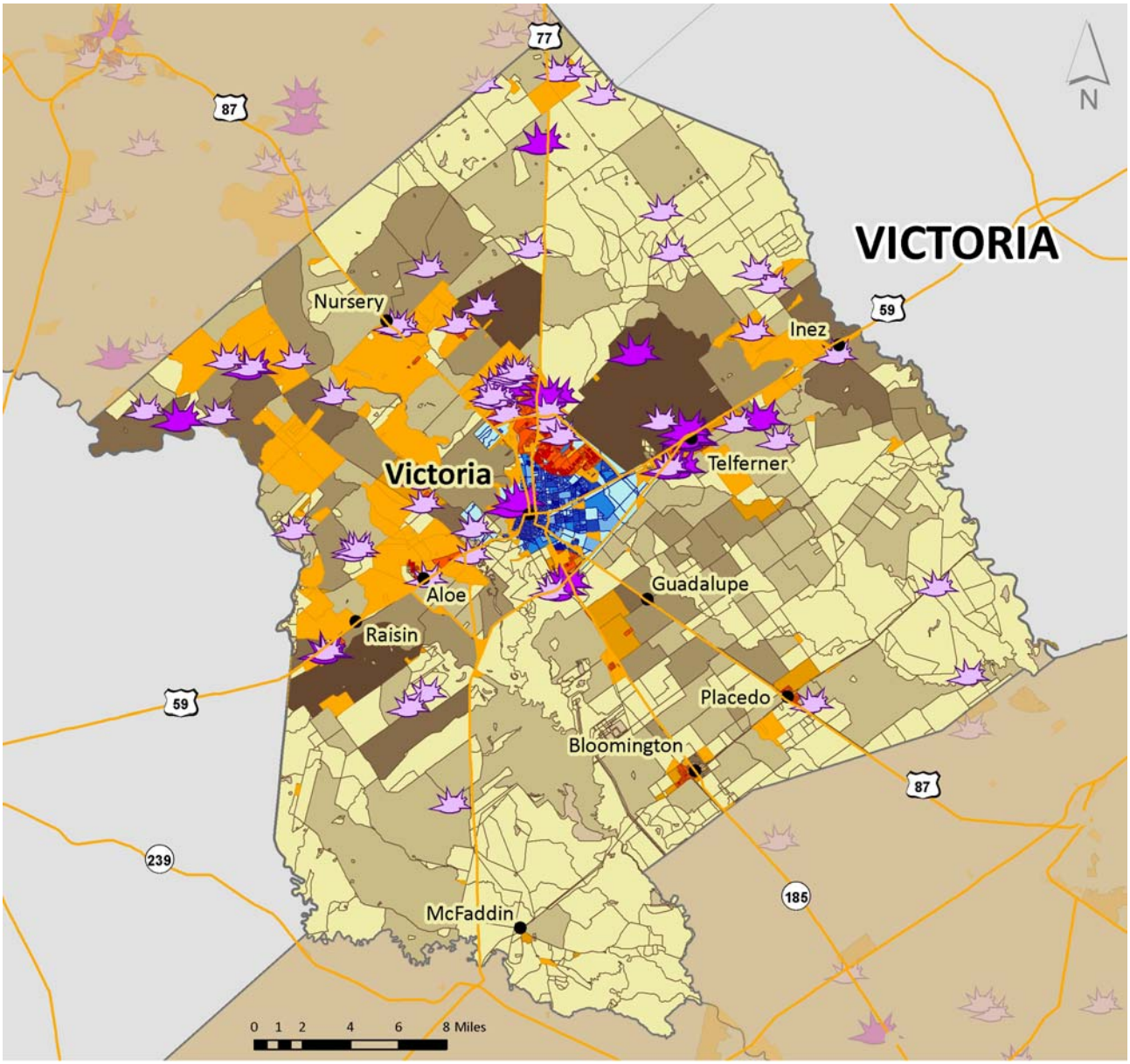


Figure 12-27. Potential Wildfire Hazard Areas in Victoria County



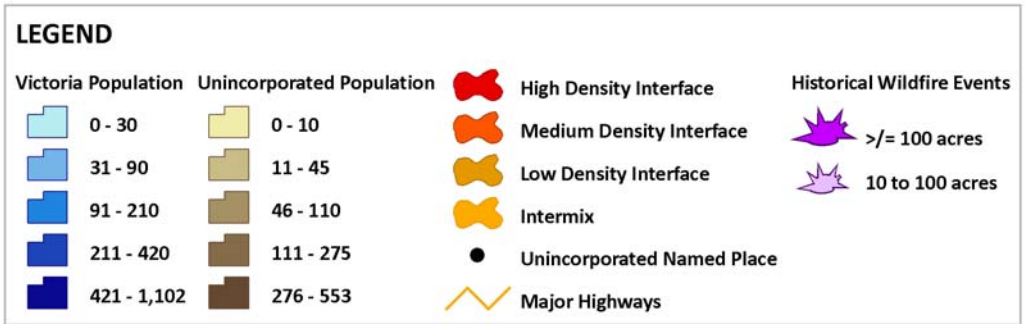
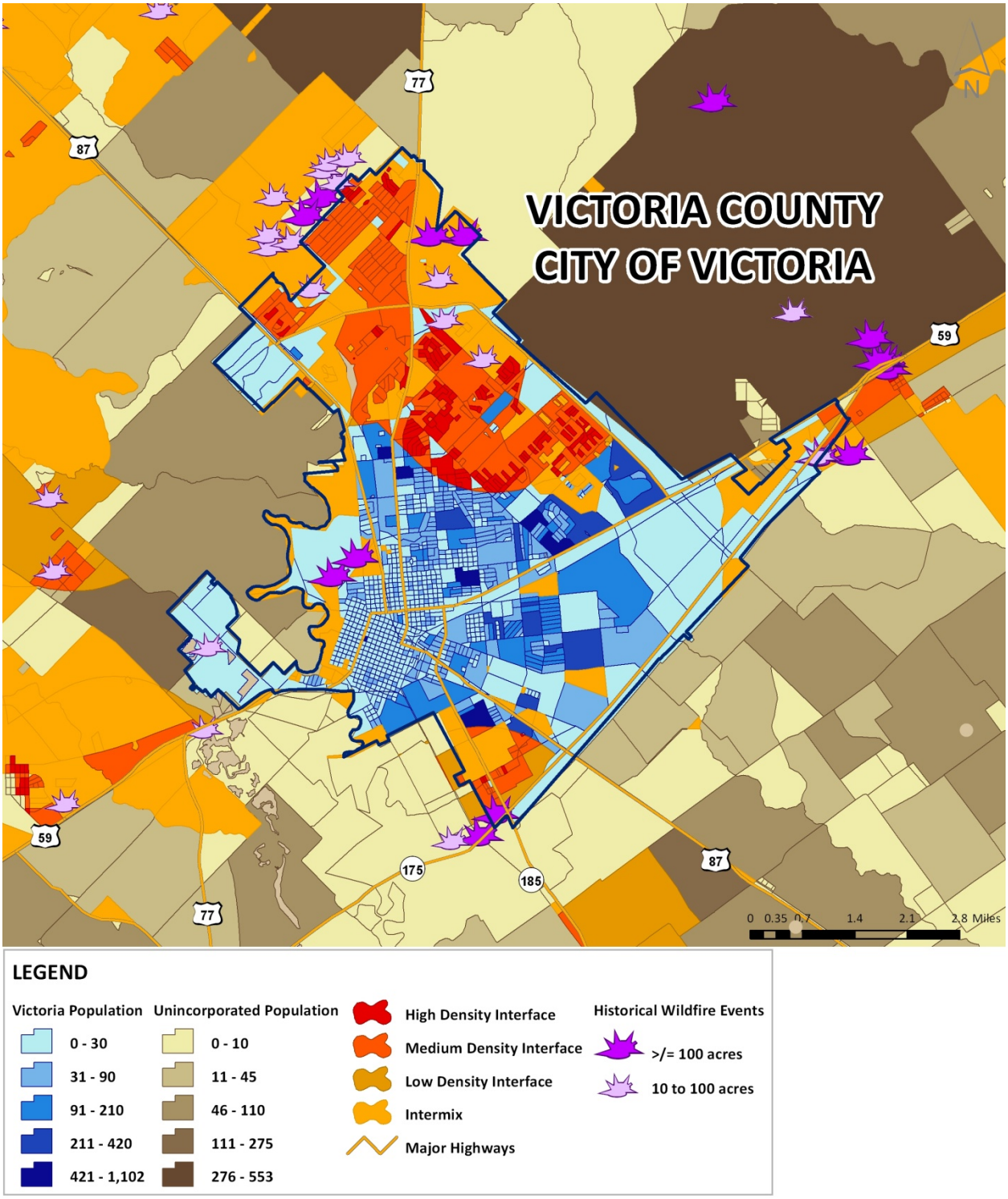


Figure 12-28. Potential Wildfire Hazard Areas in Victoria

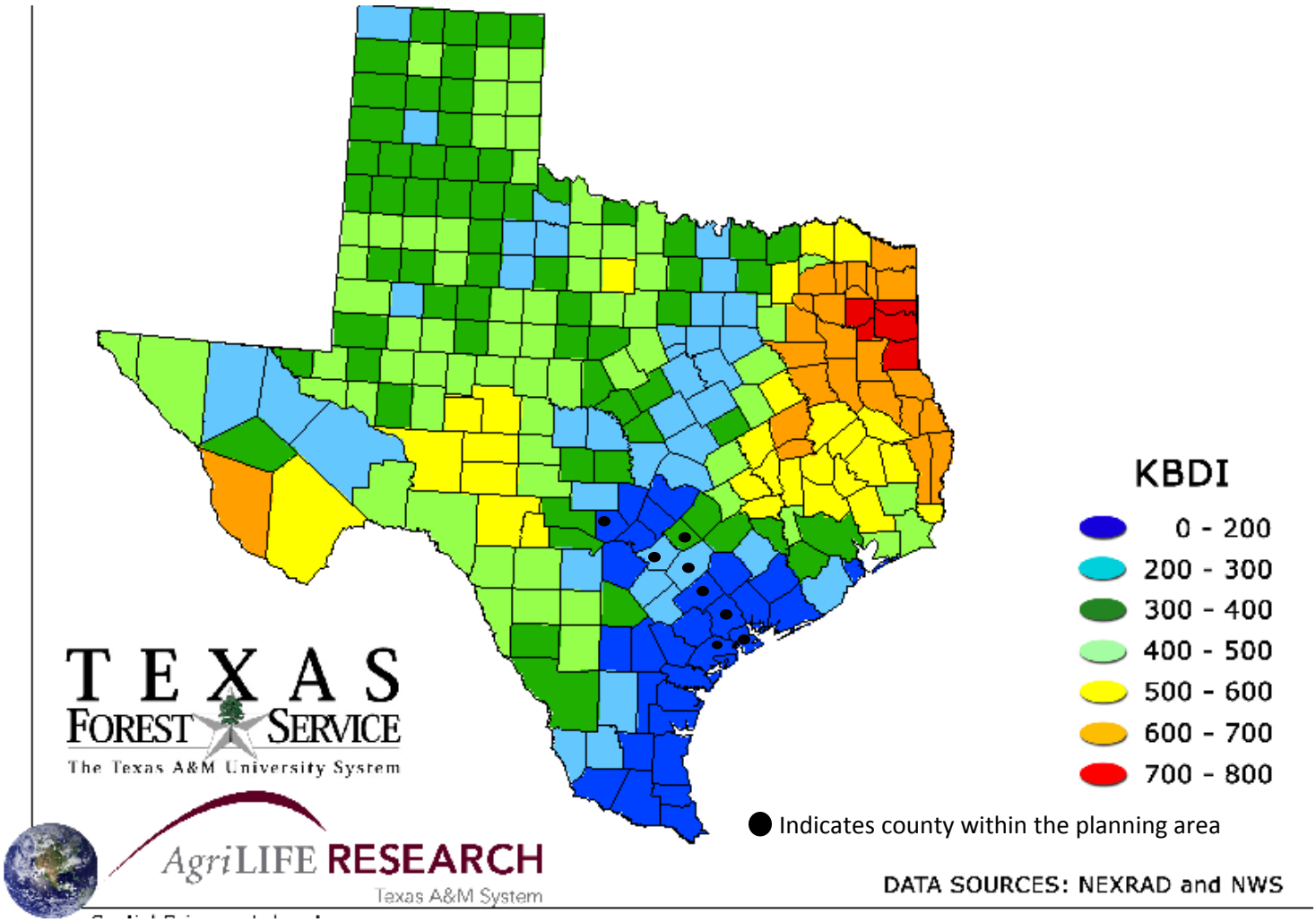


Extent

Fire risk is measured in terms of magnitude and intensity using the Keetch-Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior.

The KBDI determines forest fire potential and is based on a daily water balance, where a drought factor is balanced with precipitation and soil moisture (assumed to have a maximum storage capacity of eight inchs) and is expressed in hundredths of an inch of soil moisture depletion.

Figure 12-29. KBDI for the State of Texas, 2010



Each color on the map represents the drought index at that location. The drought index ranges from 0 to 800, where a drought index of 0 represents no moisture depletion, and an index of 800 represents absolutely dry conditions.

These numbers correlate with potential fire behavior as follows:

- **0 - 200** Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
- **200 - 400** Fires more readily burn and will carry across an area with no gaps. Heavier fuels will still not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.
- **400 - 600** Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- **600 - 800** Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn thorough the night and heavier fuels will actively burn and contribute to fire intensity.

From the illustration in Figure 12-29, the counties within the GBRA region currently fall within a scale of 0-400, with the majority at a KBDI of 200 or lower. Although this is a low to moderate level of intensity, it is not indicative of an absence of risk. In a period of extreme heat or drought, the KBDI could be over 500 for the area. Table 12-1 provides detail on the average, maximum and minimum KBDI for each county participating in the GBRA Plan. This table should be read in conjunction with the current KBDI index in determining the potential magnitude of a wildfire event. Because the KBDI is a measure of the current readiness of fuels for wildfire, caution should be exercised in dryer, hotter conditions, and the KBDI should be referenced as the area experiences changes in precipitation and soil moisture.

Table 12-1. Extent for Wildfire by County[1]

PARTICIPATING COUNTY[2]	AVERAGE KBDI	MAXIMUM KBDI	MINIMUM KBDI
Caldwell County	336	517	95
Calhoun County	25	53	14
DeWitt County	174	408	29
Gonzales County	213	361	28

[1] Source: Texas Forest Service

[2] Although Guadalupe County is not participating in this Plan Update, information is included as the City of Cibolo, within Guadalupe County, is participating as part of the planning effort.

PARTICIPATING COUNTY[2]	AVERAGE KBDI	MAXIMUM KBDI	MINIMUM KBDI
Guadalupe County	243	491	72
Kendall County	184	343	34
Refugio County	42	263	13
Victoria County	47	130	15

Historical Occurrences

Table 12-2 provides information on reported wildfires in the GBRA study region from April 2003 to November 2009 (based on data obtained from the Texas Forest Service[3]).

Table 12-2. Reported Wildfires in the GBRA Region (TFS, 2003-2009)

JURISDICTION	TOTAL WILDFIRES REPORTED >/= 10 ACRES	TOTAL WILDFIRES REPORTED >/= 100 ACRES	TOTAL ACRES BURNED FOR ALL REPORTED WILDFIRES
Caldwell County	84	8	3,872
Lockhart	5	0	268
Luling	0	0	2
Martindale	1	0	15
Calhoun County	16	21	16,850
Point Comfort	0	0	0
Port Lavaca	0	0	2
Seadrift	1	0	57
DeWitt County	40	9	3,319
Cuero	1	1	204
Nordheim	0	0	0
Yoakum	0	0	3
Yorktown	1	0	20
Gonzales County	16	6	2,284
Gonzales	0	0	6
Nixon	0	2	630

[3] The reports included in this study were given to the Texas Forest Service by volunteer fire departments. The reporting of fires or other responses to the Texas Forest Service is not required and therefore not all wildfires are represented.

JURISDICTION	TOTAL WILDFIRES REPORTED >/= 10 ACRES	TOTAL WILDFIRES REPORTED >/= 100 ACRES	TOTAL ACRES BURNED FOR ALL REPORTED WILDFIRES
Waelder	0	0	1
Cibolo (Guadalupe County)	0	0	10
Kendall County	**44**	**15**	**10,389**
Boerne	0	0	15
Refugio County	**4**	**3**	**2,038**
Austwell	0	0	0
Bayside	0	0	3
Refugio	0	0	0
Woodsboro	0	0	0
Victoria County	**54**	**19**	**8,411**
Victoria	5	7	2,940

Probability of Future Events

Wildfires can occur at any time of the year. Climatic conditions such as severe freezes and drought can significantly increase the intensity of wildfires since these conditions kill vegetation, creating a prime fuel source for these types of fires. The intensity of fires and the rate at which they spread are directly related to wind speed, temperature and relative humidity.

Due to the fact that the extent for wildfire for participating communities in the GBRA region is low to moderate and the land area encompassed by the GBRA is closer to the Gulf Coast and experiences a more moist and humid climate, the probably of a future wildfire event is likely, with an event probable in the next three years.

Impact and Vulnerability

The risk of wildfire varies by month, depending on the climate, and warning time for wildfire events is often minimal or none. The severity of impact of major wildfire events can be major. Such events can serious injury and shut down facilities for at least two weeks.

Table 12-3 provides information on the number of persons potentially exposed to the wildfire hazard based upon the mapped wildfire hazard areas shown in Figures 12-1 to 12-28, along with the estimated number of buildings at risk and the estimated total exposure for those at-risk buildings. “Negligible” indicates a dollar value less than $5,000 or a number of persons less than 50.

Table 12-3. Estimated Population and Buildings at Risk to Wildfire

JURISDICTION	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION	TOTAL ESTIMATED POPULATION	NUMBER OF PEOPLE EXPOSED TO HAZARD	NUMBER OF BUILDINGS EXPOSED TO HAZARD	ESTIMATED VALUE OF BUILDINGS EXPOSED ($) TO HAZARD
Caldwell County	**$605,797,000**	**14,661**	**6,641**	**2,730**	**$245,377,000**
Lockhart	$618,183,000	11,591	6,499	2393	$388,624,000
Luling	$264,373,000	5,025	1,726	889	$89,230,000
Martindale	$40,522,000	917	285	123	$10,760,000
Calhoun County	**$609,016,000**	**6,481**	**2,650**	**2,381**	**$231,530,000**
Point Comfort	$80,897,000	781	346	196	$29,022,000
Port Lavaca	$651,340,000	12,035	563	227	$23,633,000
Seadrift	$62,036,000	1,350	1,350	948	$62,036,000
DeWitt County	**$469,085,000**	**8,805**	**2,312**	**1,216**	**$118,862,000**
Cuero	$412,893,000	6,544	5,840	3,137	$357,806,000
Nordheim	$25,111,000	323	323	182	$24,977,000
Yoakum	$370,136,000	5,729	507	246	$23,002,000
Yorktown	$127,049,000	2,204	2,191	1,288	$121,858,000
Gonzales County	**$457,255,000**	**8,343**	**2,177**	**1,371**	**$95,758,000**
Gonzales	$401,785,000	7,160	5,847	2,856	$285,783,000
Nixon	$94,690,000	2,178	117	43	$2,750,000
Waelder	$37,972,000	947	947	570	$37,510,000
Cibolo (Guadalupe County)	$221,273,000	3,035	1,118	450	$77,506,000
Kendall County	**$1,181,519,000**	**17,618**	**12,237**	**5,495**	**$781,869,000**
Boerne	$494,789,000	6,125	5,999	2,873	$455,492,000
Refugio County	**$149,487,000**	**2,670**	**1,381**	**669**	**$67,119,000**
Austwell	$28,397,000	192	Negligible	0	Negligble

JURISDICTION	TOTAL VALUE OF ALL BUILDINGS IN JURISDICTION	TOTAL ESTIMATED POPULATION	NUMBER OF PEOPLE EXPOSED TO HAZARD	NUMBER OF BUILDINGS EXPOSED TO HAZARD	ESTIMATED VALUE OF BUILDINGS EXPOSED ($) TO HAZARD
Bayside	$26,026,000	360	70	69	$5,901,000
Refugio	$186,843,000	2,920	2,889	1,780	$180,638,000
Woodsboro	$78,606,000	1,686	1,686	824	$75,871,000
Victoria County	**$1,174,737,000**	**23,482**	**14,653**	**5,844**	**$684,878,000**
Victoria	$3,942,383,000	60,606	26,652	9,803	$1,713,373,000
TOTALS FOR STUDY AREA[4]	**$12,812,200,000**	**213,768**	**107,006**	**48,603**	**$6,191,165,000**

Source: SILVIS, Texas Forest Service, HAZUS-MH MR4

[4] Totals for the study area may include values less than $5,000 for dollar amounts that are classified as "Negligible" in the table.

WINTER STORM

Hazard Description 1
Location 1
Extent 1
Historical Occurrences 3
Probability of Future Events 3
Impact & Vulnerability 4

Hazard Description

A severe winter storm event is identified as a storm with snow, ice, or freezing rain—all of which can cause significant problems for area residents. Although rare in central and southeast Texas, severe winter weather does occasionally occur. January is the month when snow, sleet or freezing rain is most likely to be observed; yet, winter weather conditions can occur at anytime during the winter and early spring months.

Location

Winter storms vary in location, intensity and duration but are considered rare occurrences in GBRA Basin communities. It is assumed that all of the jurisdictions are uniformly exposed to winter storm events; therefore, all areas of the county are equally exposed.

Extent

Table 13-1 below displays the magnitude of severe winter storms. The wind-chill factor is further described in Figure 13-1. This is an index developed by the National Weather Service, although the chart is not applicable when temperatures are over 50° or winds are calm.

Table 13-1. Extent Scale - Winter Weather Alerts

Winter weather advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter storm watch	Severe winter weather conditions may affect your area (freezing rain, sleet or heavy snow may occur separately or in combination).

Winter storm warning	Severe winter weather conditions are imminent.
Freezing rain or freezing drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/freeze warning	Below freezing temperatures are expected and may cause significant damage to plants, crops and fruit trees.
Wind chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

Wind chill temperature is a measure of how cold the wind makes real air temperature feel to the human body, similar to the heat index for extreme heat (Figure 13-1). Since wind can dramatically accelerate heat loss from the body, a blustery 30° day would feel just as cold as a calm day with 0° temperatures. The GBRA Region has never experienced a blizzard, but based on previous occurrences, GBRA counties have been subject to winter storm watches, warnings, freezing rain, sleet, snow and wind chill.

Figure 13-1. Wind Chill Chart

Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Historical Occurrences

Table 13-2 shows historical occurrences for the area since 1950 as well as the type of event and the amount of damage provided by the National Climatic Data Center (NCDC). Although there have been relatively few storms, it is likely that a high number of occurrences have gone unreported. Additionally, historical winter storm information, as provided by the NCDC, shows winter storm activity across a multi-county forecast area for each event. In some instances within the GBRA study area, a single record could consist of up to 27 counties including some or all of the ones participating in this risk assessment. Therefore, an appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each participating county impacted by each event. In the case of the City of Cibolo, a percentage was determined for Guadalupe County and a smaller percentage determined for Cibolo.

Table 13-2. Historical Winter Storm Events by Jurisdiction (NCDC, 1950-2009)

JURISDICTION	NUMBER OF REPORTED EVENTS	TYPES OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE (2009 DOLLARS)	CROP DAMAGE (2009 DOLLARS)
Caldwell County	8	Winter Storm	0	0	$164,631	Negligible
Calhoun County	2	Winter Weather and Heavy Snow	0	0	Negligible	Negligible
DeWitt County	2	Winter Storm and Heavy Snow	0	0	$51,763	Negligible
Gonzales County	3	Winter Storm	0	0	$51,763	Negligible
Kendall County	8	Winter Storm	0	0	$863,434	$18,775
Refugio County	3	Winter Weather and Heavy Snow	0	0	Negligible	Negligible
Victoria County	6	Winter Weather and Heavy Snow	0	0	Negligible	Negligible
City of Cibolo (Guadalupe County)	11	Winter Storm, Heavy Snow, Wintry Mix, Ice	0	0	Negligible	Negligible
TOTALS[1]	**43**		**0**	**0**	**$1,131,591**	**$18,775**

Probability of Future Events

Because it is likely that more winter storms have occurred than are reported in the NCDC, the probability for winter storms occurring in the GBRA Region is occasional, meaning an event is possible in the next five years.

[1] Totals for the study area may include values less than $5,000 for dollar amounts and less than 50 for populations (where applicable) that are classified as "negligible" in the table.

Impact & Vulnerability

Winter storms are associated with freezing or frozen precipitation such as freezing rain, sleet, snow and the combined effects of winter precipitation and strong winds. Wind chill is a function of temperature and wind. Low wind chill is a product of high winds and freezing temperatures. The leading cause of death during winter storms is transportation accidents. Hypothermia and frost bite are other dangers from very cold winter temperatures.

Historical evidence shows that most of the area is susceptible to winter storm activity; however, past reported property damages indicate that, while winter events (typically consisting of snow and ice) do occur, their economic impacts are typically not severe across the entire study area. All buildings and facilities are considered to be exposed to this hazard and could potentially be impacted because it cannot be predicted where a winter storm event may cause damage or disruption. It is important to note that only winter storm events that have been reported have been factored into this risk assessment.

Table 13-3 shows potential annualized property losses for each jurisdiction based on past reports of property and crop damages in each jurisdiction (NCDC, 1950-2009) and exposure values extracted from HAZUS-MH MR4. "Negligible" indicates that the annualized expected property losses are less than $5,000.

Table 13-3. Potential Annualized Losses by County (Winter Storm)

JURISDICTION	TOTAL EXPOSURE	ANNUALIZED LOSS (AL)	ANNUALIZED LOSS RATIO (ALR)
Caldwell County	$1,528,875,000	Negligible	0.00%
Calhoun County	$1,403,343,000	Negligible	0.00%
DeWitt County	$1,404,274,000	Negligible	0.00%
Gonzales County	$991,702,000	Negligible	0.00%
Kendall County	$1,676,308,000	$14,703	0.00%
Refugio County	$469,041,000	Negligible	0.00%
Victoria County	$5,117,120,000	Negligible	0.00%
City of Cibolo (Guadalupe County)	$221,273,000	Negligible	0.00%
TOTALS FOR STUDY AREA[2]	**$12,811,936,000**	**$19,301**	**0.00%**

[2] Totals for the study area may include values less than $5,000 for dollar amounts that are classified as "Negligible" in the table.

SECTION 13: WINTER STORM

DAM FAILURE

Hazard Description 1
Location 2
Extent 12
Historical Occurrences 16
Probability of Future Events 16
Impact and Vulnerability 16

Hazard Description

Dams are water storage, control or diversion structures that impound water upstream in reservoirs. Dam failure can take several forms, including a collapse of, or breach in, the structure. While most dams have storage volumes small enough that failures have few or no repercussions, dams storing large amounts can cause significant flooding downstream. Dam failures can result from any one, or a combination, of the following causes:

- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping of the embankment;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components;
- Improper design or use of improper construction materials;
- Failure of upstream dams in the same drainage basin;
- Landslides into reservoirs, which cause surges that result in overtopping;
- High winds, which can cause significant wave action and result in substantial erosion;
- Destructive acts of terrorists; and
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, leading to structural failure.

Benefits provided by dams include water supplies for drinking, irrigation and industrial uses; flood control; hydroelectric power; recreation; and navigation. At the same time, dams also represent a risk to public safety. Dams require ongoing maintenance, monitoring, safety inspections, and sometimes even rehabilitation to continue safe service.

In the event of a dam failure, the energy of the water stored behind the dam is capable of causing rapid and unexpected flooding downstream, resulting in loss of life and great property damage. A devastating

effect on water supply and power generation could be expected as well. The terrorist attacks of September 11, 2001, generated increased focus on protecting the country's infrastructure, including ensuring the safety of dams.

One major issue with the safety of dams is their age, and the average age of America's 80,000 dams is 51 years. More than 2,000 dams near population centers are in need of repair, according to statistics released in 2009 by the Association of State Dam Safety Officials[1]. In addition to the continual aging of dams there have not been significant increases in the number of safety inspectors resulting in haphazard maintenance and inspection.

The Association of State Dam Safety Officials estimate that $16 billion will be needed to fix all high-hazard dams, but the total for all state dam-safety budgets is less than $60 million[2]. The current maintenance budget does not match the scale of America's long-term modifications of its watersheds. Worse still, more people are moving into risky areas. As the American population grows, dams that once could have failed without major repercussions are now upstream of cities and development.

Location

The State of Texas has 7,413 dams, all regulated by the Texas Commission on Environmental Quality (TCEQ). Of these, 854 are considered "high-hazard," 779 are considered "significant-hazard," and 5,780 are considered "low-hazard." According to the American Society of Civil Engineers' "Report Card," the Association of State Dam Safety Officials reports that there are 403 unsafe dams in Texas.[3]

The maps displayed at Figures 14-1 through Figure 14-9 illustrate the general location of dams for each participating jurisdiction in the GBRA area as recorded by the U.S. Army Corps of Engineers (USACE) in the National Inventory of Dams. Locations have been provided for a total of 115 dams through regional and county level maps, overlaid with census population density to graphically illustrate areas at risk. Further specific locations are provided through latitude and longitude, along with storage capacity, and height of each dam in Table 14-1. Three buffer areas were used based on the storage capacities. In lieu of dam failure inundation maps, total exposure was estimated by using 2000 census population and

[1] Association of State Dam Safety Officials, Journal of Dam Safety
[2] Ibid
[3] http://www.asce.org/reportcard/pdf/tx.pdf

building inventory data from HAZUS-MH MR4, in combination with the location and maximum storage capacity of high and significant hazard dams.

Figure 14-1. Dam Locations – GBRA

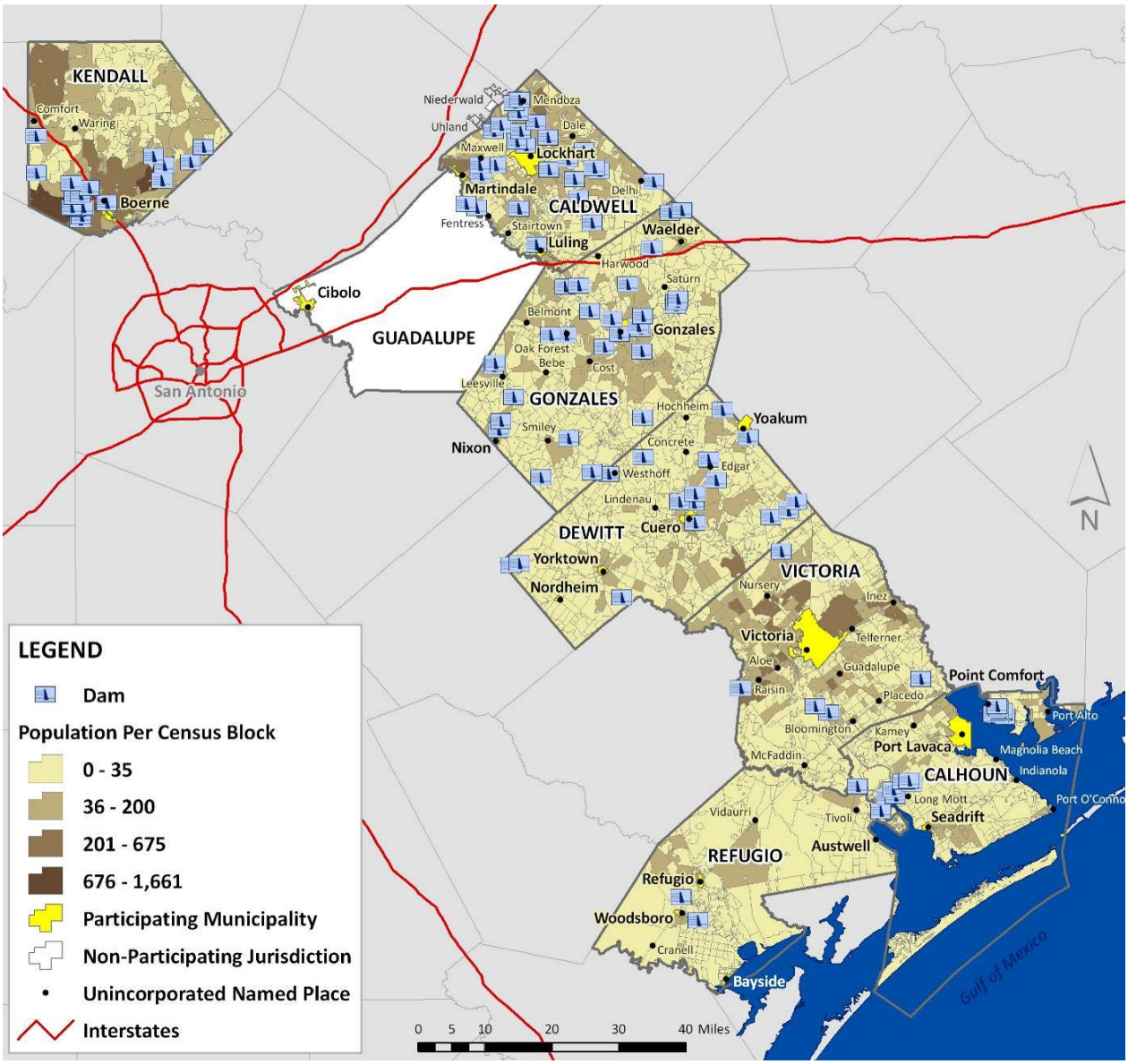


Figure 14-2. Estimated Dam Locations in Caldwell County

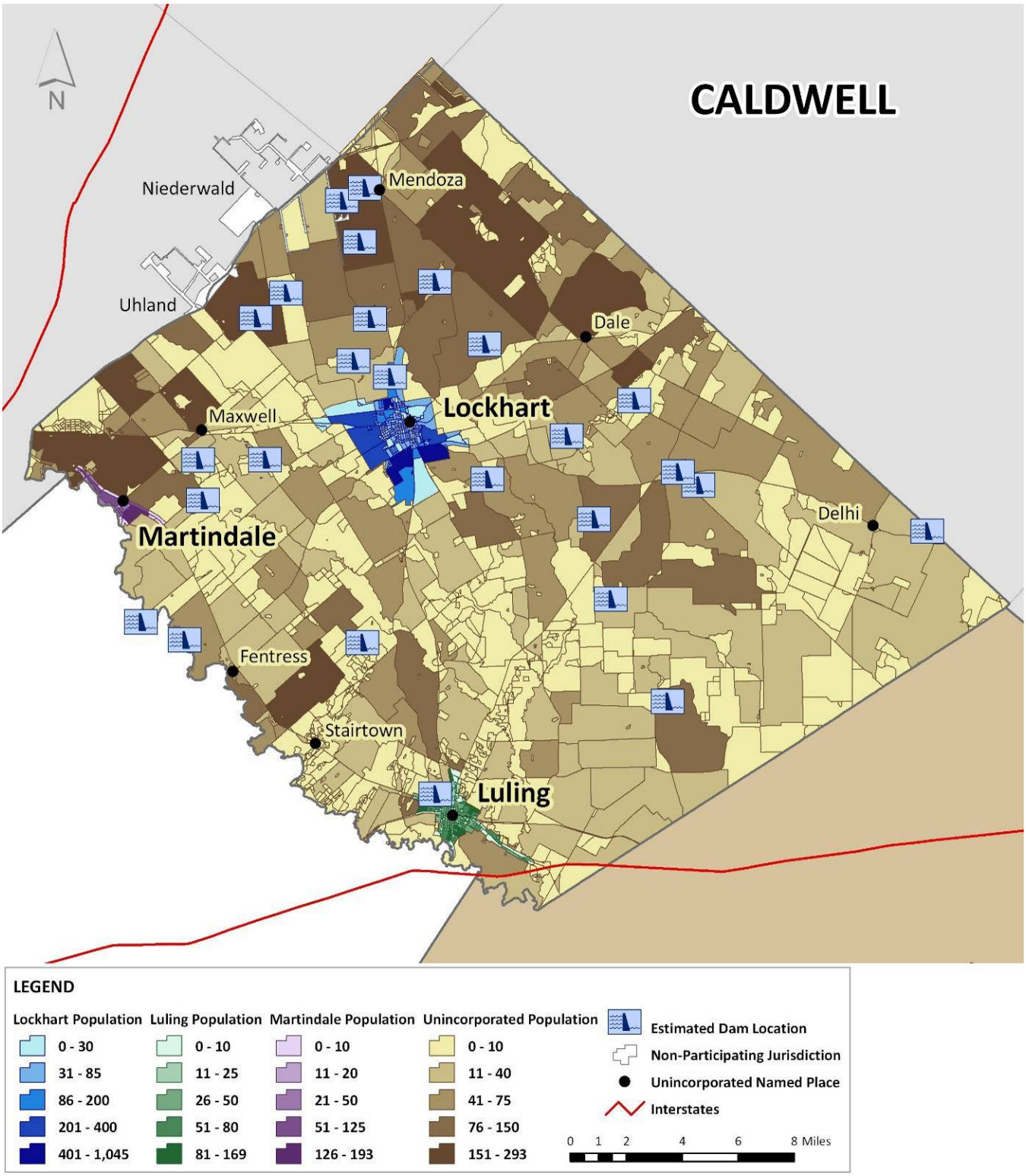


Figure 14-3. Estimated Dam Locations in Calhoun County

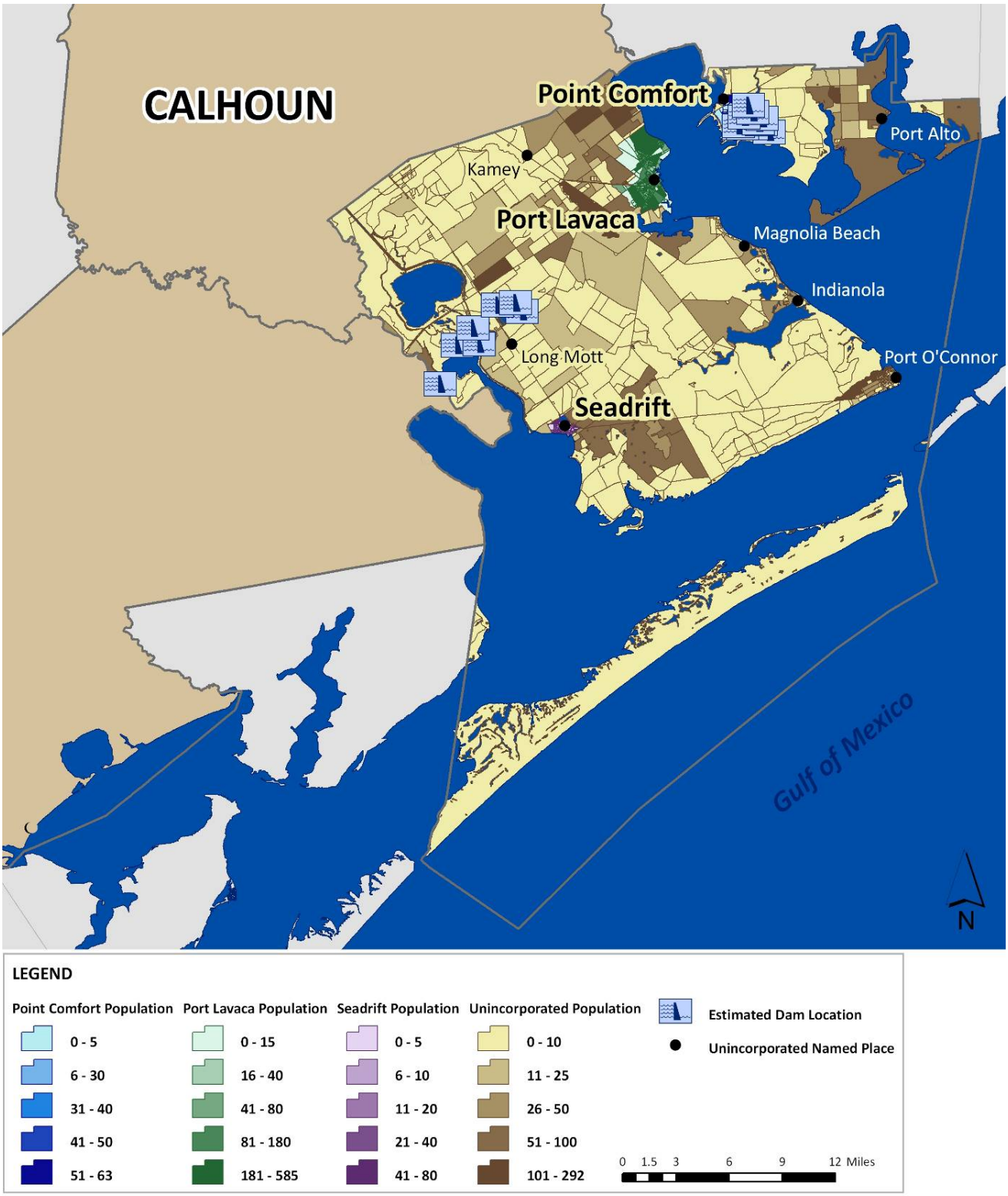


Figure 14-4. Estimated Dam Locations in DeWitt County

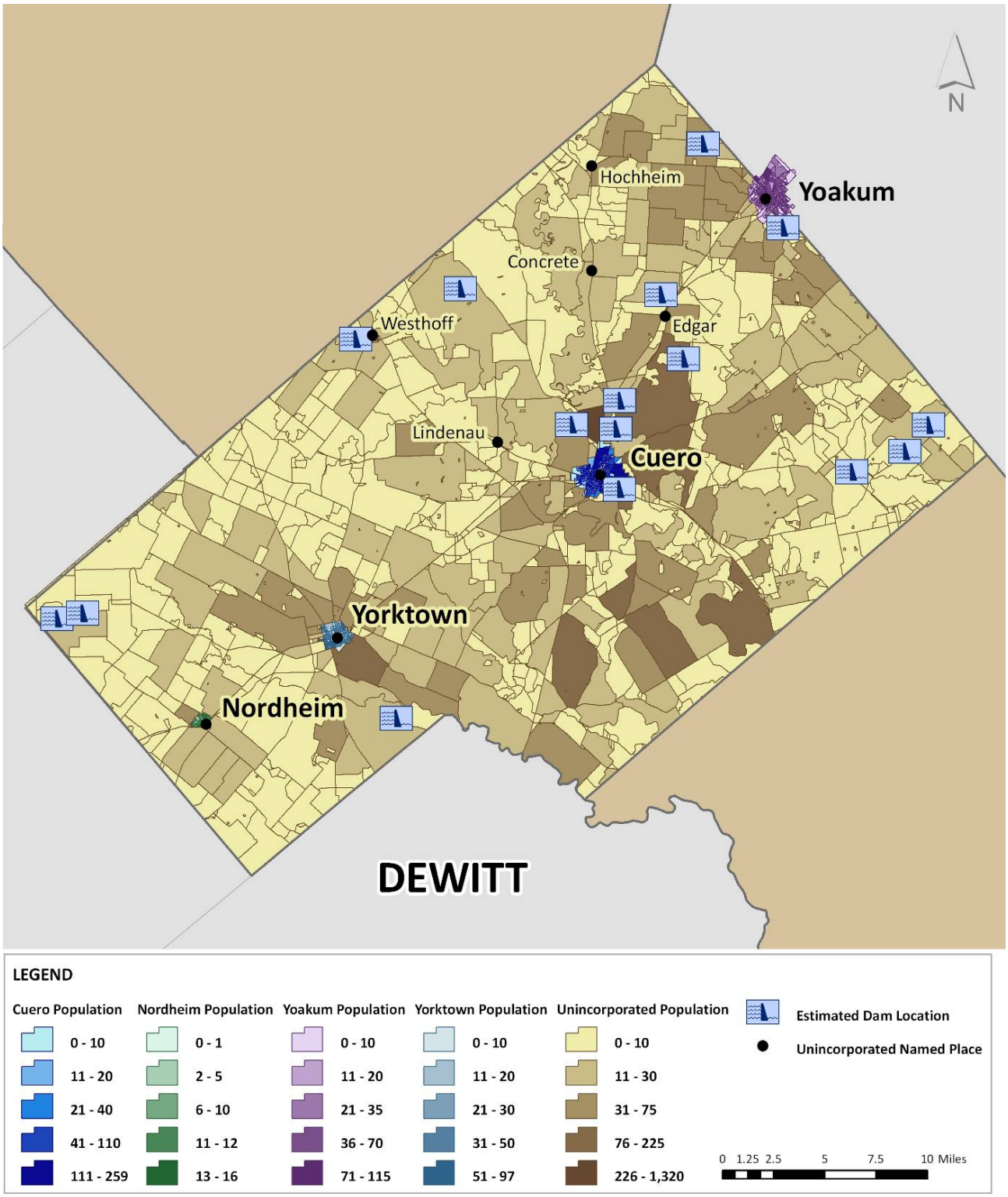


Figure 14-5. Estimated Dam Locations in Gonzales County

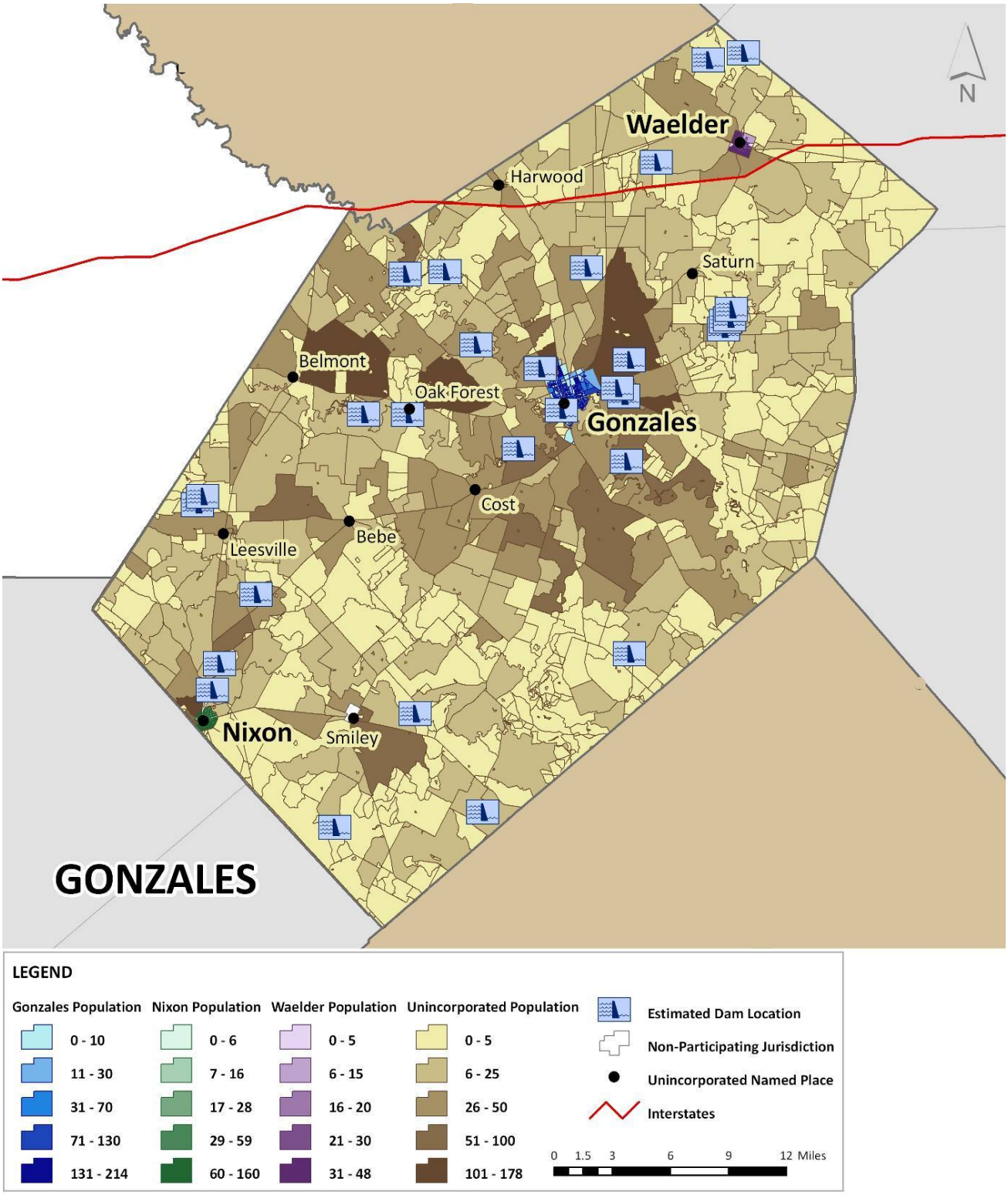


Figure 14-6. Estimated Dam Locations in Kendall County

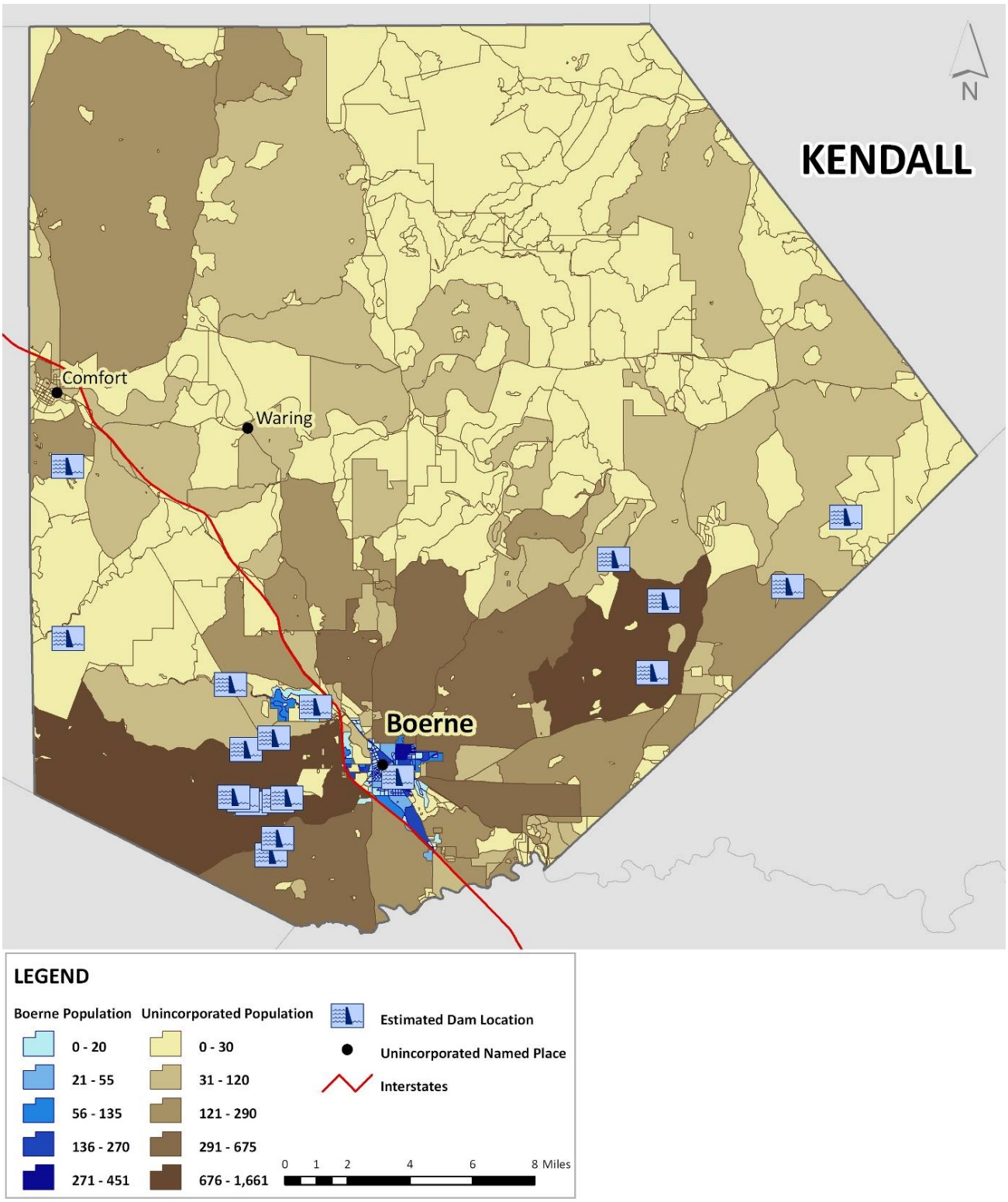


Figure 14-7. Estimated Dam Locations in Refugio County

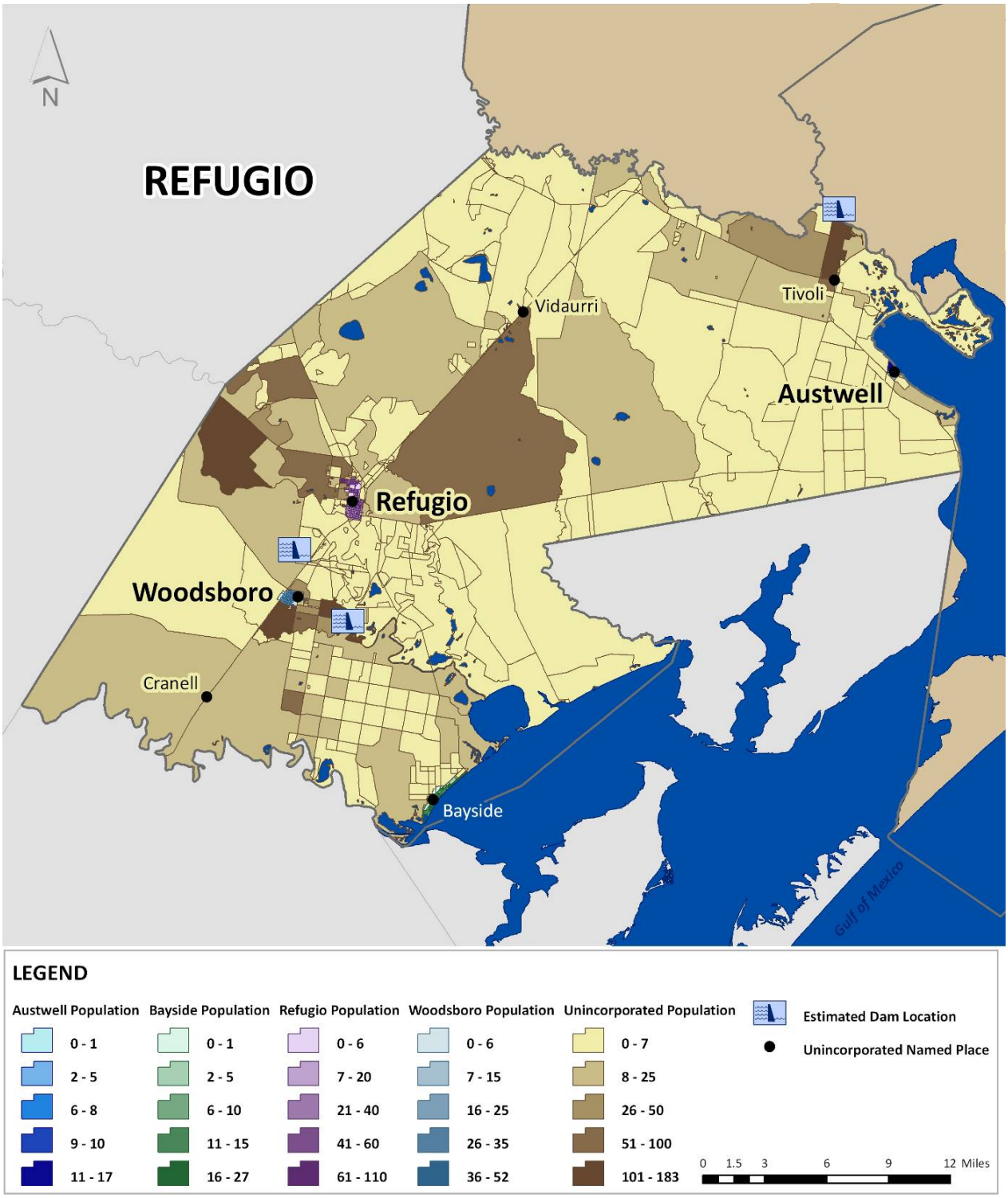


Figure 14-8. Estimated Dam Locations in Victoria County

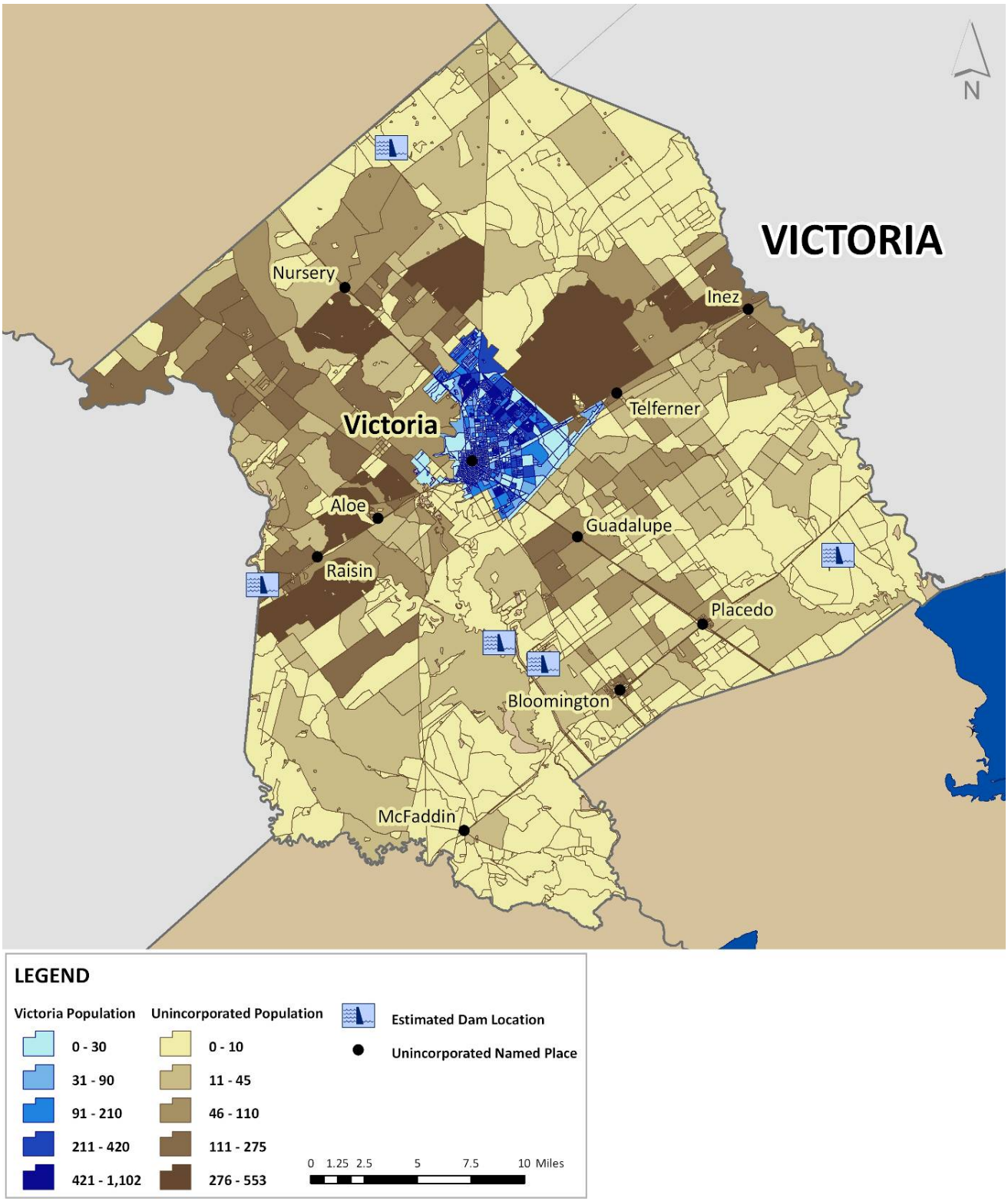
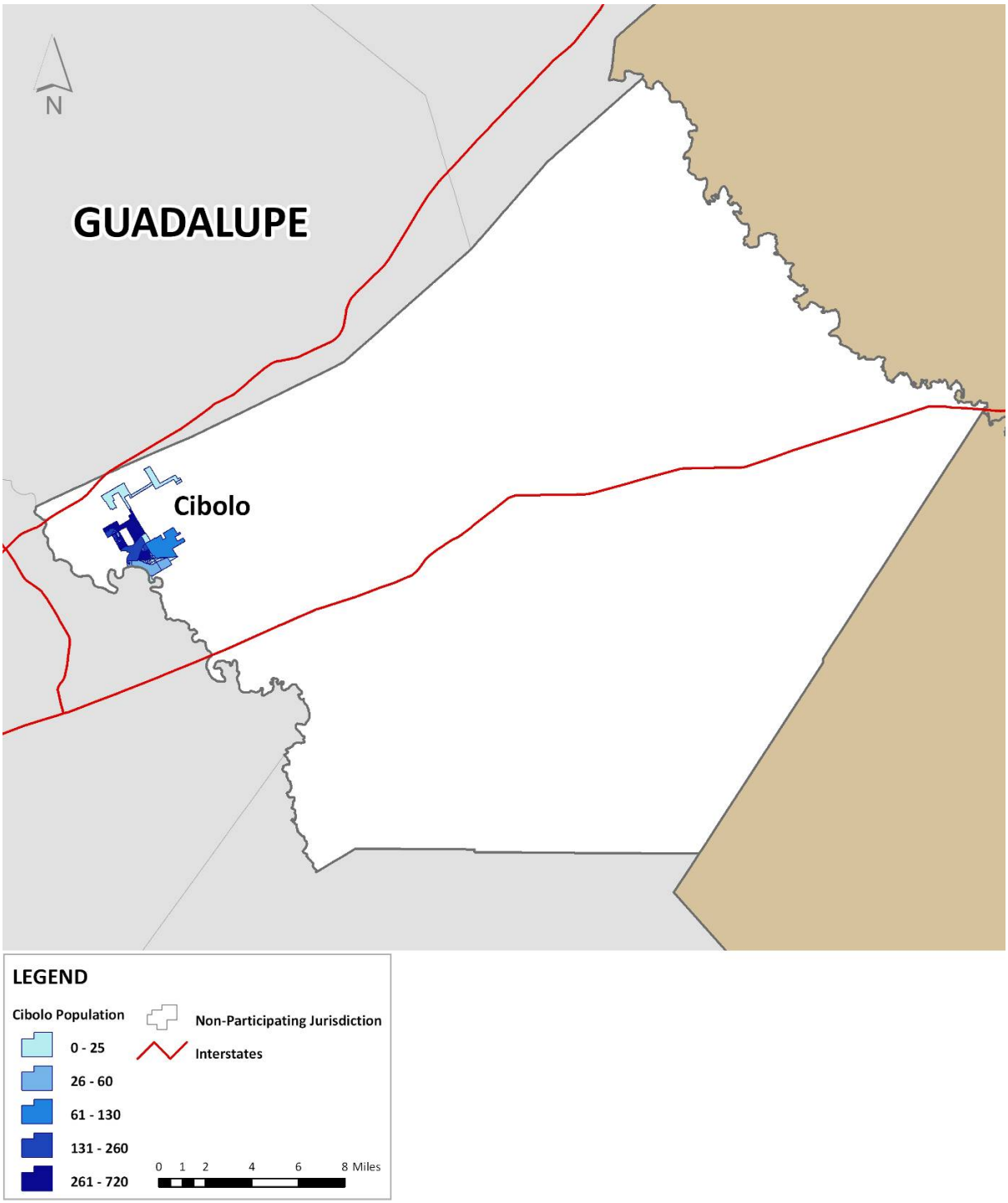


Figure 14-9. Estimated Dam Locations in Cibolo[4] (in Guadalupe County)



[4] Data provided shows no dams relevant to the Cibolo area.

SECTION 14: DAM FAILURE

Table 14-1 details the location information in terms of latitude and longitude, in addition to height, storage, and primary purpose of each dam by county.

Table 14-1. Dam Location and Storage Capacity

County	Latitude	Longitude	NID [5]Height (Ft.)	NID Storage (acre feet)*	Primary Purpose
CALDWELL	29.866136	-97.796179	22	220	Recreation
CALDWELL	29.865917	-97.756478	41	4741	Flood Control and Storm Water Management
CALDWELL	29.939354	-97.761005	49	1137	Flood Control and Storm Water Management
CALDWELL	29.857142	-97.411270	34	5404	Flood Control and Storm Water Management
CALDWELL	29.791633	-97.552164	25	1823	Flood Control and Storm Water Management
CALDWELL	29.854526	-97.624484	42	1527	Flood Control and Storm Water Management
CALDWELL	29.952436	-97.742953	46	8715	Flood Control and Storm Water Management
CALDWELL	29.16616	-97.703318	49	802	Flood Control and Storm Water Management
CALDWELL	29.999893	-97.709044	35	5312	Flood Control and Storm Water Management
CALDWELL	29.978354	-97.698776	35	1700	Flood Control and Storm Water Management
CALDWELL	29.938354	-97.693249	38	1178	Flood Control and Storm Water Management
CALDWELL	29.957187	-97.654322	41	5318	Flood Control and Storm Water Management
CALDWELL	29.894523	-97.536684	28	1066	Flood Control and Storm Water Management
CALDWELL	29.876357	-97.577177	24	2314	Flood Control and Storm Water Management
CALDWELL	29.824774	-97.363997	23	184	Recreation
CALDWELL	29.850007	-97.499341	33	2337	Flood Control and Storm Water Management
CALDWELL	29.691585	-97.657731	30	1993	Flood Control and Storm Water Management
CALDWELL	29.833115	-97.561535	28	3170	Flood Control and Storm Water Management
CALDWELL	29.770436	-97.699917	28	2160	Flood Control and Storm Water Management
CALDWELL	29.738197	-97.519208	12	106	Fire Protection, Stock, Or Small Farm Pond
CALDWELL	29.845180	-97.793618	17	131	Other
CALDWELL	29.772902	-97.805377	8	92	Recreation
CALDWELL	29.908214	-97.681744	19	144	Fire Protection, Stock, Or Small Farm Pond
CALDWELL	29.924744	-97.625220	13	52	Fire Protection, Stock, Or Small Farm Pond
CALDWELL	30.006503	-97.695307	18	211	Fire Protection, Stock, Or Small Farm Pond
CALDWELL	29.782410	-97.831111	10	150	Hydroelectric
CALDWELL	28.482625	-96.81229	10	60	Hydroelectric
CALHOUN	28.496566	-96.797136	12	0	Other
CALHOUN	28.505822	-96.884176	11	600	Irrigation
CALHOUN	28.663330	-96.525000	20	3250	Flood Control and Storm Water Management
CALHOUN	28.657711	-97.547207	40	4100	Flood Control and Storm Water Management
CALHOUN	28.515011	-96.774176	11	1312	Flood Control and Storm Water Management
CALHOUN	28.483333	-96.791667	13	3155	Flood Control and Storm Water Management
CALHOUN	28.509436	-96.751462	12	1964	Other
CALHOUN	28.515011	-97.774176	11	1312	Other
CALHOUN	28.516635	-96.757300	11	1304	Flood Control and Storm Water Management
CALHOUN	28.659483	-96.528648	45	1320	Flood Control and Storm Water Management

[5] National Inventory of Dams (NID)

County	Latitude	Longitude	NID [5]Height (Ft.)	NID Storage (acre feet)*	Primary Purpose
CALHOUN	28.658861	-96.525771	44	3542	Flood Control and Storm Water Management
CALHOUN	28.664628	-96.541770	53	3722	Flood Control and Storm Water Management
CALHOUN	28.674137	-96.537480	34	7524	Flood Control and Storm Water Management
CALHOUN	28.656008	-96.543462	8	152	Flood Control and Storm Water Management
CALHOUN	28.668218	-96.533789	8	112	Flood Control and Storm Water Management
CALHOUN	28.655967	-96.547484	10	400	Flood Control and Storm Water Management
CALHOUN	28.65194	-96.518755	40	2949	Flood Control and Storm Water Management
CALHOUN	28.655760	-96.534557	15	1174	Irrigation
CALHOUN	28.451256	-96.828352	11	462	Other
DEWITT	29.125864	-97.023361	10	144	Flood Control and Storm Water Management
DEWITT	29.107282	-97.042673	18	173	Flood Control and Storm Water Management
DEWITT	29.129974	-97.311509	37	808	Hydroelectric
DEWITT	29.093580	-97.085915	20	280	Flood Control and Storm Water Management
DEWITT	29.227400	-97.400100	22	182	Fire Protection, Stock, Or Small Farm Pond
DEWITT	29.175393	-97.220488	14	146	Recreation
DEWITT	29.083875	-97.274049	9	125	Recreation
DEWITT	29.146476	-97.272531	22	454	Flood Control and Storm Water Management
DEWITT	29.126418	-97.275994	26	1285	Flood Control and Storm Water Management
DEWITT	29.267190	-97.138501	8	144	Recreation
DEWITT	29.192779	-97.485268	16	128	Fire Protection, Stock, Or Small Farm Pond
DEWITT	29.327597	-97.202018	15	146	Fire Protection, Stock, Or Small Farm Pond
DEWITT	29.221018	-97.237763	20	88	Fire Protection, Stock, Or Small Farm Pond
DEWITT	28.923633	-97.456294	25	140	Recreation
DEWITT	29.000833	-97.708333	45	4100	Flood Control and Storm Water Management
DEWITT	28.997163	-97.728828	29	1908	Flood Control and Storm Water Management
GONZALES	29.496667	-97.455000	14	650	Flood Control and Storm Water Management
GONZALES	29.546475	-97.527311	8	0	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.435541	-97.763173	16	576	Flood Control and Storm Water Management
GONZALES	29.429270	-97.767488	7	70	Flood Control and Storm Water Management
GONZALES	29.495000	-97.58667	11	1058	Hydroelectric
GONZALES	29.495815	-97.624491	42	23520	Hydroelectric
GONZALES	29.468355	-97.492068	42	8120	Hydroelectric
GONZALES	29.570470	-97.308029	20	304	Recreation
GONZALES	29.555740	-97.315137	22	123	Recreation
GONZALES	29.528309	-97.472729	14	106	Recreation
GONZALES	29.601667	-97.553333	6	54	Flood Control and Storm Water Management
GONZALES	29.600277	-97.587339	12	120	Recreation
GONZALES	29.757703	-97.325087	17	164	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.762418	-97.294933	20	106	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.681632	-97.370901	15	120	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.533707	-97.396589	18	80	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.512743	-97.406880	18	158	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.506815	-97.401631	18	144	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.561667	-97.313333	21	92	Fire Protection, Stock, Or Small Farm Pond

County	Latitude	Longitude	NID [5]Height (Ft.)	NID Storage (acre feet)*	Primary Purpose
GONZALES	29.563333	-97.310000	21	74	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.186307	-97.653114	20	70	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.313519	-97.399529	15	104	Fire Protection, Stock, Or Small Farm Pond
GONZALES	29.290235	-97.756511	15	88	Recreation
GONZALES	29.310000	-97.750000	18	230	Recreation
GONZALES	29.361667	-97.718333	22	117	Recreation
GONZALES	29.603333	-97.431667	13	111	Recreation
GONZALES	29.270833	-97.58333	23	147	Other
GONZALES	29.196667	-97.526667	18	170	Recreation
KENDALL	29.752800	-98.791700	18	30	Irrigation
KENDALL	29.778120	-98.787817	12	50	Recreation
KENDALL	29.832145	-9813113	10	20	Flood Control and Storm Water Management
KENDALL	29.837220	-98.587780	16	35	Irrigation
KENDALL	29.853687	-98.899897	15	16	Fire Protection, Stock, Or Small Farm Pond
KENDALL	29.870560	-98.581670	12	21	Irrigation
KENDALL	29.909199	-98.484048	11	0	Fire Protection, Stock, Or Small Farm Pond
KENDALL	29.801979	-98.805072	31	212	Recreation
KENDALL	29.889950	-98.608305	12	50	Irrigation
KENDALL	29.789052	-98.724035	12	55	Recreation
KENDALL	29.877092	-98.515463	39	1170	Recreation
KENDALL	29.821722	-98.767675	89	15668	Recreation
KENDALL	29.779341	-98.783158	76	4732	Recreation
KENDALL	29.807244	-98.790158	54	1060	Flood Control and Storm Water Management
KENDALL	29.760548	-98.788132	56	1278	Flood Control and Storm Water Management
KENDALL	29.779810	-98.811632	17	120	Recreation
KENDALL	29.778581	-98.806401	18	55	Recreation
KENDALL	29.776850	-98.802176	24	83	Recreation
KENDALL	29.933870	-98.89970	50	92	Irrigation
REFUGIO	28.271572	-97.322085	8	115	Fire Protection, Stock, Or Small Farm Pond
REFUGIO	28.220844	-97.280612	11	88	Recreation
VICTORIA	29.018333	-97.061667	16	128	Flood Control and Storm Water Management
VICTORIA	28.681667	-96.985000	6	155	Irrigation
VICTORIA	28.666667	-96.951667	11	1056	Other
VICTORIA	28.723333	-97.16667	65	169000	Flood Control and Storm Water Management
VICTORIA	28.736667	-96.723333	18	286	Recreation

* Total exposure was estimated by using 2000 census population and building inventory data from HAZUS-MH MR4, in combination with the location and maximum storage capacity of high and significant hazard dams. For dams with a maximum storage capacity of 100,000 acre-feet or more, all census blocks within five miles were considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet, all census blocks within three miles were considered to be at risk to potential dam failure hazards. For dams with a maximum storage

capacity of less than 10,000 acre-feet, all census blocks within one mile were considered to be at risk to potential dam failure hazards.

Extent

The extent or magnitude of a dam failure event can be measured in terms of the classification of the dam. The National Interagency Committee on Dam Safety defines high hazard dams as those where failure or mis-operation will cause loss of human life. Prior to 2009, high hazard dams were defined as those at which failure or mis-operation would probably cause loss of human life. Dams classified as "significant" are those at which failure or mis-operation probably would not result in loss of human life but could cause economic loss, environmental damage, disruption of lifeline facilities, or other significant damage. Low hazard potential dams are those at which failure or mis-operation probably would not result in loss of human life but would cause limited economic and/or environmental losses. Losses would be limited mainly to the owner's property.

The magnitude or extent for the GBRA area can be measured by the storage capacity. Table 14-2 details the hazard potential and extent by capacity.

Table 14-2. Extent Classifications

HAZARD POTENTIAL CLASSIFICATION	LOSS OF HUMAN LIFE	DAM STORAGE CAPACITY
Low	None Expected	Less than 10,000 acre-feet
Significant	Probable (1 to 6)	Between 10,000 and 100,000 acre-feet
High	Loss of Life Expected (7 or More)	100,000 acre-feet or more

Based on the classification and storage capacity for dams in the GBRA area, all significant and high hazard dams were profiled. Table 14-1 includes specific information by County. For dams with a maximum storage capacity of 100,000 acre-feet or more or "high" hazard dams, all census blocks within five miles were considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet or "significant" hazard dams, all census blocks within three miles were considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity of less than 10,000 acre-feet, all census blocks within one mile were considered to be at risk to potential dam failure hazards.

Of the dams located for the planning area only one is considered a high hazard dam in Victoria County. Therefore people and property within five miles are considered to be at risk. A potential dam failure could result in major economic damage and the loss of seven or more lives. Although this is the only

high hazard dams, two other dams are considered to be significant hazard dams. These dams are located in Kendall and Gonzales counties. People and property within three miles of these dams are considered at risk, with a potential for loss of life of one to six people.

Historical Occurrences

There are about 80,000 dams in the United States today.[6] Catastrophic dam failures have occurred frequently throughout the past century. Between 1918 and 1958, 33 major U.S. dam failures caused 1,680 deaths. From 1959 to 1965, nine major dams failed worldwide. Some of the largest disasters in the U.S. have resulted from dam failures. More than 520 dam incidents, including 21 dam failures, were reported in the past two years to the National Performance of Dams Program, which collects and archives information on dam performance from state and federal regulatory agencies and dam owners.

The State of Texas has not experienced loss of life or extensive economic damage due to a dam failure since the first half of the twentieth century. However, due to limited state staff, many incidents are not reported and, therefore, the actual number of incidents is likely to be greater. There has not been a recorded dam failure event for any of the participating jurisdictions in the basin.

Probability of Future Events

No historical events of dam failure have been recorded in the GBRA area, though the risk of dam failure is monitored closely. Due the lack of historical occurrences, the probability of a future event is unlikely, meaning an event is possible in the next ten years.

Impact and Vulnerability

Table 14-3 lists the number of high and significant hazard dams for each participating jurisdiction in the region, and the total estimated exposure of people and buildings to potential dam failure hazards. Due to homeland security concerns, the analysis was performed for all high and significant hazard dams as a single group per NID classification based on storage capacity, as opposed to separate analyses being conducted for high-hazard dams and significant-hazard dams separately. In lieu of dam failure inundation maps, total exposure was estimated by using 2000 census population and building inventory data from HAZUS-MH MR4, in combination with the location and maximum storage capacity of high and significant hazard dams. For dams with a maximum storage capacity of 100,000 acre-feet or more, all census blocks within five miles were considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet, all census blocks within three

[6] Federal Emergency Management Agency, Dam Safety Program, http://www.fema.gov/hazards/damsafety/.

miles were considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity of less than 10,000 acre-feet, all census blocks within one mile were considered to be at risk to potential dam failure hazards.

Table 14-3. Total Exposure to High-Hazard Dams by Jurisdiction

JURISDICTION	TOTAL NUMBER OF HIGH AND SIGNIFICANT HAZARD DAMS	TOTAL POPULATION IN JURISDICTION	NUMBER OF PEOPLE AT RISK TO HAZARD	NUMBER OF BUILDINGS AT RISK TO HAZARD	VALUE OF BUILDINGS AT RISK ($) TO HAZARD
Gonzales County	1	8,343	2,534	1,397	$119,302,000
Kendall County	1	17,618	7,804	3,402	$533,117,000
Victoria County	1	23,482	2,883	1,096	$152,499,000
TOTALS FOR STUDY AREA[7]	**3**	**49,443**	**13,221**	**5,895**	**$804,918,000**

Source: USACE; HAZUS-MH MR4

Although there has never been a dam failure in the GBRA area, since there are three dams classified as "high" or "significant", the potential severity of impact of dam failure is substantial. A dam breach could result in multiple deaths with facilities shut down for 30 days or more, and more than 50 percent of property destroyed or damaged. For these reasons, creating mitigations actions to remove or protect people and structures from the path of destruction is necessary in order to minimize impact from dam failure.

[7] Totals for the study area may include values less than $5,000 for dollar amounts and less than 50 for populations that are classified as "negligible" in the table.

Oil And Gas Pipeline Failure

Hazard Description 1
Location 1
Extent 11
Historical Occurrences 11
Probability of Future Occurrences 16
Impact and Vulnerability 16

Hazard Description

Fuel pipeline breach or pipeline failure addresses the rare, but serious hazard of an oil or natural gas pipeline. An estimated 2.2 million miles of pipelines in the United States carry hazardous materials. Natural gas pipelines transport natural gas, and oil or liquid petroleum pipelines transport crude oil and refined products from crude oils, such as gasoline, home heating oil, jet fuel and kerosene in addition to liquefied propane, ethylene, butane and some petrochemical products. Sometimes oil pipelines are also used to transport liquefied gases, such as carbon dioxide.

Pipeline failure is a rare occurrence, but has the potential to cause extensive property damage and loss of life. Pipelines have caused fires and explosions that killed more than 200 people and injured more than 1,000 people nationwide and 50 people in Texas in the last decade.

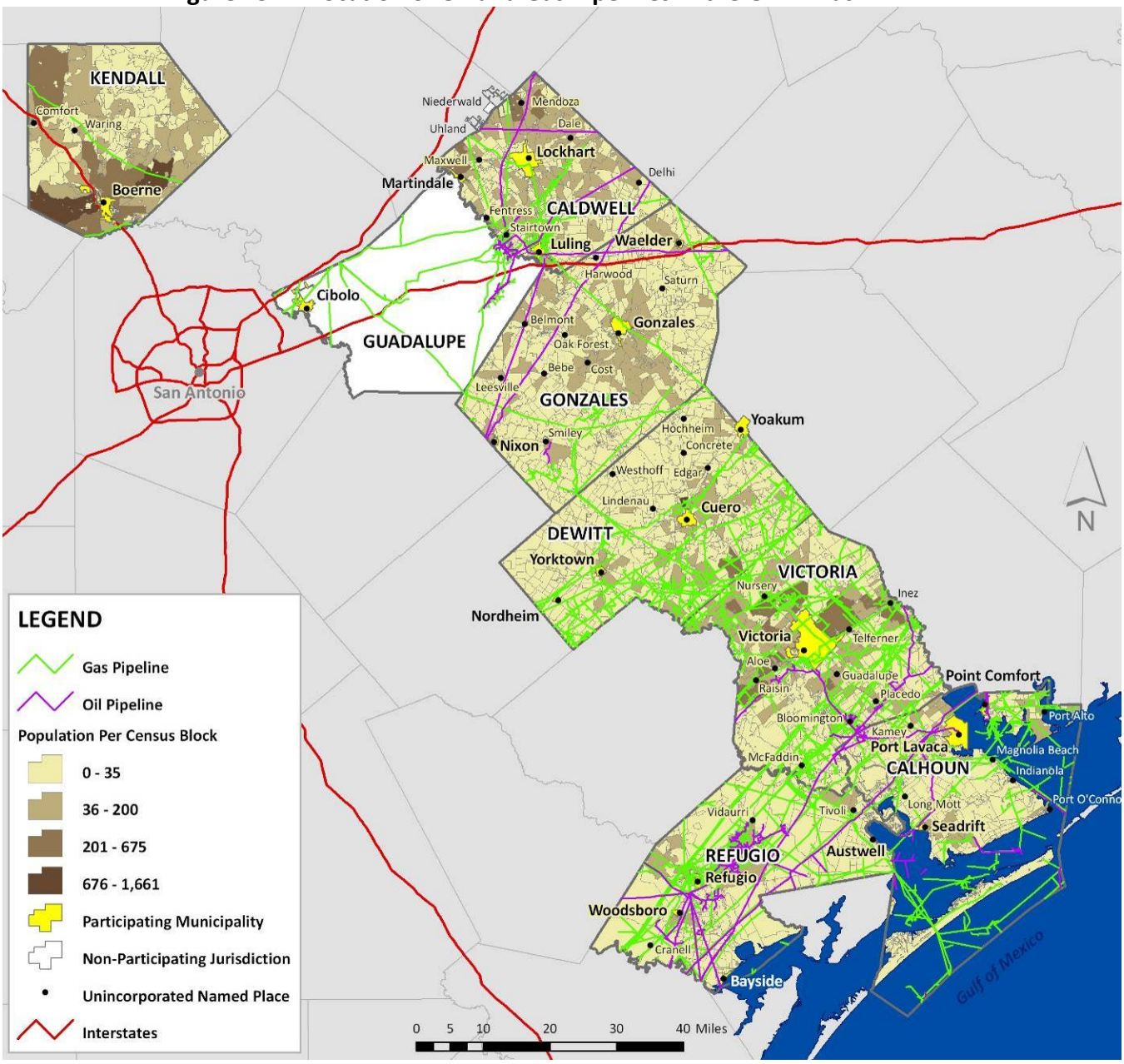
Location

Figures 15-1 on the following page shows the locations of gas and oil pipelines throughout the GBRA Basin region. Figures 15-2 through 15-9 show locations of pipelines in each respective county. It is important to note that due to scale, some pipelines cannot be seen on maps where one pipeline runs directly over another or where pipelines appear too close together to be visible on the map.

SECTION 15: PIPELINE FAILURE

If any of these energy pipelines were to rupture, such an event could endanger property and lives in the immediate area. Immediate impacts can occur within a half-mile area and secondary impacts within a mile of the incident. Therefore, due to the location of both oil and gas pipelines in the county, each participating jurisdiction faces a moderate to high risk, with the exception of Jamaica Beach.

Figure 15-1. Location of Oil and Gas Pipelines in the GBRA Basin



Gas and Oil Pipelines in GBRA Basin

Figure 15-2. Gas and Oil Pipelines in Caldwell County

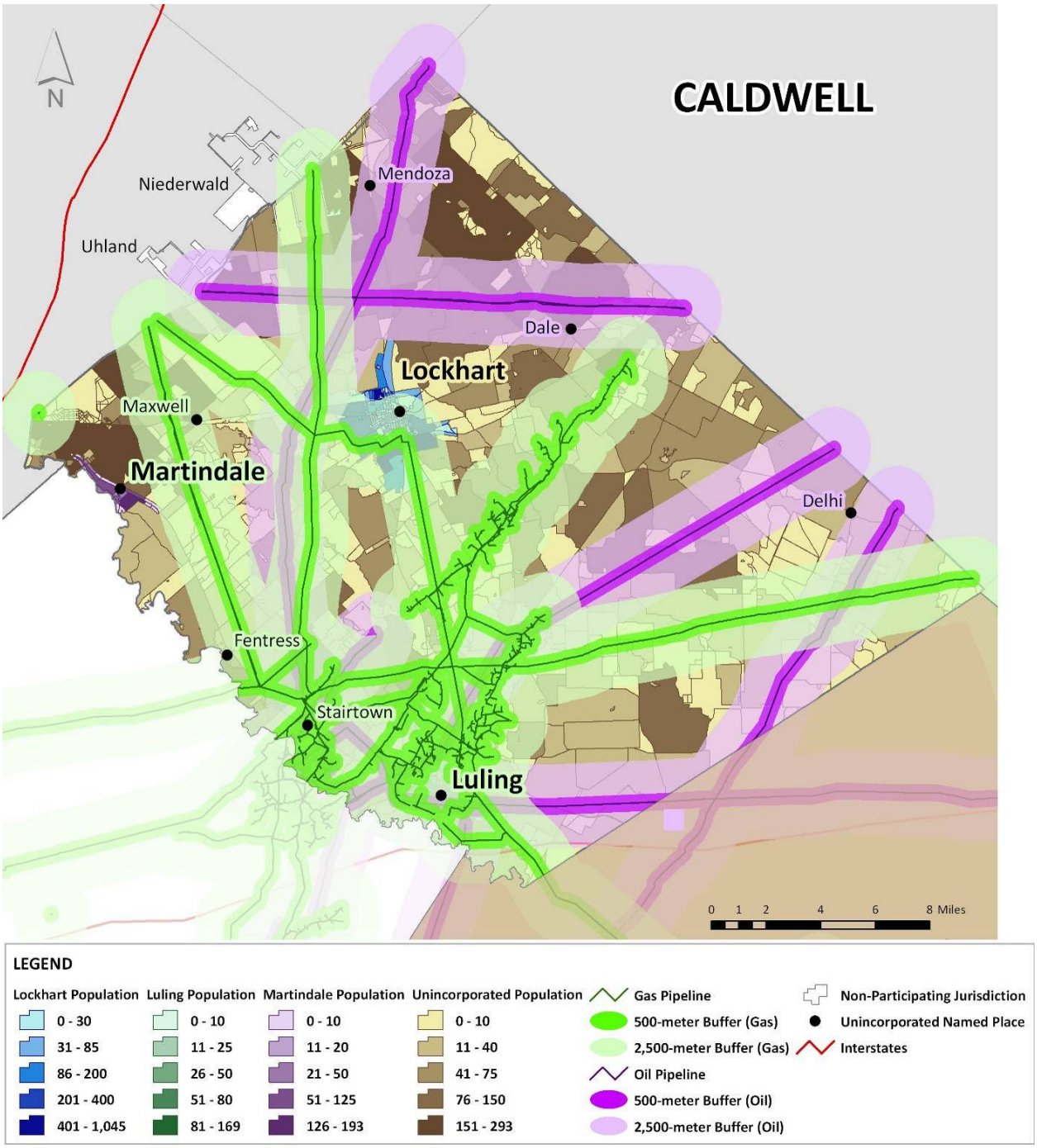


Figure 15-3. Gas and Oil Pipelines in Calhoun County

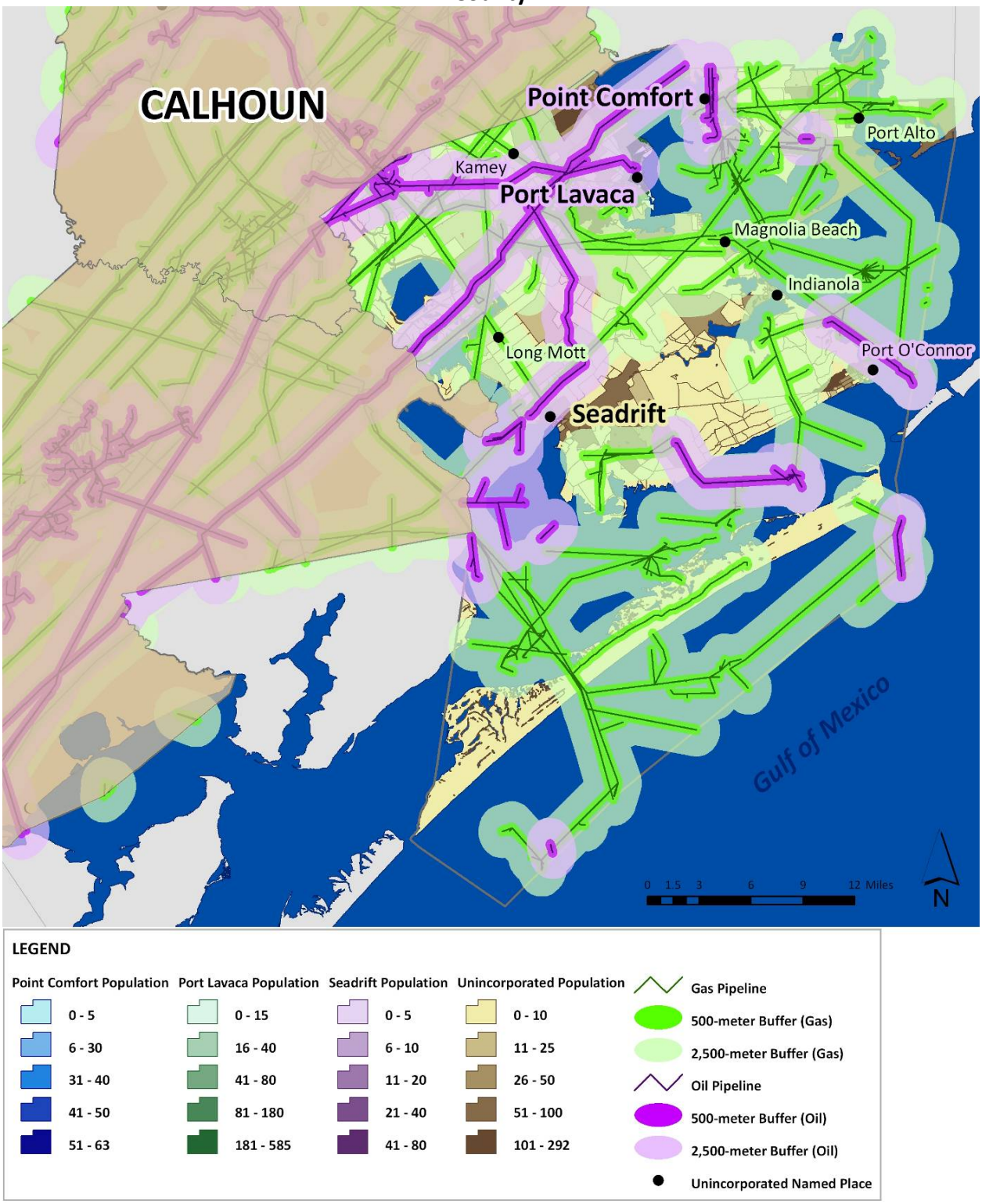


Figure 15-4. Gas and Oil Pipelines in DeWitt County

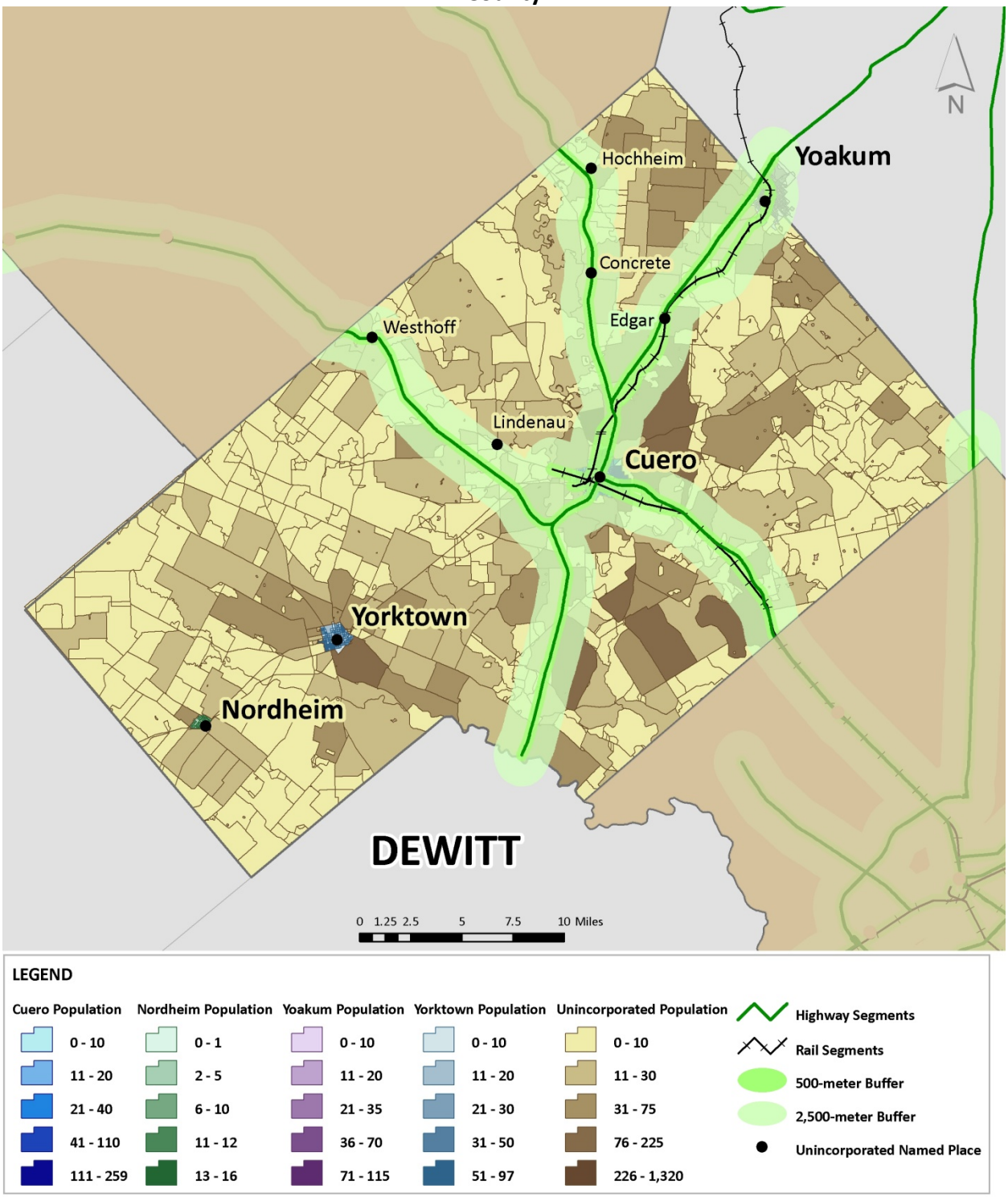


Figure 15-5. Gas and Oil Pipelines in Gonzales County

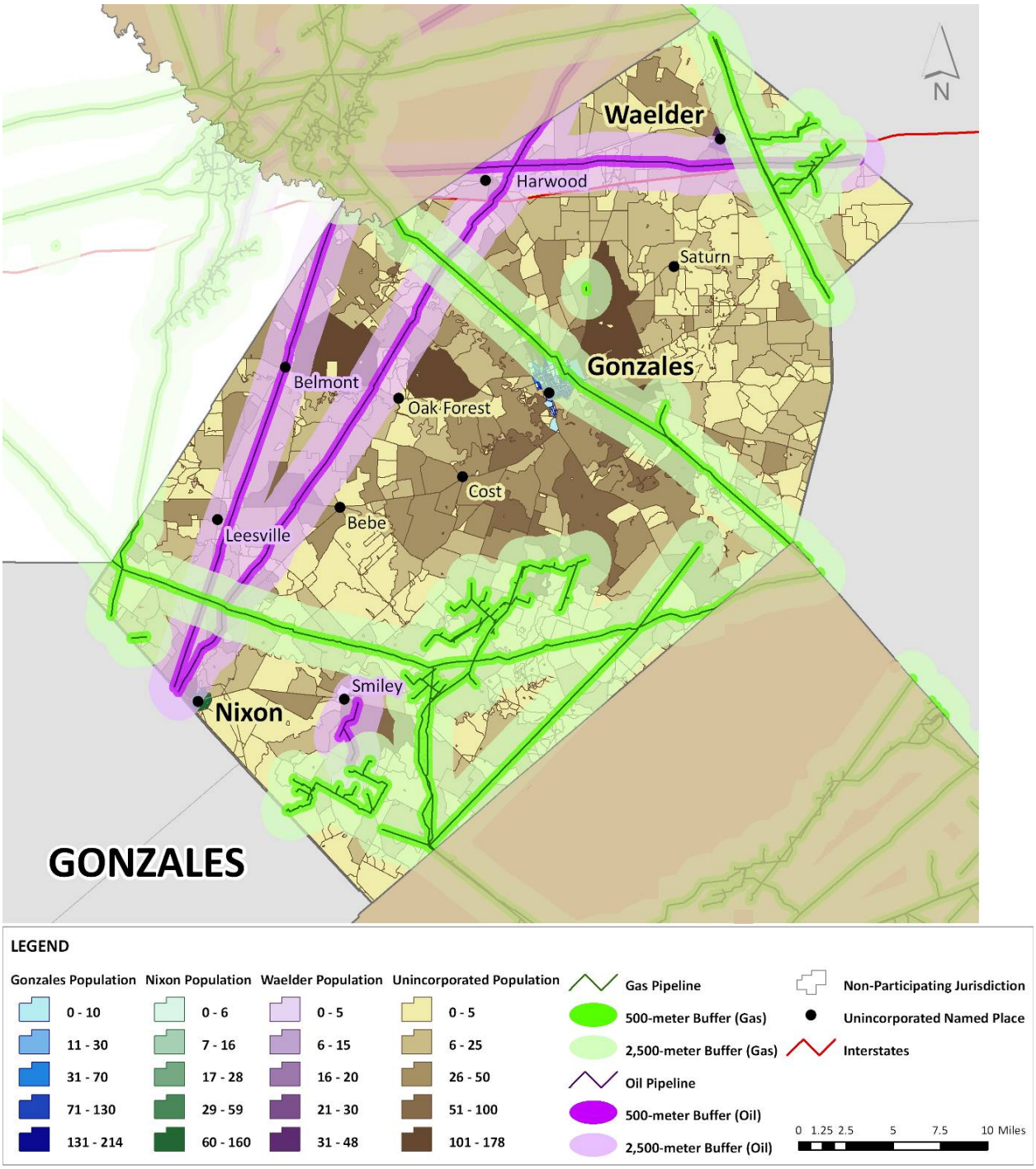


Figure 15-6. Gas and Oil Pipelines in Kendall County

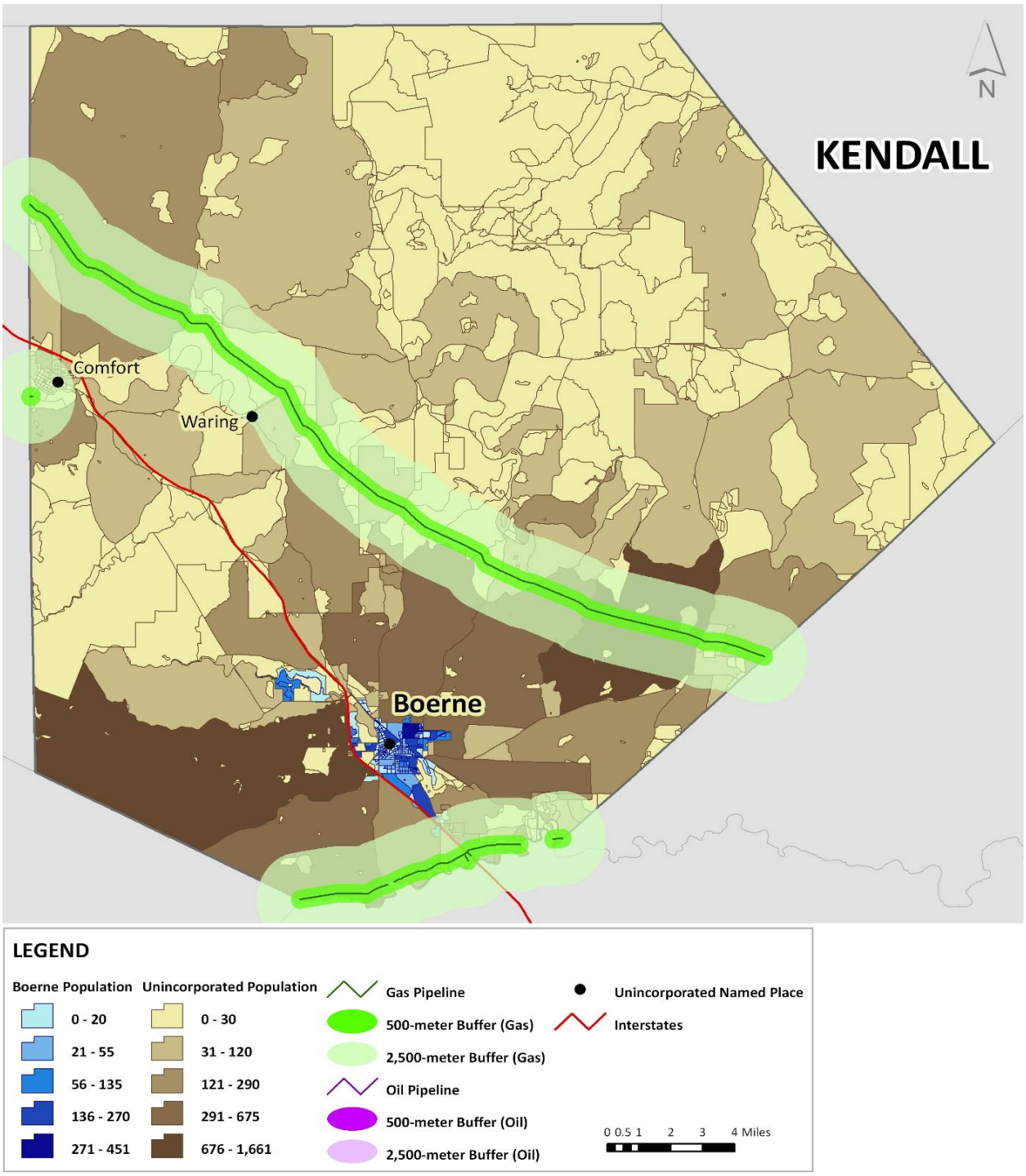


Figure 15-7. Gas and Oil Pipelines in Refugio County

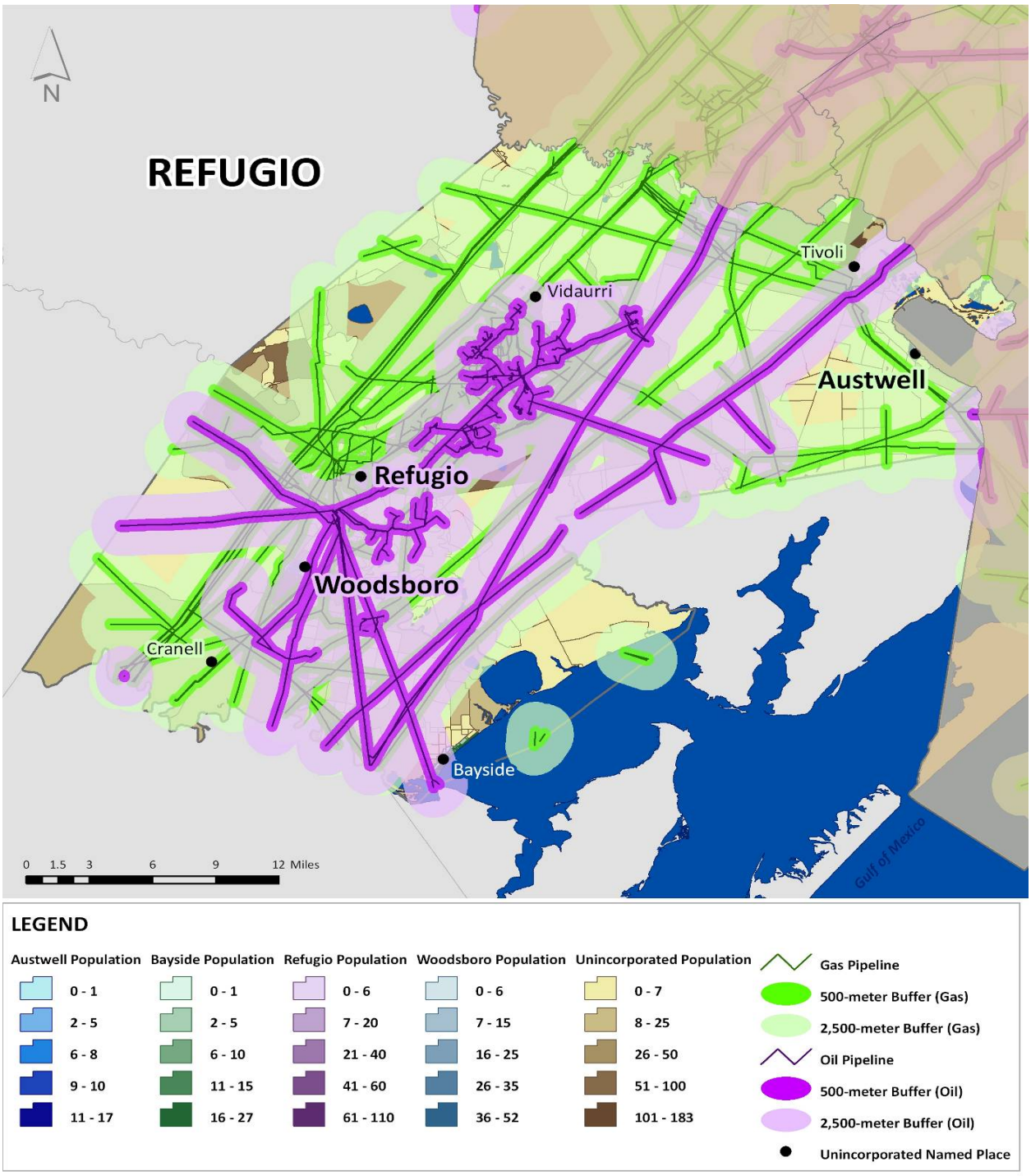


Figure 15-8. Gas and Oil Pipelines in Victoria County

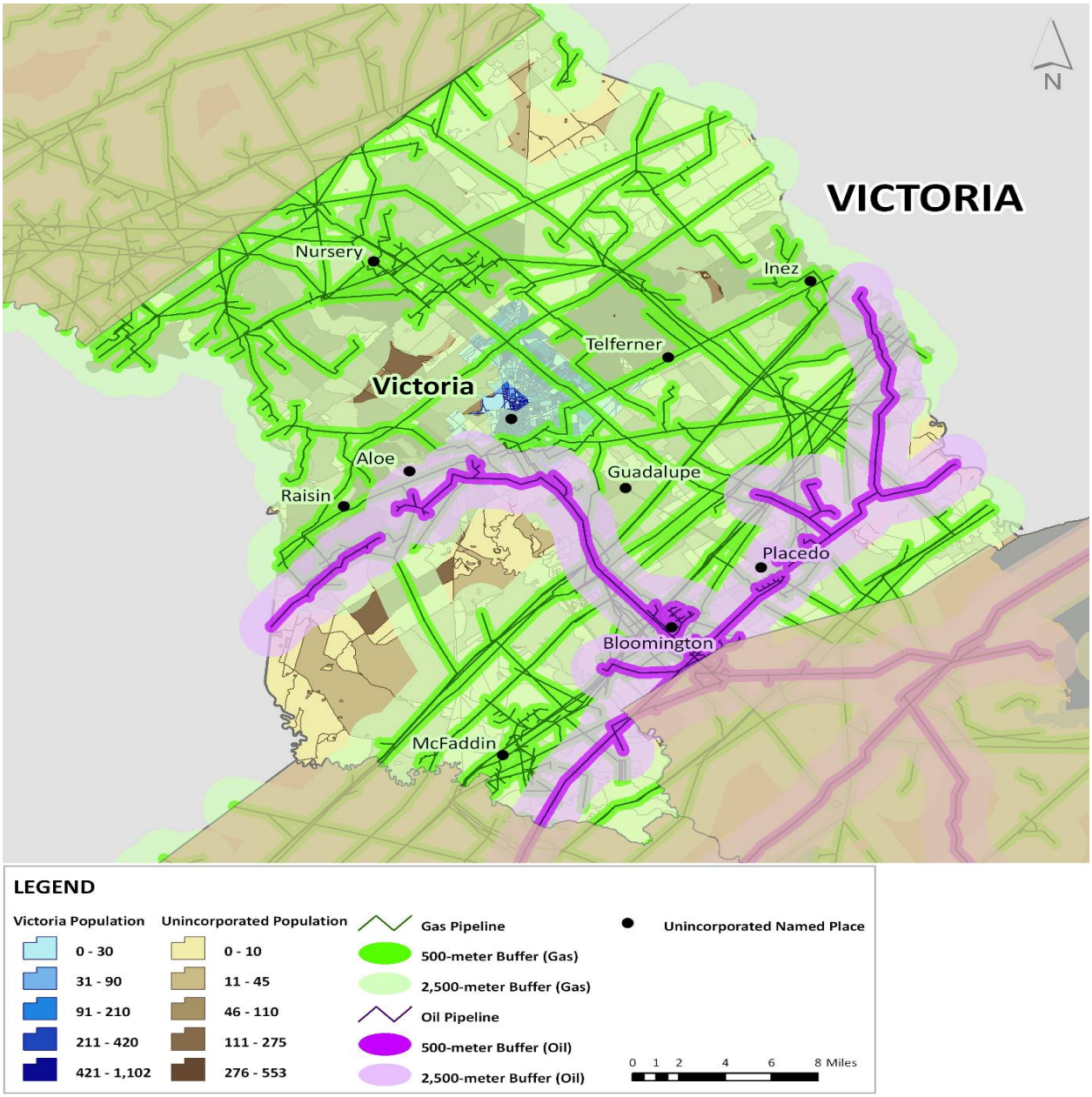
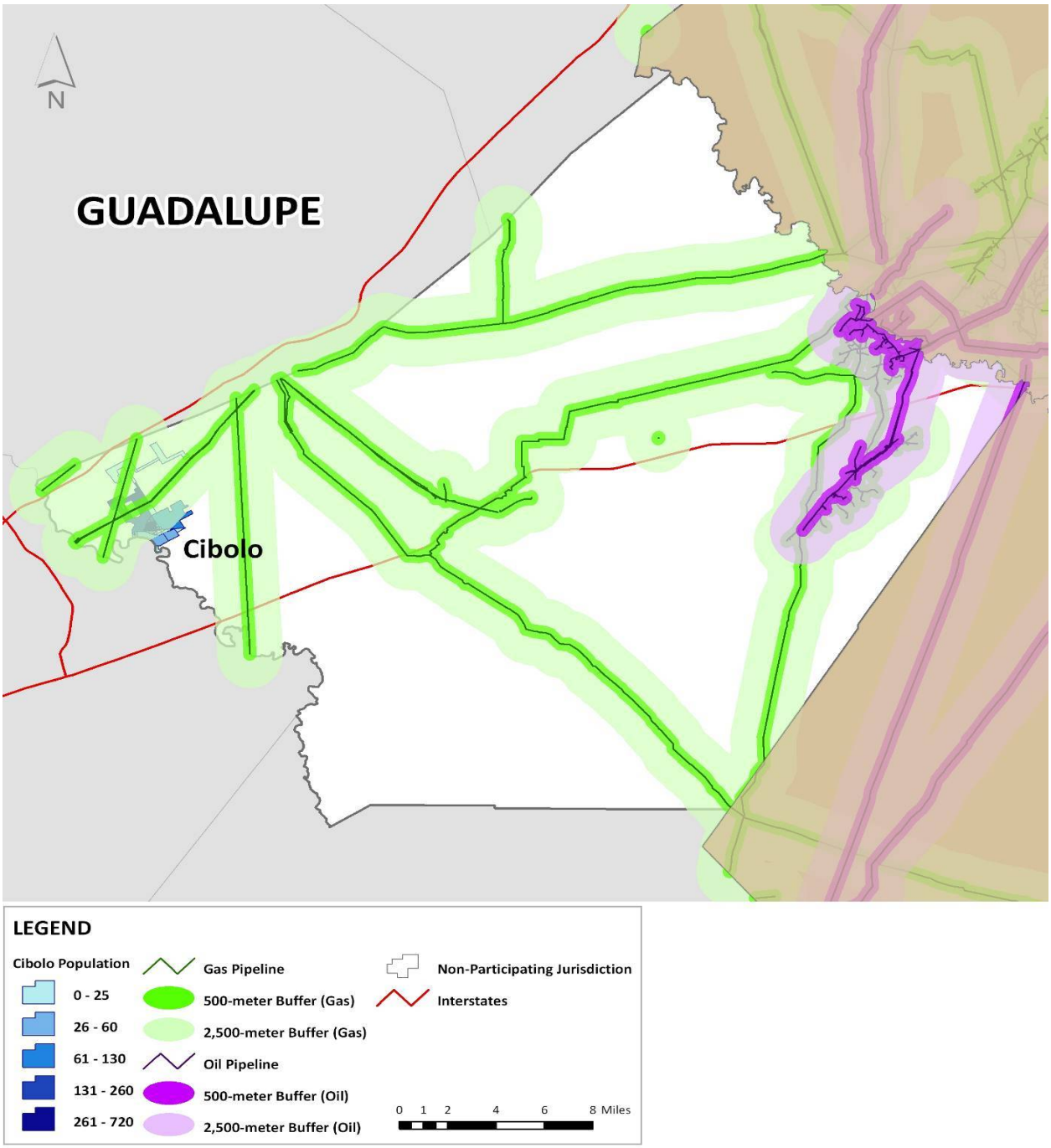


Figure 15-9. Gas and Oil Pipelines in Cibolo (in Guadalupe County)



Extent

While many of the historical accidents presented in Table 15-1 are relatively small in terms of the amount of property damage that was reported, and while some may not meet the conventional idea of a "pipeline failure," it is valuable to consider these events as presenting a range in magnitude of a possible occurrence. Reading Table 15-1 in conjunction with the Figures 15-1 through 15-9 provides an indication of the possible intensity of an event. In addition historical occurrences provide an indication of the types of issues related to gas and oil present in the GBRA Basin and the preventable nature of many of these occurrences. For example, in Table 15-2, several of the incidents reported to the Railroad Commission of Texas were of unknown origin, the result of drivers hitting presumably unprotected facilities with their vehicles. Several incidents appeared to be the result of miscommunication or lack of communication regarding locates prior to digging. Maintenance and possibly homeowner education could have been a contributing factor in two of the events.

Historical Occurrences

The causes of pipeline failures can range from internal issues such as corrosion or material defects to outside forces. Such forces can include damage from natural hazards, such as earthquakes, or intentional destruction by humans. Table 15-1 summarizes the incident log of historical pipeline accidents reported by the Railroad Commission of Texas. Table 15-2 illustrates pipeline accidents that transpired between 2003 and 2008.

Table 15-1. Historical Pipeline Accidents (Gas and Oil Combined) (1985-2001)

Annualized Expected Number of Pipeline Events = 1.571429

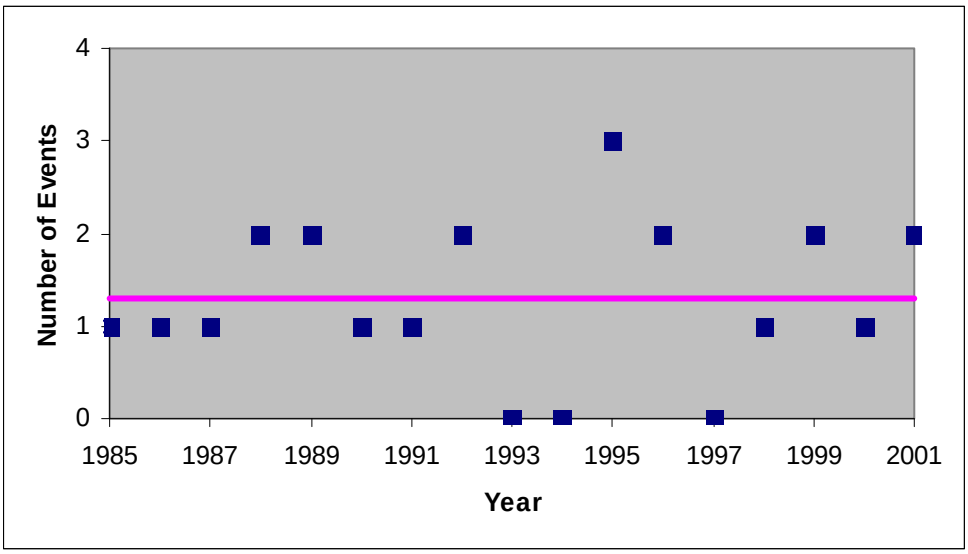


Table 15-2 Historical Pipeline Accidents[1] (Gas and Oil Combined) (2003-2008)[2]

COUNTY	INCIDENT DATE	TYPE[3]	OPERATOR	DEATHS	INJURIES	COST	NEAREST CITY
CALDWELL	07/01/05	GAS	TEXAS GAS SERVICE	0	0	>$5,000	LOCKHART
CALDWELL	03/09/06	LPG	L & L TRANSPORT	1	0	>$5,000	LOCKHART
CALDWELL	06/12/06	LIQUID	TEPPCO CRUDE PIPELINE, LP	0	0	UNKNOWN	LULING
CALDWELL	06/18/06	OG	UNKNOWN	0	0	UNKNOWN	STAIRTOWN
CALDWELL	03/31/07	OG	UNKNOWN	0	0	UNKNOWN	LOCKHART
CALDWELL	08/28/08	GAS	UNKNOWN	0	0	>$50,000	PRAIRIE LEA
CALDWELL	12/08/08	LIQUID	UNKNOWN	0	0	UNKNOWN	LULING
CALDWELL	07/06/09	OG	UNKNOWN	0	0	UNKNOWN	LOCKHART
CALDWELL	01/02/10	OG	UNKNOWN	0	0	UNKNOWN	LULING
CALHOUN	09/01/03	GAS	LAVACA PIPELINE COMPANY	0	0	<$5,000	MATAGORDA ISLAND
CALHOUN	10/20/03	LIQUID	VINTAGE PETROLEUM	0	0	$10,000	SEADRIFT
CALHOUN	10/23/03	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	PORT LAVACA
CALHOUN	12/15/03	GAS	ATMOS ENERGY CORP., MID-TEX DIVISION	0	0	>$5,000	PORT O'CONNER
CALHOUN	03/07/04	GAS	SABCO OPERATING COMPANY	0	0	$20,000	OFFSHORE
CALHOUN	04/08/04	GAS	SABCO OPERATING COMPANY	0	0	$12,000	PORT O'CONNOR
CALHOUN	06/16/04	GAS	SABCO OPERATING COMPANY	0	0	$30,000	PORT O'CONNER
CALHOUN	07/15/04	GAS	SABCO OPERATING COMPANY	0	0	$10,000	OFFSHORE
CALHOUN	01/14/05	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	PORT LAVACA
CALHOUN	01/20/05	GAS	SABCO OPERATING COMPANY	0	0	<$5,000	MATAGORDA
CALHOUN	03/02/05	GAS	SABCO OPERATING COMPANY	0	0	$43,000	PORT O'CONNER
CALHOUN	03/07/05	LIQUID	NEUMIN PRODUCTION	0	0	<$50,000	SEADRIFT
CALHOUN	03/21/05	LIQUID	NEUMIN PRODUCTION	0	0	<$5,000	SEADRIFT
CALHOUN	04/04/05	GAS	CENTERPOINT ENERGY ENTEX	0	1	UNKNOWN	SEADRIFT
CALHOUN	04/18/05	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	PORT LAVACA
CALHOUN	04/27/05	GAS	SABCO OPERATING COMPANY	0	0	$18,000	ROCKPORT

[1] Source: Texas Railroad Commission

[2] Limitations of the data used to populate Table 15-2 include the following: more than 25 percent of the entries do not provide an operator name, 35 percent of the entries do not show a cost for the release, two incidents are undated, and the data range covers only eight years (2003-2010). All entries are shown in chronological order by county. LPG stands for liquefied petroleum gas.

[3] OG stands for oil and gas.

SECTION 15: PIPELINE FAILURE

COUNTY	INCIDENT DATE	TYPE[3]	OPERATOR	DEATHS	INJURIES	COST	NEAREST CITY
CALHOUN	08/04/05	GAS	SABCO OPERATING COMPANY	0	0	>$5,000	PORT O'CONNOR
CALHOUN	09/13/05	LIQUID	NEUMIN PRODUCTION	0	0	<$5,000	SEA DRIFT
CALHOUN	10/19/05	GAS	LAVACA PIPELINE	0	0	$34,700	POINT COMFORT
CALHOUN	12/29/05	GAS	VINTAGE PETROLEUM	0	0	<$5,000	SEADRIFT
CALHOUN	02/08/06	LIQUID	SABCO OPERATING COMPANY	0	0	>$50,000	ROCKPORT
CALHOUN	04/02/06	GAS	SABCO OPERATING COMPANY	0	0	>$50,000	UNKNOWN
CALHOUN	04/22/06	GAS	VINTAGE PETROLEUM	0	0	>$5,000	PORT LAVACA
CALHOUN	05/05/06	GAS	VINTAGE PETROLEUM	0	0	>$5,000, BUT <$50,000	SEADRIFT
CALHOUN	07/29/06	GAS	LAVACA PIPELINE	0	0	<$5,000	MAGNOLIA BEACH
CALHOUN	08/06/06	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	SEA DRIFT
CALHOUN	10/24/06	GAS	LAVACA PIPELINE COMPANY	0	0	<$50,000	PORT LAVACA
CALHOUN	11/08/06	GAS	SABCO OPERATING COMPANY	0	0	>$5,000, POSSIBLY >$50,000	PORT O'CONNER
CALHOUN	12/20/06	OG	AROC TEXAS, INC.	0	0	UNKNOWN	UNKNOWN
CALHOUN	03/05/07	GAS	LAVACA PIPELINE COMPANY	0	0	<$5,000	POINT COMFORT
CALHOUN	03/13/07	GAS	SABCO OPERATING COMPANY	0	0	>$5,000 BUT <$50,000	PORT OCONNOR
CALHOUN	05/13/07	GAS	SABCO OPERATING COMPANY	0	0	$177,100 FOR 30 DAYS	PORT O'CONNER
CALHOUN	06/18/07	GAS	SABCO OPERATING COMPANY	0	0	>$5,000	UNKNOWN
CALHOUN	07/22/07	GAS	SABCO OPERATING COMPANY	0	0	$10,000	OFFSHORE
CALHOUN	09/13/07	GAS	MAIN ENERGY	0	0	$9,000	PORT LAVACA
CALHOUN	12/15/07	GAS	LAMAR OIL & GAS	0	0	<$50,000	SEADRIFT
CALHOUN	02/13/08	GAS	UNKNOWN	0	0	<$5,000	PORT LAVACA
CALHOUN	03/12/08	LIQUID	UNKNOWN	0	0	<$50,000	SAN ANTONIO BAY
CALHOUN	04/05/08	OG	UNKNOWN	0	0	UNKNOWN	POINT COMFORT
CALHOUN	09/22/08	GAS	UNKNOWN	0	0	<$50,000	POINT COMFORT
CALHOUN	09/26/08	LIQUID	UNKNOWN	0	0	UNKNOWN	SEA DRIFT
CALHOUN	11/18/08	OG	UNKNOWN	0	0	UNKNOWN	POINT COMFORT
CALHOUN	12/17/08	LIQUID	UNKNOWN	0	0	UNKNOWN	POINT COMFORT
CALHOUN	01/02/09	GAS	UNKNOWN	0	0	<$50,000	PORT

COUNTY	INCIDENT DATE	TYPE[3]	OPERATOR	DEATHS	INJURIES	COST	NEAREST CITY
							O'CONNOR
CALHOUN	05/11/09	OG	UNKNOWN	0	0	UNKNOWN	PORT O'CONNOR
CALHOUN	05/28/09	GAS	UNKNOWN	0	0	UNKNOWN	POINT COMFORT
CALHOUN	07/22/09	GAS	UNKNOWN	0	0	<$50,000	PORT LAVACA
CALHOUN	09/13/09	GAS	UNKNOWN	0	0	<$5,000	POINT COMFORT
DEWITT	04/10/06	GAS	TEXAS GAS SERVICE	0	0	<$5,000	CITY OF CUERO
DEWITT	06/11/06	GAS	CENTERPOINT ENERGY ENTEX	0	2	UNKNOWN	YORKTOWN
DEWITT	07/20/06	OG	ROCK OIL	0	0	UNKNOWN	YORKTOWN
DEWITT	03/30/07	OG	UNKNOWN	0	0	UNKNOWN	NORDHEIM
DEWITT	05/21/07	GAS	ENTERPRISE PRODUCTS OPERATING	0	0	>$5,000 BUT <$50,000	HOPE
DEWITT	03/04/09	LIQUID	UNKNOWN	0	0	UNKNOWN	VICTORIA
GONZALES	12/22/03	GAS	TEXAS GAS SERVICE	0	0	<$10,000	NIXON
GONZALES	06/20/04	GAS	DUKE ENERGY GUADALUPE PIPELINE, INC.	0	0	$24,000	SEGUIN
GONZALES	12/13/05	GAS	CITGO PRODUCTS PIPELINE	0	0	$0	GONZALES
GONZALES	01/15/06	LPG	LOGISTICS EXPRESS, INC.	0	2	>$5,000	WAELDER
GONZALES	09/28/06	LIQUID	CITGO PRODUCTS PIPELINE	0	0	UNKNOWN	LULING
GONZALES	09/18/07	LIQUID	CITGO PRODUCTS PIPELINE	0	0	UNKNOWN	GONZALES
GONZALES	11/29/07	LPG	PETRON, LLC	0	0	UNKNOWN	GONZALES
GONZALES	12/20/07	LIQUID	CITGO PIPELINE	0	0	UNKNOWN	GONZALES
GONZALES	09/12/08	LIQUID	UNKNOWN	0	0	UNKNOWN	LULING
GUADALUPE	01/08/04	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	MARION
GUADALUPE	03/30/04	LIQUID	EXXON MOBIL PIPELINE	0	0	$20,000	MCQUEENEY
GUADALUPE	12/03/04	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	MARION
GUADALUPE	04/26/05	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	SCHERTZ
GUADALUPE	06/05/06	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	SEGUIN
GUADALUPE	06/14/06	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	SEGUIN
GUADALUPE	09/19/06	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	SCHERTZ
GUADALUPE	03/08/07	LPG	MARSHALL PROPANE	0	0	>$5,000	SEGUIN
GUADALUPE	04/20/07	GAS	CENTERPOINT ENERGY ENTEX	0	0	>$5,000	SEGUIN
GUADALUPE	06/26/07	LIQUID	CITGO	0	0	DRILL	KINGSBURY
GUADALUPE	07/19/07	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	SEGUIN
GUADALUPE	01/11/08	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	SEGUIN
GUADALUPE	06/08/09	LIQUID	UNKNOWN	0	0	UNKNOWN	SAN ANTONIO
KENDALL	02/21/10	GAS	UNKNOWN	0	0	UNKNOWN	BOERNE

SECTION 15: PIPELINE FAILURE

COUNTY	INCIDENT DATE	TYPE[3]	OPERATOR	DEATHS	INJURIES	COST	NEAREST CITY
LAVACA	UNKNOWN	GAS	UNKNOWN	0	0	UNKNOWN	UNKNOWN
LAVACA	10/04/07	LPG	PETRON, LLC	0	1	UNKNOWN	HALLETTSVILLE
LAVACA	01/03/05	GAS	HOUSTON PIPE LINE COMPANY	0	0	>$5,000	HALLETTSVILLE
REFUGIO	07/29/04	GAS	KINDER MORGAN	0	0	<$5,000	REFUGIO
REFUGIO	10/23/04	LIQUID	KOCH PIPELINE CO	0	0	>$50,000	REFUGIO
REFUGIO	02/21/05	LIQUID	KOCH PIPELINE COMPANY, LP	0	0	UNKNOWN	TIVOLI
REFUGIO	05/17/05	LIQUID	EXXONMOBIL PIPELINE COMPANY	0	0	$0	TIVOLI
REFUGIO	08/12/05	LIQUID	UNKNOWN	0	0	UNKNOWN	REFUGIO
REFUGIO	09/24/06	GAS	NORTHERN NATURAL GAS	0	0	UNKNOWN	TIVOLI
REFUGIO	04/14/07	LIQUID	ENTERPRISE PRODUCTS	0	0	UNKNOWN	VICTORIA
REFUGIO	08/10/07	GAS	NORTHERN NATURAL GAS COMPANY	0	0	UNKNOWN	TIVOLI
REFUGIO	07/19/08	LIQUID	UNKNOWN	0	0	<$50,000	REFUGIO
REFUGIO	06/02/09	LIQUID	UNKNOWN	0	0	$5,000,000,000	REFUGIO
REFUGIO	11/13/09	LIQUID	UNKNOWN	0	0	<$50,000	REFUGIO
VICTORIA	UNKNOWN	GAS	CROSSTEX ENERGY	0	0	$20,000	BLOOMINGTON
VICTORIA	10/25/04	GAS	CENTERPOINT ENERGY ENTEX	0	0	UNKNOWN	VICTORIA
VICTORIA	03/10/05	GAS	ENTERPRISE PRODUCTS OPERATING	0	0	<$5,000	NURSERY
VICTORIA	03/13/05	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	VICTORIA
VICTORIA	03/17/05	LIQUID	CITGO PIPELINE	0	0	UNKNOWN	VICTORIA
VICTORIA	01/16/06	GAS	VICTORIA FIRE DEPARTMENT	0	0	UNKNOWN	VICTORIA
VICTORIA	05/04/06	GAS	CENTERPOINT ENERGY ENTEX	0	0	<$5,000	VICTORIA
VICTORIA	07/02/06	OG	D&S LEASE SERVICE (HART PETOLEUM LEASE)	0	0	UNKNOWN	VICTORIA
VICTORIA	01/27/07	GAS	FUTURE GAS	0	0	UNKNOWN	MCFADDIN
VICTORIA	03/13/07	LIQUID	CITGO PRODUCTS PIPELINE	0	0	UNKNOWN	VICTORIA
VICTORIA	09/11/07	GAS	CROSSTEX ENERGY	0	0	UNKNOWN	MCFADDIN
VICTORIA	02/01/08	GAS	CENTERPOINT ENERGY ENTEX	0	0	>$50,000	VICTORIA
VICTORIA	04/02/08	GAS	UNKNOWN	0	0	<$5,000	VICTORIA
VICTORIA	06/04/08	GAS	UNKNOWN	0	0	<$50,000	VICTORIA
VICTORIA	06/24/08	LIQUID	UNKNOWN	0	0	UNKNOWN	VICTORIA
VICTORIA	07/19/08	LIQUID	UNKNOWN	0	0	UNKNOWN	VICTORIA
VICTORIA	02/27/10	LIQUID	UNKNOWN	0	0	UNKNOWN	VICTORIA
WILSON	02/09/07	GAS	CENTERPOINT ENERGY ENTEX	0	0	$0	FLORESVILLE
WILSON	12/05/07	LPG	MARSHALL PROPANE	0	6	>$5,000	NIXON

Probability of Future Occurrences

Based on the previous incident data and location of pipelines throughout the region, the possibility of a future occurrence is likely, meaning that an event could occur in the next three years.

Impact and Vulnerability

Pipeline failure can have a substantial impact. Such events can cause multiple deaths, completely shut down facilities for thirty days or more, and cause more than fifty percent of affected properties to be destroyed or suffer major damage.

Table 15-3 and Table 15-4 are based on data from the Texas Railroad Commission and show the total number of people and buildings exposed to gas and oil pipeline ruptures, respectively. The analysis for gas pipelines consists of liquid petroleum gas (LPG) and natural gas (NG). The analysis for oil pipelines consists of crude oil (CRD) and natural gas liquids (NGL). The immediate (primary) area of impact for both types of pipeline accidents is a 500-meter buffer. The secondary area of impact for both types of pipeline accidents is a 2,500-meter buffer.

Table 15-3. Potential Impact Due to Gas Pipelines by Jurisdiction

JURISDICTION	TOTAL POPULATION IN JURISDICTION	TOTAL BUILDINGS IN JURISDICTION	IMMEDIATE IMPACT (500 METERS)			SECONDARY IMPACT (2,500 METERS)		
			Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)	Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)
Caldwell Co.	**14,661**	**6,462**	**4,944**	**2,275**	**$220,481,000**	**8,871**	**3,998**	**$386,230,000**
Lockhart	11,591	4,217	4,484	1,239	$209,500,000	11,081	4,010	$599,465,000
Luling	5,025	2,584	3,549	1,715	$183,244,000	5,025	2,584	$264,373,000
Martindale	917	424	Negligible	0	Negligible	Negligible	14	$4,849,000
Calhoun Co.	**8,541**	**6,463**	**4,092**	**2,940**	**$409,521,000**	**5,915**	**5,899**	**$696,161,000**
Point Comfort	781	477	581	381	$108,781,000	781	477	$121,298,000
Port Lavaca	12,035	5,489	762	334	$34,746,000	9,473	3,990	$490,796,000
Seadrift	1,350	1,069	Negligible	27	$3,781,000	1,214	839	$57,555,000
DeWitt Co.	**8,805**	**5,417**	**6,333**	**2,777**	**$351,817,000**	**9,172**	**4,303**	**$523,970,000**
Cuero	6,544	3,824	2,465	478	$108,074,000	8,246	3,705	$445,559,000
Nordheim	323	266	274	150	$19,004,000	473	266	$35,517,000
Yoakum	5,729	3,306	911	518	$48,119,000	5,689	3,275	$368,441,000
Yorktown	2,204	1,568	935	507	$47,553,000	2,698	1,568	$150,778,000
Gonzales Co.	**8,343**	**5,619**	**2,353**	**1,538**	**$114,617,000**	**3,910**	**2,565**	**$189,584,000**

SECTION 15: PIPELINE FAILURE

JURISDICTION	TOTAL POPULATION IN JURISDICTION	TOTAL BUILDINGS IN JURISDICTION	IMMEDIATE IMPACT (500 METERS)			SECONDARY IMPACT (2,500 METERS)		
			Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)	Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)
Gonzales	7,160	3,636	1,478	700	$84,260,000	7,101	3,596	$397,921,000
Nixon	2,178	1,326	Negligible	0	Negligible	2,178	1,326	$94,690,000
Waelder	947	572	Negligible	0	Negligible	395	249	$16,926,000
Cibolo (Guadalupe County)	3,035	1,338	1,926	734	$151,541,000	3,035	1,338	$221,273,000
Kendall Co.	**17,618**	**8,189**	**4,721**	**2,036**	**$355,143,000**	**10,168**	**4,496**	**$675,621,000**
Boerne	6,125	3,016	Negligible	0	Negligible	297	161	$36,763,000
Refugio Co.	**2,670**	**1,360**	**2,195**	**1,098**	**$126,752,000**	**2,667**	**1,349**	**$148,189,000**
Austwell	192	176	Negligible	0	Negligible	192	176	$28,397,000
Bayside	360	304	Negligible	0	Negligible	360	304	$26,026,000
Refugio	2,920	1,805	2,254	1,328	$138,391,000	2,920	1,805	$186,843,000
Woodsboro	1,683	837	Negligible	17	$1,480,000	1,686	837	$78,606,000
Victoria Co.	**23,482**	**9,699**	**20,148**	**8,307**	**$1,018,746,000**	**23,407**	**9,671**	**$1,171,269,000**
Victoria	60,606	24,412	28,685	10,803	$1,792,231,000	58,585	23,357	$3,793,993,000
TOTALS[4]	**213,765**	**103,855**	**93,144**	**39,902**	**$5,527,782,000**	**185,548**	**86,158**	**$11,211,093,000**

[4] Totals for the study area may include values less than $5,000 for dollar amounts and less than 50 for populations that are classified as "Negligible" in the table.

Table 15-4. Potential Impact Due to Oil Pipelines by Jurisdiction

JURISDICTION	TOTAL POPULATION IN JURISDICTION	TOTAL BUILDINGS IN JURISDICTION	IMMEDIATE IMPACT (500 METERS)			SECONDARY IMPACT (2,500 METERS)		
			Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed	Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed
Caldwell Co.	**14,661**	**6,462**	**5,108**	**2,219**	**$207,861,000**	**8,097**	**3,513**	**$330,166,000**
Lockhart	11,591	4,217	Negligible	14	$1,174,000	676	263	$39,810,000
Luling	5,025	2,584	2,707	1,397	$151,366,000	5,025	2,584	$264,373,000
Martindale	917	424	917	424	$40,522,000	917	424	$40,522,000
Calhoun Co.	**8,541**	**6,463**	**1,718**	**915**	**$153,075,000**	**4,135**	**3,853**	**$486,934,000**
Point Comfort	781	477	596	387	$110,085,000	362	233	$85,232,000
Port Lavaca	12,035	5,489	2,612	1,243	$180,751,000	10,618	4,633	$552,209,000
Seadrift	1,350	1,069	69	56	$6,259,000	1,477	1,024	$67,812,000
DeWitt Co.	**8,805**	**5,417**	**Negligible**	**0**	**Negligible**	**Negligible**	**0**	**Negligible**
Cuero	6,544	3,824	Negligible	0	Negligible	Negligible	0	Negligible
Nordheim	323	266	Negligible	0	Negligible	Negligible	0	Negligible
Yoakum	5,729	3,306	Negligible	0	Negligible	Negligible	0	Negligible
Yorktown	2,204	1,568	Negligible	0	Negligible	Negligible	0	Negligible
Gonzales Co.	**8,343**	**5,619**	**1,868**	**1,040**	**$111,340,000**	**3,460**	**2,242**	**$194,858,000**
Gonzales	7,160	3,636	7,160	3,636	$401,785,000	7,160	3,636	$401,785,000
Nixon	2,178	1,326	Negligible	0	Negligible	1,821	1,157	$75,870,000
Waelder	947	572	947	572	$37,972,000	947	572	$37,972,000
Cibolo (Guadalupe County)	3,035	1,338	Negligible	0	Negligible	Negligible	0	Negligible
Kendall Co.	**17,618**	**8,189**	**Negligible**	**0**	**Negligible**	**Negligible**	**0**	**Negligible**
Boerne	6,125	3,016	Negligible	0	Negligible	Negligible	0	Negligible
Refugio Co.	**2,670**	**1,360**	**1,220**	**649**	**$74,514,000**	**2,068**	**1,065**	**$113,495,000**
Austwell	192	176	192	176	$28,397,000	192	176	$28,397,000
Bayside	360	304	Negligible	27	$3,216,000	279	240	$20,668,000
Refugio	2,920	1,805	126	108	$7,564,000	1,957	1,296	$127,492,000
Woodsboro	1,683	837	461	211	$18,121,000	1,686	837	$78,606,000
Victoria Co.	**23,482**	**9,699**	**4,841**	**2,024**	**$194,184,000**	**8,828**	**3,655**	**$392,540,000**
Victoria	60,606	24,412	Negligible	0	Negligible	2,867	1,116	$106,593,000
TOTALS[5]	**213,765**	**103,855**	**32,751**	**16,424**	**$1,822,876,000**	**62,572**	**32,519**	**$3,445,334,000**

[5] Totals for the study area may include values less than $5,000 for dollar amounts and less than 50 for populations (where applicable) that are classified as "Negligible" in the table.

HAZARDOUS MATERIAL RELEASE

Hazard Description 1
Location 1
Extent 21
Historical Occurrences 22
Probability of Future Occurrences 23
Impact & Vulnerability 24

Hazard Description

Hazardous materials are substances which if released or misused can cause death, serious injury, long-lasting health effects, and damage to structure and other properties as well as to the environment. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

Varying quantities of hazardous materials from industrial chemicals and toxic waste to household detergent and air fresheners, hazardous materials are part of our everyday lives. Hazardous material incidents can range from a chemical spill on a highway to contamination of groundwater by naturally occurring methane gas.

Communities and residences located near industries or other property that use hazardous materials have a higher risk of a hazardous materials incident. However, many hazardous materials are transported regularly over our highways and by rail, and if released during transport these materials can spread quickly to any nearby community. Human error is the probable cause of most transportation incidents involving the release of hazardous materials.

Location

The Toxics Release Inventory (TRI) is a publicly available database from the federal Environmental Protection Agency (EPA) that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed

toxic chemicals to EPA and to their state or tribal entity. A facility must report if it meets the following three criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; RCRA Subtitle C treatment, storage, and disposal (TSD) facilities; and solvent recovery services;
- Has 10 or more full-time employee equivalents; and
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, bioaccumulative and toxic (PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds or 0.1 grams depending on the chemical.

Tier 2 data is a publicly available database from the Texas Department of State Health Services Tier 2 Chemical Reporting Program. Under the Community Right-to-Know program laws upheld at the state and federal level, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the state, with Local Emergency Planning Committees (LEPCs), and with local fire departments. The Texas Tier 2 Reports contain facility identification information and detailed chemical data about hazardous chemicals stored at the facility.

A facility must report if it meets the following criteria:

- Any company using chemicals that could present a physical or health hazard must report them, according to Tier 2 requirements.
- If an industry has an OSHA deemed hazardous chemical that exceeds the appropriate threshold at a certain point in time, then the chemical must be reported. These chemicals may be on the list of 356 Extremely Hazardous Substances (EHS) or could be one of the 650,000 reportable hazardous substances (not on the EHS list). This reporting format is for a "snapshot in time." EHS chemicals have to be reported if the quantity is either greater than 500 pounds, or if the Threshold Planning Quantity (TPQ) amount is less than 500 pounds.

Figure 16-1 shows the locations of TRI sites as well as Tier 2-listed toxic sites in the GBRA study area. Figure 16-2 through Figure 16-9 show the location of TRI and Tier 2-listed toxic sites at the county level.

For mobile site analysis, the major roads (including Interstate highways, U.S. highways and State highways) and railroads are considered to be the transportation corridors where hazardous materials are primarily transported and where adverse impact to people and buildings could be expected. The buffer extents used with the transportation corridors are the same as those selected for the fixed site

analysis. Figure 16-10 illustrates the estimated mobile HAZMAT corridors in the GBRA study area. Figure 16-11 through Figure 16-18 show the estimated mobile HAZMAT corridors at the county level.

Figure 16-1. Estimated Locations of Toxic Sites in GBRA

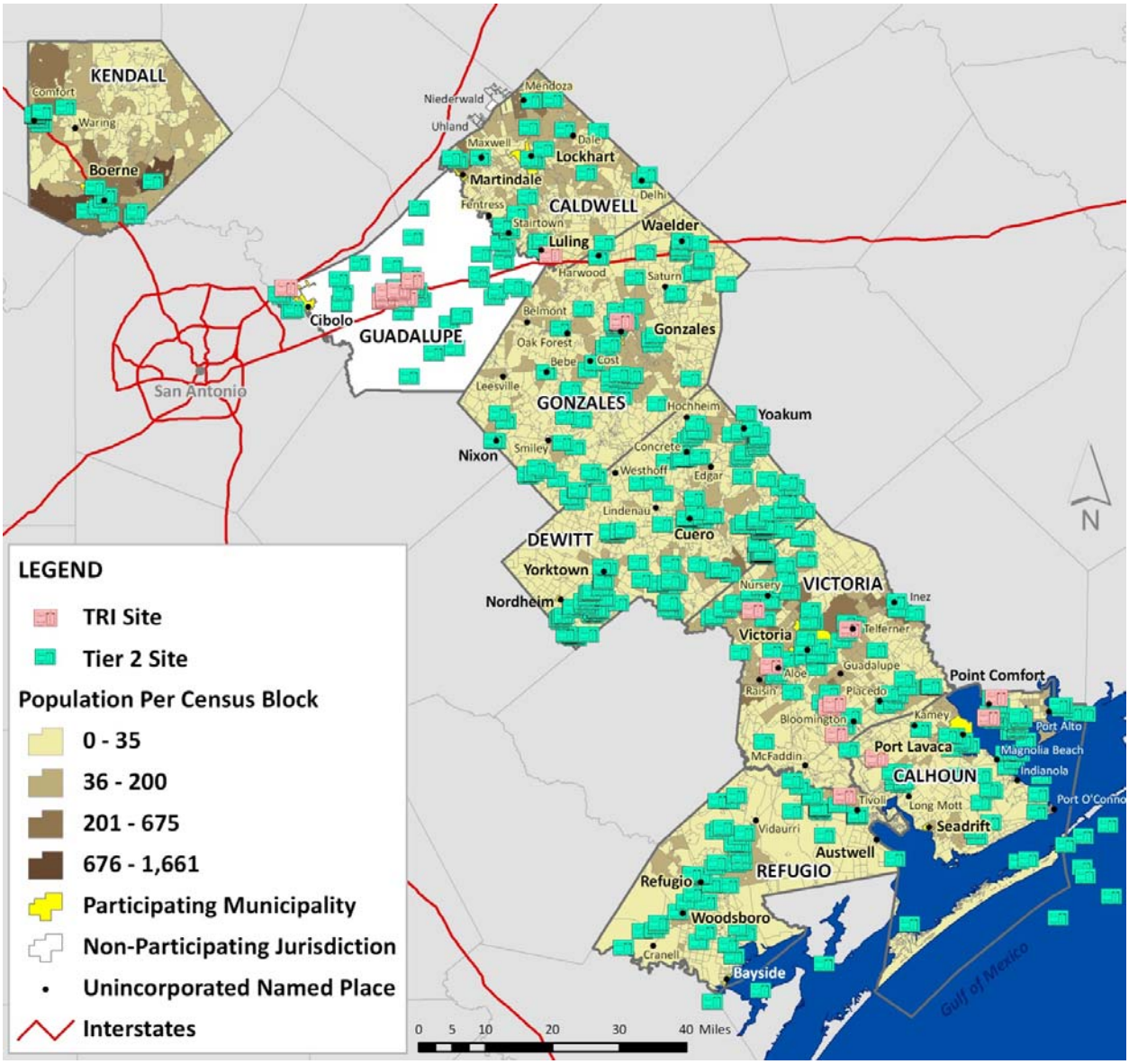


Figure 16-2. Estimated Locations of Toxic Sites in Caldwell County

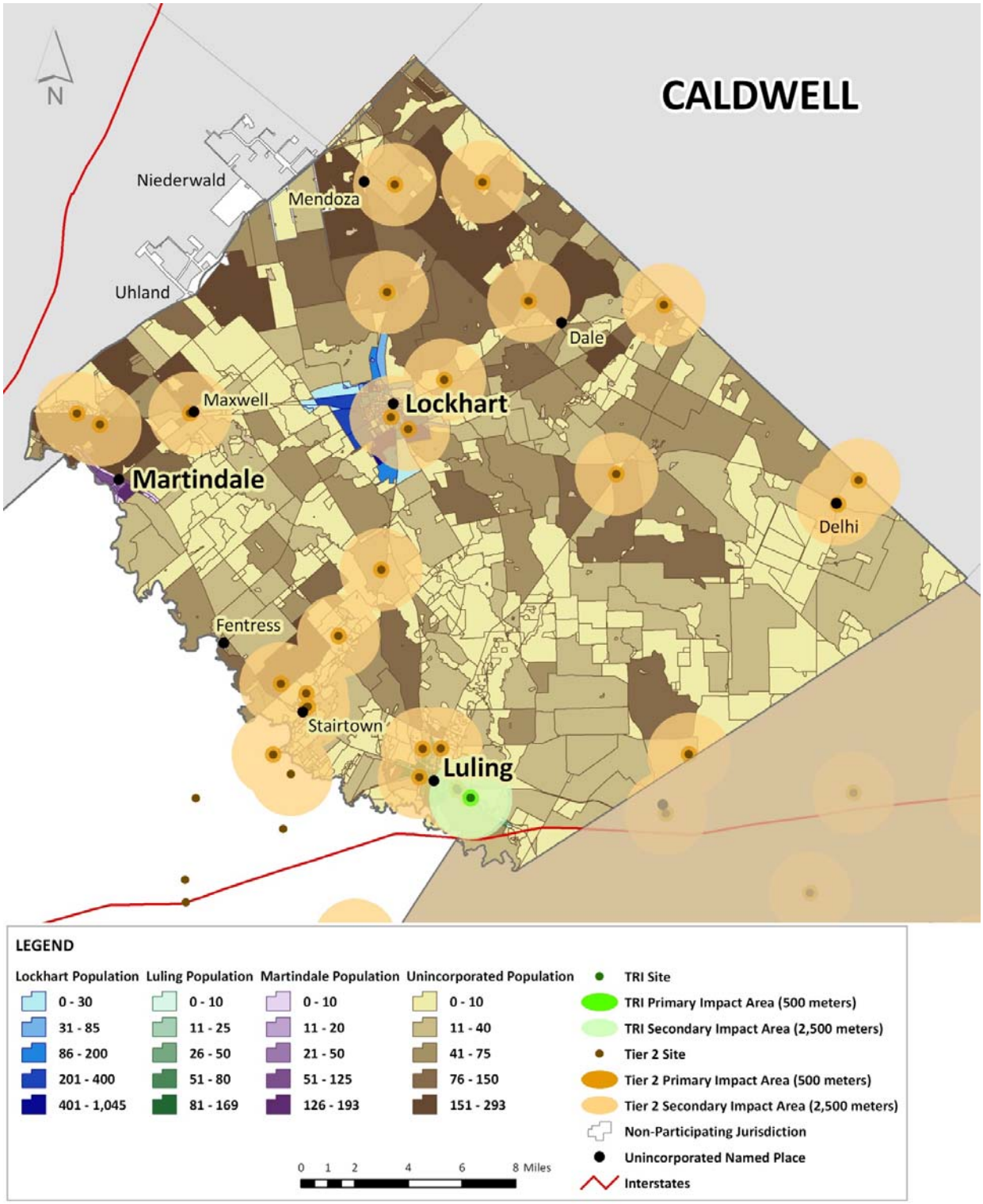


Figure 16-3. Estimated Locations of Toxic Sites in Calhoun County

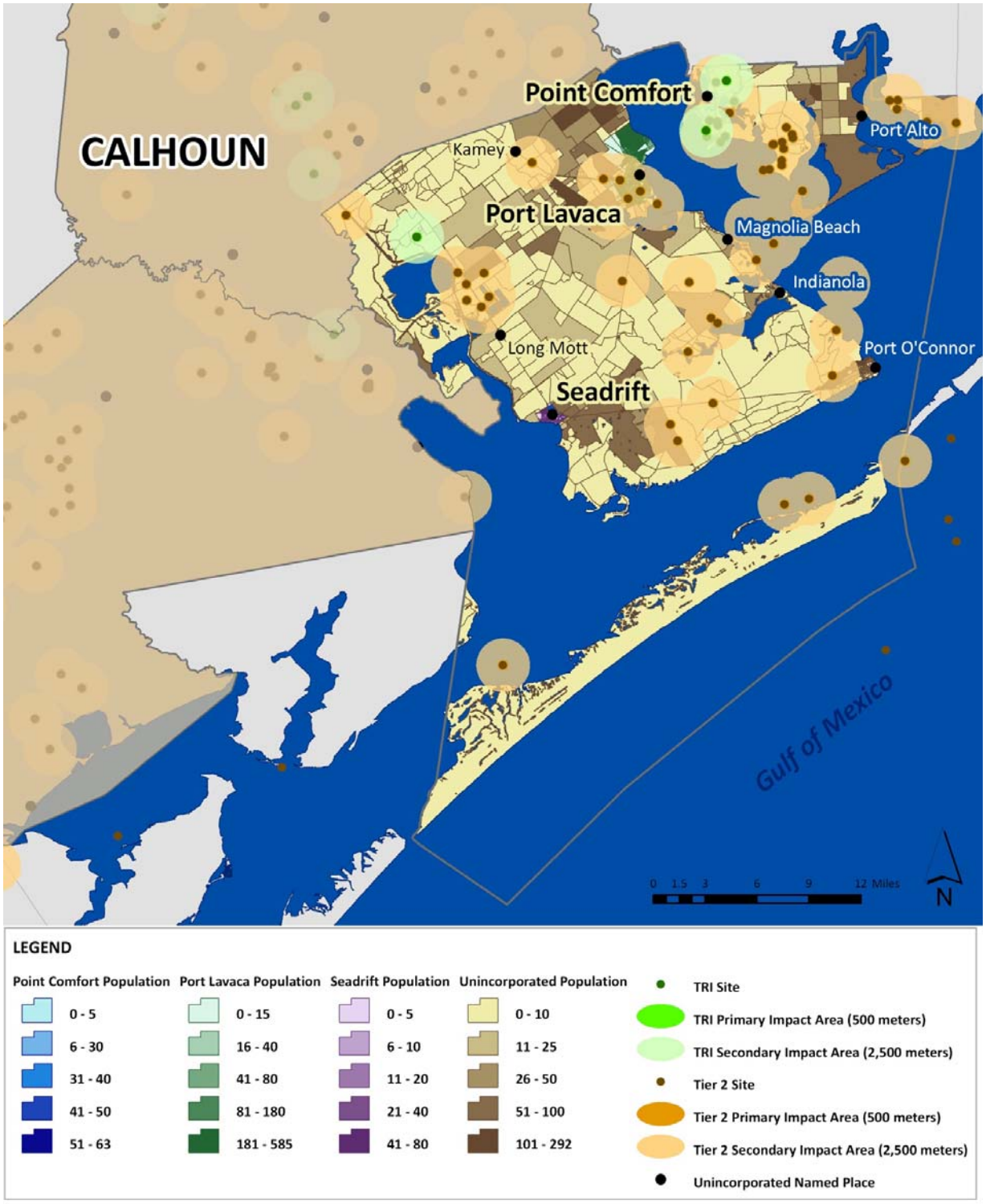


Figure 16-4. Estimated Locations of Toxic Sites in DeWitt County

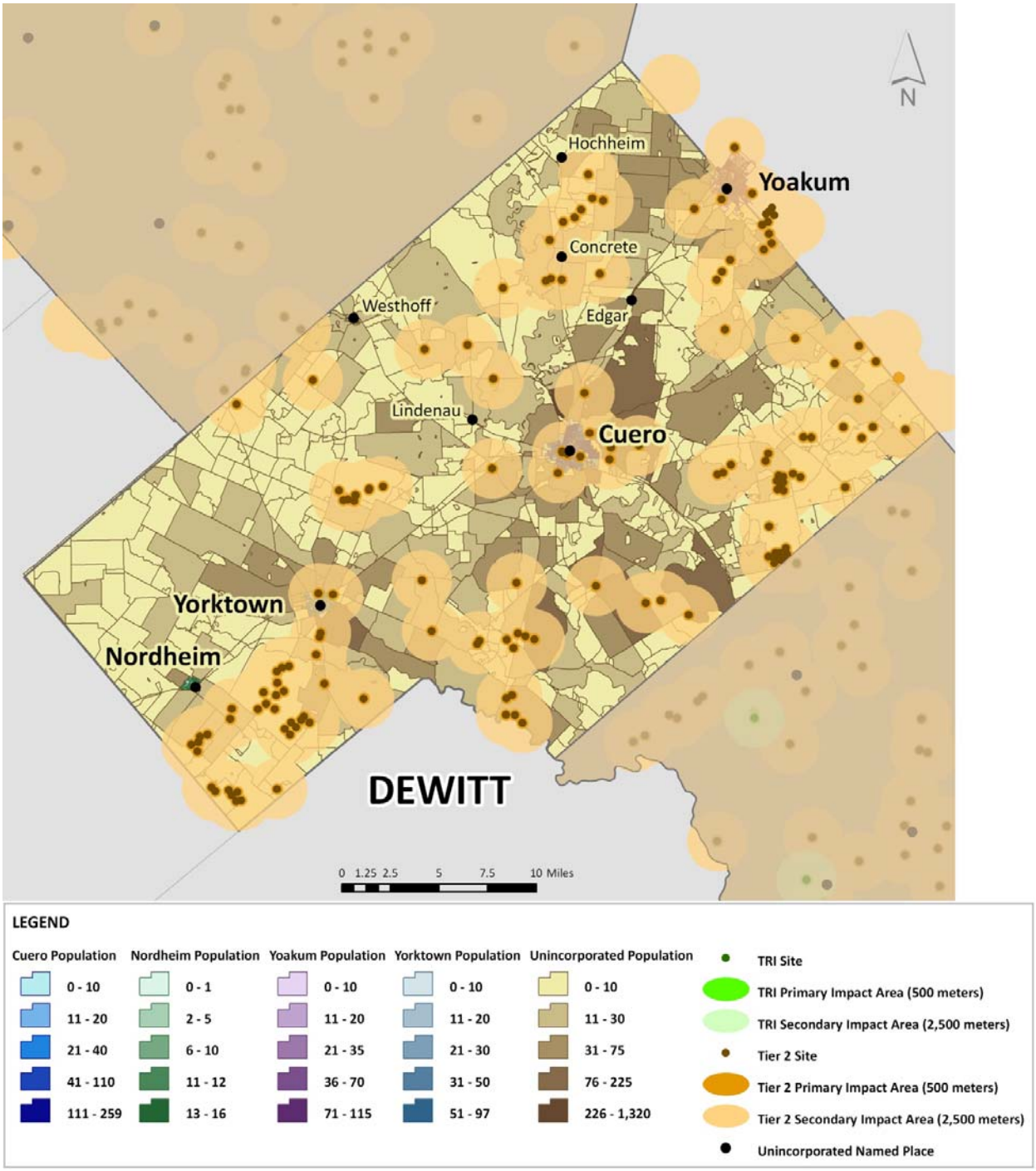


Figure 16-5. Estimated Locations of Toxic Sites in Gonzales County

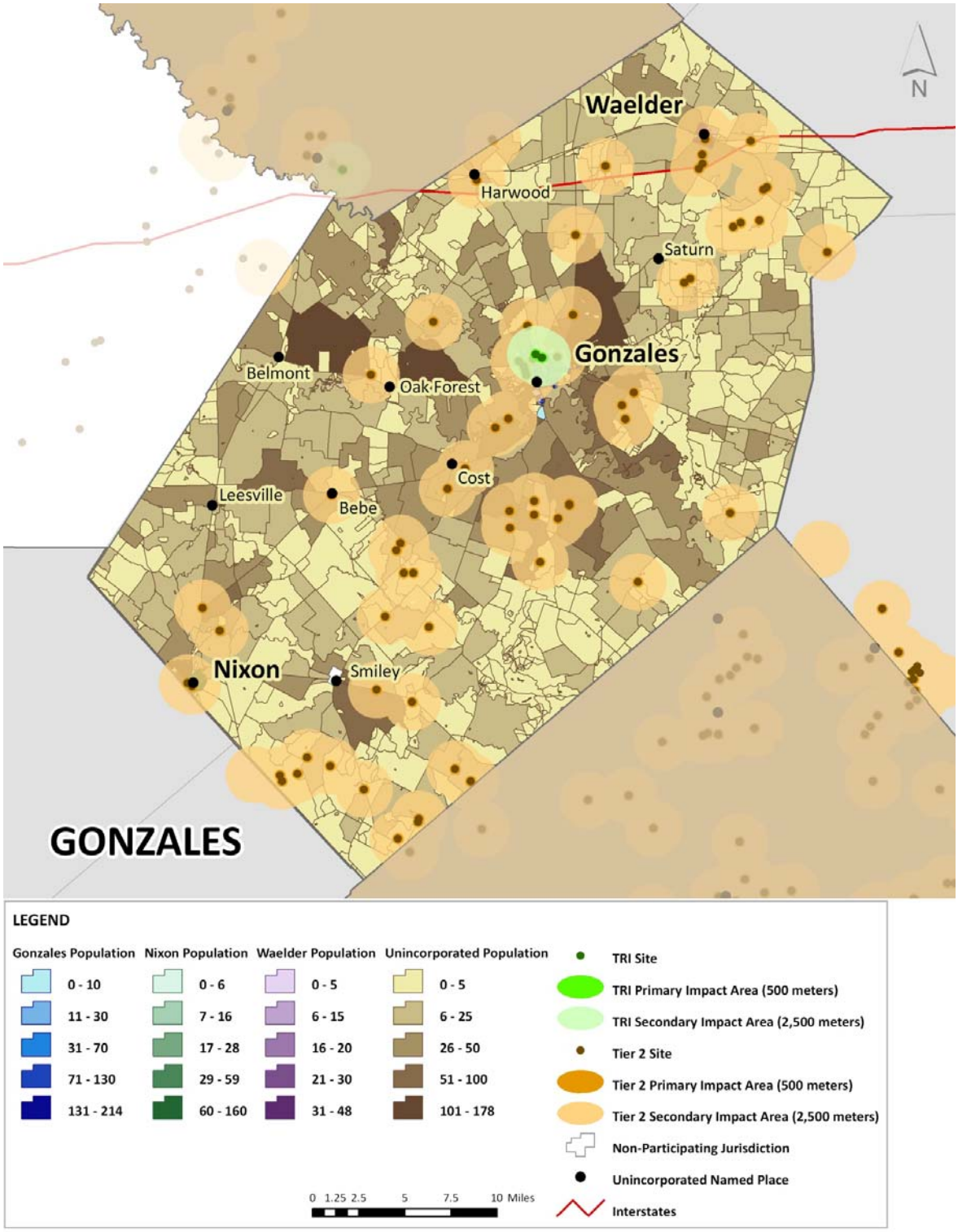


Figure 16-6. Estimated Locations of Toxic Sites in Kendall County

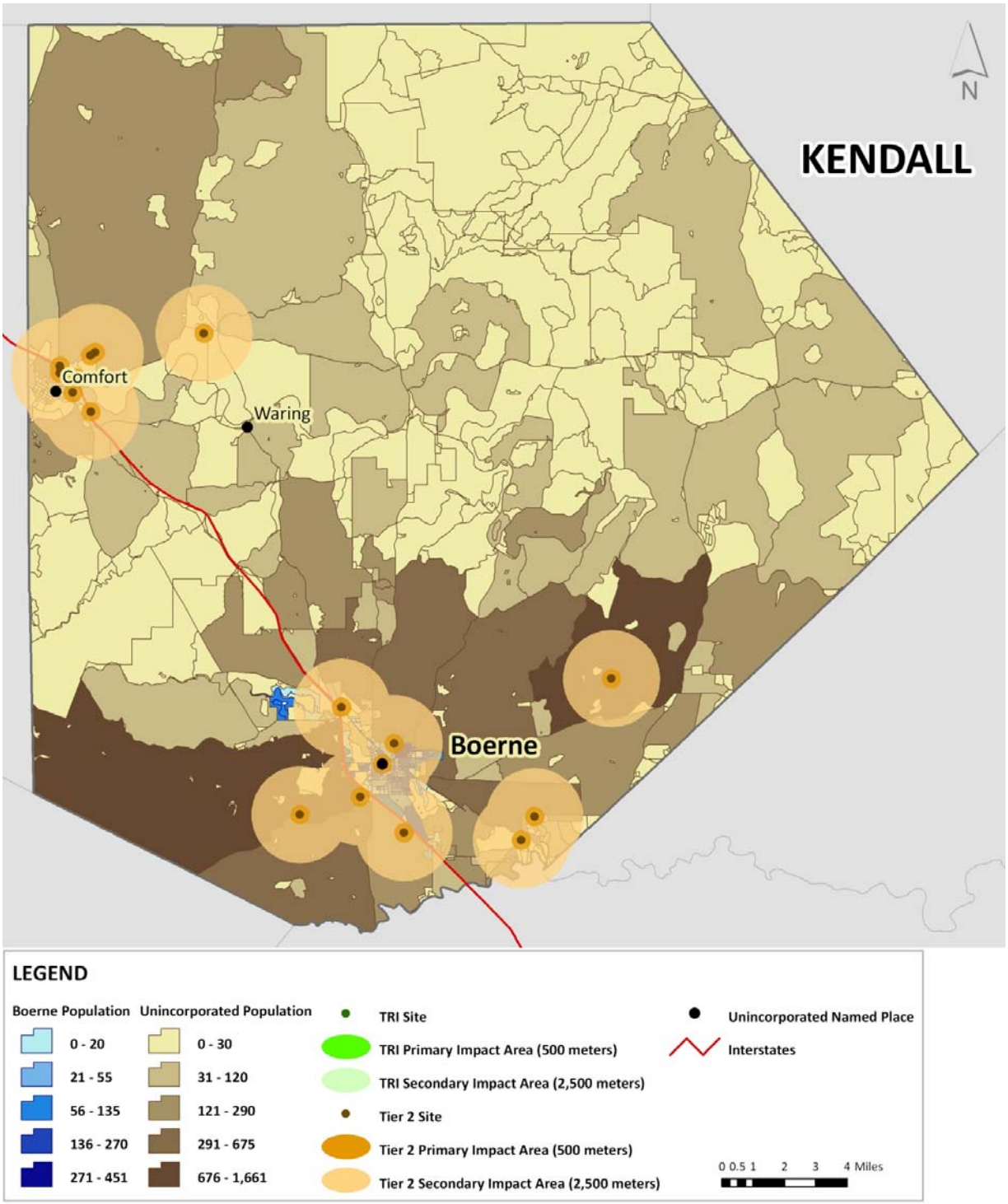


Figure 16-7. Estimated Locations of Toxic Sites in Refugio County

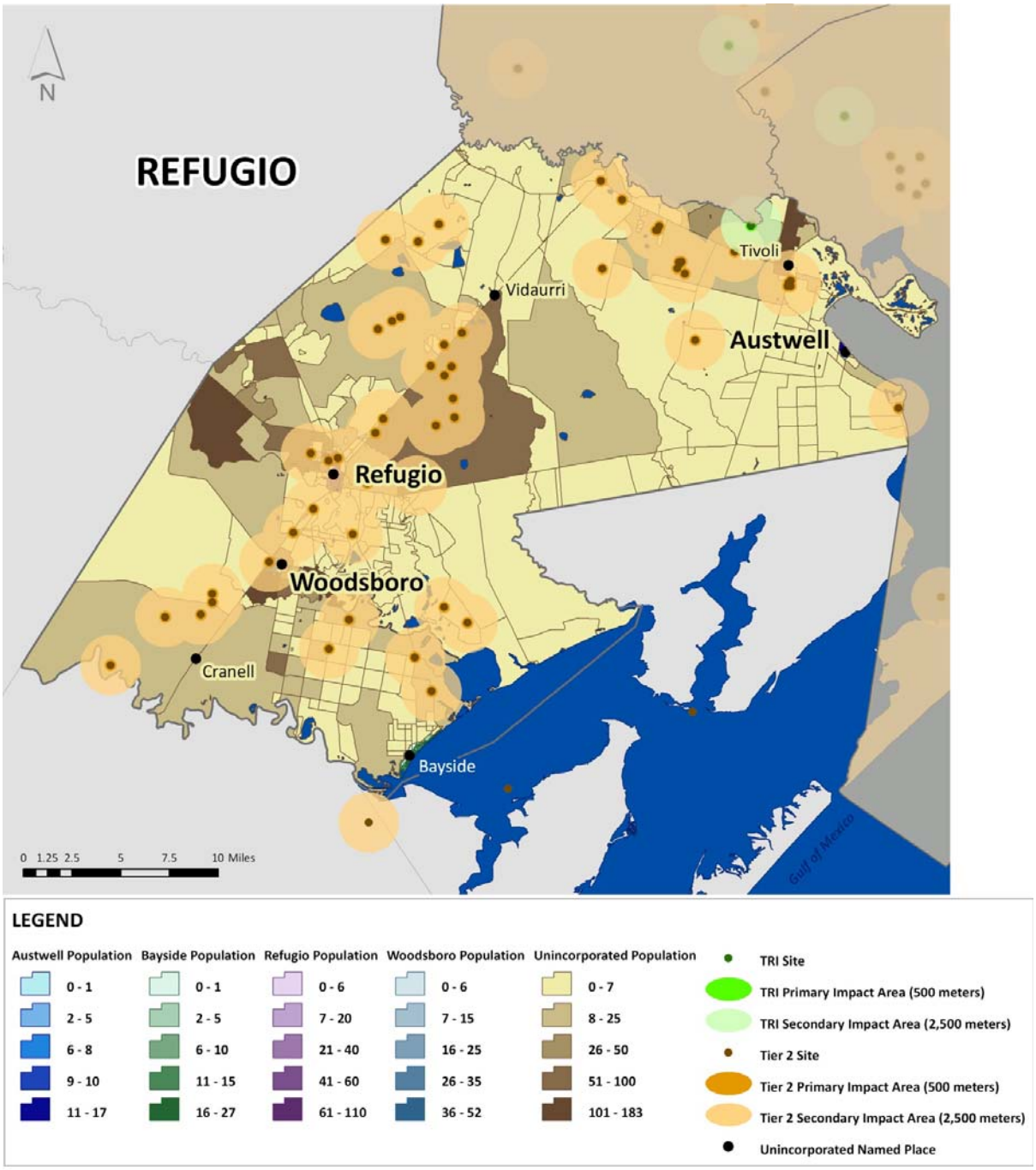


Figure 16-8. Estimated Locations of Toxic Sites in Victoria County

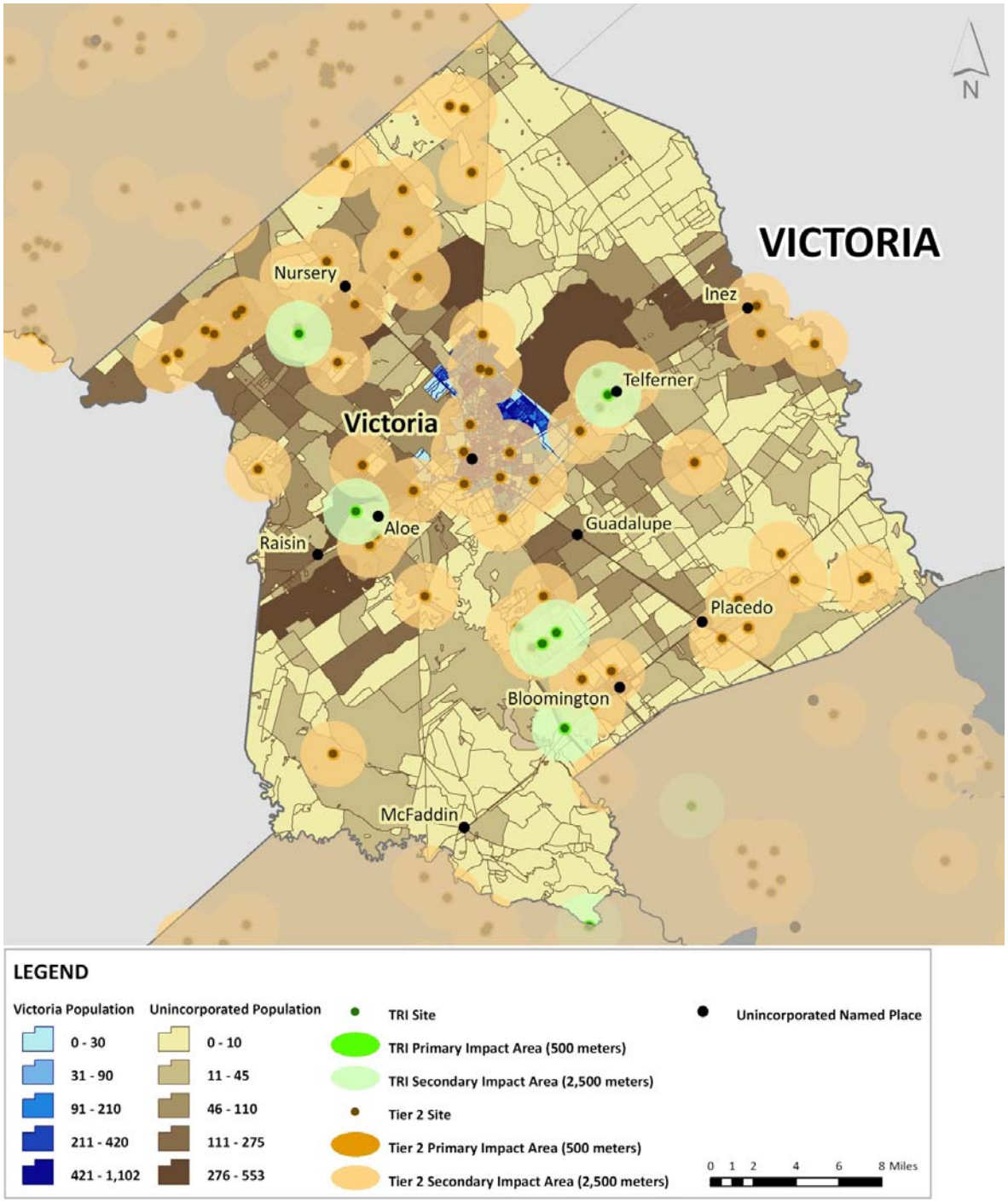


Figure 16-9. Estimated Locations of Toxic Sites in Cibolo (in Guadalupe County)

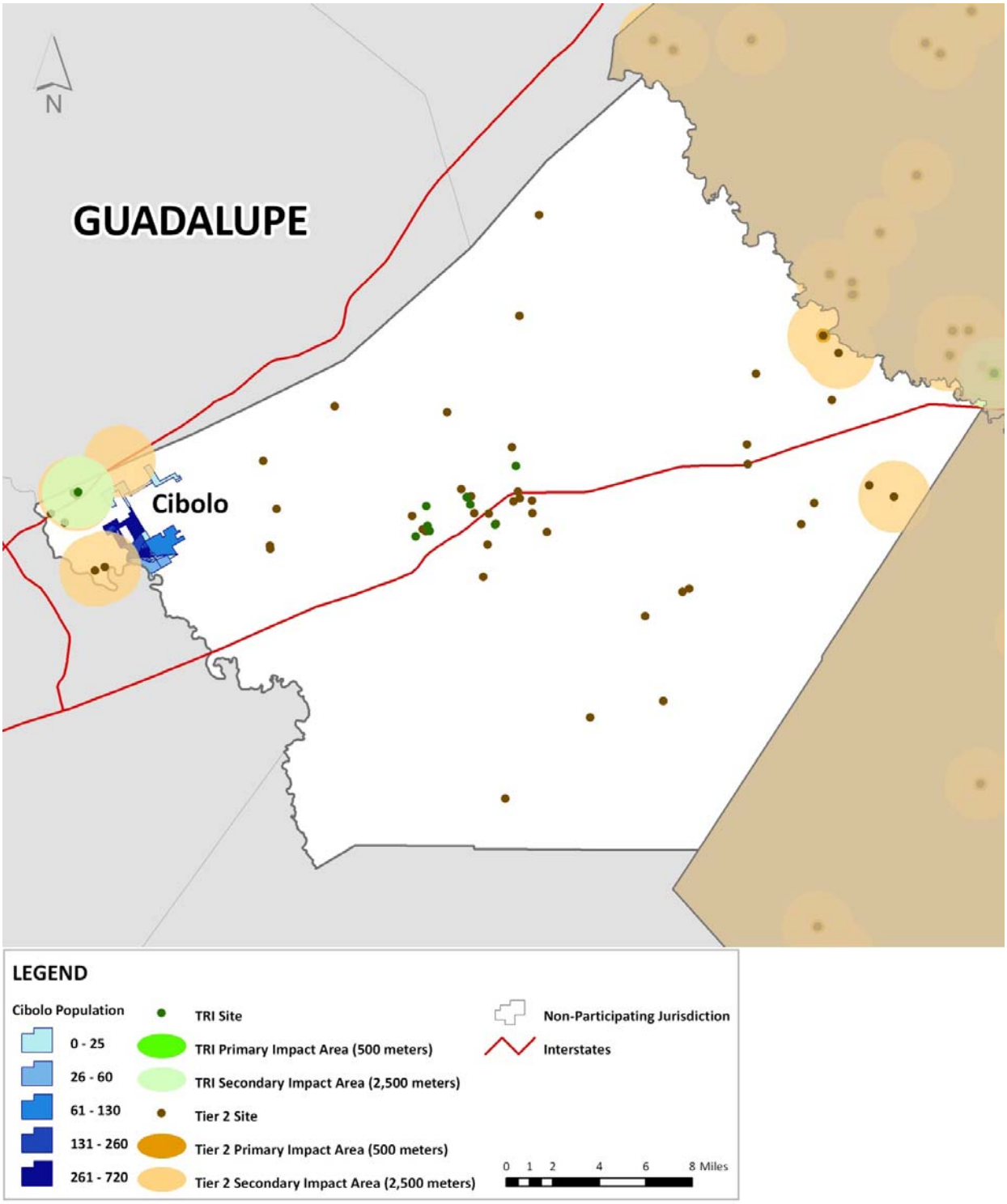


Figure 16-10. Estimated Mobile HAZMAT Corridors in GBRA

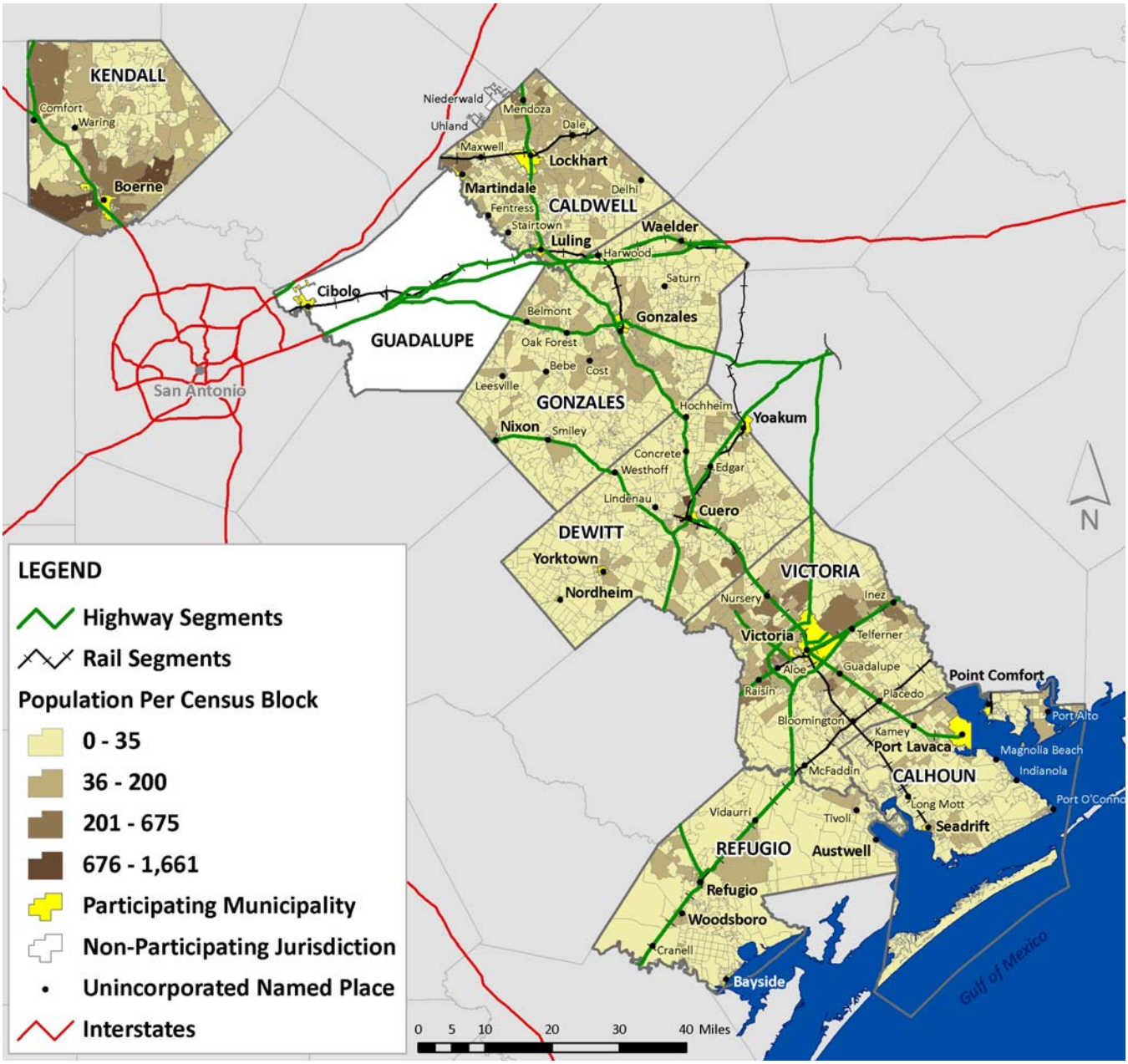


Figure 16-11. Estimated Mobile HAZMAT Corridors in Caldwell County

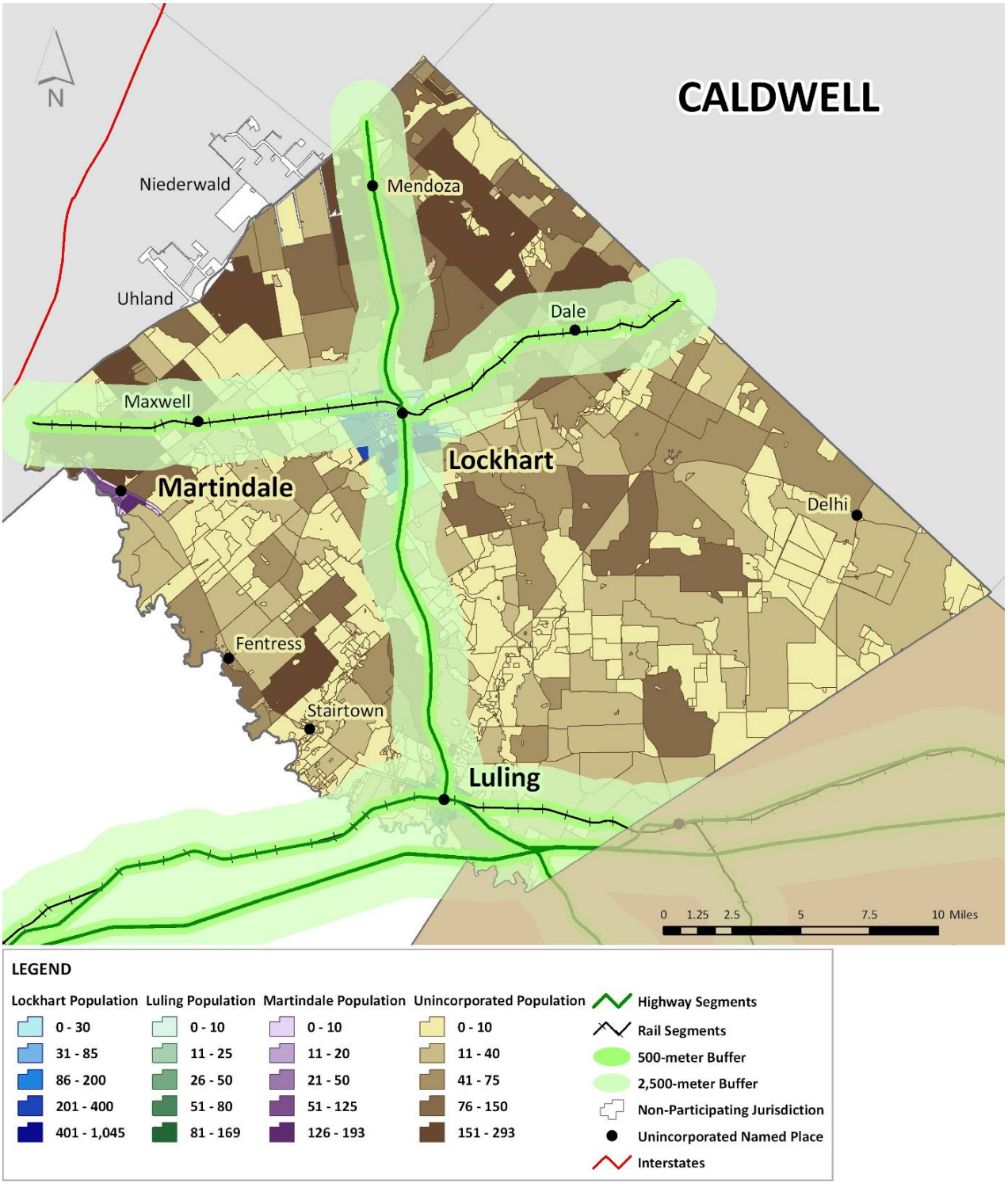


Figure 16-12. Estimated Mobile HAZMAT Corridors in Calhoun County

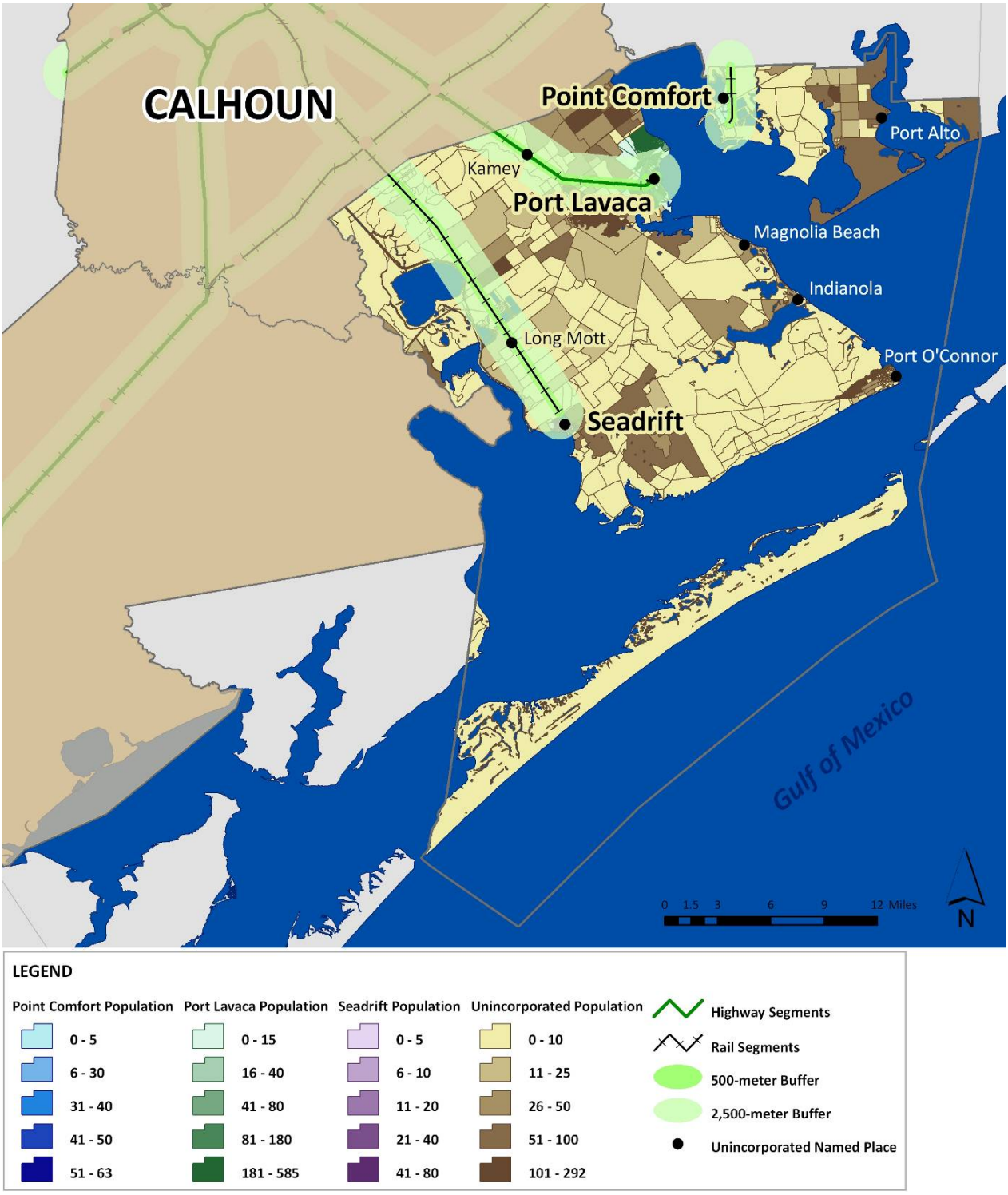


Figure 16-13. Estimated Mobile HAZMAT Corridors in DeWitt County

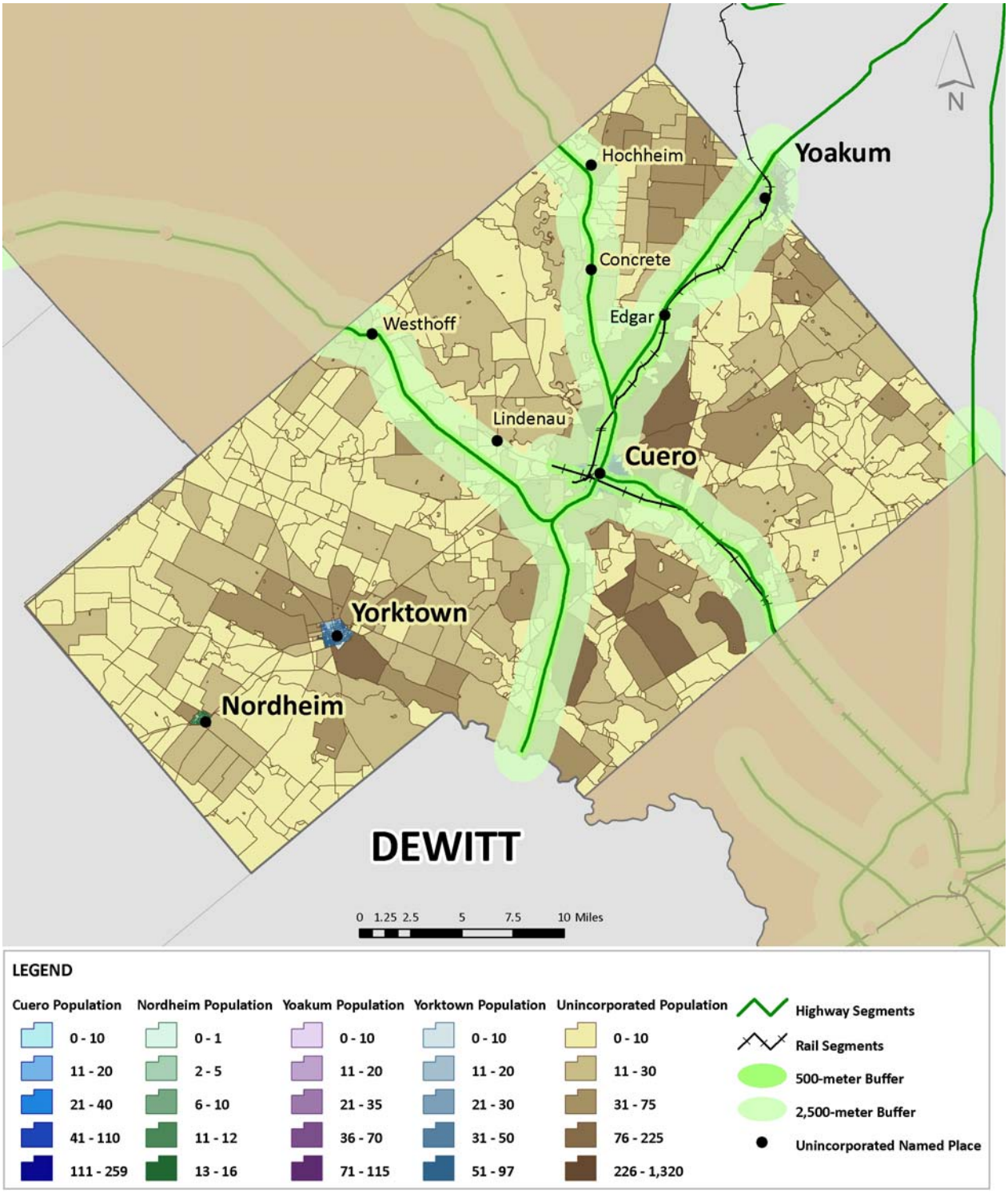


Figure 16-14. Estimated Mobile HAZMAT Corridors in Gonzales County

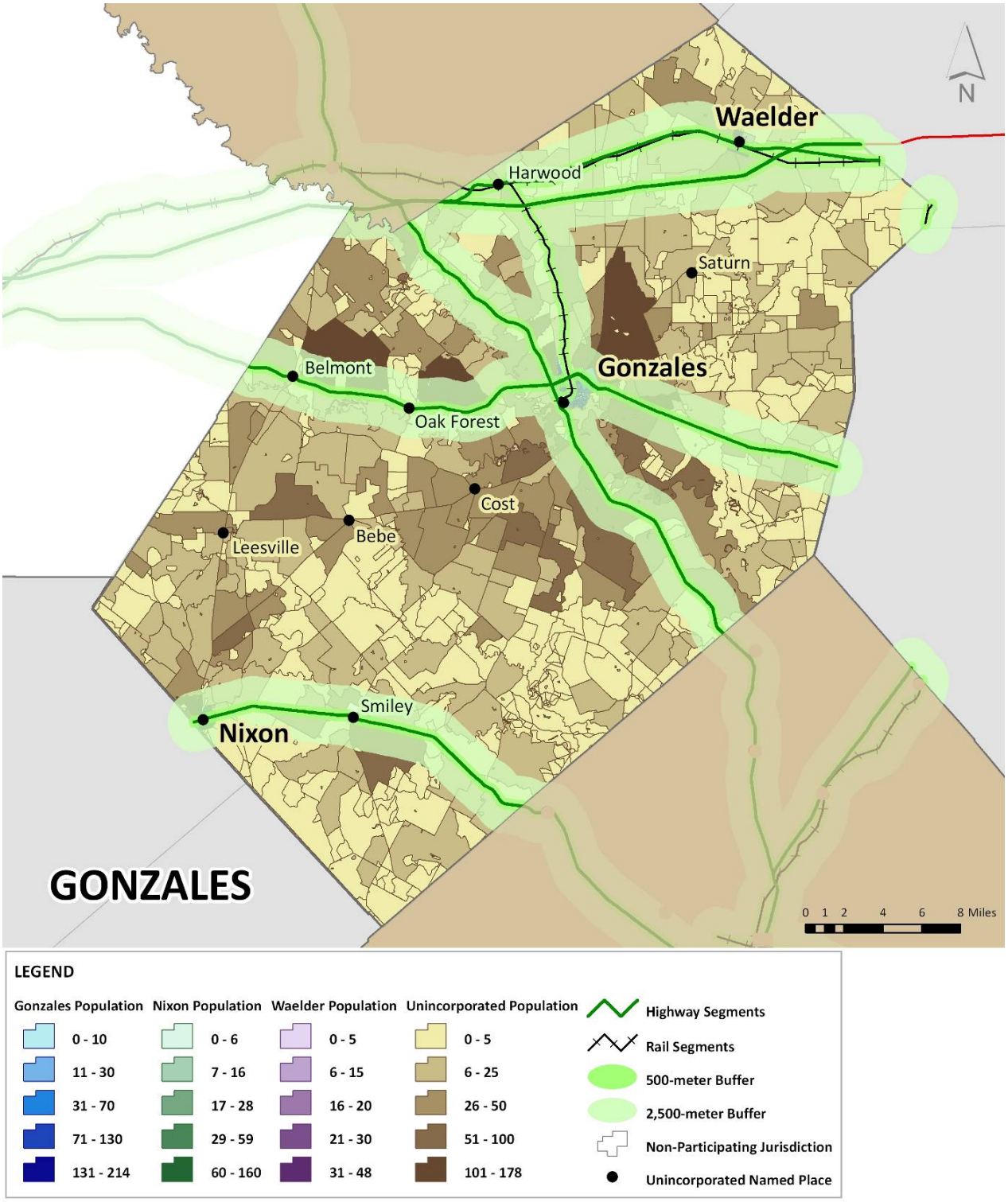


Figure 16-15. Estimated Mobile HAZMAT Corridors in Kendall County

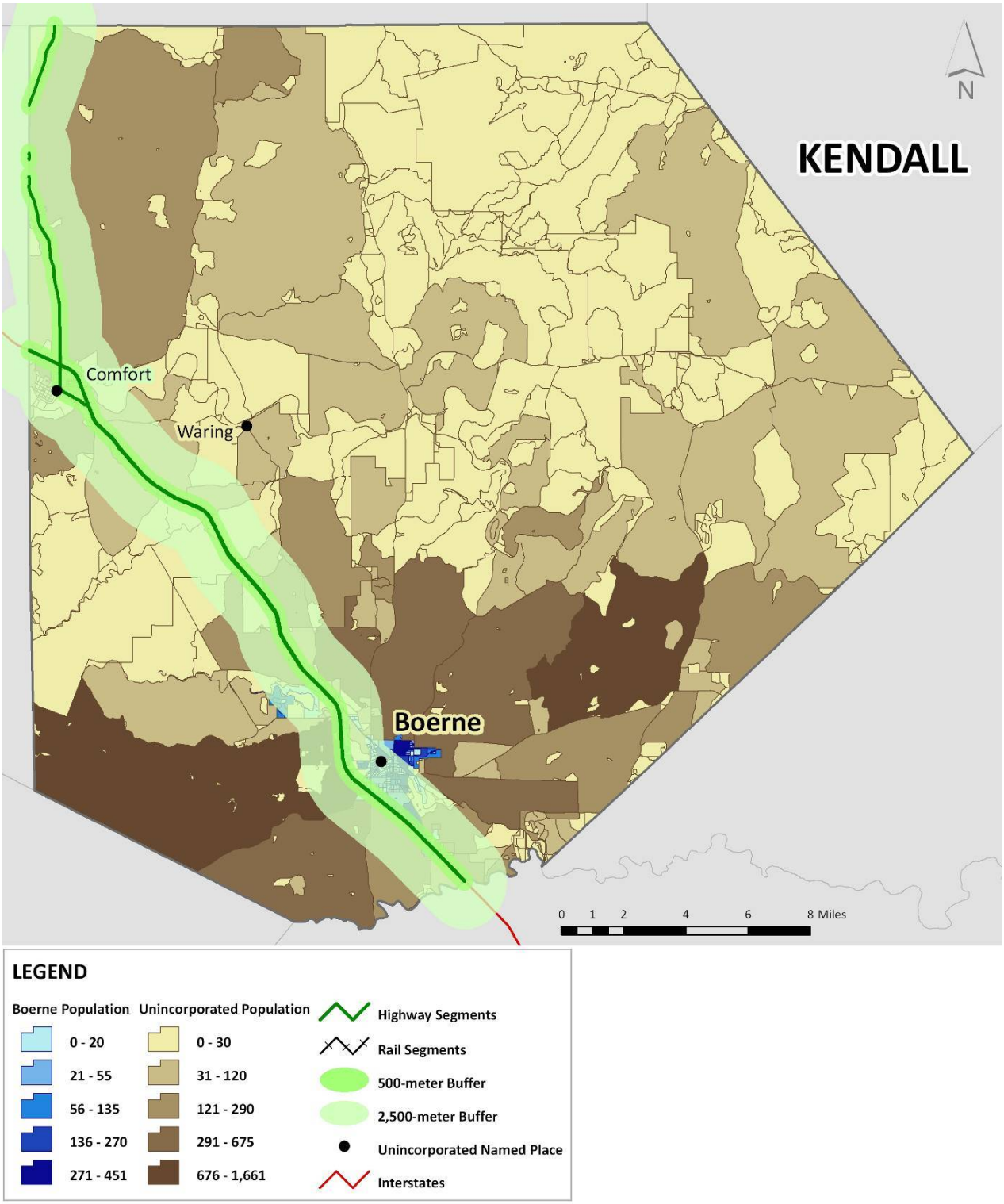


Figure 16-16. Estimated Mobile HAZMAT Corridors in Refugio County

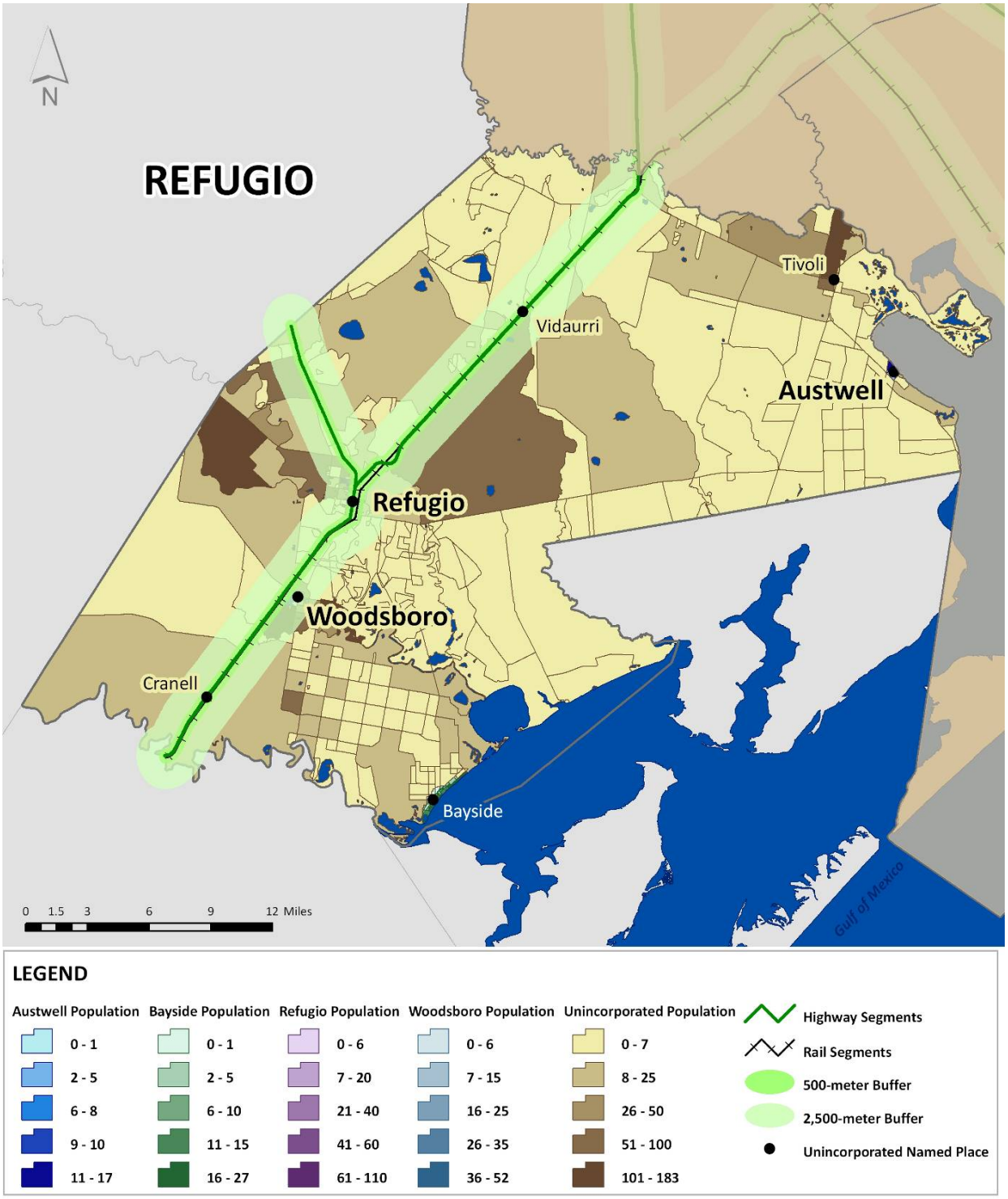


Figure 16-17. Estimated Mobile HAZMAT Corridors in Victoria County

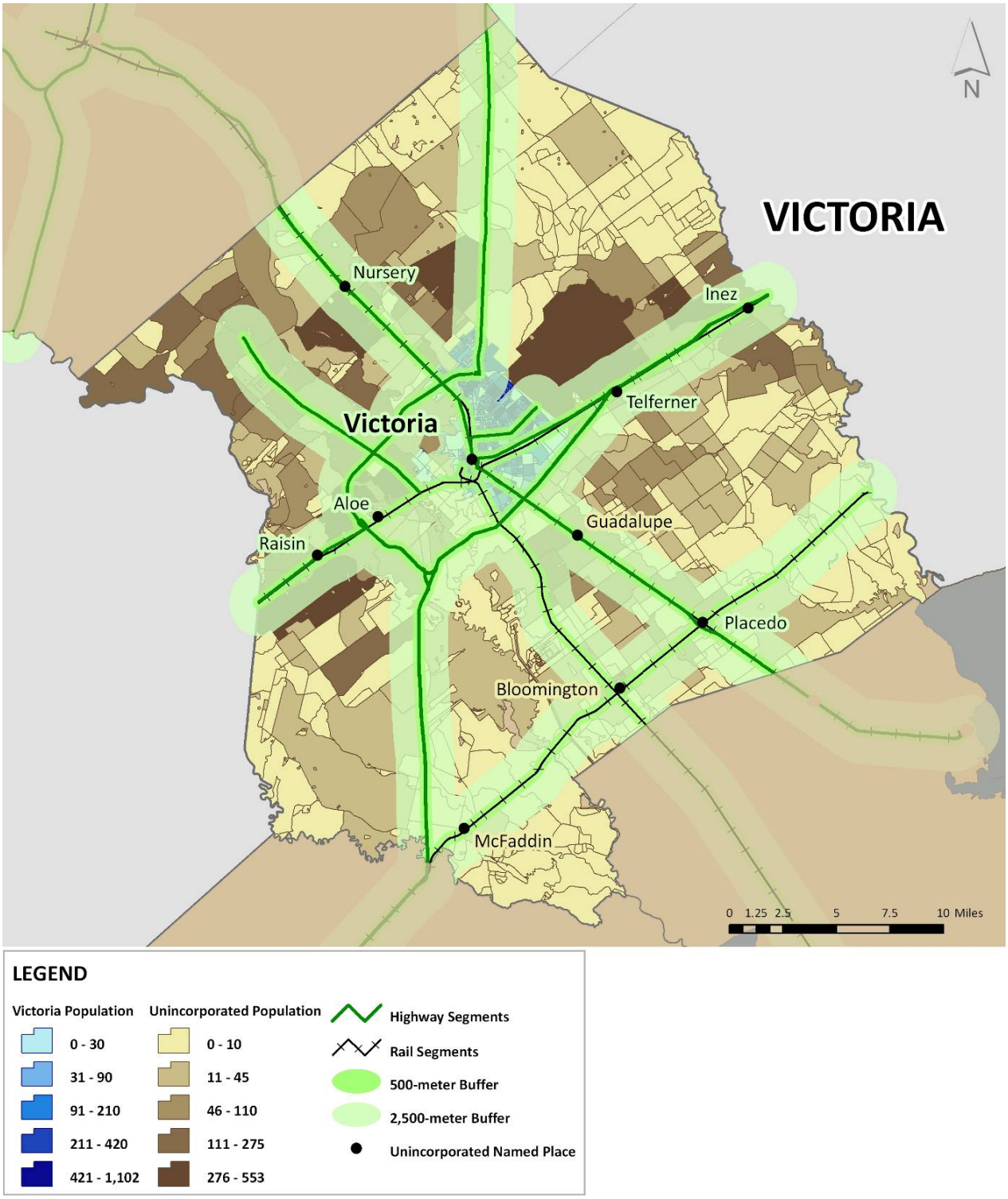
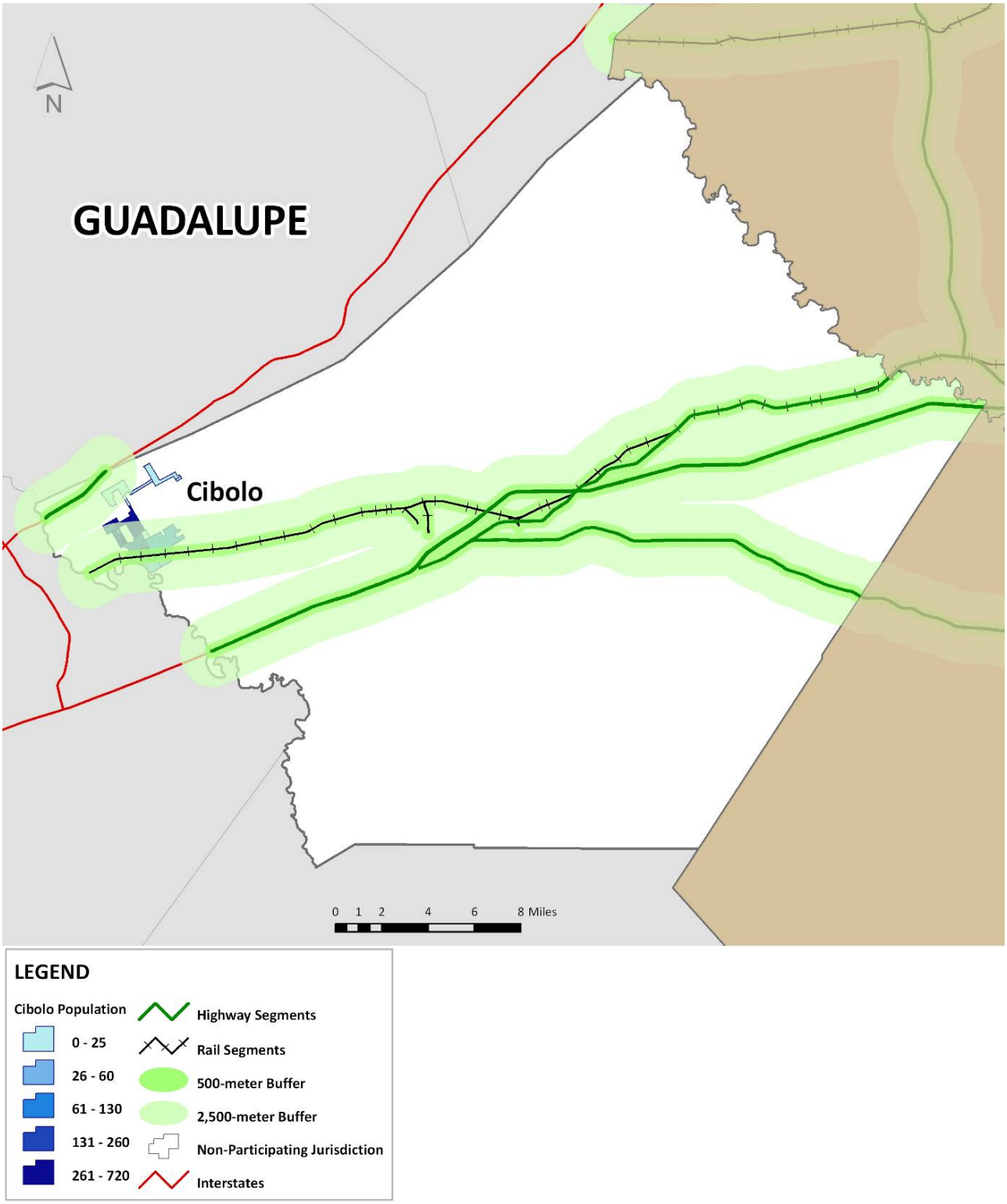
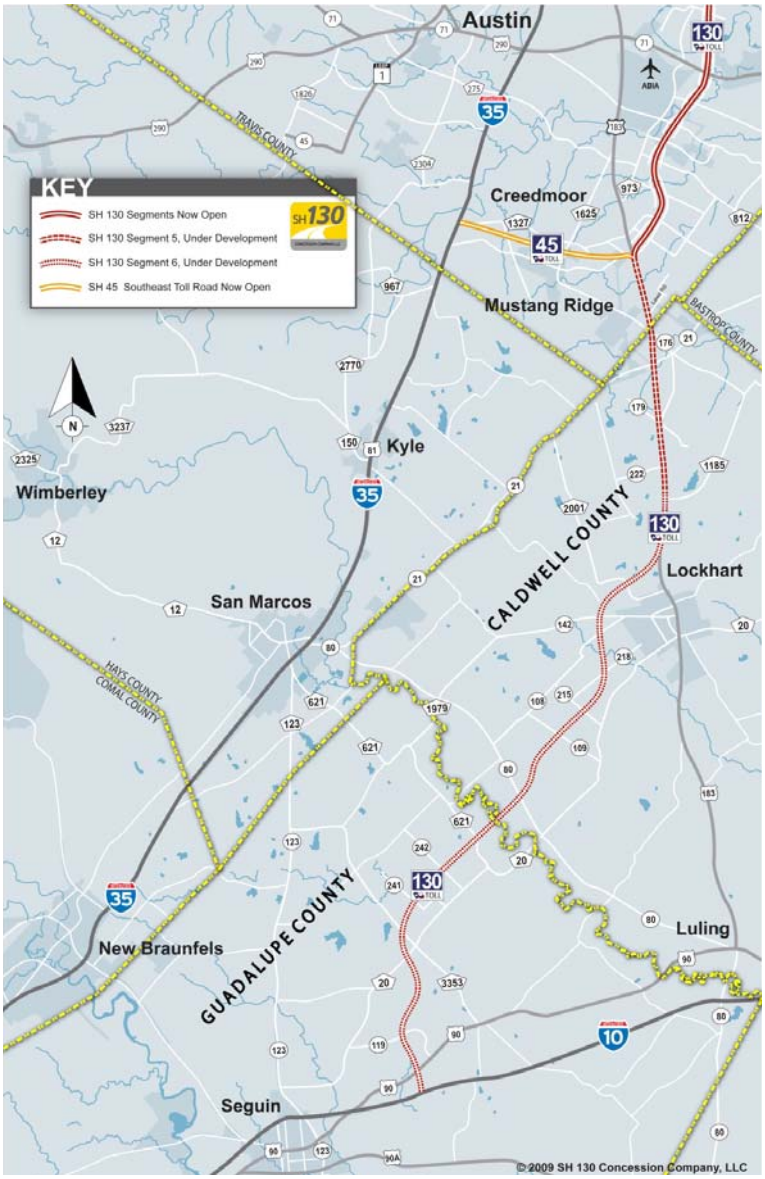


Figure 16-18. Estimated Mobile HAZMAT Corridors in Cibolo (in Guadalupe County)



Although not included in the location profile figures for mobile hazardous material sites, State Highway 130 (SH 130) is being extended through Caldwell and Guadalupe counties to 1-10 near Seguin. Construction began in 2009 and completion is expected in 2012. Although this is part of the larger Central Texas Turnpike System and would not be the responsibility of the counties, this highway segment should be considered as a future mobile hazardous materials transportation corridor. Since this road is still under construction, GIS data is not readily available to include in the hazardous materials assessment. However, a static map that was obtained via the Central Texas Turnpike Authority Web site is included below (Figure 16-19) to assist with emergency management decision making.

Figure 16-19. Image of Future Location – SH 130



Extent

The extent of a hazardous material release will depend on whether it is from a mobile or fixed site and the size of impact. The range of intensity will vary greatly depending on the circumstances. These factors and conditions include the material, toxicity, duration of the release and environmental conditions such as the wind and precipitation.

Historical Occurrences

Table 16-1 summarizes the historical on-site toxic disposal and other releases for TRI sites only that occurred from 1988 to 2007 as reported to the Environmental Protection Agency (EPA).

Table 16-1. Historical Toxic Release Summary (TRI Only):
Reported Chemical Release and Waste Management Activities, in Pounds (1988-2007)

JURISDICTION	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Caldwell County	No data	44,900	44,900	62,639	63,399	73,090	100,107	566,750	27,070	5,352
Calhoun County	92,432,602	68,964,727	35,556,571	31,914,075	29,236,660	23,313,663	14,165,388	15,888,694	14,223,002	17,090,631
DeWitt County	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Gonzales County	0	0	780	1,270	520	770	770	0	0	0
Kendall County	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Refugio County	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Victoria County	30,810,797	32,523,172	35,166,748	27,312,965	23,290,701	22,216,144	27,291,297	27,291,297	24,109,882	23,809,646
TOTALS	**123,243,399**	**101,532,799**	**70,768,999**	**59,290,949**	**52,591,280**	**45,603,667**	**41,557,562**	**43,746,741**	**38,359,954**	**40,905,629**
JURISDICTION	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Caldwell County	5,337	5,865	5,625	4,632	8,059	21,006	21,584	23,950	21,493	21,765
Calhoun County	15,304,347	17,391,245	19,831,591	17,150,915	22,270,010	17,406,820	16,072,009	17,672,735	19,059,998	19,980,720

JURISDICTION	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
DeWitt County	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Gonzales County	0	0	0	0	15	10	10	10	0	0
Kendall County	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Refugio County	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Victoria County	25,122,676	21,426,356	15,104,574	10,641,222	10,096,316	10,160,927	7,071,738	6,700,335	6,633,432	6,294,879
TOTALS	**40,432,360**	**38,823,466**	**34,941,790**	**27,796,769**	**32,374,400**	**27,588,763**	**23,165,341**	**24,397,030**	**25,714,923**	**26,297,364**

Probability of Future Occurrences

The transport of hazardous material and explosives through GBRA Basin communities is regulated by the State Department of Transportation. Hazardous materials are transported through all counties within the GBRA Basin using major highways and thoroughfares. The risk of hazardous spills during transport exists and may increase in areas with continued industrial development and major highways, such as Interstate 10. In addition, counties throughout the basin have multiple hazardous material sites as indicated in Table 16-2. Therefore the probability of future occurrences is occasional, with an event possible in the next five years.

Table 16-2. Hazardous Material Sites by Jurisdiction

JURISDICTION	HAZARDOUS MATERIALS FACILITIES
	Number of Sites
Caldwell County	**20**
Lockhart	2
Luling	6
Martindale	0
Calhoun County	**61**
Point Comfort	1
Port Lavaca	5
Seadrift	0
DeWitt County	**139**

JURISDICTION	HAZARDOUS MATERIALS FACILITIES
	Number of Sites
Cuero	4
Nordheim	0
Yoakum	1
Yorktown	1
Gonzales County	**61**
Gonzales	10
Nixon	2
Waelder	2
Cibolo (Guadalupe County)	0
Kendall County	**15**
Boerne	3
Refugio County	**53**
Austwell	0
Bayside	0
Refugio	2
Woodsboro	1
Victoria County	**55**
Victoria	0
TOTALS FOR STUDY AREA	**444**

Impact & Vulnerability

Hazardous material or toxic releases can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. The micro-meteorological effects of the buildings and terrain can influence the travel of agents.[1] Shielding in the form of sheltering-in-place can protect people from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

[1] http://www.fema.gov/txt/plan/prevent/rms/428/FEMA428_ch1.txt

Table 16-3 shows the estimated exposure of people and buildings to a toxic release by county for fixed site and Table 16-4 shows the results for a mobile site toxic release. For fixed site analysis, only toxic sites with georeferenced data available were analyzed. Two buffer extents—500 and 2,500 meters—are assumed in respect to the different levels of impact: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, *Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings* and engineering judgment.

Table 16-3. Estimated Exposure of People and Buildings by County (Fixed Site Toxic Release)

JURISDICTION	TOTAL POPULATION IN JURISDICTION	TOTAL BUILDINGS IN JURISDICTION	IMMEDIATE IMPACT (500 METERS)			SECONDARY IMPACT (2,500 METERS)		
			Number People Exposed	Number Buildings Exposed	Value Of Buildings Exposed ($)	Number People Exposed	Number Buildings Exposed	Value Of Buildings Exposed ($)
Caldwell County	**14,661**	**6,462**	**3,461**	**1,395**	**$125,576,000**	**9,411**	**3,966**	**$361,019,000**
Lockhart	11,591	4,217	3,522	1,034	$140,921,000	11,566	4,181	$613,148,000
Luling	5,025	2,584	169	860	$86,135,000	5,025	2,584	$264,373,000
Martindale	917	424	0	0	0	194	100	$7,349,000
Calhoun County	**6,481**	**6,463**	**1,123**	**957**	**$152,215,000**	**3,060**	**2,446**	**$325,233,000**
Point Comfort	781	477	0	0	$0	781	477	$80,897,000
Port Lavaca	12,035	5,489	3,245	1,302	$137,977,000	10,018	4,525	$523,911,000
Seadrift	1,350	1,069	0	0	$0	0	0	$0
DeWitt County	**8,805**	**5,417**	**2,882**	**1,637**	**$174,667,000**	**6,923**	**3,292**	**$356,828,000**
Cuero	6,544	3,824	2,443	1,404	$165,112,000	6,544	3,824	$412,893,000
Nordheim	323	266	0	0	$0	0	0	$0
Yoakum	5,729	3,306	369	220	$27,088,000	5,729	3,306	$370,136,000
Yorktown	2,204	1,568	569	343	$33,615,000	2,204	1,299	$127,049,000
Gonzales County	**8,343**	**5,619**	**2,759**	**1,493**	**$125,402,000**	**5,100**	**3,117**	**$256,734,000**
Gonzales	7,160	3,636	2,386	1,077	$144,890,000	7,148	3,623	$400,074,000
Nixon	2,178	1,326	945	541	$44,522,000	2,178	1,326	$94,690,000
Waelder	947	572	873	513	$34,374,000	947	572	$37,972,000
Cibolo (Guadalupe County)	3,035	1,338	0	0	$0	2,214	883	$163,485,000
Kendall County	**17,618**	**8,189**	**6,724**	**2,875**	**$422,285,000**	**12,192**	**5,447**	**$814,611,000**
Boerne	6,125	3,016	1,731	928	$172,691,000	5,992	2,962	$488,364,000
Refugio County	**2,670**	**1,360**	**705**	**349**	**$39,479,000**	**2,107**	**1,067**	**$118,645,000**
Austwell	192	176	0	0	$0	0	0	$0
Bayside	360	304	0	0	$0	0	0	$0
Refugio	2,920	1,805	1,180	639	$74,349,000	2,920	1,805	$186,843,000
Woodsboro	1,683	837	531	281	$27,889,000	1,686	837	$78,606,000
Victoria County	**23,482**	**9,699**	**6,418**	**2,690**	**$347,124,000**	**18,591**	**7,675**	**$899,890,000**
Victoria	60,606	24,412	8,549	3,754	$702,490,000	55,138	22,398	$3,505,204,000

JURISDICTION	TOTAL POPULATION IN JURISDICTION	TOTAL BUILDINGS IN JURISDICTION	IMMEDIATE IMPACT (500 METERS)			SECONDARY IMPACT (2,500 METERS)		
			Number People Exposed	Number Buildings Exposed	Value Of Buildings Exposed ($)	Number People Exposed	Number Buildings Exposed	Value Of Buildings Exposed ($)
TOTALS[2]	**213,765**	**103,855**	**50,584**	**24,292**	**$3,178,801,000**	**177,668**	**81,712**	**$10,487,954,000**

Source: EPA and Texas Department of State Health Services Tier 2 Chemical Reporting Program

Table 16-4. Estimated Exposure of People and Buildings by County (Mobile Site Toxic Release)

JURISDICTION	TOTAL POPULATION IN JURISDICTION	TOTAL BUILDINGS IN JURISDICTION	IMMEDIATE IMPACT (500 METERS)			SECONDARY IMPACT (2,500 METERS)		
			Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)	Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)
Caldwell County	**14,661**	**6,462**	**5,600**	**2,272**	**$203,082,000**	**8,610**	**3,685**	**$330,458,000**
Lockhart	11,591	4,217	7,549	2,595	$379,813,000	11,591	4,217	$618,183,000
Luling	5,025	2,584	3,605	1,807	$189,706,000	5,025	2,584	$264,373,000
Martindale	917	424	Negligible	0	Negligible	189	96	$7,259,000
Calhoun County	**6,481**	**6,463**	**1,117**	**865**	**$152,675,000**	**2,211**	**2,116**	**$315,984,000**
Point Comfort	781	477	401	267	$94,225,000	781	477	$121,298,000
Port Lavaca	12,035	5,489	5,323	2,383	$251,897,000	11,733	5,229	$634,089,000
Seadrift	1,350	1,069	132	68	$5,449,000	1,552	1,069	$72,052,000
DeWitt County	**8,805**	**5,417**	**5,804**	**2,383**	**$322,442,000**	**6,710**	**2,913**	**$379,031,000**
Cuero	6,544	3,824	7,997	3,602	$436,477,000	8,440	3,824	$454,999,000
Nordheim	323	266	Negligible	0	Negligible	Negligible	0	Negligible
Yoakum	5,729	3,306	3,235	1,855	$243,472,000	5,729	3,306	$370,136,000
Yorktown	2,204	1,568	Negligible	0	Negligible	Negligible	0	Negligible
Gonzales County	**8,343**	**5,619**	**4,373**	**2,657**	**$242,860,000**	**5,279**	**3,389**	**$291,177,000**
Gonzales	7,160	3,636	1,815	2,550	$311,991,000	7,160	3,636	$401,785,000
Nixon	2,178	1,326	1,815	1,073	$84,049,000	2,178	1,326	$94,690,000
Waelder	947	572	922	558	$36,988,000	947	572	$37,972,000
Cibolo (Guadalupe County)	3,035	1,338	935	521	$82,015,000	3,031	1,337	$221,140,000
Kendall County	**17,618**	**8,189**	**7,639**	**3,559**	**$544,155,000**	**10,768**	**4,983**	**$737,886,000**
Boerne	6,125	3,016	859	530	$108,924,000	5,104	2,591	$427,600,000

[2] Totals for the study area may include values less than $5,000 for dollar amounts and less than 50 for populations (where applicable) that are classified as "negligible" in the table.

JURISDICTION	TOTAL POPULA-TION IN JURIS-DICTION	TOTAL BUILDINGS IN JURIS-DICTION	IMMEDIATE IMPACT (500 METERS)			SECONDARY IMPACT (2,500 METERS)		
			Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)	Number People Exposed	Number Buildings Exposed	Value of Buildings Exposed ($)
Refugio County	**2,670**	**1,360**	**734**	**381**	**$45,535,000**	**1,201**	**579**	**$71,348,000**
Austwell	192	176	Negligible	0	Negligible	Negligible	0	Negligible
Bayside	360	304	Negligible	0	Negligible	Negligible	0	Negligible
Refugio	2,920	1,805	2,590	1,629	$165,680,000	2,920	2,920	$86,843,000
Woodsboro	1,683	837	723	366	$34,176,000	1,686	837	$78,606,000
Victoria County	**23,482**	**9,699**	**15,947**	**6,491**	**$784,852,000**	**20,859**	**20,859**	**$1,031,662,000**
Victoria	60,606	24,412	36,574	15,800	$2,651,078,000	60,606	24,411	$3,942,297,000
TOTALS[3]	**213,765**	**103,855**	**115,689**	**54,212**	**$7,371,541,000**	**184,310**	**96,956**	**$10,990,868,000**

Source: Texas Railroad Commission and U.S. Department of Transportation

[3] Totals for the study area may include values less than $5,000 for dollar amounts and less than 50 for populations that are classified as "negligible" in the table.

INFECTIOUS DISEASE

Hazard Description 1
Location 2
Extent 3
Historical Occurrences 5
H1N1 6
Probability of Future Occurrences 7
Impact and Vulnerability 8

Hazard Description

An infectious disease is defined as a clinically evident disease resulting from the presence of pathogenic microbial agents. According to FEMA, infectious diseases are a major threat around the world, killing millions globally each year. Transmission of an infectious disease may occur through one or more means including physical contact with infected individuals. These infecting agents may also be transmitted through liquids, food, bodily fluids, contaminated objects, airborne inhalation or through vector-borne dissemination.

Three terms are commonly used to classify disease impacts: endemic, epidemic and pandemic. An endemic is present at all times at a low frequency (e.g., chicken pox in the United States). An epidemic is a sudden severe outbreak of disease (e.g., the bubonic plague during Medieval times) and a pandemic is an epidemic that becomes very widespread and affects a whole region, a continent, or the world (e.g., the 1957 flu pandemic caused at least 70,000 deaths in the United States and 1-2 million deaths worldwide). Fears of pandemic have risen in recent years as our globalized economy and growing population fosters large scale international travel and trade. Also, growing populations increase the vulnerability of all areas to disease as it can travel more quickly and creates difficulty in preventing the spread of infection.

The top 11 infectious diseases according to the World Health Organization based upon number of deaths are presented in Table 17-1.

Table 17-1. Worldwide Mortality Due to Infectious Disease

RANK	CAUSE OF DEATH	APPROXIMATE WORLDWIDE DEATHS IN 2002	PERCENTAGE OF ALL DEATHS WORLDWIDE
1	Lower Respiratory Infections	3.9 million	6.9%
2	HIV/AIDS	2.8 million	4.9%
3	Diarrheal diseases	1.8 million	3.2%
4	Tuberculosis (TB)	1.6 million	2.7%
5	Malaria	1.3 million	2.2%
6	Measles	600,000	1.1%
7	Pertussis	290,000	0.5%
8	Tetanus	210,000	0.4%
9	Meningitis	170,000	0.3%
10	Syphilis	160,000	0.3%
11	Hepatitis B	100,000	0.2%

Source: World Health Organization

Location

Pandemics are random, with a few happening every century. Wherever and whenever it starts, the disease impacts all areas of the world, and all areas are vulnerable. Third world countries have fewer resources to fight disease and may be more vulnerable than more industrialized nations. In the United States, the public health system works at the federal, state and local levels to monitor diseases, plan and prepare for outbreaks and prevent epidemics where possible. But, in the age of air travel and worldwide shipping, it is becoming increasingly difficult to contain localized outbreaks as infected or exposed people travel and work, sending the disease across the globe in a matter of hours.

Extent

The severity of a pandemic virus can be evaluated from two perspectives: that of the individual who has been infected and from the population level – that is, how many complications and deaths might be expected as a whole. Measuring severity from either perspective in real time is a major challenge. The most common measure of severity is the case-fatality rate (CFR) as depicted in Figure 17-1.

The magnitude of a pandemic event is also evaluated from the population level in terms of warnings. Figure 17-2 illustrates the various warning levels for pandemic. Dr. Margaret Chan, Director General of the World Health Organization (WHO), announced in June of 2009 that H1N1 had reached Phase 6, Pandemic.

Figure 17-1. Intensity Scale – Infectious Disease

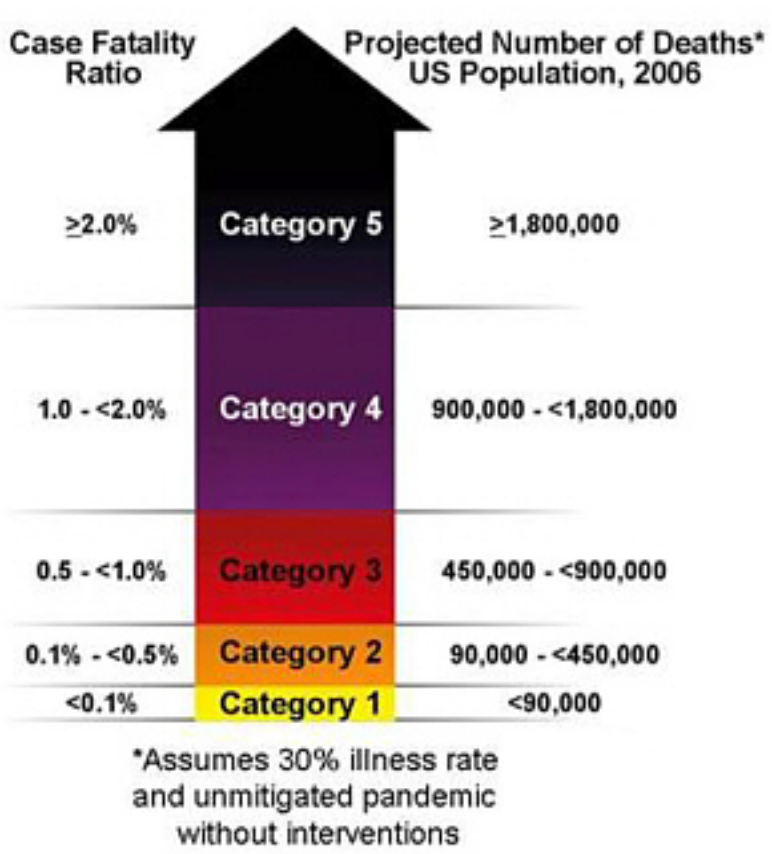
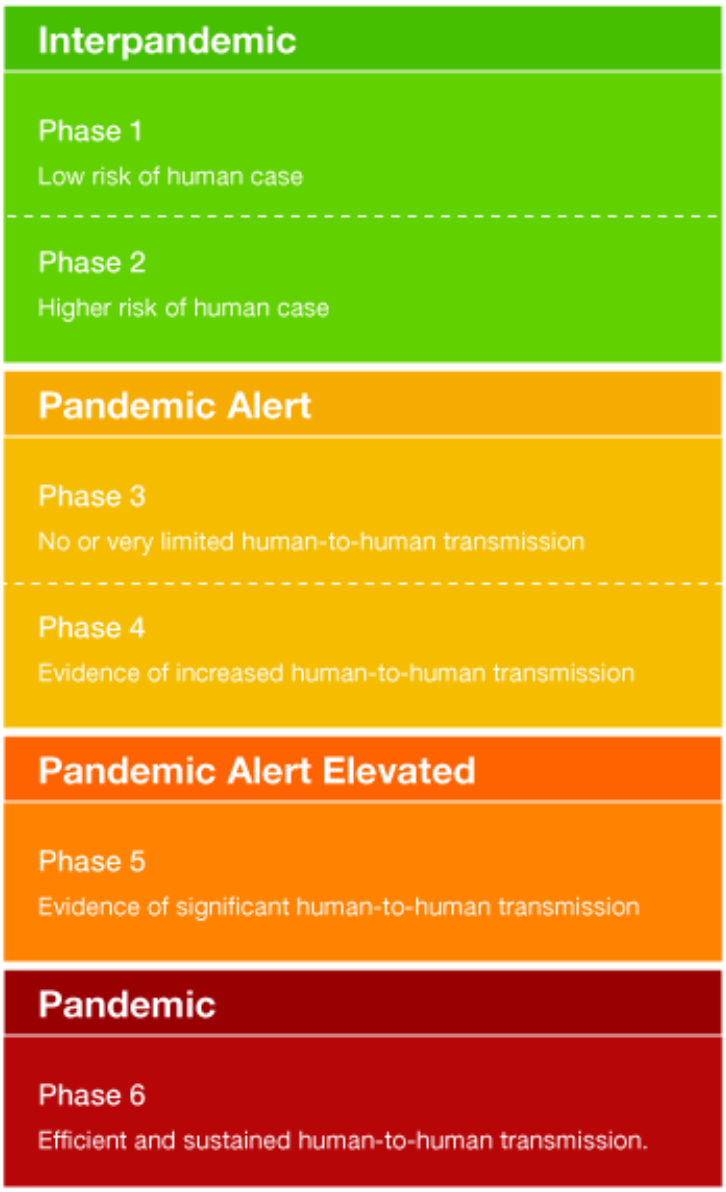


Figure 17-2. Risk levels for Pandemic (World Health Organization)



Historical Occurrences

Statewide, outbreaks of infectious diseases are recorded by the Texas Department of State Health Services, Infectious Disease Control Unit (ICDU). The IDCU tracks reported cases of all non-genetic diseases. **T**able 17-2 below reports the infectious disease outbreaks in the State over the last 5 years. The total number of cases for these diseases range from one reported case to as many as 16,527 reported cases during the timeframe studied.

Table 17-2. Infectious Disease Cases in the State of Texas 2004-2009.

Infectious Disease	Number of cases reported per year in the State of Texas					
	2009	2008	2007	2006	2005	2004
AIDS	2,353	2,717	2,678	2,796	2,851	2,881
Aseptic Meningitis	1,858	1,747	2,126	1,740	1,878	2,521
Bacterial Meningitis	239	344	484	337	332	412
Campylobacteriosis	1,617	1,425	1,690	1,075	816	1,264
Chlamydia	103,829	98,707	84,784	75,319	71,621	70,186
Cryptosporidiosis	419	2,240	233	273	115	93
Diarrheal diseases	NR	NR	NR	NR	NR	NR
Gonorrhea	28,782	31,569	31,761	30,270	26,016	24,339
Hepatitis A	184	259	264	330	461	6,224
Hepatitis B, acute	420	562	741	833	742	687
HIV/AIDS*	4,355	4,161	4,098	3,956	4,326	4,398
Lower Respiratory Infections	NR	NR	NR	NR	NR	NR
Malaria	87	87	130	106	130	111
Measles	1	0	7	0	3	0
Meningococcal Disease	53	70	55	45	61	72
Mumps	40	20	21	58	25	23
Pertussis	3,358	2,046	1,051	954	2,224	1,184
Rubella	0	0	0	0	0	1
Salmonellosis	3,964	5,583	3,534	3,060	3,145	2,665
Shigellosis	2,295	4,665	2,358	2,065	3,100	3,336
Streptococcus Disease, invasive	NR	NR	NR	NR	NR	NR
Syphilis	6,989	6,321	5,573	4,961	4,374	4,191
Tetanus	1	3	0	1	0	2
Tuberculosis	1,501	1,500	1,507	1,566	1,524	1,671
Varicella (Chicken Pox)	4,445	7,839	10,061	11,768	8,336	8,544

*New HIV diagnoses regardless of disease status

Source: Texas Department of State Health and Human Services, Infectious Disease Control Unit

H1N1

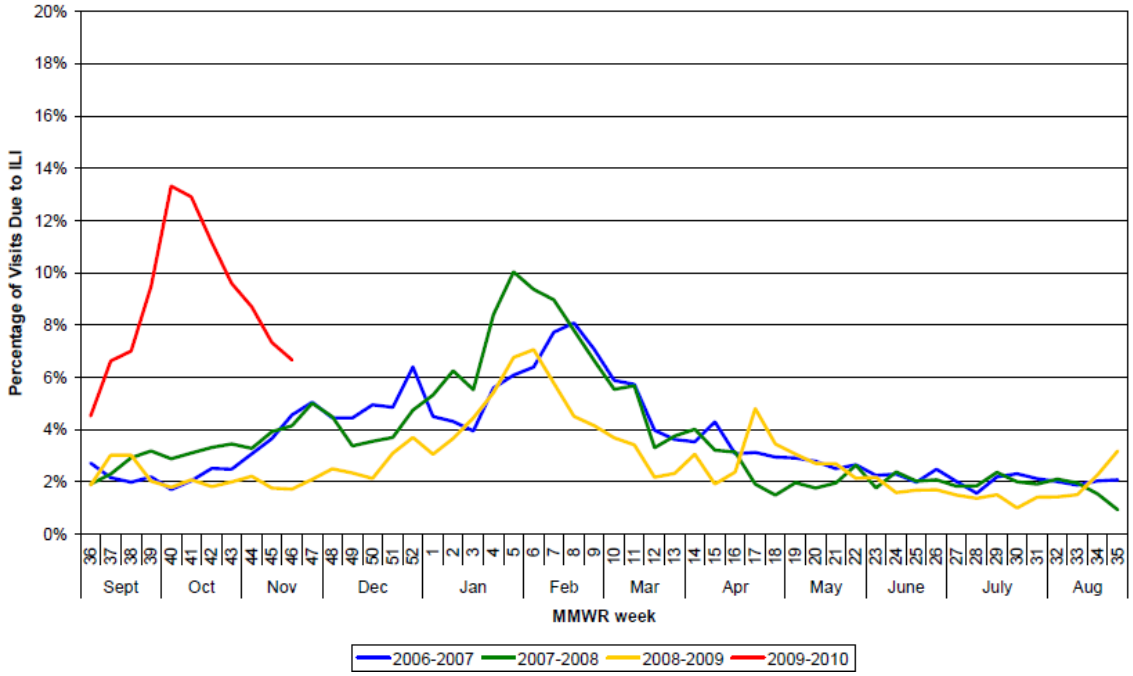
In March of 2009, a novel strain of Influenza A (H1N1 or "Swine Flu") virus was detected in Mexico and the United States. The virus has since spread worldwide. As of September 27, 2009, more than 340,000 cases of Swine Flu have been confirmed worldwide and approximately 4,100 deaths have been reported[1].

The most commonly reported symptoms include cough, fever, sore throat and gastrointestinal symptoms such as vomiting and diarrhea. Most cases with H1N1 did not require hospitalization and had symptoms that lasted four days[2].

Since June 9, 2009, the Center for Disease Control (CDC) has reported antigenic characterization results from 25 novel influenza A (H1N1) viruses and 1 seasonal influenza A (H1N1) virus received from the Texas Department of State Health Services (DSHS) Laboratory since April 26, 2009.

Figure 17-3 illustrates the percentage of visits to Texas hospitals for influenza-like symptoms. Figure 17-4 displays nationwide influenza activity.

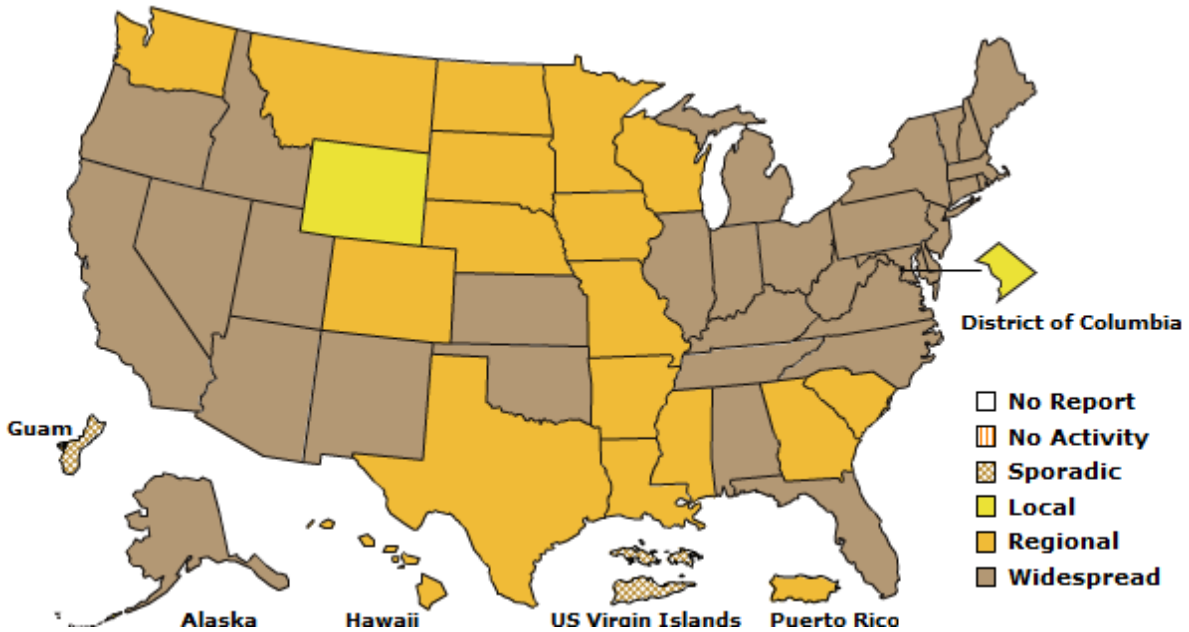
Figure 17-3. Percentage of Visits Due – Flu-Like Illness, Texas (2006-2010 Seasons)



[1] World Health Organization

[2] Carrat, F. et al. Timelines of Infection and Disease in Human Influenza: A Review of Volunteer Challenge Studies. American Journal of Epidemiology, 2008, 167: 775–785.

Figure 17-4. Influenza Summary by State – Activity Estimates, Nov. 2009



Probability of Future Occurrences

Disease impacts all areas of the world and all areas are vulnerable. Third world countries have fewer resources to fight disease and may be more vulnerable than more industrialized nations. In the United States, the public health system works at the federal, state and local levels to monitor diseases, plan and prepare for outbreaks and prevent epidemics where possible. But, in the age of air travel and worldwide shipping, it is becoming increasingly difficult to contain localized outbreaks as infected or exposed people travel and work, sending the disease across the globe in a matter of hours. Future occurrence is highly likely.

It is likely that an event is probable in the next three years. There is no seasonal pattern associated with infectious disease outbreaks. Outbreaks can last weeks or months at a time. There is no warning time. Infectious disease cannot be detected until it is diagnosed. Condensed populations within the Guadalupe Blanco River Authority region are more susceptible and rural areas are less susceptible.

Impact and Vulnerability

Based on historic occurrence, the potential severity of impact of an infectious disease outbreak could be substantial resulting in multiple deaths and complete shutdown of facilities and public buildings for 30 days or more. Property may not be destroyed by directly by a disease outbreak.

TERRORISM

Hazard Profile 1
Location 2
Extent 2
Historical Occurrences 3
Probability of Future Occurrences 3
Impact and Vulnerability 4

Hazard Profile

Terrorism can strike not just large cities, but in any community of any size. While no amount of planning and mitigation can remove 100-percent of the risk from terrorism, hazard mitigation and preparedness can help reduce the risk.

Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom. The Federal Bureau of Investigation (FBI) categorizes terrorism in the U.S. as one of two types:

- **Domestic Terrorism** – is terrorist activities that focus on facilities or populations without foreign direction.
- **International Terrorism** – is terrorist activities that are foreign-based and/or sponsored by organizations or groups outside the U.S.

The distinction between domestic or international terrorism refers not to where the terrorist act takes place but rather to the origin of the individuals or groups responsible for it. For example, the 1995 bombing of the Murrah Federal Building in Oklahoma City was an act of domestic terrorism, but the attacks of September 2001 were international in nature.

International terrorism poses the greatest threat to our national security. Global trends indicate that the growing number of terrorist groups will become more networked and even harder to identify and track. Texas' critical infrastructure, valuable resources, and geographic location create unique counterterrorism challenges.

Terrorists often use threats to create fear among the public, to convince citizens that government is powerless to prevent terrorism, and to get immediate publicity for their causes. Weapons of mass destruction (WMD), including incendiary, explosive, chemical, biological, radiological, and nuclear agents, have the capability to cause death or serious bodily injury to a significant number of people, thus posing the threat of a catastrophic incident. Terrorism includes the following hazards:

- Conventional bomb
- Biological agent

- Chemical agent
- Nuclear bomb
- Radiological agent
- Arson/incendiary attack
- Armed attack
- Agriterrorism
- Intentional hazardous materials release
- Assaults on the infrastructure and electronic information systems that could result in consequences affecting human life, health and safety.

Location

The form and locations of many natural hazards are identifiable and, even in some cases, predictable; however, there is no defined geographic boundary for terrorism. Based on previous events, it is presumed that critical facilities and services and large gatherings of people are at higher risk.

Extent

Terrorism cannot be forecast with any accuracy. There is, therefore, some potential for most, if not all, types of terrorist acts to occur anywhere and at any time. The Homeland Security Advisory System, issued by the U.S. Department of Homeland Security, is a color-coded terrorism warning system that sets out five threat levels of varying intensity. Terrorism Warning Threat Levels are described in Table 18-1.

Table 18-1. Terrorism Warning System Threat Levels[1]

Color	Threat Level[2]	Governmental actions to be taken
Green	Low: Low risk of attacks.	Requires "protective measures" such as regularly assessing facilities for weaknesses and finding ways to reduce them, and making sure State and local government employees are trained to handle terrorism situations.
Blue	Guarded: General risk of attacks.	Requires government agencies to review and update emergency response procedures and communications systems, as well as provide the public with necessary information.

[1] United States Department of Homeland Security

[2] The current threat level may be found at: www.dhs.gov/files/programs/Copy_of_press_release_0046.shtm.

Color	Threat Level[2]	Governmental actions to be taken
Yellow	Elevated: Significant risk of attacks.	Includes increasing surveillance of critical locations, coordinating emergency plans with nearby jurisdictions and implementing contingency and emergency response plans.
Orange	High: High risk of attacks.	Requires coordinating necessary security efforts with armed forces or law enforcement agencies, taking additional precautions at public events, preparing to work at an alternative site or with a dispersed workforce and restricting access to essential personnel.
Red	Severe: Severe risk of attacks.	Includes assigning emergency response personnel and setting up specially trained teams; monitoring, redirecting, or constraining transportation systems; closing public and government facilities; and increasing or redirecting personnel to address emergency needs.

The Red Cross issues Advisory System Recommendations for individuals, families, neighborhoods, schools and businesses for each alert level. These may be found at: www.redcross.org.

Historical Occurrences

No data exists to show that a community in the Guadalupe River Basin has experienced a terrorist act. The history of terrorism on United States soil includes the large-scale attacks of September 11, 2001, on the World Trade Center in New York and the Pentagon in Washington, D.C. and the ensuing anthrax attacks; the 1995 bombing of the Murrah Federal Building in Oklahoma City; and earlier bombing of the World Trade Center in 1993. There have been more numerous smaller scale bombings and fires as a result of terrorist incidents.

Probability of Future Occurrences

Terrorism can strike not just large cities, but in any community of any size. While no amount of planning and mitigation can remove 100-percent of the risk from terrorism, hazard mitigation and preparedness can help reduce the risk. Given the lack of information on observed historical damages, frequency of

occurrence, intensity and damage parameters, no estimate is available for the probability of a future occurrence of a terrorist event.

Impact and Vulnerability

Because there is no defined geographic hazard boundary, all people and property in the Guadalupe River Basin are potentially exposed to risk from damage from a terrorist event.

While we may not be able to prevent an attack, it is well within our ability to lessen the likelihood and/or the potential effects of an incident. Cities in the basin continue to improve their readiness to respond to a terrorist incident through participation in state and federal programs that provide training and equipment for agencies that would respond to a local terrorist incident, and in exercises that help to improve agency coordination and test local response plans.

MITIGATION STRATEGY

Mitigation Goals 1

Goal 1 1

Goal 2 2

Goal 3 2

Goal 4 3

Goal 5 3

Goal 6 3

Mitigation Goals

Based on the results of the risk and capability assessments, the planning team developed a mitigation strategy for the Plan Update utilizing the results of both assessments as well as reviewing the goals and objectives that were included in the 2005 Plan.

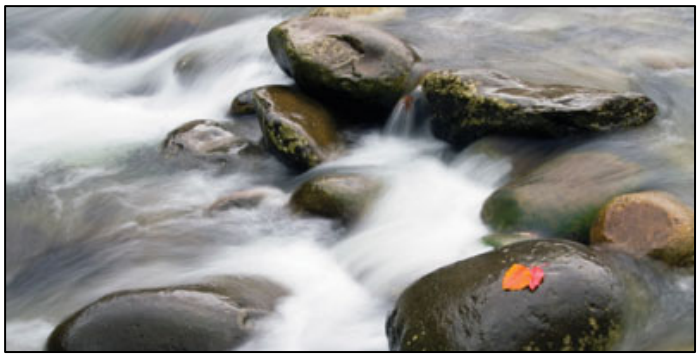
At the Mitigation Workshops in March 2010, planning team members reviewed the mitigation strategy from the 2005 Plan. The consensus among all members present was that the strategy developed for the 2005 Plan should remain, as it identified overall improvements to be sought in the Plan Update. However, the order and priority of the goals and objectives were reorganized as depicted in this section.

Goal 1

Protect public health and safety.

Objective 1.1

Advise the public about health and safety precautions to guard against injury and loss of life from hazards.



Objective 1.2

Maximize the utilization of the latest technology to provide adequate warning, communication and mitigation of hazard events.

Objective 1.3

Reduce the danger to, and enhance protection of, high risk areas during hazard events.

Objective 1.4

Protect critical facilities and services.

Goal 2

Increase the coordination and cooperation among intergovernmental entities in carrying out hazard mitigation.

Objective 2.1

Promote partnerships among the counties, cities and the Guadalupe-Blanco River Authority.

Objective 2.2

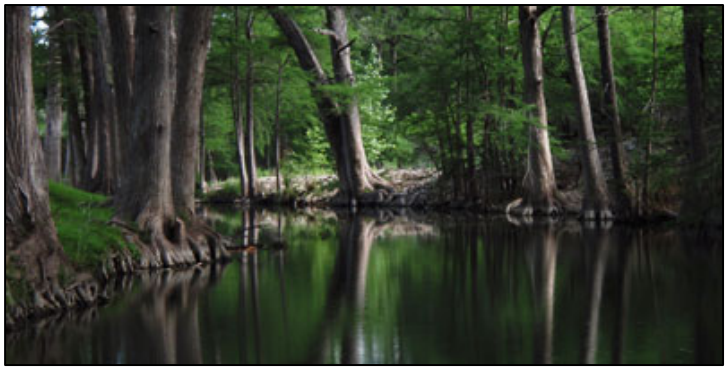
Facilitate communication and coordination within and among Federal, State and local governments and the Guadalupe-Blanco River Authority in carrying out floodplain management and hazard mitigation.

Goal 3

Build the capability for carrying out hazard mitigation activities.

Objective 3.1

Build and support partnerships to help communities become less vulnerable to hazards.



Objective 3.2

Maximize the use of Federal, State and private sector funding for hazard mitigation.

Objective 3.3

Promote adequate staffing, training and expertise for carrying out hazard mitigation.

Goal 4

Heighten public awareness and support for hazard mitigation.

Objective 4.1

Increase public understanding of the full range of natural and man-made hazards they face.

Objective 4.2

Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards.

Objective 4.3

Publicize and encourage the adoption of appropriate hazard mitigation measures.

Goal 5

Protect existing and new properties.

Objective 5.1

Reduce repetitive losses to the National Flood Insurance Program.

Objective 5.2

Protect existing buildings and public infrastructure from hazards.

Objective 5.3

Promote measures to ensure that development will not put people in harm's way or increase threats to existing properties.

Objective 5.4

Maximize insurance coverage to provide financial protection against hazard events.

Goal 6

Promote growth in a sustainable manner.

Objective 6.1

Incorporate hazard mitigation into long-range planning, budgeting and development activities.

Objective 6.2

Promote beneficial uses of hazardous areas while expanding open space and recreational opportunities.

Objective 6.3

Prevent creation of future hazards to life and property.

PREVIOUS ACTIONS

GBRA 2
Caldwell County 12
City of Lockhart 23
City of Luling 28
City of Martindale 35
Calhoun County 36
City of Point Comfort 37
City of Port Lavaca 40
City of Seadrift 44
DeWitt County 47
City of Cuero 52
City of Nordheim 60
City of Yoakum 61
City of Yorktown 63
Gonzales County 64
City of Gonzales 65
City of Nixon 67
City of Waelder 69
City of Cibolo (Guadalupe County) 71
Kendall County 71
City of Boerne 78
Refugio County 79
City of Austwell 81
City of Bayside 84
Town of Refugio 85
Town of Woodsboro 89
Victoria County 91
City of Victoria 94

SECTION 20: PAST ACTIONS

At the mitigation workshops held during the planning process, planning team members were given copies of the mitigation actions submitted in the 2005 Plan as well as the two mitigation actions added in 2007 and 2008 by the Dewitt County Drainage District and the City of Austwell, respectively. Each jurisdiction reviewed the previous action and provided an analysis as to whether the action had been completed, should be deferred as an ongoing activity, or should be deleted from the plan. The actions from the 2005 Plan are included in this section as they were written in 2005, with the exception of the "2010 Analysis" section. Sometimes hazards addressed are listed as "multiple hazards" or "all hazards" as this was allowed per the state and FEMA regulations at the time the actions were developed.

GBRA

		GBRA (Past Action)-1
	Proposed Action:	Conduct an annual workshop with the National Weather Service (NWS) for the County EMCs and Floodplain Administrators within the GBRA ten-county district
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	The Guadalupe River basin has experienced numerous floodings since the 1930's. On an average, the Guadalupe River records a flood event every 5 years.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$1000/year
Potential Funding Sources:	General funds
Lead Agency/Department Responsible:	GBRA and NWS
Implementation Schedule:	Ongoing

2010 Analysis:
Ongoing workshops and education of FPA's continues to be a goal

		GBRA (Past Action)-2
	Proposed Action:	Continue to participate in the funding of Phase 2 and Phase 3 of the COE Cibolo Watershed Study
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	The COE completed a reconnaissance study in 2001 for the Guadalupe River Basin. The Cibolo Creek Watershed study was one of several studies recommended for further analysis. Study participants include GBRA, San Antonio River Authority (SARA) and the San Antonio Water Systems, (SAWS). Phase 1 of the study has been completed.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	COE, GBRA , SARA and SAWS
Implementation Schedule:	2007

2010 Analysis:
GBRA participating in Phase II and is ongoing project; GBRA will not be participating in Ph. III

		GBRA (Past Action)-3
	Proposed Action:	Continue Weather-Net Program with the National Weather Service (NWS)
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	Communication problems are common during major flood events. In the last few years, GBRA has worked with the NWS to develop alternate methods of sending out river forecasts. Today GBRA gathers flood stage forecasts from the NWS and provides a river summary to the EMC's and other emergency management personnel within the Guadalupe River Basin. The program is called the Weather-Net Program.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000/year
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	GBRA Engineering Department
Implementation Schedule:	Ongoing

2010 Analysis:
Ongoing program; will be deferred.

		GBRA (Past Action)-4
	Proposed Action:	Outfit a portable emergency electric generator to provide temporary electric power at water and wastewater treatment plants
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	GBRA has recently purchased a used 700 Kwatt generator. The unit needs to be refurbished and mounted on a trailer.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All hazards
Priority (High, Moderate, Low):	Very High
Estimated Cost:	$15,000
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	GBRA Operation Department
Implementation Schedule:	2005

2010 Analysis:
Completed; purchased a 1200 Kwatt generator.

		GBRA (Past Action)-5
	Proposed Action:	Work with FEMA's Engineering consultant to upgrade river models within Guadalupe County
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	FEMA is presently updating the floodplain models in Guadalupe County. Halff Associates has been hired by FEMA to develop the models for the area between New Braunfels and Seguin. The Guadalupe River in this area includes four small lakes. GBRA has acquired an instrument that can be attached to a boat and will provide accurate cross sectional data on the lakes.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	GBRA Engineering Department
Implementation Schedule:	2004

2010 Analysis:
Completed; GBRA participated with FEMA to update necessary models

		GBRA (Past Action)-6
	Proposed Action:	Participate with the Corps of Engineers (COE) on a Feasibility Study in the lower Guadalupe River Basin
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	The lower reach of the Guadalupe River experiences extended periods of flooding. The COE in their reconnaissance study identified the lower Guadalupe river as an area for further study.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$350,000
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	GBRA Engineering Department
Implementation Schedule:	2004

2010 Analysis:
Project currently has not been funded and is ongoing

		GBRA (Past Action)-7
	Proposed Action:	Conduct an biennial review of the GBRA "Heavy Rainfall and Flood Response Manual"
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	During flood events in the Seguin/New Braunfels area, GBRA activates a flood response team to handle the hundreds of calls that come from the general public. The Authority has developed a manual that contains data on past floods and other relevant information to assist team members. The document is reviewed at least every two years.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000/year
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	GBRA Engineering Department and Project Development Department
Implementation Schedule:	2004

2010 Analysis:
Ongoing; conducted every 2 years but will not be deferred as an action in the Plan Update.

		GBRA (Past Action)-8
	Proposed Action:	Conduct an annual review of the Hurricane Preparedness Plan for GBRA's lower basin operations
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	During a hurricane event, keeping water and wastewater facilities in operation is critical. Developing a hurricane preparedness plan and maintaining the plan is an important part of the process. GBRA has developed plans for its lower basin operations

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000/year
Potential Funding Sources:	Plant Operating Budget
Lead Agency/Department Responsible:	GBRA Operations Division
Implementation Schedule:	Each year

2010 Analysis:
Conduct review every 2 years; ongoing and will be deferred

		GBRA (Past Action)-9
	Proposed Action:	Work with Texas Department of Transportation to stabilize erosion upstream of Hwy 59 Bridge over the Guadalupe River
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	The Guadalupe River at the Hwy 59 bridge near Victoria has experienced severe erosion on the eastern bank. Continued erosion may jeopardize the bridge in the next 5 to 10 years. If the erosion is not checked in the next 30 to 40 years, the Victoria Wastewater Treatment plant may also experience problems since the plant is not far from the bridge.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Plant Operating Budget
Lead Agency/Department Responsible:	GBRA Operations Division
Implementation Schedule:	2008

2010 Analysis:
Deleted and will not be deferred; plant will not be operated by GBRA beginning Dec. 2010

		GBRA (Past Action)-10
	Proposed Action:	Evaluate alternatives and implement modifications to the spillgates at the TP-4 Dam in Seguin, in order to prevent recurring damage during severe floods.
	BACKGROUND INFORMATION	
	Site and Location:	Guadalupe-Blanco River Authority
	History of Damages:	During the past five years, three major floods have caused damage to the spillgates at the TP-4 dam. The total cost of repairs for the first two floods was $990,140. The repairs from the 2004 flood are estimated to be approximately $390,000.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000
Potential Funding Sources:	General Funds and grant funds
Lead Agency/Department Responsible:	GBRA Operation Department
Implementation Schedule:	2008

2010 Analysis:
Completed

Caldwell County

		Caldwell County (Past Action)-1
	Proposed Action:	Obtain or develop inexpensive pamphlets and brochures on pipeline safety and directions on identifying and reporting problems
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	Much of the county is crossed by pipelines carrying flammable and combustible liquids, gases, and materials. Some of these items are under great pressure and a break in the pipes can cause an extremely dangerous condition with the possibility of loss of lives. There have been 15 pipeline events in the county since 1968, costing from $100 to $240,000 in damages.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Pipeline accidents and hazmat accidents
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$800
Potential Funding Sources:	Grants, county budget
Lead Agency/Department Responsible:	LEPC
Implementation Schedule:	ongoing

2010 Analysis:
Ongoing and is deferred

		Caldwell County (Past Action)-2
	Proposed Action:	Expand and improve the county's emergency radio communications network; upgrade repeaters and their software; build a secure equipment building
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	Problems have developed when too many radio units have attempted to communicate at the same time. The repeaters and tower are also rapidly becoming outdated and overworked.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All hazard events requiring a coordinated response
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$54,000
Potential Funding Sources:	Grants, county budgets
Lead Agency/Department Responsible:	County Judge, OEM
Implementation Schedule:	2005

2010 Analysis:
Ongoing and is deferred

		Caldwell County (Past Action)-3
	Proposed Action:	Develop a mass debris removal plan
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	All unincorporated areas of the county have had devastating storms that damaged public and private property and resulted in large quantities of debris on roads, creeks, rivers, streets, and bridges. Unit Road is the focus of this action.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500 to $1,500
Potential Funding Sources:	General revenues and grants
Lead Agency/Department Responsible:	Unit Road
Implementation Schedule:	2004

2010 Analysis:
Ongoing and is deferred

		Caldwell County (Past Action)-4
	Proposed Action:	Provide volunteer fire departments with information about fire safety and outdoor burning for distribution to the public, including information about county ordinances
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	Caldwell County is subject to grass and brush fires, particularly dangerous for this farming and ranching community. Structure fires also are increasing as land is being developed. This is work element A of the fire prevention, fire safety awareness, and general safety awareness program.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Wildfire
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000 to $1,500 per year
Potential Funding Sources:	County budget
Lead Agency/Department Responsible:	Fire Marshal
Implementation Schedule:	Begin by Dec. 2003; ongoing thereafter

2010 Analysis:
Ongoing safety training and awareness; deferred

		Caldwell County (Past Action)-5
	Proposed Action:	Ensure that area firefighters have access to high-quality training in brush and forest firefighting
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	This is work element B of the fire prevention, fire safety awareness, and general safety awareness program.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Wildfire
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal – with existing budgets
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Fire Marshal
Implementation Schedule:	Begin 2003 and ongoing thereafter

2010 Analysis:
Ongoing project and is deferred

		Caldwell County (Past Action)-6
	Proposed Action:	Enforce the special purpose ordinances concerning burning standards, burn bans, and aerial fireworks
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	This is work element C of the fire prevention, fire safety awareness, and general safety awareness program.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Wildfire
Priority (High, Moderate, Low):	High
Estimated Cost:	Within existing budgets
Potential Funding Sources:	General revenues augmented by grants
Lead Agency/Department Responsible:	Fire Marshal
Implementation Schedule:	Begin enforcement in 2003; ongoing thereafter

2010 Analysis:
Ongoing and deferred

		Caldwell County (Past Action)-7
	Proposed Action:	Apply for grants to enable the county to buy out properties in greatest danger of flooding
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	Floodplain buffer zones are needed in specific neighborhoods in the county.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Low
Estimated Cost:	$650,000 to $1,250,000
Potential Funding Sources:	Grants and other available outside funding
Lead Agency/Department Responsible:	County judge, county auditor, floodplain administrator, and OEM
Implementation Schedule:	2013

2010 Analysis:
Ongoing and deferred

		Caldwell County (Past Action)-8
	Proposed Action:	Update the DTN Weather Warning System and purchase a new computer to service that system; closely monitor National Weather Service reports during weather events
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	Through most of the county, large-scale flooding is a danger along the San Marcos River, Plum Creek, drainage ditches, and other low-lying areas. Floods could impact several bridges, businesses, roads, and residences. Since 1997, 19 flash floods and 7 floods have occurred, three of which were declared disasters.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Multiple hazards
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$3,600 per year, approx.
Potential Funding Sources:	Budgeted item
Lead Agency/Department Responsible:	OEM
Implementation Schedule:	End of 2003

2010 Analysis:
Ongoing and deferred

		Caldwell County (Past Action)-9
	Proposed Action:	Establish a telephone communication system to alert all residents in the flood-prone areas of the county and provide up-to-date emergency weather information and safety instructions; develop protocols for use of the system
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	The high-speed Emergency Notification System (Reverse 911) is a state-of-the-art telephone notification system that can communicate watches, warnings, and other important time-sensitive information from local governments and public safety agencies simultaneously to large groups of residents. The system will allow geographical selection of targeted notification areas, including homes, businesses, hospitals, etc. The Emergency Notification System will enable local governments and public safety agencies to contact residents and businesses in specific areas in the event of an emergency. The system also can be used to call response personnel and deliver incident-specific information or instructions, with confirmation of message receipt through a touch-tone response.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$27,000 to $35,000
Potential Funding Sources:	Grants, general funds, bonds
Lead Agency/Department Responsible:	Floodplain administrator
Implementation Schedule:	2008

2010 Analysis:
Complete

		Caldwell County (Past Action)-10
	Proposed Action:	Update and strengthen the floodplain ordinance to include freeboard of 1 foot and fines for violators of the freeboard requirement
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	Class C fines are expected to greatly reduce violations of the floodplain ordinance

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Very high
Estimated Cost:	Costs are within existing budgets
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Floodplain administrator
Implementation Schedule:	End of 2004

2010 Analysis:
Action complete; ongoing periodic review of ordinance

		Caldwell County (Past Action)-11
	Proposed Action:	Develop and publicize evacuation plans, policies, and procedures for all contingencies and geographic areas of the county
	BACKGROUND INFORMATION	
	Site and Location:	Caldwell County
	History of Damages:	The County has an evacuation annex to its emergency plan that needs to be expanded. The annex needs to be tailored to specific events and specific neighborhoods.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	OEM, fire departments and volunteer fire departments, law enforcement
Implementation Schedule:	2004

2010 Analysis:
Action complete

City of Lockhart

City of Lockhart – Caldwell County (Past Action)-1	
Proposed Action:	Define and publicize the locations of safe shelter for residents to use before, during, and after severe weather storms, or as necessitated by other community hazards
BACKGROUND INFORMATION	
Site and Location:	Lockhart
History of Damages:	There is a need to identify safe shelter structures for residents, obtain use agreements, and publicize their locations.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000 to $3,500 in legal costs and signs
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	City of Lockhart
Implementation Schedule:	September 2005

2010 Analysis:
Project ongoing due to funding and will be deferred.

City of Lockhart – Caldwell County (Past Action)-2	
Proposed Action:	Identify and cut or trim trees that can cause major damages to power distribution lines causing power outages
BACKGROUND INFORMATION	
Site and Location:	Lockhart
History of Damages:	City has program to identify such areas but funding has been insufficient to address the needs.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$40,000 more annually
Potential Funding Sources:	Electric funds
Lead Agency/Department Responsible:	City of Lockhart
Implementation Schedule:	September 2005

2010 Analysis:
This project in ongoing on an annual basis and is deferred.

City of Lockhart – Caldwell County (Past Action)-3	
Proposed Action:	Low-water crossing areas and high-water accumulation areas need additional identification warnings including warning lights
BACKGROUND INFORMATION	
Site and Location:	Lockhart
History of Damages:	City has several low water crossings and high water accumulation areas that need to be better identified

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000 to $20,000
Potential Funding Sources:	Grants and local match general funds
Lead Agency/Department Responsible:	City of Lockhart
Implementation Schedule:	September 2005

2010 Analysis:
Project ongoing based on funding. Action is deferred.

City of Lockhart – Caldwell County (Past Action)-4	
Proposed Action:	Designate and/or provide one central location for the safe storage of sensitive City records that might lost due fire, tornado, hurricane, or other disaster
BACKGROUND INFORMATION	
Site and Location:	Lockhart
History of Damages:	City has a small confined area of city hall for storage of sensitive City records. This storage space is insufficient and is not adequately protected. The City also uses a portion of the old hospital for storage of records and this space is not adequately protected.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 to $60,000
Potential Funding Sources:	Grants, general funds
Lead Agency/Department Responsible:	City of Lockhart
Implementation Schedule:	September 2006

2010 Analysis:
In the process of converting to electronic record storage. This action is ongoing and will be deferred.

City of Lockhart – Caldwell County (Past Action)-5	
Proposed Action:	Develop an early weather/community hazard warning system for Lockhart residents
BACKGROUND INFORMATION	
Site and Location:	Lockhart
History of Damages:	The City did have sirens on the Fire Station and on one water tower that were used to warn residents of impending weather hazards. These no longer work and cannot for costs reasons be repaired.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Tornado
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000
Potential Funding Sources:	Will seek grants
Lead Agency/Department Responsible:	City of Lockhart
Implementation Schedule:	September 2005

2010 Analysis:
Ongoing as funding is available

City of Luling

City of Luling – Caldwell County (Past Action)-1	
Proposed Action:	Adopt routine fire hydrant maintenance
BACKGROUND INFORMATION	
Site and Location:	Luling
History of Damages:	An inspection of fire hydrants disclosed some inoperable and closed valves

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Wildfire
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	City of Luling – Water Department; City of Luling – Fire Department
Implementation Schedule:	Summer 2004 and ongoing

2010 Analysis:
Action ongoing and deferred

City of Luling – Caldwell County (Past Action)-2	
Proposed Action:	Create GIS map, and show related National Flood Insurance Program policies, claims, and losses (including repetitive losses)
BACKGROUND INFORMATION	
Site and Location:	Luling
History of Damages:	Limited information about previous flood damage incidents and reports

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	General revenues, grants
Lead Agency/Department Responsible:	Code Enforcement; Public Works
Implementation Schedule:	Spring 2004

2010 Analysis:
Ongoing project. Will be deferred

City of Luling – Caldwell County (Past Action)-3	
Proposed Action:	Update the subdivision ordinance to incorporate safety measures
BACKGROUND INFORMATION	
Site and Location:	Luling
History of Damages:	Limited information for design, construction and maintenance of subdivisions

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Code Enforcement; Building Official
Implementation Schedule:	Fall 2003

2010 Analysis:
Action deferred

City of Luling – Caldwell County (Past Action)-4	
Proposed Action:	Install burn ban signs
BACKGROUND INFORMATION	
Site and Location:	Luling
History of Damages:	Several grass fires have occurred in various neighborhoods

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Wildfire
Priority (High, Moderate, Low):	Moderate - High
Estimated Cost:	$500
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Street Department
Implementation Schedule:	2003

2010 Analysis:
Ongoing public education

City of Luling – Caldwell County (Past Action)-5	
Proposed Action:	Implement a program to routinely clear rights-of-way of tree limbs and other obstructions that impinge on the free flow of traffic
BACKGROUND INFORMATION	
Site and Location:	Luling
History of Damages:	Loss of utilities during strong winds

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Thunderstorm
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Street Department
Implementation Schedule:	2004

2010 Analysis:
Ongoing and deferred

City of Luling – Caldwell County (Past Action)-6	
Proposed Action:	Clear trees and shrubs from Salt Branch Creek
BACKGROUND INFORMATION	
Site and Location:	Luling
History of Damages:	Salt Branch Creek has become an illegal dump site. The dumped debris causes backups and obstructs runoff, restricting necessary drainage of the area.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$31,000 (approx. half completed January 2003)
Potential Funding Sources:	Grants and general revenues
Lead Agency/Department Responsible:	City of Luling Street and Brush Department
Implementation Schedule:	December 2004

2010 Analysis:
Ongoing and deferred

City of Luling – Caldwell County (Past Action)-7	
Proposed Action:	Enact an ordinance to prohibit dumping in streams and ditches
BACKGROUND INFORMATION	
Site and Location:	Luling
History of Damages:	Established drainage courses are being used by the public as dumping areas

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Street Department; Code Enforcement
Implementation Schedule:	2004

2010 Analysis:
Ongoing and deferred

City of Martindale

City of Martindale – Caldwell County (Past Action)-1	
Proposed Action:	Develop and implement a maintenance program for drains and culverts
BACKGROUND INFORMATION	
Site and Location:	Martindale
History of Damages:	Frequent flash floods from the Guadalupe River result in backups of debris, particularly in low-lying public and private areas. A plan is needed to improve the efficiency and timeliness of clearance of debris from drains and culverts

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	2004

2010 Analysis:
Ongoing and deferred

Calhoun County

		Calhoun County (Past Action)-1
	Proposed Action:	Install warning sirens throughout county for all hazards
	BACKGROUND INFORMATION	
	Site and Location:	Calhoun County
	History of Damages:	Calhoun County is on the coast and vulnerable to numerous hazards (hurricanes, floods, high winds, etc.).

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2005

2010 Analysis:
Early notification of residents needed; deferred

City of Point Comfort

City of Point Comfort – Calhoun County (Past Action)-1	
Proposed Action:	Purchase and install back-up generators for utilities and emergency services
BACKGROUND INFORMATION	
Site and Location:	Point Comfort
History of Damages:	During power outages, services are halted and treated water for drinking and firefighting are limited

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	Unknown
Potential Funding Sources:	General revenues, grants
Lead Agency/Department Responsible:	Local emergency management
Implementation Schedule:	2004

2010 Analysis:
Complete

City of Point Comfort – Calhoun County (Past Action)-2	
Proposed Action:	Upgrade and integrate warning systems throughout the county
BACKGROUND INFORMATION	
Site and Location:	Point Comfort
History of Damages:	Current systems are outdated and do not provide dependable warning in emergency situations

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	General revenues, grants
Lead Agency/Department Responsible:	Local emergency management
Implementation Schedule:	2004

2010 Analysis:
Ongoing and deferred

City of Point Comfort – Calhoun County (Past Action)-3	
Proposed Action:	Identify and assist elderly, infirm, and special needs citizens to obtain transportation to a safe area and other services during an emergency
BACKGROUND INFORMATION	
Site and Location:	Point Comfort
History of Damages:	Special needs residents are not readily identifiable. A system by which they are identified, and maintenance of that system, is needed. A plan also is needed to ensure their safety during an emergency.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	Unknown
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Local emergency management
Implementation Schedule:	2005

2010 Analysis:
Ongoing public education; deferred

City of Port Lavaca

City of Port Lavaca – Calhoun County (Past Action)-1	
Proposed Action:	Develop and implement a hazard awareness program
BACKGROUND INFORMATION	
Site and Location:	Port Lavaca
History of Damages:	City citizens are not consistently made aware, pre-event and through local media, of steps to take to protect themselves against potential damages of weather events and air-quality hazards

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Port Lavaca
Implementation Schedule:	2006

2010 Analysis:
Ongoing and deferred

City of Port Lavaca – Calhoun County (Past Action)-2	
Proposed Action:	Institute routine cleaning and maintenance of drainage areas
BACKGROUND INFORMATION	
Site and Location:	Port Lavaca
History of Damages:	Debris in drainage ditches and drainage areas inhibits the drainage of floodwaters, causing excessive flooding and back-ups

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$100,000
Potential Funding Sources:	Grants, general revenues
Lead Agency/Department Responsible:	City of Port Lavaca
Implementation Schedule:	2005

2010 Analysis:
Ongoing for targeted creeks and waterways and deferred

City of Port Lavaca – Calhoun County (Past Action)-3	
Proposed Action:	Install an early warning system
BACKGROUND INFORMATION	
Site and Location:	Port Lavaca
History of Damages:	The City has no effective, consistent warning system to notify residents of impending hurricanes, floods, thunderstorms, and other hazards

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	+/- $50,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City Fire Department
Implementation Schedule:	2005

2010 Analysis:
Ongoing and deferred

City of Port Lavaca – Calhoun County (Past Action)-4	
Proposed Action:	Develop plans for removal of disaster debris from public and private property
BACKGROUND INFORMATION	
Site and Location:	Port Lavaca
History of Damages:	Debris is often a result of a natural disaster. Debris can block bridges and evacuation routes, preventing the timely provision of emergency services to victims. Debris also may contain substances that are hazardous to people.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Wildfire, Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	+/- $50,000
Potential Funding Sources:	Grants, general revenues
Lead Agency/Department Responsible:	City of Port Lavaca
Implementation Schedule:	2005

2010 Analysis:
Ongoing and deferred

City of Seadrift

City of Seadrift – Calhoun County (Past Action)-1	
Proposed Action:	Develop and implement a multi-hazard public awareness program
BACKGROUND INFORMATION	
Site and Location:	Seadrift
History of Damages:	City residents have no consistent local source to which they can turn for information about warning signals of impending events, evacuation information and routes, and general information they may need to know during an emergency

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Grants, federal funds
Lead Agency/Department Responsible:	Emergency management coordinator
Implementation Schedule:	2005

2010 Analysis:
Upon installation of warning siren, public will be mailed information regarding tones and response procedures. This action is deferred for anticipated completion in late 2010.

City of Seadrift – Calhoun County (Past Action)-2	
Proposed Action:	Select and install an early warning siren system for all hazards; develop protocols for use of the system
BACKGROUND INFORMATION	
Site and Location:	Seadrift
History of Damages:	Community residents have no local source of warning for hurricanes or other disasters, information about the disaster, or instructions as to how to protect themselves

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Multiple
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Grants, federal funds
Lead Agency/Department Responsible:	Emergency management coordinator
Implementation Schedule:	2005

2010 Analysis:
This action is ongoing and will be deferred with anticipated completion in late 2010

City of Seadrift – Calhoun County (Past Action)-3	
Proposed Action:	Develop a plan for efficient removal of debris following a disaster event
BACKGROUND INFORMATION	
Site and Location:	Seadrift
History of Damages:	Downed trees and other debris following a disaster interfere with the flow of traffic, impede access by repair crews to downed power lines, reduce drainage of floodwaters, and otherwise lengthen the recovery process

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood, Wildfire
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000
Potential Funding Sources:	Grants, federal funds
Lead Agency/Department Responsible:	City of Seadrift
Implementation Schedule:	2005

2010 Analysis:
This action is ongoing and will be deferred through 2012

DeWitt County

		DeWitt County (Past Action)-1
	Proposed Action:	Redesign the main stormwater drainage outlet from the City of Cuero to the Guadalupe River
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County
	History of Damages:	The City of Cuero has installed and will continue to install larger storm sewers in sections of the city to prevent flooding. This will cause floodwaters from the city to enter the drainage ditch at a much faster rate, which could cause flooding of property near the drainage ditch.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000 to $3,000,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County Drainage District No. 1
Implementation Schedule:	Five years from date of receipt of grant funding

2010 Analysis:
Ongoing due to grant funding

		DeWitt County (Past Action)-2
	Proposed Action:	Obtain updated Flood Insurance Rate Maps for DeWitt County
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County
	History of Damages:	Based on the flooding patterns from the 1998 storm, the floodplain maps of DeWitt County need to be revised

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	TBD
Potential Funding Sources:	FEMA mapping funds
Lead Agency/Department Responsible:	Floodplain administrator, in coordination with FEMA
Implementation Schedule:	2008

2010 Analysis:
Project complete. New maps become effective 1/6/11.

		DeWitt County (Past Action)-3
	Proposed Action:	Install a public warning system (reverse 911)
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County
	History of Damages:	The county has no way to warn residents of possible danger to lives or property when warnings are received from the National Weather Service or other sources. No television or radio stations are located in DeWitt County that could provide this information to residents.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$20,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County Emergency Management
Implementation Schedule:	Two years from date of receipt of grant funds

2010 Analysis:
Ongoing due to lack of funding

		DeWitt County (Past Action)-4
	Proposed Action:	Obtain and install a generator for the EOC or alternate EOC
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County
	History of Damages:	A back-up system is needed to provide power in the event of a power outage. The EOC has a generator but if it fails, another source of power would be needed. Another source of power would also be needed if it became necessary to move the EOC to another location, perhaps in Cuero, Yorktown, or Nordheim.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$22,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County Emergency Management
Implementation Schedule:	One year from date of receipt of grant funds

2010 Analysis:
A generator was installed in the EOC when jail was built but the generator for alternate EOC has not been purchased due to lack of funding.

DeWitt County (Past Action)-5	
Proposed Action:	Install a flood gage on the Guadalupe River Bridge located on U.S. Highway 183 at Hochheim, Texas
BACKGROUND INFORMATION	
Site and Location:	DeWitt County
History of Damages:	DeWitt County and the City of Cuero have experienced several major floods – the 1998 flood being the flood of record. Floodwaters reached Cuero two days before their predicted arrival. If a gauge had been in place during that event, citizens would have been informed earlier of the arrival of floodwaters and, thus, been able to better protect their property.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	GBRA and grants
Lead Agency/Department Responsible:	DeWitt County, in coordination with GBRA and U.S. Geological Service
Implementation Schedule:	TBD

2010 Analysis:
Ongoing due to lack of funding.

City of Cuero

City of Cuero – DeWitt County (Past Action)-1	
Proposed Action:	Install a public warning system (reverse 911)
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	Cuero is at risk for flash floods from the Guadalupe River, requiring timely notification of residents if evacuation is needed

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2004

2010 Analysis:
Ongoing and deferred

City of Cuero - DeWitt County (Past Action)-2	
Proposed Action:	Evaluate all structural and non-structural alternatives to reduce flood damage.
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	As described in the Army Corps of Engineers Reports on the flooding events or 1998 and 1994, the City of Cuero has suffered substantial damage from flooding.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Very high
Estimated Cost:	TBD
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Cuero Floodplain Administrator, in cooperation with GBRA, FEMA and the Corps of Engineers
Implementation Schedule:	Two years from award of funding

2010 Analysis:
Ongoing and deferred

City of Cuero – DeWitt County (Past Action)-3	
Proposed Action:	Obtain funding for Early Alert System
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	The City of Cuero has experienced a large number of disaster events and needs a better way of informing the public about disaster events as they unfold.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$50,000 siren system and $20,000 for reverse 911 system
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Cuero Emergency Manager
Implementation Schedule:	Two years after award of funds

2010 Analysis:
Ongoing and deferred

City of Cuero – DeWitt County (Past Action)-4	
Proposed Action:	Obtain funding to revise/update FEMA Flood Insurance Rate Maps for the City of Cuero.
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	Existing floodplain maps for the City of Cuero do not adequately characterize the flood risks.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Very high
Estimated Cost:	TBD
Potential Funding Sources:	FEMA Mapping Funds
Lead Agency/Department Responsible:	City of Cuero Floodplain Administrator, working with FEMA officials.
Implementation Schedule:	Two years from award of funding

2010 Analysis:
Deferred

City of Cuero – DeWitt County (Past Action)-5	
Proposed Action:	Obtain funding for generators for operation of water system and waste water system in emergency situations with no power.
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	In disaster situations, generators are needed for critical facilities to ensure continued operations.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$22,000
Potential Funding Sources:	Grant funding
Lead Agency/Department Responsible:	City of Cuero
Implementation Schedule:	Two years from award of grant funds

2010 Analysis:
Ongoing and deferred

City of Cuero – DeWitt County (Past Action)-6	
Proposed Action:	Promote hail-resistant construction
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	The City of Cuero is at risk from hail events. Hail-resistant construction can help reduce damages.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Hail events
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	Funding is required for promotional materials; grant funds will be sought.
Lead Agency/Department Responsible:	City of Cuero
Implementation Schedule:	Ongoing

2010 Analysis:
Ongoing and deferred

City of Cuero – DeWitt County (Past Action)-7	
Proposed Action:	Conduct annual tree trimming to protect electrical system in order to provide essential, reliable service to the community.
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	The City of Cuero has experienced high wind events and need to ensure that the electrical system continues to operate.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	High wind events
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$30,000
Potential Funding Sources:	Electric Fund Revenues
Lead Agency/Department Responsible:	City of Cuero
Implementation Schedule:	This is an on-going activity, to be conducted on an annual basis.

2010 Analysis:
Ongoing and deferred

City of Cuero – DeWitt County (Past Action)-8	
Proposed Action:	Work with GBRA to establish flood gages at U.S. Highway 183 and Hochheim south of Gonzales.
BACKGROUND INFORMATION	
Site and Location:	Cuero
History of Damages:	As described in the Army Corps of Engineers Reports on the flooding events or 1998 and 1994, the City of Cuero has suffered from frequent flooding events causing substantial damage.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	TBD
Lead Agency/Department Responsible:	City of Cuero, in coordination with GBRA and the U.S. Army Corps of Engineers
Implementation Schedule:	TBD

2010 Analysis:
Ongoing and deferred

City of Nordheim

City of Nordheim – DeWitt County (Past Action)-1	
Proposed Action:	Obtain funding for two generators (80kw 480 volt 3 phase) for operation of water and waste water systems in emergency situations with no power.
BACKGROUND INFORMATION	
Site and Location:	Nordheim
History of Damages:	In disaster situations, generators are needed for critical facilities to ensure continued operations.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$44,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Nordheim
Implementation Schedule:	Two years from award of grant funds

2010 Analysis:
Action has been completed.

City of Yoakum

City of Yoakum – DeWitt County (Past Action)-1	
Proposed Action:	Develop written mutual aid agreements with area communities
BACKGROUND INFORMATION	
Site and Location:	Yoakum
History of Damages:	The City of Yoakum presently has written mutual aid agreements with most of its surrounding communities, but not all. It will endeavor to develop written mutual aid agreements with all of its neighbors.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Multiple
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2005

2010 Analysis:
Clearer delineation of responsibilities and the legalities of mutual aid between Yoakum and communities with which it works. Action is ongoing and will be deferred

City of Yoakum – DeWitt County (Past Action)-2	
Proposed Action:	Purchase NOAA all-hazards radios for early warning and post-event information, and place them in area schools, businesses, and critical facilities
BACKGROUND INFORMATION	
Site and Location:	Yoakum
History of Damages:	The City of Yoakum presently has no "early warning" system except for fire and law enforcement vehicles driving around using their public address systems to alert the public to possible danger.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	NOAA weather radios cost approximately $50 per unit.
Estimated Cost:	TBD
Potential Funding Sources:	General funds and grants
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2008

2010 Analysis:
The ability to alert the public via radio to an impending weather or other serious hazard.Action is ongoing and will be deferred

City of Yorktown

City of Yorktown – DeWitt County (Past Action)-1	
Proposed Action:	Develop mutual aid agreements with surrounding communities, enabling cooperation in times of disaster
BACKGROUND INFORMATION	
Site and Location:	Yorktown
History of Damages:	A plan is needed to support smaller communities in DeWitt County and coordinate their participation in necessary emergency response when severe weather strikes

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Severe thunderstorms and hurricanes
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$15,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Public officials
Implementation Schedule:	2005

2010 Analysis:
Ongoing and deferred

Gonzales County

		Gonzales County (Past Action)-1
	Proposed Action:	Establish a voluntary, basin-wide or regional program of cooperation among local governments in Gonzales County to share common concerns and resolve common problems regarding flooding and other hazards
	BACKGROUND INFORMATION	
	Site and Location:	Gonzales County
	History of Damages:	Disasters that affect multiple areas of the county can better be managed by a structured response involving all impacted areas. In particular, the Guadalupe River floods the entire county from time to time, causing considerable damage in multiple communities.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Sheriff's office
Implementation Schedule:	2004

2010 Analysis:
Action is ongoing and will be deferred

City of Gonzales

City of Gonzales – Gonzales County (Past Action)-1	
Proposed Action:	Conduct a campaign to publicize the availability and location of shelters
BACKGROUND INFORMATION	
Site and Location:	Gonzales
History of Damages:	The city has designated shelters in churches and homes, but the public may not know where to go in an emergency.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal – with existing budgets
Potential Funding Sources:	Within existing budgets
Lead Agency/Department Responsible:	Fire department, EMS, law enforcement, organizations that can provide shelter
Implementation Schedule:	2004

2010 Analysis:
Ongoing public awareness and deferred

City of Gonzales – Gonzales County (Past Action)-2	
Proposed Action:	Upgrade emergency management radio coverage, frequencies, and communication uses
BACKGROUND INFORMATION	
Site and Location:	Gonzales
History of Damages:	Emergency response personnel in Gonzales can benefit from better communication in emergency situations. For example, flash floods are a high risk and there is often little warning time to enable responders to make important decisions. Better communication and better training in the use of emergency management radio is indicated.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Public works
Implementation Schedule:	2004

2010 Analysis:
Deferred due to funding

City of Nixon

City of Nixon – Gonzales County (Past Action)-1	
Proposed Action:	Undertake a review of the local floodplain management ordinance.
BACKGROUND INFORMATION	
Site and Location:	Nixon
History of Damages:	Structures built in the floodplain are subject to damage by rising waters. In addition to increasing the number of properties at risk, development in the floodplain reduces the storage capacity of these areas, resulting in greater flood heights. With this action, consideration will be given to possible improvements in the City of Nixon's local floodplain ordinance.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Floodplain administrator
Implementation Schedule:	September 2005

2010 Analysis:
Ongoing and deferred

City of Nixon – Gonzales County (Past Action)-2	
Proposed Action:	Conduct community awareness programs to inform the public about the hazards they face and actions they can take to prevent or reduce the loss of life and property.
BACKGROUND INFORMATION	
Site and Location:	Nixon
History of Damages:	-

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Mayor
Implementation Schedule:	Ongoing, starting in 2003 and ending in 2008

2010 Analysis:
Ongoing public awareness and deferred

City of Waelder

City of Waelder – Gonzales County (Past Action)-1	
Proposed Action:	Undertake a review of the local floodplain management ordinance.
BACKGROUND INFORMATION	
Site and Location:	Waelder
History of Damages:	Structures built in the floodplain are subject to damage by rising waters. In addition to increasing the number of properties at risk, development in the floodplain reduces the storage capacity of these areas, resulting in greater flood heights. With this action, consideration will be given to possible improvements in the City of Waelder's local floodplain ordinance.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Floodplain administrator
Implementation Schedule:	September 2005

2010 Analysis:
Action completed.

City of Waelder – Gonzales County (Past Action)-2	
Proposed Action:	Conduct community awareness programs to inform the public about the hazards they face and actions they can take to prevent or reduce the loss of life and property.
BACKGROUND INFORMATION	
Site and Location:	Waelder
History of Damages:	-

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Mayor
Implementation Schedule:	Ongoing, starting in 2003 and ending in 2008

2010 Analysis:
This action is ongoing and will be deferred

City of Cibolo (Guadalupe County)

The City of Cibolo is participating in the Plan Update as a new jurisdiction and therefore there are no previous actions to include.

Kendall County

		Kendall County (Past Action)-1
	Proposed Action:	Develop action plans and provide training involving hazardous materials spills including area evaluation.
	BACKGROUND INFORMATION	
	Site and Location:	Kendall County
	History of Damages:	Significant quantities of hazardous materials are transported by roads, rail and air. At any moment and at any place a spill could occur with disastrous result. An action plan and trained personnel must be in place to promptly respond at a moment's notice.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Hazardous materials spills
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	General Revenues, Fire Department allocations
Lead Agency/Department Responsible:	Emergency Management Office/Fire Department
Implementation Schedule:	2004 and ongoing

2010 Analysis:
Kendall County/Boerne has a Hazardous Materials action plan as part to the Emergency Management plan. This was revised and updated April 2006. All emergency responders continue to train in the response involving hazardous materials. We have also established evacuations routes for citizens around areas of concern were hazardous materials exist .Ongoing action and deferred.

Kendall County (Past Action)-2	
Proposed Action:	Seek FEMA grants to recover from and mitigate flood damage resulting from floods.
BACKGROUND INFORMATION	
Site and Location:	Kendall County
History of Damages:	The Texas Hill Country is subject to sudden high intensity rainfall events. These events, combined with the steep topography within the water sheds, leads to significant and damaging floods. Grant assistance is necessary to restore infrastructure and provide mitigation programs such as buyouts.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Floods
Priority (High, Moderate, Low):	Very high following flooding event
Estimated Cost:	Unknown
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office/floodplain administrator
Implementation Schedule:	Following occurrence of flooding event

2010 Analysis:
Kendall County has purchased homes and land in flood plain area and moved them or completely removed than from those areas. Ongoing as flooding events occur.

Kendall County (Past Action)-3	
Proposed Action:	Provide protective gear, monitors and other special equipment required to manage the clean up and/or control of a hazardous materials spill.
BACKGROUND INFORMATION	
Site and Location:	Kendall County
History of Damages:	Significant quantities of hazardous materials are transported by roads, rail and air. At any moment and at any place a spill could occur with disastrous result. Trained personnel need specialized equipment to enter the spill area to manage and control cleanup activities safely and effectively.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Hazardous materials transportation
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office/Fire Department
Implementation Schedule:	2004 and ongoing

2010 Analysis:
Through DHS grant funds we have been able to purchase protective gear, monitors and other equipment related to clean up and control of hazardous materials incidents. We continue to funds equipment as funds become available through budget, grants and other funding sources. Ongoing action and is deferred

Kendall County (Past Action)-4	
Proposed Action:	Increase public awareness about issues involving development within a floodplain and the enforcement authority delegated to County.
BACKGROUND INFORMATION	
Site and Location:	Kendall County
History of Damages:	Due to the steep topography of the hill country it is not always apparent where a flood-prone area or mapped floodplain exists. FEMA literature needs to be distributed and development reviews should be conducted so as not to allow development within a flood plain.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Floods
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Development Management Office
Implementation Schedule:	Ongoing

2010 Analysis:
This is an ongoing action item; we continue to work with citizens, developers and others with reference to the floodplain.

Kendall County (Past Action)-5	
Proposed Action:	Identify and supply safe shelter locations to be used during emergency events.
BACKGROUND INFORMATION	
Site and Location:	Kendall County
History of Damages:	At various times there is a need to temporarily house and feed persons due to flooding, weather or some unexpected event. Plans, supplies and arrangements must be in place to immediately implement such a plan.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	General revenues, grants and donations
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	2004 and ongoing

2010 Analysis:
We have identified many local faith based building to be used as shelter locations throughout the City and County. We also participate in the States shelter plan on using large hub cities for sheltering when evacuaee are moved to this area vs. using local shelters. Action ongoing and deferred.

		Kendall County (Past Action)-6
	Proposed Action:	Provide a telephone communications system network which will alert specific residents of emergency situations in their area.
	BACKGROUND INFORMATION	
	Site and Location:	Kendall County
	History of Damages:	The high speed Emergency Notification System (Reverse 911) is a state-of-the-art telephone system that can rapidly alert residents in a targeted area of impending dangers on emergencies.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Floods
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	2004-2005

2010 Analysis:
Through DHS funding the City of Boerne purchases a Dialogic Communications Emergency Notification Device and Call Center Automation Software. Ongoing and deferred

		Kendall County (Past Action)-7
	Proposed Action:	Expand and improve County's Emergency Communications Network
	BACKGROUND INFORMATION	
	Site and Location:	Kendall County
	History of Damages:	Law Enforcement, the Fire Department, the EMS, the Road and Bridge Department and other public safety agencies are presently unable to communicate during emergencies because of incompatible radio frequencies.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	2004 and ongoing

2010 Analysis:
Through DHS funding the County is currently working on building a VHF 7 channel trunked radio system for Fire and EMS throughout the county. As additional funding becomes available we will add additional agencies and jurisdictions. Ongoing and deferred.

City of Boerne

City of Boerne – Kendall County (Past Action)-1	
Proposed Action:	Develop and implement a public outreach program promoting the availability of flood insurance in/out of SFHA
BACKGROUND INFORMATION	
Site and Location:	Boerne
History of Damages:	Boerne is subject to frequent flash flooding, during which privately owned property is often damaged

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency management coordinator
Implementation Schedule:	2004

2010 Analysis:
Very little action was taken on this item. Most of what occurred was through national media campaigns. Ongoing and deferred.

Refugio County

		Refugio County (Past Action)-1
	Proposed Action:	Complete the Refugio County and all towns' emergency plan
	BACKGROUND INFORMATION	
	Site and Location:	Refugio County
	History of Damages:	Texas Division of Emergency Management (DEM) has revised the format for emergency plans and the county is working with those responsible for various parts of the plan to update it to present standards.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$5,000
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2004

2010 Analysis:
Ongoing and deferred

		Refugio County (Past Action)-2
	Proposed Action:	Investigate the availability and cost to operate and maintain an outdoor warning siren system
	BACKGROUND INFORMATION	
	Site and Location:	Refugio County
	History of Damages:	Refugio County and all towns rely on TV, radio, and some cable to disseminate warnings to the public.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$160,000
Potential Funding Sources:	Grants, federal and/or state
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2007

2010 Analysis:
Ongoing regional action including incorporated jurisdictions within county as funding is available

City of Austwell

		Austwell – Refugio County (Past Action)-1
	Proposed Action:	Complete the Refugio County and all towns emergency plan
	BACKGROUND INFORMATION	
	Site and Location:	Austwell
	History of Damages:	Texas DEM has revised the format for emergency plans and the county is working with those responsible for various parts of the plan to update it to present standards.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$5,000
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2004

2010 Analysis:
Ongoing and deferred

Austwell – Refugio County (Past Action)-2	
Proposed Action:	Investigate the availability and cost to operate and maintain an outdoor warning siren system
BACKGROUND INFORMATION	
Site and Location:	Austwell
History of Damages:	Refugio County and all towns rely on TV, radio, and some cable to disseminate warnings to the public.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$160,000
Potential Funding Sources:	Grants, federal and/or state
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2007

2010 Analysis:
Ongoing in conjunction with county as funding available; deferred

Austwell – Refugio County (Past Action)-3	
Proposed Action:	Conduct a comprehensive drainage study that will recommend improvements described herein. A preliminary drainage study has been conducted by LNV Engineering; recommendations include design and construct drainage improvements, remove and/or replace culvert crossings, remove and/or replace driveway culvert crossings, and upgrade three (3) outfall structures into Hynes Bay.
BACKGROUND INFORMATION	
Site and Location:	Austwell
History of Damages:	The City experienced flooding in 2003, 2006 and 2007. The City of Austwell, situated along the Gulf Coast, is approximately 25 feet in elevation above Hynes Bay. While Hynes Bay does not pose a serious threat in terms of rising flood waters, any substantial rainfall within the City Limits of Austwell causes drainage problems and flooding to streets and residences. Flooding due to inadequate drainage is a city wide problem affecting all 192 residents, and affects area residents due to backflow.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,400,000
Potential Funding Sources:	FEMA and ORCA funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	June 2009

2010 Analysis:
Partially Complete; deferred

City of Bayside

Bayside – Refugio County (Past Action)-1	
Proposed Action:	Investigate the availability and cost to both operate and maintain an outdoor warning siren system
BACKGROUND INFORMATION	
Site and Location:	Bayside
History of Damages:	Refugio County and all towns rely on TV, radio, and some cable to disseminate warnings to the public.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$160,000
Potential Funding Sources:	Grants, federal and/or state
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2007

2010 Analysis:
Ongoing and deferred as funding is available

Town of Refugio

Refugio – Refugio County (Past Action)-1	
Proposed Action:	Complete the Refugio County-and-all-towns emergency plan
BACKGROUND INFORMATION	
Site and Location:	Refugio
History of Damages:	Texas DEM has revised the format for emergency plans and the county is working with those responsible for various parts of the plan to update it to present standards.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$5,000
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2004

2010 Analysis:
Deferred

Refugio – Refugio County (Past Action)-2	
Proposed Action:	Investigate the availability and cost to both operate and maintain an outdoor warning siren system
BACKGROUND INFORMATION	
Site and Location:	Refugio
History of Damages:	Refugio County and all towns rely on TV, radio, and some cable to disseminate warnings to the public.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$160,000
Potential Funding Sources:	Grants, federal and/or state
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2007

2010 Analysis:
Ongoing in conjunction with regional/county system as funding is available; deferred

Refugio – Refugio County (Past Action)-3	
Proposed Action:	Create a hazard information and evacuation center to educate residents on when/how/where to relocate in the event of a hurricane or other related disaster
BACKGROUND INFORMATION	
Site and Location:	Refugio
History of Damages:	Hurricanes are a primary hazard and sometimes occur with little warning time for residents.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Fire service
Implementation Schedule:	2005

2010 Analysis:
Ongoing public awareness; deferred

Refugio – Refugio County (Past Action)-4	
Proposed Action:	Develop and implement a debris removal plan
BACKGROUND INFORMATION	
Site and Location:	Refugio
History of Damages:	Debris is often left in roads and creeks as a result of disasters, particularly hurricanes. This makes roads inaccessible and poses a danger to residents in that (a) emergency officials may be blocked from access to injured individuals, downed power lines or other dangers; and (b) debris may contain hazardous substances that could be released into the environment.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Fire service
Implementation Schedule:	2004

2010 Analysis:
Ongoing and deferred

Town of Woodsboro

		Woodsboro – Refugio County (Past Action)-1
	Proposed Action:	Complete the Refugio County and all towns emergency plan
	BACKGROUND INFORMATION	
	Site and Location:	Woodsboro
	History of Damages:	Texas DEM has revised the format for emergency plans and the county is working with those responsible for various parts of the plan to update it to present standards.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$5,000
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2004

2010 Analysis:
Ongoing and deferred

Woodsboro – Refugio County (Past Action)-2	
Proposed Action:	Investigate the availability and cost to both operate and maintain an outdoor warning siren system
BACKGROUND INFORMATION	
Site and Location:	Woodsboro
History of Damages:	Refugio County and all towns rely on TV, radio, and some cable to disseminate warnings to the public.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$160,000
Potential Funding Sources:	Grants, federal and/or state
Lead Agency/Department Responsible:	Office of Emergency Management
Implementation Schedule:	January 1, 2007

2010 Analysis:
Ongoing as funding is available for county wide plan; deferred

Victoria County

		Victoria County (Past Action)-1
	Proposed Action:	Identify sites where stream and rain gages need to be added or upgraded and coordinate installation requests with USGS and the Guadalupe-Blanco River Authority
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	An automated stream gauge is needed between Cuero and Victoria. The gauge at Dupont, below Victoria, needs to be replaced.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Victoria County Floodplain Manager, in coordination with USGS and GBRA
Implementation Schedule:	2005

2010 Analysis:
Deferred

		Victoria County (Past Action)-2
	Proposed Action:	Re-route hazardous materials to alternate transportation routes outside the community
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Hazardous materials routinely traverse the heart of the city

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Hazmat/Pipeline incidents
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Grants and general revenue
Lead Agency/Department Responsible:	MPO
Implementation Schedule:	2005

2010 Analysis:
Deferred

		Victoria County (Past Action)-3
	Proposed Action:	Send appropriate local officials to FEMA's Emergency Management Institute for continuing education, and to other sponsored training classes.
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Newly elected officials need competent background information to be able to make wise decisions

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Multiple hazards
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$200 per person
Potential Funding Sources:	General revenues
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2005

2010 Analysis:
Deferred

City of Victoria

City of Victoria – Victoria County (Past Action)-1	
Proposed Action:	Remove trees and brush in the floodplain along the Guadalupe River that have resulted from Hurricane Claudette and other disasters
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	Properties along the Guadalupe River have extensive amount o trees destroyed as a result of Hurricane Claudette. During the nex major flood event these downed trees will cause log jams in the river and possible damage to water and wastewater plant facilities.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood, Wildfire
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$30,000,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	December 2004

2010 Analysis:
Deferred

City of Victoria – Victoria County (Past Action)-2	
Proposed Action:	Install city-wide early warning siren system for all hazards
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	The city only has EAS and "Reverse 9-1-1" to warn residents. These are not fast enough or reliable enough to warn everyone, particularly during a Haz-Mat spill.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	Very high
Estimated Cost:	$250,000
Potential Funding Sources:	City may be able to match funds (25%) if federal or some funding received.
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	January 2005 (subject to receipt of federal or state funding)

2010 Analysis:
Ongoing and deferred

City of Victoria – Victoria County (Past Action)-3	
Proposed Action:	Improve emergency management radio interoperability, coverage and reception
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	Remote control needed for switching to alternate radio tower site. Our system is UHF-800 MHz. Surrounding areas are VHF-high band. Need cross-band repeaters and switches for radio interoperability.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood, Wildfire, Hurricane, Severe Thunderstorm, Winter Storm
Priority (High, Moderate, Low):	Very high - remote switching Medium - interoperability
Estimated Cost:	$500,000 total ($250,000 - remote switching, $250,000 - interoperability)
Potential Funding Sources:	City, grants
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	September 2005

2010 Analysis:
Ongoing and deferred

City of Victoria – Victoria County (Past Action)-4	
Proposed Action:	Provide alternate power supply (i.e., generators) for water and wastewater pumping facilities.
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	Following thunderstorms, floods, and hurricanes electrical power is often unavailable for water and wastewater pumping facilities. This contributes to sanitary sewer overflows and interruption of water supply. Reductions in pressure and the inability to pump water and wastewater compromise the public health.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Multiple
Priority (High, Moderate, Low):	High
Estimated Cost:	$750,000 for water facilities $1,000,000 for wastewater facilities
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	Subject to federal and/or state funding

2010 Analysis:
Deferred

City of Victoria – Victoria County (Past Action)-5	
Proposed Action:	Clear trees and shape levee in south Victoria.
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	The federal government (WPA) constructed a levee system in the south part of town during the 1930s. The levee system has had little maintenance since. The growth of large trees threatens the stability of the levee. The levee needs to be cleared and shaped back to its original cross-section.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	All
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000 - $2,000,000
Potential Funding Sources:	Grants/annual general fund budget
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	Subject to Federal, State and local funding

2010 Analysis:
Ongoing and deferred

City of Victoria – Victoria County (Past Action)-6	
Proposed Action:	Buy out properties in floodway/floodplain in Victoria. *Subject to state, federal and local funding
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	About 500 homes are in the floodplain. After the 1998 flood, many homeowners rebuilt in the hazard areas.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	Subject to Federal, State and local funding

2010 Analysis:
Repetitive loss property buyouts during 2008 and 2009; ongoing as funding is available

City of Victoria – Victoria County (Past Action)-7	
Proposed Action:	Establish a debris management plan for post-disasters
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	Removal of debris from natural disasters needs to be a planned activity. Experience from two recent events could be analyzed and put into a plan.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Multiple
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Grants, general revenues
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	June 2004, subject to receipt of Federal, State or local funding

2010 Analysis:
Numerous post disaster and mutual aid agreements in place

City of Victoria – Victoria County (Past Action)-8	
Proposed Action:	Retrofit police, fire, and EMS facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Victoria
History of Damages:	Fire, EMS and police stations are vulnerable to high winds, which can damage communications, roofs, windows, and mechanical parts of facilities.

MITIGATION ACTION DETAILS	
Primary Hazard Addressed:	Hurricane
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	City may be able to match funds (25%) if federal or state funding received
Lead Agency/Department Responsible:	City of Victoria
Implementation Schedule:	June 1, 2005 (subject to federal or state funding)

2010 Analysis:
Ongoing as funding is available; deferred

NEW ACTIONS

GBRA Regional Actions 3
Caldwell County 26
City of Lockhart 32
City of Luling 37
City of Martindale 43
City of Nixon 46
Calhoun County 49
City of Point Comfort 56
City of Port Lavaca 60
City of Seadrift 64
DeWitt County Drainage District 75
DeWitt County 77
City of Cuero 89
City of Nordheim 95
City of Yoakum 97
City of Yorktown 109
Gonzales County 112
City of Gonzales 120
City of Nixon 124
City of Waelder 128
City of Cibolo (Guadalupe County) 132
Kendall County 151
City of Boerne 158

SECTION 21: NEW ACTIONS

Refugio County 163
City of Austwell 166
City of Bayside 169
Town of Refugio 172
Town of Woodsboro 175
Woodsboro Independent School District 178
Victoria County 182
City of Victoria 194

Each of the actions in this section were prioritized based on FEMA's STAPLE+E criteria, which includes considering the social, technical, administrative, political, legal, economic and environmental factors necessary for the implementation of each action.

As part of the STAPLE+E analysis economic considerations were weighed for each action. The planning team evaluated each action in terms of the overall costs, measuring whether the potential benefit to be gained from the action outweighed all costs associated with it. As a result of this exercise an overall priority was assigned to each mitigation action. The overall priority was denoted within each action by team members identifying actions as High (H), Moderate (M), or Low (L). An action that is ranked as "High" indicates that the action will be implemented as soon as funding is received. A "Moderate" action is one that may not be implemented right away depending on the cost and number of citizens served by the action. Actions ranked as "Low" indicate that they will not be implemented without first seeking grant funding and after "High" and "Moderate" actions have been completed. Note that these priorities are subject to change as funding becomes available to the GBRA and the jurisdictions therein.

There are at least two mitigation actions for each of the 14 hazards in the Plan Update. In developing individual mitigation actions, each jurisdiction identified, evaluated and analyzed the regional actions developed by the GBRA. National Flood Insurance Program (NFIP) mitigation actions have been developed and prioritized to ensure continual compliance. These actions are denoted with "(NFIP)" next to each corresponding action number in the beginning row of each mitigation action.

In addition to the actions included in this section all of the previous actions are included in Section 20 of the Plan Update. For each of the past actions an analysis is included after each stating whether it will be deleted, is completed or will be deferred. Any actions that are marked as "deferred" in Section 20 will carry over for the Plan Update.

GBRA Regional Actions

		GBRA - 1
	Proposed Action:	**Repair erosion downstream of hydro dams**
	BACKGROUND INFORMATION	
	Site and Location:	The plants are located just downstream of the City of New Braunfels and the last plant is just upstream of the City of Gonzales.
	History of Damages:	The Guadalupe River experiences frequent small to large flood events which create bank and riverbed erosion downstream of the six low head hydroelectric plants.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000
Potential Funding Sources:	Grants, Hydro Electric Budget, Bonds
Lead Agency/Department Responsible:	GBRA Hydro Electric Division
Implementation Schedule:	2016

		GBRA - 2
	Proposed Action:	**Harden spillways and embankments to handle extreme flood events**
	BACKGROUND INFORMATION	
	Site and Location:	The six hydroelectric dams and plants were constructed in the 1920's. Increased development upstream may increase the magnitude and frequency of flood event
	History of Damages:	Earthen embankments need to be hardened in the event of possible dam failure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000,000
Potential Funding Sources:	Grants, Bonds, Operating Budget
Lead Agency/Department Responsible:	GBRA Hydro Electric Division
Implementation Schedule:	2016

		GBRA - 3
	Proposed Action:	**Develop and implement brush management programs in key areas within the GBRA Basin**
	BACKGROUND INFORMATION	
	Site and Location:	Various streams and rivers within GBRA Basin
	History of Damages:	In Central Texas, brush such as Mesquite and Juniper have taken over the pasture land and resulted in reduced runoff to the streams and rivers of the region.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants, Bonds, Low interest loans
Lead Agency/Department Responsible:	Staff
Implementation Schedule:	2016

		GBRA - 4
	Proposed Action:	**Review and update drought contingency plans annually and provide public information regarding drought awareness**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA has developed a drought contingency plan for Canyon Lake, the only water supply reservoir within the river basin.
	History of Damages:	Drought has occurred historically and periodically

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	An effective drought contingency plan can extend water supplies of affected jurisdictions and affected structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	GBRA Operating Budget
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	2016

GBRA - 5	
Proposed Action:	**Develop new water supply projects and initiatives working with colleagues in Region L**
BACKGROUND INFORMATION	
Site and Location:	The State of Texas updates the State Water Plan every 5 years. This water planning effort divides the state into 16 regions. The Guadalupe Basin is covered by Region L.
History of Damages:	Future water supply a concern

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	GBRA's continued participation within the planning effort will help ensure the region has an adequate water supply.
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Operating Budget
Lead Agency/Department Responsible:	Engineering
Implementation Schedule:	2011

		GBRA - 6
	Proposed Action:	**Develop training program for employees on hydration and other safety protection measures pertaining to working outdoors in extreme heat**
	BACKGROUND INFORMATION	
	Site and Location:	Employees at GBRA's water, wastewater, and hydroelectric plants are required to work long hours outdoors, which exposes them to the extreme Texas heat and ultraviolet light. Reduces lost time and overtime by rotating employees.
	History of Damages:	None

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000 annually
Potential Funding Sources:	GBRA plant operations
Lead Agency/Department Responsible:	GBRA Operations Manager
Implementation Schedule:	2011

		GBRA - 7
	Proposed Action:	**Install stream gauges and citizen monitors where needed in the Basin and develop software to allow general public to view gauges and anticipated flood events**
	BACKGROUND INFORMATION	
	Site and Location:	Key streams in Basin. River flow gauges provide invaluable information to the NWS during a flood event.
	History of Damages:	Fewer gauges results in less warning time during severe storm and weather events

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Grants, Other government entities
Lead Agency/Department Responsible:	Engineering Department
Implementation Schedule:	2015

		GBRA - 8
	Proposed Action:	**Develop hydrologic forecast models for the Guadalupe Basin**
	BACKGROUND INFORMATION	
	Site and Location:	**Model entire watershed**
	History of Damages:	The headwaters of the Guadalupe Basin are located in a region known as “Flash Flood Alley”. These intense rain events are difficult to forecast. Better tools are needed.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000
Potential Funding Sources:	Grants, Each plant operation budget
Lead Agency/Department Responsible:	Engineering Dept.
Implementation Schedule:	2015

		GBRA - 9
	Proposed Action:	**Develop job description and employ new FTE Risk Assessment personnel and/or retain consultant**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA employees are at risk to exposure to hazardous chemicals.
	History of Damages:	

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Materials Release
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000 annually
Potential Funding Sources:	O&M Budget
Lead Agency/Department Responsible:	Operations Manager
Implementation Schedule:	2012

		GBRA - 10
	Proposed Action:	**Implement employee training on hazardous material release prevention and response**
	BACKGROUND INFORMATION	
	Site and Location:	Key GBRA sites housing hazardous materials
	History of Damages:	GBRA employees work with and are exposed to hazardous materials.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Materials Release
Effect on new/existing buildings:	N/A.
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000
Potential Funding Sources:	GBRA operational budgets
Lead Agency/Department Responsible:	
Implementation Schedule:	2011

		GBRA - 11
	Proposed Action:	**Develop and implement a pathogen control plan**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA developed a pathogen control plan for the Victoria operations, aimed at reducing potential exposure to infectious diseases from wastewater.
	History of Damages:	Potential for Infectious disease needs to be addressed and preparations outlined

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	GBRA plant operation budget
Lead Agency/Department Responsible:	GBRA Safety Committee
Implementation Schedule:	2011

		GBRA - 12
	Proposed Action:	**Facilitate employee training relative to infectious diseases**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA operates several wastewater treatment plants throughout the Basin
	History of Damages:	Employees that work with wastewater have the potential to be exposed to diseases caused by pathogens in untreated or treated wastewater.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	GBRA plant operations budget
Lead Agency/Department Responsible:	Operations Manager
Implementation Schedule:	2011

		GBRA - 13
	Proposed Action:	**Provide program to offer tetanus and annual flu shots to GBRA employees**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA employees that work with wastewater have the potential to be exposed to diseases caused by pathogens in wastewater.
	History of Damages:	

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	GBRA plant operation budgets
Lead Agency/Department Responsible:	GBRA Safety Committee
Implementation Schedule:	2011

		GBRA - 14
	Proposed Action:	**Acquire and install additional cameras and intrusion alarms at the hydro dams and at critical facilities in the basin**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA owns and operates 6 low head hydroelectric plants.
	History of Damages:	These 6 facilities could possibly be a target of terrorism.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	GBRA Hydroelectric Manager
Implementation Schedule:	2016

GBRA - 15		
	Proposed Action:	**Harden security at critical wells and water treatment and delivery systems in the basin**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA operates several water treatment plants. Both water treatment and delivery systems are potential targets of terrorists.
	History of Damages:	Potential targets for terrorism exist in the Basin

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Plant operation budgets
Lead Agency/Department Responsible:	Operations Manager
Implementation Schedule:	2014

		GBRA - 16
	Proposed Action:	**Update security policy accordingly and maintain GBRA's Security Committee**
	BACKGROUND INFORMATION	
	Site and Location:	GBRA has developed a security policy under the direction of a security committee made up of representatives of each GBRA division/operation.
	History of Damages:	Potential security risks exist at various GBRA sites

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000 annually
Potential Funding Sources:	GBRA operational budgets
Lead Agency/Department Responsible:	Staff
Implementation Schedule:	2010

		GBRA - 17
	Proposed Action:	**Upgrade lightening protection equipment and critical equipment at all GBRA facilities**
	BACKGROUND INFORMATION	
	Site and Location:	All GBRA facilities
	History of Damages:	Lightning from severe thunderstorms can result in major electronic damage to water and wastewater plants. A plant can be out of commission for several days.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	Grants, plant operating budgets
Lead Agency/Department Responsible:	Operations Manager
Implementation Schedule:	2015

GBRA - 18	
Proposed Action:	**Install emergency generator hook-ups at GBRA critical facilities and install quick-connect hookups at all GBRA facilities to accept a mobile generator.**
BACKGROUND INFORMATION	
Site and Location:	Water and wastewater plants can be placed out of commission by high winds or lightning strikes. GBRA has mobile emergency generator but can be difficult to install during a rain event. Need to purchase additional mobile generators
History of Damages:	Lightning strikes and other weather events pose a threat to loss of power

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Grants, plant operating budgets
Lead Agency/Department Responsible:	Operations Manager
Implementation Schedule:	2013

		GBRA - 19
	Proposed Action:	**Add back-up SCADA control room at alternate locations in the basin**
	BACKGROUND INFORMATION	
	Site and Location:	Hydroelectric room is the central point for all river flow information.
	History of Damages:	Damage may occur if no back-up equipment during tornado events

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Hydro Division
Implementation Schedule:	2015

GBRA - 20	
Proposed Action:	**Develop a delta model for the lower basin area**
BACKGROUND INFORMATION	
Site and Location:	The Guadalupe Delta has experienced change in flow patterns and wildlife habitat over the last 60 – 70 years.
History of Damages:	Lower basin area model needed to accurately assess changes in wildlife and flow patterns

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,200,000
Potential Funding Sources:	Grants, bonds, operating budget
Lead Agency/Department Responsible:	Engineering
Implementation Schedule:	2015

		GBRA - 21
	Proposed Action:	**Improve the Dam Failure (Breach) Model for Dunlap, McQueeney, TP4 and Nolte Dams in the Basin in order to strengthen dam structure so that it will pass Probable Maximum Flood (PMF)**
	BACKGROUND INFORMATION	
	Site and Location:	Four low head hydroelectric dams constructed in the 1920's within Guadalupe County
	History of Damages:	Although there have been no previous occurrences of breach, this is a needed property protection action. An improved Dam Breach Model will provide a better understanding of possible areas of inundation

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$150,000
Potential Funding Sources:	Grants, operating budget
Lead Agency/Department Responsible:	Hydro Electric Division
Implementation Schedule:	2015

GBRA - 22	
Proposed Action:	**Develop detailed Dam Failure (Breach) Model for the H4 and H5 Dams in the Basin in order to harden the dam structure so that it will pass PMF.**
BACKGROUND INFORMATION	
Site and Location:	Two low head hydroelectric dams constructed in the 1920's within Gonzales County upstream of City of Gonzales
History of Damages:	Although there have been no previous occurrences of breach, this is a needed property protection action will provide a better understanding of possible areas of inundation. The older dam structure needs to be strengthen, but a model must be developed first.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$150,000
Potential Funding Sources:	Grants, operating budget
Lead Agency/Department Responsible:	Hydro Electric Division
Implementation Schedule:	2016

		GBRA - 23
	Proposed Action:	**Improve communication with GBRA staff and County EMC's regarding Emergency Action Plan for Dam Failure and Safety**
	BACKGROUND INFORMATION	
	Site and Location:	Basin-Wide
	History of Damages:	There have been no previous occurrences, which is why this awareness action has been developed.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal
Potential Funding Sources:	Operating Budget
Lead Agency/Department Responsible:	Hydro Electric Division
Implementation Schedule:	Upon Plan approval

Caldwell County

		Caldwell County - 1
	Proposed Action:	**Develop xeriscaping/drought education program to promote water conservation. Pamphlets and other informational materials will be placed in prominent locations such as county courthouse**
	BACKGROUND INFORMATION	
	Site and Location:	Unincorporated areas of county
	History of Damages:	Area prone to drought conditions and extreme heat

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	Less water used may reduce utilities for residential and commercial structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	County EMC
Implementation Schedule:	2011

		Caldwell County-2 (NFIP)
	Proposed Action:	**Install warning signs at low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	All of Caldwell County roads subject to flooding.
	History of Damages:	Caldwell County has many county roads that are subject to flooding causing areas to be isolated. Since 1998, 5 people have lost their lives in Caldwell County because of high water in roads.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	NA
Priority (High, Moderate, Low):	High
Estimated Cost:	Approx. $20,000 per installation
Potential Funding Sources:	County Budget/FEMA grants
Lead Agency/Department Responsible:	Unit Road
Implementation Schedule:	Ongoing

		Caldwell County – 3
	Proposed Action:	**Purchase and install portable generator and quick-connect emergency generator hookups for critical facilities in the event of flooding or other weather events**
	BACKGROUND INFORMATION	
	Site and Location:	County Emergency Operations Center (EOC), And County Health office.
	History of Damages:	At present, the County EOC does not have emergency power. This generator will provide emergency power to both EOC and the county health office.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Effect on new/existing buildings:	Provide emergency power
Priority (High, Moderate, Low):	High
Estimated Cost:	$65,000.00
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	June 2011

		Caldwell County - 4
	Proposed Action:	**Develop a Community Wildfire Protection Plan (CWPP)**
	BACKGROUND INFORMATION	
	Site and Location:	All of Caldwell County.
	History of Damages:	Caldwell County is starting to experience new population growth in the rural areas. New subdivisions are being planned without regard to the possibility of wildfire occurring in or around these subdivisions. Planning is needed to educate developers and residents of the danger of wildfire.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Protection from wildfire
Priority (High, Moderate, Low):	High
Estimated Cost:	$1200.00
Potential Funding Sources:	County Budget
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	August, 2011

		Caldwell County - 5
	Proposed Action:	**Develop a vegetation management plan for those areas outside the city limits and in extra-territorial jurisdiction that may be subject to damage from wildfire**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	No current plan to address threat of wildland fire to property and residents

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	Reduce loss of structures from wildfire
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10-20,000
Potential Funding Sources:	Grants and matching revenue funds
Lead Agency/Department Responsible:	County, EMC
Implementation Schedule:	2012

		Caldwell County – 6 (NFIP)
	Proposed Action:	**Develop public awareness program to promote "Turn Around Don't Drown"**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	Public Education and Awareness. Reduce loss of lives at low-water crossings in the County

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To Be Determined
Potential Funding Sources:	Grants and matching revenue funds
Lead Agency/Department Responsible:	County, EMC
Implementation Schedule:	2012

City of Lockhart

		Lockhart - 1
	Proposed Action:	**Obtain funding for building or retrofitting existing public buildings for shelters to house residents during severe weather events or disasters; obtain use agreements, publicize their locations, purchase signage, and fund associated legal fees**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Currently no safe shelters are identified for residents in the event of severe weather or disaster

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	Local
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Lockhart - 2
	Proposed Action:	**Develop a vegetation management plan for those areas identified in the city limits and in extra-territorial jurisdiction that may be subject to damage from wildfire**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	No current plan to address threat of wildland fire to property and residents

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	Reduce potential loss of lives and property
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10-20,000
Potential Funding Sources:	Grants and matching revenue funds
Lead Agency/Department Responsible:	City of Lockhart
Implementation Schedule:	2012

		Lockhart – 3 (NFIP)
	Proposed Action:	**Implement public awareness program and purchase NOAA weather radios for critical infrastructure locations including places of work, recreation, worship, schools, regarding dangers of flooding and low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Public Awareness and Education. Early warning during periods of severe weather a sensitive nature and essential to continued operation for city and local residents.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000-1500
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Lockhart – 4 (NFIP)
	Proposed Action:	**Develop an action plan related to the compliance with the National Flood Insurance Program (NFIP) in terms of permitting, inspections and record keeping**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	There is a need to identify procedures to address compliance with the NFIP

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce potential flooding of structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$750-1,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Lockhart – 5 (NFIP)
	Proposed Action:	**Track building improvements and repairs to maintain adequate records for the purpose of inspection and permitting in compliance with the flood ordinance.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Compliance with the flood ordinance involves adequate record-keeping to maintain compliance.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$750-1,000
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	City
Implementation Schedule:	Ongoing

City of Luling

		Luling – 1 (NFIP)
	Proposed Action:	**Implement public awareness program and purchase NOAA weather radios for critical infrastructure locations including places of work, recreation, worship, schools, regarding dangers of flooding and low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Early warning during periods of severe weather is essential to continued operation for city and local residents.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000-1500
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Luling - 2
	Proposed Action:	**Develop a wildfire recovery plan for those areas outside the city limits and in extra-territorial jurisdiction that may be subject to damage from wildfire**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	No current plan to address recovery from wildland fire to property and residents

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought / Wildfire
Effect on new/existing buildings:	Reduce potential loss of structures by wildfire
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5-10,000
Potential Funding Sources:	Grants and matching revenue funds
Lead Agency/Department Responsible:	County, EMC
Implementation Schedule:	2012

		Luling – 3 (NFIP)
	Proposed Action:	**Preserve records to verify permitting in compliance with the National Flood Insurance Program (NFIP).**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	There is a need to identify procedures to address compliance with the NFIP

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce potential flooding of structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	City
Implementation Schedule:	Ongoing

		Luling - 4
	Proposed Action:	**Develop an evacuation plan for areas in extra-territorial jurisdiction subject to damage from wildfire**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	No current evacuation plan to address threat of wildland fire for residents

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought / Wildfire
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000-10,000
Potential Funding Sources:	Grants and matching revenue funds
Lead Agency/Department Responsible:	County, EMC
Implementation Schedule:	2012

		Luling - 5
	Proposed Action:	**Stabilize dam structure at Zedler Mill Dam along San Marcos River**
	BACKGROUND INFORMATION	
	Site and Location:	Zedler Mill Dam
	History of Damages:	Structural Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1.5 Mil
Potential Funding Sources:	Grants and matching revenue funds
Lead Agency/Department Responsible:	County, EMC
Implementation Schedule:	Upon Funding

		Luling - 6
	Proposed Action:	**Purchase and install hazard weather/early warning system to alert residents in event of severe weather and disaster**
	BACKGROUND INFORMATION	
	Site and Location:	At sites to be determined
	History of Damages:	City has two working sirens at Fire Station and S. Magnolia Avenue. City boundaries have expanded with numerous annexations and not all areas are covered by warning system

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Thunderstorm, Tornado, Wildfire, hail, flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Grants and matching revenue funds
Lead Agency/Department Responsible:	County, EMC
Implementation Schedule:	2012 or Upon funding

City of Martindale

		Martindale – 1
	Proposed Action:	**Design, Engineering, and installation of drainage utility infrastructure where none currently exist**
	BACKGROUND INFORMATION	
	Site and Location:	City Wide
	History of Damages:	There are several areas in town where storm water runoff creates flooding hazards as well as damage to infrastructure.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Prevent damage to both new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	Unknown
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Martindale
Implementation Schedule:	Unknown

		Martindale – 2
	Proposed Action:	**Create a drainage utility plan to minimize or reduce the impact of storm water runoff throughout the city.**
	BACKGROUND INFORMATION	
	Site and Location:	City Wide
	History of Damages:	There are several locations in the city that hold water creating hazardous driving conditions as well as damage to infrastructure, especially the roadway. The city is also conscientious of the need for planning to ensure new development does not increase the risk to existing houses.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Prevent flooding and damage to both existing and new building and structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	Unknown
Potential Funding Sources:	Grants/drainage fees
Lead Agency/Department Responsible:	City of Martindale
Implementation Schedule:	2010-2011. The City is working on a master plan in conjunction with LCRA and Texas State University with this as a component.

		Martindale - 3
	Proposed Action:	**Establish a wildfire management plan for the City of Martindale.**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	We have had several small fires along the roadways and much larger ones in parts of the county.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Prevent damage from wildfire to both existing and new buildings.
Priority (High, Moderate, Low):	High
Estimated Cost:	Unknown
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Martindale
Implementation Schedule:	Upon funding

City of Nixon

		Nixon - 1
	Proposed Action:	**Educate the public on extreme heat/drought safety and health issues by distributing flyers and information via numerous sources and public postings**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Extreme heat can pose problems for elderly and those that work outdoors

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Nixon - 2
	Proposed Action:	**Develop xeriscaping/drought education program to promote water conservation. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to drought conditions and extreme heat

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	Less water used may reduce utilities for residential and commercial structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

City of Nixon - 3	
Proposed Action:	**Contribute to establishment of a countywide GIS Computer tracking and plotting program for tracking flood information, Hazmat release incidents, Evacuation, oil and gas pipelines, and locating all Fire Hydrants in the County for the use of the 6 Volunteer Fire Departments in the County.**
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	There have been several incidents of Hazmat Releases of Ammonia transported on Union Pacific R.R. Tracks which cross the northern section of the County. This is an extreme danger to residents countywide. Approx. 85% of all Hazardous Materials coming from Houston are transported on these tracks, and along Interstate 10 and other major highways through the county.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Materials Release
Effect on new/existing buildings:	Locating and tracking disaster events may increase warning time thereby reducing damage to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office, local officials
Implementation Schedule:	2011 and as funded

Calhoun County

		Calhoun County – 1 (NFIP)
	Proposed Action:	**Promote NFIP flood insurance, public awareness, by printing and distributing brochures on the dangers of floods, storm surge and river flooding.**
	BACKGROUND INFORMATION	
	Site and Location:	Calhoun County
	History of Damages:	Our county is on the coast and has the potential of flooding from excessive rain, storm surge and river flooding.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce potential flooding to structures by increasing citizen awareness for protecting property
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Grant and local funds
Lead Agency/Department Responsible:	Emergency Mgmt.
Implementation Schedule:	2011

		Calhoun County - 2
	Proposed Action:	**Protect, enhance and restore wetland area in Port Alto area with Geo-tubes, mats or other mitigation mechanisms to reduce erosion**
	BACKGROUND INFORMATION	
	Site and Location:	Port Alto Beach Area-Precinct #3
	History of Damages:	Erosion

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Mitigate erosion of area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Commissioner Precinct #3
Implementation Schedule:	2011-2013

		Calhoun County - 3
	Proposed Action:	**Develop and implement an all hazards warning system to reach all areas of the county. System would notify residents in the event of various disasters including flooding, hurricane, and tornado.**
	BACKGROUND INFORMATION	
	Site and Location:	All areas of Calhoun County
	History of Damages:	Calhoun County is on the coast and vulnerable to numerous hazards. (hurricanes, floods, high winds, hazmat etc)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	Protect new/existing structures with more warning time
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$250,000 approx.
Potential Funding Sources:	Local, State, Grants
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	TBD

		Calhoun County - 4
	Proposed Action:	Elevate and upgrade Ocean Drive (first of phased project)
	BACKGROUND INFORMATION	
	Site and Location:	Ocean Drive is located in Precinct #1, Calhoun County.
	History of Damages:	Flooding of this road has been an ongoing concern for access and evacuations.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$168,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Precinct #1
Implementation Schedule:	Ongoing project to elevate, repair, upgrade this road.

		Calhoun County - 5
	Proposed Action:	Upgrade and elevate Ocean Drive (second phased project).
	BACKGROUND INFORMATION	
	Site and Location:	Ocean Drive is located in Precinct #1, Calhoun County.
	History of Damages:	Flooding of this road has been an ongoing concern for access and evacuations of residents and visitors.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$360,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Precinct #1
Implementation Schedule:	TBD

		Calhoun County - 6
	Proposed Action:	Upgrade public restroom and septic facilities along Magnolia Beach that suffer damage during flood and hurricane events
	BACKGROUND INFORMATION	
	Site and Location:	Project is located along Magnolia Beach in Precinct #1, Calhoun County.
	History of Damages:	Facilities have been damaged during previous severe weather and storm events

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$270,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Precinct #1
Implementation Schedule:	TBD

		Calhoun County - 7
	Proposed Action:	Stabilize Magnolia Beach Boat Ramp Jetty Construction Project
	BACKGROUND INFORMATION	
	Site and Location:	Project is located along Magnolia Beach in Precinct #1, Calhoun County.
	History of Damages:	Jetty prone to erosion and has been weakened by severe storm events, flooding and hurricanes

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$168,000
Potential Funding Sources:	Grants/Local
Lead Agency/Department Responsible:	Precinct #1
Implementation Schedule:	TBD

City of Point Comfort

		Point Comfort – 1 (NFIP)
	Proposed Action:	**Increase capacity by adding storm water and detention basins where needed to reduce flooding, standing water and poor drainage**
	BACKGROUND INFORMATION	
	Site and Location:	City
	History of Damages:	Heavy rains cause flooding in City

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	May reduce flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	As funding is received

		Point Comfort – 2 (NFIP)
	Proposed Action:	**Backup public records by creating digital copies and storing offsite in non-SFHA area in order to properly maintain building records for the purposes of regulating permitting in compliance with the NFIP.**
	BACKGROUND INFORMATION	
	Site and Location:	City hall at 102 Jones Street
	History of Damages:	Previous storms have caused the roof to leak. Potential for damage to primary storage facility at City Hall

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	As funding is received

		Point Comfort – 3
	Proposed Action:	**Implement a backup plan for scanning existing hard copy records for permits and other critical documents into digital format**
	BACKGROUND INFORMATION	
	Site and Location:	City hall at 102 Jones Street
	History of Damages:	Previous storms have caused the roof to leak. Potential for damage to primary storage facility at City Hall

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	As funding is received

		Point Comfort – 4
	Proposed Action:	**Develop incentive program to encourage installation of porous surface pavement in lieu of impervious pavement for development/renovation construction projects.**
	BACKGROUND INFORMATION	
	Site and Location:	Pease Street
	History of Damages:	Heavy rains cause Pease Street to become flooded. Standing water erodes pavement and is costly for street repairs and continuous improvement.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	As funding is received

City of Port Lavaca

		Port Lavaca - 1
	Proposed Action:	**Construct a "safe" multi-purpose building for citizens and employees of Port Lavaca to be used in the event of disaster. Building will be multi-purpose serving as Public Works facility, Emergency Operations Center, and Training Facility.**
	BACKGROUND INFORMATION	
	Site and Location:	City of Port Lavaca Public Works
	History of Damages:	In cases of emergencies the citizens of Port Lavaca do not have a safe place to go for refuge. The new building will be used to help out the citizens with a safe and secure place to seek help and shelter in case of emergencies.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Effect on new/existing buildings:	Protect lives and property
Priority (High, Moderate, Low):	High
Estimated Cost:	$750,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2012

		Port Lavaca – 2 (NFIP)
	Proposed Action:	**Develop and implement an NFIP hazard awareness program for residents including promoting flood insurance, elevating structures and improvements, removing debris and unused building materials from residential properties in SFHAs**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Citizens are not consistently made aware, pre-event and through local media, of steps to take to protect themselves against potential damages of weather events, disaster events and air-quality hazards

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Port Lavaca
Implementation Schedule:	2013

		Port Lavaca - 3
	Proposed Action:	**Implement program to remove debris and trees for Lynn Bayou drainage areas on ongoing basis**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Debris in drainage ditches and drainage areas inhibits the drainage of floodwaters, causing excessive flooding and back-ups

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings	Reduce potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Port Lavaca
Implementation Schedule:	2013

		Port Lavaca - 4
	Proposed Action:	**Install an early warning system to notify residents of impending disasters including hurricane, flooding, tornado**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	The City has no effective, consistent warning system to notify residents of impending hurricanes, floods, thunderstorms, and other hazards

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on New/Existing Buildings	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 approx
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City of Port Lavaca
Implementation Schedule:	2013

City of Seadrift

		Seadrift – 1
	Proposed Action:	**Raise/replace bay avenue bridge over heron slough above BFE and Flood Proof Supports with concrete surface and pilings and supports**
	BACKGROUND INFORMATION	
	Site and Location:	200 West Bay Avenue Seadrift, Texas
	History of Damages:	Hurricane Carla 1961: Bridge washed out and crashed into residential structure, destroying both. Bridge was replaced with almost identical construction and materials (wood)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	HIGH
Estimated Cost:	$400,000
Potential Funding Sources:	Federal/State, Grants, etc.
Lead Agency/Department Responsible:	City
Implementation Schedule:	2015

		Seadrift – 2
	Proposed Action:	**Strengthen Building Codes incorporating Texas windstorm construction amendments/supplements along with requiring manufactured home tie downs and requiring Wind Zone II & III rated manufactured housing on new installations within the city. Also tightened up on elevation certificate requirements in 100 year flood plain.**
	BACKGROUND INFORMATION	
	Site and Location:	City Wide
	History of Damages:	Hurricane Carla 1961: Widespread wind & flood damage Hurricane Claudette 2003: Wind damage

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	Reduce impact to all structures from hurricane
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	None
Lead Agency/Department Responsible:	City
Implementation Schedule:	2010: completed October 2009

		Seadrift – 3
	Proposed Action:	**Hire a building inspector capable of performing windstorm inspections and certifications. This requires an engineer, certified by the Texas Department of Insurance.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Proximity to Texas coast warrants additional personnel to enforce codes and ordinances

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000 annually
Potential Funding Sources:	Federal/State match for first 2 years
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2015

		Seadrift - 4
	Proposed Action:	**Develop drought contingency plans outlining actions to take at varying levels of drought or water supply interruptions requiring restricted water use.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	NONE

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	Federal Planning/State Planning
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2014

		Seadrift – 5
	Proposed Action:	**Implement/Create Disaster Recovery Operations Center (DROC) to assist/implement disaster recovery after a disaster in the local area. Need to allocate space in with kitchen/shower space in existing civic center, adding an emergency generator so that emergency personnel have a place to rest/sleep during disaster recovery.**
	BACKGROUND INFORMATION	
	Site and Location:	Civic Center/City Hall
	History of Damages:	Hurricane Carla 1961: Wide spread damage, no electricity or city utilities for several weeks. Hurricane Claudette 2003: Some damage, no electricity for almost a week. Hurricane Ike 2008: Sea wall damage, no electricity for about 6 hours

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	FEDERAL/STATE GRANTS
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2015

		Seadrift – 6
	Proposed Action:	**Construct concrete block structure/control room at waste water treatment plant to replace vulnerable portable bldg to assist with continuity of service operations in event of disaster.**
	BACKGROUND INFORMATION	
	Site and Location:	101 S. Orange
	History of Damages:	Hurricane Carla 1961: Structures destroyed by wind and flood, but plant itself was unharmed except by flood water intrusion.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Effect on new/existing buildings:	Ensure continuation of wastewater operations for structures citywide
Priority (High, Moderate, Low):	High
Estimated Cost:	$60,000
Potential Funding Sources:	Federal Grants
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2015

		Seadrift – 7
	Proposed Action:	**Construct new water treatment/production building with concrete block structure to weatherproof and vermin proof. Current structure is metal with severe metal rust and corrosion.**
	BACKGROUND INFORMATION	
	Site and Location:	103 East Dallas Seadrift, Texas
	History of Damages:	None – Yet

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	Ensure continuation of utility operations citywide
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Federal/grants etc.
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2016

		Seadrift - 8
	Proposed Action:	**Extend existing seawall 300 feet eastward from 3rd Street to Heron Slough**
	BACKGROUND INFORMATION	
	Site and Location:	200 Block of West Bay Avenue Seadrift, Texas
	History of Damages:	This section of seawall has gone without protection from erosion forever. Existing seawall was terminated at 3rd Street. Hurricane Carla 1961: Area washed out and contributed to the destruction of the bridge that destroyed a residential structure.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Increase protection of structures affected by surge and flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000
Potential Funding Sources:	Federal/grants
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2016

		Seadrift - 9
	Proposed Action:	**Extend existing seawall approximately 900 feet westward from approximately 12th Street, incorporating drainage that flows down 14th Street to the bay and incorporating and preserving shoreline and wetland areas.**
	BACKGROUND INFORMATION	
	Site and Location:	Between 12th and 15th Streets Seadrift, Texas
	History of Damages:	Hurricane Carla 1961: Area eroded severely causing upland flooding and existing seawall ended at around 12th Street.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	Reduce eroded streets, flooding to area streets, structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,000,000
Potential Funding Sources:	Federal/grants
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2020

		Seadrift – 10 (NFIP)
	Proposed Action:	**Improve and upgrade drainage of the Bayside Subdivision area constructed about 1952 down Saint Louis Avenue eastward to 9th Street drainage route. Distance of 4 blocks from 13th to 9th.**
	BACKGROUND INFORMATION	
	Site and Location:	Between 9th and 13th Streets along West Saint Louis Seadrift, Texas
	History of Damages:	This area suffered severe flooding following Hurricane Beulah due to poor drainage that had deteriorated since construction in 1952 using surface drainage. More recently during heavy rains in 2006 and most recently during Hurricane Alex and Hermine in 2010.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Each flood brings structures closer to flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$750,000
Potential Funding Sources:	Federal/grants
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2015

Seadrift – 11 (NFIP)	
Proposed Action:	**Improve drainage and acquire property along Railroad Street down and parallel to old Railroad Right of Way southward all the way to this drainage's outlet at the bay near the harbor. Property acquisition would include drainage easements to allow maintenance and upkeep and to restrict construction in this area.**
BACKGROUND INFORMATION	
Site and Location:	Beginning at East Washington Ave southward along Pine Street to the harbor passing over Bay Avenue. This was previously railroad right of way and the rail company maintained the drainage until the property was sold to private owners. The city has acquired drainage easement down to Washington Avenue, but due to private interests have not been able to acquire or negotiate the drainage right of way
History of Damages:	This is in line with the harbor and any hurricane drives water through this path. The overgrown nature of these two blocks of drainage severely restricts water flow and is now causing upland flooding along Railroad Avenue southward, with the bottleneck south of Washington Avenue to the Bay.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	If development is allowed to continue without drainage easements, flooding will result.
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	Federal/grants
Lead Agency/Department Responsible:	CITY
Implementation Schedule:	2015

DeWitt County Drainage District

		DeWitt County Drainage District – 1
	Proposed Action:	**Construct and install a basket drop structure and reconstruct drainage channels to control flooding and erosion throughout county and increase conveyance of floodwaters**
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County locations
	History of Damages:	The county is a "C" repetitive loss county with 17 losses since September 2003. During major flood events or storms flooding is severe. Major flood events occurred in 1981, 1994, and 1998. Additional flood events occurred in 2002, 2004. The drainage district is in proximity to the Gulf Coast, and flood events are frequent in conjunction with hurricanes and formation of associated storm systems.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1-$3 Million
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County drainage district
Implementation Schedule:	2 years from receipt of funds

DeWitt County Drainage District - 2	
Proposed Action:	**Install a public warning reverse 911 system to increase citizen response to disasters**
BACKGROUND INFORMATION	
Site and Location:	Countywide
History of Damages:	DeWitt County experiences floods and hurricane and warning system would enable faster evacuation and warning to citizens

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County drainage district
Implementation Schedule:	2 years from receipt of funds

DeWitt County

		DeWitt County – 1
	Proposed Action:	**Construct and install a basket drop structure and reconstruct drainage channels to control flooding and erosion throughout county and increase conveyance of floodwaters**
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County locations
	History of Damages:	The county is a "C" repetitive loss county with 17 losses since September 2003. During major flood events or storms flooding is severe. Major flood events occurred in 1981, 1994, and 1998. Additional flood events occurred in 2002, 2004. The drainage district is in proximity to the Gulf Coast, and flood events are frequent in conjunction with hurricanes and formation of associated storm systems.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1-$3 Million
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County drainage district/DeWitt County
Implementation Schedule:	2 years from receipt of funds

		DeWitt County - 2
	Proposed Action:	**Install a public warning reverse 911 system to increase citizen response to disasters**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	DeWitt County experiences floods and hurricane and warning system would enable faster evacuation and warning to citizens

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County drainage district/DeWitt County
Implementation Schedule:	2 years from receipt of funds

		DeWitt County -3
	Proposed Action:	**Purchase generator for alternative Emergency Operations Center in the event floodwaters knock down power lines and electric service is suspended**
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County courthouse at 115 N. Gonzales St, Cuero, TX
	History of Damages:	Primary EOC was out of service during renovation of county jail. Alternate EOC would have been activated if necessary but there is no backup power.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000/partial funding if purchased by county
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt Co. EMC
Implementation Schedule:	1 years from receipt of grant funds

		DeWitt County -4 (NFIP)
	Proposed Action:	**Develop hydraulic modeling of rivers and creeks as technical partner in updating FEMA flood maps**
	BACKGROUND INFORMATION	
	Site and Location:	County wide
	History of Damages:	Better flood maps are needed to map major and minor flooding areas countywide

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt Co. EMC
Implementation Schedule:	2 years from receipt of grant funds

		DeWitt County - 5
	Proposed Action:	**Develop an emergency action plan in the event of area dam failure**
	BACKGROUND INFORMATION	
	Site and Location:	Two dams/flood retention structures north of Cuero off of Hwy. 183 in county
	History of Damages:	The county has experienced many major floods; dam failure would cause major flooding

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	Reduce flooding to structures if dam failed
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County
Implementation Schedule:	Two years from funding

DeWitt County – 6 (NFIP)	
Proposed Action:	**Purchase and install signs prohibiting dumping in streams, ditches, waterways, and floodplain areas. Dumping in waterways may cause overbank flooding and minor flooding of adjacent structures and residences**
BACKGROUND INFORMATION	
Site and Location:	Various locations throughout county
History of Damages:	The county has flooding problems which are exacerbated by dumping debris, garbage and building materials in waterways

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County
Implementation Schedule:	Two years from funding

		DeWitt County – 7
	Proposed Action:	**Implement program to identify sites where additional stream and flood gauges need to be added or upgraded. Coordinate installation requests with county jurisdictions as needed**
	BACKGROUND INFORMATION	
	Site and Location:	Various locations throughout county
	History of Damages:	The county has experienced many floods due to heavy local rains in low lying areas on numerous county roads and waterways. In 1998 floodwaters reached Cuero 2 days before the predicted arrival. Had gauges been in place citizens would have been warned and evacuated earlier and prepared property and livestock for flooding

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County
Implementation Schedule:	Two years from funding

DeWitt County – 8	
Proposed Action:	**Install flood gauges on Sandies Creek**
BACKGROUND INFORMATION	
Site and Location:	Sandies Creek at Westhoff Cheapside Road, Catholic Church Lane at low water crossing at Hartman Road in county
History of Damages:	The county has experienced many floods due to heavy local rains in low lying areas on numerous county roads and waterways

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flooding due to expanded warning time
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County
Implementation Schedule:	Two years from funding

		DeWitt County – 9 (NFIP)
	Proposed Action:	**Construct new road to provide additional access into single entry area to prevent residents from being trapped during a flood event and reasonably safe from flooding**
	BACKGROUND INFORMATION	
	Site and Location:	Catholic Church Lane in northern portion of the county
	History of Damages:	This area has experienced many floods and access and egress is restricted from 3-7 days until water recedes due to flooding and backup of flood waters from Guadalupe River. Road has been closed 3 times in 2010 thus far. Road erodes and has to be replaced; rail cars become obstructed with debris putting crossing in jeopardy of complete failure.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County
Implementation Schedule:	Two years from funding

		DeWitt County – 10
	Proposed Action:	**Implement program for removing debris and log jams from bridges, increasing conveyance of floodwaters**
	BACKGROUND INFORMATION	
	Site and Location:	Thomaston River Road at Guadalupe River Bridge in county
	History of Damages:	This area has had frequent major floods

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County
Implementation Schedule:	Two years from funding

		DeWitt County - 11
	Proposed Action:	**Develop erosion protection program for erosion prone areas of county**
	BACKGROUND INFORMATION	
	Site and Location:	Thomaston River Road at Guadalupe River Bridge and other sites in county
	History of Damages:	This area has had frequent major floods

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt County
Implementation Schedule:	Two years from funding

		DeWitt County - 12
	Proposed Action:	**Place guard rails on Hebron Church Road Bridge to prevent vehicles from being swept into waterway**
	BACKGROUND INFORMATION	
	Site and Location:	North of FM 682 at Hebron Community
	History of Damages:	Driving across bridge in severe weather extremely dangerous as there are no guard rails and vehicles can potentially be swept off during floods or hurricanes

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$4,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	County Commissioner, Pct. 2
Implementation Schedule:	Two years from receipt of funding

City of Cuero

		Cuero -1
	Proposed Action:	**Construct and install basket drop structure and reconstruct drainage channels to control flooding and erosion**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Major flooding has and continues to occur in and around Cuero. With community's proximity to the Gulf Coast flood events are frequent due to hurricane and formation of associated storm events.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Partial funding of $1-$3 Mil. Estimated countywide
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	DeWitt Co. Drainage District #1, local officials
Implementation Schedule:	2 years from receipt of grant funds

		Cuero -2
	Proposed Action:	**Install public warning system (reverse 911)**
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt Co. EOC
	History of Damages:	Countywide system to include Cuero would benefit warning time for residents in event of flooding and hurricanes.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt Co. EMC
Implementation Schedule:	2 years from receipt of grant funds

		Cuero -3
	Proposed Action:	**Install public warning system (reverse 911)**
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt Co. EOC
	History of Damages:	Countywide system to include Cuero would benefit warning time for residents in event of flooding and hurricanes.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt Co. EMC
Implementation Schedule:	2 years from receipt of grant funds

		Cuero -4
	Proposed Action:	**Purchase generator for alternative Emergency Operations Center in the event tree limbs and other debris knock down power lines during winter storm events**
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt County courthouse at 115 N. Gonzales St, Cuero, TX
	History of Damages:	Primary EOC was out of service during renovation of county jail. Alternate EOC would have been activated if necessary but there is no backup power.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Winter Storm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000/partial funding if purchased by county
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt Co. EMC
Implementation Schedule:	1 years from receipt of grant funds

		Cuero -5 (NFIP)
	Proposed Action:	**Develop hydraulic modeling of rivers and creeks as technical partner in updating FEMA flood maps**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Better flood maps are needed to map major and minor flooding areas in Yorktown, Cuero, and countywide

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt Co. EMC
Implementation Schedule:	2 years from receipt of grant funds

		Cuero -6 (NFIP)
	Proposed Action:	**Improve drainage under S. Esplanade from 1-200 Blk. W. Hamilton across S. Esplanade. Run a drain south to drainage ditch, widen ditch and bridge culvert at Stockdale St. to allow for larger ditch.**
	BACKGROUND INFORMATION	
	Site and Location:	1. W. Hamilton under S. Esplanade (183) 2. E. Hamilton to S. Gonzales St. 3. S. Gonzales or enlarge present bridge 4. S. on Gonzales to drainage ditch 5. Drainage ditch to Stockdale 6. Enlarge culvert bridge @S. Stockdale
	History of Damages:	Each time the Guadalupe River overflows it backs up this small drainage ditch under the highway and floods into the housing area on west side of S. Esplanade. As it reaches Cuero the drainage ditch rises and flooding occurs.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flooding of area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	City of Cuero
Implementation Schedule:	Upon receipt of grant funds

City of Nordheim

		Nordheim - 1
	Proposed Action:	**Develop xeriscaping/drought education program to promote water conservation. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to drought conditions and extreme heat

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	Less water used may reduce utilities for residential and commercial structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Nordheim - 2
	Proposed Action:	**Educate the public on extreme heat/drought safety and health issues**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Extreme heat can pose problems for the elderly and those that work outdoors

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

City of Yoakum

		Yoakum – 1 (NFIP)
	Proposed Action:	**Develop detailed engineering study to support mitigation project to reduce urban flooding along Kennedy flood control channel.**
	BACKGROUND INFORMATION	
	Site and Location:	Kennedy Street drainage structure from Waco St. to the City limits.
	History of Damages:	Infrastructure damage and damage to private property during periods of heavy rainfall.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000.00
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum – 2
	Proposed Action:	**Develop engineering study to support mitigation project to reduce urban flooding along Koether St. #2 in the High School area**
	BACKGROUND INFORMATION	
	Site and Location:	Koether St. #2 from Goldman St. to Brushy Creek.
	History of Damages:	Infrastructure damage and damage to private property during periods of heavy rainfall.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000.00
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum - 3
	Proposed Action:	**Develop detailed engineering study to support mitigation project to address urban flooding for Brushy Creek drainage from Hwy 77a to the wastewater plant.**
	BACKGROUND INFORMATION	
	Site and Location:	Brushy Creek natural drainage from the crossing @ Hwy 77a along the City limits to the transfer station and wastewater plant.
	History of Damages:	Property Protection. Infrastructure damage and damage to private property during periods of heavy rainfall and flooding.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$60,000.00
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum - 4
	Proposed Action:	**Develop detailed engineering study to support mitigation project to reduce urban flooding for Supple Creek drainage.**
	BACKGROUND INFORMATION	
	Site and Location:	**Supple Creek drainage along North/South St. to N. Park Rd (City Limits).**
	History of Damages:	Property Protection. Infrastructure damage and damage to private property during periods of heavy rainfall.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000.00
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum - 5
	Proposed Action:	**Develop detailed engineering study to support mitigation project to reduce urban flooding for Lavaca St., Baxter, Trimmel area.**
	BACKGROUND INFORMATION	
	Site and Location:	**In the Lavaca St., Baxter, Trimmel, area**
	History of Damages:	Property Protection of infrastructure damage and structural damage during periods of heavy rainfall and flooding

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000.00
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum – 6 (NFIP)
	Proposed Action:	**Install storm water drainage system on Front St.**
	BACKGROUND INFORMATION	
	Site and Location:	**Front St. from W. Gonzales to Hopkins.**
	History of Damages:	Structural Protection. Infrastructure damage and damage to private property during periods of heavy rainfall and flooding

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flooding to structures along Front St.
Priority (High, Moderate, Low):	High
Estimated Cost:	$700,000.00
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2012

		Yoakum – 7 (NFIP)
	Proposed Action:	**Implement stormwater project to reduce urban flooding along Kennedy flood control channel based on results of detailed engineering study**
	BACKGROUND INFORMATION	
	Site and Location:	Kennedy Street drainage structure from Waco St. to the City limits.
	History of Damages:	Infrastructure damage and damage to private property during periods of heavy rainfall.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum – 8
	Proposed Action:	**Implement drainage project to reduce urban flooding along Koether St. #2 in the High School area based on results of detailed engineering study**
	BACKGROUND INFORMATION	
	Site and Location:	Koether St. #2 from Goldman St. to Brushy Creek.
	History of Damages:	Infrastructure damage and damage to private property during periods of heavy rainfall.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum - 9
	Proposed Action:	**Implement stream channelization for Brushy Creek drainage from Hwy 77a to the wastewater plant based on results of detailed engineering study**
	BACKGROUND INFORMATION	
	Site and Location:	Brushy Creek natural drainage from the crossing @ Hwy 77a along the City limits to the transfer station and wastewater plant.
	History of Damages:	Infrastructure damage and damage to private property during periods of heavy rainfall and flooding.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum - 10
	Proposed Action:	**Clear ditches as a flood reduction project to reduce urban flooding for Supple Creek drainage based on results of detailed engineering study**
	BACKGROUND INFORMATION	
	Site and Location:	**Supple Creek drainage along North/South St. to N. Park Rd (City Limits).**
	History of Damages:	Infrastructure damage and damage to private property during periods of heavy rainfall.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum - 11
	Proposed Action:	**Implement clearing and channelization project based on study to reduce urban flooding for Lavaca St., Baxter, Trimmel, area based on results of detailed engineering study.**
	BACKGROUND INFORMATION	
	Site and Location:	**In the Lavaca St., Baxter, Trimmel area**
	History of Damages:	Property protection to prevent structural damage during periods of heavy rainfall and flooding

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flood water damage to area structures
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	FEMA pre-disaster mitigation grants.
Lead Agency/Department Responsible:	City Director of Public Works
Implementation Schedule:	2013

		Yoakum – 12 (NFIP)
	Proposed Action:	**Implement public awareness program and purchase NOAA weather radios for critical infrastructure locations including places of work, recreation, worship, schools, regarding dangers of flooding and low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Early warning during periods of severe weather is essential to continued operation for city and local residents.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000-1500
Potential Funding Sources:	General Revenue/Grants where available
Lead Agency/Department Responsible:	City
Implementation Schedule:	2012-2013

City of Yorktown

		Yorktown – 1
	Proposed Action:	**Procure funds to implement removal of large trees along Coleta Creek that currently cause backup of flood and storm water runoff and cause severe upstream flooding**
	BACKGROUND INFORMATION	
	Site and Location:	City of Yorktown, south of Yorktown on 1st Street, Coleto Creek to FM 884.
	History of Damages:	Area has experienced many flood events. During 1998 stormwater runoff due to blocked channels of Coleto Creek caused severe damage to homes and businesses including sewer treatment plan.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flooding of structures from runoff
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grant funds
Lead Agency/Department Responsible:	DeWitt County, City
Implementation Schedule:	Two years from receipt of funds.

		Yorktown - 2
	Proposed Action:	**Install public warning system (reverse 911)**
	BACKGROUND INFORMATION	
	Site and Location:	DeWitt Co. EOC
	History of Damages:	Countywide system to include Yorktown would benefit warning time for residents in event of flooding and hurricanes.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt County EMC
Implementation Schedule:	2 yrs. From receipt of grant funds

		Yorktown – 3 (NFIP)
	Proposed Action:	**Develop hydraulic modeling of rivers and creeks as technical partner in updating FEMA flood maps**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide floodprone areas
	History of Damages:	Better flood maps are needed to map major and minor flooding areas in Yorktown, Cuero, and countywide

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	DeWitt County EMC
Implementation Schedule:	2 yrs. From receipt of grant funds

Gonzales County

		Gonzales County – 1 (NFIP)
	Proposed Action:	**Implement program to cross train building inspector in NFIP Program and floodplain management requirements**
	BACKGROUND INFORMATION	
	Site and Location:	Gonzales County
	History of Damages:	Severe flooding warrants multiple County personnel trained and experienced in County regulations and NFIP Program requirements.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Prevent building in Flood Plain areas and/or minimize risk by building in compliance
Priority (High, Moderate, Low):	HIGH
Estimated Cost:	$3.500.
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Gonzales County
Implementation Schedule:	ASAP

		Gonzales County - 2
	Proposed Action:	**Purchase Portable Generators for Shelters and Key Government facilities in case of Power Outage due to falling trees and large limbs. These would be trailer mounted and therefore could be used where needed the most.**
	BACKGROUND INFORMATION	
	Site and Location:	Shelters in Gonzales County and County Court House. These would furnish necessary power in case of an emergency.
	History of Damages:	Power failure during storms and after Hurricanes due to lots of lines down. There is no emergency power available in the County with the exception of the County Jail and Hospital.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	Furnish Power for lights and necessary accessories.
Priority (High, Moderate, Low):	HIGH
Estimated Cost:	$150,000.
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Gonzales County Emergency Management
Implementation Schedule:	ASAP

		Gonzales County - 3
	Proposed Action:	**Establish a County Wide monitoring system for flooding on local streams and rivers. Install stream monitors at strategic points in and around the County to monitor any rises in stream activity. Also Rain Gauges strategically located to monitor rain fall with a central point to collect this info.**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	Stream activities in the past have flooded large sections of the county. Also there has been wide spread flooding caused by river flooding. The Guadalupe river has flooded most of the county in the past.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Gonzales County Emergency Management
Implementation Schedule:	ASAP Threat is there every day

		Gonzales County - 4
	Proposed Action:	**Purchase Portable Generators for Shelters and Key Government facilities in case of Power Outage due to falling trees and large limbs. These would be trailer mounted and therefore could be used where needed the most.**
	BACKGROUND INFORMATION	
	Site and Location:	Shelters in Gonzales County and County Court House. These would furnish necessary power in case of an emergency.
	History of Damages:	Power failure during storms and after Hurricanes due to lots of lines down. There is no emergency power available in the County with the exception of the County Jail and Hospital.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	Furnish Power for lights and necessary accessories.
Priority (High, Moderate, Low):	HIGH
Estimated Cost:	$150,000.
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Gonzales County Emergency Management
Implementation Schedule:	ASAP

		Gonzales County - 5
	Proposed Action:	**Purchase Cascade Air Trailer for Fire and Hazardous Materials Release events. Include Air Compressor and dual fill station.**
	BACKGROUND INFORMATION	
	Site and Location:	Equipment will serve Gonzales County, incorporated communities and unincorporated areas, 6 county Volunteer Fire Depts.
	History of Damages:	Currently there is lack of capability to refill air packs in the event of structural fires, train derailment, and hazardous material release. Gonzales County has multiple railroads and major highways including Interstate 10 and Hwy. 183 that pose potential daily threats from these hazards.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Materials Release
Effect on new/existing buildings:	Mitigate fire damage to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$55,000-$80,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Gonzales County, Fire Fighter Association
Implementation Schedule:	Upon funding

		Gonzales County - 6
	Proposed Action:	**Install Quick Connects for Emergency Power on Key facilities in Gonzales County in the event of wildfire and utility failure**
	BACKGROUND INFORMATION	
	Site and Location:	First Baptist Church, First Methodist Church, Gonzales County Court House, Waelder Community Center (Shelter), Nixon Fire Station and 2 other shelters.
	History of Damages:	Loss of Power during Sheltering of Hurricane Victims and also during other sheltering activities such as flooding and wildfires.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$35,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Gonzales County Emergency Management
Implementation Schedule:	As soon as possible

		Gonzales County – 7 (NFIP)
	Proposed Action:	**Install stream monitors at strategic points in and around the County to monitor any rises in stream activity and install rain gauges to monitor rainfall with a central point in order collect more accurate information and issue timely warnings to residents.**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	Stream activities in the past have flooded large sections of the county. Also there has been wide spread flooding caused by river flooding. The Guadalupe river has flooded most of the county in the past.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Gonzales County Emergency Management
Implementation Schedule:	Upon funding

		Gonzales County - 8
	Proposed Action:	**Establish a GIS Computer tracking and plotting program for the County as a whole for tracking flood information, Hazmat release incidents, Evacuation, Tracking pipelines, Locating all Fire Hydrants in the County for the use of the 6 Volunteer Fire Departments and the vulnerable site in the County.**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	There have been several incidents of Hazmat Releases of Ammonia transported on Union Pacific R.R. Tracks which cross the northern section of the County. This is an extreme danger to residents countywide. Approx. 85% of all Hazardous Materials coming from Houston are transported on these tracks, and along Interstate 10 and other major highways through the county.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Protect structures in the event of disaster
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office
Implementation Schedule:	2011 and as funded

City of Gonzales

		City of Gonzales-1
	Proposed Action:	**Design and build an evacuation center for governmental entities and first responders to use in the event of area disasters.**
	BACKGROUND INFORMATION	
	Site and Location:	Inside city limits of Gonzales on future site to be designated.
	History of Damages:	Local flooding, local and County wide and hail, regional hurricanes have caused damages exceeding millions of dollars.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$15-20,000,000
Potential Funding Sources:	Local, State, and Federal
Lead Agency/Department Responsible:	City of Gonzales/FEMA
Implementation Schedule:	36 months from securing funding.

City of Gonzales - 2	
Proposed Action:	**Contribute to establishment of a countywide GIS Computer tracking and plotting program for tracking flood information, Hazmat release incidents, Evacuation, oil and gas pipelines, and locating all Fire Hydrants in the County for the use of the 6 Volunteer Fire Departments in the County.**
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	There have been several incidents of Hazmat Releases of Ammonia transported on Union Pacific R.R. Tracks which cross the northern section of the County. This is an extreme danger to residents countywide. Approx. 85% of all Hazardous Materials coming from Houston are transported on these tracks, and along Interstate 10 and other major highways through the county.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood / Hazardous Materials Release
Effect on new/existing buildings:	Locating and tracking disaster events may increase warning time thereby reducing damage to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Management Office, local officials
Implementation Schedule:	2011 and as funded

City of Gonzales - 3 (NFIP)	
Proposed Action:	**Install stream monitors and rain gauges at strategic points in the city to monitor any rises in stream activity in order to collect accurate information and timely warn residents in the event of a flood.**
BACKGROUND INFORMATION	
Site and Location:	Sites to be determined within City
History of Damages:	There has been wide spread flooding caused by river flooding along the Guadalupe river and tributaries.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City/County Emergency Management
Implementation Schedule:	Upon funding

City of Gonzales - 4 (NFIP)	
Proposed Action:	**Add rain gauges in strategic locations to monitor rain fall with a central point to collect this info.**
BACKGROUND INFORMATION	
Site and Location:	Sites to be determined within City
History of Damages:	Public education and awareness to contribute to flood prevention program

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	Upon funding

City of Nixon

Nixon - 1	
Proposed Action:	**Educate the public on extreme heat/drought safety and health issues**
BACKGROUND INFORMATION	
Site and Location:	City wide
History of Damages:	Extreme heat can pose problems for elderly and those that work outdoors

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Nixon - 2
	Proposed Action:	**Develop xeriscaping/drought education program to promote water conservation. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to drought conditions and extreme heat

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	Less water used may reduce utilities for residential and commercial structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

Nixon – 3 (NFIP)	
Proposed Action:	**Develop flood insurance and flood awareness education program. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
BACKGROUND INFORMATION	
Site and Location:	City wide
History of Damages:	This action would help alert citizens to the benefits of flood insurance.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2012

Nixon – 4 (NFIP)	
Proposed Action:	**Inspect and review permits for new development in compliance with the flood ordinance and NFIP.**
BACKGROUND INFORMATION	
Site and Location:	City wide
History of Damages:	The City regulated development through an inspection of permits for compliance with the NFIP.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2012

City of Waelder

		Waelder -1
	Proposed Action:	**Upgrade existing public building to serve as temporary shelter during time of natural or man-caused disaster for housing pass-through evacuees, local residents and their pets, and first responders. Supply shelter with non-perishable items including food, medical supplies, water, cots, pillows, blankets, pet carriers, pet food, and a back-up generator.**
	BACKGROUND INFORMATION	
	Site and Location:	Local public building, community center, school or church to be determined
	History of Damages:	Currently there is no existing local shelter to house residents, evacuees, first responders and/or pets.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Mgmt, Fire
Implementation Schedule:	2012

		Waelder -2
	Proposed Action:	**Contribute to establishment of a countywide GIS Computer tracking and plotting program for tracking Hazmat release incidents, Evacuation, oil and gas pipelines and locating all Fire Hydrants in the County for the use of the 6 Volunteer Fire Departments in the in and around the City**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	There have been several incidents of Hazmat Releases of Ammonia transported on Union Pacific R.R. Tracks which bisect the center of Waelder. This is an extreme danger to residents of the community. Approx. 85% of all Hazardous Materials coming from Houston are transported on these tracks, and along Interstate 10 and other major highways through the county.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hazardous Materials Release
Effect on new/existing buildings:	Mitigate loss of life and property damage
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Mgmt, Fire
Implementation Schedule:	2012 and as funded

		Waelder -3 (NFIP)
	Proposed Action:	**Track and create GIS maps for flood-prone areas including flood-prone structures, high water marks, and other flood data**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	This action would better inform emergency management to the extent of flood events.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Mitigate loss of life and property damage due to flood
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Mgmt, Floodplain Manager
Implementation Schedule:	2012 and as funded

		Waelder - 4 (NFIP)
	Proposed Action:	**Conduct community awareness programs to inform the public about hazards they face and actions they can take to prevent or reduce the loss of life and property. Action includes public notices in local paper for pre- and post-disaster information, brochures for prevention in city hall and other public offices.**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	An educated citizenry is one of the best ways to protect against disaster. This action will increase community awareness and foster adoption of appropriate hazard mitigation actions.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal
Potential Funding Sources:	General Revenue
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	2012, and ongoing

City of Cibolo (Guadalupe County)

		Cibolo - 1
	Proposed Action:	**Revise and upgrade landscape ordinance to offer flexibility for xeriscaping.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	History of Damages:	High water use due to water needs of lawns.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	Plant shade structures to protect new/existing structures from extreme heat
Priority (High, Moderate, Low):	Low
Estimated Cost:	varies
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Planning
Implementation Schedule:	2011-2012

		Cibolo - 2
	Proposed Action:	**Provide water conservation education and incentives for low-flow plumbing and toilets, efficient washers, rain harvesting.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	History of Damages:	High water use due to water needs of household appliances and watering practices.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Low
Estimated Cost:	varies
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Utilities
Implementation Schedule:	2012-2014

		Cibolo - 3
	Proposed Action:	**Initiate public awareness program and Insert flyers in residential and business water bills describing xeriscape planting resources and benefits.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	History of Damages:	High water use due to water needs of lawns.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	moderate
Estimated Cost:	varies
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Utilities
Implementation Schedule:	2011-2012

		Cibolo - 4
	Proposed Action:	**Incorporate cooling features in public areas such as water misters or fountains in parks and plazas that offer respite from the heat but also conserve water.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	History of Damages:	Area experiences drought and extreme heat periodically.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Low
Estimated Cost:	varies
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2012-2014

		Cibolo - 5
	Proposed Action:	**Educate the public on extreme heat/drought safety and health issues.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	History of Damages:	Would reduce hospital visits and possibly death due to heat stroke and heat-related illness.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	varies
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2011-2014

		Cibolo - 6
	Proposed Action:	**Increase tree planting in public right of ways to reduce urban heat levels.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	History of Damages:	Urban heating effect is due to heat absorption properties of cement and asphalt and lack of evapotranspiration due to lack of or limited vegetation.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	varies
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2011-2012

		Cibolo – 7 (NFIP)
	Proposed Action:	**Acquire ROW along Town Creek to provide conveyance for the ultimate conditions events to meet or exceed NFIP compliance regulations**
	BACKGROUND INFORMATION	
	Site and Location:	Land bordering Town Creek
	History of Damages:	Flood damage to existing building along Town Creek.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	varies
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2010-2014

		Cibolo – 8 (NFIP)
	Proposed Action:	**Construct localized drainage improvements in Cibolo Old Town to provide a minimum 10-year level of service**
	BACKGROUND INFORMATION	
	Site and Location:	Cibolo Old Town
	History of Damages:	Homes and businesses flood in a 2-year event due to poor drainage.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2010-2012

		Cibolo - 9
	Proposed Action:	**Upgrade EM radio communications to use same radio technologies so Cibolo can communicate with surrounding communities and other first responders during emergencies and severe weather events**
	BACKGROUND INFORMATION	
	Site and Location:	City of Cibolo
	History of Damages:	History of trouble communicating because of different technologies.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000-$250,000
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Fire, Police, and EMS
Implementation Schedule:	2010-2011

		Cibolo – 10 (NFIP)
	Proposed Action:	**Upgrade Road Crossing of Town Creek at Green Valley Rd to provide clear conveyance of the 1% annual event.**
	BACKGROUND INFORMATION	
	Site and Location:	Green Valley Rd and Town Creek
	History of Damages:	History of water over-topping road cutting off key transportation corridor.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Leverages local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2012-2014

		Cibolo – 11
	Proposed Action:	**Install low water crossing safety features at low water crossings, specifically at Haeckerville Rd and Schaeffer Rd.**
	BACKGROUND INFORMATION	
	Site and Location:	Low water crossings at Haeckerville Rd and Schaeffer Rd.
	History of Damages:	History of water overtopping these locations in frequent storms.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	To be Determined
Potential Funding Sources:	Leveraged local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2011-2012

		Cibolo – 12 (NFIP)
	Proposed Action:	**Create a GIS map of National Flood Insurance Program policies, claims and losses, including repetitive losses.**
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	History of Damages:	City has history of NFIP claims, particularly in certain areas prone to flooding.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Leveraged city funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2011-2012

		Cibolo – 13 (NFIP)
	Proposed Action:	**Develop a voluntary acquisition and relocation fund that can be used to purchase properties at risk in a 4% chance or higher event, and convert them to open space.**
	BACKGROUND INFORMATION	
	Site and Location:	Properties surrounding creeks and streams, especially Town Creek, that are at risk of flooding.
	History of Damages:	Mobile and single-family houses in the areas adjacent to Town Creek flood frequently.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce flooding to single-family and mobile homes in these areas by removing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$850,000
Potential Funding Sources:	Leveraged local funds, grants, impact fees
Lead Agency/Department Responsible:	Planning
Implementation Schedule:	2010-2015

		Cibolo – 14
	Proposed Action:	**Construct regional detention facility downstream of FM 1103 and upstream of FM 78 to mitigate for the 4% ultimate event.**
	BACKGROUND INFORMATION	
	Site and Location:	Town Creek between FM 1103 and FM 78
	History of Damages:	This area experiences severe flooding even in frequent storm events.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Existing buildings will experience reduced risk due to flooding.
Priority (High, Moderate, Low):	High
Estimated Cost:	$6.3 Million
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2010-2011

		Cibolo – 15
	Proposed Action:	**Implement retrofits of existing stormwater detention facilities to more effectively utilize volume in more frequent events.**
	BACKGROUND INFORMATION	
	Site and Location:	Various stormwater detention facilities constructed as part of residential drainage plans throughout the city.
	History of Damages:	While these detention facilities were designed to actuate in the 1% event, they completely fail at detaining floodwaters in more frequent events.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Will reduce flooding to new and existing buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2010-2011

		Cibolo – 16
	Proposed Action:	**Acquire easements and ROW, and construct drainage improvements to serve the Schneider Industrial Park.**
	BACKGROUND INFORMATION	
	Site and Location:	Schneider Industrial Park
	History of Damages:	Inadequate drainage causes minor problems such as standing water, erosion of streets

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2011-2013

		Cibolo – 17
	Proposed Action:	**Introduce stream flow gauges and rainfall gauges to Town Creek and creeks in the watershed.**
	BACKGROUND INFORMATION	
	Site and Location:	Town Creek and creeks in the watershed.
	History of Damages:	Information obtained from these gauges is vital to further study of the creek and its flood levels.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	To be determined
Potential Funding Sources:	Leveraged local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2011-2014

		Cibolo – 18
	Proposed Action:	**Construct regional detention facility at Tolle Rd**
	BACKGROUND INFORMATION	
	Site and Location:	Tolle Rd.
	History of Damages:	Reduce flooding potential of structures in vicinity of detention facility

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3.1 Million
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2012-2014

		Cibolo – 19
	Proposed Action:	**Improve the crossing at Weidner Rd and Town Creek Tributary No. 1 to at least a 25-year level of service.**
	BACKGROUND INFORMATION	
	Site and Location:	Weidner Rd and Town Creek Tributary No. 1.
	History of Damages:	Water overtops road in high frequency events.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Leverage local funds, grants, impact fees
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	2011-2013

Kendall County

		Kendall County - 1
	Proposed Action:	**Implement FireWise Community Program for County**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide with emphasis on subdivisions, and areas close to city limits
	History of Damages:	County has experienced an increase in large wildfires in areas that threaten homes

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Reduce losses to homes and businesses through awareness and implementation of firewise actions
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimum
Potential Funding Sources:	Grants, Budget, Tx. Forest Service, National Firewise Program
Lead Agency/Department Responsible:	Fire Dept., Fire Marshall

		Kendall County - 2
	Proposed Action:	**Purchase and place hazardous warning signs and auto barricades at low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	Low water crossings throughout county
	History of Damages:	County experiences several flash floods yearly. Citizens routinely drive into floodwaters requiring rescue. Three deaths have occurred in previous years at these areas.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	High
Potential Funding Sources:	Grants, Budget, and other Program
Lead Agency/Department Responsible:	Road and Bridge, Commissioner's court, Emergency Mgmt
Implementation Schedule:	2011 and continuing

		Kendall County - 3
	Proposed Action:	**Continue to expand and improve county's communications network to include 7 channel trunked system to facilitate communication between responders**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	Inoperable issues need to be addressed.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$800,000.00
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Emergency Mgmt/EMS/Fire/Law
Implementation Schedule:	2011 and continuing

		Kendall County – 4
	Proposed Action:	**Implement storm water drainage improvements in Comfort, TX**
	BACKGROUND INFORMATION	
	Site and Location:	Vicinity of 3rd and Main St. and surrounding area outside Comfort
	History of Damages:	Comfort Tx experiences flash floods annually and as a result of development the storm runoff backs up into the township causing flooding of streets and homes in low lying areas

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$350,000
Potential Funding Sources:	Grants, Budget
Lead Agency/Department Responsible:	Road and Bridge, county engineer
Implementation Schedule:	2011 and continuing

		Kendall County - 5
	Proposed Action:	**Upgrade existing flood warning signage and barricades with signs meeting or exceeding new reflectivity requirements of the Manual on Uniform traffic Control Devices, (2009) Sec. 2**
	BACKGROUND INFORMATION	
	Site and Location:	Multiple low water crossings throughout the county
	History of Damages:	Kendall County has several flash floods annually. Several deaths have occurred due to individuals driving into low water crossings with numerous rescues and close calls

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Grants, Budget
Lead Agency/Department Responsible:	Road and Bridge, county engineer
Implementation Schedule:	2011 and continuing

		Kendall County - 6
	Proposed Action:	**Place Advanced Warning System at low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	Multiple low water crossings throughout the county
	History of Damages:	Kendall County has several flash floods annually. Several deaths have occurred due to individuals driving into low water crossings with numerous rescues and close calls

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Grants, Budget
Lead Agency/Department Responsible:	Road and Bridge, county engineer
Implementation Schedule:	2011 and continuing

		Kendall Co - 7 (NFIP)
	Proposed Action:	**Seek FEMA grants to mitigate flood damage, pursue buyouts and restore infrastructure after severe flooding and flood damage occurs.**
	BACKGROUND INFORMATION	
	Site and Location:	Countywide
	History of Damages:	County is subject to sudden high intensity rainfall events. Grant assistance is necessary to provide mitigation programs as stated above

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce or eliminate flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	Unknown
Potential Funding Sources:	Grants,
Lead Agency/Department Responsible:	Floodplain Administrator, EMC
Implementation Schedule:	As funding and following flood events

City of Boerne

		Boerne - 1
	Proposed Action:	**Implement FireWise Community Program for the City**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide with emphasis on subdivisions
	History of Damages:	City has experienced an increase in large wildfires in areas that threaten homes

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	Reduce losses to homes and businesses through awareness and implementation of firewise actions
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimum
Potential Funding Sources:	Grants, Budget, Tx. Forest Service, National Firewise Program
Lead Agency/Department Responsible:	Fire Dept., Fire Marshall
Implementation Schedule:	2011 and continuing

		Boerne – 2 (NFIP)
	Proposed Action:	**Implement public awareness program to identify sites and place hazardous warning signs and auto barricades at low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	Low water crossings within city limits
	History of Damages:	City experiences several flash floods yearly. Citizens routinely drive into floodwaters requiring rescue. Greater awareness is needed to reduce loss of lives due to driving through low water crossings.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To Be Determined
Potential Funding Sources:	Grants, Budget, and other Program
Lead Agency/Department Responsible:	Road and Bridge, Emergency Mgmt
Implementation Schedule:	2011 and continuing

		Boerne - 3
	Proposed Action:	**Continue to expand and improve City's communications network to include 7 channel 6.25 kHz trunked system to facilitate communication between responders**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Inoperable issues need to be addressed.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$400,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	EMS/Fire
Implementation Schedule:	2011 and continuing

		Boerne - 4
	Proposed Action:	**Upgrade existing flood warning signage and barricades with signs meeting or exceeding new reflectivity requirements of the Manual on Uniform traffic Control Devices, (2009) Sec. 2**
	BACKGROUND INFORMATION	
	Site and Location:	Multiple low water crossings throughout the City
	History of Damages:	Boerne has several flash floods annually. Several deaths have occurred due to individuals driving into low water crossings with numerous rescues and close calls

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Grants, Budget
Lead Agency/Department Responsible:	Road and Bridge, City engineer
Implementation Schedule:	2011 and continuing

		Boerne – 5 (NFIP)
	Proposed Action:	**Install Advanced Warning System at low water crossings**
	BACKGROUND INFORMATION	
	Site and Location:	Multiple low water crossings throughout the City
	History of Damages:	City has several flash floods annually. Several deaths have occurred due to individuals driving into low water crossings with numerous rescues and close calls

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000 per crossing
Potential Funding Sources:	Grants, Budget
Lead Agency/Department Responsible:	Road and Bridge, city engineer
Implementation Schedule:	2012 and continuing

Refugio County

		Refugio County - 1
	Proposed Action:	**Procure funds to stabilize and reshore eroding bluff in vicinity of residential area at Austwell Bluff**
	BACKGROUND INFORMATION	
	Site and Location:	Austwell Bluff
	History of Damages:	Bluff continues to erode with each storm event including hurricane wind and rains

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	Reduce potential erosion of residential structures in vicinity
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Refugio County EMC and Pct. 4
Implementation Schedule:	As funding is available

Refugio County – 2 (NFIP)	
Proposed Action:	**Implement public awareness program for flood to include purchase of early warning alert system to include variable tone plus voice activated alert**
BACKGROUND INFORMATION	
Site and Location:	County wide to include Town of Refugio, Woodsboro, Bayside, Austwell and Tivoli
History of Damages:	Public Awareness for Severe weather and potential hazardous material release incidents. Occur with little warning to citizens countywide

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Flood, Hazardous Materials Release
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Refugio County EMC and Pct. 4
Implementation Schedule:	As funding is available

		Refugio County -3 (NFIP)
	Proposed Action:	**Increase stabilization of existing dike on Guadalupe/San Antonio River spill area on River Bottom Road, thus preventing washouts during severe weather and flooding events**
	BACKGROUND INFORMATION	
	Site and Location:	River Bottom Road
	History of Damages:	During heavy rain flooding occurs and damages existing containment dike. Flooding of fields washes out existing road for several hundred yards

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 or higher
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Refugio County EMC and Pct. 4
Implementation Schedule:	As funding is available

City of Austwell

		Austwell – 1 (NFIP)
	Proposed Action:	**Install early alert warning system to include variable tone plus voice activated alert for flooding.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Flood warning and alert system is necessary to prevent citizens from going through dangerous areas, such as low water crossings.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Refugio County EMC and Pct. 4, City of Austwell
Implementation Schedule:	As funding is available

		Austwell - 2
	Proposed Action:	**Develop xeriscaping/drought education program to promote water conservation. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to drought conditions and extreme heat

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Austwell – 3 (NFIP)
	Proposed Action:	**Develop flood awareness and education program to promote flood insurance. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to flooding

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2012

City of Bayside

		Bayside – 1 (NFIP)
	Proposed Action:	**Install early alert warning system to include variable tone plus voice activated alert for flooding.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Flood warning and alert system is necessary to prevent citizens from going through dangerous areas, such as low water crossings.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Refugio County EMC and Pct. 4, City of Bayside
Implementation Schedule:	As funding is available

		Bayside - 2
	Proposed Action:	**Develop xeriscaping/drought education program to promote water conservation. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to drought conditions and extreme heat

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Bayside – 3 (NFIP)
	Proposed Action:	**Develop flood education program to promote flood awareness and flood insurance. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to flooding

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

Town of Refugio

		Town of Refugio – 1 (NFIP)
	Proposed Action:	**Install early alert warning system to include variable tone plus voice activated alert for flooding.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Flood warning and alert system is necessary to prevent citizens from going through dangerous areas, such as low water crossings.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Hazardous Material Release
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Refugio County EMC and Pct. 4, Town of Refugio
Implementation Schedule:	As funding is available

		Town of Refugio - 2
	Proposed Action:	**Develop xeriscaping/drought education program to promote water conservation. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to drought conditions and extreme heat

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

		Town of Refugio – 3 (NFIP)
	Proposed Action:	**Develop flood awareness and education program to promote flood insurance. Pamphlets and other informational materials will be placed in prominent locations such as City Hall**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Area prone to flooding during periods of heavy rainfall

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	City
Implementation Schedule:	2011

Town of Woodsboro

		Woodsboro – 1 (NFIP)
	Proposed Action:	**Install early alert warning system to include variable tone plus voice activated alert for flooding.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Flood warning and alert system is necessary to prevent citizens from going through dangerous areas, such as low water crossings.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Refugio County EMC and Pct. 4, City of Woodsboro
Implementation Schedule:	As funding is available

		Woodsboro - 2
	Proposed Action:	**Educate the public on extreme heat/drought safety and health issues**
	BACKGROUND INFORMATION	
	Site and Location:	citywide
	History of Damages:	Severe and extreme heat can be a problem particularly for the elderly and those that work outdoors

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funding
Lead Agency/Department Responsible:	City of Austwell
Implementation Schedule:	2011

		Woodsboro – 3 (NFIP)
	Proposed Action:	**Develop education program for the public on flood awareness and flood insurance availability**
	BACKGROUND INFORMATION	
	Site and Location:	citywide
	History of Damages:	Public awareness. Reduce potential flooding and increase policy base

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local funding
Lead Agency/Department Responsible:	City of Austwell
Implementation Schedule:	2011

Woodsboro Independent School District

		WISD – 1
	Proposed Action:	**Improve drainage at Woodsboro Elementary**
	BACKGROUND INFORMATION	
	Site and Location:	Front of Woodsboro Elementary Campus on Myrtle Street
	History of Damages:	During flood events water backs up and students and faculty have difficulty accessing the building.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood / Hurricane
Effect on new/existing buildings:	Improved drainage would help the existing building by reducing water damage during flood events.
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000.00
Potential Funding Sources:	HMGP and PDM grants
Lead Agency/Department Responsible:	Woodsboro ISD with assistance from the Town of Woodsboro
Implementation Schedule:	Upon receipt of grant funding

		WISD – 2
	Proposed Action:	**Improve drainage at Jr./Sr. High School Building.**
	BACKGROUND INFORMATION	
	Site and Location:	Front of Woodsboro Jr. /Sr. High School Building.
	History of Damages:	The campus has several issues with standing water during periods of heaving rains and improved drainage is necessary to prevent continuous damage.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood / Hurricane
Effect on new/existing buildings:	Improved drainage would help the existing building by reducing water damage during flood events.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	HMGP and PDM grants
Lead Agency/Department Responsible:	Woodsboro ISD
Implementation Schedule:	Upon receipt of grant funding

		WISD – 3
	Proposed Action:	**Retrofit roof and facilities at the Woodsboro ISD Auditorium**
	BACKGROUND INFORMATION	
	Site and Location:	Woodsboro ISD Auditorium
	History of Damages:	The current auditorium is need of repair as lack of facilities and deterioration has makes it difficult for the district to conduct evacuation plans.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood / Hurricane
Effect on new/existing buildings:	Improved use during emergency events
Priority (High, Moderate, Low):	High
Estimated Cost:	$600,000
Potential Funding Sources:	Local funding and HMGP/PDM grants
Lead Agency/Department Responsible:	Woodsboro ISD
Implementation Schedule:	2011-2012

		WISD – 4
	Proposed Action:	**Strengthen campus buildings by replacing windows and installing electronic roll-down shutters**
	BACKGROUND INFORMATION	
	Site and Location:	Woodsboro Jr./Sr. High School Building
	History of Damages:	Windows are always broken and replaced during storms. The building should be retrofitted by strengthening windows and installing electronic roll-down shutters.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm
Effect on new/existing buildings:	This action would prevent a continuous cycle of damage to windows during storm events.
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	Local funding and HMGP/ PDM grants
Lead Agency/Department Responsible:	Woodsboro ISD
Implementation Schedule:	2011-2012

Victoria County

		Victoria County – 1
	Proposed Action:	**Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas to include security cameras or some form of surveillance. Public awareness campaign on illegal dumping and violations incurred for such activity.**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Consistent violations occurring throughout the County, affecting the water ways, water shed, and flood plain regions.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	20,000 – 30,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1 – 2 year

		Victoria County - 2
	Proposed Action:	**Implement annual outreach program for County residents regarding development activities in Floodplain in accordance with the Victoria County Floodplain Ordinance.**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Consistent violations throughout Victoria County. Citizen's have become complaisant to the proper development and the permitting process

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce potential flooding of structures elevated above BFE and built in accordance with local floodplain ordinance
Priority (High, Moderate, Low):	High
Estimated Cost:	2000 - 5000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria County Floodplain Administration
Implementation Schedule:	6 months – 1 year

		Victoria County - 3
	Proposed Action:	**Implement Stormwater Runoff Outreach Campaign to reduce non-point source pollution to include how runoff affects ground water quality**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Consistent violations throughout Victoria County of non-point source pollution in storm water.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	2000 - 5000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria County Floodplain Administration
Implementation Schedule:	1 – 5 years

		Victoria County - 4
	Proposed Action:	**Install or upgrade drop structures, concrete spillways, culverts, culvert pipes, wingback walls, tieback walls and bridges at various county roads and bridges**
	BACKGROUND INFORMATION	
	Site and Location:	Hollybrook Rd, Tipton Rd, Hamilton Rd, Karnes Rd, Salem Rd, Oliver Rd, Parsons Rd, Nursery Dr, Kemper City East, Dove Rd, and other areas in the county.
	History of Damages:	Repetitive flood damages to structures, requiring extensive repairs from the floods of 1998, 2002, & 2007.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $100,000 (each)
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria County Road and Bridge
Implementation Schedule:	1-3 yrs

		Victoria County - 5
	Proposed Action:	**Install visible flood gauges at all county low water crossings and bridges.**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Repetitive flood damages to structures, requiring extensive repairs from the floods of 1998, 2002, & 2007.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	County
Implementation Schedule:	As funding becomes available

		Victoria County - 6
	Proposed Action:	**Elevate road height of Industrial Dr. to alleviate flooding of roadway**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Consistent flooding after rains, making the road impassible.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	$350,000-$500,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria County Road and Bridge
Implementation Schedule:	1-2 yrs

		Victoria County - 7
	Proposed Action:	**Drainage outfall rehabilitation and de-vegetation of Garciata's Creek, Quail Creek, and Spring Creek areas**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County sites as described
	History of Damages:	Repetitive flooding and back flow of water during heavy rain events.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	$1,000,000.00
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1-5 yrs

		Victoria County - 8
	Proposed Action:	Implement program to trim trees and remove vegetative debris in the right of way.
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Heavy debris in right of ways after severe weather events

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Winter Storms
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000.00
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1-2 yrs

		Victoria County - 9
	Proposed Action:	**Develop program and work with Federal, State, and Local Officials to determine storage locations and reduce fuel on public and private lands.**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Repetitive wildfires during drought and high wind seasons.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000.00
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1-2 yrs

		Victoria County - 10
	Proposed Action:	**Purchase tailgate spreaders to ensure adequate supplies of snow and ice supplies can be distributed in a effective time frame during severe winter storms**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Repetitive road and bridges closures due to inclement weather conditions such as snow and ice.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Winter Storms
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000.00
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1-2 yrs

		Victoria County - 11
	Proposed Action:	**Retrofit windows on Bridge Street County Annex**
	BACKGROUND INFORMATION	
	Site and Location:	Bridge Street County Annex EOC
	History of Damages:	Fire, EMS, EOC's and Police stations are vulnerable to high winds, which can damage communications, roof, windows and mechanical parts to facilities.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Tornado
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$58,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1-3 years from Plan adoption

		Victoria County - 12
	Proposed Action:	**Drainage project at Live Oak and Acorn Loop**
	BACKGROUND INFORMATION	
	Site and Location:	Victoria County
	History of Damages:	Repetitive flood damages to structures, requiring extensive repairs from the floods of 1998, 2002, & 2007

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$189,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1-3 Years from Plan approval

City of Victoria

		City of Victoria - 1
	Proposed Action:	**Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas to include security cameras or some form of surveillance. Public awareness campaign on illegal dumping and violations incurred for such activity.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Consistent violations occurring throughout the City, affecting the water ways, water shed, and flood plain regions.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	20,000 – 30,000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	City
Implementation Schedule:	1 – 2 year

City of Victoria – 2 (NFIP)	
Proposed Action:	**Implement annual Outreach program for residents regarding development activities in Floodplain in accordance with the City's Floodplain Ordinance.**
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Consistent violations throughout Victoria. Citizen's have become complacent to the proper development and the permitting process

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduce potential flooding of structures elevated above BFE and built in accordance with local floodplain ordinance
Priority (High, Moderate, Low):	High
Estimated Cost:	2000 - 5000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria Floodplain Administration
Implementation Schedule:	6 months – 1 year

		City of Victoria - 3
	Proposed Action:	**Implement Stormwater Runoff Outreach Campaign to reduce non-point source pollution to include how runoff affects ground water quality**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Consistent violations throughout Victoria of non-point source pollution in storm water.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	2000 - 5000
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	City Floodplain Administration
Implementation Schedule:	1 – 5 years

City of Victoria - 4	
Proposed Action:	**Install, replace, repair, or rehabilitate drop structures, concrete spillways, culverts, culvert pipes, wingback walls, tieback walls and bridges at various roads and bridges**
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Repetitive flood damages to structures, requiring extensive repairs from the floods of 1998, 2002, & 2007.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $100,000 (each)
Potential Funding Sources:	Grant
Lead Agency/Department Responsible:	Victoria Road and Bridge
Implementation Schedule:	1-3 yrs

City of Victoria - 5	
Proposed Action:	**Install visible flood gauges at all low water crossings and bridges within the City**
BACKGROUND INFORMATION	
Site and Location:	Citywide
History of Damages:	Repetitive flood damages to structures, requiring extensive repairs from the floods of 1998, 2002, & 2007.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	To be determined
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	As funding becomes available

		City of Victoria - 6
	Proposed Action:	**Implement program to remove tree limbs and vegetative debris in the right of way.**
	BACKGROUND INFORMATION	
	Site and Location:	Citywide
	History of Damages:	Heavy debris in right of ways after severe weather events

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000.00
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	1-2 yrs

		City of Victoria - 7
	Proposed Action:	**Work with Federal, State, and Local Officials to determine locations to reduce fuel on public and private lands.**
	BACKGROUND INFORMATION	
	Site and Location:	City wide
	History of Damages:	Repetitive wildfires during drought and high wind seasons.

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000.00
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Victoria County
Implementation Schedule:	1-2 yrs

City of Victoria - 8	
Proposed Action:	**Purchase tailgate spreaders to ensure adequate supplies of snow and ice supplies can be distributed in a effective time frame during severe winter storms**
BACKGROUND INFORMATION	
Site and Location:	City wide
History of Damages:	Road and bridges closed due to severe weather conditions such as snow and ice

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Winter Storms
Effect on new/existing buildings:	Reduce potential for damage to structures caused by heavy snow/ice
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	City
Implementation Schedule:	1-2 yrs.

City of Victoria - 9	
Proposed Action:	**Purchase and install lightning arrestor on City Water Pumping Plant #3**
BACKGROUND INFORMATION	
Site and Location:	Pumping Station number 3 Airline St @ Ben Jordan St
History of Damages:	Structural Protection from lightning strikes

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Thunderstorm
Effect on new/existing buildings:	Reduce potential for damage to structures caused by lightning strikes
Priority (High, Moderate, Low):	High
Estimated Cost:	$111,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	City
Implementation Schedule:	1-3 years from Plan approval

PLAN MAINTENANCE

Plan Maintenance Procedures 1
Monitoring and Evaluation 1
Plan Monitoring 2
Plan Evaluation 2
Updating 2
Plan Amendments 2
Five (5) Year Review 2
Incorporation 3
Incorporation of the 2005 Plan 3
Incorporation of the Plan Update 4
Continued Public Involvement 5
Public Involvement over the Past Five Years 5
Public Involvement Going Forward 6

Plan Maintenance Procedures

The following is an explanation of how the participating jurisdictions and the GBRA will implement the updated plan, and continue to evaluate and enhance it over time. In order to ensure that the Plan remains current and relevant the following plan maintenance procedures will be addressed:

- Monitoring and Evaluating the Plan
- Updating the Plan
- Incorporating the Plan into other Planning Mechanisms
- Continued Public Involvement

Monitoring and Evaluation

Periodic revisions of the updated plan are required to ensure that the goals, objectives, and mitigation action plans are kept current. In addition, revisions may be necessary to ensure that the updated plan remains in full compliance with state and federal standards.

SECTION 22: PLAN MAINTENANCE

Plan Monitoring

Monitoring the Plan Update will be the responsibility of all of the jurisdictions, GBRA and additional planning team members. Each community has designated one person or department responsible for the development and implementation of the Plan. This team member's title is listed in Appendix A. The person that holds the title listed in Appendix A will be responsible for monitoring the plan. The plan will be monitored by each jurisdiction annually. The department responsible will review mitigation actions submitted and develop a brief report if any changes are needed, such as recommending an action for funding.

Plan Evaluation

As part of the evaluation process, team members from each jurisdiction will meet bi-annually. The first meeting will be held among those involved in the planning process for the specific jurisdiction. The second meeting will be held at the county level so that each county and the communities therein can assess any changes in risk, determine whether implementation of mitigation actions is on schedule or if there are any implementation problems (such as technical, political, legal or coordination issues), and reflect changes in land development or programs that affect mitigation priorities in their respective jurisdictions.

Updating

Plan Amendments

At any time, minor technical changes may be made to the Plan to keep it current. However, any changes by a participating jurisdiction to the mitigation actions or modifications in the overall direction of the Plan will be subject to formal adoption by the governing body of that jurisdiction. Once the amendment is approved it will be transmitted to the Texas Division of Emergency Management (TDEM).

In determining whether to recommend approval or denial of a plan amendment request, the following factors will be considered:

- Errors or omissions made in the identification of issues or needs during the preparation of the Plan;
- New issues or needs that were not adequately addressed in the Plan; and
- Changes in information, data or assumptions from those on which the Plan was based.

Five (5) Year Review

The Plan will be thoroughly reviewed by each planning team member at the end of three years from the date of adoption by the local governing body to determine whether there have been any significant changes that necessitate changes in the types of mitigation actions proposed. New development in

identified hazard areas, an increased exposure to hazards, disaster declarations, the increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the content of the updated plan.

This plan review will provide the GBRA and participating jurisdictions with an opportunity to evaluate successful actions and document potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. It is recommended that the planning team meet to review the plan at the end of three years, as grant funds may be necessary for the development of a five-year update. Due to the timelines for grant cycles, it is wise planning to begin the review process in advance of the five-year deadline.

Following the review, any revisions deemed necessary will be summarized and utilized according to the reporting procedures and plan amendment process outlined herein. Upon completion of the review and update/amendment process and after being approved by the local governing body, the revised plan will be submitted to the TDEM for final review and approval in coordination with FEMA.

Incorporation

At the beginning of the planning process, each team member was given a capability assessment survey to complete for their jurisdiction. The purpose of this survey was to identify the plans available for the incorporation of the Plan Update by inventorying each jurisdiction's relevant plans, programs and ordinances; indentifying shortfalls or weaknesses that could hinder the incorporation or implementation of mitigation actions; identifying opportunities for establishing or enhancing mitigation policies, programs or projects; and establishing goals based on an understanding of the organizational capacity and technical capability of each community.

Incorporation of the 2005 Plan

The capability survey distributed not only provided an assessment of current planning capabilities, but also served as a critical component in obtaining information on how the 2005 Plan had been incorporated into various planning mechanisms.

Some of the jurisdictions incorporated the mitigation plan into emergency planning updates or updates to Annex P. One jurisdiction, the Dewitt County Drainage District, amended to be added to the regional plan in 2007. Others, including the City of Austwell in Refugio County added mitigation actions for grant funding in response to hurricanes and flooding. On the whole the 2005 Plan was not incorporated into other community planning mechanisms, but reviewed during annual budget meetings for grant determinations. Public awareness activities were also maintained; however the mitigation plan itself was not referenced or added as an appendix to other plans. It is the intention that with this Plan

Update, revisions will be made and the plan incorporated into other mechanisms as there continues to be development throughout the GBRA.

Incorporation of the Plan Update

Table 22-1identifies planning mechanisms available for all jurisdictions in the GBRA and provides examples of how the Plan will be incorporated into current plans.

Table 22.1 – Examples of Incorporation of the Plan Update

PLANNING MECHANISM	METHOD OF INCORPORATION
Grant Applications	Jurisdictions will consult the Plan Update whenever there are yearly grant funding cycles available through FEMA, including the Pre-Disaster Mitigation (PDM) cycle and when there is a Disaster Declaration for Texas triggering Hazard Mitigation Grant Program (HMGP) funds. Mitigation actions for each jurisdiction will be reviewed by the planning team members and information will be updated for completing applications, such as maps and risk assessment data. If a project is not in the Update, an amendment may be developed.
Annual Budget Review	Each jurisdiction that participated in the planning process will review the Update and mitigation actions therein when conducting their annual budget review. When allocating funds for upcoming operating and construction budgets, high priority mitigation actions will be reviewed during City Council and Commissioner Court meetings. Each Planning Team member will be responsible for bringing mitigation actions to their respective county or city to discuss feasibility of the potential project in terms of the availability of funds, grant assistance and a preliminary cost benefit review.
Emergency Planning	Based on the results of the Capability Assessment Survey, each jurisdiction in the GBRA has an Emergency Operations or Management Plan. The Plan Update will be consulted when during updates to each jurisdiction's local emergency and/or disaster recovery plan. Risk assessment and vulnerability data will be pulled from the plan and reviewed in conjunction with the review,

PLANNING MECHANISM	METHOD OF INCORPORATION
	renewal or re-writing of an Emergency Operations or Management Plan. This data will either be included within the new emergency planning mechanism or included as an appendix. Mitigation projects that relate to prevention and protection will also be reviewed for relevance to determine if they should be included.
Capital Improvements	Before any updates to Capital Improvement Plans (CIP) are conducted, each jurisdiction will review the risk assessment and mitigation strategy sections of the Plan Update, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments. Profile information and data regarding NFIP compliance and maintenance will be reviewed in conjunction with any CIP that is developed. If new census or land use data is available, this information should be added to the Plan Update.
Floodplain Management and Fire Protection	The Plan Update will be utilized in updating and maintain floodplain management and fire protection plans, as the goals of both planning mechanisms are similar. In updating or maintaining these plans the Plan Update will be consulted for NFIP compliance and flood risk (Section 5) and wildfire risk and extent (Section 12). Information from these sections will be reviewed for inclusion. In addition mitigation actions that address wildfire and flood will be reviewed for inclusion by jurisdiction.

Continued Public Involvement

Public Involvement over the Past Five Years

Throughout the past five years, the GBRA has continued to solicit public comment and involvement. The 2005 Plan has been available on the GBRA website in the "Hazard Mitigation" section since FEMA approval. Citizens and stakeholders were encouraged to download sections of the 2005 Plan and obtain the latest news, including any proposed updates or amendments. A notice for public comments was posted in 2007 and 2008 when the 2005 Plan was amended.

In addition, participating jurisdictions have implemented several public education programs and campaigns since 2005 in order to maintain public involvement, such as:

- Promoting hazard awareness and mitigation activities through media outlets;
- Conducting public education activities through seminars and presentations at conferences and local school events;
- Developing pamphlets and hosting public forums; and
- Posting public surveys.

Public Involvement Going Forward

Input from the public was an integral part of the preparation of this updated plan and will continue to be essential as the Plan grows and changes. As noted above, a significant change to this plan will require opportunities for the public to make its views known.

This Plan will be posted on the GBRA website, www.gbra.org, and the websites of participating jurisdictions, where available, so that officials and the public will be able to provide ongoing feedback. A copy of the updated plan also will be kept for public review at GBRA headquarters.

Further, if necessary, the GBRA can designate voluntary citizens or willing members of the private sectors as members of the planning team as well as utilize local media to notify the public of any maintenance or periodic review activities taking place.

APPENDIX A

Planning Team Members 1
Stakeholders 2

Planning Team Members

The GBRA Plan Update was organized using a direct representative model, as the Guadalupe Blanco River Authority (GBRA) acted as direct representative or Advisory Committee for participating jurisdictions in this effort. At the beginning of the process GBRA sent notices to jurisdictions asking for input and participation in the process. The following organizations[1] responded to the request and participated throughout the planning process.

Table A-1. Advisory Committee Planning Team Members – Organization and Title

ORGANIZATION	TITLE
Guadalupe-Blanco River Authority Staff	Chief Engineer
Guadalupe-Blanco River Authority Staff	Mgr. of Communications and Education
Guadalupe-Blanco River Authority Staff	Administrative Staff
H2O Partners Consulting Services	Project Manager
H2O Partners Consulting Services	Hazard Mitigation Specialist
H2O Partners Consulting Services	Environmental Analyst/Hazard Mitigation Specialist

Table A-2. Team Members – Organization and Title

ORGANIZATION	TITLE
Caldwell County	EMC/Sheriff
City of Lockhart	EMC/Fire Chief
City of Luling	EMC/Fire Chief
City of Martindale	EMC/Fire Chief/FPA

[1] Titles are given rather than names as the person holding the title in the respective organization will be responsible for continual maintenance of the Update, regardless of whether that same person initially held that role in 2009.

APPENDIX A – PLANNING TEAM

ORGANIZATION	TITLE
Calhoun County	County Judge/EMC/FPA
City of Seadrift	Mayor/Water Dept.
City of Port Lavaca	Dir. Public Works/Fire Marshall
City of Point Comfort	Mayor
DeWitt County	EMC
City of Cuero	Police, Fire Chief/Public Works Dir.
City of Yoakum	Dir.Public Works/FPA
City of Nordheim	Mayor
City of Yorktown	Mayor/Police Chief
Gonzales County	EMC
City of Gonzales	EMC/Police, Fire Chief
City of Nixon	Mayor
City of Waelder	Mayor/Public Works Dir./FPA
Kendall County	EMC/Dir.Public Works/FPA
City of Boerne	Dir.Public Works/FPA
Refugio County	EMC
City of Austwell	Mayor
City of Bayside	EMC/Dir. Public Works
Town of Refugio	Mayor
City of Woodsboro	Mayor
Woodsboro Independent School District	Superintendent
Victoria County	Dir. Public Works/FPA
City of Victoria	Dir. Public Works/FPA
City of Cibolo (Guadalupe County)	Engineering Consultant

Stakeholders

The following groups listed in Tables A-3 and A-4 were invited to stakeholder meetings, public meetings and workshops throughout the planning process and include: non-profit organizations; private businesses; hospitals; and school districts. Of the school districts invited, only Woodsboro ISD chose to participate in meetings and became an active planning participant. For a list of attendance at meetings, please see Appendix E[2].

[2] Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

Table A-3. Businesses and Organizations

SMI
Cemex Quarry
Hunter Industries
Christus Santa Rosa Hospital
Guadalupe Regional Hospital

Table A-4. Businesses and Organizations

American Red Cross
National Oceanic and Atmospheric Administration (NOAA)
National Weather Service (NWS)
Texas Forest Service
Texas Water Development Board (TWDB)

APPENDIX B: SURVEY RESULTS

Overview 1
Survey Results 2

Overview

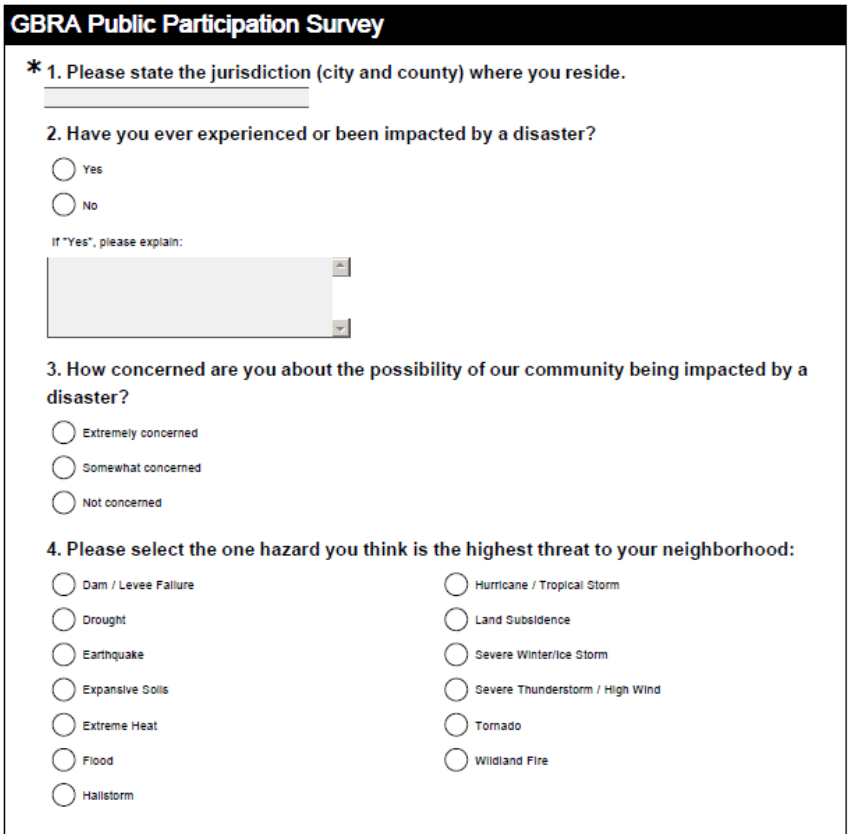
The Guadalupe Blanco River Authority prepared public surveys that asked a wide range of questions concerning the opinions of the public regarding natural and man-caused hazards. This fifteen-question survey was made available on the websites of the GBRA. This survey was also distributed in hard copy format at public meetings and stakeholder events throughout the planning process.

A total of 77 surveys were collected, the results of which are analyzed in this Appendix. The purpose of the surveys was twofold: 1) to solicit public input during the planning process and 2) to help the city to identify any potential actions or problem areas.

The online survey was the most accessible version. The first page is pictured below. Survey results are depicted on the following pages, showing the percentage of responses for each answer.

For questions that did not provide a multiple choice answer, or that

Figure B-1. Screenshot of Public Survey


GBRA Public Participation Survey

* 1. Please state the jurisdiction (city and county) where you reside.

2. Have you ever experienced or been impacted by a disaster?

- Yes
- No

If "Yes", please explain:

3. How concerned are you about the possibility of our community being impacted by a disaster?

- Extremely concerned
- Somewhat concerned
- Not concerned

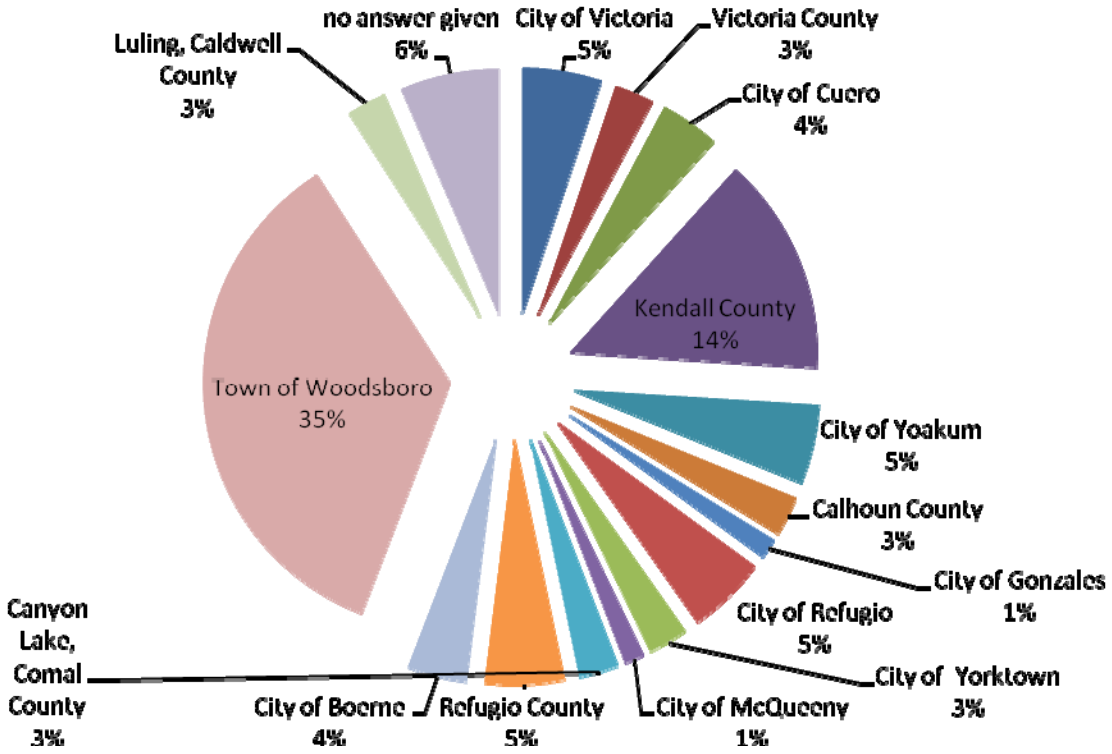
4. Please select the one hazard you think is the highest threat to your neighborhood:

- Dam / Levee Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flood
- Hailstorm
- Hurricane / Tropical Storm
- Land Subsidence
- Severe Winter/Ice Storm
- Severe Thunderstorm / High Wind
- Tornado
- Wildland Fire

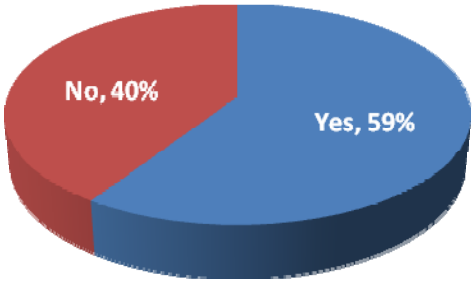
required an explanation, comments are included as they were entered on the survey itself and are not in any particular ranking order.

Survey Results

1. Please state the jurisdiction (city and county) where you reside.



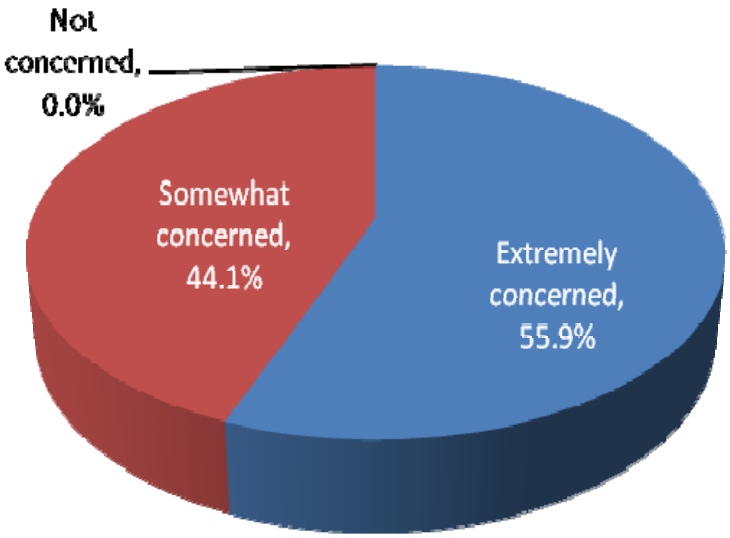
2. Have you ever experienced or been impacted by a disaster?



If "yes", what hazard have you endured[1]?

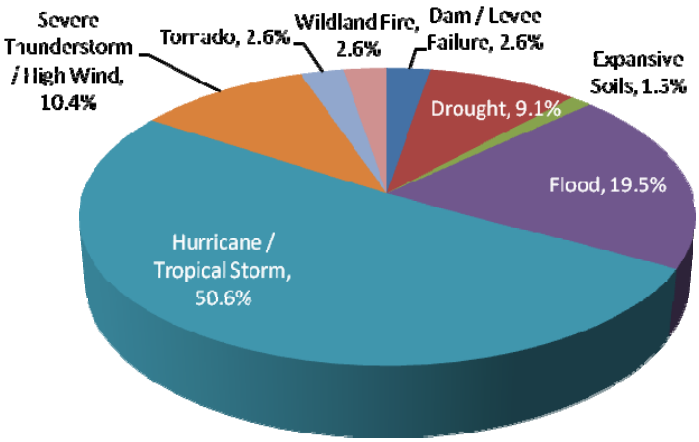
- Tornado
- Flood
- Hurricane

3. How concerned are you about the possibility of your community being impacted by a disaster?

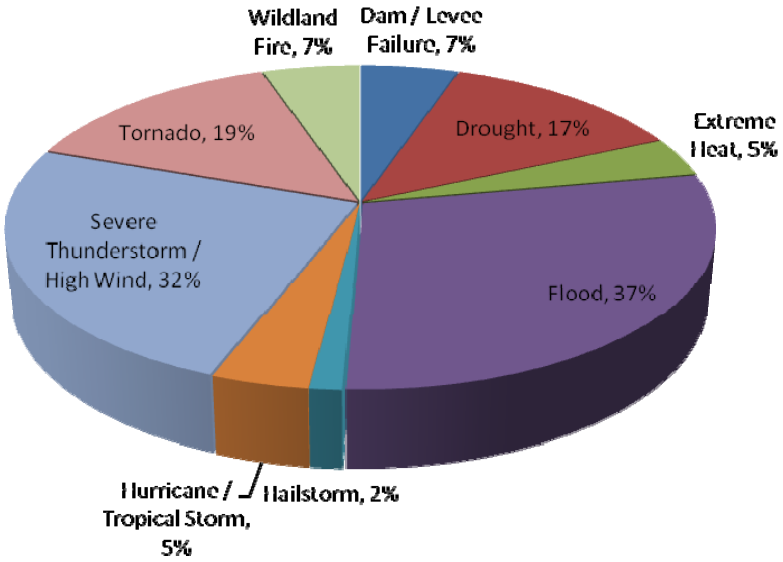


[1] Responses entered may not be specific to GBRA jurisdictions as some survey participants could have endured a hazard in another location.

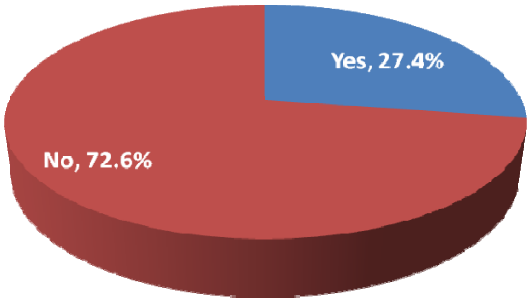
4. Please select the one hazard you think is the highest threat to your neighborhood:



5. Please select the one hazard you think is the second highest threat to your neighborhood:



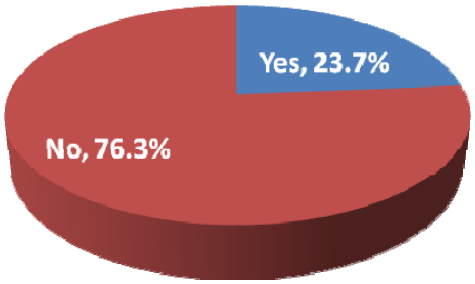
6. Is there another hazard not listed above that you think is a wide-scale threat to your neighborhood?



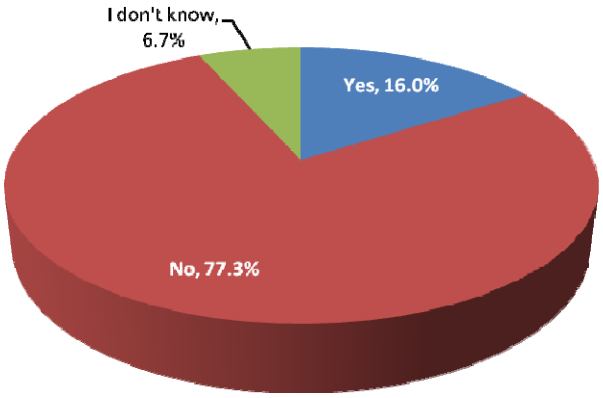
If "yes", please explain what hazards you think are a wide-scale threat that are not listed?

- Proposed nuclear power plant
- Illegal immigrants
- Boat traffic on lakes
- Gang violence
- Water supply

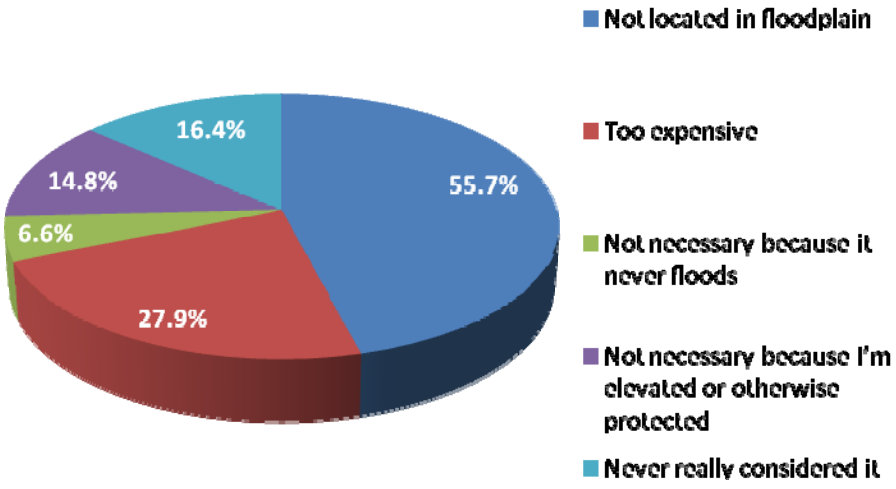
7. Is your home located in a floodplain?



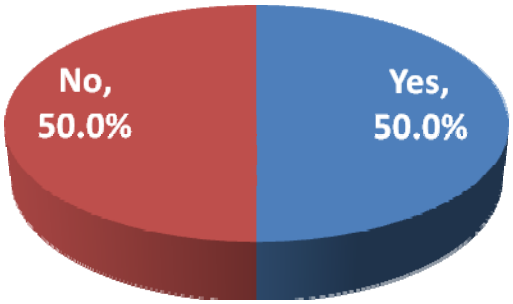
8. Do you have flood insurance?



9. If you don't have flood insurance, why not?



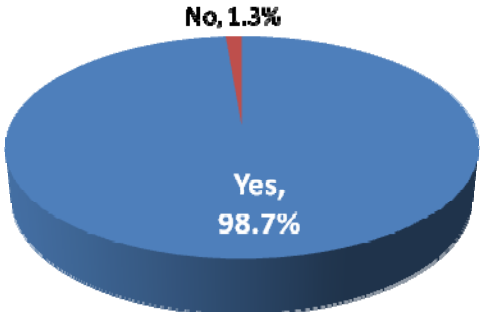
10. Have you taken any actions to make your home or neighborhood more resistant to hazards?



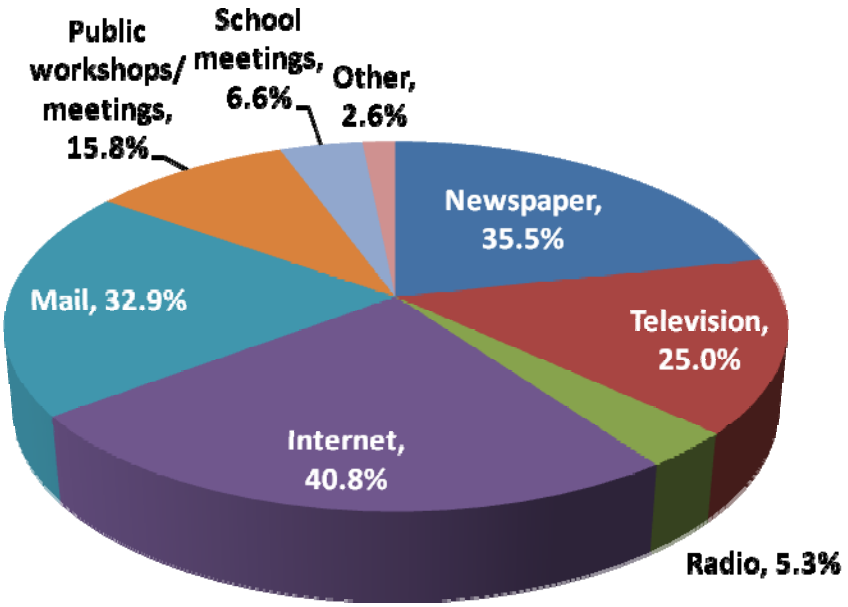
10(a) What have you done?

- elevated structure
- purchased weather radios
- weatherized windows and doors
- winterized pipes
- keep trees trimmed
- hurricane proof construction
- installed fire alarms

11. Are you interested in making your home or neighborhood more resistant to hazards?



12. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards[2]?



13. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood[3]?

- Control water use. Require rain catchment on all new construction
- Obtain and implement early warning systems
- Plant trees
- Drainage projects to resolve these issues
- Make known where the flood plains are.
- Better fire and EMS coverage
- Advanced warning system for flash food areas
- Brush control
- Improve and enforce current ordinances
- Improve communication among leaders and residents
- Keep residences free of junk that will be blown around by wind and washed down the sewer

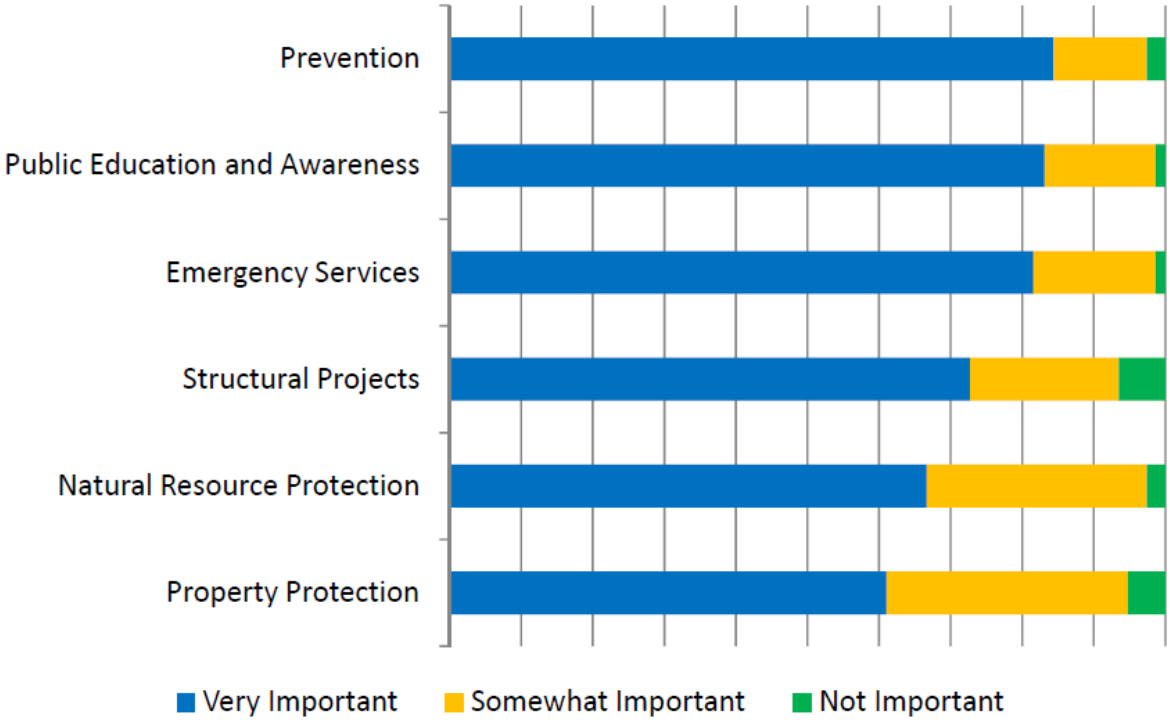
[2] Results total more than 100 percent as participants selected more than one type of communication.

[3] Answers for questions 13 and 14 are entered as they appeared in the survey.

14. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

- There will be issue if the nuclear plant is constructed
- Illegal immigrants
- Boat traffic on lakes
- Gang violence

15. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.



APPENDIX B: PUBLIC SURVEY RESULTS

	Very Important	Somewhat Important	Not Important
Property Protection	61.0%	33.8%	5.2%
Natural Resource Protection	66.7%	30.8%	2.6%
Structural Projects	72.7%	20.8%	6.5%
Emergency Services	81.6%	17.1%	1.3%
Public Education and Awareness	83.1%	15.6%	1.3%
Prevention	84.4%	13.0%	2.6%

PUBLIC EDUCATION AND AWARENESS

Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include: outreach projects, school education programs, library materials and demonstration events.

EMERGENCY SERVICES

Actions that protect people and property during and immediately after a hazard event. Examples include: warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.

STRUCTURAL PROJECTS

Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include: dams, levees, seawalls, detention/retention basins, channel modifications, retaining walls and storm sewers.

NATURAL RESOURCE PROTECTION

Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.

PROPERTY PROTECTION

Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include: acquisition, relocation, evaluation, structural retrofits, and storm shutters.

PREVENTION

Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include: planning and zoning, building codes, open space, preservation, and floodplain regulations.

APPENDIX C-TOXIC SITES

This Appendix is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

Listing of Toxic Release Inventory (TRI) Toxic Sites in GBRA

JURISDICTION	OWNER NAME	FACILITY NAME	FACILITY ADDRESS
CALDWELL CO	N/A	DUROL WESTERN MANUFACTURING CO.	5000 E PIERCE, LULING
CALHOUN CO	ALCOA INC.	ALCOA WORLD ALUMINA LLC	STATE HWY 35, POINT COMFORT
CALHOUN CO	DOW CHEMICAL CO	UNION CARBIDE CORP SEADRIFT PLANT	7501 N HWY 185, SEADRIFT
CALHOUN CO	FORMOSA PLASTICS CORP USA	FORMOSA PLASTICS CORP TEXAS	201 FORMOSA DR, POINT COMFORT
CALHOUN CO	N/A	INEOS USA LLC GREEN LAKE PLANT	TEXAS HWY 185, PORT LAVACA
GONZALES CO	CLEAVER BROOKS	GONZALES MANUFACTURING CO	2900 JOHNSON ST, GONZALES
GONZALES CO	CLEAVER BROOKS	GONZALES MANUFACTURING CO	2900 JOHNSON ST, GONZALES
GONZALES CO	LAND O LAKES INC	LAND O'LAKES PURINA FEED LLC - GONZALES	1402 E SARAH DEWITT DR, GONZALES
GONZALES CO	TYSON FOODS INC.	TYSON FOODS INC -GONZALES FEED MILL	2504 CHURCH ST, GONZALES
GUADALUPE CO	ACME BRICK	ACME BRICK COMPANY-MCQUEENY	FM 725, MC QUEENEY
GUADALUPE CO	CARGILL, INC	CARGILL ANIMAL NUTRITION	2464 STATE HWY 46 N, SEGUIN

APPENDIX C: TOXIC SITES

JURISDICTION	OWNER NAME	FACILITY NAME	FACILITY ADDRESS
GUADALUPE CO	COMMERCIAL METALS CO	STRUCTURAL METALS INC.	STEEL MILL RD, SEGUIN
GUADALUPE CO	IMS DIV TUBE CITY IMS	IMS DIV TUBE CITY IMS	100 STEEL MILL RD, SEGUIN
GUADALUPE CO	N/A	ARMORTEX (FORMERLY SAFEGUARD SECURITY SERVICES)	5926 CORRIDOR PKWY, SCHERTZ
GUADALUPE CO	N/A	TEMIC AUTOMOTIVE OF NORTH AMERICA INC	3740 N AUSTIN ST, SEGUIN
GUADALUPE CO	TEMPLE INLAND INC (DBA TEMPLE INLAND)	TEMPLE INLAND MCQUEENEY	3401 FM 78 & CYPRESS RIDGE RD, MC QUEENEY
GUADALUPE CO	TYSON FOODS INC	TYSON FOODS INC SEGUIN POULTRY PROCESSING PLANT	1200 W KINGSBURY ST, SEGUIN
GUADALUPE CO	XERXES CORP	XERXES CORP	2001 PROFORM RD, SEGUIN
VICTORIA CO	AIR LIQUIDE LI LP LLC	AIR LIQUIDE LARGE INDUSTRIES U.S. LP	767 OLD BLOOMINGTON RD, BLOOMINGTON
VICTORIA CO	COMMERCIAL METALS CO	CMC STEEL FABRICATORS INC. DBA CMC SAFETY STEEL SERVICE	255 SKYTOP RD, VICTORIA
VICTORIA CO	E. I. DU PONT DE NEMOURS & CO. INC.	DUPONT VICTORIA PLANT	2695 OLD BLOOMINGTON RD N, VICTORIA
VICTORIA CO	EQUISTAR CHEMICALS (A LYONDELL COMPANY)	EQUISTAR CHEMICALS	2695 OLD BLOOMINGTON RD, VICTORIA
VICTORIA CO	INVISTA S. R.L..	INVISTA S. R.L. VICTORIA	2695 OLD BLOOMINGTON RD NORTH, VICTORIA
VICTORIA CO	N/A	DIAMOND FIBERGLASS	1036 INDUSTRIAL PARK DR, VICTORIA
VICTORIA CO	N/A	SOUTH TEXAS ELECTRIC COOPERATIVE INC.	2849 FM 447, NURSERY

Listing of Tier-2 Toxic Sites in GBRA

JURISDICTION	FACILITY NAME
BOERNE	BOERNE SUBSTATION
BOERNE	MENGER CREEK SUBSTATION
BOERNE	VERIZON BOERNE CO (TX5411001)
CALDWELL CO	CAMP GARY SUBSTATION
CALDWELL CO	DALE SUBSTATION
CALDWELL CO	DELHI STATION
CALDWELL CO	DGP - LULING GAS PLANT
CALDWELL CO	FERRELLGAS LOCKHART
CALDWELL CO	GONZALES COUNTY WATER SUPPLY CORP - 794
CALDWELL CO	INERGY PROPANE, LLC DBA PLUM CREEK PROPANE
CALDWELL CO	INERGY PROPANE, LLC DBA PLUM CREEK PROPANE
CALDWELL CO	LEVEL 3 - MAXWELL (MXWLTXGA)
CALDWELL CO	LULING BRANYON
CALDWELL CO	LULING SUBSTATION
CALDWELL CO	LULING-MAGNOLIA SUBSTATION
CALDWELL CO	MAGNOLIA-MERCER SUBSTATION
CALDWELL CO	MCMAHAN
CALDWELL CO	MENDOZA SUBSTATION
CALDWELL CO	MIEARS -F- LEASE
CALDWELL CO	PRAIRIE LEA COMPRESSOR STATION
CALDWELL CO	REEDVILLE SUBSTATION
CALDWELL CO	TXDOT-AUSTIN-LOCKHART MAINTENANCE
CALDWELL CO	VERIZON LYTTON SPRINGS CO (TX6108462)
CALHOUN CO	AIRGAS SOUTHWEST, INC. - PORT LAVACA #110

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
CALHOUN CO	ALAMO CONCRETE PRODUCTS, LTD. - PORT O'CONNER # 55
CALHOUN CO	ALCOA STATION
CALHOUN CO	ALCOA WORLD ALUMINA ATLANTIC - POINT COMFORT OPERATIONS
CALHOUN CO	ALCOA/POINT COMFORT METER STATION
CALHOUN CO	BARGE CANAL FIELD
CALHOUN CO	BAYOU BENGAL B-13 #1 BATTERY
CALHOUN CO	CALHOUN PORT AUTHORITY
CALHOUN CO	CHARBULA LEASE
CALHOUN CO	COX BAY STATE TRACT 59-1
CALHOUN CO	CP&L
CALHOUN CO	FLORIDA GAS TRANSMISSION, PORT LAVACA COMPRESSOR STATION
CALHOUN CO	FORMOSA PLANT
CALHOUN CO	FORMOSA PLASTICS CORPORATION, TEXAS
CALHOUN CO	GRASS ISLAND FIELD TANK BATTERY
CALHOUN CO	INEOS USA, LLC - GREEN LAKE
CALHOUN CO	KEERAN RANCH
CALHOUN CO	KELLERS BAY STATE GAS UNIT 19F
CALHOUN CO	KELLERS BAY STATE GAS UNIT 9
CALHOUN CO	LANE ROAD
CALHOUN CO	MAGNOLIA BEACH
CALHOUN CO	MAGNOLIA BEACH KELLER BAY ST GU K13
CALHOUN CO	MAUDE B. TRAYLOR FACILITY
CALHOUN CO	MAUDE B. TRAYLOR NO. 1 AND 2
CALHOUN CO	MAUDE B. TRAYLOR NO. 3
CALHOUN CO	MAUDE B. TRAYLOR NO. 4

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
CALHOUN CO	MAUDE TRAYLOR A 1
CALHOUN CO	MAUDE TRAYLOR A 2
CALHOUN CO	MAUDE TRAYLOR A 3 ST
CALHOUN CO	MAUDE TRAYLOR A 5
CALHOUN CO	MAUDE TRAYLOR ESTATES NO. 1 AND 2
CALHOUN CO	MAUDE TRAYLOR ESTATES NO. 3
CALHOUN CO	MEEK LEASE
CALHOUN CO	MELBOURN
CALHOUN CO	MOTORBOAT & OFFSHORE FUELS, INC.
CALHOUN CO	MRS MAUDE B TRAYLOR 7
CALHOUN CO	MUELLER LEASE
CALHOUN CO	PANTHER REEF
CALHOUN CO	PHI, INC. - PORT O' CONNOR BASE
CALHOUN CO	PORT O'CONNOR
CALHOUN CO	PSENCIK LEASE
CALHOUN CO	SCHLUMBERGER TECHNOLOGY CORPORATION
CALHOUN CO	SEADRIFT COKE L.P.
CALHOUN CO	SEADRIFT COKE L.P.
CALHOUN CO	SEADRIFT PLANT_UNION CARBIDE CORP.
CALHOUN CO	SEADRIFT PUMP STATION_THE DOW CHEMICAL COMPANY
CALHOUN CO	STATE TRACT 254 #1 BATTERY
CALHOUN CO	STATE TRACT 257 #1 BATTERY
CALHOUN CO	STATE TRACT 42-1
CALHOUN CO	STATE TRACT 59 2
CALHOUN CO	TRULL 'B' #2 BATTERY

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
CALHOUN CO	TRULL 'B' #3 BATTERY
CALHOUN CO	TXDOT-YOAKUM-CALHOUN CO MAINT (SH 185 & SH 35)
CALHOUN CO	TXDOT-YOAKUM-CALHOUN CO MAINT (SH 238 & FM2433)
CALHOUN CO	TXDOT-YOAKUM-CALHOUN CO MAINT (US 87)
CALHOUN CO	TXDOT-YOAKUM-VICTORIA CO MAINT (US 59 AT SL 463)
CALHOUN CO	VERIZON PORT O (TX5470001)
CALHOUN CO	WASTE MANAGEMENT OF TEXAS, INC. - VICTORIA
CUERO	DEWITT COUNTY PRODUCERS COOPERATIVE
CUERO	GUADALUPE VALLEY ELECTRIC COOPERATIVE, INC
CUERO	MOUNT VERNON MILLS, INC. BRENTEX DIVISION - CUERO
CUERO	RATH PROPANE GAS CO.
DEWITT CO	(SOLD-MAR 20, 08) BRUSHY CREEK FIELD
DEWITT CO	(SOLD-MAR 20, 08) RAMBLER FIELD
DEWITT CO	ALAMO CONCRETE PRODUCTS, LTD. - CUERO B # 72B
DEWITT CO	ANNA BARRE HERMINE HENRY #1
DEWITT CO	BARRE #1 FACILITY
DEWITT CO	BARRY # 1
DEWITT CO	BELITZ #1
DEWITT CO	BELITZ DRIP
DEWITT CO	BERRY #2
DEWITT CO	BETTGE # 1
DEWITT CO	BLACKWELL TRUST GAS UNIT 1
DEWITT CO	BLACKWELL TRUST GAS UNIT 2
DEWITT CO	BLACKWELL TRUST GAS UNIT 3
DEWITT CO	BLACKWELL TRUST GAS UNIT 4

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
DEWITT CO	BLACKWELL TRUST GAS UNIT 5
DEWITT CO	BOOTHE AMINE PLANT
DEWITT CO	BUCHEL FIELD FACILITY
DEWITT CO	C.A. GEARY # 6
DEWITT CO	CHESTER H. BETTGE #3
DEWITT CO	CLARK GU I #1
DEWITT CO	CLARK GU II #1
DEWITT CO	COLORADO UNIT 1
DEWITT CO	COLORADO UNIT 2
DEWITT CO	CUERO SUBSTATION
DEWITT CO	D.R. KRUEGAR # 1
DEWITT CO	DEE-JAY EXPLORATION CULPEPPER
DEWITT CO	DEE-JAY EXPLORATION KING A#1
DEWITT CO	DEE-JAY EXPLORATION L.H. KIFER
DEWITT CO	DEE-JAY EXPLORATION GATLIN
DEWITT CO	DEE-JAY EXPLORATION KING A#2
DEWITT CO	DEMMER-ATZENHOFFER GU 1
DEWITT CO	DEWITT MOTT PLANT
DEWITT CO	DOUBLE T 1
DEWITT CO	DUPLICATE - LACY 03, LLC.- H.P. ORTS "B" LEASE - RRC#05026
DEWITT CO	DUPLICATE - LACY 03, LLC.- H.P. ORTS "B-6H" LEASE - RRC#12795
DEWITT CO	DUPLICATE - LACY 03, LLC.- LESTER-BRUNS LEASE - RRC#13192
DEWITT CO	DUPLICATE - LACY 03, LLC.- RUFUS KING LEASE - RRC#11999
DEWITT CO	E.C. SCHAEFER # 1, 2, 4, 5
DEWITT CO	EW RIDDELL 01

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
DEWITT CO	FERRELLGAS - STOCKDALE
DEWITT CO	FERRELLGAS SMILEY
DEWITT CO	FREUDE #2H
DEWITT CO	FRIAR RANCH #2
DEWITT CO	FRIAR-THOMAS 01
DEWITT CO	FT. WORTH NAT'L BANK # 3 BATTERY
DEWITT CO	FT. WORTH NAT'L BANK #3
DEWITT CO	FT. WORTH NAT'L BANK CENTRAL TANK BATTERY
DEWITT CO	GARY-ENGLAND #1
DEWITT CO	GERBERT, RICHARD LEASE
DEWITT CO	GOHLKE HEIR A-637
DEWITT CO	GOHMERT # 1 & 2
DEWITT CO	GOHMERT GU #2
DEWITT CO	GONZALES MANUFACTURING COMPANY
DEWITT CO	GREEN #1
DEWITT CO	GREEN #2
DEWITT CO	GUN POINT FIELD
DEWITT CO	H.O. ANGERSTEIN # 1
DEWITT CO	HELEN ENGLAND # 2
DEWITT CO	HENLEY #1
DEWITT CO	HOLMES FOODS INC./ FEEDMILL
DEWITT CO	J B DUDERSTADT 1
DEWITT CO	J B DUDERSTADT 2
DEWITT CO	JANSSEN #1
DEWITT CO	KEERAN #2

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
DEWITT CO	KERLICK ET AL GU WELL #1
DEWITT CO	KESELING A-64 #1
DEWITT CO	KNANDEL #1 & #3H
DEWITT CO	KNANDEL #2
DEWITT CO	KNANDEL/ROEDER/CARTER DRIP
DEWITT CO	KUESTER-OCHOA LEASE
DEWITT CO	LACY 03, LLC.- H.P. ORTS "A" LEASE - RRC#04750
DEWITT CO	LAMBERT NUMBER 1
DEWITT CO	LEMMONS #1
DEWITT CO	LEMMONS #2
DEWITT CO	LEMMONS/CLARK/GREEN/DRIP
DEWITT CO	LMP INNOCENTI # 1
DEWITT CO	LOLA FUHRKEN # 1
DEWITT CO	LOLA FUHRKEN # 2
DEWITT CO	MCALISTER #1
DEWITT CO	MUSSELMAN #1
DEWITT CO	MUSSELMAN AMINE PLANT
DEWITT CO	NORDHEIM #2
DEWITT CO	NORDHEIM #4
DEWITT CO	NORDHEIM #5
DEWITT CO	NORDHEIM COMPRESSOR
DEWITT CO	NORDHEIM DRIP
DEWITT CO	NORDHEIM FIELD
DEWITT CO	PATTESON LEASE
DEWITT CO	PRIDGEN ET AL 1

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
DEWITT CO	RAMBLER OIL & GAS FIELD
DEWITT CO	RATH PROPANE GAS CO.
DEWITT CO	RATH PROPANE GAS CO.
DEWITT CO	REIFFERT THOMAS TANK BATTERY
DEWITT CO	REMMERS #6
DEWITT CO	REMMERS #7
DEWITT CO	REMMERS #8
DEWITT CO	REMMERS PRODUCTION FACILITY
DEWITT CO	RICE, EUGENE ET AL #2
DEWITT CO	RIEDEL, MARTHA ANN #1
DEWITT CO	ROEDER #1
DEWITT CO	S L WHITE 1
DEWITT CO	SCHAEFER, E. C. #1J
DEWITT CO	SHEPPARD 1 & 2
DEWITT CO	SHEPPARD CENTRAL TANK BATTERY
DEWITT CO	SIEVERS, JOHANNA LEASE
DEWITT CO	SINAST #1
DEWITT CO	SINAST #2
DEWITT CO	SINAST #3
DEWITT CO	SIXJAY TANK BATTERY
DEWITT CO	SMITH GAS UNIT 1
DEWITT CO	SPIES GU 1-2
DEWITT CO	STEVENS 1 (CHK)
DEWITT CO	TCC-CUERO SUBSTATION
DEWITT CO	TCC-NIXON SUBSTATION

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
DEWITT CO	THOMASTON COMPRESSOR STATION
DEWITT CO	TXDOT-SAN ANTONIO-FLORESVILLE MAINTENANCE REMOTE #19
DEWITT CO	TXDOT-YOAKUM-DEWITT CO MAINT (SH 72 & US 87)
DEWITT CO	TXDOT-YOAKUM-DEWITT CO.(US 183 N OF CUERO @ RR OVERPASS)
DEWITT CO	VOELKEL #1 & #2
DEWITT CO	W T BELL GAS UNIT 1
DEWITT CO	W T BELL GAS UNIT 10
DEWITT CO	W T BELL GAS UNIT 11
DEWITT CO	W T BELL GAS UNIT 2
DEWITT CO	W T BELL GAS UNIT 3
DEWITT CO	W T BELL GAS UNIT 4
DEWITT CO	W T BELL GAS UNIT 5
DEWITT CO	W T BELL GAS UNIT 6
DEWITT CO	W T BELL GAS UNIT 7
DEWITT CO	W T BELL GAS UNIT 8
DEWITT CO	W T BELL GAS UNIT 9
DEWITT CO	W T BELL GAS UNIT A 1
DEWITT CO	WESLEY NUMBER ONE
DEWITT CO	WHITFIELD #2
DEWITT CO	WILL T. CARTER #2
DEWITT CO	WOLF HOLLOW #1
DEWITT CO	WOLF, WALTER #1
DEWITT CO	YOAKUM DA COMPRESSOR
DEWITT CO	YOAKUM FIELD
DEWITT CO	ZENGERIE # 1

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
GONZALES	ALAMO CONCRETE PRODUCTS, LTD. - GONZALES # 35
GONZALES	FERRELLGAS GONZALES
GONZALES	GONZALES COUNTY PCT 1 YARD
GONZALES	GONZALES COUNTY PCT 3 YARD
GONZALES	GONZALES SUBSTATION
GONZALES	GUADALUPE VALLEY ELECTRIC COOPERATIVE, INC.
GONZALES	TYSON FOODS LIVE PRODUCTION FACILITY (GONZALES FEED MILL)
GONZALES CO	ALAMO GROUP (TX) L.P.
GONZALES CO	BACO: NOLTE #1 (DUBOSE) FIELD
GONZALES CO	BARNHART "A" LEASE
GONZALES CO	BARTA LEASE
GONZALES CO	C E ROSS LEASE
GONZALES CO	CITY OF SMILEY
GONZALES CO	CULPEPPER A 1-H
GONZALES CO	DGP - LULING GAS PLANT - DARST COMPRESSOR STATION
GONZALES CO	DGP - LULING GAS PLANT - NORTH SPILLER COMPRESSOR STATION
GONZALES CO	DGP - LULING GAS PLANT - SOUTH BRANYON COMPRESSOR STATION
GONZALES CO	DGP - LULING GAS PLANT - SOUTH SALT FLAT COMPRESSOR STATION
GONZALES CO	E E SMITH JR ESTATE 1-H
GONZALES CO	EAST SIDE COMPRESSOR STATION (VICTORIA)
GONZALES CO	ENERQUEST (BAKER #1H)
GONZALES CO	FERRELLGAS GONZALES
GONZALES CO	GONZALES COUNTY WATER SUPPLY CORP - BB
GONZALES CO	GONZALES COUNTY WATER SUPPLY CORP. - 304
GONZALES CO	GONZALES COUNTY WATER SUPPLY CORP. - OF

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
GONZALES CO	GONZALES COUNTY WATER SUPPLY CORPORATION - W'SBORO
GONZALES CO	GONZALES COUNTY WATER SUPPLY CORPORATION - WTP
GONZALES CO	GRANBERRY GU 2-H
GONZALES CO	HANSON PIPE AND PRECAST- SEGUIN
GONZALES CO	HARWOOD SUBSTATION
GONZALES CO	HESTER APPLING LEASE
GONZALES CO	HEXCEL CORPORATION
GONZALES CO	HOLMES FOODS INC / HATCHERY
GONZALES CO	INERGY PROPANE, LLC DBA PLUM CREEK PROPANE
GONZALES CO	JOE H. JOHNSTON LEASE
GONZALES CO	JOHN J. FIETSAM INC - WAELDER STORAGE
GONZALES CO	JOHNSTON & PARR LEASE
GONZALES CO	KNICKERBOCKER LEASE
GONZALES CO	LILLIAN CONLEY LEASE
GONZALES CO	M. CROZIER LEASE
GONZALES CO	MALATEK LEASE
GONZALES CO	MAXWELLL WATER SUPPLY CORPORATION
GONZALES CO	MUENZLER LEASE
GONZALES CO	N. C. STULTING LEASE
GONZALES CO	NIXON SUBSTATION
GONZALES CO	NOPAL
GONZALES CO	PARR 5A LEASE
GONZALES CO	PARR LEASE
GONZALES CO	PAWNEE PIPELINE COMPRESSOR
GONZALES CO	RACHEL LEASE

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
GONZALES CO	SCHAUER
GONZALES CO	SMILEY COMPRESSOR STATION
GONZALES CO	SMITH EE 1
GONZALES CO	SMITH EE 2
GONZALES CO	SMITH EE UNIT 2 # 2
GONZALES CO	TEMIC AUTOMOTIVE OF NORTH AMERICA, INC
GONZALES CO	THOMAS E. CLIFTON LEASE
GONZALES CO	THOMPSONVILLE SUBSTATION
GONZALES CO	TXDOT-SAN ANTONIO-FLORESVILLE MAINTENANCE REMOTE #20
GONZALES CO	TXDOT-YOAKUM-GONZALES CO MAINT (WAELDER) NW IH 10/SH 97
GONZALES CO	TXDOT-YOAKUM-GONZALES CO MAINT (WAELDER) SW IH 10/SH 97
GONZALES CO	TXDOT-YOAKUM-GONZALES CO MAINT FM 533/FM 443 NE CORNER
GONZALES CO	TXDOT-YOAKUM-GONZALES CO MAINT (NIXON SH97& SH80)
GONZALES CO	TXDOT-YOAKUM-GONZALES CO MAINT (SMILEY)
GONZALES CO	TYSON HARWOOD ROAD HATCHERY
GONZALES CO	VIOLA MORROW LEASE
GONZALES CO	WAELDER
GONZALES CO	WAELDER SUBSTATION
KENDALL CO	CICO SUBSTATION
KENDALL CO	CITY OF FAIR OAKS RANCH WATER PLANT NO. 3
KENDALL CO	CITY OF FAIR OAKS RANCH WATER PLANT NO. 5
KENDALL CO	COMFORT COMPRESSOR STATION
KENDALL CO	COMFORT SUBSTATION
KENDALL CO	CORDILLERA RANCH
KENDALL CO	FERRELLGAS - COMFORT

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
KENDALL CO	JAMES AVERY CRAFTSMAN, INC.
KENDALL CO	JAMES AVERY CRAFTSMAN, INC.
KENDALL CO	KENDALL (CTEC) SUBSTATION
KENDALL CO	KENDALL SUBSTATION
KENDALL CO	THE HOME DEPOT STORE 6556
KENDALL CO	TXDOT-SAN ANTONIO-BOERNE MAINTENANCE
KENDALL CO	TXDOT-SAN ANTONIO-BOERNE MAINTENANCE REMOTE #3
KENDALL CO	TXDOT-SAN ANTONIO-BOERNE MAINTENANCE REMOTE #4
LOCKHART	LOCKHART PLANT 1274
LOCKHART	LOCKHART SUBSTATION
LULING	DUPLICATE - HYDROCARBON RECOVERY SERVICES INC. -LULING BRANCH
LULING	FERRELLGAS LULING
LULING	HANSON ROOF TILE - LULING PLANT
LULING	LSI - LULING
LULING	TCC-VICTORIA SUBSTATION
NIXON	GONZALES COUNTY PRECINT 4 YARD
NIXON	HOLMES FOODS INC
POINT COMFORT	FORMOSA HYDROCARBON PLANT
PORT LAVACA	ALAMO CONCRETE PRODUCTS, LTD. - PORT LAVACA # 56
PORT LAVACA	EQUALIZER INCORPORATED
PORT LAVACA	INERGY PROPANE, LLC DBA HALL PROPANE
PORT LAVACA	MATAGORDA ISLAND LIQUID SEPARATION PLANT
PORT LAVACA	STATION 806
REFUGIO	CLARKSON LEASE

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
REFUGIO	TXDOT-CORPUS CHRISTI-REFUGIO CO-REFUGIO
REFUGIO CO	FAGAN EST. "M" #2
REFUGIO CO	FAGAN M #5
REFUGIO CO	FAGAN M #6
REFUGIO CO	FAGAN N #2
REFUGIO CO	FESCO, LTD. REFUGIO
REFUGIO CO	FVW HEARD
REFUGIO CO	GC DOW INTERCONNECT STATION
REFUGIO CO	HALLMARK FGT LATERAL
REFUGIO CO	HANSON PIPE AND PRECAST INC. - VICTORIA
REFUGIO CO	HENRY SCHIRMER LEASE - BONNIE VIEW FIELD
REFUGIO CO	HOPPER LANDING
REFUGIO CO	J M O'BRIEN
REFUGIO CO	JFB HEARD
REFUGIO CO	KENTUCKY FAGAN #12
REFUGIO CO	KENTUCKY FAGAN #7
REFUGIO CO	KENTUCKY FAGAN 5R
REFUGIO CO	KENTUCKY-FAGAN #5
REFUGIO CO	KOCH PIPELINE COMPANY LP - REFUGIO
REFUGIO CO	LAMBERT LEASE "A" BATTERY
REFUGIO CO	LAMBERT LEASE "B" BATTERY
REFUGIO CO	LAMBERT LEASE "C" BATTERY
REFUGIO CO	LAMBERT LEASE "D" BATTERY
REFUGIO CO	LONGORIA UNIT
REFUGIO CO	MLV 805 CONDENSATE TANK

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
REFUGIO CO	NORTHERN NATURAL GAS COMPANY - TIVOLI DEHYDRATION FACILITY
REFUGIO CO	O'BRIEN
REFUGIO CO	O'CONNOR "A" TANK BATTERY/SALES FACILITY
REFUGIO CO	O'CONNOR "B" WELL #1
REFUGIO CO	O'CONNOR "B" WELL #1 BATTERY
REFUGIO CO	O'CONNOR "G" WELL #1
REFUGIO CO	PANTHER POINT
REFUGIO CO	REFUGIO COMPRESSOR STATION
REFUGIO CO	REFUGIO COUNTY; ROOKE FIELD AIRPORT; VANAIR AVIATION SERVICES
REFUGIO CO	REFUGIO STATION
REFUGIO CO	ROCHE "E" # 1 TANK BATTERY
REFUGIO CO	ROCHE LEASE "A-1" TANK BATTERY
REFUGIO CO	ROCHE LEASE "A-2" TANK BATTERY
REFUGIO CO	ROCHE RANCH
REFUGIO CO	ROOKE # A-1 TANK BATTERY
REFUGIO CO	SHELTON
REFUGIO CO	STATION 804
REFUGIO CO	TOM O'CONNOR
REFUGIO CO	TXDOT-CORPUS CHRISTI-REFUGIO CO-REFUGIO SUB 11
REFUGIO CO	TXDOT-CORPUS CHRISTI-REFUGIO CO-REFUGIO SUB 4
REFUGIO CO	TXDOT-YOAKUM-VICTORIA CO MAINT (US77 AT RIVER GUADALUPE)
REFUGIO CO	U.S. COAST GUARD SECTOR CORPUS CHRISTI
REFUGIO CO	VERIZON TIVOLI MAIN (TX5488001)
REFUGIO CO	W. J. FOX
REFUGIO CO	WELDER COMPRESSOR STATION

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
REFUGIO CO	WELDER HEIRS FACILITY (AT NO 3)
REFUGIO CO	WELDER RANCH FIELD
REFUGIO CO	WOODSBORO FARMERS COOPERATIVE
VICTORIA	AIRGAS SOUTHWEST, INC.- VICTORIA #1
VICTORIA	ALAMO CONCRETE PRODUCTS, LTD. - VICTORIA / BEN WILSON # 50
VICTORIA	ALAMO CONCRETE PRODUCTS, LTD. - VICTORIA / H H # 51
VICTORIA	HALLIBURTON ENERGY SERVICES - VICTORIA
VICTORIA	SAMÆS CLUB #6471
VICTORIA	SCHWAN'S HOME SERVICE, INC. - 107110
VICTORIA	TCC-CHOCOLATE BAYOU SUBSTATION
VICTORIA	TCC-VICTORIA SERVICE CENTER
VICTORIA	THE HOME DEPOT STORE 6587
VICTORIA	THOMAS PETROLEUM LLC - VICTORIA
VICTORIA	TXDOT-YOAKUM-VICTORIA CO MAINT (SH 185)
VICTORIA	VICTORIA POWER STATION
VICTORIA CO	AIR LIQUIDE LARGE INDUSTRIES U.S. LP
VICTORIA CO	BATSON #1 & #2
VICTORIA CO	BEN SHELTON # 7 TANK BATTERY
VICTORIA CO	CARMICHAEL DRIP STATION
VICTORIA CO	CARPENTER #1
VICTORIA CO	COLORADO MATERIALS, LTD.
VICTORIA CO	CUELLAR LEON C. #1
VICTORIA CO	DEGOLYER
VICTORIA CO	DREYER 2. 3 & 4
VICTORIA CO	DUPONT BLOOMINGTON SOUTH

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
VICTORIA CO	DUPONT BLOOMINGTON WEST
VICTORIA CO	EQUALIZER INCORPORATED
VICTORIA CO	EQUISTAR CHEMICALS (A LYONDELL COMPANY)
VICTORIA CO	FARRIS GAS UNIT 1
VICTORIA CO	FARRIS GAS UNIT 2
VICTORIA CO	GAVILON FERTILIZER, LLC.
VICTORIA CO	GOHIKE STATION
VICTORIA CO	INERGY PROPANE, LLC DBA INDEPENDENT PROPANE COMPANY
VICTORIA CO	JANK #1
VICTORIA CO	JOHNSON. J.R. #1 (VICTORIA COUNTY)
VICTORIA CO	KEERAN # 12 TANK BATTERY
VICTORIA CO	KEERAN #1
VICTORIA CO	KEERAN #3
VICTORIA CO	KEERAN #4
VICTORIA CO	KEERAN CENTRAL TANK BATTERY
VICTORIA CO	KOCH PIPELINE COMPANY LP - PLACEDO STATION
VICTORIA CO	MCCOLLUM FACILITY
VICTORIA CO	MCFADDIN FIELD
VICTORIA CO	MILNER 1
VICTORIA CO	OHRT-ALBRECHT #1
VICTORIA CO	OHRT-HEINHOLD #1
VICTORIA CO	SAM RAYBURN POWER PLANT
VICTORIA CO	SHELTON LEASE - TANK BATTERY
VICTORIA CO	SPOETZL BREWERY
VICTORIA CO	TXDOT-YOAKUM-VICTORIA CO MAINT (BU 59 AT BU 77)

APPENDIX C: TOXIC SITES

JURISDICTION	FACILITY NAME
VICTORIA CO	TXDOT-YOAKUM-VICTORIA CO MAINT (US 59 AT FM 446)
VICTORIA CO	TXDOT-YOAKUM-VICTORIA CO MAINT (US 59 AT TELFERNER)
VICTORIA CO	TXDOT-YOAKUM-VICTORIA CO MAINT (US 77 AT BECK RD)
VICTORIA CO	TXDOT-YOAKUM-VICTORIA CO MAINT (US 77 AT COLETO CREEK)
VICTORIA CO	VERIZON BLOOMINGTON CO (TX5410002)
VICTORIA CO	VICTORIA TEXAS
VICTORIA CO	VICTORIA YARD
VICTORIA CO	VILLAFRANCA
VICTORIA CO	WATTS-GISLER
VICTORIA CO	WELDER RANCH B 3
VICTORIA CO	WELDER RANCH 1
VICTORIA CO	WELDER RANCH A 2
VICTORIA CO	WOOD FAMILY MEMORIAL TRUST #1
WAELDER	GONZALES COUNTY PRECINT 2 YARD
WAELDER	J BAR B FOODS
WOODSBORO	TOWN OF WOODSBORO
YOAKUM (DEWITT)	YOAKUM SUBSTATION
YORKTOWN	BAKER OIL TOOLS - YORKTOWN

APPENDIX D-CRITICAL FACILITIES

This Appendix is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

Georeferenced Critical Facilities in Participating Jurisdictions

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
CALDWELL	LOCKHART	LOCKHART FIRE DEPARTMENT	FIRE STATION	N/A
CALDWELL	LOCKHART	MID-COUNTY FIRE DEPARTMENT	FIRE STATION	N/A
CALDWELL	LOCKHART	CALDWELL COUNTY SHERIFF	POLICE STATION	$1,246
CALDWELL	LOCKHART	CALDWELL HIGHWAY PATROL	POLICE STATION	$1,246
CALDWELL	LOCKHART	LOCKHART POLICE DEPT	POLICE STATION	$1,246
CALDWELL	LOCKHART	BLUEBONNET ELEMENTARY SCHOOL	SCHOOL	$6,338
CALDWELL	LOCKHART	CARVER KINDERGARTEN SCHOOL	SCHOOL	$4,753
CALDWELL	LOCKHART	CLEAR FORK EL	SCHOOL	$5,397
CALDWELL	LOCKHART	LOCKHART H S	SCHOOL	$14,470
CALDWELL	LOCKHART	LOCKHART HIGH SCHOOL FRESHMAN CAMP	SCHOOL	$4,534
CALDWELL	LOCKHART	LOCKHART JUNIOR HIGH SCHOOL	SCHOOL	$16,889
CALDWELL	LOCKHART	LOCKHART PRIDE HS	SCHOOL	$699
CALDWELL	LOCKHART	NAVARRO ELEMENTARY	SCHOOL	$5,397
CALDWELL	LOCKHART	PLUM CREEK EL	SCHOOL	$5,661
CALDWELL	LULING	LULING VOL. FIRE DEPT	FIRE STATION	N/A
CALDWELL	LULING	SOUTHEAST CALDWELL COUNTY VOLUNTEER FIRE	FIRE STATION	N/A
CALDWELL	LULING	LULING CITY POLICE DEPT	POLICE STATION	$1,246
CALDWELL	LULING	LEONARD SHANKLIN EL	SCHOOL	$3,366
CALDWELL	LULING	LULING H S	SCHOOL	$6,097

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
CALDWELL	LULING	LULING J H	SCHOOL	$3,908
CALDWELL	LULING	LULING PRI	SCHOOL	$2,150
CALDWELL	LULING	ROSENWALD PRI	SCHOOL	$1,887
CALDWELL	UNINCORPORATED	CHISHOLM TRAIL FIRE RESCUE	FIRE STATION	N/A
CALDWELL	UNINCORPORATED	MAXWELL COMMUNITY VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
CALDWELL	UNINCORPORATED	MCMAHAN VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
CALDWELL	UNINCORPORATED	TRI-COMMUNITY VFD	FIRE STATION	N/A
CALDWELL	UNINCORPORATED	PRAIRIE LEA SCHOOL	SCHOOL	$2,693
CALDWELL	UNINCORPORATED	PROVIDENCE CHRISTIAN ACAD	SCHOOL	$330
CALHOUN	POINT COMFORT	POLICE DEPT	POLICE STATION	$1,246
CALHOUN	POINT COMFORT	POINT COMFORT EL	SCHOOL	$989
CALHOUN	PORT LAVACA	MAGNOLIA BEACH VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	PORT LAVACA	OLIVIA-PORT ALTO VOLUNTEER FIRE DEPARTME	FIRE STATION	N/A
CALHOUN	PORT LAVACA	PORT LAVACA FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	PORT LAVACA	PORT LAVACA FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	PORT LAVACA	PORT LAVACA FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	PORT LAVACA	MEMORIAL MEDICAL CENTER	HOSPITAL	$10,961
CALHOUN	PORT LAVACA	CALHOUN COUNTY SHERIFF'S DEPT	POLICE STATION	$1,246
CALHOUN	PORT LAVACA	PORT LAVACA POLICE DEPT	POLICE STATION	$1,246
CALHOUN	PORT LAVACA	CALHOUN H S	SCHOOL	$20,458
CALHOUN	PORT LAVACA	HARRISON/JEFFERSON/MADISON COMPLEX	SCHOOL	$11,820
CALHOUN	PORT LAVACA	HOPE ALTERNATIVE H S	SCHOOL	$127
CALHOUN	PORT LAVACA	HOPE H S	SCHOOL	$648
CALHOUN	PORT LAVACA	J J A E P	SCHOOL	$140
CALHOUN	PORT LAVACA	JACKSON/ROOSEVELT COMPLEX	SCHOOL	$11,952

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
CALHOUN	PORT LAVACA	OUR LADY OF THE GULF CATHOLIC	SCHOOL	$980
CALHOUN	PORT LAVACA	SIX MILE ASSEMBLY OF GOD	SCHOOL	$305
CALHOUN	PORT LAVACA	TRAVIS MIDDLE	SCHOOL	$14,374
CALHOUN	SEADRIFT	SEADRIFT VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	SEADRIFT	SEADRIFT CITY POLICE	POLICE STATION	$1,246
CALHOUN	SEADRIFT	SEADRIFT SCHOOL	SCHOOL	$3,647
CALHOUN	UNINCORPORATED	HOLIDAY BEACH VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	UNINCORPORATED	ROCKSPRINGS VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	UNINCORPORATED	THOMASTON VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
CALHOUN	UNINCORPORATED	PORT O CONNOR EL	SCHOOL	$925
DEWITT	CUERO	CUERO FIRE DEPARTMENT	FIRE STATION	N/A
DEWITT	CUERO	CUERO POLICE DEPT	POLICE STATION	$1,246
DEWITT	CUERO	DEWITT SHERIFF'S OFFICE	POLICE STATION	$1,246
DEWITT	CUERO	CUERO H S	SCHOOL	$9,685
DEWITT	CUERO	CUERO J H	SCHOOL	$5,193
DEWITT	CUERO	DEWITT-LAVACA SPECIAL ED CO-OP	SCHOOL	$102
DEWITT	CUERO	FRENCH EL	SCHOOL	$4,126
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$102
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$38
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$1,550
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$1,550
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$1,550
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$1,550
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$1,550
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$22
DEWITT	CUERO	G O A L S PROGRAM	SCHOOL	$9

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
DEWITT	CUERO	GOALS PROGRAM	SCHOOL	$1,550
DEWITT	CUERO	HUNT EL	SCHOOL	$5,826
DEWITT	CUERO	LEARNING CONNECTIONS	SCHOOL	$267
DEWITT	CUERO	ST MICHAELS CATHOLIC SCHOOL	SCHOOL	$390
DEWITT	NORDHEIM	NORDHEIM SCHOOL	SCHOOL	$914
DEWITT	UNINCORPORATED	MEYERSVILLE VFD	FIRE STATION	N/A
DEWITT	UNINCORPORATED	WESTHOFF VFD	FIRE STATION	N/A
DEWITT	UNINCORPORATED	MEYERSVILLE EL	SCHOOL	$1,297
DEWITT	UNINCORPORATED	WESTHOFF EL	SCHOOL	$445
DEWITT	YOAKUM	YOAKUM HIGH SCHOOL	SCHOOL	$6,452
DEWITT	YOAKUM	YOAKUM INTERMEDIATE	SCHOOL	$3,961
DEWITT	YOAKUM	YOAKUM JUNIOR HIGH	SCHOOL	$3,516
DEWITT	YOAKUM	YOAKUM PRIMARY	SCHOOL	$5,149
DEWITT	YORKTOWN	YORKTOWN CHIEF OF POLICE	POLICE STATION	$1,246
DEWITT	YORKTOWN	YORKTOWN EL	SCHOOL	$3,102
DEWITT	YORKTOWN	YORKTOWN H S	SCHOOL	$2,743
DEWITT	YORKTOWN	YORKTOWN J H	SCHOOL	$1,655
GONZALES	GONZALES	CITY OF GONZALES FIRE DEPARTMENT	FIRE STATION	N/A
GONZALES	GONZALES	MEMORIAL HOSPITAL	HOSPITAL	$6,655
GONZALES	GONZALES	WARM SPRINGS REHAB HOSPITAL	HOSPITAL	$13,310
GONZALES	GONZALES	GONZALES COUNTY SHERIFF'S DEPT	POLICE STATION	$1,246
GONZALES	GONZALES	GONZALES POLICE DEPT	POLICE STATION	$1,246
GONZALES	GONZALES	EMMANUEL CHRISTIAN SCHOOL	SCHOOL	$330
GONZALES	GONZALES	GONZALES ALTER	SCHOOL	$356
GONZALES	GONZALES	GONZALES EAST AVENUE PRIMARY	SCHOOL	$6,289
GONZALES	GONZALES	GONZALES ELEMENTARY	SCHOOL	$7,411
GONZALES	GONZALES	GONZALES H S	SCHOOL	$10,252

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
GONZALES	GONZALES	GONZALES J H	SCHOOL	$3,974
GONZALES	GONZALES	GONZALES NORTH AVENUE INTERMEDIATE	SCHOOL	$3,930
GONZALES	NIXON	NIXON VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
GONZALES	NIXON	FLORESVILLE ALTER ED CTR	SCHOOL	$11
GONZALES	NIXON	FLORESVILLE CHOICES PROG	SCHOOL	$1,550
GONZALES	NIXON	NIXON SMILEY EL	SCHOOL	$5,744
GONZALES	NIXON	NIXON-SMILEY H S	SCHOOL	$3,734
GONZALES	NIXON	WILSON CO J J A E P	SCHOOL	$11
GONZALES	UNINCORPORATED	BELMONT VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
GONZALES	UNINCORPORATED	CITY OF SMILEY VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
GONZALES	UNINCORPORATED	NIXON-SMILEY MIDDLE	SCHOOL	$3,048
GONZALES	WAELDER	WAELDER EL	SCHOOL	$980
GONZALES	WAELDER	WAELDER H S	SCHOOL	$1,397
KENDALL	BOERNE	BOERNE FIRE DEPARTMENT	FIRE STATION	N/A
KENDALL	BOERNE	BOERNE POLICE DEPT	POLICE STATION	$1,246
KENDALL	BOERNE	KENDALL COUNTY LAW ENFORCEMENT	POLICE STATION	$1,246
KENDALL	BOERNE	KENDALL COUNTY LAW ENFORCEMENT	POLICE STATION	$1,246
KENDALL	BOERNE	KENDALL COUNTY SHERIFF'S OFC	POLICE STATION	$1,246
KENDALL	BOERNE	BOERNE ALTER SCH	SCHOOL	$1,550
KENDALL	BOERNE	BOERNE H S	SCHOOL	$26,559
KENDALL	BOERNE	BOERNE MIDDLE SCHOOL NORTH	SCHOOL	$9,564
KENDALL	BOERNE	BOERNE MIDDLE SCHOOL SOUTH	SCHOOL	$13,396
KENDALL	BOERNE	CURINGTON EL	SCHOOL	$12,679
KENDALL	BOERNE	FABRA EL	SCHOOL	$9,013
KENDALL	BOERNE	HILL COUNTRY MONTESSORI SCHOOL	SCHOOL	$263
KENDALL	BOERNE	KENDALL ELEMENTARY SCHOOL	SCHOOL	$10,664

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
KENDALL	BOERNE	MEADOWLANDS	SCHOOL	$1,550
KENDALL	UNINCORPORATED	COMFORT VFD	FIRE STATION	N/A
KENDALL	UNINCORPORATED	HOWE VOLUNTEER FIREFIGHTERS INC.	FIRE STATION	N/A
KENDALL	UNINCORPORATED	KENDALIA VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
KENDALL	UNINCORPORATED	WARING VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
KENDALL	UNINCORPORATED	COMFORT EL	SCHOOL	$7,940
KENDALL	UNINCORPORATED	COMFORT H S	SCHOOL	$4,331
KENDALL	UNINCORPORATED	COMFORT MIDDLE	SCHOOL	$3,320
LAVACA	YOAKUM	FORDTRAN VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
LAVACA	YOAKUM	YOAKUM FIRE/ EMS DEPARTMENT	FIRE STATION	N/A
LAVACA	YOAKUM	YOAKUM COMMUNITY HOSPITAL	HOSPITAL	$5,481
LAVACA	YOAKUM	YOAKUM POLICE DEPT	POLICE STATION	$1,246
LAVACA	YOAKUM	ST JOSEPHS ELEMENTARY SCH	SCHOOL	$1,350
REFUGIO	REFUGIO	REFUGIO VFD	FIRE STATION	N/A
REFUGIO	REFUGIO	REFUGIO COUNTY MEMORIAL HOSPITAL	HOSPITAL	$3,915
REFUGIO	REFUGIO	REFUGIO COUNTY SHERIFF'S	POLICE STATION	$1,246
REFUGIO	REFUGIO	REFUGIO POLICE DEPT	POLICE STATION	$1,246
REFUGIO	REFUGIO	REFUGIO POLICE DEPT	POLICE STATION	$1,246
REFUGIO	REFUGIO	REFUGIO HIGH SCHOOL	SCHOOL	$4,255
REFUGIO	REFUGIO	STRICKLIN ELEMENTARY	SCHOOL	$4,142
REFUGIO	UNINCORPORATED	TIVOLI VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
REFUGIO	UNINCORPORATED	REFUGIO COUNTY SHERIFF	POLICE STATION	$1,246
REFUGIO	UNINCORPORATED	AUSTWELL-TIVOLI EL	SCHOOL	$880
REFUGIO	UNINCORPORATED	AUSTWELL-TIVOLI H S	SCHOOL	$1,054
REFUGIO	WOODSBORO	WOODSBORO FIRE DEPARTMENT	FIRE STATION	N/A
REFUGIO	WOODSBORO	WOODSBORO EL	SCHOOL	$3,019
REFUGIO	WOODSBORO	WOODSBORO H S	SCHOOL	$1,969

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
REFUGIO	WOODSBORO	WOODSBORO J H	SCHOOL	$1,296
VICTORIA	UNINCORPORATED	BLOOMINGTON VOLUNTEER FIRE DEPARTMENT I	FIRE STATION	N/A
VICTORIA	UNINCORPORATED	NURSERY VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
VICTORIA	UNINCORPORATED	PLACEDO VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
VICTORIA	UNINCORPORATED	TELFERNER VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
VICTORIA	UNINCORPORATED	BLOOMINGTON EL	SCHOOL	$4,241
VICTORIA	UNINCORPORATED	BLOOMINGTON H S	SCHOOL	$3,379
VICTORIA	UNINCORPORATED	BLOOMINGTON J H	SCHOOL	$1,568
VICTORIA	UNINCORPORATED	INDUSTRIAL EL WEST	SCHOOL	$1,633
VICTORIA	UNINCORPORATED	NURSERY EL	SCHOOL	$853
VICTORIA	UNINCORPORATED	PLACEDO EL	SCHOOL	$2,264
VICTORIA	VICTORIA	LONE TREE VFD	FIRE STATION	N/A
VICTORIA	VICTORIA	QUAIL CREEK VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
VICTORIA	VICTORIA	RAISIN VOLUNTEER FIRE DEPARTMENT	FIRE STATION	N/A
VICTORIA	VICTORIA	VICTORIA FIRE DEPARTMENT	FIRE STATION	N/A
VICTORIA	VICTORIA	CITIZENS MEDICAL CENTER	HOSPITAL	$49,131
VICTORIA	VICTORIA	DETAR HOSPITAL	HOSPITAL	$72,228
VICTORIA	VICTORIA	DETAR HOSPITAL NORTH	HOSPITAL	$30,535
VICTORIA	VICTORIA	SCCI HOSPITAL OF VICTORIA	HOSPITAL	$4,502
VICTORIA	VICTORIA	VICTORIA WARM SPRINGS HOSPITAL	HOSPITAL	$4,306
VICTORIA	VICTORIA	POLICE TRAINING	POLICE STATION	$1,246
VICTORIA	VICTORIA	SHERIFF INVESTIGATION	POLICE STATION	$1,246
VICTORIA	VICTORIA	VICTORIA CRIME PREVENTION	POLICE STATION	$1,246
VICTORIA	VICTORIA	ALOE EL	SCHOOL	$6,701
VICTORIA	VICTORIA	C O CHANDLER ELEMENTARY	SCHOOL	$8,782
VICTORIA	VICTORIA	COLETO CREEK SCHOOL	SCHOOL	$508

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
VICTORIA	VICTORIA	CRAIN MIDDLE	SCHOOL	$15,172
VICTORIA	VICTORIA	DUDLEY ELEMENTARY MAGNET SCHOOL	SCHOOL	$6,553
VICTORIA	VICTORIA	F W GROSS MONTESSORI MAG	SCHOOL	$5,991
VICTORIA	VICTORIA	FAITH ACADEMY	SCHOOL	$2,858
VICTORIA	VICTORIA	GUADALUPE EL	SCHOOL	$1,043
VICTORIA	VICTORIA	HOMEBOUND	SCHOOL	$1,550
VICTORIA	VICTORIA	HOPKINS MAGNET ACADEMY	SCHOOL	$4,869
VICTORIA	VICTORIA	HOWELL MIDDLE	SCHOOL	$16,589
VICTORIA	VICTORIA	JUAN LINN MATH AND SCIENCE MAGNET	SCHOOL	$5,298
VICTORIA	VICTORIA	JUVENILE DETENT CTR	SCHOOL	$381
VICTORIA	VICTORIA	MARTIN DE LEON EL	SCHOOL	$8,765
VICTORIA	VICTORIA	MEMORIAL HIGH SCHOOL	SCHOOL	$75,572
VICTORIA	VICTORIA	MISSION VALLEY EL	SCHOOL	$1,715
VICTORIA	VICTORIA	MITCHELL GUIDANCE CENTER	SCHOOL	$1,169
VICTORIA	VICTORIA	NAZARETH ACADEMY	SCHOOL	$499
VICTORIA	VICTORIA	NORTHSIDE BAPTIST SCHOOL	SCHOOL	$272
VICTORIA	VICTORIA	O'CONNOR ELEMENTARY MAGNET SCHOOL	SCHOOL	$9,079
VICTORIA	VICTORIA	OUR LADY OF VICTORY SCHOOL	SCHOOL	$3,919
VICTORIA	VICTORIA	OUTREACH WORD ACADEMY	SCHOOL	$998
VICTORIA	VICTORIA	PATTI WELDER MAGNET MIDDLE SCHOOL	SCHOOL	$16,146
VICTORIA	VICTORIA	PRESBYTERIAN DAY SCHOOL	SCHOOL	$45
VICTORIA	VICTORIA	PROFIT ACADEMIC CTR FOR SUCCESS	SCHOOL	$3,506
VICTORIA	VICTORIA	ROWLAND ELEMENTARY MAGNET	SCHOOL	$6,801
VICTORIA	VICTORIA	SHIELDS ELEMENTARY MAGNET SCHOOL	SCHOOL	$9,079
VICTORIA	VICTORIA	SMITH ELEMENTARY MAGNET	SCHOOL	$7,709
VICTORIA	VICTORIA	ST JOSEPH HIGH SCHOOL	SCHOOL	$4,483
VICTORIA	VICTORIA	TRINITY EPISCOPAL SCHOOL	SCHOOL	$1,372

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
VICTORIA	VICTORIA	VICKERS EL	SCHOOL	$7,775
VICTORIA	VICTORIA	VICTORIA CHRISTIAN SCHOOL	SCHOOL	$958
VICTORIA	VICTORIA	WILLIAM WOOD EL	SCHOOL	$771

Source: HAZUS-MH MR3

Additional Critical Facilities – Kendall County (not georeferenced)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
KENDALL	CITY OF BOERNE	KENDALL COUNTY COURT HOUSE	COURTHOUSE	$9,000
KENDALL	CITY OF BOERNE	KENDALL COUNTY EMS (BOERNE)	EMS STATION	$191
KENDALL	CITY OF BOERNE	STREET DEPARTMENT	FACILITY	$750
KENDALL	CITY OF BOERNE	ELECTRIC & GAS DEPARTMENT	FACILITY	$750
KENDALL	CITY OF BOERNE	BOERNE FIRE DEPARTMENT	FIRE STATION	$2,500
KENDALL	CITY OF BOERNE	BOERNE POLICE DEPARTMENT	POLICE STATION	$6,500
KENDALL	CITY OF BOERNE	BOERNE ALTER SCHOOL	SCHOOL	$200
KENDALL	CITY OF BOERNE	BOERNE HIGH SCHOOL	SCHOOL	$47,000
KENDALL	CITY OF BOERNE	BOERNE SAMMEL V CHAMPION HS	SCHOOL	$49,900
KENDALL	CITY OF BOERNE	BOERNE MIDDLE SCHOOL SORTH	SCHOOL	$33,250
KENDALL	CITY OF BOERNE	BOERNE MIDDLE SCHOOL NORTH	SCHOOL	$33,250
KENDALL	CITY OF BOERNE	CURINGTION ELEMENTARY	SCHOOL	$13,367
KENDALL	CITY OF BOERNE	FABRA ELEMENTARY	SCHOOL	$10,807
KENDALL	CITY OF BOERNE	CIBILO ELEMENTARY	SCHOOL	$11,880
KENDALL	CITY OF BOERNE	KENDALL ELEMENTRY	SCHOOL	$13,118
KENDALL	CITY OF BOERNE	MEADOWLANDS	SCHOOL	$1,750
KENDALL	CITY OF BOERNE	KENDALL COUNTY LAW ENFORCEMENT	SHERIFF'S DEPT.	$3,700
KENDALL	UNINCORPORATED	KENDALL COUNTY EMS (COMFORT)	EMS STATION	$217
KENDALL	UNINCORPORATED	ROAD AND BRIDGE DEPARTMENT	FACILITY	$946
KENDALL	UNINCORPORATED	COMMUNICATION FACILITY	FACILITY	$750
KENDALL	UNINCORPORATED	ALAMO SPRINGS FIRE DEPARTMENT	FIRE STATION	$100
KENDALL	UNINCORPORATED	BERGHEIM FIRE DEPARTMENT	FIRE STATION	$892
KENDALL	UNINCORPORATED	COMFORT FIRE DEPARTMENT	FIRE STATION	$292

Appendix D – Critical Facilities (For Official Use Only)

COUNTY	JURISDICTION	NAME	TYPE	COST (IN THOUSANDS)
KENDALL	UNINCORPORATED	KENDALIA FIRE DEPARTMENT	FIRE STATION	$142
KENDALL	UNINCORPORATED	SISTERDALE FIRE DEPARTMENT	FIRE STATION	$180
KENDALL	UNINCORPORATED	WARING FIRE DEPARTMENT	FIRE STATION	$150
KENDALL	UNINCORPORATED	HILL COUNTRY MONTESSORI SCHOOL	SCHOOL	$1,069
KENDALL	UNINCORPORATED	COMFORT HIGH SCHOOL	SCHOOL	$2,100
KENDALL	UNINCORPORATED	COMFORT MIDDLE SCHOOL	SCHOOL	$1,400
KENDALL	UNINCORPORATED	COMFORT ELEMENTARY SCHOOL	SCHOOL	$1,200
KENDALL	UNINCORPORATED	GENEVA SCHOOL OF BOERNE	SCHOOL	$5,700

APPENDIX E

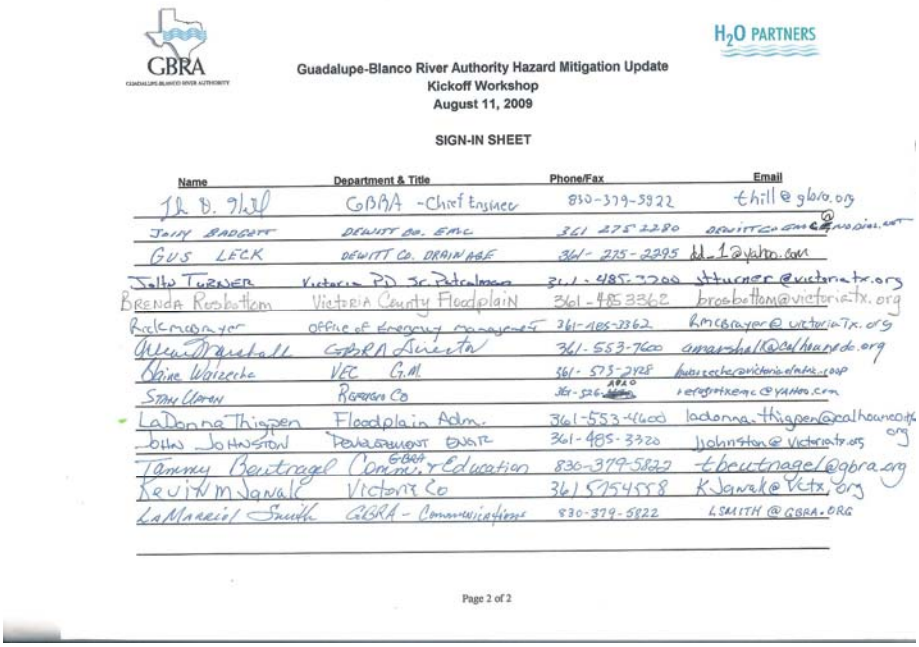
Workshop Documentation 1
Stakeholder and Public Meeting Documentation 7
Notices 9

Workshop Documentation

This Appendix is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

The Guadalupe Blanco River Authority (GBRA) held a Planning Team Member workshop in August 2009, followed by three Kickoff Workshops in August 2009; two Risk Assessment Workshops in April 2010 and two Mitigation Workshops in July 2010. At each of these workshops, stakeholders were informed of steps in the planning process and expressed opinions and volunteered information as necessary. The sign in sheets for each workshop are included below. For more details on the workshops and planning process, see Section 2.

Figure E-1. Kickoff Workshop, Victoria - 8.11.09



GBRA

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Update
Kickoff Workshop
August 11, 2009

SIGN-IN SHEET

Name	Department & Title	Phone/Fax	Email
Th D. Hill	GBRA - Chief Engineer	830-379-5922	thill@gbra.org
John Baggett	DeWitt Co. EMC	361 275 2280	DeWittco EMC@navdial.net
Gus Leck	DeWitt Co. Drainage	361-275-2295	dd-1@yahoo.com
Jolly Turner	Victoria PD Sr. Patrolman	361-485-3200	jtturner@victoriatx.org
Brenda Rosbottom	Victoria County Floodplain	361-485 3362	brosbottom@victoriatx.org
Rick Mayer	Office of Emergency Management	361-485-3362	RMcBrayer@victoriatx.org
Alex Marshall	GBRA Victoria	361-553-7600	amarshall@calhounco.org
Diane Wolzecke	VEC G.M.	361-573-2928	dwolzecke@victoriaedc.com
Stan Urban	Refugio Co	361-526-2820	refugiokeyc@yahoo.com
LaDonna Thigpen	Floodplain Adm.	361-553-4600	ladonna.thigpen@calhounco.org
Otto Johnston	Development Engr	361-485-3320	jjohnston@victoriatx.org
Tammy Beutnagel	GBRA Comm. Education	830-379-5822	tbeutnagel@gbra.org
Kevin Janak	Victoria Co	361 5754558	KJanak@Vctx.org
LaMarcia Smith	GBRA - Communications	830-379-5822	LSMITH@GBRA.ORG

Page 2 of 2

Figure E-2. Kickoff Workshop, Seguin - 8.18.09

GBRA
GUADALUPE-BLANCO RIVER AUTHORITY

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Update
Kickoff Workshop
August 18, 2009

SIGN-IN SHEET

Name	Department & Title	Phone/Fax	Email
James Hooks	City of Schertz Pw. Superintendent	(210) 619-1800	Jhooks@schertz.com
Sam Willoughby	City of Schertz PW Director	210-619-1800	swilloughby@schertz.com
Kenneth M. Russell	Kendall Co. Comm. Pct 4	8309953758	
Gene Mientschin	" " " 2	8302499343	
Mike Schultz	GBRA Kendall Co Director		
Jeff Fincke	Kendall Co. EMC	830 249-3721	Jeff376@aol.com
Richard Tobolka	Kendall Co	830-331-8250	Richard.Tobolka@ Richard.Tobolka@Co.Kendall.Tx.US

Page 1 of 2

GBRA
GUADALUPE-BLANCO RIVER AUTHORITY

H2O PARTNERS

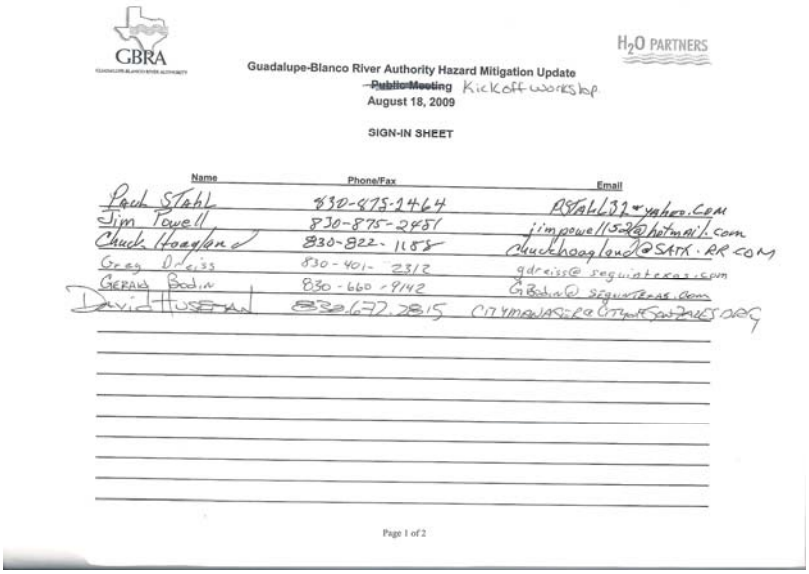
Guadalupe-Blanco River Authority Hazard Mitigation Update
Kickoff Workshop
August 18, 2009

SIGN-IN SHEET

Name	Department & Title	Phone/Fax	Email
Oscar H. Fogle	Director-GBRA	512-376-9950	
Randy M Bunker	Floodplain Admin	512/757-3318	randymbunker@gmail.com
Phil Balcer	City of Yoakum	361-293-5125	[illegible]@cityofyoakum.org
Jack Maloney	City Tech Svcs	361 293 6321	jmaloney@cityofyoakum.org
Stanley A. Dabney II	Environmental Mgr	210-250-4009	stanley.dabney@CEMEX.COM
Chris Iaccio	Production Mgr	830.708.2960	Christopher.Iaccio@cemex.com
Jim Parker	Caldwell Co. EMC	512/398-8122	ccemc@austin.rr.com
Jeff Turner	HCOEM EMC	512-393-7301	jeff.turner@co.hays.tx.us
Dan Kinsey	Guadalupe Co. EMC	830-303-8856	Dkinsey@co.guadalupe.tx.us
Terry Akers	Gonzales County	830-672-7647	jda@gvtc.net
Nathan Ponce	City of New Braunfels - Rive Mgr	830-660-2775	nponce@nbtexas.org
Carl Merkle	City of New Braunfels, Mayor	830-914-3206	merkleg@texas.net
Jon Clack	City of San Marcos	512-393-8003	jclack@sanmarcostx.gov
Roger Baenziger	Guad Co. Commissioner	830 303-4148	Baenziger@co.guadalupe.tx.us
Robert Boyd	Comal County Engineers Office	830/608-2090 / 830/608-2009	Boydr@co.comal.tx.us
John Westbrook	City of Luling	830 875 2481	smc@cityofluling.net

Page 2 of 2

Figure E-3. Kickoff Workshop, Boerne - 8.18.09



GBRA

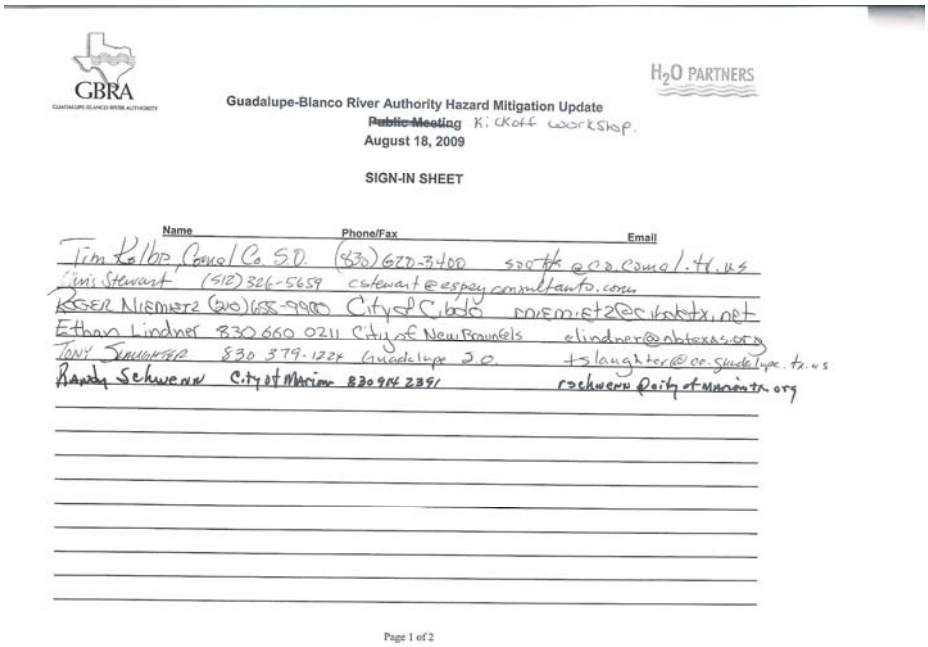
H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Update
~~Public Meeting~~ Kickoff workshop
August 18, 2009

SIGN-IN SHEET

Name	Phone/Fax	Email
Paul Stahl	830-875-2464	PStahl37@yahoo.com
Jim Powell	830-875-2481	jimpowell15-26@hotmail.com
Chuck Hoaglund	830-822-1158	chuckhoaglund@SATX.RR.COM
Greg Dreiss	830-401-2312	gdreiss@seguinatexas.com
GERAD Bodin	830-660-9142	GBodin@seguinTexas.com
David HUSEMAN	830.672.2815	CITYMANAGER@CITYofSANMARCOS.ORG

Page 1 of 2



GBRA

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Update
~~Public Meeting~~ Kickoff workshop
August 18, 2009

SIGN-IN SHEET

Name	Phone/Fax	Email
Tim Kelly, Comal Co. S.O.	(830) 620-3400	sso@co.comal.tx.us
Jim Stewart	(512) 326-5659	cstewart@espeyconsultants.com
ROGER NIEMEYER	(210) 658-9900	City of Cibolo rniemeyer@cibolotx.net
Ethan Lindner	830 660 0211	City of New Braunfels elindner@abtexas.org
TONY SLAUGHTER	830 379-1224	Guadalupe S.O. tslaughter@co.Guadalupe.tx.us
Randy Schwenn	City of Marion 830 914 2351	rschwenn@cityofmarion.org

Page 1 of 2

Figure E-4. Risk Assessment Workshop, Buda – 2.1.10

GBRA
GUADALUPE BLANCO RIVER AUTHORITY

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Plan Update
Risk Assessment Workshop
Buda, TX
February 1, 2010

SIGN-IN SHEET

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
Erin Cappe	H2O Partners	512-769-5483	
Jim Powell	City of Lulling / Code	830-875-2481	codeenforcement2@
Paul Stahl	" " " / EMC	830-875-2412	EMC@cityofluling.net (City of Luling, Tex.)
John Westbrook	City of Luling / Floodplain	830 875 2481	smo@cityofluling.net
Jeff Fenoglio	Kenedy County / EMC	830 249-3721	Jeff276@aol.com
Jerry Doyle	City of Lockhart	512-398-2324	jdoyle@lockhart-tx.org,
Mike Mann	City of Boerne	(830) 249 9511 / 248-3026	mkmann@ci.boerne.tx.us
Anne Williams	H2O	361-815-6041	anne@h2opartners.com
Eric Eskelund	Woodcreek / Mayor	512-847-9390	MAYOR@CITYOFWOODCREEK.COM
Pieter Sybesma	" / City Administrator	"	administrator@cityofwoodcreek.com
Gabe Rojas	Cibolo / Espey Consultants	512-326-5659	grojas@espeyconsultants.com
Stanley Fees	City of Buda / City Engr	512-312-0084	sfees@cityofbuda.tx.us

Page 1 of 3

Figure E-5. Risk Assessment Workshop, Victoria – 2.2.10

GBRA
GUADALUPE BLANCO RIVER AUTHORITY

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Plan Update
Risk Assessment Workshop
Victoria, TX
February 2, 2010

SIGN-IN SHEET

√ marks want ppt. emailed

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
Jack Maloney	(Tech Servs Dir) City of Yoakum	(361) 293-6321	jmaloney@cityofyoakum.org
LeMarriol Smith	GBRA	(830) 379-5822	LSMITH@GBRA.ORG
Tommy Beutnagel	GBRA	(830) 379-5822	tbeutnagel@gbra.org
Tommy Hill	GBRA	(830) 379-5822	thill@gbra.org
Katherine Payne	mgr City of Nordheim	361-938-7345	
[illegible]	Bloomington City	830-359-9082	qeeec@queo.net
Darren Gourley	City of P.L	361-552-3347	dgourley@portlavaca.org
Jerry Bodiford	DeWitt County	361 275 3682	DEWITTCOEMC@[illegible]
LaDonna Thigpen	Calhoun Co	361-553-4455	ladonna.thigpen@calhouncoty.org
Steve Schubert	Woodsboro	361-543-8001	steve_schubert@[illegible]
Steven Self	" ISD	361-543-[illegible]	
Jeb Lacey	Victoria OEM	361 485 3362	jlacey@victoriatx.org

* Please send him a copy of the slideshow, per his request

Page 1 of 3

GBRA
GUADALUPE BLANCO RIVER AUTHORITY

H_2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Plan Update
Risk Assessment Workshop
Victoria, TX
February 2, 2010

SIGN-IN SHEET

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
LaMonsiol Smith	GBRA – Communications,	(830)379-5822	LSMITH@GBRA.ORG
~~Tommy Bertnaget Jr.~~			
Paul D. Campos	City of Yorktown	361-564-2611	Yorktownpd@sbcGlobal.net

Page 2 of 3

Figure E-6. Mitigation Workshop, Buda – 3.23.10

GBRA
GUADALUPE BLANCO RIVER AUTHORITY

H_2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Plan Update
Mitigation Workshop
Buda, TX
March 23, 2010

SIGN-IN SHEET

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
Elmer DoForest	Mayor, Seadrift	3617852251 Fax 2208	seadrift@tisd.net
Jim Powell	Lulling/Code Enf. Fire	830-875-2481	~~jimpow~~ codeenforcement2@ ~~city of~~ lulling.net
Jenny Doyle	City of Luckhart	512-398-2321	jdoyle@luckhart-tx.org
Tim Crow	City of Gonzales	830 672 8686	tcrow@cityofgonzales.org
Gabe Rojas	Cibolo	512 376-5654	grojas@cityofcibolo.com
Jim Parker	Caldwell County EMC	512 738-6145	ccemc@austin.rr.com

Page 2 of 3

Figure E-7. Mitigation Workshop, Victoria – 3.25.10

GBRA
GUADALUPE BLANCO RIVER AUTHORITY

H_2O PARTNERS

Guadalupe Blanco River Authority Hazard Mitigation Plan Update
Hazard Mitigation Workshop, Victoria, TX
March 25, 2010

SIGN-IN SHEET

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
STAN UPTON	REFUGIO CO EMC	361-526-2820/526-2690	refugiotxemc@yahoo.com
Elmer DeForest	Mayor City of Seadrift	361-785-2251 / Fax 2208	seadrift@tisd.net
Charlotte Felkins	City of Point Comfort	361-987-2606	pcomfort@tisd.net
Jerry BADGETT	DEWITT COUNTY	361 275-3242 / 275-2250	pdewittcoemc@yahoo.net
Donald Reese	City of Victoria	(361) 485-3414	dreese@victoriatx.org
Steve Schubert	Goodsbeard	361-543-8001	
Lynn Short	City of Victoria	361-485-3381	lshort@victoriatx.org
Brenda Rosbottom	Victoria County Floodplain	361 485 3362	brosbottom@victoriatx.org
Perry Morris	City of Cuero	361-275-3476	PMORRIS@cuero.com
Darren Gourley	City of Port Lavaca	361-552-3347	dgourley@portlavaca.org
PHIL BAUGER	City of Yoakum	361 293-5125	firechief@cityofyoakum.org

Page 1 of 3

GBRA
GUADALUPE BLANCO RIVER AUTHORITY

H_2O PARTNERS

Guadalupe Blanco River Authority Hazard Mitigation Plan Update
Hazard Mitigation Workshop, Victoria, TX
March 25, 2010

SIGN-IN SHEET

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
Katherine Pappas	Nordheim – Mayor	361-938-7345	
Rick McBrayer	OEM Victoria Regional EMC	361-485-3362	rmcbrayer@victoriatx.org
Adam Findeisen	Yoakum Code Enforcement	361-293-6321	afindeisen@cityofyoakum.org
Derrick Smith	Yoakum Director of Community Services	361-293-6321	dsmith@cityofyoakum.org

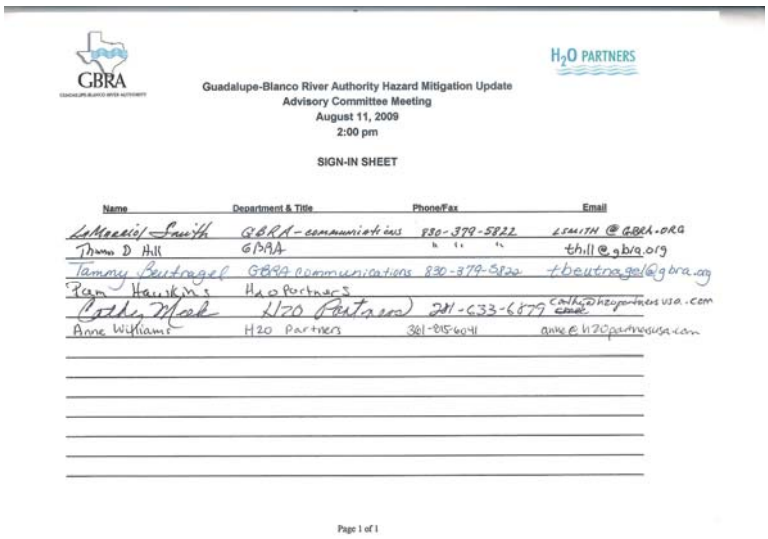
Page 2 of 3

APPENDIX E – MEETING DOCUMENTATION (FOR OFFICIAL USE ONLY)

Planning Team and Public Meeting Documentation

As discussed in Section 2, a series of public meetings were held in addition to a Planning Team meeting on August 11, 2009, at the beginning of the planning process. Documentation in the form of sign in sheets for each of the meetings follows.

Figure E-8. Planning Team Meeting, Victoria – 8.11.09



GBRA

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Update
Advisory Committee Meeting
August 11, 2009
2:00 pm

SIGN-IN SHEET

Name	Department & Title	Phone/Fax	Email
LeMoniel Smith	GBRA-communications	830-379-5822	LSMITH@GBRA.ORG
Thomas D Hill	GBRA	" " "	thill@gbra.org
Tammy Beutnagel	GBRA Communications	830-379-5822	tbeutnagel@gbra.org
Pam Hawkins	H2O Partners		
Cathy Mock	H2O Partners	281-633-6879	cathy@h2opartnersusa.com
Anne Williams	H2O Partners	361-815-6041	anne@h2opartnersusa.com

Page 1 of 1

Figure E-9. Public Meeting 1, Seguin – 8.11.09

No one from the public attended this meeting and sign-in sheet unavailable

Figure E-10. Public Meeting 1, Buda – 2.1.10

GBRA
GUADALUPE-BLANCO RIVER AUTHORITY

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Plan Update
Risk Assessment Workshop
Buda, TX
February 1, 2010 6:00 p.m.
PUBLIC MEETING
SIGN-IN SHEET

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
Lawrence Smith	GBRA	(830) 379-5822	LSMITH@GBRA.ORG
Cody Meek	H2O Partners	(888) 328-4187	cmeek@h2opartners.com
Tommy Hill	GBRA	(830) 379-5822	thill@gbra.org

Page 2 of 3

Figure E-11. Public Meeting 2, Buda – 3.22.10

Public Meeting

GBRA
GUADALUPE-BLANCO RIVER AUTHORITY

H2O PARTNERS

Guadalupe-Blanco River Authority Hazard Mitigation Plan Update
Mitigation Workshop
Buda, TX
March 23, 2010

SIGN-IN SHEET

Name	Jurisdiction/Organization & Title	Phone/Fax	Email
Cody Meek	H2O Partners	888-328-4187	cmeek1808@yahoo.com
Lawrence Smith	GBRA	830-379-5822	LSMITH@GBRA.ORG

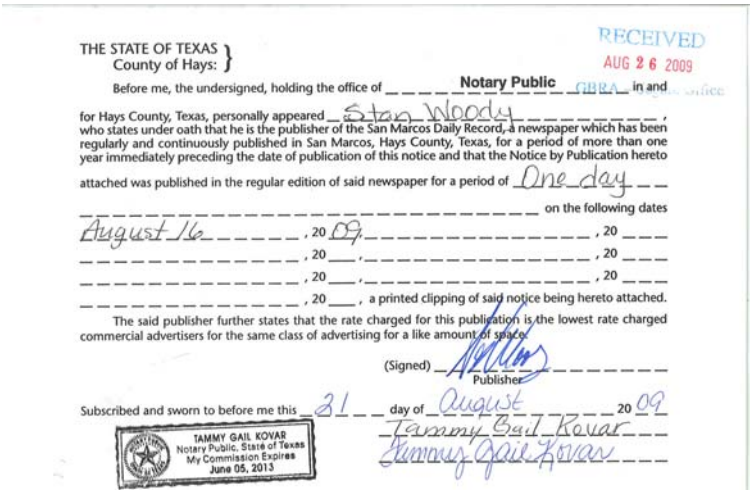
Page 3 of 3

APPENDIX E – MEETING DOCUMENTATION (FOR OFFICIAL USE ONLY)

Notices

A public notice to announce GBRA's participation in the Hazard Mitigation Plan Update was posted in the notice section of the San Marcos Daily Record on August 16, 2009. website and on websites of planning partners such as neighborhood groups. A press conference was also held before the second series of public meetings in April as discussed in Section 2 of this Plan Update.

Figure E-12. Public Notice, San Marcos Daily Record



RECEIVED
AUG 26 2009
GBRA

THE STATE OF TEXAS
County of Hays:

Before me, the undersigned, holding the office of Notary Public in and for Hays County, Texas, personally appeared Stan Woody, who states under oath that he is the publisher of the San Marcos Daily Record, a newspaper which has been regularly and continuously published in San Marcos, Hays County, Texas, for a period of more than one year immediately preceding the date of publication of this notice and that the Notice by Publication hereto attached was published in the regular edition of said newspaper for a period of One day on the following dates

August 16, 2009

, a printed clipping of said notice being hereto attached.

The said publisher further states that the rate charged for this publication is the lowest rate charged commercial advertisers for the same class of advertising for a like amount of space.

(Signed) Publisher

Subscribed and sworn to before me this 31 day of August 2009

Tammy Gail Kovar

TAMMY GAIL KOVAR
Notary Public, State of Texas
My Commission Expires
June 05, 2013

Figure E-13. GBRA Website, Hazard Mitigation Plan Update Notice and Request to Complete Public Survey Online

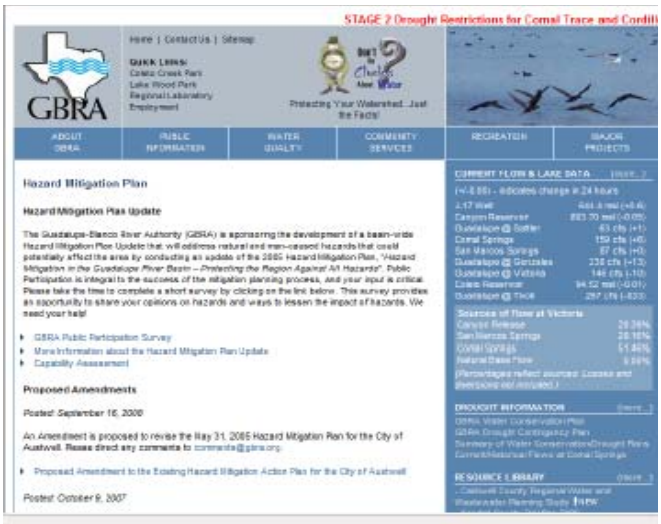


Figure E-14. Public Meeting Notice, Office of the Secretary of State - 8.18.09

Cricket Dietert

From: liaison@sos.state.tx.us
Sent: Friday, August 14, 2009 10:38 AM
To: Cricket Dietert
Subject: S.O.S. Acknowledgment of Receipt

Agency: Guadalupe-Blanco River Authority
Liaison: W.E. West Jr.

Acknowledgment of Receipt

The Office of the Secretary of State has posted notice of the following meeting:

Meeting Information:
Guadalupe-Blanco River Authority
08/18/2009 05:30 PM "TRD# 2009006169"
Notice posted: 08/14/09 10:38 AM
Proofread your current open meeting notice at:

http://info.sos.state.tx.us/pls/pub/pubomquery$omquery.queryTRD?p_trd=2009006169

Figure E-15. GBRA Public Meeting Notice – 8.18.09

NOTICE OF PUBLIC MEETING
GUADALUPE-BLANCO RIVER AUTHORITY

In accordance with the provisions of the Texas Open Meetings Act, Chapter 551, Texas Government Code, the Guadalupe-Blanco River Authority (GBRA), whose principal office is in the City of Seguin, Guadalupe County, Texas, hereby gives to notice of a public meeting to be held at the **GBRA River Annex, 905 Nolan, Seguin, Guadalupe County, Texas, at 5:30 p.m., on Tuesday, August 18, 2009.**

The Guadalupe-Blanco River Authority is hosting a public meeting at 5:30 p.m. Tuesday, Aug. 18, 2009, at GBRA River Annex located at 905 Nolan Street in Seguin. The purpose of the meeting is to have citizens aid in the update of a five-year, multi-jurisdictional Hazard Mitigation Plan and to provide the community with information about making the region more hazard resistant.

The public is invited and encouraged to attend the meeting to assist in identifying and analyzing hazards affecting the 10-county GBRA basin, which includes Kendall, Comal, Hays, Caldwell, Gonzales, DeWitt, Victoria, Calhoun and Refugio counties.

This plan, developed in conjunction with H2O Partners, will help communities meet Federal Emergency Management Administration (FEMA) requirements and increase eligibility for federal funding on local projects.

For more information, please contact Cathy Meek or Erin Capps toll free at 888-328-4151 or go to WWW.GBRA.ORG.; or contact LaMarriol Smith at the GBRA office at 830-379-5822.

W. E. West, Jr., General Manager
GBRA, 933 East Court, Seguin, Texas 78155
August 14, 2009

FILED FOR RECORD
2009 AUG 14 AM 11:39
TERESA KIEL
COUNTY CLERK GUADALUPE COUNTY
BY

Figure E-16. Public Meeting Notice, Buda – 2.1.10

GBRA
GUADALUPE-BLANCO RIVER AUTHORITY

H2O PARTNERS

Public Notice

The Guadalupe-Blanco River Authority (GBRA) is sponsoring the development of a multi-jurisdictional **Hazard Mitigation Plan Update.** GBRA is encouraging the public to attend a meeting to discuss ways to make the region more hazard resistant. The meeting will be held on **Monday, February 1st** at **6:00 pm at Cabela's Sporting Goods Meeting Room, 15570 IH 35, Buda, TX 78610.**

For questions please contact Cathy Meek or Anne Williams toll free at 888-328-4151.

Figure E-17. Public Meeting Notice, Buda – 3.23.09

The Public is Invited to Participate in Hazard Mitigation Planning for the Guadalupe Blanco River Authority and Participating Jurisdictions

The GBRA and participating jurisdictions will hold a public meeting as part of a collaborative effort to create a Hazard Mitigation Plan Update. The public meeting information is as follows:

Tuesday, March 23, 2010 6:00 pm

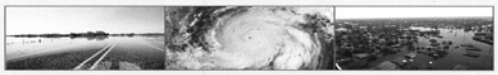
Cabela's Sporting Goods
Meeting Room
15570 IH 35
Buda, TX 78610

The purpose of the open meeting is to inform the community on the development of the plan and to solicit information that can help the project team in identifying and analyzing hazards affecting residents, as well as recommending possible actions that can be taken to reduce the impact of those hazards. **The public is invited and encouraged to attend the meeting.**

Communities along the GBRA Basin have experienced the disastrous effects of natural and manmade hazard events. They are undertaking the development of a comprehensive hazard mitigation plan update which will result in a FEMA approved Plan that will comply with the hazard mitigation planning standards and criteria of the State of Texas and the Federal Emergency Management Agency (FEMA).

The goal of this Hazard Mitigation Plan is to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. *Mitigation* is defined by FEMA as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects*.

The purpose of the Plan is to minimize disruption to residents following a disaster; streamline disaster recovery by defining actions to be taken before a disaster strikes to reduce or eliminate future damage; to serve as a basis for future funding that may become available through grant and technical assistance programs offered by state or Federal agencies; and to ensure that GBRA communities maintain eligibility for the full range of future Federal disaster relief. Certain forms of Federal hazard mitigation assistance for projects are made available only to local governments that have a FEMA-approved Hazard Mitigation Plan in place.

At the public meeting a briefing will be provided on the planning process. An opportunity will be provided for the public to offer thoughts on their hazards of concern and recommended ways to reduce future risk.

Questions about the Hazard Mitigation Plan should be addressed to H_2O Partners, planning consultants for GBRA. You may reach Cathy Meek at (281) 633-6879 or by email at cathy@h2opartnersusa.com or Anne Williams at (361) 815-6041 or anne@h2opartnersusa.com.